OPERATING INSTRUCTIONS

OLM100

Linear measurement sensor

SICK
Sensor Intelligence.

Described product

OLM100

OLM100 Hi

Manufacturer

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

These operating instructions do not provide information on the handling and safe operation of the machine or system in which the device is integrated. Information on this can be found in the operating instructions for the machine or system.

1.2 Explanation of symbols

Warnings and important information in this document are labeled with symbols. Signal words introduce the instructions and indicate the extent of the hazard. To avoid accidents, damage, and personal injury, always comply with the instructions and act carefully.

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

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

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

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

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

1.3 Further information

More information can be found on the product page.

The page can be accessed via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

The following information is available depending on the product:

- Data sheets
- This document in all available language versions
- CAD files and dimensional drawings
- Certificates (e.g., declaration of conformity)
- Other publications
- Software
- Accessories

2 Safety information

2.1 Correct use

The linear measurement sensor is an opto-electronic sensor and is used for positioning of a displacement unit by means of a barcode tape.

Areas of application:

- Automated high-bay warehouses
- Positioning of overhead conveyors, curve-going stackers, turning rings/tables, shuttles
- Applications in which movable devices need to be positioned in relation to a reference

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

2.2 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:

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

2.3 Cybersecurity

Overview

To protect against cybersecurity threats, it is necessary to continuously monitor and maintain a comprehensive cybersecurity concept. A suitable concept consists of organizational, technical, procedural, electronic, and physical levels of defense and considers suitable measures for different types of risks. The measures implemented in this product can only support protection against cybersecurity threats if the product is used as part of such a concept.

You will find further information at www.sick.com/psirt, e.g.:

- General information on cybersecurity
- Contact option for reporting vulnerabilities
- Information on known vulnerabilities (security advisories)

2.4 Limitation of liability

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

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

2.5 Modifications and conversions

NOTICE

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

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

2.6 Requirements for skilled persons and operating personnel

WARNING

Risk of injury due to insufficient training.

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

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

The following qualifications are required for various activities:

Table 1: Activities and technical requirements

Activities	Qualification
Mounting, maintenance	▪ Basic practical technical training ▪ Knowledge of the current safety regulations in the workplace
Electrical installation, device replacement	▪ Practical electrical training ▪ Knowledge of current electrical safety regulations ▪ Knowledge of the operation and control of the devices in their particular application
Commissioning, configuration	▪ Basic knowledge of the computer operating system used ▪ Basic knowledge of the design and setup of the described connections and interfaces ▪ Basic knowledge of data transmission
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 specific hazards

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

Danger due to visible radiation is product-specific. See the technical data for more information.

The product is fitted with LEDs in risk group 0. The accessible radiation from these LEDs does not pose a danger to the eyes or skin.

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.

2.8 Hazard warnings and operational safety

CAUTION
Risk of injury from LED radiation.

Looking directly into the LED illumination may result in eye injury.

- Do not look directly into the LED illumination.
- Comply with the latest version of the applicable protection provisions.

2.9 UL conformity

NFPA79 applications only. Adapters including field wiring cables are available.

More information can be found on the product page:

The page can be accessed via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

3 Function and use

3.1 Scope of delivery

The scope of delivery includes the following:

- Device in the version ordered
- Printed Safety Notes, multilingual (brief information and general safety notes)

NOTE

All the available documentation can be found on the online product page.

The page can be accessed via the **SICK Product ID**: **pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

There, you can also find:

- Available control marks, configuration marks, and position marks for download as a PDF file
- SOPAS Engineering Tool for configuration
- example applications

3.2 Function

The linear measurement sensor is a device that can measure product travel paths up to 10 km without moving parts. The device with its visible, red LED light beam orientates itself by means of a barcode tape attached along the product travel path. By reading the barcode, the device determines the absolute position and delivers this via an interface.

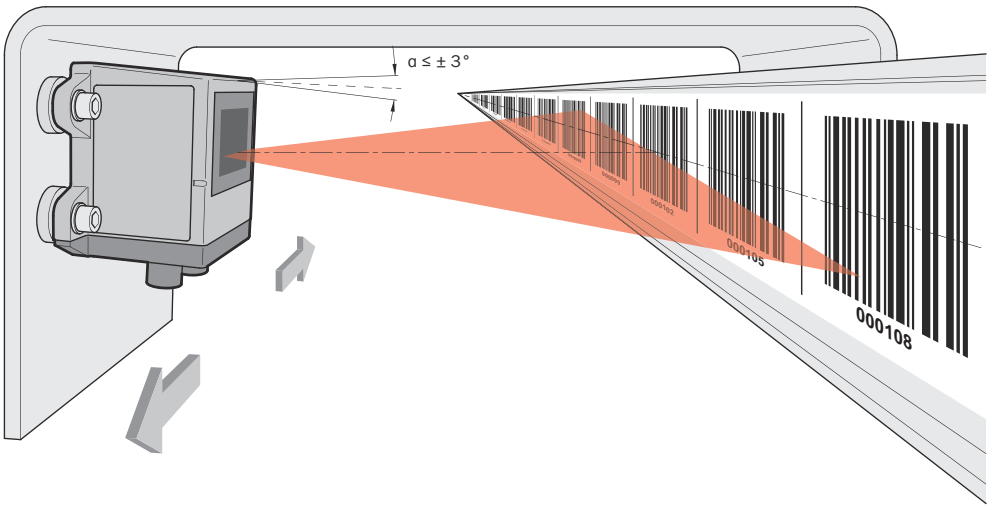


Figure 1: Functionality schematic diagram

Determining bar code tape alignment

On startup, the device initially detects the alignment in relation to the barcode tape (0° or 180°). The device automatically adapts itself to the alignment that is detected, and starts outputting position values.

If there are no barcodes in the field of view when the device is started up, the device selects the orientation which it detected before being deactivated. The device starts position value output as soon as barcodes with the expected orientation are located in the field of view.

Error F4 and the measured value "0" are output if an unexpected alignment is detected, and this also applies if the alignment is changed during the product travel path. In such a case, position values are not output until after the supply voltage has been interrupted and the new alignment has been detected successfully (if the "Detect tape position during operation" function has not been activated via SOPAS ET).

NOTE

In the delivery condition, the tape position is assumed to be 0°, i.e. the alignment of the device and the barcode tape to each other is such that the lower edge of the device (black part of the housing) and the lower edge of the barcode tape are directly opposite each other.

During running operation, the alignment of the bar code tape can also be altered using SOPAS ET see "Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)", page 28 or by configuration marks see "Configuration marks", page 14.

NOTE

If the barcode tape is mounted in the entire system with an alignment of 180° in relation to the device, then it is necessary to make sure that the barcode tape is located in the field of view when the device is started for the first time.

Error condition

If the device detects an error condition during the traversing (e.g. no barcode tape, or barcode tape defective), this is immediately suppressed and extrapolated measured values are output. The extrapolation time depends on the measured value history and in the delivery condition is max. 160 ms.

The measured value "0" is output if the error status is present for longer or exists from the moment of switching on. Individual faulty bar codes do not have any effect on the measured value.

Error statuses can be interrogated via the data interface. Alternatively, the SOPAS ET software is also available for this in conjunction with the Ethernet configuration interface.

3.3 Type label

There is a type label on the device that provides all relevant information.

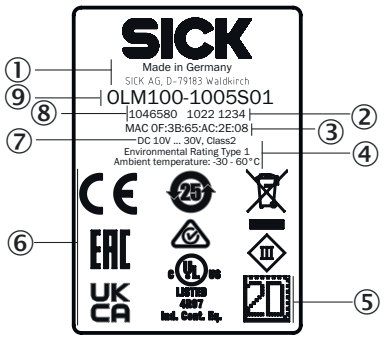


Figure 2: OLM type label (example)

① Manufacturer, place of production
② Serial number
③ MAC address
④ Environmental compatibility and ambient temperature
⑤ 2D code with part number and type description
⑥ Conformity mark/certification mark, WEEE mark

⑦ Supply voltage and protection class
⑧ Part number
⑨ Type designation

3.4 Bar code tape

For the OLM-xx0x variants, suitable barcode tapes with a barcode width of 30 mm and a tape height of 25 mm, 30 mm, 40 mm, 60 mm and 100 mm are available as accessories see "Bar code tape", page 50.

3.5 Control marks and configuration marks

NOTE
The marks are available for download and subsequent printing on the online product page.

The page can be accessed via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

The print resolution must be at least 1200 dpi (pixels per inch). Page or size adjustment must be deactivated.

3.5.1 Control marks

NOTE
For devices with an SSI interface, no control marks can be used due to the interface.

The purpose of control marks is to trigger a certain action in the device:

- Output of the control mark value at the data interface

Control marks can be stuck onto the barcode tape at selected points (e.g. switches). When doing this, make sure that the cut markings of the fiducial are congruent with the cut markings of the position mark that has been stuck over.

NOTE
In order to obtain a continuous distance value, it is necessary to ensure that there is a position mark directly before and after a control mark. A maximum of one control mark is permitted in the field of view of the device. Therefore, at least two position marks must lie between two control marks.

Output of the value via the data interface

The information on a control mark consists of a letter (A, B, C, D or Z) followed by two digits (0 - 9). All other control codes are output via the data interface as ASCII hex values. The control code must be interpreted byte-by-byte as ASCII characters. In this case, the most recently read control code is always output every cycle.

3.5.2 Configuration marks

Configuration marks are special barcodes with which parameters in the device can be adjusted. After reading the configuration marks, the change is stored permanently in the device.

To change a parameter, the appropriate configuration mark is placed in the field of view of the device. The device confirms reading a configuration mark with both LEDs on the upper part of the side of the housing (**Power** and **Status**). The responses have the following meanings:

Signal	Meaning
Both LEDs flash green	Parameter has been changed.
Both LEDs flash orange	Parameter was already set and remains unchanged.
Both LEDs flash red	Parameter is not supported.

The following settings can be changed using configuration marks:

- Action in case of read error
- SmartPOS operating mode,
- Activation of SmartPOS warning F2
- Multiple reading
- Bus address (only variants OLM100-1005,)
- Resolution
- Resetting all settings to the factory setting

NOTE

Parameterization marks can be generated using the configuration mark generator. You can find it on the following product page under **Downloads**.

The page can be accessed via the **SICK Product ID**: **pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

The printout must have a resolution of at least 1,200 dpi (dots per inch). Page or size adjustment must be deactivated.

4 Transport and storage

4.1 Transport

NOTICE
Damage due to improper transport!

- The product must be packaged with protection against shock and damp.
- Recommendation: Use the original packaging.
- 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

- Do not store outdoors.
- Store in a place protected from moisture and dust.
- Recommendation: Use the original packaging.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: see "Technical data", page 46.
- Relative humidity: see "Technical data", page 46.
- For storage periods of longer than 3 months, check the general condition of all components and packaging on a regular basis.

5 Mounting

5.1 Mounting procedure

1. Applying barcode tape see "Attaching the barcode tape", page 17.
2. Mounting the device see "Mounting the device", page 22.
3. Establishing electrical connection, see "Electrical installation", page 25.

