OPERATING INSTRUCTIONS

OLM100

Linear measurement sensor

EN

applicable to firmware V1.0 – 01.03.10
V1.1 – 01.03.10
V1.0 – 15.03.10

SICK
Sensor Intelligence.

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Contents

1 About this document

Please read this chapter carefully before you use the documentation and work with the linear measurement sensor OLM100.

1.1 Function of this document

These operating instructions instruct the technical personnel of the machine manufacturer or machine owner in safe mounting, configuration, electrical installation, commissioning as well as operation and maintenance of the linear measurement sensor OLM100.

These operating instructions do not provide information about operation of the machine in which the linear measurement sensor OLM100 is or will be integrated. For information about this, refer to the operating instructions of the machine.

1.2 Information depth

These operating instructions contain information about the linear measurement sensor OLM100 on the following topics:

- Mounting
- Electrical installation
- Commissioning and configuration
- Fault diagnosis and rectification
- Technical data

All official and statutory regulations governing operation of the linear measurement sensor OLM100 must be complied with.

Note Please also refer to the website at: www.sick.com/OLM

There, you can find:

- Available control codes and repair codes for download as a PDF file
- Sample applications
- The "OLM100.eds" EDS file for the linear measurement sensor OLM100-xxx6
- A list of FAQs for the linear measurement sensor OLM100
- SOPAS Engineering Tool software for configuration via the Ethernet interface.

1.3 Scope of application and version

Note These operating instructions apply to the linear measurement sensor OLM100 with firmware version V1.0-01.03.10 or V1.1-01.03.10 and bar code tapes with a date of manufacture ≥ week 27/2010. The current version of this document is given in the footer.

Important modifications compared to the version 2009-08-05:

Tab. 1: Important modifications

Section	Description
2.2	– Modification of the variant OLM100-1005 from RS-485 binary protocol type 2 to RS-485 ASCII protocol – Introduction of the special device OLM100-1005S01 (RS-485 binary protocol type 2) – Introduction of the high-performance variant OLM100-1201 – Introduction of additional device variants for 40 mm wide bar codes
3.1	– Introduction of an alignment mark for sensor mounting and adjusting for optimum vertical alignment
5.3	– Introduction of the RS-485 interface with ASCII protocol – Expansion of the RS-422 interface with ASCII-CRLF protocol – Expansion of the command interface
7.4	– Dimensional drawings and order numbers of bar code tapes – List of available bar code tapes

1.4 Symbols used

Note Notes inform you about special aspects of the device.

WARNING

Warning!

A warning refers to specific or potential dangers. This is intended to protect you against accidents.

Read the warnings carefully and comply with them!

2 Product description

This chapter informs you about the special properties of the linear measurement sensor OLM100. It describes the construction and operating principle of the device.

Always read this chapter before mounting, installing or operating the device.

2.1 Safety notes

2.1.1 Safety standard

The linear measurement sensor OLM100 has been developed, produced and tested in accordance with the applicable safety standards. It is in accordance with the state of the art.

2.1.2 Correct use

The linear measurement sensor OLM100 is an opto-electronic sensor and is used for positioning by means of a bar code tape.

WARNING

Protection of the operating personnel and of the device is not guaranteed if the device is not used in accordance with its correct use.

2.1.3 Areas of application

The linear measurement sensor OLM100 is suitable for the following areas of application:

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

2.2 Device designation and corresponding bar code tapes

2.2.1 Standard devices (OLM100-x0xx)

The standard devices listed in Tab. 2 have the following type-specific features:

Max. traverse speed:	4 m/s
Reproducibility: (statistical error 1σ)	1 mm

Tab. 2: Device designation of the standard devices

Data interface	Device designation	Part no.	Bar code width	Reading distance
RS-485	OLM100-1005	1046580	30 mm	100 mm ± 20 mm
RS-422	OLM100-1003	1047412	30 mm	100 mm ± 20 mm
CANopen	OLM100-1006	1047413	30 mm	100 mm ± 20 mm
SSI	OLM100-1001	1047411	30 mm	100 mm ± 20 mm
RS-485 binary protocol type 2	OLM100-1005S01[1)]	1050976	30 mm	100 mm ± 20 mm
RS-485	OLM100-1055	1050135	40 mm	130 mm ± 20 mm
RS-422	OLM100-1053	1050137	40 mm	130 mm ± 20 mm
CANopen	OLM100-1056	1050138	40 mm	130 mm ± 20 mm
SSI	OLM100-1051	1050136	40 mm	130 mm ± 20 mm

2.2.2 High-performance devices (OLM100-x2xx)

The high-performance device listed in Tab. 3 has the following type-specific features:

Max. traverse speed: 10 m/s

Reproducibility: (statistical error 3σ) 0.15 mm

Tab. 3: Device designation of high-performance devices

Data interface	Device designation	Part no.	Bar code width	Reading distance
SSI	OLM100-1201	1053074	30 mm	100 mm ± 20 mm

Note Accessories available for the OLM100-xx0x variants are the appropriate bar code tapes with a bar code width of 30 mm and a tape height of 30 mm or 40 mm.

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

A bar code tape with a height of 30 mm is sufficient in applications in which the linear measurement sensor OLM100 does not exceed a tolerance of ± 3.5 mm at right angles to the transport direction.

The bar code tape with a height of 40 mm permits a tolerance of up to ± 8.5 mm.

[1)] Special device, see chapter 8 "Special devices".

2.3 Principle of operation

The linear measurement sensor OLM100 is a sensor that can measure traverse paths up to 10 km without moving parts. The sensor determines its position via bar code tape attached along the traverse path and uses a visible, red LED beam to do this. By reading the bar codes that are printed on the bar code tape at intervals of 3 cm (OLM100-xx0x) or 4 cm (OLM100-xx5x), the linear measurement sensor OLM100 determines the absolute position and outputs this via an interface. Traverse speeds of up to 4 m/s are possible with a reproducibility of 1 mm.

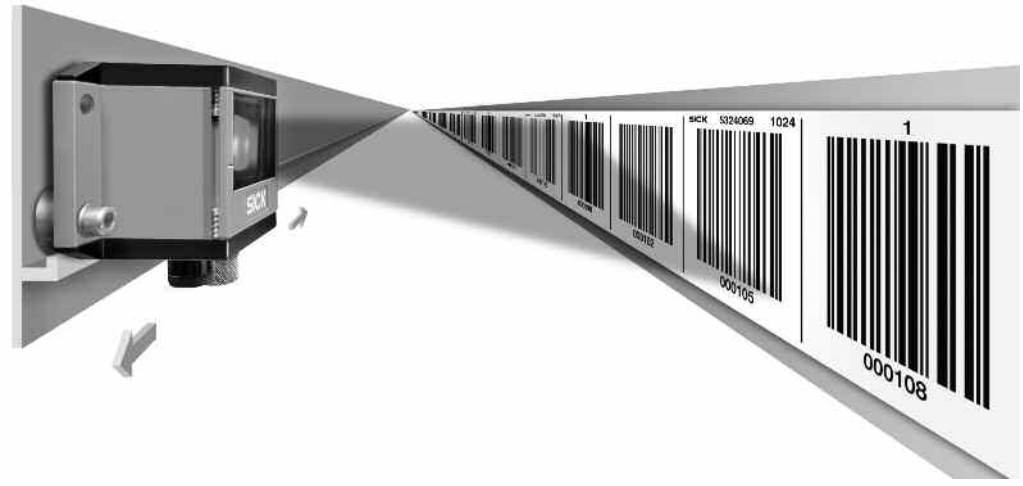
When the supply voltage is applied, the linear measurement sensor OLM100 initially detects the alignment in relation to the bar code tape (0° or 180°). The sensor automatically adapts itself to the alignment that is detected, and then starts outputting position values.

If no bar code tape is detected on startup then the sensor assumes that the alignment is 0°. First of all, error F3 and the measured value "0" are output. The output of current position values starts as soon as bar codes with an alignment of 0°are detected during subsequent traversing. Error F4 and the measured value "0" are output if the alignment of 180° is unexpectedly detected, and this also applies if the alignment is changed along the traverse path. In such a case, current position values are not output until after the supply voltage has been interrupted and the new orientation detected successfully, or after the "Cold start" command has been sent via the serial interface (only in OLM100-xxx3 or OLM100-xxx5 variants).

If the linear measurement sensor OLM100 detects an error condition during the traversing (e.g. no bar code tape or bar code tape defective), this is initially suppressed and extrapolated measured values are output. The extrapolation time depends on the measured value history and is max. 160 ms. If the error conditon persists or exists right from switching on, the OLM100 outputs the measured value "0".

Error statuses can be interrogated via the data interface (except in SSI variant OLM100-xxx1). Alternatively, the SOPAS ET software is available for this via the Ethernet configuration interface.

Fig. 1:
Principle of operation



3 Mounting

This chapter describes how to prepare and perform the mounting of the bar code tape and the linear measurement sensor OLM100.

Note Illustrations and dimension values not in brackets apply to the 30 mm bar code width. Dimensions in brackets apply to the 40 mm bar code width.

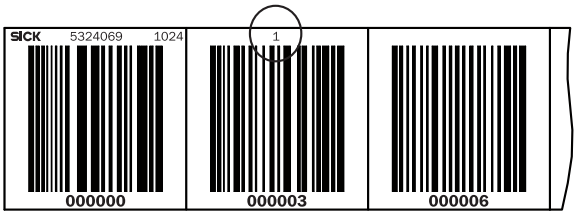
3.1 Bar code tape mounting

3.1.1 General data for the bar code tape

The 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 roll sequence number is located on the bar code tapes to make it easier to maintain the correct sequence.

Fig. 2:
Example for roll 1, measuring range 0 to 20 m



Measuring range [m] from	to	Roll sequence number	Code Start	End
0	20	**1 (see Fig. 2)**	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
120	140	7	012003	014001
140	160	8	014004	016002
160	180	9	016005	018000
180	200	10	018003	020001
200	220	11	020004	022002
220	240	12	022005	024000
240	260	13	024003	026001
260	280	14	026004	028002
280	300	15	028005	030000
300	320	16	030003	032001
320	340	17	032004	034002
340	360	18	034005	036000
360	380	19	036003	038001
380	400	20	038004	040002
400	420	21	040005	042000
420	440	22	042003	044001
440	460	23	044004	046002
460	480	24	046005	048000
480	500	25	048003	050001

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

Align the bar code tape with a reference edge (e.g. rail) of the traverse path and stick this onto the smooth, dry surface that is free from grease and dust, without any tension, folds or creases.

