OPERATING INSTRUCTIONS

OLM200

Linear measurement sensor

Mounting, operating, maintenance

SICK
Sensor Intelligence.

Contents

Described product

OLM200

Manufacturer

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Original document

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1 About this document

1.1 Information regarding the operating instructions

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

Ensure that you read through these operating instructions carefully before starting any work. They constitute an integral part of the product and should be stored in the direct vicinity of the sensor so they remain accessible to personnel at all times. Should the linear measurement sensor be passed on to a third party, these operating instructions should be handed over with it.

These operating instructions do not provide information on operating the machine in which the linear measurement sensor is integrated. For information about this, refer to the operating instructions of the respective machine.

1.2 Explanation of symbols

Warnings in these operating instructions are indicated by symbols. The warnings are introduced by signal words that indicate the extent of the danger. These warnings must be observed at all times and care must be taken to avoid accidents, personal injury, and material damage.

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

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

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

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

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

1.3 Scope of delivery

The scope of delivery includes the following:

- Linear measurement sensor
- Optional: Accessories see "Accessories", Page 80

Supplied documentation:

- Quickstart guide

NOTE
All available documentation can be found online at

▶ http://www.mysick.com/en/olm200

There, you can also find:

- Available control marks, configuration marks, and position marks for download as a PDF file
- Device description file (GSD – generic station description) for PROFINET and PROFIBUS
- Device description file (EDS – electronic data sheet) for EtherNet/IP
- Information about software updates
- SOPAS Engineering Tool for configuration
- A list of FAQs for the linear measurement sensor
- Example applications

1.4 Customer service

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

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

2 Safety information

2.1 Correct use

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

Areas of application:

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

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

2.2 Incorrect use

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

WARNING

Danger due to incorrect use.

Any incorrect use can result in dangerous situations.

Therefore, take note of the following information:

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

2.3 IP technology

NOTE

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

2.4 Limitation of liability

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

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

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

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

2.5 Modifications and conversions

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

2.6 Requirements for skilled persons and operating personnel

WARNING
Risk of injury due to insufficient training.

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

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

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

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

2.7 Operational safety and particular hazards

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

2.8 Hazard warnings and operational safety

CAUTION
Risk of injury from LED radiation.

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

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

2.9 Environmental protection

ATTENTION

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

Disposing of sensors improperly may cause damage to the environment.

Therefore, take note of the following information:

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

3 Function and use

3.1 Function

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

Determining bar code tape alignment

On startup, the linear measurement sensor initially detects the alignment in relation to the bar code tape (0° or 180°). The sensor automatically adapts itself to the alignment that is detected, and starts outputting position values. If there are no bar codes in the field of view when the sensor is started up, the sensor selects the orientation which it detected before being deactivated. The sensor starts position value output as soon as bar codes with the expected orientation are located in the field of view. Error F4 and the measured value "0" are output if an unexpected alignment is detected, and this also applies if the alignment is changed during the product travel path. In such a case, position values are not output until after the supply voltage has been interrupted and the new alignment has been detected successfully.

NOTE

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

During running operation, the alignment of the bar code tape can also be altered using SOPAS ET see "Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)", Page 31 or by configuration marks see "Configuration marks", Page 14.

NOTE

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

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

The extrapolation time can be set using control marks or SOPAS ET see "Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)", Page 31.

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

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

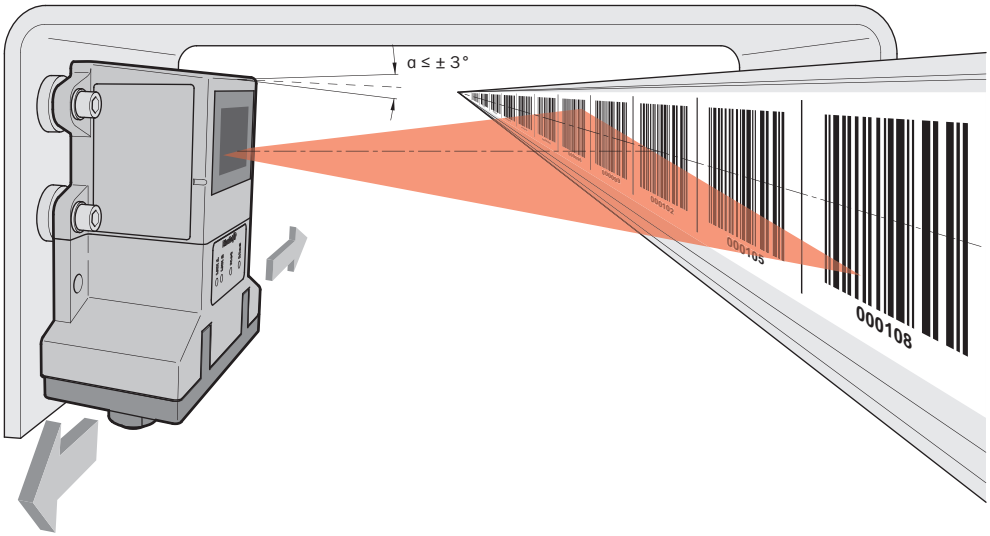


Figure 1: Functionality schematic diagram OLM200

3.2 Type label

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

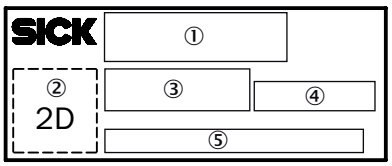


Figure 2: Type label

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

3.3 Bar code tape

For the OLM-xx0x variants, suitable bar code tapes with a bar code width of 30 mm and a tape height of 25 mm, 30 mm, 40 mm, 60 mm, and 100 mm are available as accessories see "Bar code tape", Page 80.