5.2 General data on the bar code tape

The barcode tapes have a nominal length of 20 m; they are supplied rolled up with the smallest number on the outside. The particular measuring ranges are selected so that successive barcode tapes can be placed against one another without gaps. The sequential roll number is located on the barcode tapes to make it easier to maintain the correct sequence.

Irrespective of the starting code required, bar code tapes with a customer specific measuring range always begin with the sequential roll number "1".

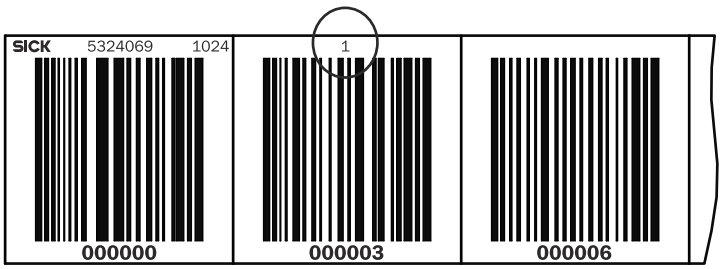


Figure 3: Example for roll 1, measuring range 0 to 20 m

Measuring range [m]		Sequential roll number	Code	
from	to		Start	End
0	20	1	000000	002001
20	40	2	002004	004002
40	60	3	004005	006000
60	80	4	006003	008001
80	100	5	008004	010002
100	120	6	010005	012000

5.3 Attaching the barcode tape

The orientation of the barcode tape in relation to the device must remain the same throughout the entire product travel path (alignment always 0° or always 180° in relation to the device).

For the best adhesion, the temperature of the surface and the barcode tape must be between 15 and 25 °C at the time of application.

Align the barcode tape with a reference edge (e.g. rail) of the product travel path and stick this onto the smooth, dry surface that is free from grease and dust, without any tension, folds or creases. The surface must be free of grease, dust and other soiling.

Small expansion joints and minor points of unevenness can be stuck over. At disruptive points which would cause the barcode tape to be significantly distorted were it to be stuck over, it is possible to cut out an individual barcode at the corresponding cut marks.

To ensure optimum linearity, the distance between the two cut marks at the resulting gap must be 30 mm. At least two contiguous barcodes must follow after a gap. Continuous output of position values by the device is ensured if the width of the gap is not more than 30 mm and the barcodes were separated cleanly at the cut mark.

It is recommended that the self-adhesive, cut-to-length blank labels should be stuck over the gap in order to allow it to be traversed without problems see "Blank labels for repair codes or control marks", page 53.

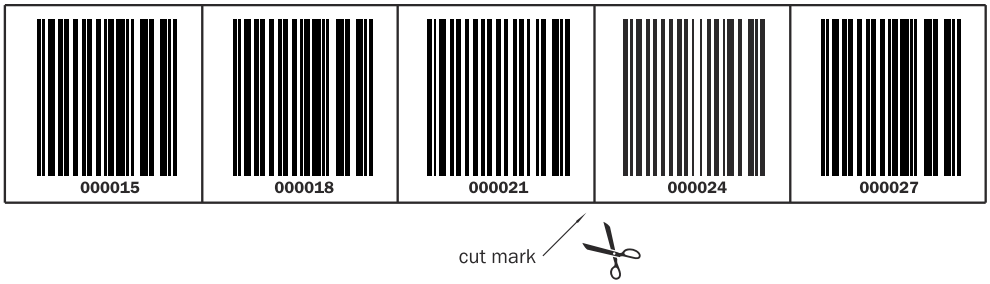


Figure 4: Barcode tape cut marks

① Cut mark

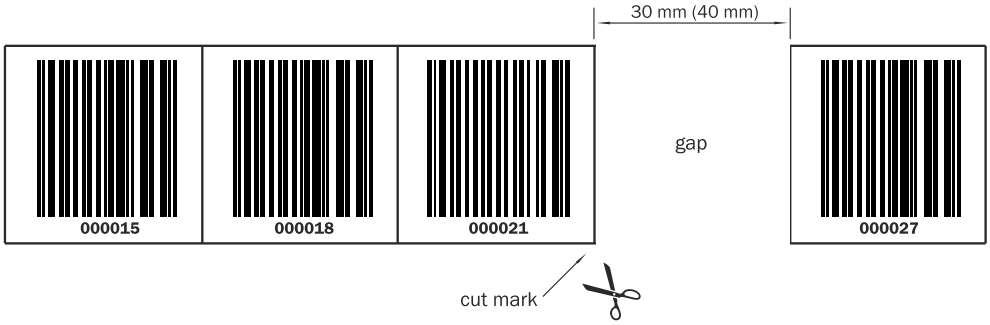


Figure 5: Gap in the separated barcode tape, unit: mm (inch), decimal separator: point

① Cut mark

② Gap

A sequence of barcode tapes with discontinuous measuring ranges is not allowed, otherwise a continuous position cannot be indicated. Where there is non-continuity (e.g. at diverters), the device outputs a corresponding jump in the position value as soon as at least two sequential barcodes of the new measuring range have been identified.

The device cannot output negative position values. Therefore, in applications in which it is necessary to go below the 0 cm position (e.g. turntables, diverters), it is recommended to dispense with the measuring range 0 ... 20 m, or else to remove the first two position codes 0 cm and 3 cm.

NOTE

Affix the barcode tape as near as possible to the vertical in order to avoid dust build-ups.

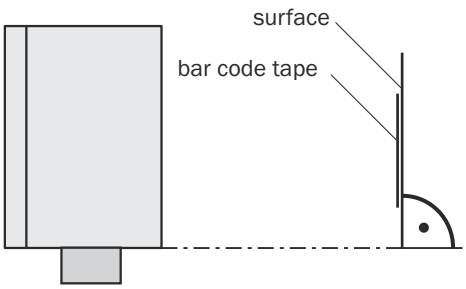


Figure 6: Vertical mounting of the barcode tape

① Tape carrier
② Barcode tape

NOTE
Avoid strong ambient light reflections on the barcode tape.

NOTE
Illustrations and dimension values apply to the 30 mm barcode width.

5.3.1 Applying barcode tape in horizontal curves

A minimum radius must be complied with for horizontal curves. This depends on the mounting position of the device. As a rule, the device should be mounted on the axis of rotation if possible. Tangential differences, referred to below as L, leading to the device swiveling in or out during the course of a curve mean that larger curve radii are required. This requirement applies both to outer and inner radii.

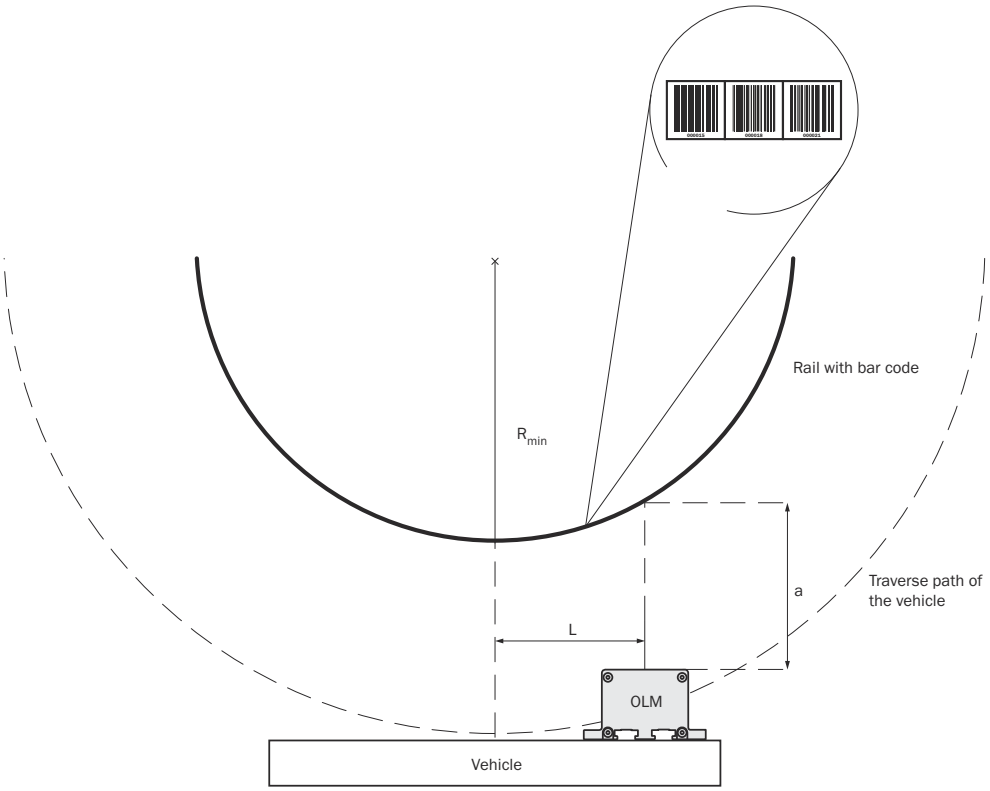


Figure 7: Tangential distance L during cornering

① Vehicle
② Travel path of the vehicle

③ Rail with barcode

④ R_{min}: Minimum radius

⑤ L: Tangential distance during cornering

⑥ a: Reading distance

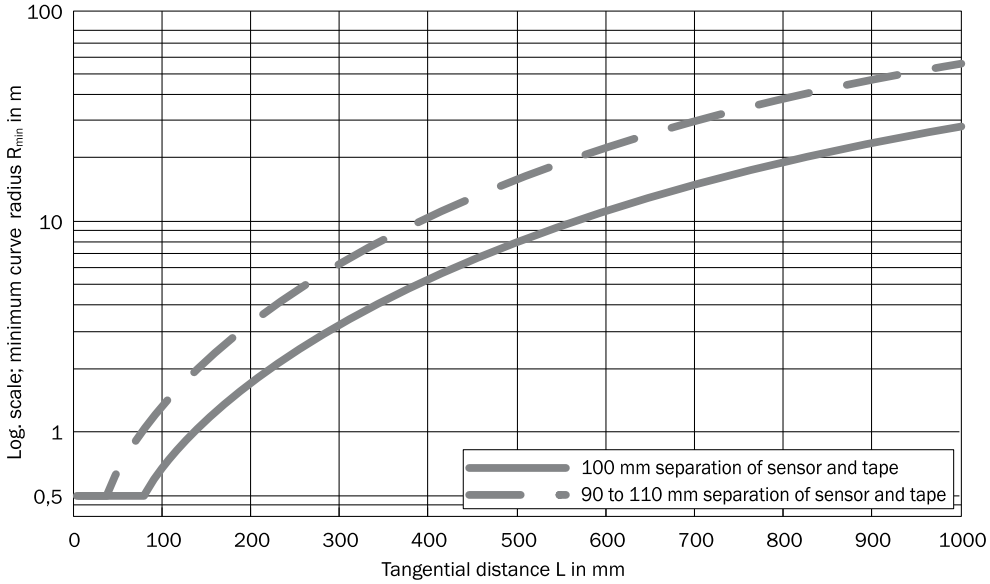


Figure 8: Minimum curve radius R_{min} dependent upon the tangential distance L

① log. scale: minimum curve radius R_{min} in mm

② Tangential distance L in m

③ Reading distance a 90 and 110 mm

④ Reading distance a 100 mm

5.3.2 Applying barcode tape in vertical curves

To apply barcode tape along a vertical curve, cut the barcode tape at the cut marks and fan it out. The maximum angle must not exceed 3°. This corresponds to a gap d of 1.5 mm. This produces a smallest case minimum radius of 500 mm. The voids created by fanning open should not have a shiny surface, in order to ensure an optimum function reserve.