It is possible to stick the tape over small expansion joints and minor points of unevenness. In the case of unevenness or gaps which would cause the bar code tape to be significantly distorted were they 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 (40 mm). At least two successive bar codes must follow after a gap.

We recommend that self-adhesive, cut-to-length blank labels should be stuck over the gap in order to allow it to be traversed without problems (see section 7.4 "Accessories").

Fig. 3:
Cut mark of the bar code tape

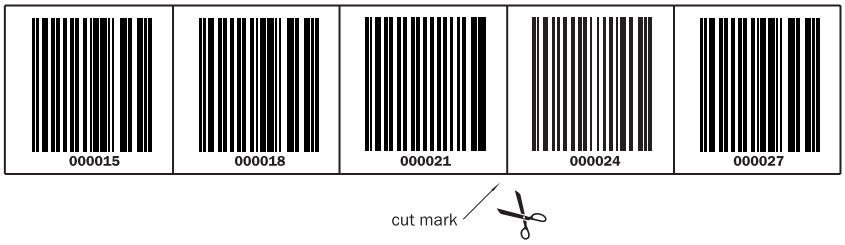
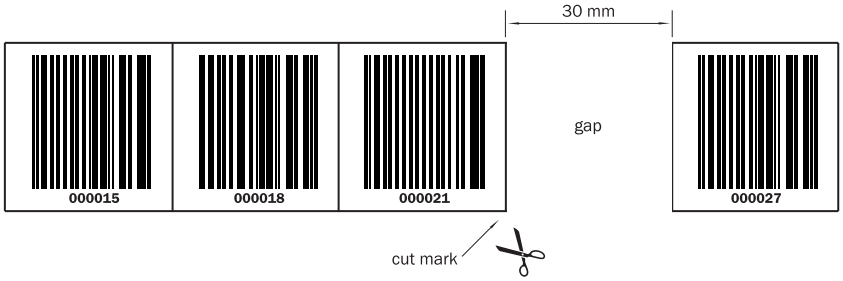


Fig. 4:
Gap in the cut-open bar code tape

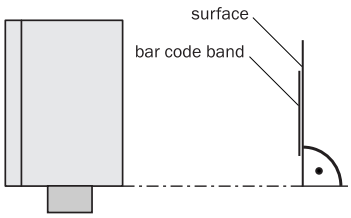


A sequence of bar code tapes without successive measuring ranges is not allowed, otherwise a smooth continuous position cannot be indicated. In case of discontinuation (e.g. at track changes), the linear measurement sensor OLM100 outputs a corresponding jump in the position value as soon as at least two successive bar codes have been detected in the new measuring range.

The linear measurement sensor OLM100 cannot output any negative position values. Therefore, in applications in which it is possible to go below the "0 cm" position (e.g. turntables, switches), it is recommended to dispense with the measuring range from 0 to 20 m, or else to remove the first two codes "0 cm" and "3 cm" ("4 cm").

Note Affix the bar code tape as near as possible to the vertical in order to avoid dust buildups.

Fig. 5:
Vertical bar code tape mounting



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

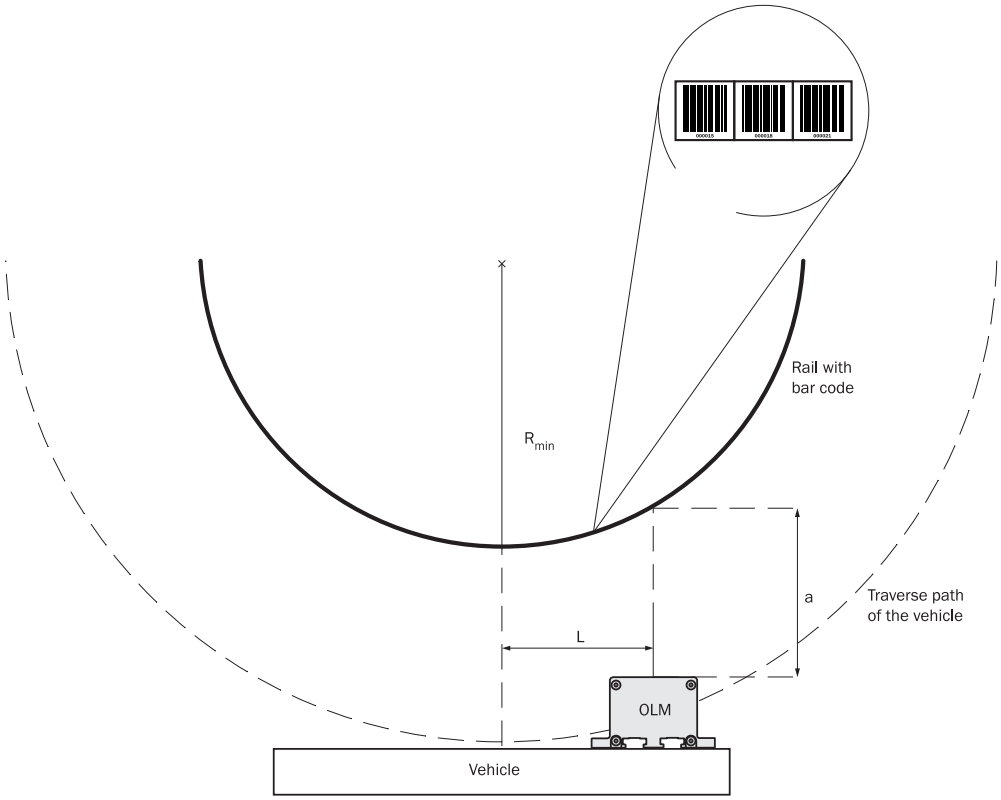
Note A damaged bar code tape can be repaired. Files containing bar codes are available for download from www.sick.com/OLM for this purpose.

These can be printed out on self-adhesive DIN-A4 blank labels (see section 7.4 "Accessories") using a laser printer and cut to size. The printout must be made with at least 600 dpi and without any page or size adaptation.

3.1.2 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. Generally, the linear measurement sensor OLM100 should be mounted preferably in the axis of rotation. 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 applies both to outer and inner radii.

Fig. 6:
Tangential deviation L when cornering



Legend:
R_{min} = Minimum radius
L = Tangential distance when cornering
a = Reading distance

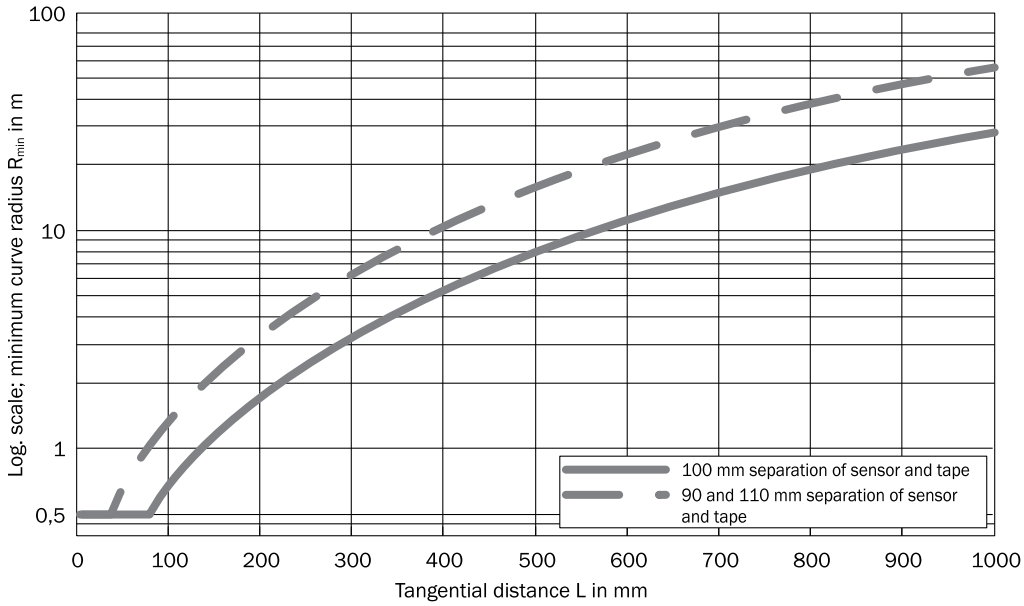


Fig. 7:
Minimum curve radius R_{min} depending on the tangential distance L

3.1.3 Mounting of the bar code tape on vertical curves

In order to attach the bar code tape along a vertical curve, cut into the bar code tape at the cut marks and fan it out. The maximum angle is not allowed to exceed 3°. This corresponds to a gap d of 1.5 mm or 2 mm (with 30 mm or 40 mm high bar code tape, respectively). This produces a minimum radius of 500 mm. The voids created by fanning open should not have a shiny surface, in order to ensure an optimum functional reserve.

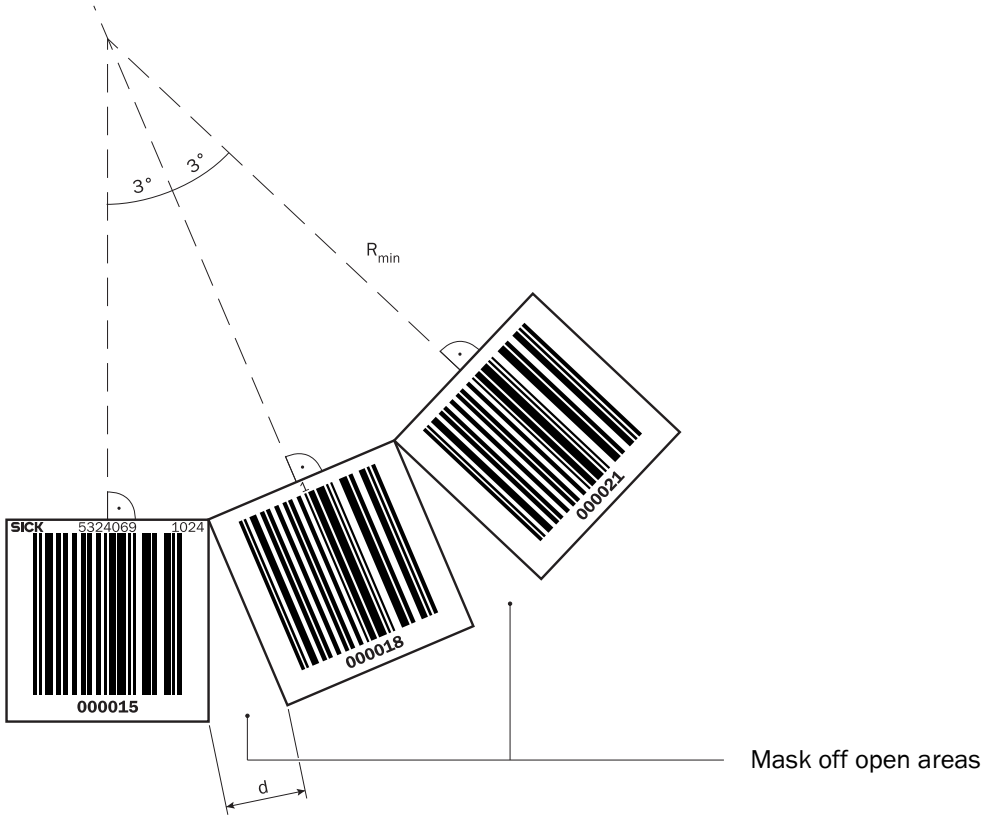


Fig. 8:
Vertical curve radii

Note Make sure that the bar code tape is always in the field of view of the linear measurement sensor OLM100 along a vertical curve. The mounting location of the OLM100 should therefore be selected so that its traverse path runs parallel to the linear axis of the bar code tape. If, as a deviation from this, the OLM100 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.

