OPERATING INSTRUCTIONS

OLM100

Linear measurement sensor

Mounting, operating, maintenance

SICK
Sensor Intelligence.

Contents

Described product

OLM100

Manufacturer

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Original document

This document is an original document of SICK AG.

1 About this document

1.1 Information regarding the operating instructions

As part of the OLM100 product family, SICK AG offers the following two performance classes:

- OLM100 Standard, identifiable by the type code OLM100-10xx
- OLM100 Hi, identifiable by the type code OLM100-12xx

These operating instructions provide important information on how to handle linear measurement sensors from SICK AG. Adherence to all the specified safety instructions and guidelines is a prerequisite for working safely. You must also comply with any local work safety regulations and general safety specifications applicable to the use of the linear measurement sensors.

Ensure that you read through these operating instructions carefully before starting any work. They constitute an integral part of the product and should be stored in the direct vicinity of the sensor so they remain accessible to personnel at all times. Should the linear measurement sensor 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 in which the linear measurement sensor is integrated. For information about this, refer to the operating instructions of the respective machine.

1.2 Explanation of symbols

Warnings in these operating instructions are indicated by 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.

ATTENTION
... 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 Scope of delivery

The scope of delivery includes the following:

- Linear measurement sensor
- Optional: Accessories see "Accessories", Page 48

Supplied documentation:

- Quickstart guide

NOTE

All available documentation can be found online at

- ▶ **http://www.mysick.com/en/olm100**
- ▶ **http://www.mysick.com/en/olm100_hi**

There, you can also find:

- Available configuration marks and position marks for download as a PDF file
- Information about software updates
- SOPAS Engineering Tool for configuration
- A list of FAQs for the linear measurement sensor
- Example applications

1.4 Customer service

Do not hesitate to contact our customer service should you require any technical information. Please refer to the back page of these operating instructions for your agent's contact details.

NOTE

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

2 Safety information

2.1 Correct use

The linear measurement sensor is an opto-electronic sensor and is used for positioning of a displacement unit by means of a bar code 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 Incorrect use

The linear measurement sensor does not constitute a safety component according to the EC Machinery Directive (2006/42/EC). The linear measurement sensor must not be used in explosion hazard areas. Any other use that is not described as correct use is prohibited. The use of accessories not specifically approved by SICK is at own risk.

WARNING

Danger due to incorrect use.

Any incorrect use can result in dangerous situations.

Therefore, take note of the following information:

- Linear measurement sensors should be used only in accordance with intended use specifications.
- All information in these operating instructions must be strictly complied with.

2.3 IP technology

NOTE

SICK uses standard IP technology in its products. The emphasis is placed on availability of products and services. SICK always assumes that the integrity and confidentiality of the data and rights affected by the use of the aforementioned products will be ensured by the customer. In all cases, appropriate security measures, such as network separation, firewalls, virus protection, and patch management, must be taken by the customer on the basis of the situation in question.

2.4 Limitation of liability

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

- Failing to observe the operating instructions
- Incorrect use
- Use by untrained personnel
- Unauthorized conversions

- Technical modifications
- Use of unauthorized spare parts, consumables and accessories

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

2.5 Modifications and conversions

Modifications and conversions to the sensor and/or the installation may result in unforeseeable dangers. Before any technical modifications to and expansions of the sensor, the prior written approval of the manufacturer must be obtained.

2.6 Requirements for skilled persons and operating personnel

WARNING
Risk of injury due to insufficient training.

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

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

These operating instructions list the training requirements for the various fields of activity, as follows:

- **Instructed personnel** have been given a briefing 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 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 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.

2.7 Operational safety and particular hazards

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

2.8 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 Environmental protection

ATTENTION

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

Disposing of sensors improperly may cause damage to the environment.

Therefore, take note of the following information:

- Always observe the valid regulations on environmental protection.
- Following correct disassembly, pass on any disassembled components for reuse.
- Separate the recyclable materials by type and place them in recycling containers.

3 Function and use

3.1 Function

The linear measurement sensor is a sensor that can measure product travel paths up to 10 km without moving parts. The sensor orientates itself using a bar code tape attached along the product travel path, using a visible, red LED beam. By reading the bar code, the linear measurement sensor determines the absolute position and delivers this via an interface.

Determining bar code tape alignment

On startup, the linear measurement sensor initially detects the alignment in relation to the bar code tape (0° or 180°). The sensor automatically adapts itself to the alignment that is detected, and starts outputting position values. If there are no bar codes in the field of view when the sensor is started up, the sensor selects the orientation which it detected before being deactivated. The sensor starts position value output as soon as bar codes 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.

NOTE

In the delivery condition, the tape position is assumed to be 0°, i. e. the alignment of the sensor and the bar code tape to each other is such that the lower edge of the sensor (black part of the housing) and the lower edge of the bar code 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 29 or by configuration marks see "Configuration marks", Page 12.

NOTE

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

If the linear measurement sensor detects an error condition during the traversing (e. g. no bar code tape, or bar code 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.

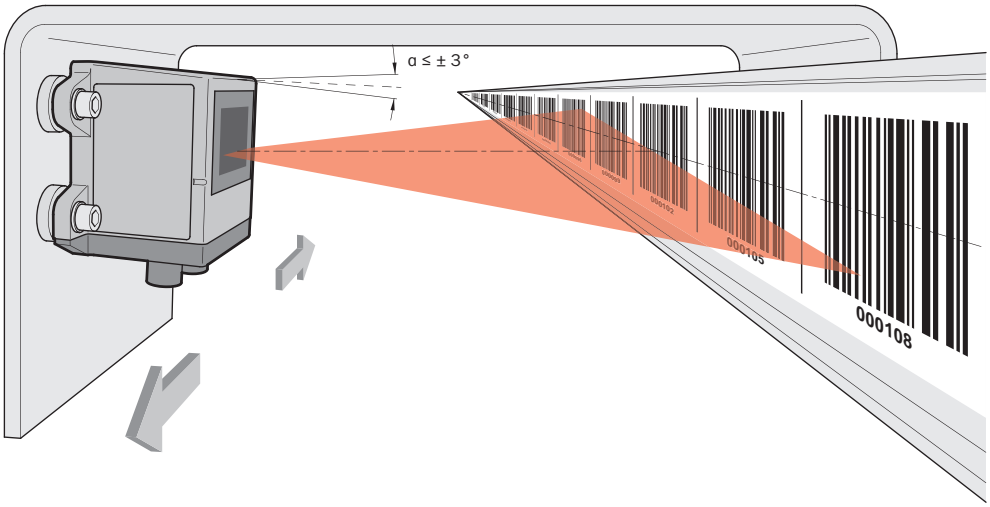


Figure 1: Functionality schematic diagram OLM100

3.2 Type label

There is a type label on the sensor which provides all relevant information.

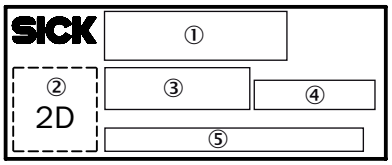


Figure 2: Type label

① Type designation
② 2D code with part number and type description
③ Part number
④ Date code and serial number
⑤ MAC address

3.3 Bar code tape

For the OLM-xx0x variants, suitable bar code tapes with a bar code 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 48.

3.4 Configuration marks

NOTE
The marks are available for download and can then be printed out:

- http://www.mysick.com/en/olm100
- http://www.mysick.com/en/olm100_hi

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

Configuration marks are special bar codes with which parameters in the sensors can be adjusted. After reading the configuration marks, the change is stored permanently in the sensor.

To change a parameter, the appropriate configuration mark is placed in the field of view of the sensor. The sensor 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, OLM100-1xx6)
- Resolution
- Resetting all settings to the factory setting

4 Transport and storage

4.1 Transport

For your own safety, please read and observe the following notes:

NOTE

Damage to the sensor due to improper transport.

- 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

Upon receipt, please 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 sensor under the following conditions:

- Do not store outdoors.
- Store in a dry area that is protected from dust.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: between –40 and +75 °C
- Relative humidity: max. 95%, non-condensing
- 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. Mount the bar code tape see "Mount the bar code tape", Page 17.
2. Mount the sensor see "Mounting the sensor", Page 19.
3. Make the electrical connection see "Electrical installation", Page 23.