Cover the open positions indicated by arrows with blank labels see "Blank labels for repair codes or control marks", page 53.

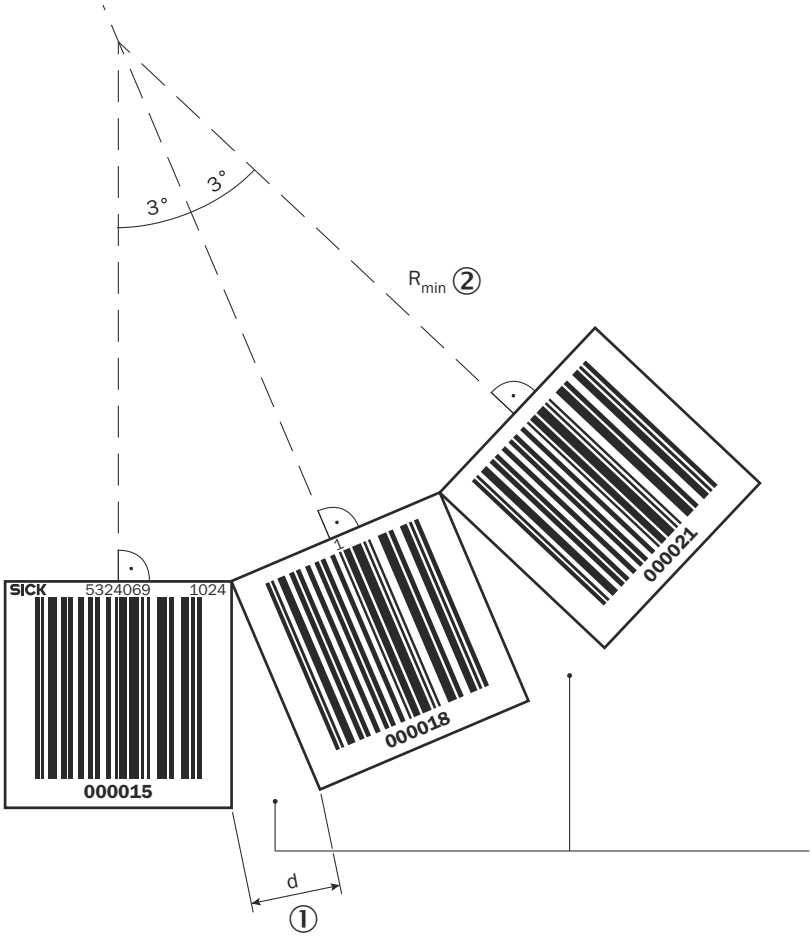


Figure 9: Vertical curves

① d: Gap

② R_{min}: Minimum radius

NOTE

For vertical curve paths, ensure that the barcode tape is always in the field of view of the device. The mounting location of the device should therefore be selected so that its product travel path runs parallel to the longitudinal axis of the barcode tape. If this is not done and the device is mounted with a tangential distance from the axis of rotation, this will result in swiveling of the device and the barcode tape will move out of the field of view.

NOTE

With a vertical curve path, only restricted accuracy and repeatability are possible.

5.4 Mounting instructions

- Observe the technical data.
- To prevent condensation, avoid exposing the device to rapid changes in temperature.
- The mounting site has to be designed for the weight of the device.
- Follow the mounting instructions for the bar code tape.

5.5 Mounting the device

The device can be mounted either using the four housing through-holes or the T-slots on the back using sliding nuts see "Sliding nuts", page 53. To ensure optimum reading results and the greatest possible functional reserve, mount the device at a distance of 100 mm from the barcode tape. Align perpendicular to the barcode tape. The depth of field of the device is ± 20 mm.

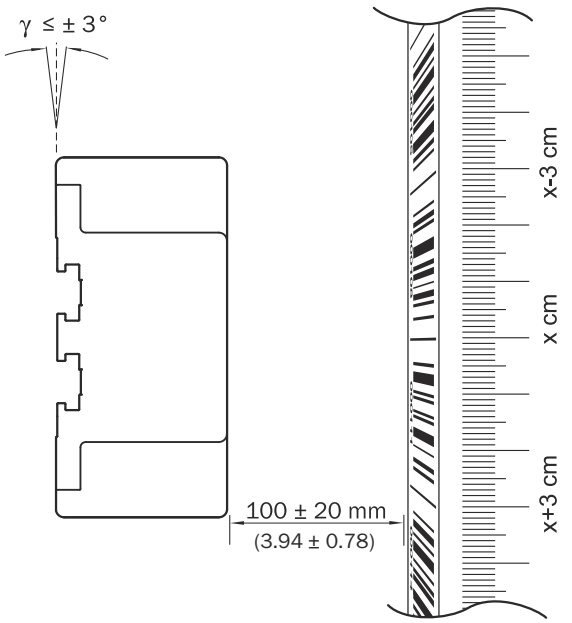


Figure 10: Mounting distances for OLM100-xx0x, unit: mm (inch), decimal separator: point

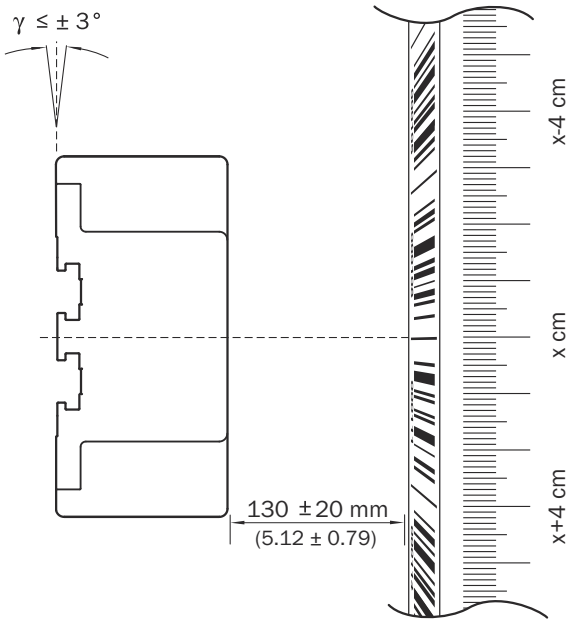


Figure 11: Mounting distances for OLM100-xx5x, unit: mm (inch), decimal separator: point

A vertical distance that depends on the barcode tape used is to be maintained between the lower edge of the housing and the lower edge of the barcode tape see "table 2: Vertical distance dependent upon the barcode tape", page 23.

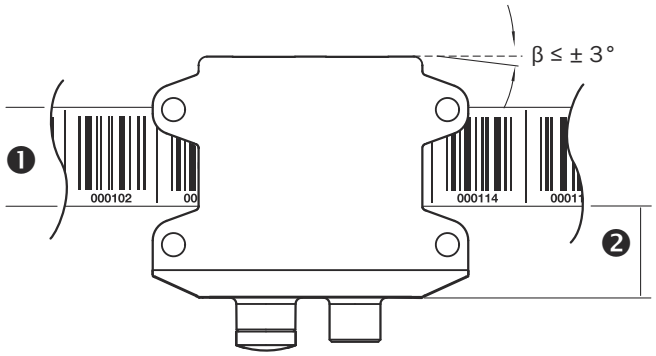


Table 2: Vertical distance dependent upon the barcode tape

Barcode tape height ❶	Distance ❷	Tolerance
25 mm	13 mm	± 3.5 mm
30 mm	9 mm	± 3.5 mm
40 mm	4 mm	± 8.5 mm
60 mm	-6 mm	± 18.5 mm
100 mm	-26 mm	± 38.5 mm

NOTE
In particular during cornering, ensure a distance of 100 mm ± 20 mm from the barcode tape is maintained.

A reading distance > 85 mm must be maintained in order to ensure an optimum functional reserve in applications in which individual barcodes are not always fully readable.

If optimally aligned, the two alignment marks on the front of the device are located in the vertical center of the barcode tape so that the red light strip running from the top left to the bottom right is vertically centered on the barcode bar see figure 12.

This vertical alignment of the device to the barcode tape must lie within a tolerance throughout the product travel path see "table 2: Vertical distance dependent upon the barcode tape", page 23.

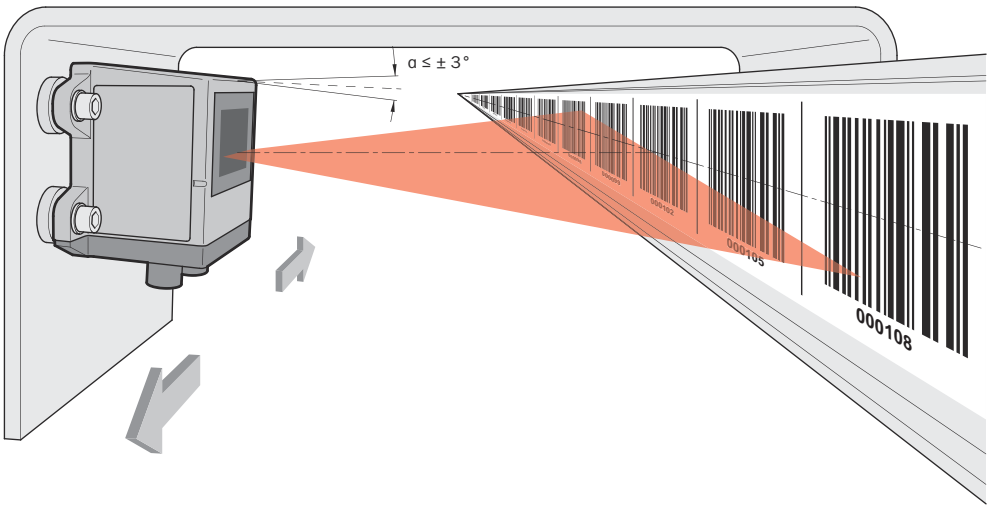


Figure 12: Vertical alignment

When two devices are operated next to one another, it is necessary to maintain a minimum gap between the two devices of 120 mm. If the travel path includes cornering, make sure that the device is mounted as close as possible to the axis of rotation. Information on recommended minimum radii when cornering see "Applying barcode tape in horizontal curves", page 19.