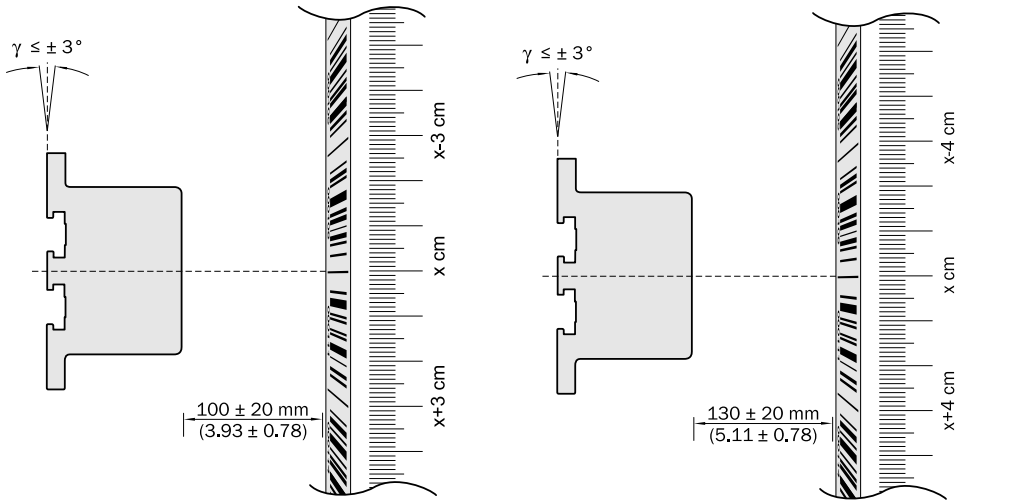
Note Only restricted accuracy and reproducibility are possible with a vertical curve.

3.2 Sensor mounting

The linear measurement sensor OLM100 can be mounted either using the four through boreholes in the housing or the T-slot on the back, using sliding nuts (see section 7.4 "Accessories").

To ensure optimum reading results, mount the linear measurement sensor OLM100 at a nominal distance of 100 mm (130 mm) from the bar code tape, depending on variant, and align it at right angles to the bar code tape.

Fig. 9:
Mounting distances OLM100



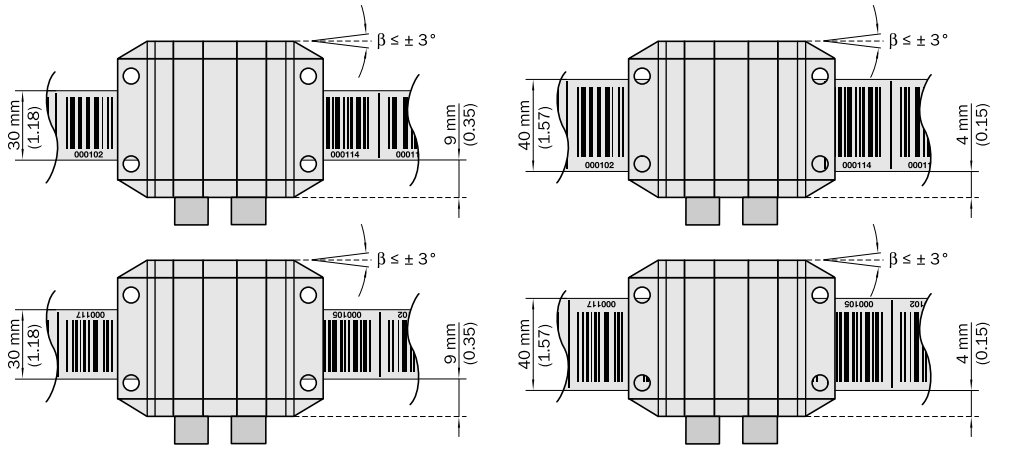
All dimensions in mm (inch)

OLM100-xx0x

All dimensions in mm (inch)

OLM100-xx5x

Comply with the illustrated distances between the bottom edge of the housing and bottom edge of the SICK bar code tape, depending on the height of the bar code tape.



All dimensions in mm (inch)

All dimensions in mm (inch)

Note In particular in curves, take care to maintain a distance of 100 mm ± 20 mm (130 mm ± 20 mm) from the bar code tape.

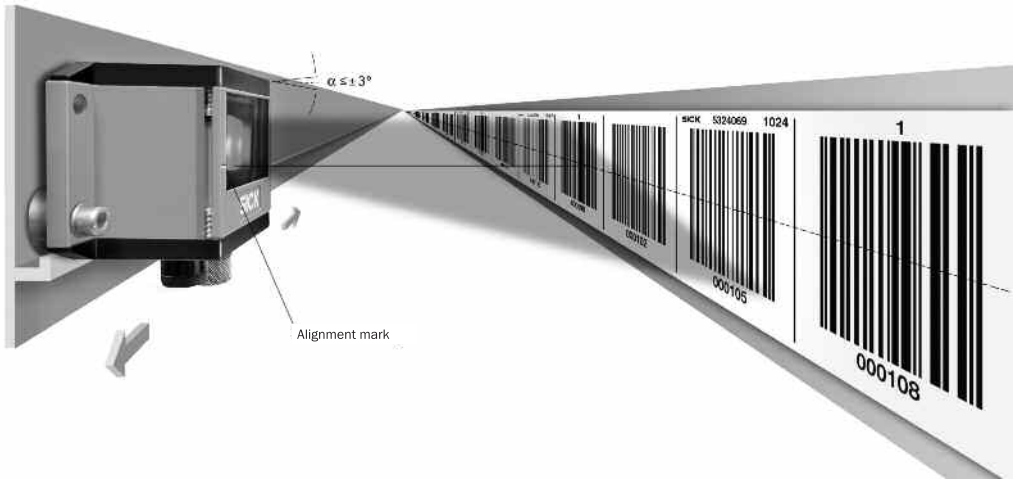


Fig. 10:
Mounting OLM100

The luminous row of the OLM100 does not run parallel to the bar code tape, but on a slight angle. If optimally aligned, the two alignment marks on the front of the OLM100 are located in the vertical middle of the bar code tape, so that the red luminous row is vertically centered on the bar code bar (see Fig. 10). This centering should remain within a tolerance of ± 3.5 mm or ± 8.5 mm for a 30 mm or 40 mm high SICK bar code tape, respectively, along the entire traverse path.

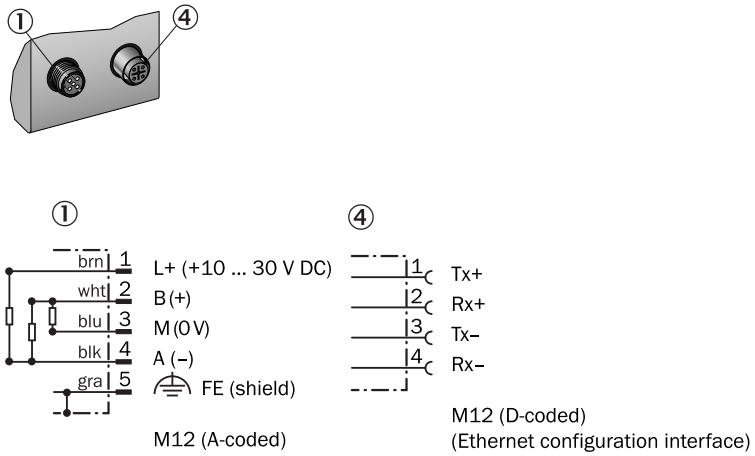
Note If two OLM100 sensors are operated next to one another, a minimum gap of 120 mm (OLM100-xx0x) or 160 mm (OLM100-xx5x) must be maintained between the two sensors.

4 Electrical installation

Secure data transmission is possible when using shielded cables with twisted-pair conductors. A correct and complete shield concept is required for trouble-free function. In particular, it is necessary to ensure that the cable shield contacts the control cabinet and the linear measurement sensor OLM100 at both ends. The cable shield of the cables with terminals (see section 7.4 "Accessories") is connected to the knurled nut and the functional earth connection pin, and therefore to the sensor housing. Take suitable measures to ensure that equipotential bonding currents are prevented from flowing along the cable shield.

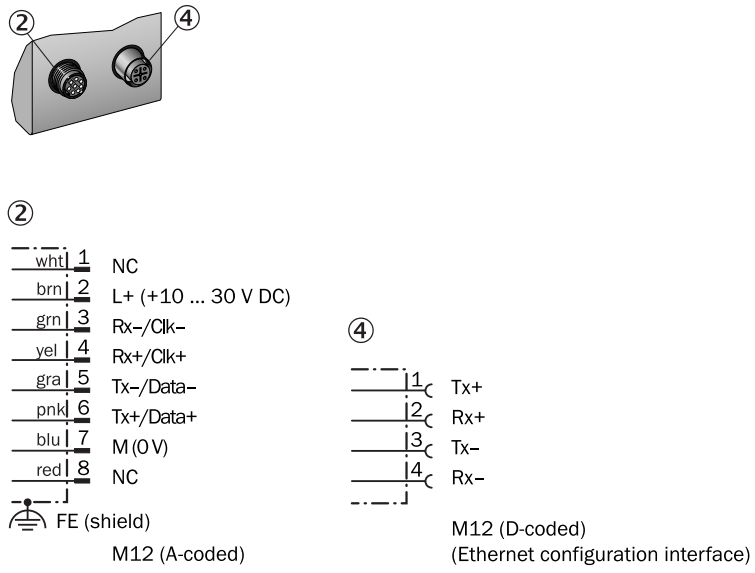
4.1 RS-485

Fig. 11:
RS-485 connection example



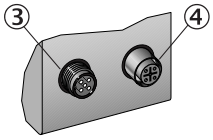
4.2 RS-422/SSI

Fig. 12:
RS-422/SSI
connection example



4.3 CANopen

Fig. 13: CANopen connection example

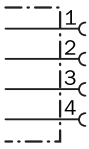


③

FE (shield)
L+ (+10 ... 30 V DC)
M (0 V)
CAN_H
CAN_L

M12 (A-coded)

④



Tx+
Rx+
Tx–
Rx–

M12 (D-coded)
(Ethernet configuration interface)

5 Commissioning

Apply the sensor to operating voltage (see type label). The operating indicator [power on] and status display [status] must light up green if the bar code tape is aligned correctly.