5.2 Mounting instructions

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

- Comply with technical data such as the measuring range.
- Protect the sensor from direct sunlight.
- To prevent condensation, avoid exposing the data transmission system to rapid changes in temperature.
- Follow the mounting instructions for the bar code tape.

5.3 General data on the bar code tape

Bar code 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 bar code tapes can be placed against one another without gaps. The sequential roll number is located on the bar code 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".

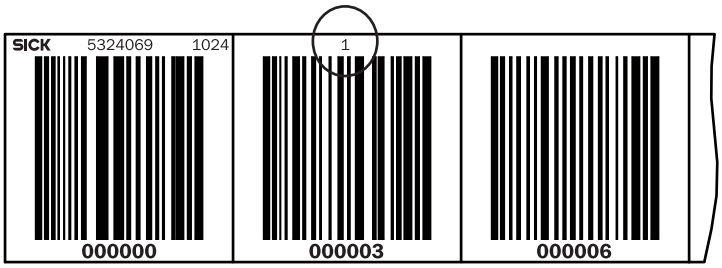


Figure 3: Example for roll 1, measuring range 0 to 20 m

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

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

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

Align the bar code 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 bar code tape to be significantly distorted were it to be stuck over, it is possible to cut out an individual bar code 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 bar codes must follow after a gap. Continuous output of position values by the sensor is ensured if the width of the gap is not more than 30 mm and the bar codes 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 50.

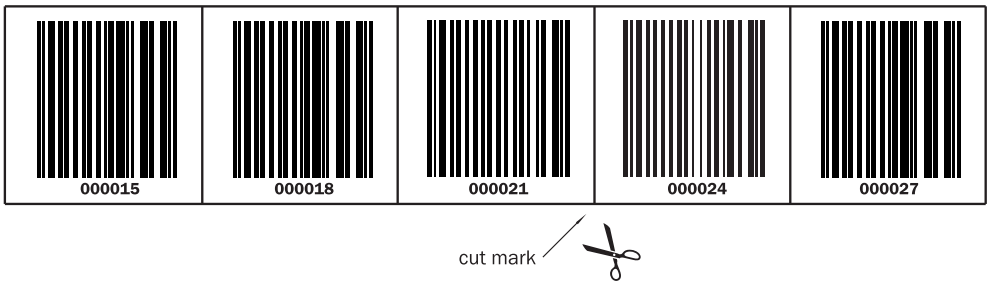


Figure 4: Bar code tape cut marks

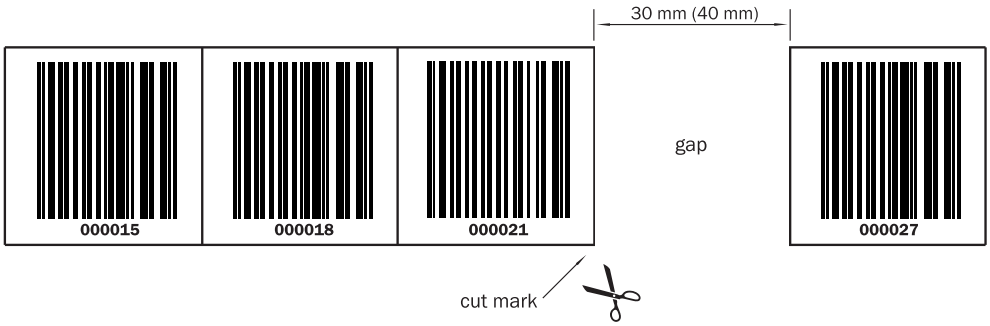


Figure 5: Gap in the separated bar code tape

A sequence of bar code 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 linear measurement sensor outputs a corresponding jump in the position value as soon as at least two sequential bar codes of the new measuring range have been identified.

The linear measurement sensor 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 - 20 m, or else to remove the first two position codes "0 cm" and "3 cm".

NOTE

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

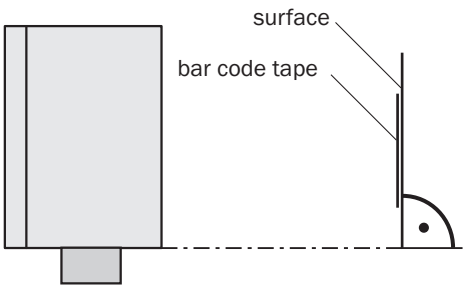


Figure 6: Vertical mounting of the bar code tape

NOTE
Avoid strong extraneous light reflections striking the bar code tape.

5.4 Mount the bar code tape

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

5.4.1 Mounting of the bar code tape at horizontal curves

A minimum radius must be complied with for horizontal curves. This depends on the mounting position of the sensor. As a rule, the linear measurement sensor should be mounted on the axis of rotation if possible. Tangential differences, referred to below as L, leading to the sensor 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.

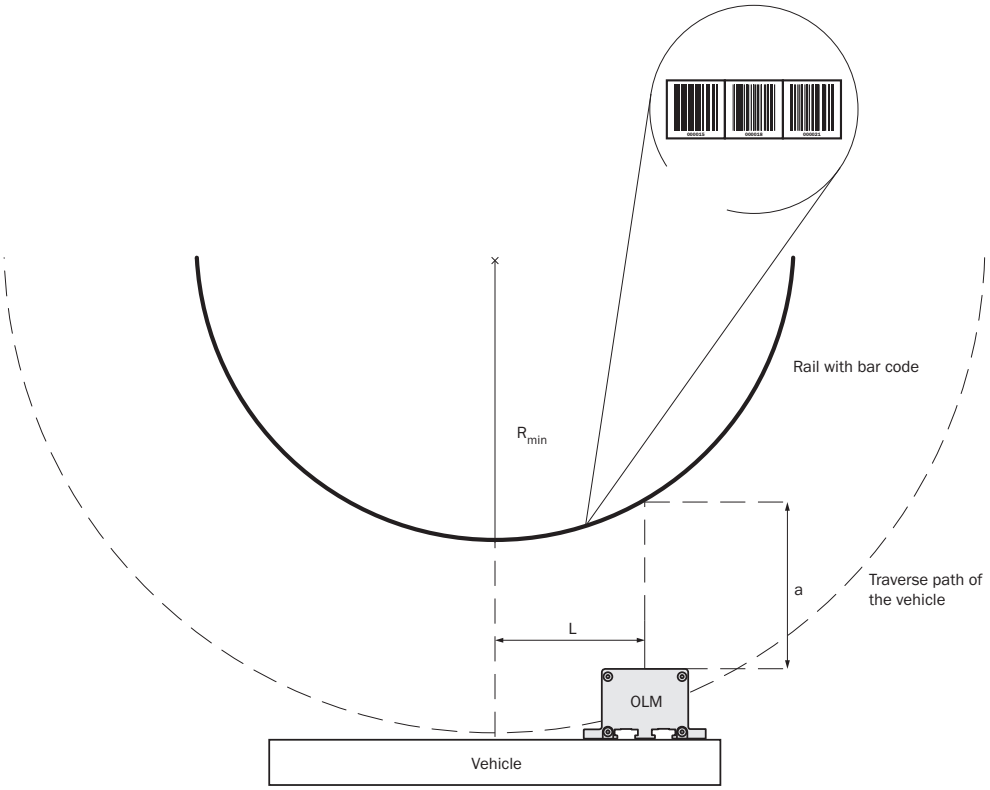


Figure 7: Tangential distance L for curve travel

R_{min} Minimum radius
L Tangential distance for curve travel

a Reading distance

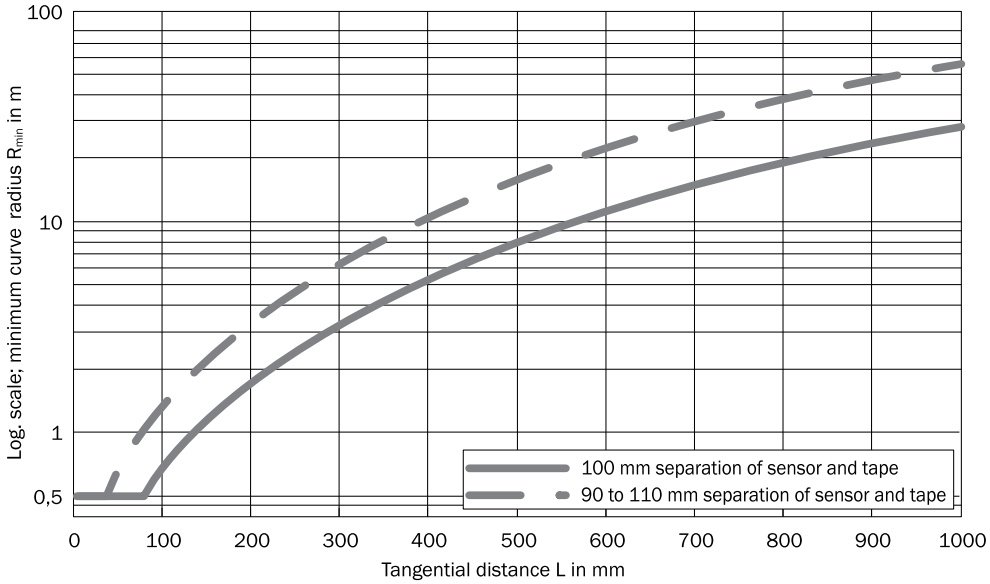


Figure 8: Minimum curve radius R_{min} dependent upon the tangential distance L

5.4.2 Mounting of the bar code tape at vertical curves

In order to attach the bar code tape along a vertical corner, cut into the bar code tape at the cut marks and fan it out. The maximum angle must not exceed 3°. This corresponds to a gap 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 50.