NOTE

To ensure trouble-free operation, the following points should be observed:

- The field of view of the device must be completely clear
- There are no reflective surfaces in the field of view of the device
- The device and barcode tape are mounted vibration-free

It is recommended to mount the device so that subsequent intricate adjustment of the field of view is possible.

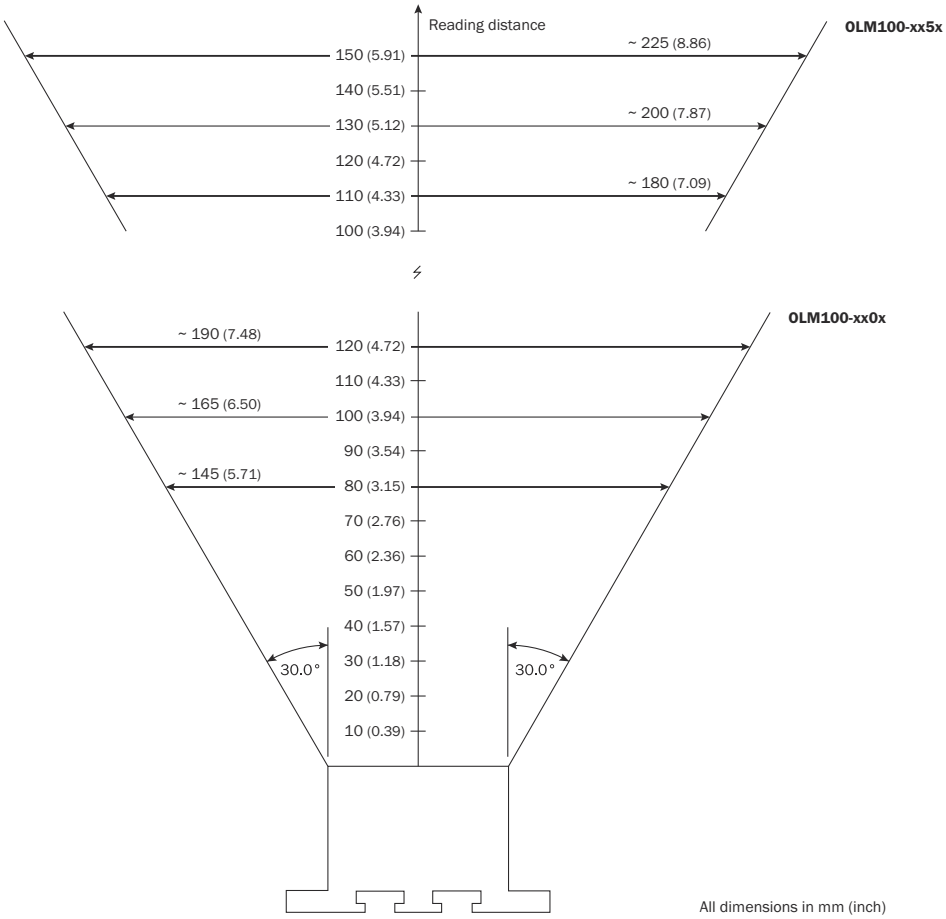


Figure 13: Field of view; unit: mm (inch), decimal separator: point

① Working distance

6 Electrical installation

6.1 Safety

WARNING
Personal injury due to improper supply voltage!

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

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

Working with live parts may result in unpredictable operation.

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

6.2 Wiring instructions

NOTE

Pre-assembled cables can be found on the product page.

The page can be accessed via the **SICK Product ID**: **pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

NOTICE
Faults during operation and defects in the device or the system

Incorrect wiring may result in operational faults and defects.

- Follow the wiring notes precisely.

For data transmission, use only shielded cables with twisted-pair wires.

All electrical connections of the device are configured as M12 round connectors.

6.3 Connecting the device electrically

NOTE

The connection diagram, and information on inputs and outputs can be found on the type label on the device.

1. Ensure the voltage supply is not connected.
2. Connect the device according to the connection diagram.

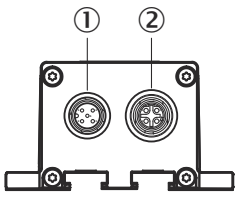


Figure 14: Position of electrical connections

① Data interface, M12 male connector, 5 or 8-pin

② Ethernet interface, M12 female connector, 4-pin

6.4 Connection diagrams

6.4.1 RS-422 and SSI connection diagram

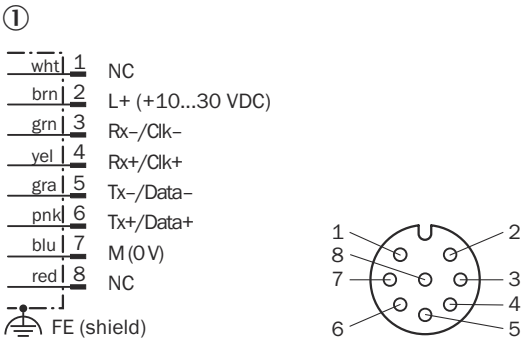
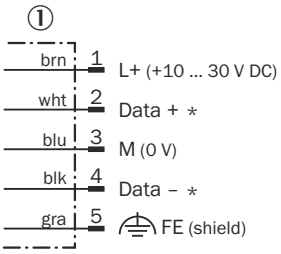


Table 3: Connection diagram for RS-422 and SSI, male connector M12, 8-pin, A-coded

Contact	Marking	Wire color	Description
1	NC	White	Not assigned
2	L+	Brown	Supply voltage: +10 - 30 V DC
3	Rx–/CLK–	Green	Clock – (SSI) / receiver – (RS-422)
4	Rx+/CLK+	Yellow	Clock + (SSI) / receiver + (RS-422)
5	Tx–/Data–	Gray	Data signal – (SSI) / sender – (RS-422)
6	Tx+/Data+	Pink	Data signal + (SSI) / sender + (RS-422)
7	M	Blue	Supply voltage: 0 V
8	NC	Red	Not assigned

6.4.2 Connection diagram RS-485



* Termination resistors integrated into the device

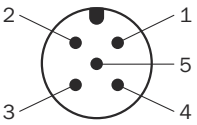


Table 4: Connection diagram for RS-485, M12 male connector, 5-pin, A-coded

Contact	Marking	Wire color	Description
1	L+	Brown	Supply voltage: +10 ... +30 V DC
2	Data +	White	Data cable +

Contact	Marking	Wire color	Description
3	M	Blue	Supply voltage: 0 V
4	Data –	Black	Data cable –
5	FE	Gray	Shielding

6.4.3 CANopen connection diagram

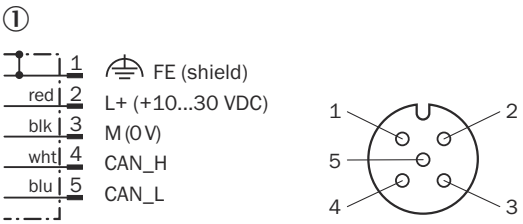


Table 5: Connection diagram for CANopen, male connector M12, 5-pin, A-coded

Contact	Marking	Wire color	Description
1	FE	–	Screen
2	L+	Red	Supply voltage: +10 ... +30 V DC
3	M	Black	Supply voltage: 0 V
4	CAN_H	White	Data cable (CAN) high
5	CAN_L	Blue	Data cable (CAN) low

6.4.4 Ethernet connection diagram

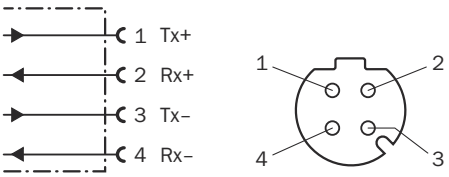


Table 6: Ethernet port connection diagram

Contact	Marking	Description
1	Tx+	Send data signal +
2	Rx+	Receive data signal +
3	Tx–	Send data signal –
4	Rx–	Receive data signal –

7 Commissioning

7.1 Configuring the device

7.2 Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)

For configuration and servicing or diagnostic purposes, the device can be accessed using the SOPAS ET software.

To use the SOPAS ET with the device, a computer with an Ethernet connection is required. In addition, a suitable Ethernet connecting cable (RJ45 male connector on M12 male connector) is required.

NOTE
The latest version of the SOPAS ET software can be downloaded at www.sick.com/SOPAS_ET.

The relevant system requirements for installing SOPAS ET on a computer are also specified there.

The device has the following IP network configuration in its delivery condition:

- Permanent IP address (no DHCP)
- IP address: 192.168.100.236
- IP network mask: 255.255.255.0
- Standard gateway: not present (address 0.0.0.0)

7.2.1 Parameters for output of measured values

On the **Parameters page**, settings for output of measured values can be made.

NOTE
The parameters **Action in case of read errors**, **Multiple reading** and **SmartPOS** can only be modified using SOPAS ET or via configuration marks see "Configuration marks", page 14.

Action in case of read errors

If the device cannot detect any barcodes on a barcode tape, the position value 0 is output. At the same time the error is displayed in SOPAS ET and output over the data interface.

The action on read errors can optionally be changed to **Hold measured value**. With this setting, instead of the value 0, the last valid position value is output, should there be an error. This value is retained until a valid position value is available again.

At the data interface, the error is always output, irrespective of this setting.

NOTE
The **Retain measured value** option is only available if the data interface has been configured to enable the regular output of errors.

Resolution

The output of the position value at the data interface can be at different resolutions.

Possible values are:
- 0.1 mm (default)
- 1 mm

Multiple reading

The **Multiple reading** option allows the detection reliability of the device to be increased. With this, a barcode is only evaluated if it has been read correctly several times. The settings which can be used for multiple reading depend on the maximum traversing speed. With the **auto** option, multiple reading is adjusted dynamically according to the current traversing speed.

Setting	Max. traverse speed
Dynamic (1x)	Max. specified traversing speed
Medium (3x)	up to 3.3 m/s
Rugged (5x)	up to 2.0 m/s
Auto	Max. specified traversing speed

SmartPOS

The **SmartPOS** function enables the output of a position value even under impeded reading conditions. These can be caused by:

- Dirty bar code tape
- Damaged bar code tape
- Interruption of the barcode tape (e.g. at diverters or expansion joints)

If, as a result of the stated read interference barcodes can no longer be read, the current position value is determined in another way. Initially, an attempt is made to determine the position change by processing the raw images taken by the device. Pictures taken in sequence are compared to determine a change in position (shift). Starting from the last valid position value, the current position value is updated incrementally.

If image data cannot be evaluated, the position value is calculated by extrapolation. For this, the most recent position, traversing speed, and acceleration are taken into account. Extrapolation is only used in the **Measuring error** and **Extrapolation time** SmartPOS operating modes.

With the **SmartPOS operating mode** settings, it can be established if and to what extent these two procedures should be used. The maximum duration of the extrapolation is adjustable and can be up to 2 seconds. As soon as it is once again possible to detect a valid position value from the barcodes read, output will recommence.