5.1 Device configuration and diagnostics

If required, the factory setting of the linear measurement sensor OLM100 can be modified using the corresponding serial data interface (only RS-422 or RS-485 variants). In addition, diagnostic data can be interrogated. The corresponding commands are described in sections 5.3 and 5.4.

Alternatively, the factory setting can be changed and diagnostic data interrogated via the Ethernet configuration interface in all variants. The current version of the SOPAS Engineering Tool software is available to download from www.sick.com/OLM. SOPAS ET version ≥ V2.22 is required. The available parameters are described in section 5.2.

The parameters that can be displayed and changed depend on the data interface in question.

5.2 Ethernet parameter list and factory defaults

Tab. 4: Ethernet parameter list

Device side	Data interface	Description of parameters	Setting options
OLM100 Main page	all	Indication of position, speed, acceleration, mark counter	Indication only
Overview	all	Indication of firmware version, product code, serial number	Indication only
Diagnostics	RS-485, RS-422, CANopen	Indication of the temperature inside the device, error marker	Indication only
	RS-485 binary protocol type 2 [1)]	Indication of the temperature inside the device, error marker, status information	Indication only

[1)] Notes on data interface RS-485, binary protocol type 2, see chapter 8.1.

Device side	Data interface	Description of parameters	Setting options
Configuration	all	Indication of the MAC address, hardware version	Indication only
Parameter	RS-485	Protocol	**Standard** CRLF on request Binary protocol type 2 [1)]
	RS-422	Protocol	**Standard** CRLF on request CRLF continuous output
	RS-422, RS-485	Baud rate	4k8/9k6/19k2/38k4/57k6/ 62k5/**115k2** bd
		Data format	9n1/**8n1**/8e1/8o1/7n1/7e1/7o1
		Measured value resolution	**0.1 mm**/1 mm
	CANopen	Node ID	1 ... **6** ... 127
		Baud rate	125/250/**500**/1000 **kbd**
		Measured value resolution	**0.1 mm**/1 mm
	SSI	Data format	24 data bits binary + 1 error bit binary (LSB) **24 data bits Gray + 1 error bit binary (LSB)** 24 data bits binary 24 data bits Gray 25 data bits binary 25 data bits Gray
	RS-485 binary protocol type 2 [1)]	Device address	**0** ... 3
		Protocol	Standard CRLF on request **Binary protocol type 2**
		Measured value resolution	**1 mm** (cannot be changed)
		Baud rate	4k8/9k6/19k2/38k4/57k6/ **62k5**/115k2 bd
		Data format	**9n1**/8n1/8e1/8o1/7n1/7e1/7o1
	all	TCP/IP configuration	DHCP switch on/**switch off** IP address: **192.168.100.236** Network mask: **192.168.100.236** Gateway: **255.255.255.0**
	all	Save parameters	Save parameters; reset parameters to factory settings

[1)] Notes on data interface RS-485, binary protocol type 2, see chapter 8.1.

Device side	Data interface	Description of parameters	Setting options
Methods	all	Illumination	**Lightning on**, lightning off
		Restart	Device cold start: Reinitialization Device warm start: Software restart

Bold = Factory default

5.3 RS-422 or RS-485 interface

The serial interface of the linear measurement sensor OLM100 makes it possible to read out the position values and other defined operating date, 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 section 5.3.1 "Protocol types for outputting the position value".

Note

Commands and the corresponding responses (except measured value with "CRLF" and "CRLF continuous" protocols) are always based on the standard protocol.
Parameter changes always need a password to be entered, see Tab. 7. This remains active until it is switched off again using the corresponding command, or the electrical power supply is interrupted.
The factory default setting of the linear measurement sensor OLM100 is the "Standard" protocol type with measured value output "on request", baud rate 115K2, 8n1.

5.3.1 Protocol types for outputting the position value

Depending on the selected protocol type, the linear measurement sensor OLM100 transmits the position values as follows:

Tab. 5: Protocol types

Protocol type	Protocol structure	Output mode
Standard	<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)]

"Standard" protocol type:

All messages are framed within <STX> and <ETX>. There are four additional ASCII characters between <STX> and the nine bytes of the position value. These four are required within the device for communication with the SOPAS Engineering Tool software (see section 5.1 "Device configuration and diagnostics").

Depending on the sent command, either an individual position value is output or the continuous output of position values is switched on or off. A non-volatile configuration as the "Standard" protocol type is possible; this means "Output on request" mode is automatically active.

[1)] Only in RS-422 variant.

Non-volatile configuration as "Continuous output" mode is not possible. After each device restart, starting continuous output requires the corresponding command to be sent via the serial interface.

"CRLF" protocol type:

All messages with the exception of the position value output are enclosed in <STX> and <ETX>. The sign 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 as this protocol type is possible.

"CRLF continuous" protocol type:

All messages with the exception of the position value output are enclosed in <STX> and <ETX>. The sign is always positive, followed by an 8-byte position value and <CR><LF>. A position value is output immediately after the device restart.
Non-volatile parameter setting with this protocol type is only possible with the RS-422 variant.

5.3.2 Commands

Commands for outputting position values

Tab. 6: Commands for position value output

Request position value	<STX>0107<ETX>
Continuous position value output "on" [3]	<STX>050101<ETX>
Continuous position value output "off" [3]	<STX>050100<ETX>

Commands for special functions

Tab. 7: Special commands

Switch on operator password	<STX>0300010000000<ETX>
Switch off operator password	<STX>0302<ETX>
Select standard protocol[1) 2)]	<STX>023000<ETX>
Select CRLF protocol[1) 2)]	<STX>023001<ETX>
Select CRLF continuous[1) 2) 3)]	<STX>023002<ETX>
Set baud rate 4,800 bd[1) 2)]	<STX>022C00<ETX>
Set baud rate 9,600 bd[1) 2)]	<STX>022C01<ETX>
Set baud rate 19,200 bd[1) 2)]	<STX>022C02<ETX>
Set baud rate 38,400 bd[1) 2)]	<STX>022C03<ETX>
Set baud rate 115,200 bd[1) 2)]	<STX>022C04<ETX>
Set resolution 1 mm[1) 2)]	<STX>022E00<ETX>
Set resolution 0.1 mm[1) 2)]	<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>0104<ETX>
Reinitialization (cold start)	<STX>030A<ETX>

1) Operator password required.
2) Following any modification it is essential to store the changes by sending the command "Activate parameter and store permanently" or "Activate parameter without storing".
3) Only in the RS-422 variant.

Reset to factory settings[1)]	<STX>0303<ETX>
Request diagnostics	<STX>011D<ETX>

5.3.3 Examples of commands for outputting position values

Request position value:

To OLM100	<STX>0107<ETX>
From OLM100 (with standard protocol)	<STX>8107<9*[0...9]><ETX>
Example: Position 836 mm (with 1 mm resolution)	<STX>8107000000836<ETX>

Output position value continuously "on":

To OLM100	<STX>050101<ETX>
From OLM100 (with standard protocol)	<STX>850101<ETX>
Then continuously from OLM100	<STX>0301<9*[0...9]><ETX>
Example: Position 836 mm (with 1 mm resolution)	<STX>0301000000836<ETX>

Output position value continuously "off":

To OLM100	<STX>050100<ETX>
From OLM100 (with standard protocol)	<STX>850100<ETX>

5.3.4 Examples of commands for special functions

Set operator password:

To OLM100	<STX>0300010000000<ETX>
From OLM100	<STX>04000001<ETX>

Select standard protocol:

To OLM100	<STX>023000<ETX>
From OLM100	<STX>823000<ETX>

Set baud rate 4,800 bd:

To OLM100	<STX>022C00<ETX>
From OLM100	<STX>822C00<ETX>

Set resolution 1 mm:

To OLM100	<STX>022E00<ETX>
From OLM100	<STX>822E00<ETX>

Activate parameter and store permanently:

To OLM100	<STX>0306<ETX>
From OLM100	<STX>04060001<ETX>

Activate parameter without storing (warm start):

To OLM100	<STX>0307<ETX>
From OLM100	<STX>040700<ETX>

[1)] Following any modification it is essential to store the changes by sending the command "Activate parameter and store permanently" or "Activate parameter without storing".

Read out sensor internal temperature:

To OLM100	<STX>0124<ETX>
From OLM100	<STX>8124<4*[0...F]<ETX>
Example: +45 °C	<STX>8124002D<ETX>

Switch off LED lighting:

To OLM100	<STX>0333<ETX>
From OLM100	<STX>043300<ETX>

Read out firmware version:

To OLM100	<STX>0104<ETX>
From OLM100	<STX>8104000D<13*[ASCII]><ETX>
Example: V1.0-01.03.10	<STX>8104000DV1.0-01.03.10<ETX>

Reinitialization (cold start):

To OLM100	<STX>030A<ETX>
From OLM100	<STX>040A00<ETX>

Reset to factory settings:

To OLM100	<STX>0303<ETX>
From OLM100	<STX>040300<ETX>

Read out diagnostics:

To OLM100	<STX>011D<ETX>
From OLM100	<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

See section 9.1 "D" for errors.

Bits of unused or inactive error codes = "0", active error codes = "1"

Example: Error F3 (= no bar code tape)

From OLM100	<STX>811D04<ETX>

0	0	0	0	0	**1**	0	0	From OLM100
F8	F7	F6	F5	F4	**F3**	F2	F1	Error code

Note Measured value "0" is output if the linear measurement sensor OLM100 detects an error status.

5.4 SSI interface

Data transmission with the "SSI" setting takes place on request by the controller, in which case the cycle time and transmission speed can be set within broad limits. For this purpose, the connected controller applies a pulse sequence to the input of the linear measurement sensor OLM100. Every positive pulse flank causes a data bit to be pushed onto the transmit line of the linear measurement sensor OLM100, starting from the most significant bit. There is a pause of at least 30 µs between two pulse sequences.