3.4 Control marks and configuration marks

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

▶ **http://www.mysick.com/en/olm200**

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

3.4.1 Control marks

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

- Output of the control mark value at the data interface
- Switching the MF1 digital output (active or inactive)

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 fiducial are congruent with the cut markings of the position mark that has been stuck over.

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

Output of the value via the data interface

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

3.4.2 Configuration marks

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

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

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

The following settings can be changed using configuration marks:

- Action in case of read error
- SmartPOS operating mode
- Activation of SmartPOS warning F2
- Multiple reading
- Bus address (only variants OLM200-1xx2)
- Resolution
- Resetting all settings to the factory setting

4 Transport and storage

4.1 Transport

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

NOTE

Damage to the sensor due to improper transport.

- Transport should be performed by trained specialist staff only.
- The utmost care and attention is required at all times during unloading and transportation on company premises.
- Note the symbols on the packaging.
- Do not remove packaging until immediately before you start mounting.

4.2 Transport inspection

Upon receipt, please check the delivery for completeness and for any damage that may have occurred in transit. In the case of transit damage that is visible externally, proceed as follows:

- Do not accept the delivery or only do so conditionally.
- Note the scope of damage on the transport documents or on the transport company's delivery note.
- File a complaint.

NOTE

Complaints regarding defects should be filed as soon as these are detected. Damage claims are only valid before the applicable complaint deadlines.

4.3 Storage

Store the sensor under the following conditions:

- Do not store outdoors.
- Store in a dry area that is protected from dust.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: between –40 and +75 °C
- Relative humidity: max. 95%, non-condensing
- For storage periods of longer than 3 months, check the general condition of all components and packaging on a regular basis.

5 Mounting

5.1 Mounting procedure

1. Mount the bar code tape see "Mount the bar code tape", Page 18.
2. Mount the sensor see "Mounting the sensor", Page 20.
3. Make the electrical connection see "Electrical installation", Page 25.

5.2 Mounting instructions

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

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

5.3 General data on the bar code tape

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

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

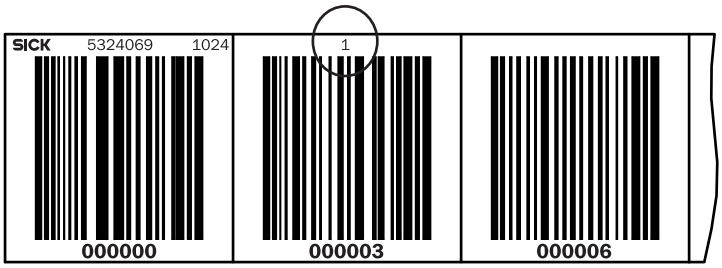


Figure 3: Example for roll 1, measuring range 0 to 20 m

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

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

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

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

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

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

It is recommended that the self-adhesive, cut-to-length blank labels should be stuck over the gap in order to allow it to be traversed without problems see "Blank labels for repair codes or control marks", Page 82.