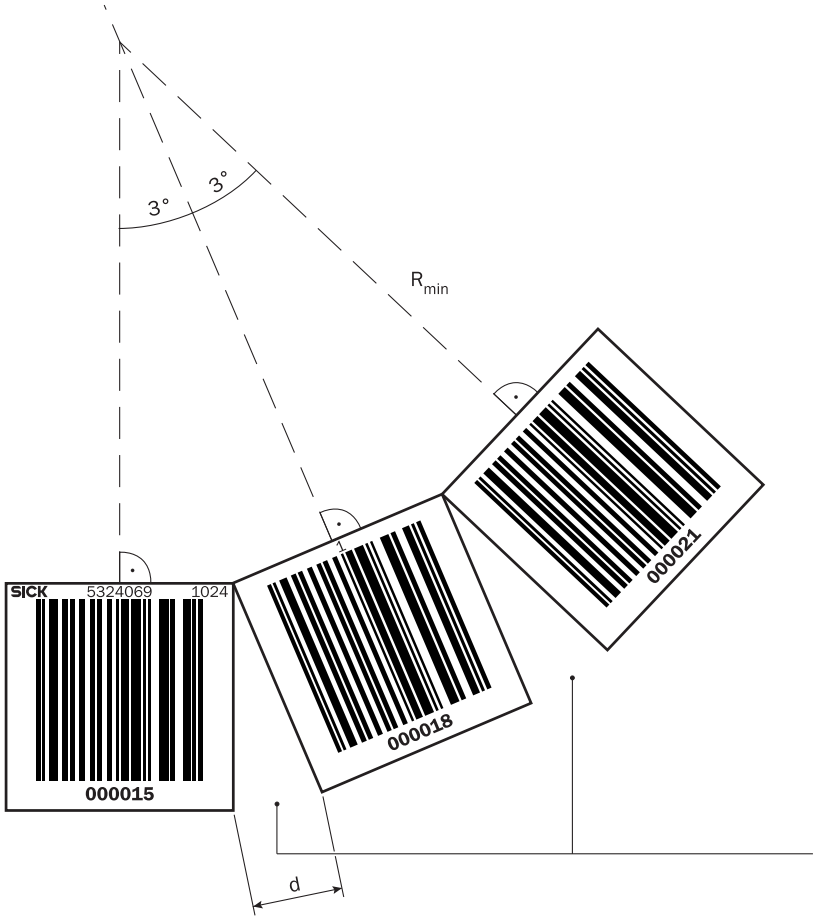


Figure 9: Vertical curves

NOTE

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

NOTE

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

5.5 Mounting the sensor

The sensor can be mounted either using the four housing through-holes or the T-slots on the back using sliding nuts see "Sliding nuts", Page 51. To ensure optimum reading results and the greatest possible functional reserve, mount the sensor at a distance of 100 mm from the bar code tape and align it at right angles to the bar code tape. The sensor's depth of field is ± 20 mm.

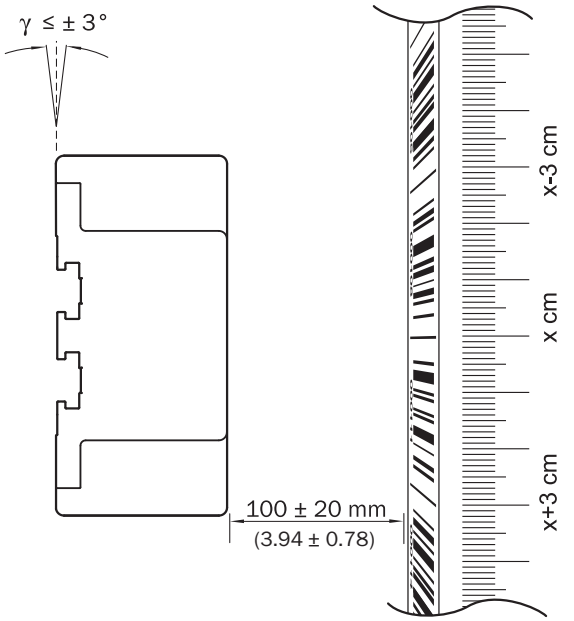


Figure 10: Mounting distances OLM100-xx0x

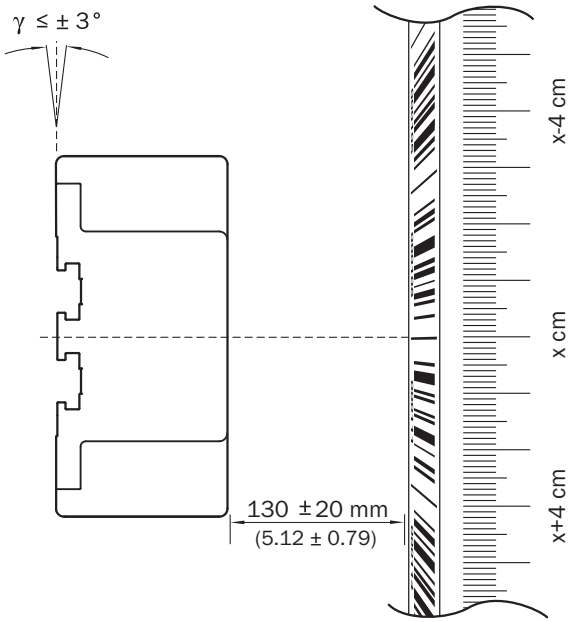
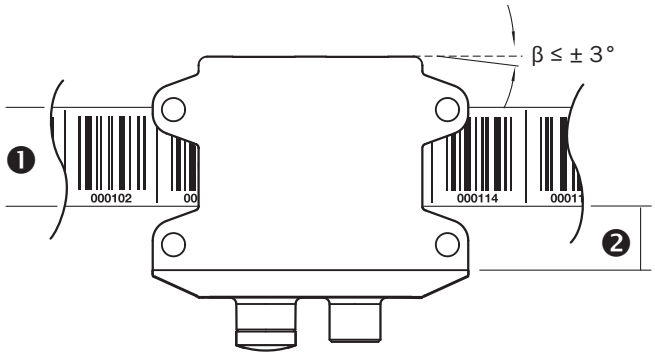


Figure 11: Mounting distances OLM100-xx5x

A vertical distance that depends on the bar code tape used is to be maintained between the lower edge of the housing and the lower edge of the bar code tape see "Tab. 1: Vertical distance dependent upon the bar code tape", Page 21.



Bar code 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

Table 1: Vertical distance dependent upon the bar code tape

NOTE

In the case of curved paths pay particular attention to maintaining a distance of 100 mm ± 20 mm to the bar code tape.

A reading distance greater than 85 mm ± 20 mm must be maintained in order to ensure an optimum functional reserve in applications in which individual bar codes are not always fully readable.

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

This vertical alignment of the sensor on the bar code tape must lie within a tolerance throughout the product travel path see "Tab. 1: Vertical distance dependent upon the bar code tape", Page 21.