SmartPOS operating mode	Description
Measuring error	It is guaranteed that the maximum possible measurement error (difference between the output position and the actual position) is no greater than the defined value. If the maximum possible measurement error could exceed the defined value, the **SmartPOS** function is interrupted and an error output.
Product travel path	The **SmartPOS** function is restricted to a particular product travel path. Starting with the position at which bar codes could last be read, with **SmartPOS** the maximum set distance can be reset in both directions. If this distance is exceeded, the **SmartPOS** function is interrupted and an error output.
Extrapolation time	The **SmartPOS** function is restricted to a particular duration. Starting from the most recent time at which bar codes could be read, the position value is determined with **SmartPOS** for the set duration. If this duration is exceeded, the **SmartPOS** function is interrupted and an error output.

As an option, the device can indicate whether **SmartPOS** is active. To do this, the output for warning F2 **SmartPOS active** must be switched on in SOPAS ET. The output is effected via the status LED on the device (flashes green), SOPAS ET, and the data interface. Warning F2 **SmartPOS active** is deactivated by default.

Application mode

Application mode	Description
Automated storage and retrieval systems	In this mode, position value jumps (e.g. for switches) are not permitted and are deliberately ignored by the device
Electrical overhead conveyor	Position jumps are allowed in this mode
Shuttles	Position jumps are allowed in this mode

7.2.2 Diagnostics

Using SOPAS ET, it is possible to monitor the operational status of the device. In particular, the following values can be monitored:

Page	Values
Measured data	Current plotter position and travel speed for position and numerical value
Diagnostics	Read quality (number of barcodes in the field of view), errors and warnings, signal quality (exposure time), temperature in the device. Illustration of the LEDs on the device.

NOTE
With the data recorder present in SOPAS ET, it is possible to record measurement and diagnostics data from the device and to export them as a file (e.g. Microsoft Excel).

7.2.3 Changing the bar code tape alignment

Using SOPAS ET, the barcode tape alignment can be manually changed during running operation see "Function", page 12. This function can be found on the **Methods** page.

NOTE
Changes to barcode alignment are not stored permanently by SOPAS ET and are deleted after restarting the device.

The activation for automatic tape position detection during operation is also located on the **Parameters** page.

7.3 SSI interface

7.3.1 Basics

The **SSI** (synchronous serial interface) makes it possible to receive absolute information about the position using serial data transfer. Clock and data are transferred over the interface.

Data transmission takes place on request by the control unit, in which case the cycle time and transmission speed can be set within broad limits. For this purpose, the connected control unit applies a pulse sequence to the receiving input of the device. Every positive pulse edge causes a data bit to be pushed onto the transmit line of the device, starting from the most significant bit. There is a pause of at least 30 µs between two pulse sequences. The bit pulse is between 70 kHz and 500 kHz and is dependent on the length of cable.

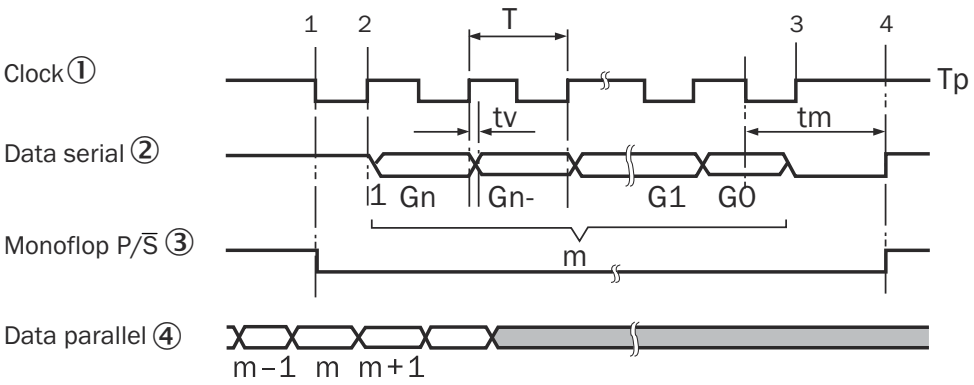
Table 7: Cable lengths and transmission rates

Cable length [m]	Transmission rate [kbd]
< 25	< 500

Cable length [m]	Transmission rate [kbd]
< 50	< 400
< 100	< 300
< 200	< 200
< 400	< 100

NOTE
If the resolution of the device is set to 0.1 mm, only the position range from 0 to 1677 m can be displayed on the SSI interface. For larger position values, the largest value that can be displayed is output.

NOTE
Only positive distance values are displayed via the SSI interface. The value “0“ is output for negative values.



m = saved parallel information ⑤
tv = max. 540 ns delay time for the 1st clock cycle, max. 360 ns for all further cycles ⑥
Gn = most significant data bit ⑦
T = period duration of the clock signal ⑧
G0 = least significant data bit ⑨
Tm = monoflop time 15 µs to 25 µs ⑩
Tp = clock pause ⑪

Figure 15: Pulse diagram of the data transmission

① Clock
② Data serial
③ Monoflop P/S
④ Data parallel
⑤ Saved parallel information
⑥ max. 540 ns delay time for the 1st clock cycle, max. 340 ns for all further cycles
⑦ Most significant data bit
⑧ period duration of the clock signal
⑨ Least significant data bit
⑩ monoflop time 15 µs to 25 µs
⑪ clock pause

7.3.2 SSI protocol (data formats)

The device supports the following SSI data formats:

- Gray code

- Gry24E: Measured value bit 24...1, error bit 0 (factory default)
- Gry24E: Measured value bit 23 - 0
- Gry25: Measured value bit 24 - 0

- Binary code
  - Bin24E: Measured value bit 24 - 1, error bit 0
  - Bin24: Measured value bit 23...0
  - Bin25: Measured value bit 24...0

NOTE
If the device detects an error status, the measured value "0" is output and depending on the selected data format, the binary error bit (LSB) is set.

Data format: Gry24E and Bin24E: 24 data bit Gry code/binary code + 1 binary error bit (LSB)

MSB																							LSB
Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Error binary
24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	

Data format Gry24 and Bin24: 24 data bit Gray code/binary code

MSB																							LSB
Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit
23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Data format Gry25 and Bin25: 25 data bit Gray code/binary code

MSB																							LSB
Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit	Bit
24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

7.4 RS-422 or RS-485 interface

The serial interface of the device makes it possible to read the position values and other defined operating data, or to change the configuration. All data is transmitted as ASCII characters.

Operating data such as interior temperature is transmitted on request; position values are transmitted in a continuous data stream (RS-422) or only on request (RS-422 or RS-485). Various protocol types are available for outputting the position values see "Protocol types for outputting the position value ", page 32

NOTE
Commands and corresponding responses (except measured value for protocol **CRLF** and **CRLF continuous**) are always based on the standard protocol.

The default setting for the device is the **Standard** protocol type, output of measured values **on request**, baud rate 115k2, 8n1.

7.4.1 Protocol types for outputting the position value

Depending on the selected protocol type, the device transmits the position values as shown below:

Table 8: Protocol types

Protocol type	Protocol structure	Output mode
Standard (STX/ETX)	<STX>8107<9*[0 - 9]><ETX>	On request
	<STX>0301<9*[0 - 9]><ETX> <STX>0301<9*[0 - 9]><ETX> ...	Continuous [1]
CRLF	+<8*[0 - 9]><CR><LF>	On request
CRLF continuous	+<8*[0 - 9]><CR><LF> +<8*[0 - 9]><CR><LF> ...	Continuous [1]

[1] Only for variant RS-422 (OLM100-1xx3)

Protocol type Standard

All messages are included within <STX> and <ETX>. Four additional ASCII characters can be found between <STX> and the new byte of the position value see "Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)", page 28.

Depending on the command transmitted, either an individual position value is output, or the continuous output of position values is switched on or off. A non-volatile configuration in the protocol type **Standard** is possible, for which the **Output and request** mode is active.

A non-volatile configuration in the **Continuous output** mode is not possible. After each device restart, starting continuous output requires the corresponding command to be sent via the serial interface.

Protocol type CRLF

All messages, with the exception of the position value output are enclosed in <STX> and <ETX>. The sign of the position is always positive, followed by an 8-byte position value and <CR><LF>. A position value is output on request in each case. A non-volatile parameter setting in this protocol type is possible.

Protocol type CRLF continuous (RS-422 only)

All messages, with the exception of the position value output are enclosed in <STX> and <ETX>. The sign of the position is always positive, followed by an 8-byte position value and <CR><LF>.

A position value is output immediately after restarting the device. A non-volatile parameter setting in this protocol type is only possible with the RS-422 variant.

Protocol type Binary protocol 2

The protocol is compatible with the protocol of previously familiar type 2 binary protocol RS-485 devices of other manufacturers.

7.4.2 Output rates and response times

After the device has received a complete command, the response takes place in the measurement cycle immediately following. Thus after receipt of a message, a maximum of 5 ms will elapse until the response is sent.

Standard protocol

Table 9: Standard protocol output rates/response times

	Continuous	On request	
Data transmission rate	Output rate [ms]	Time from request start to measured value start [ms]	Time from request start to measured value end [ms]
115k2	5	≤ 5.6	≤ 6.9
38k4	5	≤ 6.6	≤ 10.5
19k2	10	≤ 8.1	≤ 15.9
9k6	35	≤ 11.3	≤ 26.8
4k8	60	≤ 17.5	≤ 48.9

CRLF protocol/CRLF continuous protocol

Table 10: CRLF protocol and CRLF continuous protocol output rates/response times

	Continuous	On request	
Data transmission rate	Output rate [ms]	Time from request start to measured value start [ms]	Time from request start to measured value end [ms]
115k2	5	≤ 5.6	≤ 6.6
38k4	5	≤ 6.6	≤ 9.5
19k2	10	≤ 8.1	≤ 13.8
9k6	15	≤ 11.3	≤ 22.7
4k8	25	≤ 17.5	≤ 40.2

7.4.3 Commands

Commands for outputting position values

Table 11: Commands for position value output

Request position value (decimal value)	<STX>0107<ETX>
Request position value (hexadecimal value)	<STX>0105<ETX>
Request speed (hexadecimal value)	<STX>0108<ETX>
Request position value with diagnostics	<STX>010E<ETX>
Output position value continuously "on"	<STX>050101<ETX>
Output position value continuously "off"	<STX>050100<ETX>

1) Only for variant RS-422 (OLM100-1xx3)

Commands for changing the output protocol

Table 12: Commands for position value output

Select standard protocol	RS-422	<STX>023100<ETX>
	RS-485	<STX>023200<ETX>
Select CRLF protocol	RS-422	<STX>023101<ETX>
	RS-485	<STX>023201<ETX>
Select CRLF continuously [1) 2)]	–	<STX>023102<ETX>

1) After changing, the command **Activate parameter and store permanently** or **Activate parameter without storing** must be sent.
2) Only for RS-422 variant (OLM100-1xx3)

Commands for special functions

Table 13: Special commands

Set data transmission rate 4,800 bd	<STX>022C00<ETX>
Set data transmission rate 9,600 bd	<STX>022C01<ETX>
Set data transmission rate 19,200 bd	<STX>022C02<ETX>
Set data transmission rate 38,400 bd	<STX>022C03<ETX>
Set data transmission rate 115,200 bd	<STX>022C04<ETX>
Set resolution 1 mm	<STX>022C00<ETX>
Set resolution 0.1 mm	<STX>022E01<ETX>
Activate parameter and store permanently	<STX>0306<ETX>
Activate parameter without storing	<STX>0307<ETX>
Activating preset	<STX>029801<ETX>
Set preset to 1000	<STX>0297+00001000<ETX>
Reset preset	<STX>029800<ETX>
Read offset value	<STX>0196<ETX>
Set offset value to -9000	<STX>0296-00009000<ETX>
Read the device internal temperature (°C in Hex)	<STX>0124<ETX>
Switch off LED lighting	<STX>0333<ETX>
Switch on LED lighting	<STX>0332<ETX>
Read out firmware version	<STX>0118<ETX>
Reinitialization (cold start)	<STX>030A<ETX>
Reset to factory settings	<STX>0303<ETX>
Request diagnostics	<STX>011D<ETX>
Mark counter	<STX>010B<ETX>
Read barcode orientation (0 = 0°; 1 = 180°)	<STX>0151<ETX>
Switch barcode orientation to 0°	<STX>035001<ETX>
Switch barcode orientation to 180°	<STX>035002<ETX>
Detect barcode orientation automatically	<STX>035000<ETX>

1) After changing, the command **activate parameter and store permanently** or **activate parameter without storing** must be sent.