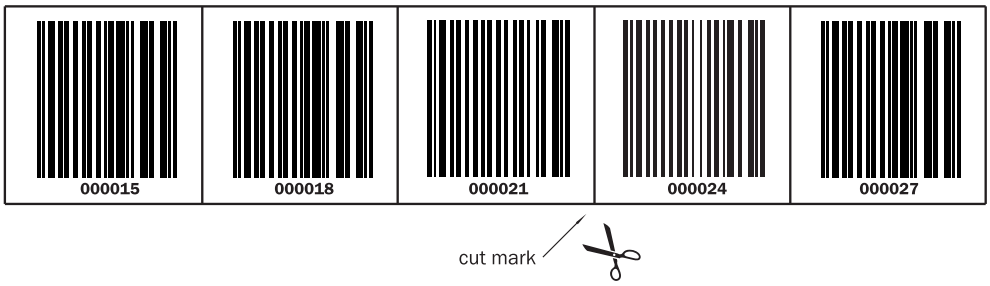


Figure 4: Bar code tape cut marks

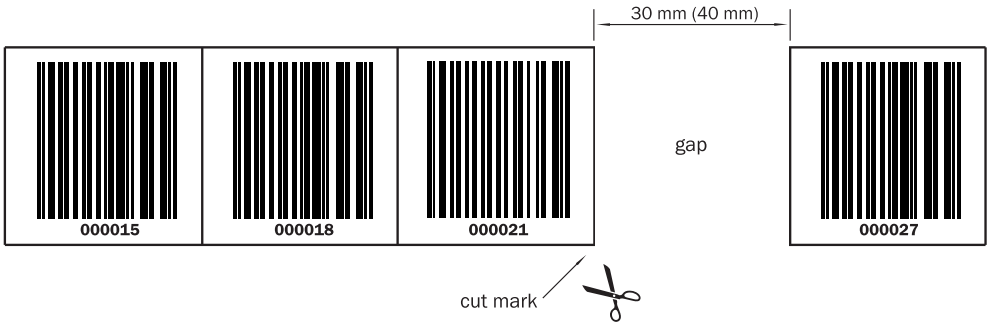


Figure 5: Gap in the separated bar code tape

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

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

NOTE

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

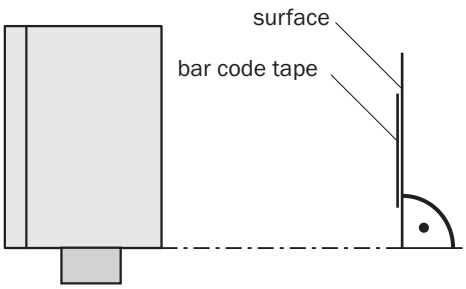


Figure 6: Vertical mounting of the bar code tape

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

5.4 Mount the bar code tape

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

5.4.1 Mounting of the bar code tape at horizontal curves

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

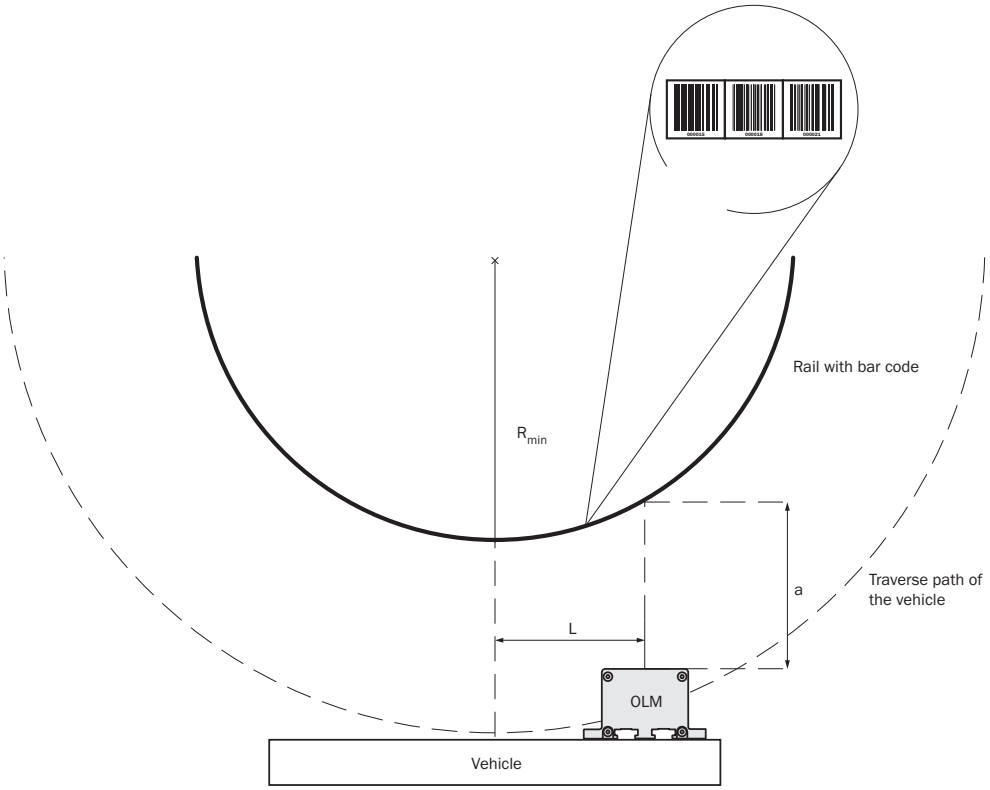


Figure 7: Tangential distance L for curve travel

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

a Reading distance

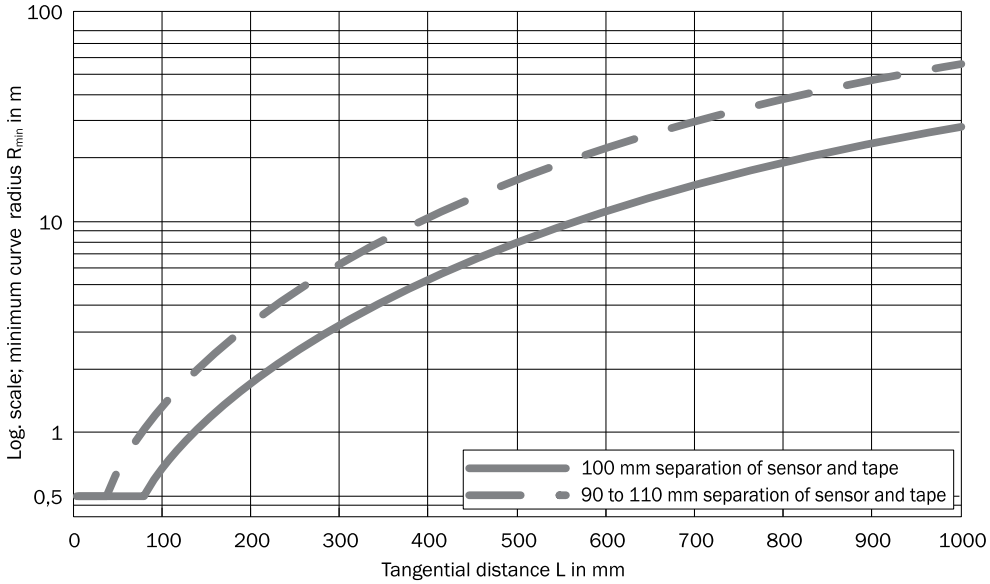


Figure 8: Minimum curve radius R_{min} dependent upon the tangential distance L

5.4.2 Mounting of the bar code tape at vertical curves

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

Cover the open positions indicated by arrows with blank labels see "Blank labels for repair codes or control marks", Page 82.

