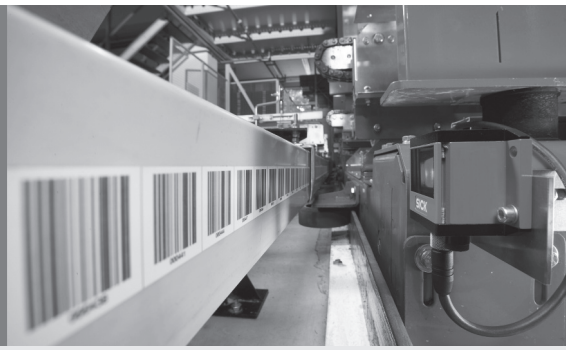
OPERATING INSTRUCTIONS



OLM200 – EtherNet/IP

Linear measurement sensor

EN

Applicable to firmware ≥ V2.1

SICK
Sensor Intelligence.

Note SICK uses standard IP technology in its products, such as I/O-Link and industrial PCs. The emphasis is placed on availability of products and services. SICK always assumes that the integrity and the confidentiality of the data and rights which are affected by the use of the aforementioned products are ensured by the customer. In any case, appropriate security measures, such as network separation, fire walls, virus protection or patch management, are always to be taken by the customer, depending on the situation.

Contents

1 About this document

Please read through this chapter carefully before you use the documentation and work with the linear measurement sensor OLM200.

1.1 Function of this document

This operating instruction instructs 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 OLM200, and also the associated bar code tape.

This operating instruction does not provide information about operation of the machine in which the linear measurement sensor OLM200 is or will be integrated. For information about this, refer to the operating instruction of the machine.

1.2 Information depth

This operating instruction contains information about the linear measurement sensor OLM200 on the following topics:

- Device designation
- Mounting
- Electrical installation
- Commissioning and configuration
- Fault tables and counter measures
- Technical data
- Accessories

All official and statutory regulations governing operation of the linear measurement sensor OLM200 must be complied with.

Note Please also refer to the website at: www.mysick.com/en/OLM200

There, one can find:

- available control codes and position codes for download as a PDF file,
- sample applications,
- a list of FAQs for the linear measurement sensor OLM200,
- SOPAS Engineering Tool for configuration,
- information about software updates,
- Device description file (Electronic Data Sheet/EDS).

1.3 Scope

Note This operating instruction applies to the linear measurement sensor OLM200-xxx8.

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 contains information about the special properties of the linear measurement sensor OLM200. It describes the construction and operating principle of the device, especially the various operating modes.

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

2.1 Safety notes

2.1.1 Safety standard

The linear measurement sensor OLM200 has been developed, produced and tested in accordance with the applicable safety standards. It is in accordance with the state of the art.

The radiation safety has been evaluated based on the DIN EN 62471 standard, “Photobiological safety of lamps and lamp systems”. It is allocated to the “free group”, i.e. safety of the eyes and the skin against radiation is guaranteed at all times assuming the device is used correctly (in particular, this implies not opening the device).

2.1.2 Correct use

The linear measurement sensor OLM200 is an opto-electronic sensor and is used for positioning of a movement unit 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 OLM200 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

Tab. 1: Device designation

Data interface	Device designation	Part no.	Bar code width	Reading distance
EtherNet/IP	OLM200-1008	1058813	30 mm	100 mm ± 20 mm

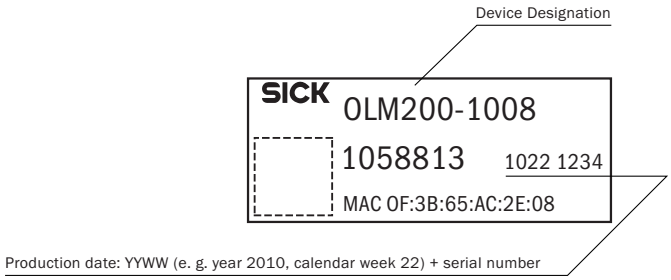
Note Accessories available for the OLM200-xx0x variants are the appropriate bar code tapes with a bar code width of 30 mm and a tape height of 30 mm or 40 mm.

Note A bar code tape with a height of 30 mm is sufficient in applications in which the linear measurement sensor OLM200 does not exceed a tolerance of ± 3.5 mm perpendicular to the transport direction.

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

2.2.1 Type plate

Fig. 1:
Type plate



2.3 Principle of operation

The linear measurement sensor OLM200 is a sensor that can measure traverse paths up to 10 km without moving parts. The sensor determines its position via a 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 (OLM200–xx0x), the linear measurement sensor OLM200 determines the absolute position and outputs this via an interface. Traverse speeds of up to 10 m/s are possible with a repeatability of 0.15 mm.

On startup, the linear measurement sensor OLM200 initially detects its 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 last known orientation of the bar code tape. The sensor starts position values 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 along the traverse 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 The tape orientation is assumed to be 0° in the delivery state.

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

If the linear measurement sensor OLM200 detects an error condition while in motion (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. The extrapolation time can be set by control marks or via SOPAS ET (see page 21, parameter “Extrapolation time”). The measured value “0” is output if the error status is present or longer or exists right from 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 available for this via the Ethernet configuration interface.

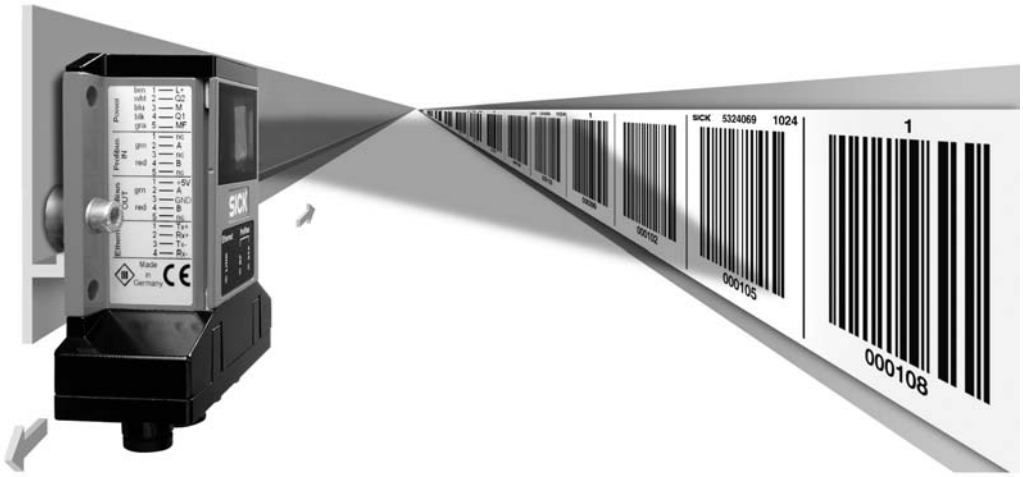


Fig. 2:
Schematic representation of the mode of function OLM200

2.4 Control marks

Note The control marks are available for download and subsequent print at www.mysick.com/en/OLM200.

2.4.1 Control marks for operation

If required, control marks can be stuck onto the bar code tape at selected points (e.g. switches). 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 OLM200.

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

The control marks are available for download from www.mysick.com/en/OLM200, and can then be printed out.

The control marks Q00 and Q01 control the switching output of the device. In this case, Q01 sets the switching output to active. Q00 sets the switching output to inactive.

All other control marks are output via the EtherNet/IP as ASCII hex values. The control mark must be interpreted byte-by-byte as ASCII characters. In this case, the most recently read control mark is always output every cycle.

Example: Control mark A98 corresponds to 0x41, 0x39, 0x38

Note In order to obtain a continuous distance value, it is necessary to ensure that there is a position code directly before or directly after the control mark.

Note Only **one** control mark may be within the field of view at any given time. Therefore, a minimum of two bar codes must be placed between successive control marks.

3 Mounting

This chapter describes how to prepare and perform the mounting of the bar code tape and the linear measurement sensor OLM200.

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

3.1 Bar code tape mounting

3.1.1 General data for 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 roll sequence number is located on the bar code tapes to make it easier to maintain the correct sequence.

Bar code tapes with customer specific range start with the roll sequence number “1”, independent of the desired starting code.

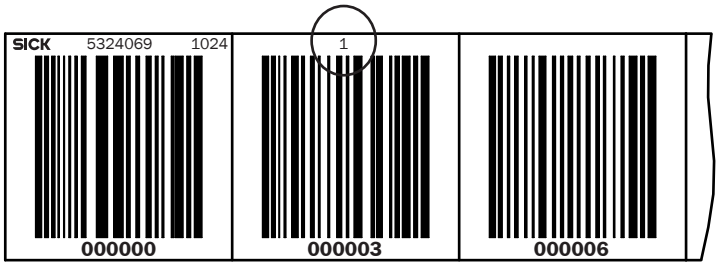


Fig. 3:
Example for roll 1, measuring range 0 to 20 m

Measuring range [m] from	to	Roll sequence number	Code Start	Code End
0	20	**1 (see Fig. 3)**	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

Measuring range [m] from	to	Roll sequence number	Code Start	Code End
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. At least two successive bar codes must follow after a gap.