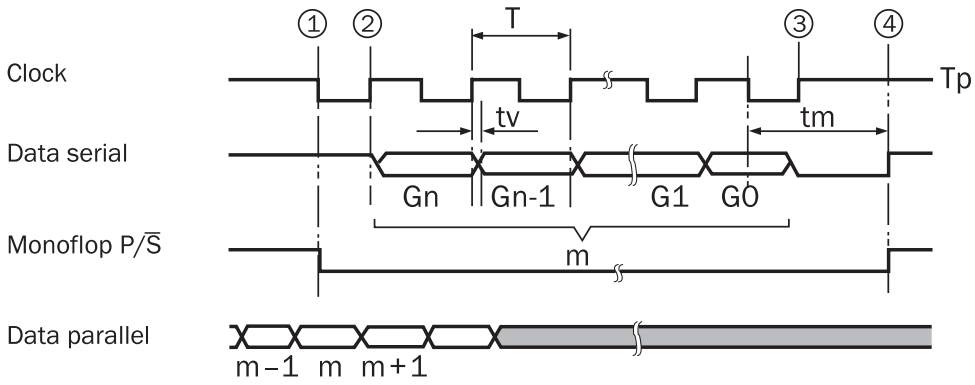
The maximum pulse frequency is between 70 kHz and 500 kHz, and is dependent on the length of cable.

Tab. 8: Lengths of cable and transmission rates

Length of cable [m]	Transmission rate [kbd]
< 25	< 500
< 50	< 400
< 100	< 300
< 200	< 200
< 400	< 100

Fig. 14: Pulse diagram of the data transmission

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

5.4.1 SSI data formats

The linear measurement sensor OLM100 supports the following SSI data formats:

- 24 data bits binary + 1 error bit binary (LSB)
- **24 data bits Gray + 1 error bit** binary (LSB)
- 24 data bits binary
- 24 data bits Gray
- 25 data bits binary
- 25 data bits Gray

Bold = Factory default

Note The measured value "0" is output if the linear measurement sensor OLM100 detects an error status, and the binary error bit (LSB) is set depending on the selected data format.

Data format: 24 data bits binary/Gray + 1 error bit binary (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 bina-ry
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: 24 data bit binary/Gray

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
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: 25 data bit binary/Gray

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

5.5 CANopen

5.5.1 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.

5.5.2 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) "OLM100.eds" (download from: www.sick.com/OLM).

5.5.3 Configuration

It is only possible to change device-specific parameters including node ID and baud rate via the Ethernet configuration interface by using the SOPAS ET software. For information about the available parameters and factory settings, see section 5.1 "Device configuration and diagnostics".

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

5.5.4 Measured value output

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

TPDO 1:

- Transmission mode/type: "Asynchronous/timer triggered".
- The TPDO parameter "COB-ID" has the value "0x180 + node ID".
- The default setting of the event timer is "0 ms". This means the continuous data output is deactivated.
- The event timer is only temporarily stored in the linear measurement sensor OLM100. 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:

Tab. 9: 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. For a detailed description of the error, refer to chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** "**Fehler! Verweisquelle konnte nicht gefunden werden.**".

Following the start, the linear measurement sensor OLM100 is in "PRE-OPERATIONAL" CANopen status. 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 "OPERATIONAL" status. This is done using the NMT service "start remote service" which must be sent by the NMT master (see CIA-301 specification).

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

Tab. 10: Index values output SDO

Index (hex)	**English designation**	**German designation**
0x2000	Measured value	Messwert
0x2001	Diagnostic data	Diagnosewerte

Note The measured value "0" is output if the linear measurement sensor OLM100 detects an error, and the corresponding error is output.

6 Maintenance

The linear measurement sensor OLM100 is maintenance-free.

We recommend that you clean the external lens surfaces and check the screw connections and plug-in connections regularly.

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

7 Technical data

7.1 OLM100 data sheet

Tab. 11: Data sheet OLM100

General data

Measured length of the traverse path	0 ... 10,000 m [1]
Light source	LED, visible red light
Service life	100,000 h [2]
Distance from bar code tape	100 mm ± 20 mm (OLM100-xx0x) 130 mm ± 20 mm (OLM100-xx5x)
Resolution: SSI/RS-422/RS-485/CANopen RS-485 binary protocol type 2 (special device)	 0.1 mm or 1 mm 1 mm
Reproducibility[3]	1 mm or 0.15 mm
Max. traverse speed[3]	4 m/s or 10 m/s
Output rate: SSI RS-422, RS-485, CANopen	 1 ms 5 ms
Initialization time	< 3 s

Electrical data

Supply voltage U_V [4]	10 ... 30 V DC
Power consumption	< 3 W
Protection class	III

Indications/controls

Power LED	[power on]
Status LED	[status]

Interfaces

Data interface	RS-485	OLM100-xxx5
	RS-485 binary protocol type 2	OLM100-xxx5S01 (special device)
	RS-422	OLM100-xxx3
	SSI	OLM100-xxx1
	CANopen	OLM100-xxx6
Configuration interface	Ethernet, SOPAS Engineering Tool operating software	

[1] Depending on the set resolution and transmission protocol.
[2] Typ. at +25 °C.
[3] Depending on the device type, see section 2.2.
[4] Limit values, reverse polarity protected.

Mechanical data

Housing material	Aluminum, zinc
Weight	Approx. 260 g
Dimensions	75 x 69.4 x 42 mm
Enclosure rating	IP 65 (EN 60529)

Ambient conditions

Ambient operating temperature [1) 2)]	–20 °C ... +60 °C
Storage temperature	–40 °C ... +75 °C
Insensitivity to ambient light	30,000 lux [3)]
EMC	EN 61000-6-2, EN 61000-6-4

Mechanical load

Shock/vibration	DIN/EN 60068-2-29 Single shock 30 g, nominal shock duration 6 ms, semi-sinusoidal, 3 shocks each in 6 excitation directions
Continuous shock/fatigue	DIN/EN 60068-2-29 25 g, nominal shock duration 6 ms, semi-sinusoidal, 500 shocks each in 6 excitation directions
Vibration	DIN/EN 60068-2-6 Resonance search 1 g, 10 ... 1,000 Hz Acceleration overshoot < 2.5
Wide-band noise	DIN/EN 60068-2-64 10 g rms, 20 ... 500 Hz, 100 min. per axis No destruction

1) –30 °C after 30 min warming-up time.
2) Max. humidity 95 % non-condensing.
3) Typ. value at 25 °C ambient temperature.

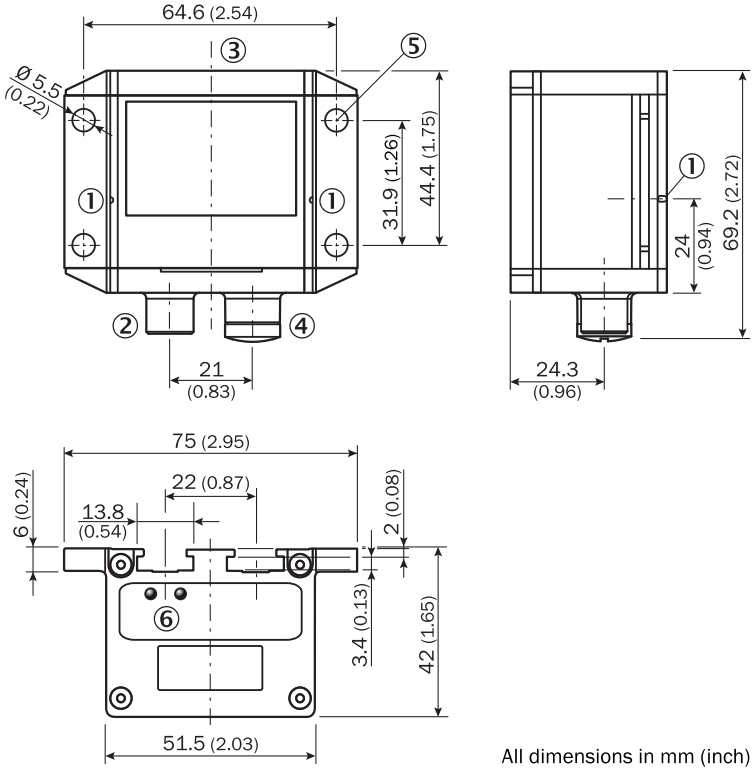
7.2 Bar code tape data sheet

Tab. 12: Bar code tape data sheet

Upper material	White, matt polyester foil, silicone-free
Foil thickness acc. to ISO 534	56 µm ± 10 %
Upper material thickness incl. adhesive	Approx. 102 µm
Tearing strength acc. to ISO 1184	> 150 N/15 mm
Adhesive	Permanent adhesive on the basis of modified acrylates. Suitable for problem substrates.
Adhesive force (adhesive force level T acc. to DIN 30646, measured on stainless steel, tested acc. to FTM 1*/after 24 h): – Steel – Aluminum – Polypropylene – HD polyethylene – Smooth powder paint	 > 9.3 N/10mm > 8.0 N/10mm > 6.2 N/10mm > 4.3 N/10mm > 7.8 N/10mm
Min. adhesion temperature	> +4 °C
Temperature resistance	−40 °C ... +150 °C
Chemical resistance Load test (glued onto stainless steel): – Relative humidity 98 % – Diesel oil – Glass cleaner – Isopropyl alcohol – Brake fluid DOT 4 – Heptane – Engine oil SAE 15W40 – Toluol – Industrial cleaner – Kerosene (US), paraffin (GB) – Washing-up liquid – Salt spray test acc. to DIN 50021 SS – Climatic stress acc. to DIN 50018 SFW 2.0	Resistant to most oils and greases, fuels, aliphatic solvents and dilute acids No complaint: 120 h at 38 °C 4 h at 23 °C 4 h 4 h 4 h 4 h 4 h 4 h 4 h 4 h 24 h 150 h No change after 2 load cycles
Base corrosion	No corrosion on the glued base
Dimensional stability	Key figure 02 (tested acc. to DIN 30646) Shrinkage < 0.2 %

7.3 Dimensional drawing

Fig. 15:
Dimensional drawing
OLM100



All dimensions in mm (inch)

Legend:

① Alignment aid (slot)