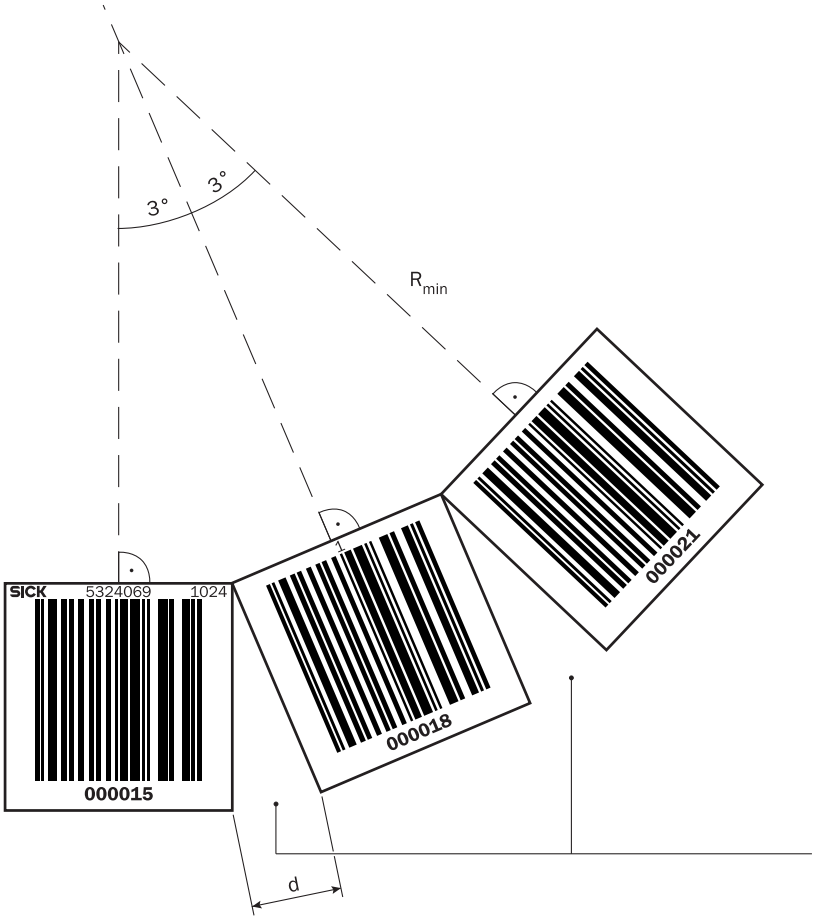


Figure 9: Vertical curves

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

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

5.5 Mounting the sensor

The sensor can be mounted either using the six housing through-holes or the T-slots on the back using sliding nuts see "Sliding nuts", Page 83. To ensure optimum reading results and the greatest possible functional reserve, mount the sensor at a distance of 100 mm from the bar code tape and align it at right angles to the bar code tape. The sensor's depth of field is ± 20 mm.

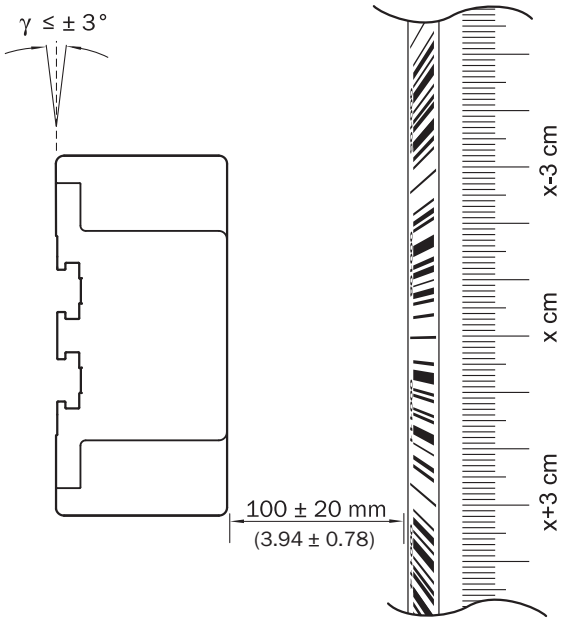


Figure 10: Mounting distances OLM200-xx0x

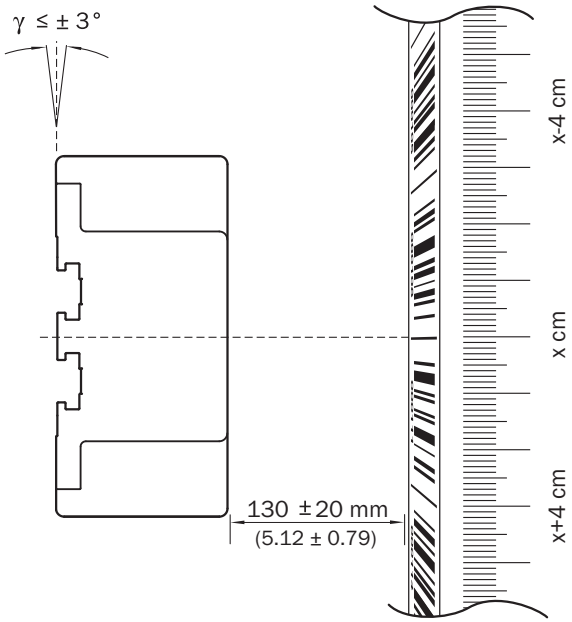
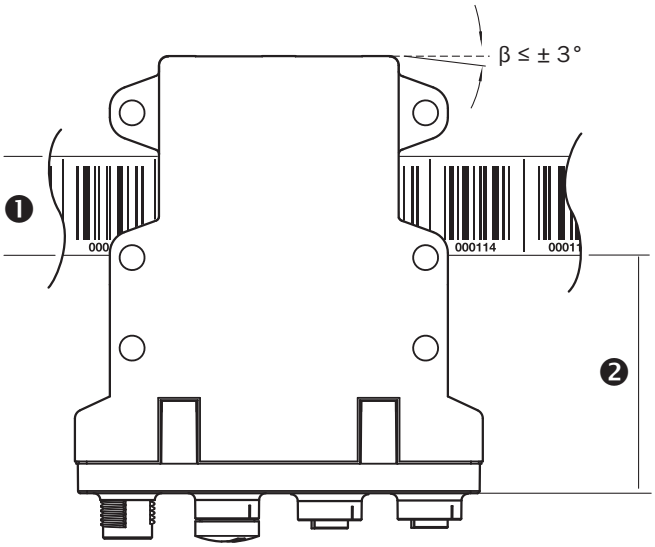


Figure 11: Mounting distances OLM200-xx5x

A vertical distance that depends on the bar code tape used is to be maintained between the lower edge of the housing and the lower edge of the bar code tape see "Tab. 1: Vertical distance dependent upon the bar code tape", Page 22.