It is recommended 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. 4:
Cut mark of the bar code tape

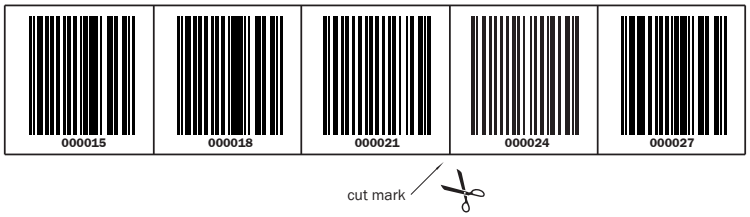
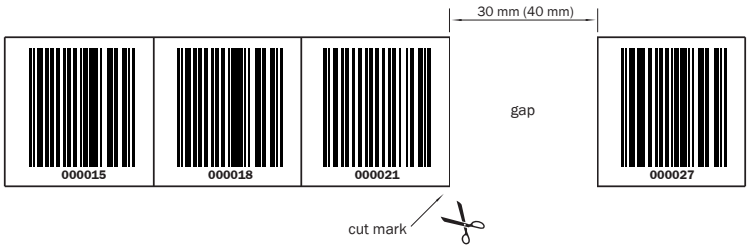


Fig. 5:
Gap in the cut-open bar code tape



A sequence of bar code tapes without successive measuring ranges is not allowed, otherwise a continuous position cannot be indicated. In case of discontinuation (e.g. at track changes), the linear measurement sensor OLM200 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 OLM200 cannot output any negative position values. Therefore, in applications in which it is necessary to go below the “0 cm” position (e.g. turntables, track changes), it is recommended not to use the measuring range 0 to 20 m, or else to remove the first two bar codes “0 cm” and “3 cm”.

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

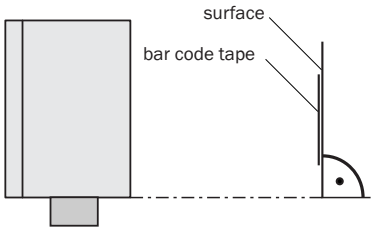


Fig. 6:
Vertical bar code tape mounting

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

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 OLM200 should be mounted preferably in the axis of rotation. Tangential distances, 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.

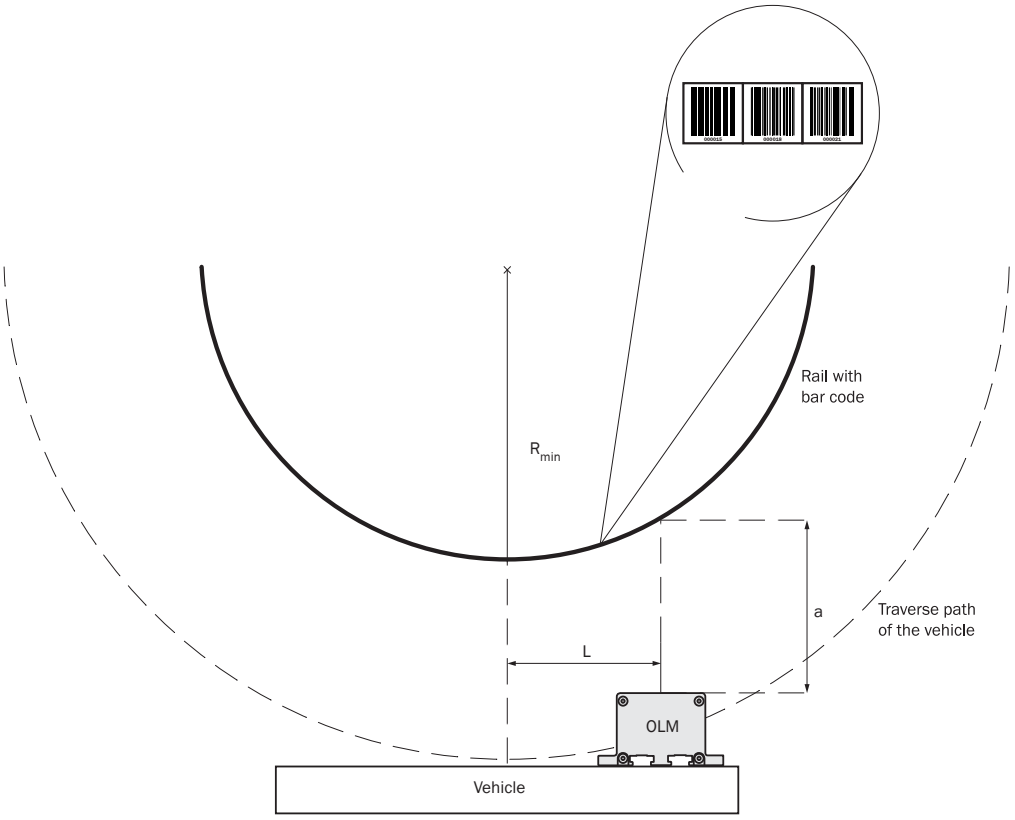


Fig. 7:
Tangential distance L when cornering

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

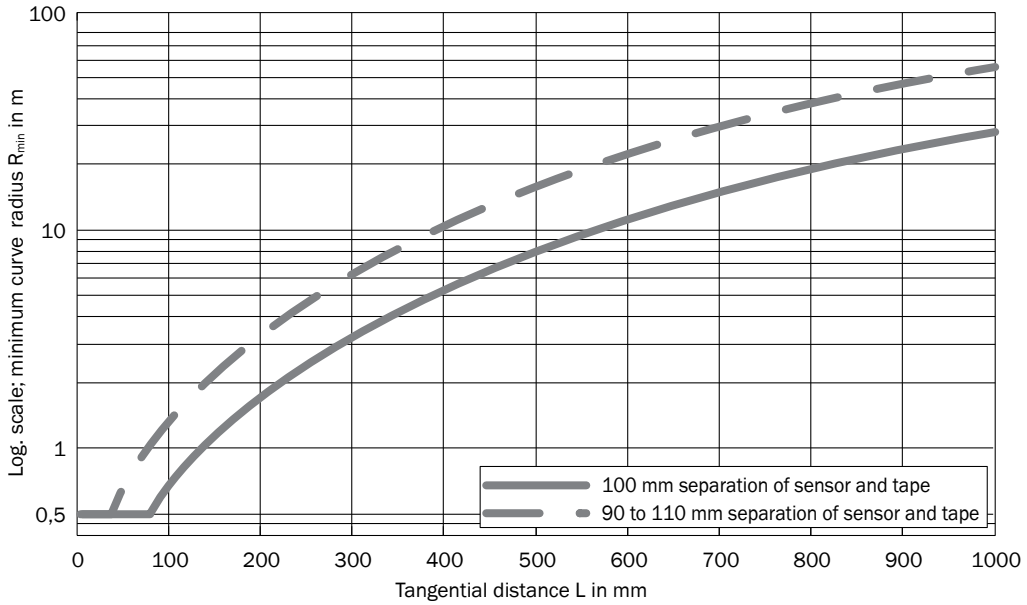


Fig. 8:
Minimum curve radius R_{min} depending on the tangential distance L

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.

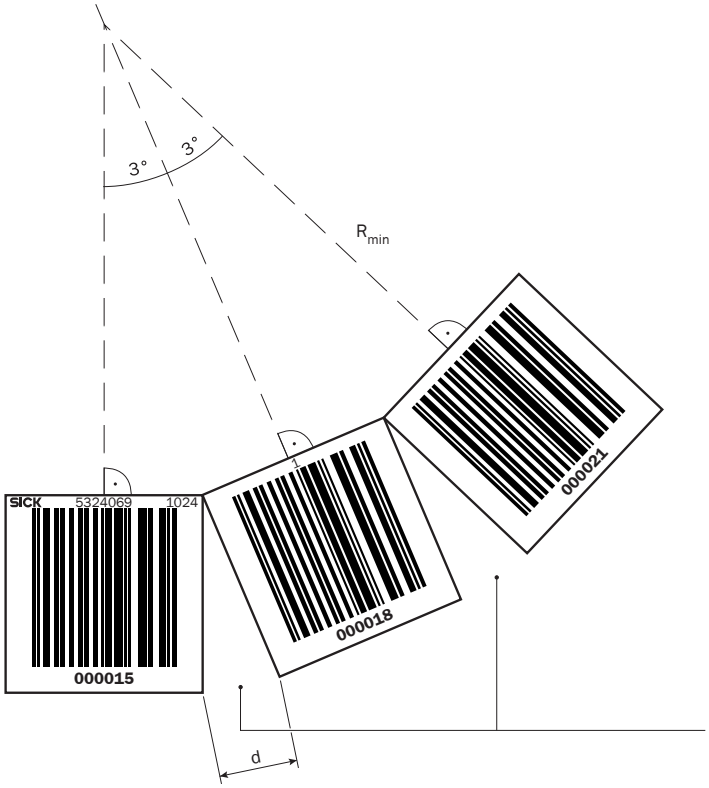


Fig. 9:
Vertical curves

Open items must be taped off with blank labels (see section 7.4 “Accessories”).

Note Make sure that the bar code tape is always in the field of view of the linear measurement sensor OLM200 along a vertical curve. The mounting location of the OLM200 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 OLM200 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.

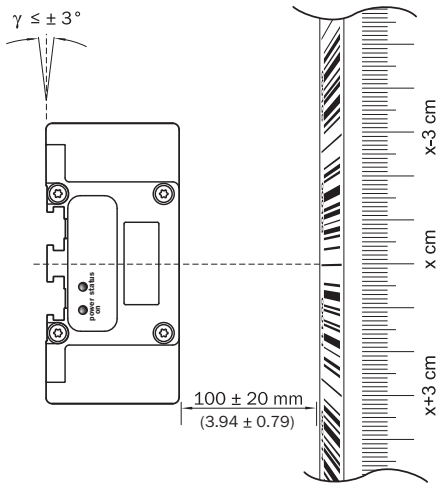
Note Only restricted accuracy and reproducibility are possible with a vertical curve.