7.4.4 Examples of commands for outputting measurement and distance values

Request position value

To the device	<STX>0107<ETX>
From the device (for standard protocol)	<STX>8107<9*[0 - 9]><ETX>
Example: Position 836 mm (at resolution 1 mm)	<STX>8107000000836<ETX>

Request position value with diagnostics

To the device	<STX>010E<ETX>
From the device (for standard protocol)	<STX>810E<9*[0 - 9]><ETX>
Example: Position 836 mm (at resolution 1 mm)	<STX>810E**2**00000836<ETX>

Assignment of diagnostics information:

- 1 ≙ F1: over/under temperature
- 2 ≙ F2: SmartPOS active
- 3 ≙ F3: no bar code tape detected

- 4 ≙ F4: error in position value calculation
- 5 ≙ F5: contamination
- 7 ≙ F7: Position outside measuring range

Output position value continuously "on"

To the device	<STX>050101<ETX>
From the device (for standard protocol)	<STX>850101<ETX>
Then continuously sent from device	<STX>0301<9*[0 - 9]><ETX>
Example: Position 836 mm (at resolution 1 mm)	<STX>0301000000836<ETX>

Output position value continuously "off"

To the device	<STX>050100<ETX>
From the device	<STX>850100<ETX>

7.4.5 Examples of commands for special functions

Set operator password

To the device	<STX>0300010000000<ETX>
From the device	<STX>04000001<ETX>

Select standard protocol

To the device	<STX>023100<ETX>
From the device	<STX>823100<ETX>

Set baud rate 4,800 bd

To the device	<STX>022C00<ETX>
From the device	<STX>822C00<ETX>

Set resolution 1 mm

To the device	<STX>022C00<ETX>
From the device	<STX>822E00<ETX>

Activate parameter and store permanently

To the device	<STX>0306<ETX>
From the device	<STX>04060001<ETX>

Activate parameter without storing (warm start)

To the device	<STX>0307<ETX>
From the device	<STX>040700<ETX>

Read device internal temperature

To the device	<STX>0124<ETX>
From the device	<STX>8124<4*[0...F]<ETX>
Example: +45 °C	<STX>8124002D<ETX>

Switch off LED lighting

To the device	<STX>0333<ETX>

From the device	<STX>043300<ETX>

Read out firmware version

To the device	<STX>0118<ETX>
From the device	<STX>8118<12*[ASCII]><ETX>

Reinitialization (cold start)

To the device	<STX>030A<ETX>
From the device	<STX>040A00<ETX>

Reset to factory settings

To the device	<STX>0303<ETX>
From the device	<STX>040300<ETX>

Read out diagnostics

To the device	<STX>011D<ETX>
From the device	<STX>811Dxx<ETX> (xx in hex)

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit number
F8	F7	F6	F5	F4	F3	F2	F1	Error code

Error see "Warning and error messages", page 43. Bits of unused or inactive error codes = "0", active error codes = "1"

Example: Error F3 (= no bar code tape)

From the device					<STX>811D04<ETX>			
0	0	0	0	0	1	0	0	From the device
F8	F7	F6	F5	F4	F3	F2	F1	Error code

NOTE

If the device detects an error condition, the position value “0” is output.

7.5 CANopen interface

7.5.1 The CANopen standard

The CANopen communication standard has been defined as a standardized application for distributed industrial automation systems on the basis of CAN and CAL (CAN Application Layer). The CiA (CAN in Automation) user organization has described CANopen in detail as a standard, see www.can-cia.org

The underlying communication mechanisms and their descriptions are defined in the CIA-301 and CIA-302 specifications. There are separate device profiles for certain device groups.

7.5.2 CANopen specific settings

- VendorName = SICK AG
- Advanced Industrial Sensors VendorNumber = 0x02000056
- ProductName = OLM100
- ProductNumber = 1
- RevisionNumber = 1

NOTE
These settings are contained in the EDS file (Electronic Data Shield). You can download the EDS file from the online product page.

The page can be accessed via the **SICK Product ID**: **pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

Settings for CANopen communication

In the factory configuration, the device has the following settings for CANopen communication:

- Baud rate: 500 kBaud
- Node ID 6

The settings can be configured with the SOPAS Engineering Tool see "Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)", page 28 or using configuration marks see "Configuration marks", page 14.

7.5.3 Configuration

It is only possible to change device-specific parameters including node ID and data transmission rate via the Ethernet configuration interface by using the SOPAS ET software. Information on available parameters and factory settings: see "Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)", page 28.

NOTE
The settings of node ID and baud rate do not take effect until after a device restart.

7.5.4 Output of measured values

NOTE
Only positive distance values are output via the CAN interface. The value “0“ is output for negative values.

The measured value can be output by two TPDOs (Transmit Process Data Objects).

NOTE
The output of the position value is synchronized with master requests in TPDO 2. At the time of the request, a position value is calculated that corresponds exactly to the actual position at this time.

TPDO 1

- Transmission mode/type: **Asynchronous/timer triggered**.
- The TPDO parameter **COB-ID** has the value 0x180 + node ID.
- The event timer is preset to 0 ms. This means the continuous data output is deactivated.
- The event timer is only stored temporarily in the device. This is reset to 0 ms after a device restart, and therefore the continuous data output is stopped.

TPDO 2

- Transmission mode/type: **Synchronous/cyclic**.
- The TPDO parameter **COB-ID** has the value 0x280 + node ID.
- The TPDO parameter **Transmission type** has the default setting 1, i.e. the measured value is transmitted from the NMT master after each SYNC.

Both TPDOs transmit the same 5 bytes of user data. The measured value is represented in bytes 0 to 3, and the diagnostic data in byte 4:

Table 14: Description of data bytes

Byte no.	Description							
0	Position value (LOW byte)							
1	Position value							
2	Position value							
3	Position value (HIGH byte)							
4	Error codes							
	F8	F7	F6	F5	F4	F3	F2	F1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

If error bit = 1 then there is an error, if error bit = 0 then there is no error. A detailed error description can be found in see "Warning and error messages", page 43.

After startup, the device is in the **Preoperational** CANopen state. In this status, measured values, parameters and diagnostic values can be transmitted via SDO service. The TPDOs for the measured values do not start until after the switchover to the **Operational** status. This is done by the **Start remote service** NMT service, which must be sent by the NMT master (see specification CIA-301).

Index values of the measured value and diagnostic byte for output via SDO:

Table 15: Index value SDO output

Index (hex)	English designation	German designation
0x2000	Measurement value	Measured value
0x2001	Diagnostic data	Diagnostic value

NOTE

If the device detects an error , the position value 0 and the corresponding error are output.

8 Ethernet interface

8.1 Establishing a connection

The devices have the following factory default settings:

- IP address: 192.168.100.236 (modifiable via SOPAS ET)
- TCP port: 2112 (fixed setting)

The connection to the device must therefore also be a TCP connection.

8.2 Protocol structure

The commands to be sent are shown as HEX values in square brackets. E.g. [02 A5] means the HEX values “02” and “A5” must be sent to the OLM via the Ethernet connection as the data content of a TCP frame.

[02 02 02 02	00 00 00 06	73 52 41	00 1D	7F	02]
Protocol framing	Length information In the example “0x06” = 6 bytes	Part of the SOPAS protocol	Index number of the read variable	Value of the variable = user data. In the example “7F”. This means for the error telegram that bit 0 to 7 is set = all errors active.	Checksum

8.3 Commands with examples

Reading the error number

To the device	[02 02 02 02 00 00 00 05 73 52 49 00 1D 75]
From the device	[02 02 02 02 00 00 00 06 73 52 41 00 1D 7F 02]
	The value is output as a bit field (each bit stands for an error)

Table 16: Fault numbers

Byte no.	Description
0	Temperature warning
1	Speed information
2	No barcode
3	Incorrect distance calculation
4	Contamination warning
5	Interface problems
6	Measured value overflow

Reading the operating temperature

To the device	[02 02 02 02 00 00 00 05 73 52 49 00 24 4C]
From the device	[02 02 02 02 00 00 00 07 73 52 41 00 24 00 00 44]
	The output value is in “°C” (0 °C in the example).

Reading the exposure time

To the device	[02 02 02 02 00 00 00 05 73 52 49 00 25 4D]

From the device	[02 02 02 02 00 00 00 06 73 52 41 00 25 00 45]
	The output value is in µs (0 µs in the example).

Reading the read quality (exposure time) with high averaging depth

To the device	[02 02 02 02 00 00 00 05 73 52 49 00 26 4E]
From the device	[02 02 02 02 00 00 00 06 73 52 41 00 26 62 24]
	The value output is in % (98% in the example). A read quality of 100% is the optimum. For checking longer barcode sections - averaging over several seconds. After about 30 seconds without a valid barcode tape, the read quality is still 70%.

Reading the read quality (exposure time) with medium averaging depth

To the device	[02 02 02 02 00 00 00 05 73 52 49 00 27 4F]
From the device	[02 02 02 02 00 00 00 06 73 52 41 00 27 62 25]
	For checking local barcode sections - averaging over a few seconds. After about 1 second without a valid bar-code tape, the read quality is still 70%.

9 Maintenance

9.1 Cleaning

NOTICE
Equipment damage due to improper cleaning.

Improper cleaning may result in equipment damage.

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

► Clean the front screen at regular intervals and in the event of contamination with a lint-free lens cloth (part number 4003353) and plastic cleaning agent (part number 5600006). The cleaning interval essentially depends on the ambient conditions.

Bar code tape

If the bar code tape is heavily contaminated with oil or grease, this can be removed with isopropanol (80%).