Bar code tape height ❶	Distance ❷	Tolerance
25 mm	51 mm	± 3.5 mm
30 mm	47 mm	± 3.5 mm
40 mm	42 mm	± 8.5 mm
60 mm	32 mm	± 18.5 mm
100 mm	12 mm	± 38.5 mm

Table 1: Vertical distance dependent upon the bar code tape

NOTE

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

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

If optimally aligned, the two alignment marks on the front of the linear measurement sensor are located in the vertical center of the bar code tape. When the sensor is switched on, the red light spot moves from top left to bottom right along the bar code tape. The light spot is centered vertically on the bar code tape (see Fig. 12).

This vertical alignment of the sensor on the bar code tape must lie within a specified tolerance. This depends on the height of the bar code tape used (see "Tab. 1: Vertical distance dependent upon the bar code tape", Page 22).

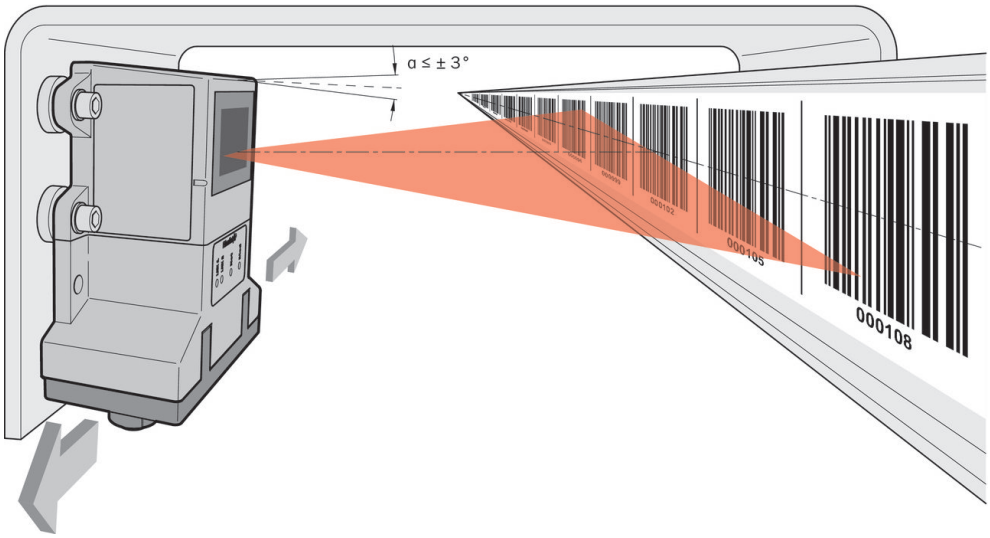


Figure 12: Vertical alignment

When two sensors are operated next to one another, it is necessary to maintain a minimum gap between the two sensors of 120 mm. At corners, make sure that the sensor is mounted as close as possible to the axis of rotation. For information on recommended minimum radii for curve travel see "Mounting of the bar code tape at horizontal curves", Page 18.

NOTE

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

- The field of view of the sensor must be completely clear
- No reflective surfaces may be in the field of view of the sensor
- The sensor and the bar code tape are mounted vibration free