3.2 Sensor mounting

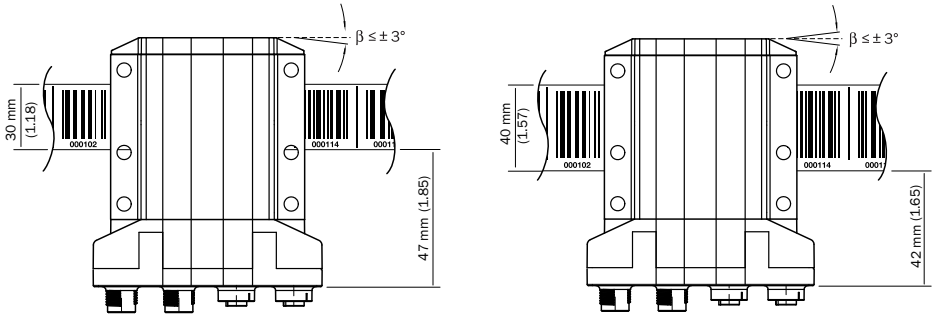
The linear measurement sensor OLM200 can be mounted either using the six holes in the housing or the T-slots on the back, using sliding nuts (see section 7.4 “Accessories”).

To ensure optimum reading results and the greatest possible functional reserve, mount the linear measurement sensor OLM200 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.

Fig. 10:
Mounting distances OLM200



A distance of 47 mm or 42 mm must be maintained between the bottom edge of the housing and the bottom edge of the SICK bar code tape.

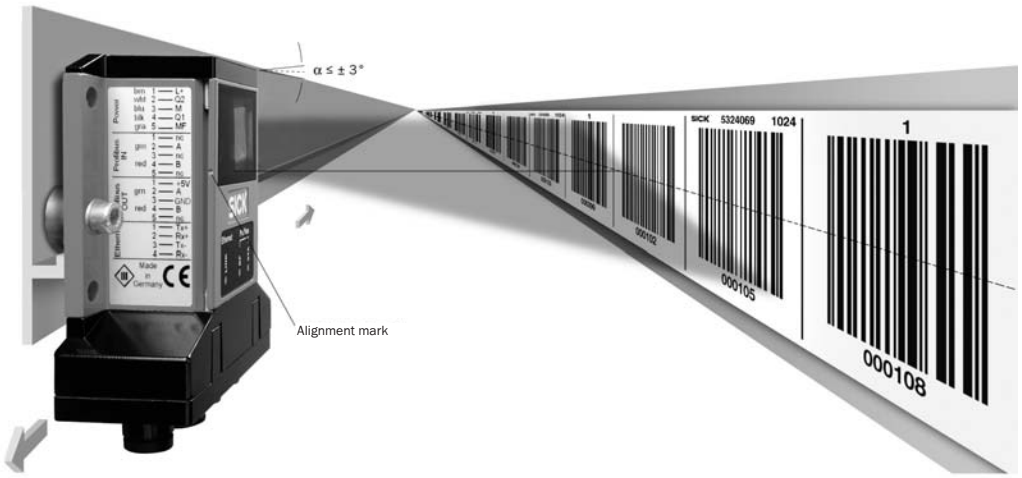


Note In particular in curves, take care to maintain a distance of 100 mm ± 20 mm from the bar code tape.

If optimally aligned, the two alignment marks on the front of the OLM200 are located in the vertical middle of the bar code tape, so that the red luminous row running from the top left to the bottom right is vertically centered on the bar code bar (see Fig. 11).

This centering must be within a tolerance of ± 3.5 mm or ± 8.5 mm respectively for the 30 mm or 40 mm height SICK bar code tape.

Fig. 11:
Vertical alignment OLM200

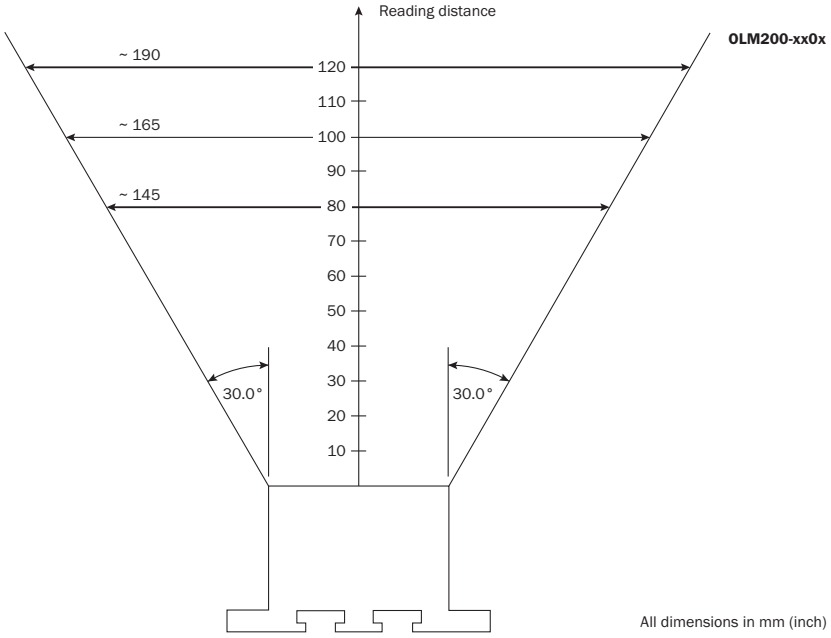


When two sensors are operated next to one another, it is necessary to maintain a minimum gap between the two sensors of 120 mm.

At curves, make sure that the sensor is mounted as close as possible to the axis of rotation. For information about the minimum radii at curves, refer to section 3.1.2 “Mounting of the bar code tape at horizontal curves” on page 12.

Note The sensor must be mounted in a way that no objects are within the field of view, obstructing a clear view of the bar code tape.

Fig. 12:
Field of view of the OLM200



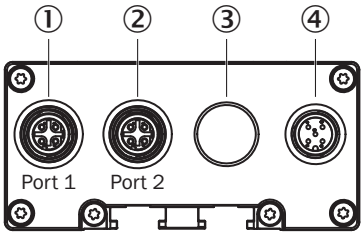
4 Electrical installation

Secure data transmission is possible when using shielded cables with twisted-pair wires. A correct and complete shield concept is required for trouble-free function. Specifically, it is necessary to ensure that the cable shield contacts the control cabinet and the linear measurement sensor OLM200 at both ends. The cable shield of the cables with terminals (see section 7.4 “Accessories” on page 37) is connected to the knurled nut and the functional earth connection pin, and therefore to the sensor housing. Equipotential bonding currents must be avoided by a suitable grounding concept. If required, earth currents may be avoided by use of an EtherNet/IP adapter (item no. 2044264).

4.1 Position of the electrical plug connections

The position of the electrical connections can be seen in the following illustration.

Fig. 13: Connections of the OLM200 EtherNet/IP



① Ethernet, socket M12, 4-pin
② Ethernet, socket M12, 4-pin
③ not connected
④ Device connection (supply voltage), plug M12, 5-pin

4.1.1 Ethernet interface

The OLM200-xxx8 is equipped with two Ethernet interfaces. They serve communication via EtherNet/IP and diagnosis and parameterization via SOPAS ET. The two interfaces have equal priorities and are internally connected to a switch.

Fig. 14: Connection diagram Ethernet

①/② Ethernet interface

Connect the OLM200 to the network via Ethernet connection lines.

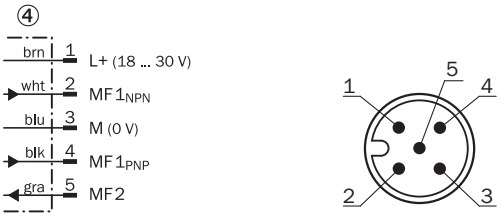
If the network is not forwarded to another network participant, connection to one of the Ethernet female connectors is sufficient. Close the female connectors not in use with a cover or a blind plug.

4.1.2 Supply voltage connection

The OLM200 is configured with electrical protection class III. This means the device is intended for operation in protective extra-low voltage systems (PELVs).

Fig. 15: Connection diagram supply voltage

④ Supply voltage



4.2 General notes for electrical installation

All electrical connections of the OLM200 are configured as M12 circular plug-in connectors. Refer to the corresponding connection examples and wiring notes in chapter 4.3.

Information about suitable plugs and cables can be found in section 7.4 “Accessories” on page 37. The connection plugs of the linear measurement sensor OLM200 are compatible with SPEEDCON quick connectors as well as standard M12 screw connectors.

Note It is not possible to use self-made angled plugs/female connectors.

Note Enclosure rating IP 65 is only achieved with screwed connection plugs or using cover caps.