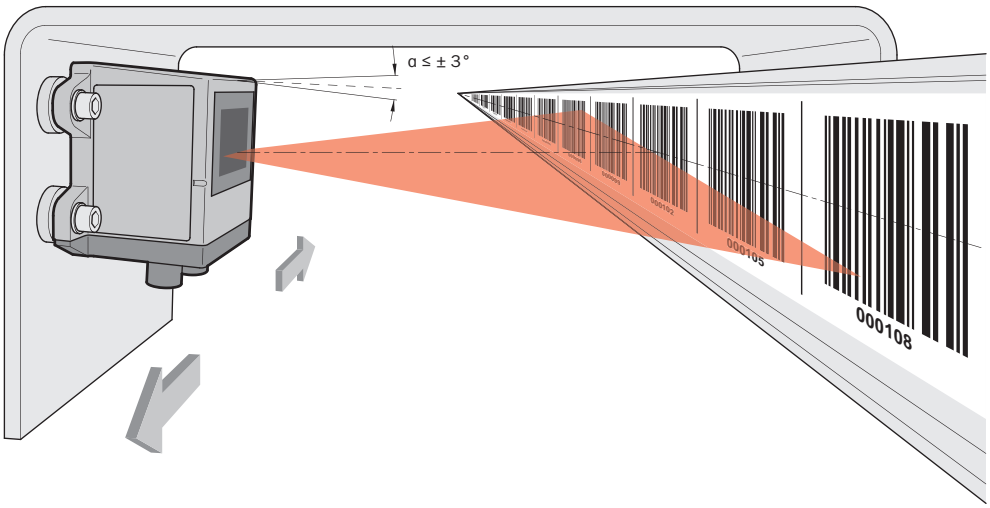


Figure 12: Vertical alignment

When two sensors are operated next to one another, it is necessary to maintain a minimum gap between the two sensors of 120 mm. At corners, make sure that the sensor is mounted as close as possible to the axis of rotation. For information on recommended minimum radii for curve travel see "Mounting of the bar code tape at horizontal curves", Page 17.

NOTE

The sensor must be mounted such that no objects are located in the field of view in front of the bar code tape.

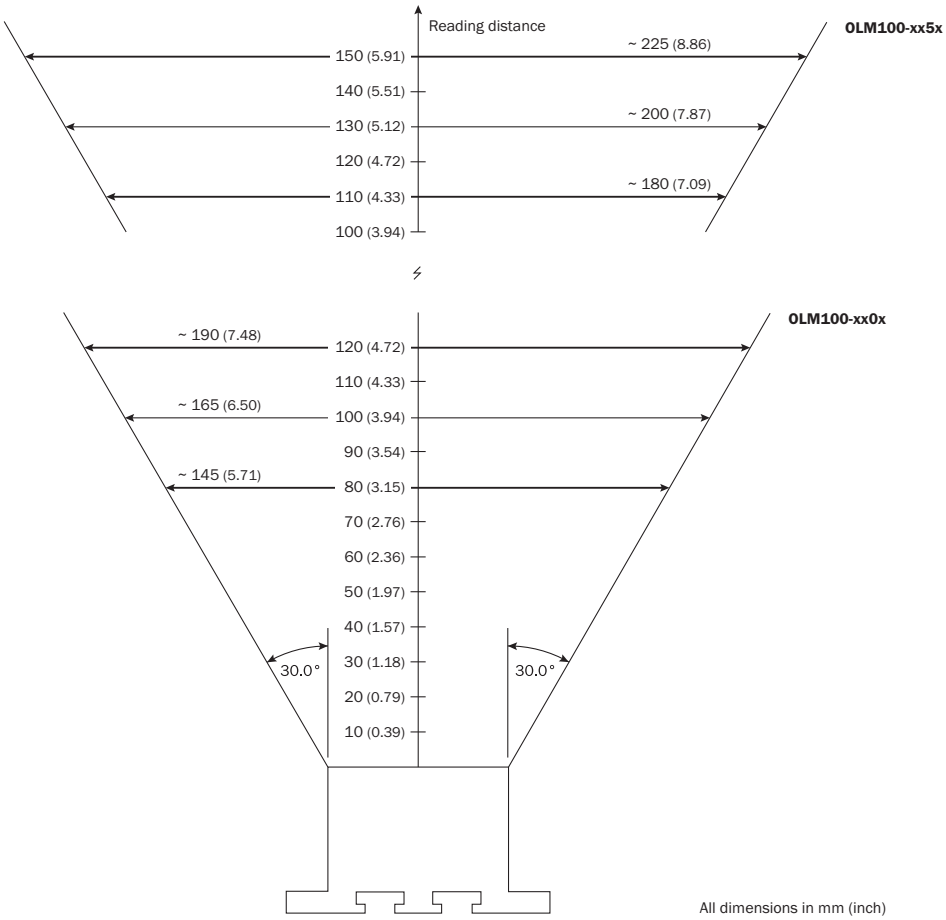


Figure 13: Field of view of the OLM100

6 Electrical installation

6.1 Safety

ATTENTION
Sensor damage due to incorrect supply voltage.

An incorrect supply voltage may result in damage to the sensor.

- Only operate the sensor using a protected low voltage and safe electrical insulation as per Protection Class III.

ATTENTION
Sensor damage or unpredictable operation due to working with live parts.

Working with live parts may result in unpredictable operation.

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

6.2 Wiring notes

ATTENTION
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:

- ▶ http://www.mysick.com/en/olm100
- ▶ http://www.mysick.com/en/olm100_hi

All electrical connections of the sensor are configured as M12 round connectors. The IP65 protection class is only achieved with screwed plug connectors or cover caps.

Please observe the following wiring notes:

- A correct and complete cable shielding design is required for trouble-free data transmission.
- The cable shield must be connected at both ends in the control cabinet and at the sensor. The cable shield of the pre-assembled cable is connected to the knurled nut and thus extensively to the sensor housing also.
- The cable shield in the control cabinet must be connected extensively to the operational earth see Fig. 17.
- Appropriate measures must be taken to prevent equipotential bonding currents flowing through the cable shield.
- During installation, pay attention to the different cable groups. The cables are grouped into the following 4 groups according to their sensitivity to interference or radiated emissions.
  - Group 1: Cables very sensitive to interference, such as analog measuring cables
  - Group 2: Cables sensitive to interference, such as sensor cables, communication signals, bus signals
  - Group 3: Cables which are a source of interference such as control cables for inductive loads, motor brakes

- Group 4: Cables which are powerful sources of interference, such as output cables from frequency inverters, welding system power supplies, power cables
- Cables in groups 1, 2 and 3, 4 must be crossed at right angles see Fig. 14
- Cables in groups 1, 2 and 3, 4 must be routed in different cable channels or metallic separators must be used see Fig. 15 and see Fig. 16. This applies particularly if cables of devices with a high level of radiated emission, such as frequency converters, are laid parallel to sensor cables.