NOTE
Do not clean the bar code tape using continuously traveling cleaning devices, since this will impair the reading quality.

9.2 Maintenance plan

During operation, the device works maintenance-free.

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

Table 17: Maintenance plan

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

10 Troubleshooting

General faults, warnings and errors

General faults are subdivided into warnings and errors. Current measured values continue being output when there are warnings; measurement is no longer possible when there are faults.

Warnings and errors are signaled by the **Status** LED. Warnings and errors can also be output via the multifunctional outputs or the data interface. They are not stored on the device. The **Power** LED indicates that the device is connected to the voltage supply.

10.1 Warning and error messages

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

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

Table 18: Warning and error messages

Indication on display (meaning)	LED display	Possible causes	Troubleshooting
Error F1 (Over or under temperature)	■ Power LED: red ■ Status LED: off	The internal temperature of the device is outside the permissible range.	■ Check the ambient temperature. Provide better ventilation if necessary. ■ Shield the device from radiated heat, e.g. shade the device from direct sunlight. ■ Where ambient temperatures are low, wait for warm up phase (at temperatures ≤ -20 °C).
Warning F2 SmartPOS active	■ Power LED: green ■ Status LED: green, flashing	SmartPOS function is active. Position is not determined from barcodes, but from processing raw images or extrapolation see "Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)", page 28.	Check barcode tape and device. Remove contamination and rectify damage.
Error F3 (no barcode tape detected)	■ Power LED: green ■ Status LED: red	■ No barcode tape present. ■ Device poorly aligned. ■ Device or barcode tape totally contaminated. ■ Working distance too small/large.	■ Mount barcode tape in front of device. ■ Align device with the barcode tape. ■ Clean the optical interfaces of the device and the barcode tape. ■ Check the distance between the device and the barcode tape.

Indication on display (meaning)	LED display	Possible causes	Troubleshooting
Error F4 (error during position value calculation/read error)	■ Power LED: green ■ Status LED: red	■ Alignment of barcode not detected. ■ Barcode tape is damaged. ■ Unsuitable barcode tape used.	■ Interrupt the supply voltage or send cold start command. ■ Replace barcode tape. ■ Use original barcode tape see "Bar code tape", page 50.
Warning F5 (contamination)	■ Power LED: green ■ Status LED: red, flashing	■ Device or barcode tape contaminated. ■ Insufficient illumination.	■ Clean the barcode tape and optical interfaces of the device. ■ Replace device.
Error F7 (position outside measuring range)	■ Power LED: green ■ Status LED: red	Calculated position value less than 0 or greater than 10 km.	Modify the value range of the attached barcode tape accordingly.
Memory error	■ Power LED: red ■ Status LED: red	Internal error	Restart the device (interrupt voltage supply). If the fault recurs, contact SICK customer services. For address, see rear side.

10.2 Returns

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

NOTE

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

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

10.3 Repairs

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

10.3.1 Repairing damage to bar code tape

Replace bar code tape

For a high quality and long-lasting result, the use of original SICK barcode tape is recommended see "Order notes and variants of the bar code tape", page 51. The minimum order quantity is 5 m.

Using repair codes

PDF documents with bar codes that can be printed are available to quickly repair damaged areas on bar code tape. These can be printed on self-adhesive DIN A4 blank labels see "Blank labels for repair codes or control marks", page 53.

The PDF documents are available for download on the product page.

The page can be accessed via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

This means individual codes can be printed independently if necessary, in order, for example, to replace damaged segments in the short term. The bar codes can be found by following the **'Products'** link on the web page, and then selecting the relevant product type.

The bar codes can be printed out using a laser printer. Use the following settings in the printer menu:

- Paper format A4
- Resolution as high as possible – at least 1200 dpi
- Deactivate automatic page and size adjustment

Using SmartPOS repair bar code tape

Damaged areas can be temporarily covered with SmartPOS repair barcode tape see "Order notes and variants of the bar code tape", page 51. This is a special repair tape that, unlike the normal barcode tape, does not contain any absolute position values and can therefore be used anywhere. When traveling over this tape, the device detects the position incrementally.

NOTE

The **SmartPOS** function must be active when using SmartPOS tape see "Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)", page 28.

NOTE

A position value determined by SmartPOS is not stored in the device. If the device is switched off and on again whilst only the SmartPOS tape is in the field of view, no position value is output.

10.4 Disposal

CAUTION

Risk of injury due to hot device surface.

The surface of the device can become hot.

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

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

NOTICE

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

Disposing of devices improperly may cause damage to the environment.

Therefore, observe the following information:

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

11 Technical data

NOTE

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

The page can be accessed via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

Please note: This documentation may contain further technical data.

11.1 Type-specific data

Standard devices (OLM100-x0xx)

Interface	Bar code tape reading distance	Bar code width	Type designation
SSI	100 mm ± 20 mm	30 mm	OLM100-1001
RS-422	100 mm ± 20 mm	30 mm	OLM100-1003
RS-485	100 mm ± 20 mm	30 mm	OLM100-1005
CANopen	100 mm ± 20 mm	30 mm	OLM100-1006
SSI	130 mm ± 20 mm	40 mm	OLM100-1051

High performance devices (OLM100-x2xx)

Interface	Bar code tape reading distance	Bar code width	Type designation
SSI	100 mm ± 20 mm	30 mm	OLM100-1201
SSI	100 mm ± 20 mm	30 mm	OLM100-1201S03 [1]
RS-422	100 mm ± 20 mm	30 mm	OLM100-1203
CANopen	100 mm ± 20 mm	30 mm	OLM100-1206

[1] The device variant also has a multifunctional switching input/output (MF1/MF2) and the default SOPAS configuration: "applicationMode" -> "stackerCranes"

Suitable bar code tapes

For the OLM100-xx0x variants, suitable barcode tapes with a barcode width of 30 mm and a tape height of 25 mm, 30 mm, 40 mm, 60 mm and 100 mm are available as accessories.

No barcode tapes are available as accessories for the OLM100-xx5x variants. These devices are only used in existing machines in which a barcode tape with a barcode width of 40 mm is already installed.

11.2 Performance

Resolution	0,1 mm, 1 mm
Repeatability [1]	0,15 mm (OLM12xx), 1 mm (OLM10xx)
Output rate	1 ms (OLM100-1xx1, OLM100-1xx6), 5 ms (OLM100-1xx3, OLM100-1xx5)
Light sender	LED, red
Measurement range of the travel path [2]	0 m ... 10,000 m

Max. traverse speed	7 m/s (OLM12xx), 4 m/s (OLM10xx)

1) Statistical error 3 σ, no warm-up time required
2) Dependant on the set resolution and transfer protocol

11.3 Mechanics/electronics

Supply voltage V_S [1]	DC 10 V ... 30 V
Residual ripple [2]	≤ 5 Vss
Power consumption	< 3 W
Power-up time	approx. 3 s
Weight	approx. 170 g
Housing material	▪ Housing: magnesium, zinc ▪ Front screen: PMMA
Connections	M12

1) Limit values, reverse-polarity protected
2) May not fall below or exceed U_V tolerances.

11.4 Ambient data

Table 19: Ambient data

Protection class	 Suitable for operation in PELV (Protective Extra Low Voltage) systems with safe separation.
Electromagnetic compatibility	EN 61000-6-2, EN 61000-6-4
Ambient temperature range [1] [2]	– 30 °C ... + 60 °C
Storage temperature range	–40 °C ... +75 °C
Permissible relative humidity	0% ... 90%, non-condensing
Typical ambient light immunity [3]	≤ 5,000 lx
Enclosure rating	IP65
Vibration resistance	EN 60068-2-6, EN 60068-2-64
Shock resistance	EN 60086-2-27

1) Temperatures ≤ 20 °C with 5 min warm-up time
2) Maximum 95% humidity, non condensing
3) Typ. Value at +25 °C ambient temperature

11.5 Dimensional drawing

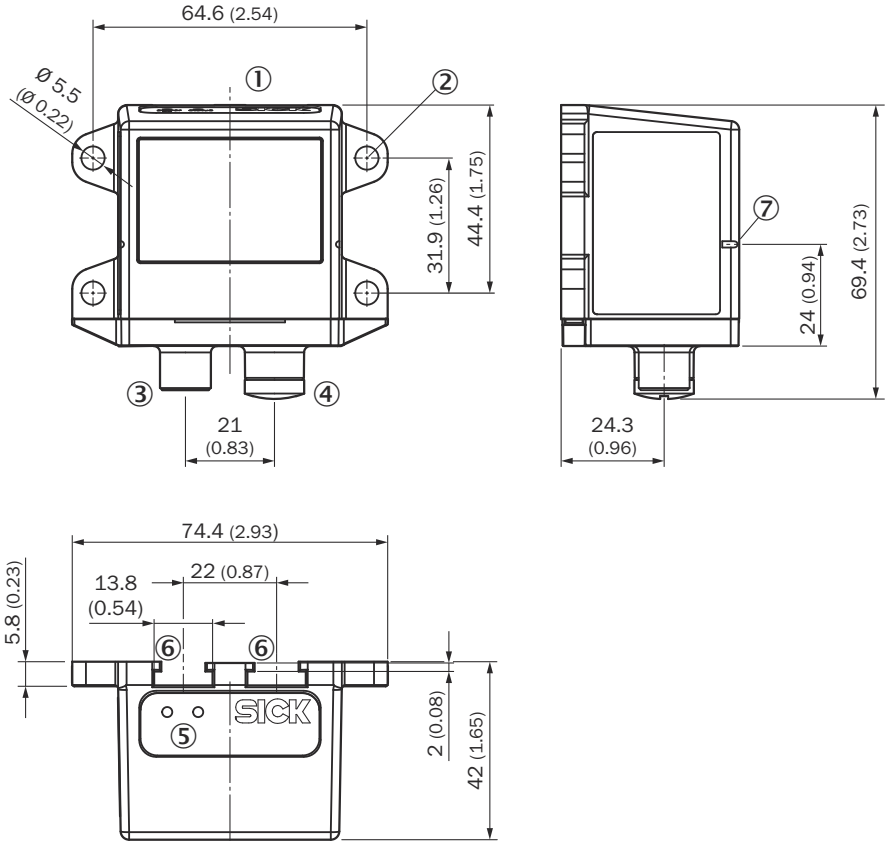


Figure 16: Structure and device dimensions, unit: mm (inch), decimal separator: point

① Reference axis position measurement
② Fixing hole
③ Connection plug M12, 5-pin or 8-pin
④ Connector socket Ethernet M12, 4-pin
⑤ Status LEDs
⑥ T-slot
⑦ Alignment aid (slot)

11.6 Bar code tape

Table 20: Bar code tape

Upper material	Polyester film, white, matt, silicone-free
Foil thickness according to ISO 534	56 µm ± 10%
Upper material thickness incl. adhesive	Approx. 102 µm
Carrier material	Compressed paper, silicone-coated on both sides, white
Grammage	62 g/m²
Carrier material thickness	approx. 56 µm
Adhesive	Permanent adhesive based on modified acrylates. Suitable for problem substrates.