4.3 Wiring notes

Legend for cable groups Fig. 16 to Fig. 18:

1 = Cables very sensitive to interference (analog measuring cables)

2 = Cables sensitive to interference (sensor cables, communication signals, bus cables)

3 = Cable which is a source of interference (control cable for inductive loads, motor brakes)

4 = Cables which are powerful sources of interference (output cables from frequency inverters, feeders to welding systems, power cables)

Fig. 16: Cables in groups 1, 2 and 3, 4 must be crossed at right angles

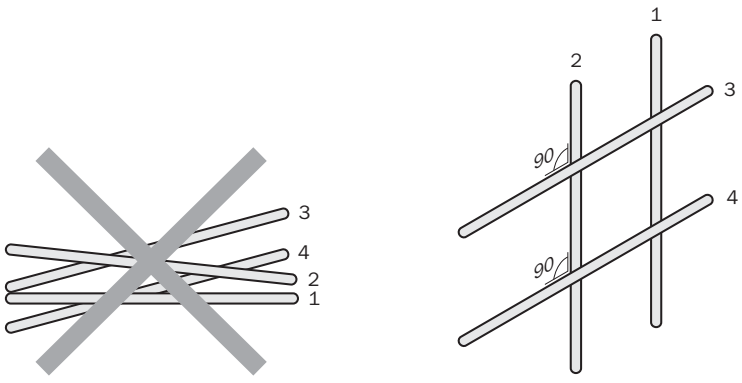


Fig. 17:
Ideal: route cables in different cable channels

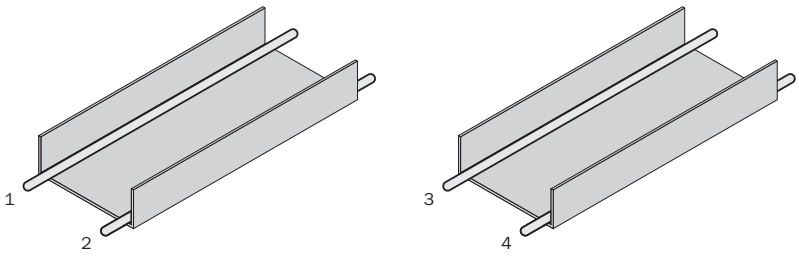


Fig. 18:
Alternative: separate cables with a metallic divider

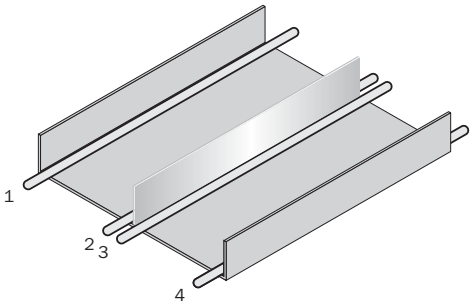


Fig. 19:
No “pigtails”, shield short and connected over the full area, grounding at BOTH ends

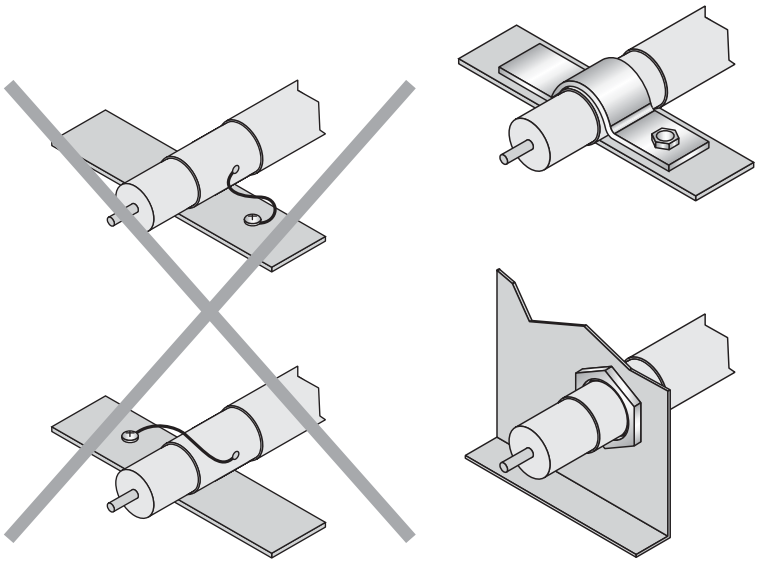
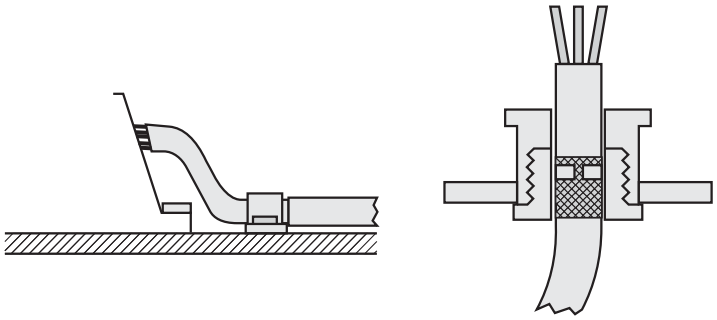


Fig. 20:
Shield connection in plastic housings



5 Commissioning

Apply the sensor to supply 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

Linear measurement sensors OLM200-xxx8 have an EtherNet/IP interface. The devices are configured using the device description file Electronic Data Sheet/EDS. For a description of the EtherNet/IP modules for, refer to section 5.3 “EtherNet/IP interface”.

Note The device description file EDS can be downloaded from the website at www.mysick.com/en/OLM200.

The EDS file was generated with the tool “EZ-EDS“, version 3.9. The EDS file can run on RS Logix as of version 19.

5.1.1 Configuring the participants

Every EtherNet/IP field device like, e.g., the OLM200 EtherNet/IP, has its own MAC address. The MAC address of the OLM200 EtherNet/IP is written on the type label (e.g. 00:06:77:02:00:A7).

The settings for the Internet Protocol (IP) can be changed via the SOPAS Engineering Tool.

5.1.2 Parameterization

Note The parameter „Extrapolation time“ cannot be parameterized via EtherNet/IP. The parameter can be parameterized either via control marks or via SOPAS ET. See page 21, parameter “Extrapolation time”.

5.2 Ethernet parameter list and factory settings

For service or diagnosis purposes, you may read and set parameters via Ethernet (SOPAS ET).

Note Parameters configured by Ethernet (SOPAS) are overwritten with the EtherNet/IP parameters once the device is integrated into an EtherNet/IP network. During fieldbus operation, the parameters must not be changed via Ethernet (SOPAS).

A sensor has the following IP network configuration in its delivery state:

- Static IP address
- IP address: 192.168.100.236
- IP network mask: 255.255.255.0
- Standard gateway: 0.0.0.0

If the system detects an invalid IP network configuration then the delivery-state configuration is used instead.

Note It is necessary to log onto the device as “Maintenance” in order to be able to access certain settings in the following table.

To do this, select “Login Device” in SOPAS (Ctrl + I), select the “Maintenance” user level and enter the password “esick”.

Tab. 2: Ethernet parameter list

Device side	Parameters	Setting options/description
OLM200 Main page	Position, speed, number of marks	Indication only The first two digits of “Number of marks” represent the number of legible marks, the last two the number of detected marks.
Overview	Device name, software version, product code, serial number, part number	Indication only
Diagnostics	Display of the internal temperature, device errors/warnings, signal quality , reading quality	Indication only
Configuration	Device name (can be set after logging onto the device)	20-character device name (unique assignment of the devices if there are several devices in the network)
	Ethernet MAC address	Indication only
	Store configuration (visible after logging onto the device)	Save device name permanently
Parameter	Device ident number	Indication only
	TCP/IP configuration	Indication only Can be modified when establishing a connection via SOPAS ET.

Device side	Parameters	Setting options/description
Parameter	Resolution position value	0.1 mm, **1 mm**, 10 mm, 100 mm
	Measurement offset	**0** ... 10 km (unit mm)
	Measurement preset	**0** ... 10 km (unit mm)
	Function MF2 input	**Off**, preset, Illumination
	MF2, active status	**HIGH**/LOW active
	Function MF1 output	Measurement, speed, **service**, control mark, illumination
	MF1 output, active status	**HIGH**/LOW active
	Switching threshold, measured value	**– 10 km** ... 10 km (unit mm, default 0 mm)
	Hysteresis for switching threshold	**1 mm** ... 10 km (unit mm, default 10 mm)
	Speed switching threshold	**0** ... 10 m/s (unit mm/s)
	Speed mode	**Direction +**, Direction –, Direction ±
	Configure MF1 on service	Distance out of range, temperature too high/too low, no bar code detected, distance calculation/code reading problems, pollution problems
	Extrapolation time	**160 ms**, 500 ms, 1000 ms, 2000 ms
	Store parameters	Save parameters; reset parameters to factory settings
Methods	Illumination	**Lighting on**, lighting off
	Restart	**Coldstart:** reinitialization of device hardware and software **Warmstart:** reinitialization of the device software
	Image data (can be used after logging onto the device)	**ATTENTION** **After execution of this method a coldstart will be necessary!** Update: Current shot is shown as a histogram and stored as a text file under “c:\temp\calibData.txt”

bold = factory default

5.3 EtherNet/IP interface

The OLM200 EtherNet/IP implements “EtherNet/IP Industrial Level with Device Level Ring (DLR)“. The sensor supports the profile “Encoder“ (22H) from the Common Interface Protocol (CIP).

5.3.1 Ethernet interface

The OLM200 EtherNet/IP is equipped with two Ethernet interfaces. The interfaces serve communication via EtherNet/IP and parameterization with SOPAS Engineering Tool (SOPAS ET). The Ethernet interfaces have the following properties:

- Transfer rate 10 or 100 MBit, half or full duplex
- Auto-negotiation (automatic adjustment of transfer rate and duplex procedure)
- Auto-crossover (automatic adjustment with crossed lines)

Both Ethernet interfaces are equal and internally connected by a switch. Since this internal switch also has the sensor as such connected, only one IP address is needed.

5.3.2 EtherNet/IP interface

EtherNet/IP is a fieldbus based on Ethernet. EtherNet/IP uses the Common Interface Protocol (CIP) of the Open DeviceNet Vendor Association (ODVA). CIP uses objects to exchange data between devices. Data exchange can by cyclical or acyclical. Cyclic communication at EtherNet/IP takes place by Implicit Messaging via UDP (User Datagram Protocol). Acyclic communication takes place by Explicit Messaging via TCP (Transport Control Protocol).