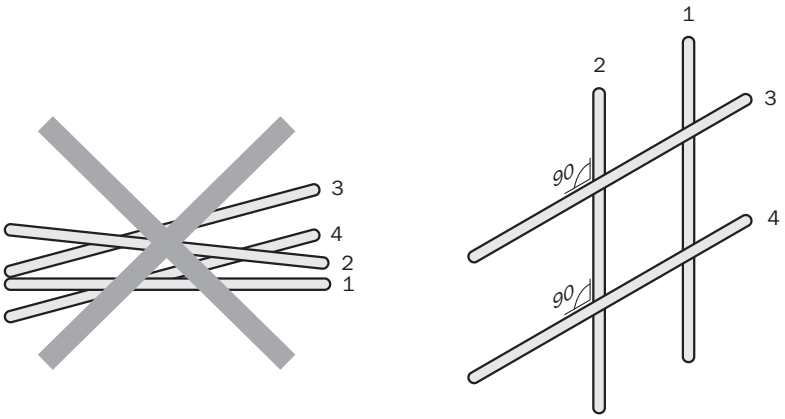


Figure 14: Cross cables at right angles

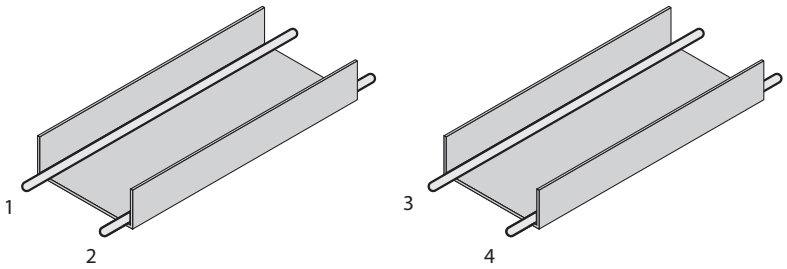


Figure 15: Ideal laying - Place cables in different cable channels

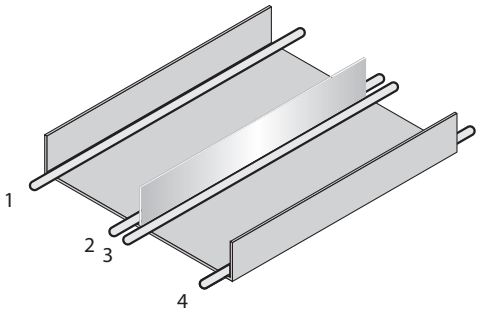


Figure 16: Alternative laying – Separate cables with metallic separators

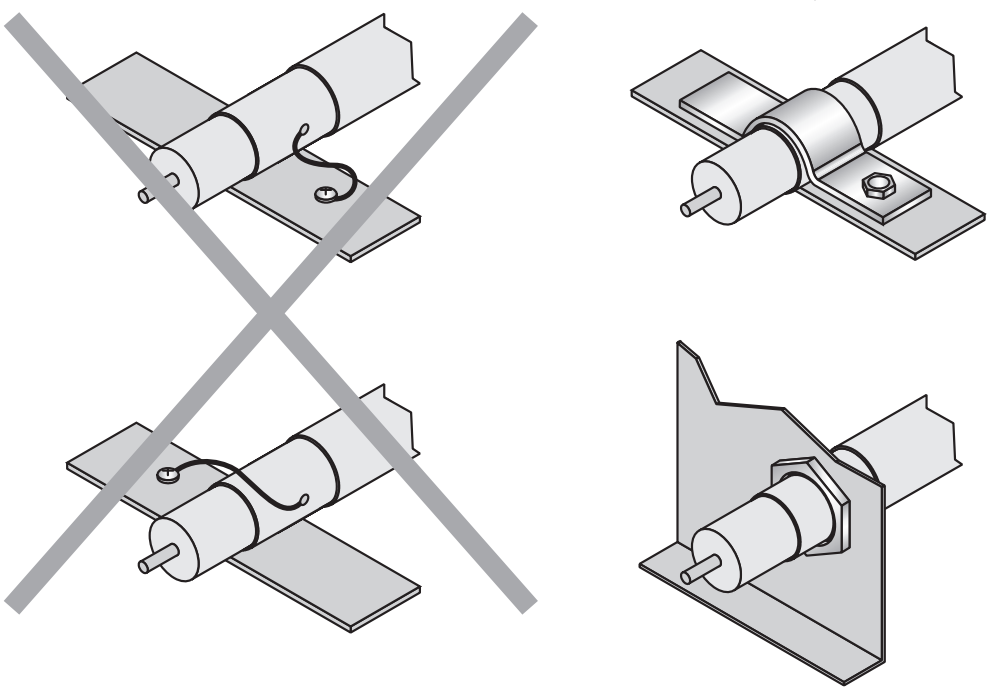


Figure 17: Make an extensive and low-impedance ground connection of the cable shield in the control cabinet.

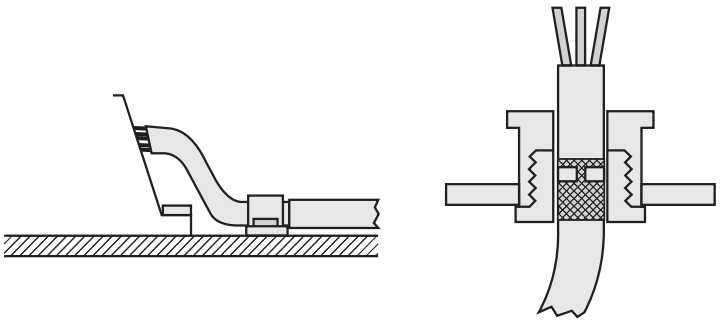


Figure 18: Shield connection in plastic housings

NOTE

Prevent equipotential bonding currents via the cable shield with a suitable grounding concept.

6.3 Connect sensor electrically

NOTE

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

1. Ensure that there is no voltage.
2. Connect the sensor according to the connection diagram.

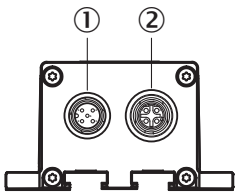


Figure 19: Position of the electrical connections

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

② Ethernet interface, female connector M12, 4-pin

NOTE

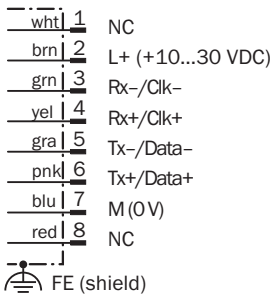
Reliable data transmission is only possible when using screened cables with twisted-pair conductors. A correct and complete cable shielding concept is required for trouble-free operation. In particular, it is necessary to ensure that the cable shield contacts the control cabinet and the linear measurement sensor at both ends.

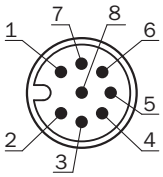
The cable shield of the pre-assembled cable is connected to the knurled nut or the functional earth connection pin and thus also to the sensor housing. Appropriate measures must be taken to prevent equipotential bonding currents flowing through the cable shield.

6.4 Connection diagrams

6.4.1 RS-422 and SSI connection diagram

①

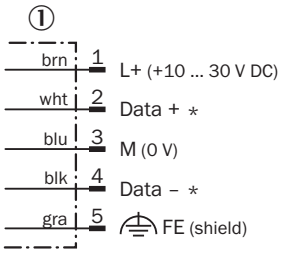


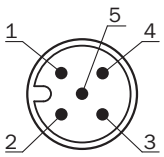


Contact	Marking	Wire color	Description
1	NC	White	Not assigned
2	L+	Brown	Supply voltage: +10 - 30 V DC
3	Rx–/CLK–	Green	Clock – (SSI) / receiver – (RS-422)
4	Rx+/CLK+	Yellow	Clock + (SSI) / receiver + (RS-422)
5	Tx–/Data–	Gray	Data signal – (SSI) / sender – (RS-422)
6	Tx+/Data+	Pink	Data signal + (SSI)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

Table 2: RS-422 and SSI connection diagram, M12 male connector, 8-pin, A coded

6.4.2 Connection diagram RS-485

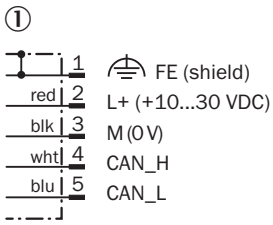


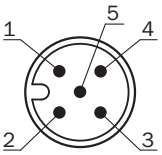


Contact	Marking	Wire color	Description
1	L+	Brown	Supply voltage: +10 - +30 V DC
2	Data +	White	Data cable +
3	M	Blue	Supply voltage: 0 V
4	Data –	Black	Data cable –
5	FE	Gray	Shield

Table 3: Connection diagram RS-485, male connector M12, 5-pin, A coded

6.4.3 CANopen connection diagram

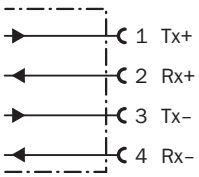


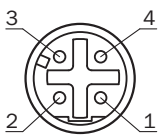


Contact	Marking	Wire color	Description
1	FE	–	Screen
2	L+	Red	Supply voltage: +10 - +30 V DC
3	M	Black	Supply voltage: 0 V
4	CAN_H	White	Data cable (CAN) high
5	CAN_L	Blue	Data cable (CAN) low

Table 4: CANopen connection diagram, male connector M12, 5-pin, A coded

6.4.4 Ethernet connection diagram





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

Table 5: Ethernet connection diagram port 1 and port 2

Contact	Marking	Description
4	Rx–	Receive data signal –

Table 5: Ethernet connection diagram port 1 and port 2

7 Commissioning

7.1 Configure the sensor

If required, the factory setting of the linear measurement sensor can be modified using the corresponding serial data interface (only in RS-422 or RS-485 variant). In addition, diagnostic data can be interrogated. Alternatively, the factory setting can be changed and diagnostic data interrogated via the Ethernet configuration interface in all variants. The parameters that can be displayed and changed depend on the data interface in question.

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

For configuration of the linear measurement sensor and servicing or diagnostic purposes, the sensor can be accessed using the SOPAS ET software.