Adhesive force (adhesive force level T according to DIN 30646, measured on stainless steel)	Steel	> 21 N / 25 mm
	Aluminum	> 18 N / 25 mm
	Polypropylene	> 14 N / 25 mm
	Polyethylene	> 10 N / 25 mm
Min. adhesion temperature	> +4 °C	
Temperature Resistance	–40 °C ... +150 °C	
Chemical resistance	Resistant to most oils and greases, fuels, aliphatic solvents and dilute acids.	
Load test (bonded to stainless steel), no issues	Diesel	4 h
	Isopropanol	4 h
	Brake fluid	1 h
	Heptane	4 h
	Engine oil 15W40	4 h
	Toluol	1 h
	Industrial cleaner (lemon)	4 h
	Washing-up liquid	4 h
	MEK	1 h
	Heptane	4 h
	Lye (PH10)	4 h
	Acid (PH4)	4 h
	Salt spray test according to DIN 50021 SS	150 h
	Climatic stress according to DIN 50018 – SFW 2.0	No change after 2 stress cycles
Determination of chemical resistances using the immersion method. Testing of label properties and barcode labeling in digital printing with UV protective coating	• Immersion resistance after 2 h / 60 °C NaOH 5% • Immersion resistance after 24 h / 21 °C H_2NO_3 3% • Immersion resistance after 10 d / 21 °C water. • Immersion resistance after 24 h / 21 °C heptane. • Immersion resistance after 24 h / 21 °C DOT4 brake fluid. • Wipe resistance after 2 min/ethanol/soaked cloth / 500 g pressure. • Immersion resistance after 72 h / 21 °C acetic acid 3%. • Immersion resistance after 24 h / 21 °C $NaNO_3$ 3%.	
Base corrosion	No corrosion on the glued base	
Dimensional stability	Classification number 02 (tested according to DIN 30646) shrinkage < 0.2%	

12 Accessories

NOTE

On the product page you will find accessories and, if applicable, related installation information for your product.

The page can be accessed via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

12.1 Bar code tape

The barcode tape is available in the following heights: 25 mm, 30 mm, 40 mm, 60 mm and 100 mm. The width of the barcode is always 30 mm.

For correct mounting of the bar code tape see "Attaching the barcode tape", page 17.

Dimensions of the bar code tape

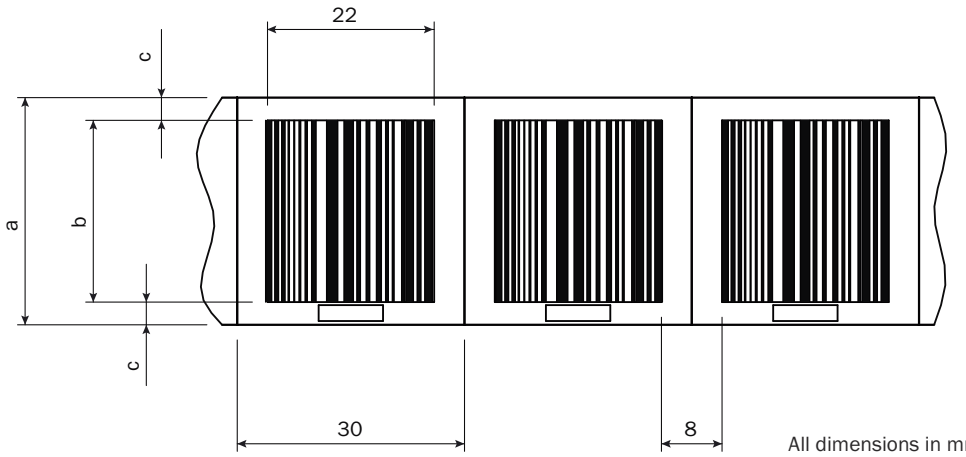


Figure 17: Unit: mm (inch), decimal separator: point

a (height of the bar code tape)	b (height of the bar code)	c (distance of the bar code to the edge of the bar code tape)
25 [1]	24	0
30	24	3
40	34	3
60	54	3
100	94	3

[1] Target application must be analyzed in detail and checked for feasibility before ordering.

Bar code tape printing

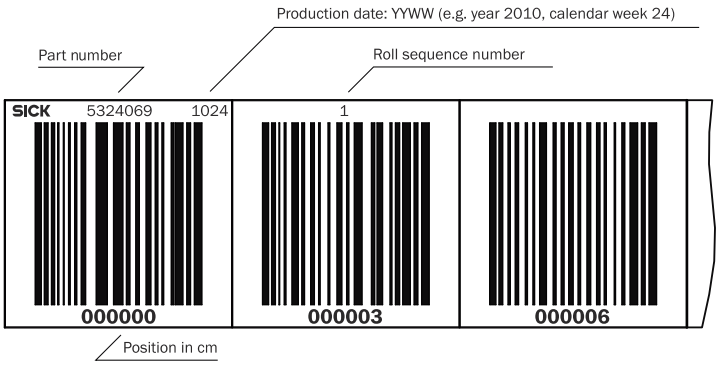


Figure 18: Barcode tape, height 30/40/60/100 mm

① Part number
② Date of manufacture: YYWW (e.g. year 2010, calendar week 24)
③ Sequential roll number
④ Position in cm

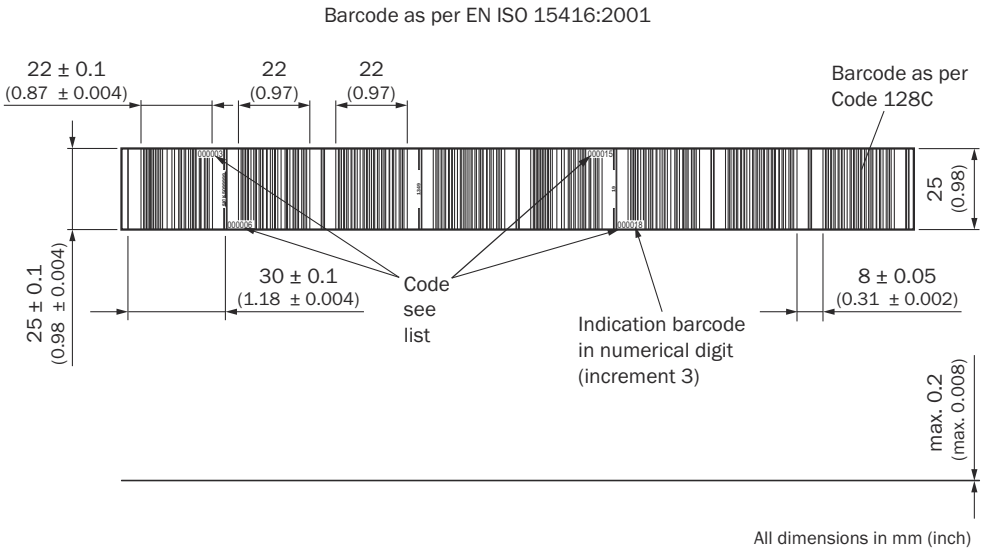


Figure 19: Barcode tape 25 mm high, barcode according to EN ISO 15416:2001; unit mm (inch), decimal separator: point

① Code, see list
② Specification of barcode in digits (increment 3)
③ Barcode according to code 128C

12.2 Order notes and variants of the bar code tape

Barcode tapes with a height of 30 or 40 mm, for the measuring range 0 to 120 m, are available from stock in rolls of 20 m each. Barcode tapes for measuring ranges > 120 m are not available from stock and are custom made. All barcode tapes with a height of 25 mm, 60 mm and 100 mm are custom made and are not available from stock.

NOTE

For detailed ordering information on the barcode tape, please visit the online product page.

The page can be accessed via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).

Customer specific bar code tape

Bar code tape	Part no.	Description
Width 30 mm Height 25 mm	5328960	Barcode tape with customer specific printed measuring range. Delivered on rolls of max. 100 m length per roll
Width 30 mm Height 30 mm	5322556	Barcode tape with customer specific printed measuring range. Delivered on rolls of max. 100 m length per roll
Width 30 mm Height 40 mm	5323951	Barcode tape with customer specific printed measuring range. Delivered on rolls of max. 100 m length per roll
Width 30 mm Height 60 mm	5327812	Barcode tape with customer specific printed measuring range. Delivered on rolls of max. 100 m length per roll
Width 30 mm Height 100 mm	5327576	Barcode tape with customer specific printed measuring range. Delivered on rolls of max. 100 m length per roll

Calculation of the start and end codes (for customer specific tape)

1. Divide the selected value from start to end of the measuring range in centimeters by 3.
2. For start code: Round the result from "1." down to the next whole number. For end code: Round the result from "1." up to the next whole number.
3. Multiply the result from "2." by 3. This produces the start or end code.

Example:

Start of measuring range = 251 cm

1. 251 / 3 = 83.667 (divide by 3).
2. 83.667 → 83 (round down to next whole number).
3. 83 x 3 = 249 x 3 (multiply by 3). **Start code = 249 cm**

End of measuring range = 986 cm

1. 986/3 = 328.667 (divide by 3).
2. 328.667 → 329 (round up to next whole number).
3. 329 x 3 = 987 (multiply by 3). **End code = 987 cm**

SmartPOS repair bar code tape

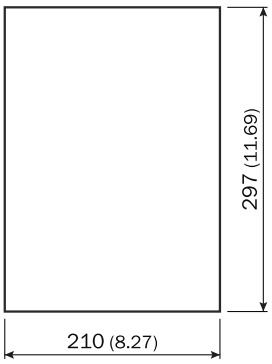
Bar code tape	Part no.
Height 25 mm Width 30 mm	5329017
Height 30 mm Width 30 mm	5329018
Height 40 mm Width 30 mm	5329019

Bar code tape	Part no.
Height 60 mm Width 30 mm	5329020
Height 100 mm Width 30 mm	5329021

12.3 Blank labels for repair codes or control marks

Table 21: Blank labels

Type	Part number
Blank labels, self-adhesive, DIN-A4, 10 items (BES-A4-OLM)	5322680



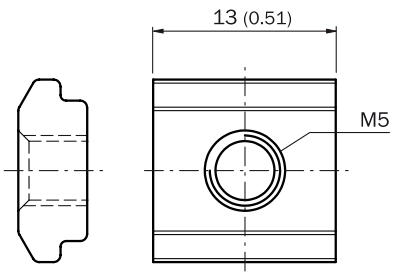
All dimensions in mm (inch)

Figure 20: Unit: mm (inch), decimal separator: point

12.4 Sliding nuts

Table 22: Sliding nuts, M5

Type	Part number
Sliding nuts M5 (4 items)	2017550



All dimensions in mm (inch)

Figure 21: Unit: mm (inch), decimal separator: point

13 Appendix

13.1 Declarations of conformity and certificates

You can download declarations of conformity and certificates via the product page.

The page can be accessed via the **SICK Product ID: pid.sick.com/{P/N}/{S/N}**

{P/N} corresponds to the part number of the product, see type label.

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