The OLM200 supports the following EtherNet/IP features:

- A “listen only“, an “input only“ and an “exclusive owner“ connection.
- Cycle time (Request Packet Interval) ≥ 2 ms
- DLR (Device Level Ring)
- DHCP (Dynamic Host Configuration Protocol)
- ACD (Address Conflict Detection)
- EDS (Electronic Data Sheet)

5.3.3 Address Conflict Detection

The OLM200 EtherNet/IP supports the performance feature “Address Conflict Detection (ACD)“. The feature „ACD“ is activated in the factory settings. To deactivate the feature “ACD“, you need to set the attribute “10“ to „FALSE (Disable ACD)“ in object “TCP/IP Interface“ (classID 0xF5). This setting is saved non-volatile in the device.

Note Every time the sensor recognizes a present address conflict by ACD, this event is written into the sensor's internal memory (flash memory) as diagnosis information. The number of permissible writing processes is limited. In networks with frequent address conflicts, it is recommended that you deactivate the feature “ACD“.

5.3.4 Data types used

Tab. 3: Data types used

Name	Size [Byte]	Description
BOOL	1	Boolean Value FALSE = 0, TRUE = 1
BYTE	1	Bit-Container
WORD	2	Bit-Container
DWORD	4	Bit-Container
SINT	1	Integer with prefix as a complement of two
INT	2	Integer with prefix as a complement of two
DINT	4	Integer with prefix as a complement of two
USINT	1	Integer without prefix
UINT	2	Integer without prefix
DINT	4	Integer without prefix
ENGUNIT	2	Physical unit; see following section
SHORT_STRING	1+n	Character string with n signs, 1 Byte length information advanced

5.3.5 Specific Measuring Units (Engineering Units)

Tab. 4: Position

Value	Unit
0x0801	0.1 mm
0x2203	1 mm
0x2202	10 mm
0x0806	100 mm

Tab. 5: Speed

Value	Unit
0x0816	0.1 mm/s
0x0810	1 mm/s
0x2B01	10 mm/s
0x0811	100 mm/s

5.4 Acyclic Data Exchange

5.4.1 Standard Objects

The following objects from the CIP standard and the EtherNet/IP standard are available for acyclical data exchange (Explicit Messaging):

- Identity (classID 0x01)
- Message Router (classID 0x02)
- Connection Manager (classID 0x06)
- Ethernet Link (classID 0xF6)
- TCP/IP (classID 0xF5)
- Device Level Ring (classID 0x47)
- Quality of Service (classID 0x48)

5.4.2 Objects from the Encoder-Profile

The following objects are present in the CIP-profile “Encoder“:

- Assembly Object
- Position Sensor Object

Assembly Object (classID 0x04)

Tab. 6: Class Attributes Assembly Object

Attribute ID	Name	Data type	Size [Byte]
1	Revision	UINT	2

Position Sensor Object (classID 0x23)

Tab. 7: Class Attributes Position Sensor Object

Attribute ID	Name	Data typ	Size [Byte]
1	Revision	UINT	2

Tab. 8: Standard Instance Attributes Position Sensor-Object

Attribute ID	Name	Data type	Size [Byte]	Get	Set
9	Auto Zero	BOOL	1		X
10	Position Value Signed	DINT	4	X	
11	Position Sensor Type constant value: 0x0008 (absolute linear encoder)	UINT	2	X	
12	Direction Counting Toggle default value: 0 (FORWARD)	BOOL	1		X
15	Position Format, default value: 0x2203 (1 mm) range: 0x1001 (counts), 0x0801 (0.1 mm), 0x2203 (1 mm), 0x2202 (10 mm), 0x0805 (100 mm)	ENGUNIT (UINT)	2		X
19	Preset Value	DINT	4		X
24	Velocity Value	DINT	4	X	
25	Velocity Format default value: 0x0810 (1 mm/s), range: 0x1F04 counts/s), 0x0816 (0.1 mm/s), 0x0810 (1 mm/s), 0x2B01 (10 mm/s), 0x0811 (100 mm/s)	ENGUNIT (UINT)	2		X
26	Velocity Resolution default value: 1	UDINT	4		X
41	Operating Status	BYTE	1	X	
44	Alarms	WORD	2	X	
45	Supported Alarms	WORD	2	X	
46	Alarm Flag	BOOL	1	X	
47	Warnings	WORD	2	X	
48	Supported Warnings	WORD	2	X	
49	Warning Flag	BOOL	1	X	
51	Offset Value	DINT	4	X	

The OLM200 EtherNet/IP also provides the following attributes:

Tab. 9: Manufacturer-specific instance attributes position sensor

Attribute ID	Name	Data type	Size [Byte]	Get	Set
100	Label (3 bytes)	DWORD	4	X	
101	Temperature	SINT	1	X	
102 [1)]	Quality	WORD	2	X	
103	Warning and Alarm Flags	BYTE	1	X	
120	[MF1 Output] Active Level	BOOL	1		X
121	[MF1 Output] Function	USINT	1		X

[1)] Device-specific value for the quality of a measured value. Higher values mean less quality..

Attribute ID	Name	Data type	Size [Byte]	Get	Set
122	[MF1 Output] Position Threshold, range: –10 000 000 … 10 000 000 [mm], default value: 0 [mm]	DINT	4		X
123	[MF1 Output] Position Hysteresis, range: 1 … 10 000 000 [mm], default value: 10 [mm]	DINT	4		X
124	[MF1 Output] Velocity Threshold, range: 0 … 10 000 [mm/s], default value: 0 [mm/s]	DINT	4		X
125	[MF1 Output] Velocity Sign	USINT	1		X
126	[MF1 Output] Service: Position out of range	BOOL	1		X
127	[MF1 Output] Service: Temperature failure	BOOL	1		X
128	[MF1 Output] Service: No bar code visible	BOOL	1		X
129	[MF1 Output] Service: No plausible position	BOOL	1		X
130	[MF1 Output] Service: Pre-failure	BOOL	1		X
140	[MF2 Input] Active Level	BOOL	1		X
141	[MF2 Input] Function	USINT	1		X
142	Dynamic Preset Value, default value: 0 [mm]	DINT	4		X
143	Dynamic Preset Control, range: 0 … 3, default value: 0	BYTE	1		X
150	Serial Number (8 characters)	SHORT_ STRING	1 + 8	X	
151	Product Code (14 characters)	SHORT_ STRING	1 + 14	X	
152	Version HW (8 characters)	SHORT_ STRING	1 + 8	X	
153	Version FPGA (19 characters)	SHORT_ STRING	1 + 20 [1)]	X	
154	Version µC (19 characters)	SHORT_ STRING	1 + 20 [1)]	X	
155	Version µC2 (19 characters)	SHORT_ STRING	1 + 20 [1)]	X	

[1)] Only the first 19 characters (of 20 possible ones) are used.

5.4.3 Description of the individual attributes

“Operating Status” (Attribute ID 41)

Tab. 10: “Operating Status”

Bit	Name	Description	Supported by OLM200
0	Direction	increasing (0) decreasing (1)	Yes
1	Scaling	off (0), on (1)	Yes
2 ... 4	Reserved by CIP	Always 0	–
5 ... 7	Vendor specific		No

“Alarms” (Attribute ID 44) and “Supported Alarms” (Attribute ID 45)

The attribute “Alarms” (Attribute ID 44) can take on the following values:

Tab. 11: “Alarms” and “Supported Alarms“

Bit	Name	Description	Supported by OLM200
0	Position error	F7: Position out of range	Yes
1	Diagnostic error		No
2 ... 11	Reserved by CIP		–
12	Vendor specific	Not ready	Yes
13	Vendor specific	F1: Temperature too low or too high	Yes
14	Vendor specific	F3: No barcode detected	Yes
15	Vendor specific	F4: Reading error	Yes

The same bit layout applies for the attribute „Supported Alarms“ (Attribute ID 45).

“Warnings” (Attribute ID 47) and “Supported Warnings” (Attribute ID 48)

The attribute “Warning” (Attribute ID 47) can take on the following values:

Tab. 12: “Warnings” and “Supported Warnings”

Bit	Name	Description	Supported by OLM200
0	Frequency exceeded		No
1	Light control reserve		No
2	CPU watchdog		No
3	Operating time limit warning		No
4	Battery charge		No
5	Reference point		No
6	Minimum velocity flag		No
7	Maximum velocity flag		No
8	Minimum acceleration flag		No
9	Maximum acceleration flag		No
10	Position limits exceeded		No
11 ... 12	Reserved by CIP	Always 0	–
13	Vendor specific	F5: Pollution	Yes
14 ... 15	Vendor specific		No

The same bit layout applies for the attribute “Supported Warnings” (Attribute ID 48).

"Label" (Attribute ID 100)

The attribute "Label" delivers the value of the last control code read. If no control code was read yet, the value "0" is returned. "

"Warning" and "Alarm Flags" (Attribute ID 103)

Tab. 13: "Warning" and "Alarm Flags"

Bit	Name	Description	Supported by OLM200
0	Alarm Flag Identical with Attribute ID 46		Yes
1	Warning Flag Identical with Attribute ID 49		Yes
2 ... 4	Reserved by CIP		–
5 ... 7	Vendor specific		No

Switching Output MF1 (Attributes-ID 120 ... 130)

Tab. 14: Switching Output MF1

Attribute	Value	Meaning
Active Level (Attribute ID 120)	0 (Default)	HIGH
	1	LOW
Function (Attribute ID 121)	0	POSITION
	1	VELOCITY
	2 (Default)	SERVICE
	3	CONTROL LABEL
	4	ILLUMINATION OFF
Velocity Sign (Attribute ID 125)	0 (Default)	+ (Positive direction)
	1	– (Negative direction)
	2	+/– (Both directions)
Service (Attribute ID 126 ... 130)	0 (FALSE)	DISABLED
	1 (TRUE) (Default)	ENABLED

Switching Input MF2 (Attributes-ID 140 ... 141)

Tab. 15: Switching Input MF2

Attribute	Wert	Meaning
Active Level (Attribute ID 140)	0 (Default)	HIGH
	1	LOW
Function (Attribute ID 141)	0 (Default)	INACTIVE
	1	PRESET ACTIVATION
	2	ILLUMINATION OFF

"Dynamic Preset Control" (Attribute ID 143)

Tab. 16: Dynamic Preset Control

Bit	Name	Description	Supported by OLM200
0	Clear Preset	Resets preset and offset	Yes
1	Set Preset	Sets preset to "Dynamic Preset Value" and calculates new offset	Yes
2 ... 7	–	Reserved for future use	–

5.4.4 Preset function

There are different options of using the attribute “Preset Value” (ID 19):

- Directly by acyclic data exchange (Explicit Messaging)
- Via a control bit of the attribute “Dynamic Preset Control” (ID 142) with the cyclic data exchange (Implicit Messaging) or acyclic data exchange.
- Via switching output MF2

If the attribute “Preset Value” (ID 19) is changed as described, the attribute “Offset Value” (ID 51) is re-set at the same time.