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

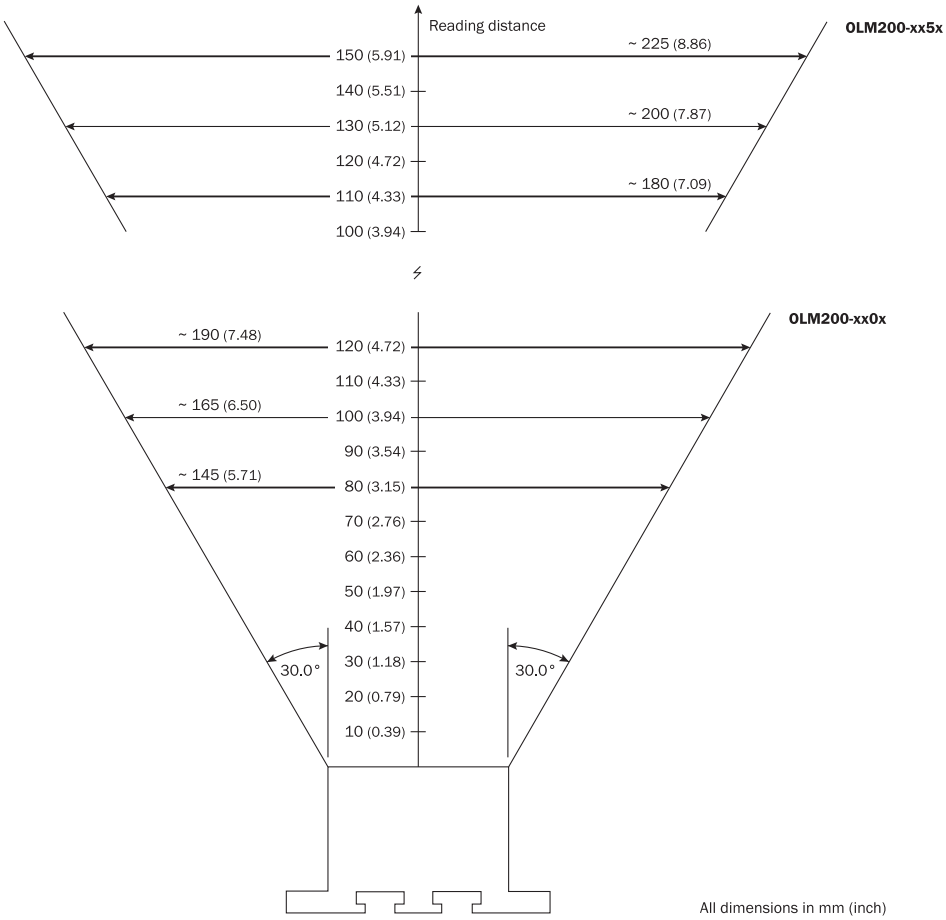


Figure 13: Field of view of the 0LM200

The angular position of the bar code tape can be 0° or 180°. The sensor detects the angular position automatically on switching on if the bar code tape is in the field of view at this moment. If the sensor can not see a bar code tape on switching on, the last used angular position is used. Changing the angular position during the track is not possible.

6 Electrical installation

6.1 Safety

ATTENTION
Sensor damage due to incorrect supply voltage.

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

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

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

Working with live parts may result in unpredictable operation.

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

6.2 Wiring notes

ATTENTION
Faults due to incorrect wiring.

Incorrect wiring may result in operational faults.

- For data transmission, use only screened cables with twisted-pair wires.
- Follow the wiring notes precisely.

NOTE
Preassembled cables can be found online at:

▶ http://www.mysick.com/en/olm200

All electrical connections of the sensor are configured as M12 round connectors. The connection male connectors of the sensor are compatible with SpeedCon™ quick connectors and standard M12 screw connectors. The IP65 protection class is only achieved with screwed plug connectors or cover caps.

Please observe the following wiring notes:

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

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

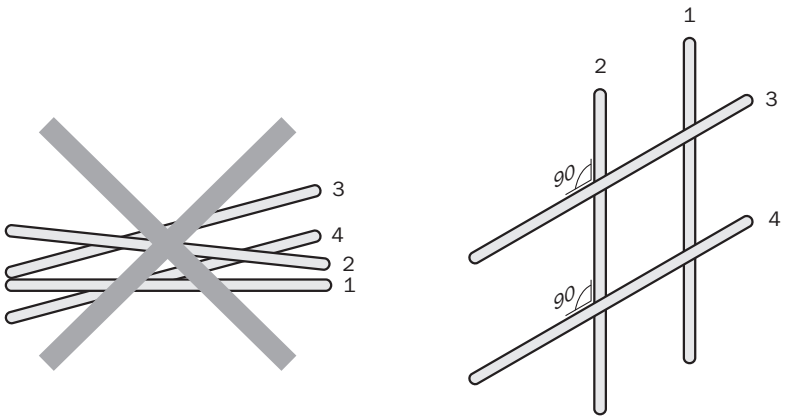


Figure 14: Cross cables at right angles

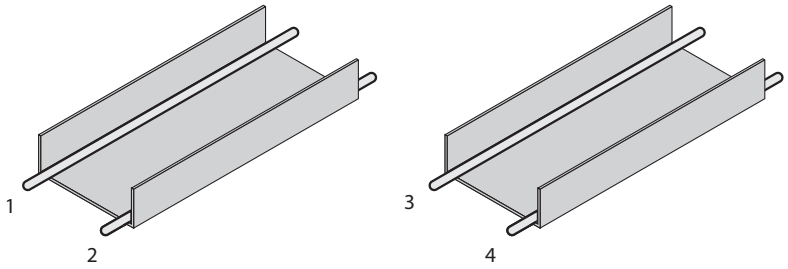


Figure 15: Ideal laying - Place cables in different cable channels

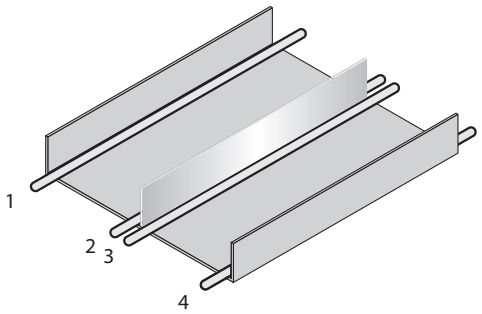


Figure 16: Alternative laying – Separate cables with metallic separators

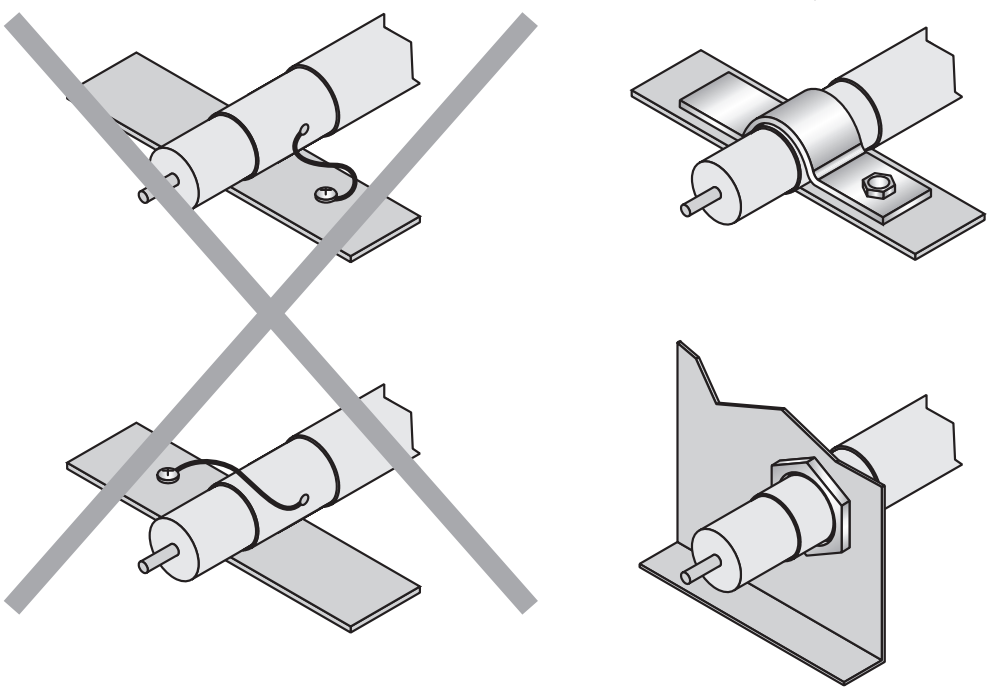


Figure 17: Make an extensive and low-impedance ground connection of the cable shield in the control cabinet.