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

NOTE
The most up-to-date version of the SOPAS ET software can be downloaded at http://www.mysick.com/en/SOPAS_ET .

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

A sensor 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.

Action in case of read errors

If the sensor cannot identify any bar codes on a bar code tape, the position value 0 is output. At the same time the error is displayed in SOPAS ET and output over the data interface. Alternatively, the action on read errors can be changed to RETAIN 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
- 1 mm

Multiple reading

The MULTIPLE READING option allows the detection reliability of the sensor to be increased. With this, a bar code 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)	Up to 10.0 m/s
Medium (3x)	Up to 3.3 m/s
Rugged (5x)	Up to 2.0 m/s
Auto	Up to 10.0 m/s (see above)

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 bar code tape (e. g. at diverters or expansion joints)

If, as a result of the stated read interference bar codes can no longer be read, the current position value is determined in another way. Initially, an attempt is made to determine the position change from processing raw images taken by the sensor. 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. As soon as it is once again possible to detect a valid position value from the bar codes 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 sensor 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 sensor (flashes green), SOPAS ET, and the data interface. Warning F2 SMARTPOS ACTIVE is deactivated by default.

7.2.2 Diagnostics

Using SOPAS ET, it is possible to monitor the operational status of the sensor. 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 bar codes in the field of view), errors and warnings, signal quality (exposure time), temperature in the sensor. Illustration of the LEDs on the sensor.

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

7.2.3 Changing the bar code tape alignment

Using SOPAS ET, the bar code tape alignment can be changed during running operation see "Function", Page 11. This function can be found on the METHODS page.

NOTE
Changes to bar code alignment are not stored permanently by SOPAS ET and are deleted after restarting the sensor.

7.3 SSI interface

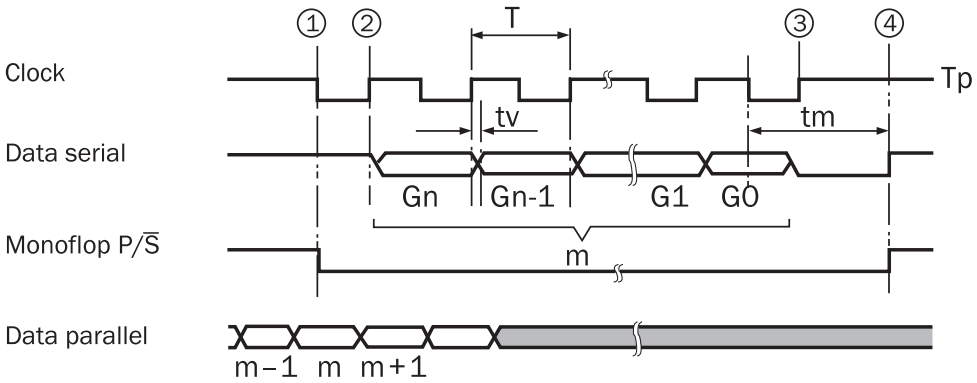
Data transmission with the SSI setting takes place on request by the control unit, in which case the cycle time and transmission speed can be set within broad limits. For this purpose, the connected control unit applies a pulse sequence to the receive input of the linear measurement sensor. Every positive pulse edge causes a data bit to be pushed onto the transmit line of the linear measurement sensor, 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.

Cable length [m]	Transmission rate [kbd]
< 25	< 500
< 50	< 400
< 100	< 300
< 200	< 200
< 400	< 100

Table 6: Cable lengths and transmission rates

NOTE
If the resolution of the linear measurement sensor 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.

Pulse diagram – data transmission



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

7.3.1 SSI data formats

The sensor supports the following SSI data formats (bold = factory presetting):

- Gray code
  - **Gry24E: Measured value bit 24 - 1, error bit 0**
  - Gry24E: Measured value bit 23 - 0
  - Gry25: Measured value bit 24 - 0
- Binary code
  - Bin24E: Measured value bit 24 - 1, error bit 0
  - Bin24E: Measured value bit 23 - 0
  - Bin25E: Measured value bit 24 - 0

NOTE
If the sensor 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	Er-
24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	ror bi- nary

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	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

7.4 RS-422 or RS-485 interface

The serial interface of the sensor makes it possible to read out 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 33

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 linear measurement sensor is the STANDARD protocol type, output of measured values ON REQUEST, data transmission rate 115k2, 8n1.

7.4.1 Protocol types for outputting the position value

Depending on the selected protocol type, sensor transmits the position values as follows:

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]

Table 7: Protocol types

[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 29.

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 sensors of other manufacturers.

7.4.2 Output rates and response times

After the sensor 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

	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

Table 8: Standard protocol output rates/response times

CRLF protocol/CRLF continuous protocol

	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

Table 9: CRLF protocol and CRLF continuous protocol output rates/response times

7.4.3 Commands

Commands for outputting position values

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" [1]	<STX>050101<ETX>
Output position value continuously "off" [1]	<STX>050100<ETX>

Table 10: Commands for position value output

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

Commands for changing the output protocol

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

Table 11: Commands for position value output

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

Set data transmission rate 4,800 bd [1]	<STX>022C00<ETX>
Set data transmission rate 9,600 bd [1]	<STX>022C01<ETX>
Set data transmission rate 19,200 bd [1]	<STX>022C02<ETX>
Set data transmission rate 38,400 bd [1]	<STX>022C03<ETX>
Set data transmission rate 115,200 bd [1]	<STX>022C04<ETX>
Set resolution 1 mm [1]	<STX>022C00<ETX>
Set resolution 0.1 mm [1]	<STX>022E01<ETX>
Activate parameter and store permanently	<STX>0306<ETX>
Activate parameter without storing	<STX>0307<ETX>
Read out sensor interior 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>

Table 12: Special commands

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

Assignment of diagnostics information:

- 1 ≙ F1: over/under temperature
- 2 ≙ F3: 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 sensor	<STX>050101<ETX>
From sensor (with standard protocol)	<STX>850101<ETX>
After this, continuously sent from sensor	<STX>0301<9*[0 - 9]><ETX>
Example: Position 836 mm (at resolution 1 mm)	<STX>0301000000836<ETX>

Output position value continuously "off"

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

7.4.5 Examples of commands for special functions

Set operator password

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

Select standard protocol

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

Set baud rate 4,800 bd

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

Set resolution 1 mm

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

Activate parameter and store permanently

From the sensor	<STX>0306<ETX>
To the sensor	<STX>04060010<ETX>

Activate parameter without storing (warm start)

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

Read out sensor internal temperature

From the sensor	<STX>0124<ETX>
To the sensor	<STX>8124<2*[0...F]<ETX>
Example: +45 °C	<STX>81242D<ETX>

Switch off LED lighting

From the sensor	<STX>0333<ETX>
To the sensor	<STX>043300<ETX>

Read out firmware version

From the sensor	<STX>0118<ETX>
To the sensor	<STX>8118000C<12*[ASCII]><ETX>

Reinitialization (cold start)

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

Reset to factory settings

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

Read out diagnostics

From the sensor	<STX>011D<ETX>
To the sensor	<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 41. Bits of unused or inactive error codes = "0", active error codes = "1"

Example: Error F3 (= no bar code tape)

From the sensor					<STX>811D04<ETX>			
0	0	0	0	0	1	0	0	From the sensor

F8	F7	F6	F5	F4	F3	F2	F1	Error code

NOTE
If the sensor 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 online at:

- http://www.mysick.com/en/olm100
- http://www.mysick.com/en/olm100_hi

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 29.

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

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 temporarily stored in the linear measurement sensor. 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:

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

Table 13: Description of data bytes

If error bit = 1 then there is an error, if error bit = 0 then there is no error. For a detailed description of the error, refer to Chapter 9, "Error tables and preventive measures."

Following start up, the sensor is in CANopen status PRE-OPERATIONAL. 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 status OPERATIONAL. This is produced by the NMT service 'START REMOTE SERVICE', that must be sent by the NMT master (see Specification CIA-301).

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

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

Table 14: Index value SDO output

NOTE

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

8 Maintenance

8.1 Cleaning

ATTENTION
Sensor damage due to improper cleaning.

Improper cleaning may result in damage to the sensor.

- Never use cleaning agents containing aggressive substances.
- Never use pointed objects for cleaning.

▶ Clean the front screens at regular intervals with a lint-free cloth and plastic cleaning agent. 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.