The following applies: <Offset Value > = <Preset Value> – <Position Value>

In running operation, the value of the attribute “Offset Value” (ID 51) is added to the internal position value when the attribute “Position Value” (ID 10) is output. The attribute “Offset Value” can only be read through the EtherNet/IP interface.

Directly by acyclic data exchange

The attribute “Preset Value” (ID 19) can be written directly.

Via a control bit of the attribute “Dynamic Preset Control” by cyclical or acyclical data exchange

Via the bit 1 “Set Preset” of the attribute “Dynamic Preset Control” (ID 143), the preset can be activated dynamically. Via the bit 0 “Clear Preset”, the preset can be deleted again.

The following steps are required for this:

- Write the value for the preset for the attribute “Dynamic Preset Value” (ID 142).
- Set preset: Set attribute “Dynamic Preset Control” (ID 143) first to 0x00 and then to 0x02. Delete preset: Set attribute “Dynamic Preset Control” (ID 143) first to 0x00 and then to 0x01.

The 0-1 transfer of the control bit sets the attribute “Preset Value” (ID 19) to the same value as the attribute “Dynamic Preset Value” (ID 142). The attribute “Offset Value” (ID 51) is also re-set.

Via switching input MF2

The switching input MF2 can dynamically activate the preset

The following steps are required:

- Write the value for the preset for the attribute “Dynamic Preset Value” (ID 142).
- Set attribute “MF2 Input Function” (ID 141) to 0x01 (“PRESET ACTIVATION”).

Once an active level is applied at the switching input MF2, the attribute “Preset Value” (ID 19) is set to the same value as the attribute “Dynamic Preset Value” (ID 142). The attribute “Offset Value” (ID 51) is also re-set.

5.5 Cyclic Data Exchange

The special CIP objects that are used for cyclic data exchange (Implicit Messaging) are also referred to as “Assemblies”. Each assembly comprises one or several attributes of CIP objects of the device. The OLM200 EtherNet/IP only provides static assemblies:

A CIP object with the name “Assembly” (classID 0x04) is used to set the cyclic data exchange with pre-defined assemblies. For cyclic data exchange, one assembly each can be used for input, output and configuration.

In the OLM200 EtherNet/IP, all assemblies are made up of the attributes of the CIP object “Position Sensor”.

Input Assemblies

Tab. 17: Input Assemblies

instanceID	Name	Size [Byte]	Attribute-Name	Data type	Attribute ID
0x01	Position	4	Position Value Signed	DINT	10
0x02	Position, Flags	5	Position Value Signed	DINT	10
			Warning and Alarm Flags	BYTE	103
0x03	Position, Velocity	8	Position Value Signed	DINT	10
			Velocity Value	DINT	24
0x64	Velocity	4	Velocity Value	DINT	24
0x65	Position, Velocity, Flags	12	Position Value Signed	DINT	10
			Velocity Value	DINT	24
			Warning and Alarm Flags	BYTE	103
			Reserved	3 BYTE	–
0x66	Position. Velocity, Label, Flags	16	Position Value Signed	DINT	10
			Velocity Value	DINT	24
			Label	DWORD	100
			Warning and Alarm Flags	BYTE	103
			Reserved	3 BYTE	–
0x67	Extended	24	Position Value Signed	DINT	10
			Velocity Value	DINT	24
			Label	DWORD	100
			Offset Value	DINT	51
			Alarms	WORD	44
			Warnings	WORD	47
			Operation Status	BYTE	41
			Temperature	SINT	101
			Quality	WORD	102

Output Assembly

Tab. 18: Output Assembly

instanceID	Name	Size [Byte]	Attribute-Name	Data type	Attribute ID
0x80	Dynamic Preset	8	Dynamic Preset Value	DINT	142
			Dynamic Preset Control	BYTE	143
			Reserved	3 BYTE	–

The following table shows example values for the output assembly “Dynamic Preset”. In this case, the preset value is neither set nor deleted.

Name	Attribute-Name	Data type	Value
Dynamic Preset	Dynamic Preset Value	DINT	0
	Dynamic Preset Control	BYTE	0x00
	Reserved	3 BYTE	0x00, 0x00, 0x00

Configuration Assembly

Tab. 19: Configuration assembly

instanceID	Name	Size [Byte]	Attribute-Name	Data type	Attribute ID
0x99	Configure All	28	Auto Zero	BOOL	9
			Direction Counting Toggle	BOOL	12
			Position Format	ENGUNIT (UINT)	15
			Velocity Format	ENGUNIT (UINT)	25
			[MF1 Output] Active Level	BOOL	120
			[MF1 Output] Function	USINT	121
			[MF1 Output] Position Threshold	DINT	122
			[MF1 Output] Position Hysteresis	DINT	123
			[MF1 Output] Velocity Threshold	DINT	124
			[MF1 Output] Velocity Sign	USINT	125
			[MF1 Output] Service: Position out of Range	BOOL	126
			[MF1 Output] Service: Temperature Failure	BOOL	127
			[MF1 Output] Service: No bar code visible	BOOL	128
			[MF1 Output] Service: No plausible position	BOOL	129
			[MF1 Output] Service: Pre-failure	BOOL	130
			[MF2 Input] Active Level	BOOL	140
			[MF2 Input] Function	USINT	141

To receive a valid basic configuration, the attributes must be set according to the following table. Observe that a valid value must have been entered for the attributes “Position Format” and “Velocity Format”. The default value according to CIP specification must not be used.

Name	Attribute-Name	Data type	Initial value recommended
Configure All	Auto Zero	BOOL	0 (DISABLED)
	Direction Counting Toggle	BOOL	0 (FORWARD)
	Position Format	ENGUNIT (UINT)	0x2203 (mm)
	Velocity Format	ENGUNIT (UINT)	0x0810 (mm/s)
	[MF1 Output] Active Level	BOOL	0 (HIGH)
	[MF1 Output] Function	USINT	2 (SERVICE)
	[MF1 Output] Position Threshold	DINT	0
	[MF1 Output] Position Hysteresis	DINT	10
	[MF1 Output] Velocity Threshold	DINT	0
	[MF1 Output] Velocity Sign	USINT	0 (+)
	[MF1 Output] Service: Position out of range	BOOL	1 (ENABLED)
	[MF1 Output] Service: Temperature failure	BOOL	1 (ENABLED)
	[MF1 Output] Service: No bar code visible	BOOL	1 (ENABLED)
	[MF1 Output] Service: No plausible position	BOOL	1 (ENABLED)
	[MF1 Output] Service: Pre-failure	BOOL	1 (ENABLED)
	[MF2 Input] Active Level	BOOL	0 (HIGH)
	[MF2 Input] Function	USINT	0 (INACTIVE)

6 Maintenance

The linear measurement sensor OLM200 is maintenance-free.

We recommend regularly doing the following:

- Clean the optical interfaces.
- Check the screw connections and plug connections.

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 Data sheet OLM200 – EtherNet/IP

Tab. 20: Data sheet OLM200 – EtherNet/IP

Performance

Repeatability [1]	0.15 mm
Output rate	2.5 ms
Response time [2]	10 ms
Light source	LED, red
Measurement length of the distance moved [3]	0 m ... 10,000 m
Service life [4]	100,000 h
MTTFd	> 100 years
Accuracy of speed output	± 5 mm/s
Maximum speed	10 m/s

[1] Statistical error 3 σ, no warm-up time required.
[2] Response time of switching output
[3] Dependent on the set resolution and transfer protocol.
[4] Typ. At +25 °C.

Interfaces

Data interface	EtherNet/IP Industrial Level with Device Level Ring (DLR)
Switching output [1]	Multifunctional output MF1: PNP, MF1: NPN
Output current I_A [2]	≤ 100 mA
Switching input	Multifunctional input MF2
Data transmission rate	100 Mbit/s fullduplex

[1] Functions of switching output MF1: Position speed; control mark Q00 (off), Q01 (on); illumination on/off; service [prefailure (dirt/LED life time), no bar code tape, over/under temperature, out of range 0 km > position > 10 km, internal error].
[2] Outputs MF1 short-circuit protected.

Mechanics/electrics

Supply voltage V_S [1]	DC 18 V ... 30 V
Ripple [2]	≤ 5 V_{SS}
Power consumption	< 5.5 W
Initialization time	10 s
Housing material	Aluminum, zinc
Weight	Approx. 510 g

[1] Limit values, reverse polarity protected.
[2] May not exceed or fall short V_s tolerances.