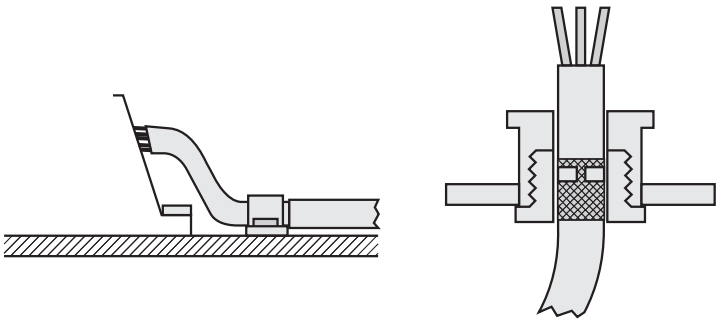


Figure 18: Shield connection in plastic housings

NOTE

Prevent equipotential bonding currents via the cable shield with a suitable grounding concept. If necessary, ground currents on the EtherNet/IP cabling can be prevented by the use of an EtherNet/IP adapter (part number 2044264).

6.3 Connect sensor electrically

NOTE

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

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

OLM200-1xx2

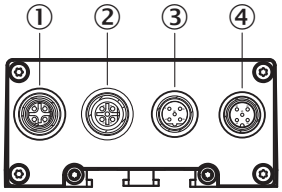


Figure 19: Position of the electrical connections

① Ethernet, M12 female connector, 4-pin
② Fieldbus, female connector M12, 5-pin
③ Fieldbus, M12 male connector, 5-pin
④ Supply voltage connection, male connector M12, 5-pin

OLM200-1xx8 / OLM200-1xx9

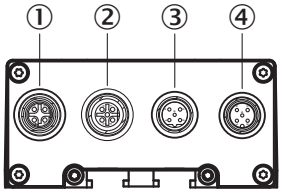


Figure 20: Position of the electrical connections

① Ethernet, female connector M12, 4-pin
② Ethernet, female connector M12, 4-pin
③ Not assigned
④ Supply voltage connection, male connector M12, 5-pin

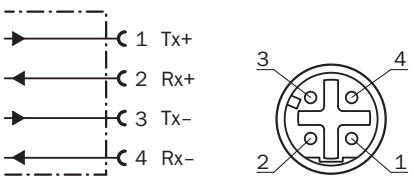
NOTE

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

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

6.4 Connection diagrams

6.4.1 Ethernet connection diagram



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

Table 2: Ethernet connection diagram port 1 and port 2

Contact	Marking	Description
4	Rx–	Receive data signal –

Table 2: Ethernet connection diagram port 1 and port 2

NOTE

Sensors OLM200-xxx8 and OLM200-xxx9 are equipped with two Ethernet interfaces. These are for communication via PROFINET IO, and for diagnostics and configuration via SOPAS ET. The two interfaces are of equal status and are internally connected to a switch.

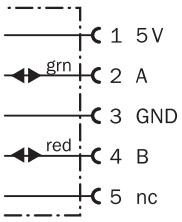
NOTE

Connect the sensor to the power supply via the Ethernet connecting cables. If the network is not to be connected to a further network subscriber, connection to one of the Ethernet female connectors is sufficient. Close the unused female connector with a cover or dummy connector.

6.4.2 PROFIBUS connection diagram

If the sensor forms the end of a PROFIBUS segment, then a terminator plug must be mounted for the PROFIBUS-OUT connection (e. g., PR-STE-END, Part no. 6021156).

PROFIBUS-OUT interface

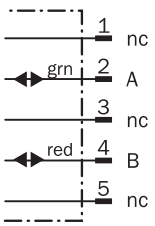


M12 (B-coded)

Contact	Marking	Wire color	Description
1	5 V	–	Supply voltage: +18 ... +30 V DC
2	A	Green	Data
3	GND	–	Bus voltage 0 V, e. g., electrically isolated for terminator
4	B	Red	Data
5	Nc	–	Not connected

Table 3: PROFIBUS-OUT connection diagram, M12 plug, 8-pin, B-coded

PROFIBUS-IN interface

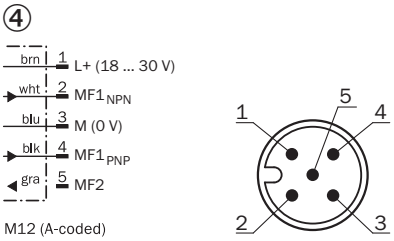


M12 (B-coded)

Contact	Marking	Wire color	Description
1	Nc	–	Not connected
2	A	Green	Data
3	Nc	–	Not connected
4	B	Red	Data
5	Nc	–	Not connected

Table 4: PROFIBUS-IN connection diagram, M12 plug, 8-pin, B-coded

6.4.3 Supply voltage connection diagram



Contact	Marking	Wire color	Description
1	L+	Brown	Supply voltage: +18 ... +30 V DC
2	$MF1_{NPN}$	White	Multifunctional output MF1, NPN
3	M	Blue	Supply voltage: 0 V
4	$MF1_{PNP}$	Black	Multifunctional output MF1, PNP
5	MF2	Gray	Multifunctional input MF2

NOTE

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

7 Commissioning

7.1 Configuring the sensor

Linear measurement sensors OLM200-xxx2 have a PROFIBUS interface. The devices are configured using the device description file (GSD). For a description of the PROFIBUS modules, see "PROFIBUS interface", Page 48.