8.2 Maintenance

The sensor requires the following maintenance work at regular intervals:

Interval	Maintenance work	To be carried out by
Cleaning interval depends on ambient conditions and climate	Clean housing and front screen	Specialist
Every 6 months	Check the screw connections and plug connections	Specialist

Table 15: Maintenance schedule

9 Troubleshooting

Possible faults and rectification measures are described in the table below. In case of faults that cannot be rectified using the information below, please contact the manufacturer. Please refer to the back page of these operating instructions for your agent's contact details.

General faults, warnings and errors

General faults are subdivided into warnings and errors. For active warnings, current measured values are output, for active errors, measurement is no longer possible. 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 in the sensor. The POWER LED signals that the sensor is connected to the power supply.

9.1 Warning and error messages

Indication on display (meaning)	LED indicator	Possible causes	Troubleshooting
Error F1 (Over or under temperature)	■ Power LED: red ■ Status LED: off	The internal temperature of the sensor is outside the permissible range.	■ Check 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 not determined from bar codes, but from processing raw images or extrapolation see "Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)", Page 29.	Check bar code tape and sensor. Remove contamination and rectify damage.
Error F3 (no bar code tape detected)	■ Power LED: green ■ Status LED: red	■ No bar code tape present. ■ Sensor poorly aligned. ■ Sensor or bar code tape totally contaminated. ■ Working distance too small/large.	■ Mount bar code tape in front of sensor. ■ Align sensor with the bar code tape. ■ Clean the optical limit surfaces of the sensor and the bar code tapes. ■ Check the distance between the sensor and the bar code tape.
Error F4 (error during position value calculation/read error)	■ Power LED: green ■ Status LED: red	■ Alignment of bar code not detected. ■ Bar code tape damaged. ■ Unsuitable bar code tape used.	■ Interrupt the supply voltage or send cold start command. ■ Renew bar code tape. ■ Use original bar code tape see "Bar code tape", Page 48.

Table 16: Warning and error messages

Indication on display (meaning)	LED indicator	Possible causes	Troubleshooting
Warning F5 (contamination)	▪ Power LED: green ▪ Status LED: red, flashing	▪ Sensor or bar code tape contaminated. ▪ Insufficient illumination.	▪ Clean bar code tape and optical limit surfaces of the sensor. ▪ Replace sensor.
Error F7 (position outside measuring range)	▪ Power LED: green ▪ Status LED: red	Calculated position value smaller than 0 or greater than 10 km.	Modify the value range of the attached bar code tape accordingly.
Memory error	▪ Power LED: red ▪ Status LED: red	Internal error	Restart the sensor (interrupt voltage supply). If the fault recurs, contact SICK customer services. For address, see rear side.

Table 16: Warning and error messages

9.2 Returns

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

- Details of a contact person
- A description of the application
- A description of the fault that occurred

9.3 Repairs

Repairs of the sensor may only be carried out by the manufacturer. Any manipulation or modification of the sensor will invalidate the manufacturer warranty.

9.3.1 Repairing damage to bar code tape

Replace bar code tape

For a high-quality and long-lasting result, the use of original SICK bar code tape is recommended see "Order notes and variants of the bar code tape", Page 49. The minimum ordering length 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 50.

The PDF documents are available for download at:

▶ **http://www.mysick.com/en/olm100**
▶ **http://www.mysick.com/en/olm100_hi**

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

Temporary repairs to damaged areas can be achieved by covering them with SmartPOS repair bar code tape see "Order notes and variants of the bar code tape", Page 49. This is a special repair tape that, unlike the normal bar code tape, does not contain any absolute position values and can therefore be used anywhere. When traveling over this tape, the sensor 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 29.

NOTE

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

9.4 Disposal

Observe the following points for disposal:

- Do not dispose of the device along with household waste.
- Dispose of the sensor according to the applicable country specific regulations.

10 Technical data

NOTE

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

- http://www.mysick.com/en/olm100
- http://www.mysick.com/en/olm100_hi

10.1 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
RS-485, binary	100 mm ± 20 mm	30 mm	OLM100-1005S01
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[1]	30 mm	OLM100-1201
RS-422	100 mm ± 20 mm[1]	30 mm	OLM100-1203
CANopen	100 mm ± 20 mm[1]	30 mm	OLM100-1206

Suitable bar code tapes

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

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

10.2 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 product travel path[2]	0 m - 10000 m
Max. traverse speed	10 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

10.3 Mechanics/electronics

Supply voltage U_V[1]	DC 10 V ... 30 V
Residual ripple[2]	≤ 5 Vss
Power consumption	< 3 W
Initialization 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.

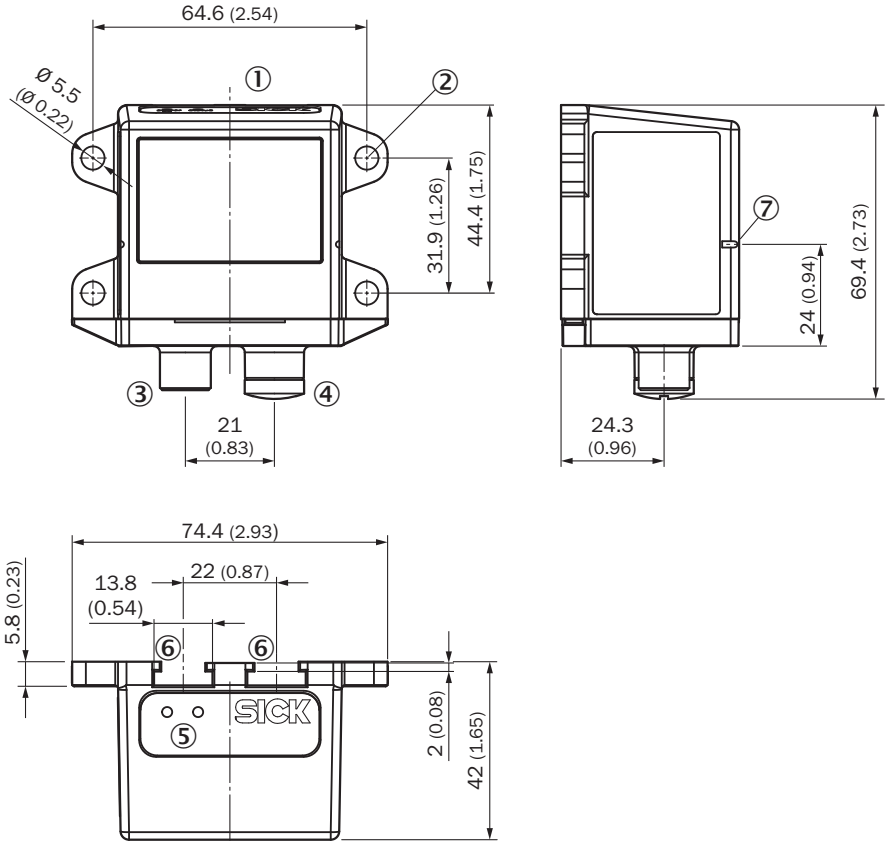
10.4 Ambient data

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
Typical ambient light immunity[3]	≤ 30000 lx
Enclosure rating	IP 65
Vibration resistance	EN 60068-2-6, EN 60068-2-64
Shock resistance	EN 60086-2-27

Table 17: Ambient data

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

10.5 Dimensional drawing



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)

10.6 Bar code tape

Upper material	Polyester film, white, matt, silicone-free
Foil thickness acc. to ISO 534	56 µm ± 10 %
Upper material thickness incl. adhesive	Approx. 102 µm
Tear resistance acc. to ISO 1184	> 150 N/15 mm
Adhesive	Permanent adhesive based on modified acrylates. Suitable for problem substrates.