Ambient data

Enclosure rating	IP 65 (EN 60 529)
Protection class	III
EMC[1),]	EN 61000-6-2, EN 61000-6-4
Ambient temperature [2), 3)]	Operation: –30 °C ... +60 °C Storage: –40 °C ... +75 °C
Typ. ambient light safety [4)]	≤ 30,000 lx
Vibration	DIN/EN 60068-2-6, DIN/EN 60068-2-64
Shock	DIN/EN 60068-2-27

1) This is a facility of class A. This facility may cause radio interferences in the living area.
2) For temperatures below –20 °C with 5 min. heating time.
3) Max. 95 % humidity, non-condensing.
4) Typ. value at +25 °C ambient temperature.

Type-specific data

Interface	Bar code tape reading distance	Bar code width	Type designation	Part no.
EtherNet/IP	100 mm ± 20 mm [1)]	30 mm	OLM200-1008	1058813

1) A reading distance greater than 85 mm must be maintained in order to ensure an optimum functional reserve in applications in which a bar code is sporadically covered.

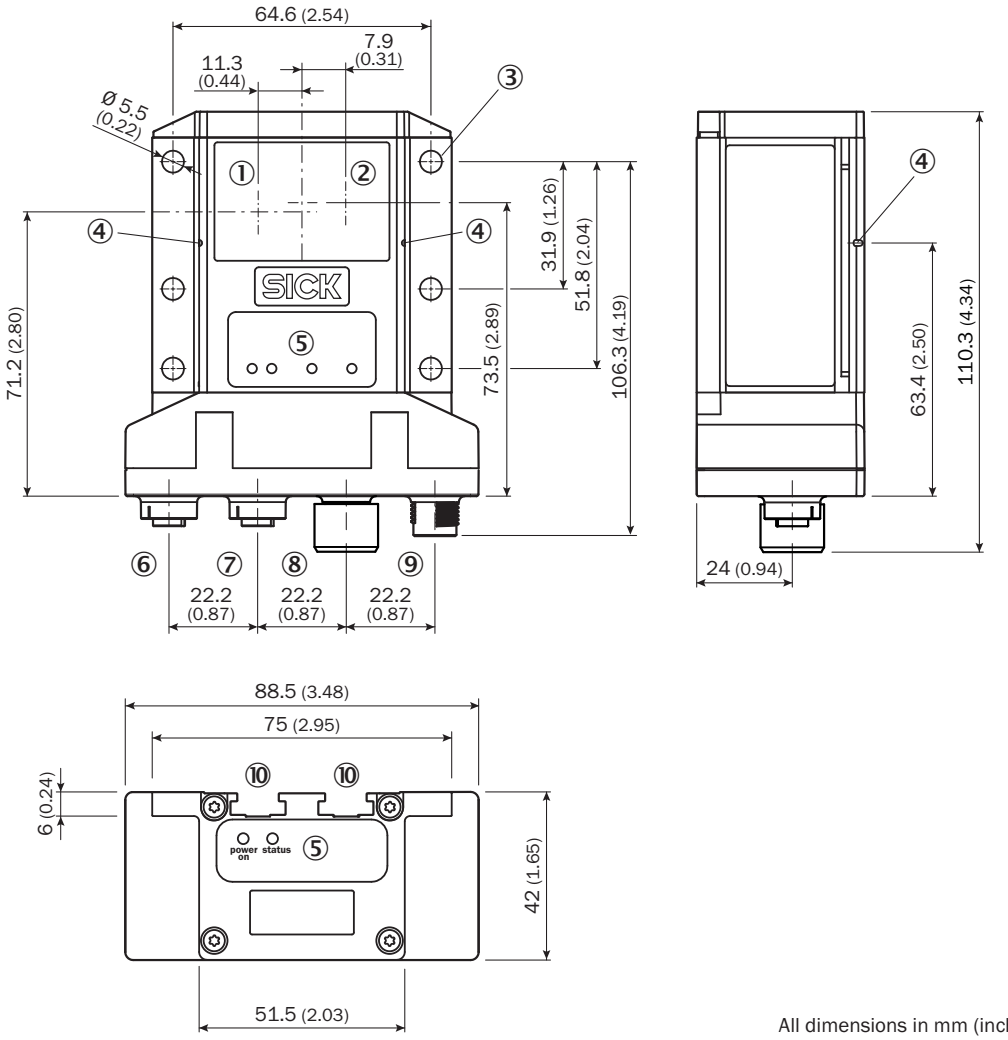
7.2 Data sheet bar code tape

Tab. 21: 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, checked to FTM 1*/after 24 h):	
– Steel	> 9.3 N/10mm
– Aluminum	> 8.0 N/10mm
– Polypropylene	> 6.2 N/10mm
– HD polyethylene	> 4.3 N/10mm
– Smooth powder paint	> 7.8 N/10mm
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 (glued onto stainless steel):	No complaint:
– Relative air humidity 98 %	120 h at 38 °C
– Diesel oil	4 h at 23 °C
– Glass cleaner	4 h
– Isopropyl alcohol	4 h
– Brake fluid DOT 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 load cycles
Base corrosion	No corrosion on the glued base
Dimensional stability	Key figure 02 (checked to DIN 30646) Shrinkage < 0.2 %

7.3 Dimensional drawing

Fig. 21:
Dimensional drawing
OLM200



All dimensions in mm (inch)

① Center of sender optical axis
② Center of receiver optical axis
③ Mounting hole
④ Alignment aid (slot)
⑤ Status LEDs
⑥ Ethernet/EtherNet/IP, socket M12, 4-pin
⑦ Ethernet/EtherNet/IP, socket M12, 4-pin
⑧ Not connected
⑨ Device connection, plug M12, 5-pin
⑩ T-Nut

7.4 Accessories

7.4.1 Plug connectors and cables

Tab. 22: Female connectors with cable

Female connectors, M12, 5-pin		
Description	**Type**	**Part no.**
Female connector, M12, 5-pin, straight, 2 m, PVC	DOL-1205-G02M	6008899
Female connector, M12, 5-pin, straight, 5 m, PVC	DOL-1205-G05M	6009868
Female connector, M12, 5-pin, straight, 10 m, PVC	DOL-1205-G10M	6010544

7.4.2 EtherNet/IP Male connector with cable

Tab. 23: EtherNet/IP Male connector with cable

EtherNet/IP Male connector with cable		
Description	**Type**	**Part no.**
Male connector, M12, connector D-coded, straight on M12 connector straight, 2m	SSL-1204-G02ME90	6045222
Male connector, M12 connector D-coded, straight on M12 connector straight, 5m	SSL-1204-G05ME90	6045277
Male connector, M12 connector D-coded, straight on M12 connector straight, 10m	SSL-1204-G10ME90	6045279
Male connector, M12 connector D-coded, straight on RJ45 straight, 2m	SSL-2J04-G02ME60	6047916
Male connector, M12 connector D-coded, straight on RJ45 straight, 5m	SSL-2J04-G05ME60	6047917
Male connector, M12 connector D-coded, straight auf RJ45 straight, 10m	SSL-2J04-G10ME60	6047918
Male connector, M12 connector D-coded, straight on open end, 2m	STL-1204-G02ME90	6045284
Male connector, M12 connector D-coded, straight on open end, 5m	STL-1204-G05ME90	6045285
Male connector, M12 connector D-coded, straight on open end, 10m	STL-1204-G10ME90	6045286
Male connector, M12 connector D-coded, angled on M12 connector straight, 2m	SSL-1204-H02ME90	6047908
Male connector, M12 connector D-coded, angled on M12 connector straight, 5m	SSL-1204-H05ME90	6047909
Male connector, M12 connector D-coded, angled on M12 connector straight, 10m	SSL-1204-H10ME90	6047910
Male connector, M12 connector D-coded, angled on RJ45 straight, 2m	SSL-2J04-H02ME60	6047911
Male connector, M12 connector D-coded, angled on RJ45 straight, 5m	SSL-2J04-H05ME60	6045287
Male connector, M12 connector D-coded, angled on RJ45 straight, 10m	SSL-2J04-H10ME60	6045288
Male connector, M12 connector D-coded, angled on open end, 2m	STL-1204-W02ME90	6047912
Male connector, M12 connector D-coded, angledon open end, 5m	STL-1204-W05ME90	6047913
Male connector, M12 connector D-coded, angled on open end, 10m	STL-1204-W10ME90	6047914
Male connector, M12 connector D-coded angled on open end, 25m	STL-1204-W25ME90	6047915

Tab. 24: EtherNet/IP male and female connector without cable

EtherNet/IP male connectors and female connectors without cable		
Description	**Type**	**Part no.**
Male connector, RJ 45	STE-0J08-GE	6048150
Male connector, M124-pin, straight	STE-1204-GE01	6048151
Male connector, M12, 4-pin, angled	STE-1204-WE	6048152
Female connector, M12, 4-pin, straight	DOS-1204-GE	6048153
Female connector, M12, 4-pin, angled	DOS-1204-WE	6048154

Tab. 25: Wall penetration

Wall penetration		
Description	**Type**	**Part no.**
Wall penetration, RJ-45, angled, D-coded	DOS-RJ45 Passage female connector	6048180