② Device connection plug M12, 5-pin or 8-pin

③ Reference axis for position measurement

④ Ethernet M12 connection socket, 4-pin

⑤ Fixing holes, Ø 5.5 mm

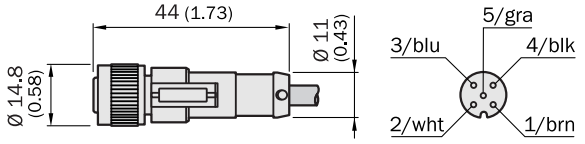
⑥ Status LEDs

7.4 Accessories

7.4.1 Connecting cables, T-pieces, plugs

Tab. 13: RS-485 accessories

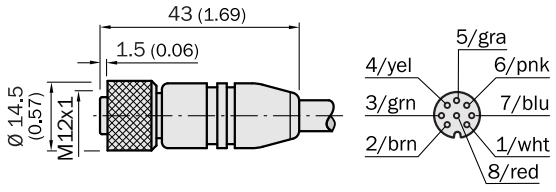
Cable socket, M12, 5-pin, A-coded, moulded cable with shield over knurled nut		
Type	**Part no.**	**Length of cable**
DOL-1205-G05MAC	6036384	5 m



All dimensions in mm (inch)

Tab. 14: RS-422/SSI accessories

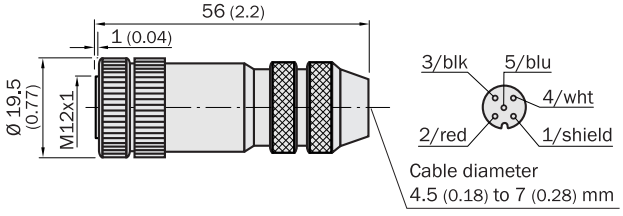
Cable socket, M12, 8-pin, A-coded, moulded cable with shield over knurled nut		
Type	**Part no.**	**Length of cable**
DOL-1208-G02MAH1	6032448	2 m
DOL-1208-G05MAH1	6032449	5 m
DOL-1208-G10MAH1	6032450	10 m
DOL-1208-G20MAH1	6032451	20 m



All dimensions in mm (inch)

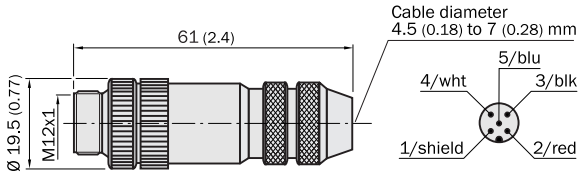
Tab. 15: CANopen accessories

Cable socket, M12, 5-pin, straight, shielded, with terminals, A-coding	
Type	**Part no.**
DOS-1205-GA	6027534



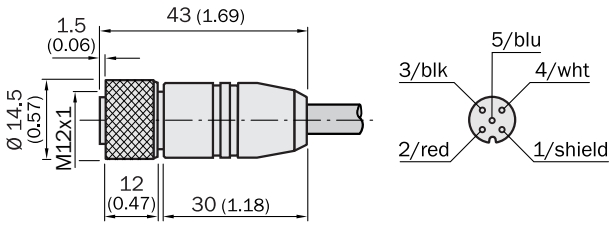
All dimensions in mm (inch)

CANopen	
Cable plug, M12, 5-pin, straight, shielded, with terminals, A-coding	
Type	**Part no.**
STE-1205-GA	6027533



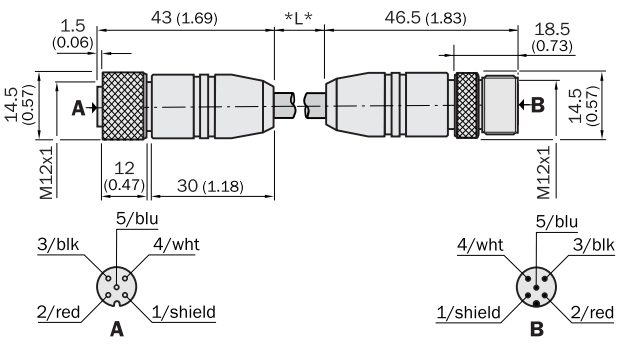
All dimensions in mm (inch)

CANopen		
Cable socket, M12, 5-pin, straight, shielded, drop cable, A-coding		
Type	**Part no.**	**Length of cable**
DOL-1205-G06MK	6028326	6 m



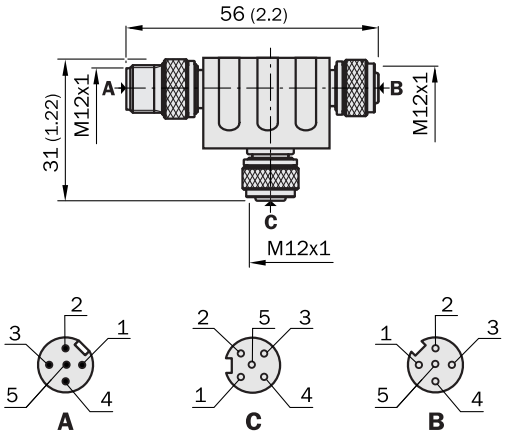
All dimensions in mm (inch)

CANopen		
Connection cable, M12 socket, 5-pin, straight, M12 plug, 5-pin, straight, drop cable, A-coding, shield on pin 1		
Type	**Part no.**	**Length of cable**
DOL-1205-G06MK	6028327	6 m



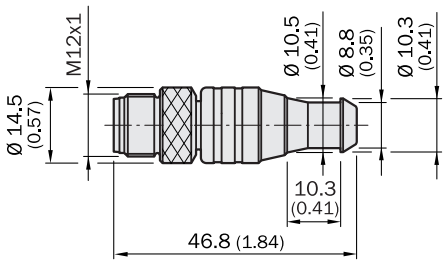
All dimensions in mm (inch)

CANopen	
M12 T-distributor, 1:1, 5-pin	
Type	**Part no.**
DSC-1205T000025KM0	6030664



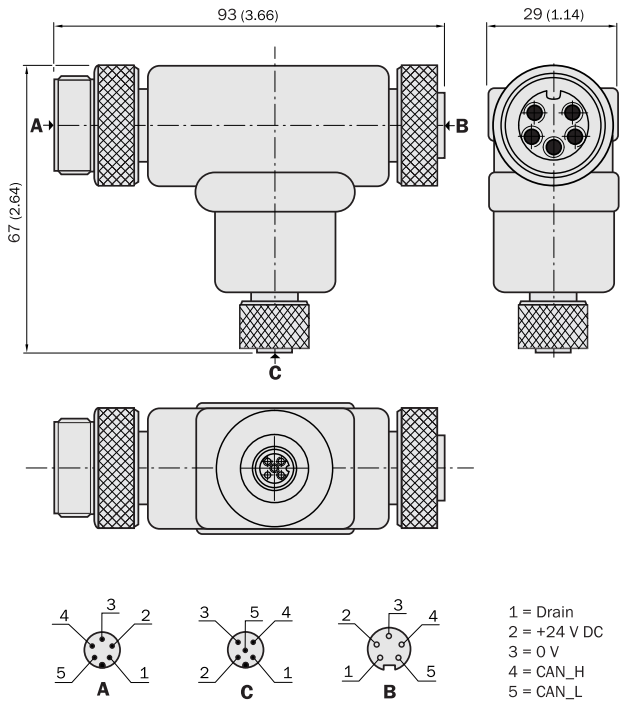
All dimensions in mm (inch)

CANopen	
M12 terminating resistor, 5-pin	
Type	**Part no.**
STE-1205-GKEND	6037193



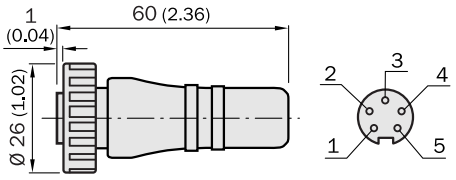
All dimensions in mm (inch)

CANopen	
T-distributor, M12 socket, 5-pin, on plug, socket 7/8", 5-pin	
Type	**Part no.**
SD0-02D78-SF	6028330



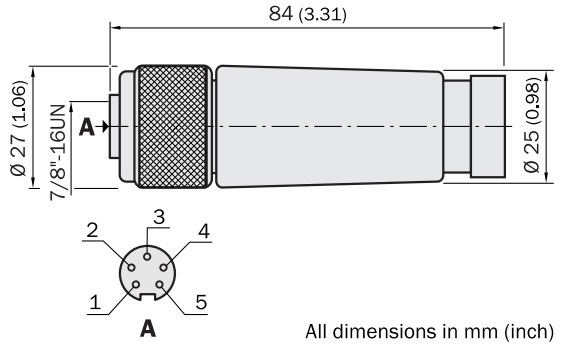
All dimensions in mm (inch)

CANopen	
Terminating resistor, socket 7/8", 5-pin, straight	
Type	**Part no.**
DOS-7805-GKEND	6028329



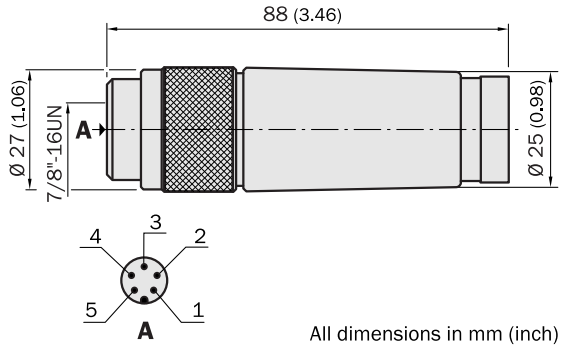
All dimensions in mm (inch)

CANopen	
Cable socket 7/8", 5-pin, straight, PG16, with terminals	
Type	**Part no.**
DOS-7805-GK	6028331



All dimensions in mm (inch)

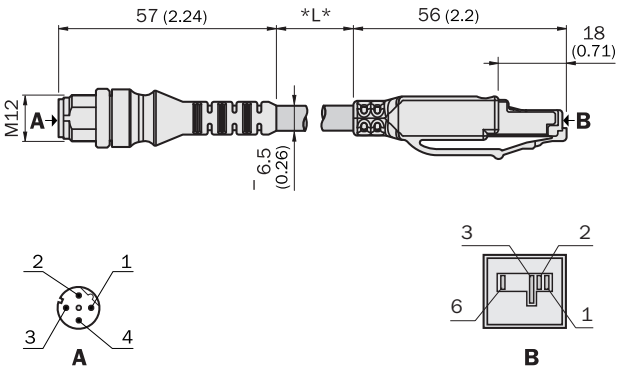
CANopen	
Cable plug 7/8", 5-pin, straight, PG16, with terminals	
Type	**Part no.**
STE-7805-GK	6028332



All dimensions in mm (inch)

CANopen		
Cable, 4 x 0.34 mm^2, twisted-pair conductors, shielded with AL-PT foil		
Type	**Part no.**	**Technical data**
LTG-2804-MW	6028328	Operating temperature: Mobile –10 °C ... +70 °C; fixed routing –40 °C ... +70 °C Sheath: PUR black ø 6.8 mm Shield: Galvanized Cu