Table 18: Bar code tape

Adhesive force (adhesive force level T acc. to DIN 30646, measured on stainless steel)	Steel	> 9.3 N/10 mm
	Aluminum	> 8.0 N/10 mm
	Polypropylene	> 6.2 N/10 mm
	HD polyethylene	> 4.3 N/10 mm
	Smooth powder paint	> 7.8 N/10 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	Relative humidity 98 %	120 h at 38 °C
	Diesel oil	4 h at 23 °C
	Glass cleaner	4 h
	Isopropanol	4 h
	DOT brake fluid 4	4 h
	Heptane	4 h
	Engine oil SAE 15W40	4 h
	Toluol	4 h
	Industrial cleaner	4 h
	Kerosene (US), paraffin (GB)	4 h
	Washing-up liquid	24 h
	Salt spray test acc. to DIN 50021 SS	150 h
	Climatic stress acc. to DIN 50018 SFW 2.0	No change after 2 stress cycles
Base corrosion	No corrosion on the glued base	
Dimensional stability	Key figure 02 (checked to DIN 30646) Shrinkage < 0.2%	

Table 18: Bar code tape

11 Accessories

NOTE

Accessories can be found online at:

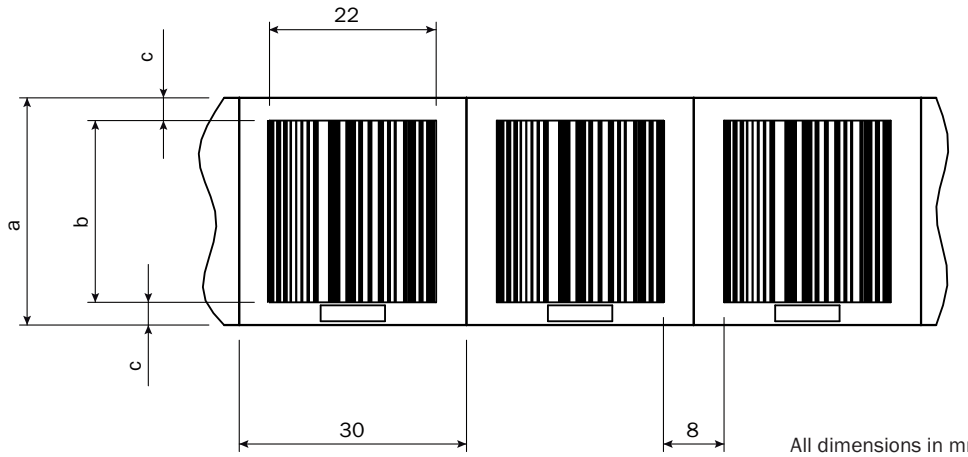
- http://www.mysick.com/en/olm100
- http://www.mysick.com/en/olm100_hi

11.1 Bar code tape

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

For correct mounting of the bar code tape see "Mount the bar code tape", Page 17.

Dimensions of the bar code tape



All dimensions in mm

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	24	0
30	24	3
40	34	3
60	54	3
100	94	3

Bar code tape printing

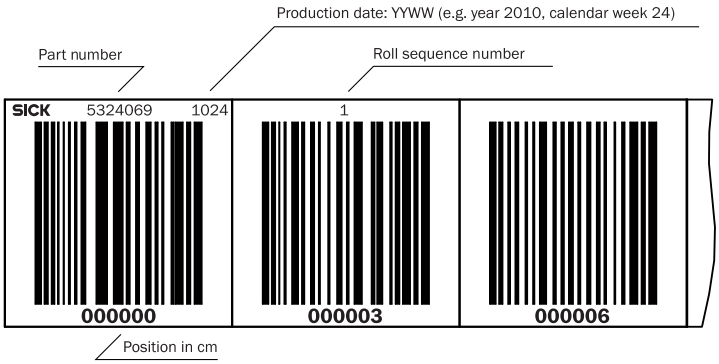


Figure 20: Bar code tape, height 30/40/60/100 mm

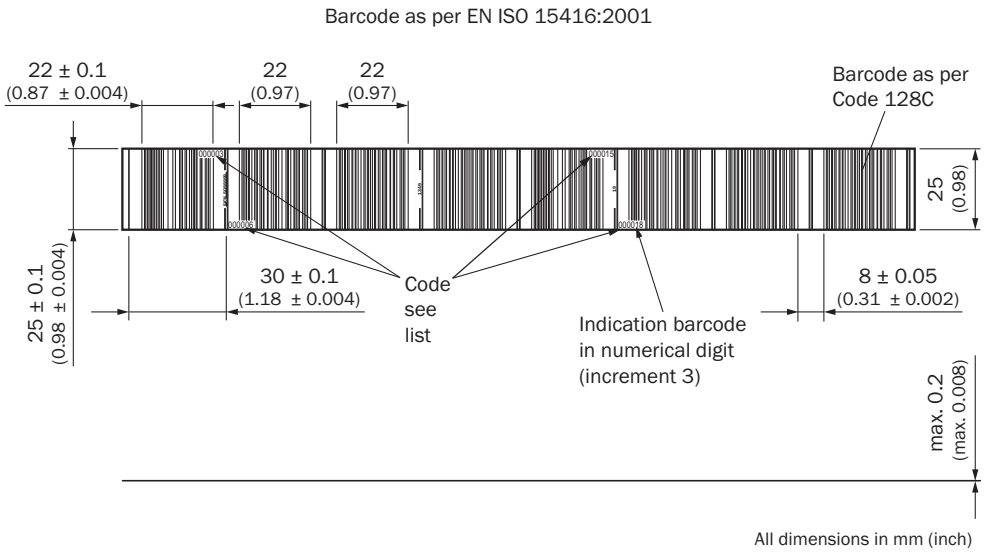


Figure 21: Bar code tape, 25 mm height

11.2 Order notes and variants of the bar code tape

The bar code tape is available from the warehouse for measuring ranges from 0 to 120 m, in lengths of 20 m per roll. Bar code tape for measuring ranges that exceed 120 m or which cannot reasonably be represented with the available 20 m sections can be produced for specific customer orders. For measuring ranges greater than 120 m, we recommend ordering the entire measuring range as a bar code tape produced as a specific customer order.

NOTE

Detailed ordering information for the bar code tape can be found online at:

- http://www.mysick.com/en/olm100
- http://www.mysick.com/en/olm100_hi

Customer specific bar code tape

Bar code tape	Part no.	Description
Width 30 mm Height 25 mm	5328960	Bar code tape with customer specific printed measuring range. Tape height = 25 mm/minimum length = 20 m Delivery on rolls with max. 20 m length per roll
Width 30 mm Height 30 mm	5322556	Bar code tape with customer specific printed measuring range. Tape height = 30 mm/minimum length = 20 m Delivery on rolls with max. 20 m length per roll
Width 40 mm Height 40 mm	5323951	Bar code tape with customer specific printed measuring range. Tape height = 40 mm/minimum length = 20 m Delivery on rolls with max. 20 m length per roll
Width 30 mm Height 60 mm	5327812	Bar code tape with customer specific printed measuring range. Tape height = 60 mm/minimum length = 20 m Delivery on rolls with max. 20 m length per roll
Width 30 mm Height 100 mm	5327576	Bar code tape with customer specific printed measuring range. Tape height = 100 mm/minimum length = 20 m Delivery on rolls with max. 20 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 the measuring range = 251 cm

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

End of the measuring range = 986 cm

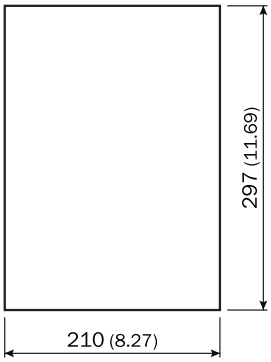
1. 1. 986 / 3 = 328.667 (divide by 3).
2. 2. 328.667 → 329 (round up to next whole number).
3. 3. 329 x 3 = 987 x 3 (multiply by 3). **End code = 987 cm**

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
Height 60 mm Width 30 mm	5329020
Height 100 mm Width 30 mm	5329021

11.3 Blank labels for repair codes or control marks

Type	Part number
Blank labels, self-adhesive, DIN-A4, 10 items (BES-A4-0LM)	5322680

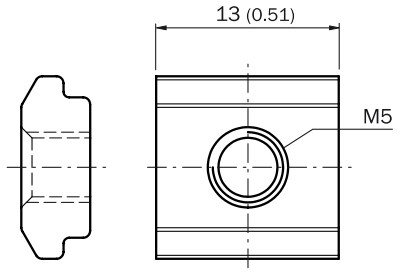


All dimensions in mm (inch)

Table 19: Blank labels

11.4 Sliding nuts

Type	Part number
Sliding nuts M5 (4 items)	2017550



All dimensions in mm (inch)

Table 20: Sliding nuts, M5

12 Appendix

12.1 EC declaration of conformity

The EC declaration of conformity can be downloaded via the Internet from:

- http://www.mysick.com/en/olm100
- http://www.mysick.com/en/olm100_hi

8014310/YCT8/2014-07 | 8M_SH

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