Tab. 26: Adapter EtherNet/IP

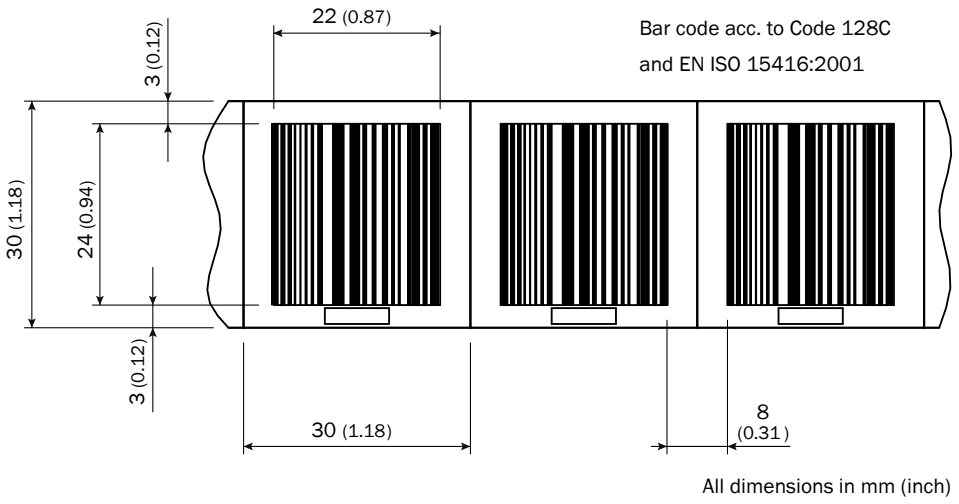
Adapter EtherNet/IP		
Description	**Type**	**Part no.**
Adapter EtherNet/IP	Adapter EtherNet/IP IVC M12	2044264

7.4.3 Bar code tape

The SICK bar code tape is available in heights of 30 mm and 40 mm. The width of the bar code is always 30 mm. The coding of the bar code tape is 128C, acc. to EN ISO 15416:2001.

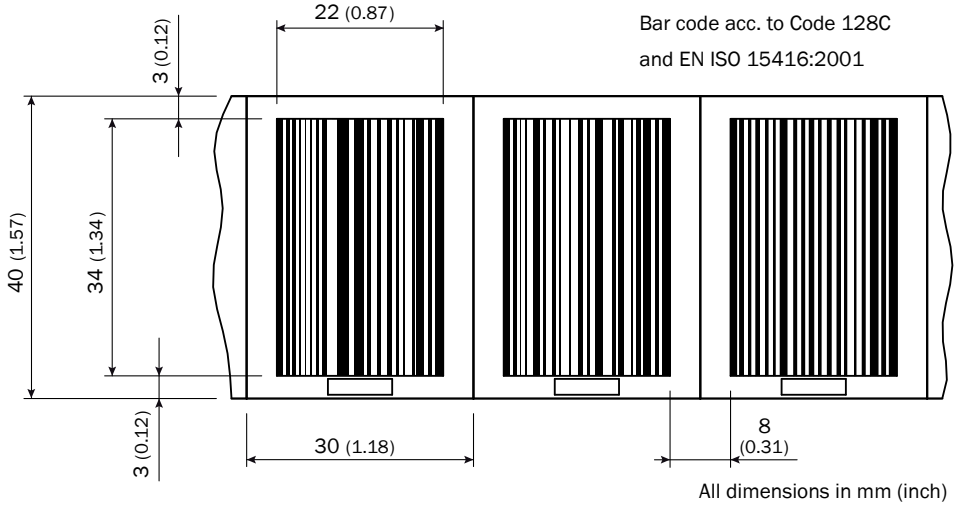
Information about correct mounting of the bar code tape can be found in section 3.1 “Bar code tape mounting”.

Bar code tape, height 30 mm, width 30 mm



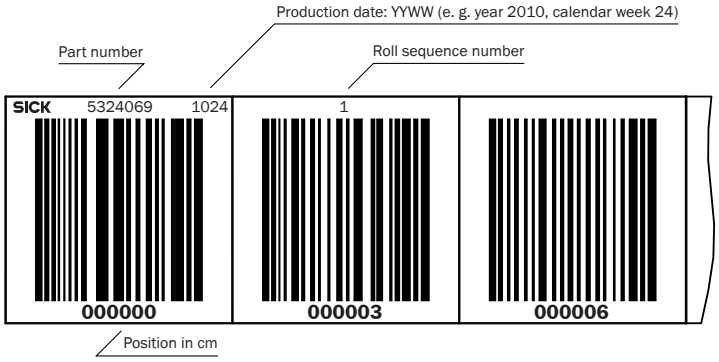
All dimensions in mm (inch)

Bar code tape, height 40 mm, width 30 mm



All dimensions in mm (inch)

7.4.4 Bar code tape printing



7.4.5 Order notes and variants of the bar code tape

The bar code tape is available with a measuring range up to 500 m, in lengths of 20 m per roll, from stock. Measuring ranges that exceed 500 m or which cannot reasonably be represented with the available 20 m sections can be produced for specific customer orders. In measuring ranges greater than 500 m, we recommend ordering the entire measuring range as a bar code tape produced for a specific customer order.

Tab. 27: Bar code tape accessories

Bar code tape with 30 mm height					
Measuring range in meters		**Roll sequence number**	**Code Start**	**Code End**	**Part no.**
from	**to**				
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
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

Bar code tape with 30 mm height					
Measuring range in meters		**Roll sequence number**	**Code Start**	**Code End**	**Part no.**
from	**to**				
440	460	23	044004	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 Start**	**Code End**	**Part no.**
from	**to**				
0	5	1	000000	000501	5324252

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

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

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

1. Determine the value of the start and end position of your measurement range in centimeters. Devide this value by 3!
2. 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.
3. 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 20 m in one section. The measuring range including start and finish code must be entered for a customer-specific measuring range!

7.4.6 Bar code tape repair kit

PDF files with position codes are available on the website at www.mysick.com/en/OLM200. This means individual codes can be printed independently if necessary, for example in order to replace damaged segments.

The position codes can be located by clicking the products link on the website and selecting the product type in question.

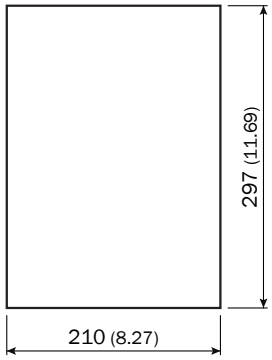
The position codes can be printed out using a laser printer. Note the following points when doing this:

- A4 paper format
- Resolution set as high as possible – 1200 dpi or higher
- “Page scalling” and “Auto-Rotate and Center” features disabled

7.4.7 Blank labels for repair codes or control marks

Tab. 28: Blank labels

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

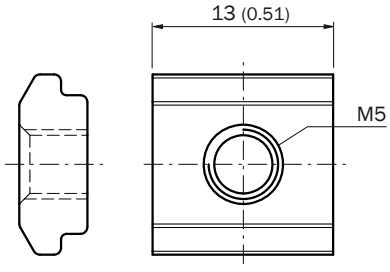


All dimensions in mm (inch)

7.4.8 Sliding nuts

Tab. 29: Sliding nuts

Sliding nuts, M5	
Type	**Part no.**
Set of sliding nuts (4x)	2017550



All dimensions in mm (inch)

8 Error tables and countermeasures

8.1 Device errors and warnings

Tab. 30: Device errors and warnings

Error/Warnings	LED indication	Cause	Possible measure
F1 Error: Temperature too high/too low	Power LED: red Status LED: off	Ambient temperature too high. Ambient temperature too low.	Reduce ambient temperature. Wait for heating-up phase (at temperatures ≤ −20 °C).
F3 Error: no bar code tape detected	Power LED: green Status LED: red	Bar code tape is nonexistent. Bad orientation of the sensor. Sensor or bar code tape totally dirty Working distance too small/too large.	Mount bar code tape in front of the sensor. Align Sensor with the bar code tape. Clean the optical interfaces of the sensor and the bar code tape. Check distance from sensor to bar code tape.
F4 Error: distance calculation/code reading problem	Power LED: green Status LED: red	Bar code orientation not recognized. Damaged bar code strip	Interrupt the power supply or send cold start command. Renew bar code tape.
F5 Warning: pollution problem	Power LED: green Status LED: flashing red	Sensor or bar code tape dirty. LED sender power inadequate.	Clean the optical interfaces of the sensor and the bar code tape. Replace sensor.
F7 Error: distance out of range	Power LED: green Status LED: red	Calculated position value less than 0 or greater than 10 km.	Modify the value range of the attached bar code tape accordingly.

8.2 Communication error

8.2.1 Ethernet errors

The LED LINK signals the Ethernet connection state:

Tab. 31: Ethernet errors

LINK	Condition
Off	Condition right after activation or no physical change present.
Lit green	Ethernet connection is established.
Orange flashing:	Ethernet connection is established and data are exchanged.

8.2.2 EtherNet/IP errors

The LEDs “Module Status (Mod)” and “Network Status (Net)” signal the EtherNet/IP condition:

Tab. 32: Module Status (Mod)

Display	Condition	Remedies
Off	Supply voltage not present.	Check supply voltage
Lit green	Device works correctly.	–
Flashing green	Standby. Sensor is not configured.	–
Flashing red	Fault	Check sensor configuration.
Lit red	Severe fault	–
Flashing red-green	Self-test. Takes place when the sensor starts.	–

Tab. 33: Network Status (Net)

Display	Condition	Remedies
Off	No supply voltage or IP address assigned.	Check supply voltage Check IP settings.
Flashing green	No connection: IP-settings are set but no CIP connection could be set up.	–
Lit green	Connection present.	–
Flashing red	Connection fault (timeout)	–
Lighted red	Same IP address is already assigned to another device.	Check IP settings.
Flashing red-green	Self-test. Takes place when the sensor starts.	–

9 Repair

9.1 Repair barcode tape

Note A damaged bar code tape can be repaired. Files containing bar codes are available for download from www.mysick.com/en/OLM200 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.

10 Appendix

10.1 List of figures

10.2 List of tables

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