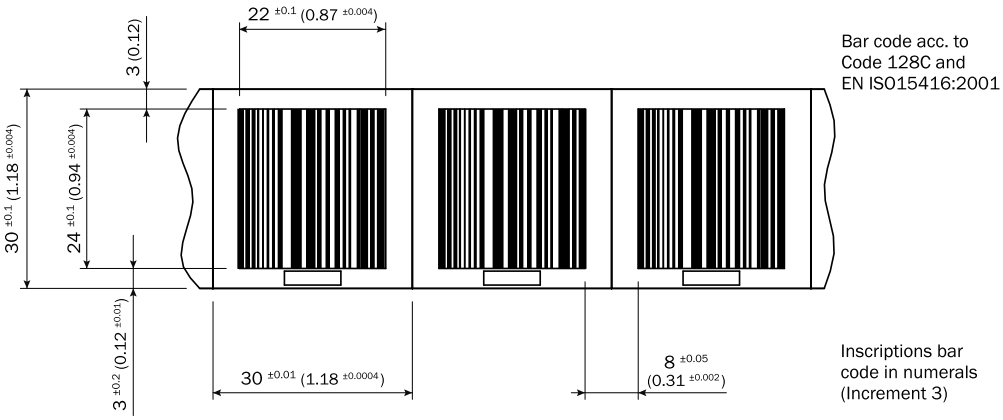
Ethernet configuration interface		
Ethernet patch plug connector, M12, 4-/5-pin D-coded/RJ45		
Type	**Part no.**	**Length of cable**
SSL-2J04-G02ME	6034414	2 m
SSL-2J04-G03ME	6029630	3 m
SSL-2J04-G05ME	6035389	5 m
SSL-2J04-G10ME	6030928	10 m
SSL-2J04-G25ME	6033555	25 m



All dimensions in mm (inch)

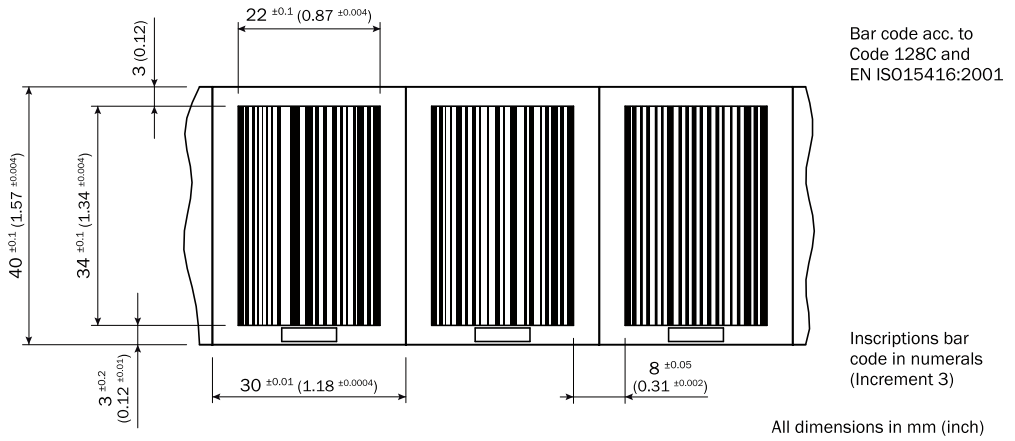
7.4.2 Bar code tape

Bar code tape, height 30 mm, width 30 mm

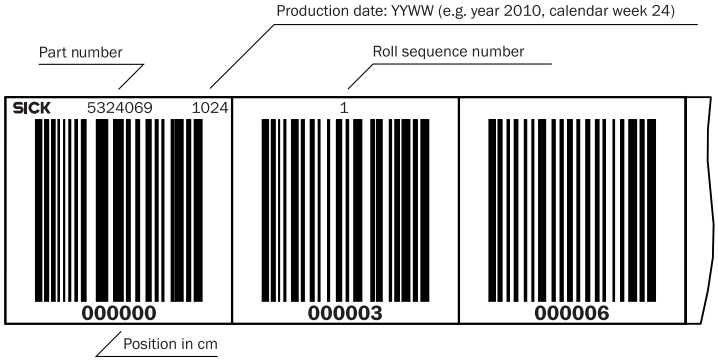


All dimensions in mm (inch)

Bar code tape, height 40 mm, width 30 mm



Bar code tape printing



Order notes and variants of the bar code tape

Bar code tape with 30 mm height					
Measuring range in meters		**Roll sequence number**	**Code**		**Part no.**
from	**to**		**Start**	**End**	
0	20	1	000000	002001	5324069
20	40	2	002004	004002	5324070
40	60	3	004005	006000	5324071
60	80	4	006003	008001	5324072
80	100	5	008004	010002	5324073
100	120	6	010005	012000	5324074
120	140	7	012003	014001	5324075
140	160	8	014004	016002	5324076
160	180	9	016005	018000	5324077
180	200	10	018003	020001	5324077
200	220	11	020004	022002	5324079
220	240	12	022005	024000	5324080
240	260	13	024003	026001	5324081
260	280	14	026004	028002	5324082
280	300	15	028005	030000	5324083

Bar code tape with 30 mm height					
Measuring range in meters		Roll sequence number	Code		Part no.
from	to		Start	End	
300	320	16	030003	032001	5324084
320	340	17	032004	034002	5324085
340	360	18	034005	036000	5324086
360	380	19	036003	038001	5324087
380	400	20	038004	040002	5324088
400	420	21	040005	042000	5324205
420	440	22	042003	044001	5324206
440	460	23	004004	046002	5324207
460	480	24	046005	048000	5324208
480	500	25	048003	050001	5324209

Special lengths with height 30 mm					
Measuring range in meters		Roll sequence number	Code		Part no.
from	to		Start	End	
0	5	1	000000	000501	5324252

Bar code tape with 40 mm height					
Measuring range in meters		Roll sequence number	Code		Part no.
from	to		Start	End	
0	20	1	000000	002001	5324090
20	40	2	002004	004002	5324091
40	60	3	004005	006000	5324092
60	80	4	006003	008001	5324093
80	100	5	008004	010002	5324094
100	120	6	010005	012000	5324095
120	140	7	012003	014001	5324096
140	160	8	014004	016002	5324097
160	180	9	016005	018000	5324098
180	200	10	018003	020001	5324099
200	220	11	020004	022002	5324100
220	240	12	022005	024000	5324101
240	260	13	024003	026001	5324102
260	280	14	026004	028002	5324103
280	300	15	028005	030000	5324104
300	320	16	030003	032001	5324105
320	340	17	032004	034002	5324106
340	360	18	034005	036000	5324107
360	380	19	036003	038001	5324108
380	400	20	038004	040002	5324109
400	420	21	040005	042000	5324210

Bar code tape with 40 mm height					
Measuring range in meters		**Roll sequence number**	**Code**		**Part no.**
from	**to**		**Start**	**End**	
420	440	22	042003	044001	5324211
440	460	23	004004	046002	5324212
460	480	24	046005	048000	5324213
480	500	25	048003	050001	5324214

Special lengths with height 40 mm					
Measuring range in meters		**Roll sequence number**	**Code**		**Part no.**
from	**to**		**Start**	**End**	
0	5	1	000000	000501	5324251

Bar code tape with customer-specific measuring range

Bar code tape	**Part no.**	**Description**
Width 30 mm/ Height 30 mm [1)]	5322556	Bar code tape with measuring range printed to customer-specific length. Tape height = 30 mm/minimum length = 5 m Delivery on rolls with max. 20 m length per roll
Width 30 mm/ Height 40 mm [1)]	5323951	Bar code tape with measuring range printed to customer-specific length. Tape height = 40 mm/minimum length = 5 m Delivery on rolls with max. 20 m length per roll

Instruction for calculating the start and end code for customer-specific lengths

Determine the value of the start and end position of your measurement range in centimeters. Devide this value by 3!

For start-code: round down the result of “1. ” to the next full number.
For end-code: round up the result of “1. ” to the next full number.

Take the result of “2. ” and multiply it by 3. The result is the start/end code.

Example:

Start position of measurement range = 251 cm

1. 251/3 = 83.667 (divide by 3)
2. 83.667 → 83 (round down to next full number)
3. 83 x 3 = 249 (multiply by 3)

Start code = 249 cm

End position of measurement range = 986 cm

1. 986/3 = 328.667 (divide by 3)
2. 328.667 → 329 (round up to next full number)
3. 329 x 3 = 987 (multiply by 3)

End code = 987 cm

[1)] Minimum length is 5 m in one section. The measuring range including start and end code must be entered for a customer-specific measuring range!

7.4.3 Sliding nuts

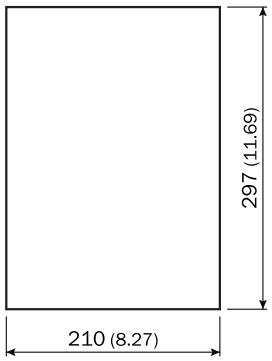
Tab. 16: Sliding nuts

Sliding nuts	
Type	**Part no.**
Sliding nut set	2017550

7.4.4 Blank labels for repair codes or control codes

Tab. 17: Blank labels

Blank labels, self-adhesive, DIN-A4, 10x	
Type	**Part no.**
BES-A4-OLM	2059180



All dimensions in mm (inch)

8 Special devices

8.1 OLM100-1005S01, RS-485, binary protocol type 2

The linear measurement sensor OLM100-1005S01 is a special pre-configured variant of the OLM100-1005. The factory default settings are:

- Device address: „0“
- Resolution: 1 mm
- Baud rate: 62K5,
- Data format: 9n1

This default setting means the protocol is compatible with the protocol of previously familiar sensors RS-485, binary protocol type 2 of other manufacturers.

8.1.1 Control marks (only with RS-485 variant OLM100-1005-S01)

If required, control marks can be stuck onto the bar code tape at selected points (e.g. track changes). When doing this, make sure that the cut markings of the control mark are congruent with the cut markings of the position bar code that has been stuck over. Control marks transmit specific information to the linear measurement sensor OLM100.

The information on a control mark consists of a letter (A, B, C, D or Z) followed by two digits (0 ... 9), e.g. A58.

Fig. 16:
Example of control mark A58

8.1.2 Commands

Binary protocol type 2 makes it possible to interrogate position values, control marks and diagnostic data of the linear measurement sensor OLM100 or to switch off the LED lighting of the sensor (sleep mode). This is done using commands which are sent as control bytes to the linear measurement sensor OLM100. The command is selected using bit no. 2 to bit no. 4 in the control byte.

The two least significant bits, bit no. 0 or bit no. 1, are used for addressing if several OLM100 are operated in a network.

Note Only one bit out of bit no. 2 to bit no. 4 is allowed to be set for each control byte. If several bits are set then only the bit with the highest priority is processed. Priority of the bits:

1. Diagnostic data
2. Control mark information
3. Sleep mode
4. Position values

Request to OLM100 (control byte)

Tab. 18: Request to OLM100

Bit no.	Description
0	Address (can only be changed with Ethernet)
1	Address (can only be changed with Ethernet)
2	0 = Request position values 1 = Request control mark information
3	0 = Request position values 1 = Request diagnostic data
4	0 = Measure 1 = Switch off LED lighting (sleep mode)
5	No function, permanently set to 1
6	No function, permanently set to 1
7	No function, permanently set to 0
8	No function, permanently set to 1

Response from OLM100

Tab. 19: Response from OLM100

Bit no.	Description
0 (MSB)	Status byte
1	Data byte 1 (bits 23 ... 16)
2	Data byte 2 (bits 15 ... 8)
3	Data byte 3 (bits 7 ... 0)
4	XOR logic operation of bytes 0 ... 3
5	Repetition of data byte 1 (bits 23 ... 16)
6	Repetition of data byte 2 (bits 15 ... 8)
7 (LBS)	Repetition of data byte 3 (bits 7 ... 0)

Depending on the sent command, the content of data bytes 1 to 3 can consist either of a position value of control mark information or diagnostic data.

Description of the status byte (byte 0)

Tab. 20: Description of the status byte

Bit no.	Function	Value	Description
0 (LSB)	Err	0	Position value calculation correct
		1	Error in position value calculation
1	OUT	0	Bar code visible
		1	No bar code visible
2	QTO		Reading quality[1)]
3	QT1		Reading quality[1)]
4	A0		Address
5	A1		Address
6	M	0	No control mark present
		1	Control mark present
7	D	0	No diagnostic data present
		1	Diagnostic data present
8 (MSB)	NU	0	No function, permanently set to 0

Description of the data byte (byte 1 ... 7)

Tab. 21: Description of the status bytes

Bit no.	Function	Description
1 ... 3	0 ... 8	Data, binary coded, bit 8 always 0
4	0 ... 8	Block check digit, XOR logic operations from byte 0 to byte 3
5 ... 7	0 ... 8	Repetition of the data, binary coded, bit 8 always 0

8.1.3 Example for command to request the position value

Request **position values** to OLM100:

Tab. 22: Example of position value request

Bit no. 8	Bit no. 7	Bit no. 6	Bit no. 5	Bit no. 4	Bit no. 3	Bit no. 2	Bit no. 1	Bit no. 0
1	0	1	1	0	**0**	**0**	0	0

Control byte for device address 0

Response from OLM100 for position 10335 mm = **00285F** (hex):

Tab. 23: Example of response for position 10335 mm

Byte no.	Description	Bit no. 8	Bit no. 7	Bit no. 6	Bit no. 5	Bit no. 4	Bit no. 3	Bit no. 2	Bit no. 1	Bit no. 0	Value in hex
0	Status byte	0	0	0	0	0	0	0	0	0	0x00
1	Data byte 1	0	0	0	0	0	0	0	0	0	**0x00**
2	Data byte 2	0	0	0	1	0	1	0	0	0	**0x28**
3	Data byte 3	0	0	1	0	1	1	1	1	1	**0x5F**
4	XOR logic operation	XOR logic operation on bytes 0 ... 3									
5	Data byte 1	0	0	0	0	0	0	0	0	0	**0x00**
6	Data byte 2	0	0	0	1	0	1	0	0	0	**0x28**
7	Data byte 3	0	0	1	0	1	1	1	1	1	**0x5F**

Status byte for: no error in distance calculation, bar code visible, optimum reading quality, device address 0, no control mark, no diagnostic data

[1)] Reading quality 00 ... 11 = optimum reading quality ... illegible.

8.1.4 Example for command to request the control mark information

Detection of a control mark is indicated in the status byte (bit no. 6). After a control byte has been sent, the control mark information can be requested and, as a result, the status byte reset at the same time. The control mark information is output as a three-byte ASCII hex value.

If the control mark information is not requested then position values continue to be output and the status byte continues to show an existing control mark.

Note There is allowed to be 1 control mark at most in the field of view of the linear measurement sensor OLM100.

Control mark files are available for download from www.sick.com/OLM. These can be printed out on self-adhesive DIN-A4 blank labels (see section 7.4 "Accessories") using a laser printer, and cut to size. The printout must be made with at least 600 dpi and without any page or size adaptation.

Request **control mark information** to OLM100:

Tab. 24: Request control mark information

Bit no. 8	**Bit no. 7**	**Bit no. 6**	**Bit no. 5**	**Bit no. 4**	**Bit no. 3**	**Bit no. 2**	**Bit no. 1**	**Bit no. 0**
1	0	1	1	0	**0**	**1**	0	0

Control byte for device address 0

Response from OLM100 for control mark **A58** (ASCII):

Tab. 25: Response for control mark A58

Byte no.	**Description**	**Bit no. 8**	**Bit no. 7**	**Bit no. 6**	**Bit no. 5**	**Bit no. 4**	**Bit no. 3**	**Bit no. 2**	**Bit no. 1**	**Bit no. 0**	**Value in**	
											hex	**ASCII**
0	Status byte	0	0	1	0	0	0	0	0	0	0x40	
1	Data byte 1	0	0	1	0	0	0	0	0	1	0x41	**A**
2	Data byte 2	0	0	0	1	1	0	1	0	1	0x35	**5**
3	Data byte 3	0	0	0	1	1	1	0	0	0	0x38	**8**
4	XOR logic operation	XOR logic operation of bytes 0 ... 3										
5	Data byte 1	0	0	1	0	0	0	0	0	1	0x41	**A**
6	Data byte 2	0	0	0	1	1	0	1	0	1	0x35	**5**
7	Data byte 3	0	0	0	1	1	1	0	0	0	0x38	**8**

Status byte for:
no error in distance value calculation, bar code visible, optimum reading quality, device address 0, control mark present, no diagnostic data

8.1.5 Example for command to request the diagnostic data

Detection of an error is indicated in the status byte (bit no. 7). After a control byte has been sent, the diagnostic data can be requested. The diagnostic data is output as a three-byte ASCII hex value.

The status byte is not reset until no more diagnostic data is present and the data has been requested using the control byte.

Request **diagnostic data** to OLM100:

Tab. 26: Request diagnostic data

Bit no. 8	**Bit no. 7**	**Bit no. 6**	**Bit no. 5**	**Bit no. 4**	**Bit no. 3**	**Bit no. 2**	**Bit no. 1**	**Bit no. 0**
1	0	1	1	0	**1**	**0**	0	0

Control byte for device address 0

Response from OLM100 for diagnostic data **E09** (ASCII):

Tab. 27: Response for diagnostic data E09 (ASCII)

Byte no.	**Description**	**Bit no. 8**	**Bit no. 7**	**Bit no. 6**	**Bit no. 5**	**Bit no. 4**	**Bit no. 3**	**Bit no. 2**	**Bit no. 1**	**Bit no. 0**	**Value in**	
											hex	**ASCII**
0	Status byte	0	1	0	0	0	0	0	0	1	0x81	
1	Data byte 1	0	0	1	0	0	0	1	0	1	0x45	**E**
2	Data byte 2	0	0	0	1	1	0	0	0	0	0x30	**0**
3	Data byte 3	0	0	0	1	1	1	0	0	1	0x39	**9**
4	XOR logic operation	XOR logic operation of bytes 0 ... 3										
5	Data byte 1	0	0	1	0	0	0	1	0	1	0x45	**E**
6	Data byte 2	0	0	0	1	1	0	0	0	0	0x30	**0**
7	Data byte 3	0	0	0	1	1	1	0	0	1	0x39	**9**

Status byte for: error in distance value calculation, bar code visible, optimum reading quality, device address 0, no control mark, diagnostic data present.

The Exx diagnostic data is assigned to the error codes Fx from section 9.1 "D" as follows:

- E01: F6 (unused)
- E05: F7 (sensor outside the measuring range)
- E06: F2 (unused)
- E07: F1 (temperature error)
- E08: F5 (sensor dirty)
- E09: F4 (no plausible position values present)

Note: If diagnostic data is requested although the status byte indicates there is no diagnostic data present, then the version number of the OLM100 is displayed instead of the error message Exx, e.g. 100 for 1.00.

9 Error tables and countermeasures

9.1 Device errors

Tab. 28: Device errors

Error	LED indication	Cause	Possible measure
F1 Temperature error	Power LED: red Status LED: off	Ambient temperature outside specification	Wait for heating-up phase (at temperatures ≤ –20 °C) Reduce ambient temperature
F2 (unused)			
F3 No bar code tape present	Power LED: green Status LED: red	There is no bar code tape in the field of view of the OLM100	Align sensor with the bar code tape
F4 No plausible position values present	Power LED: green Status LED: red	Bar code tape dirty	Clean or renew the bar code tape
F5 Sensor dirty	Power LED: green Status LED: flashing red	Sensor or front screen dirty LED sender power inadequate	Clean bar code tape and sensor Replace sensor
F6 (unused)			
F7 Sensor outside the measuring range	Power LED: green Status LED: red	The OLM has undershot the measured value 0 mm or overshot the measured value 9,999,999 mm	Modify the value range of the attached bar code tape accordingly

9.2 Version of the firmware

The firmware version of the linear measurement sensor OLM100 can be read out in the device variants OLM100-xxx3 or OLM100-xxx5 by means of a command via the RS-422 or RS-485 data interface, or in all device variants, using the SOPAS ET configuration software and the Ethernet interface.

Refer to the list for important modifications. Modification details on www.sick.com/OLM under preparation.

V1.0-15.03.10:

- Internal adaptations, use exclusively in high-performance variant OLM100-1201.

V1.1-01.03.10:

- Minimum number of readable bar codes reduced from 2 to 1 bar code for successful device start.

V1.0-01.03.10

- Modification of the OLM100-1005 variant from RS-485 binary protocol type 2 to RS-485 ASCII protocol.
- Introduction of the OLM100-1005S01 special device (RS-485 binary protocol type 2).
- Introduction of additional device variants for 40 mm wide bar codes.
- Optimization of Auto-IP or DHCP for Ethernet configuration interface.

V1.0-23.11.09

- Internal corrections.

V1.0-20.10.09

- First version.

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10 Appendix

10.1 List of figures

10.2 List of tables

8013321/VC40/2011-05-13 · GO (2011-09) · A4 sw int37

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