Linear measurement sensors OLM200-xxx9 have a PROFIBUS IO interface. The devices are configured using the device description file (GSD). For a description of the PROFINET IO modules, see "PROFINET IO interface", Page 35.

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, see "EtherNet/IP interface", Page 59.

Configuration of the participants

Each sensor has its own MAC address. The device's MAC address can be found on the type label (e.g., 00:06:77:02:00:A7). You can change the setting for the internet protocol (IP) via the SOPAS Engineering Tool.

Configuration

The EXTRAPOLATION TIME parameter cannot be configured via EtherNet/IP. You can configure the parameter either via control marks or via SOPAS ET (see "Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)", Page 31).

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

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

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

NOTE

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

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

NOTE

Parameters that were configured using SOPAS can be overwritten via the fieldbus (PROFIBUS, PROFINET, EtherNet/IP) as soon as the device has been integrated into a network with a corresponding master.

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

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

7.2.1 Parameters for output of measured values

On the PARAMETERS PAGE, settings for output of measured values can be made.

NOTE

The parameters ACTION IN CASE OF READ ERRORS, MULTIPLE READING, and SMARTPOS can only be modified by using SOPAS ET or via configuration marks see "Configuration marks", Page 14.

Action in case of read errors

If the sensor cannot identify any bar codes on a bar code tape, the position value 0 is output. At the same time the error is displayed in SOPAS ET and output over the data interface. Alternatively, the action on read errors can be changed to RETAIN MEASURED VALUE. With this setting, instead of the value 0, the last valid position value is output, should there be an error. This value is retained until a valid position value is available again. At the data interface, the error is always output, irrespective of this setting.

NOTE

The RETAIN MEASURED VALUE option is only available if the data interface has been configured to enable the regular output of errors.

NOTE

The RETAIN MEASURED VALUE option is not available for the EtherNet/IP interface.

Resolution

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

Possible values are:

- 0.1 mm
- 1 mm
- 10 mm
- 100 mm

Multiple reading

The MULTIPLE READING option allows the detection reliability of the sensor to be increased. With this, a bar code is only evaluated if it has been read correctly several times. The settings which can be used for multiple reading depend on the maximum traversing speed. With the AUTO option, multiple reading is adjusted dynamically according to the current traversing speed.

Setting	Max. traverse speed
Dynamic (1x)	Up to 10.0 m/s
Medium (3x)	Up to 3.3 m/s
Rugged (5x)	Up to 2.0 m/s
Auto	Up to 10.0 m/s (see above)

SmartPOS

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

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

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

If image data cannot be evaluated, the position value is calculated by extrapolation. For this, the most recent position, traversing speed, and acceleration are taken into account. Extrapolation is only used in the MEASURING ERROR and EXTRAPOLATION TIME SmartPOS operating modes. With the SMARTPOS OPERATING MODE settings, it can be established if and to what extent these two procedures should be used. As soon as it is once again possible to detect a valid position value from the bar codes read, output will recommence.

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

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

7.2.2 Diagnostics

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

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

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

7.2.3 Changing the bar code tape alignment

Using SOPAS ET, the bar code tape alignment can be changed during running operation see "Function", Page 12. This function can be found on the METHODS page.

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

8 PROFINET IO interface

The sensor with PROFINET IO supports Ethernet networks with a transmission speed of 100 Mbit/s and PROFINET IO/RT, Conformance Class B. In addition the following I&M (Identification and Maintenance) functions are supported:

- IM0 = Device identification (serial number, version number, ordering number, etc.)
- IM1 = Users can enter system and location identification (AKZ and OKZ)
- IM2 = Installation date
- IM3 = Description of the function
- IM4 = Signature (config CRC)

The version number in the IM0 I&M function describes the version of the PROFINET interface and is not identical to the version number of the sensor firmware.

8.1 Description of PROFINET IO modules for configuration and IO data

For flexible adjustment to various control tasks, the sensor offers various PROFINET IO modules with a range of module types.

- Straightforward input modules that only transmit values to the master and, optionally, can contain configuration data
- Input and output modules that can transmit values to the master as well as receiving values, and can optionally contain configuration data
- Setup modules that only contain configuration data, and do not transfer any process data to the master or receive process data from the master.

The naming of the modules follows the scheme: <module number><name>/<signature>, <name>/<signature>, ... The module names are read from left to right, and specify the values without any gaps which are transported by the module. A value further to the left is transmitted before a value further to the right in this case, and input and output values count independently of one another. The signature specifies whether the value is an input or an output value, and how many words or bytes the value contains. The signature has the structure: <direction><number><unit> Direction is:

- "i" for an input value from the device to the master
- "o" for an output value from the master to the device

Unit is:

- "b" for bytes
- "w" for words

Examples

- 5-Position/i2w, Preset dyn/o2w
- 13-Temp/i1b, Level/i2b, res/i2b

The first example deals with the module with number 5 which contains two values:

1 An input value two words long to the master called "Position"
2 An output value two words long from the master to the device called "Preset dyn"

The second example is module number 13 with 3 values:

1 An input value "Temp" 1 byte long for "Temperature"
2 An input value "Level" 2 bytes long
3 A reserved area 2 bytes long

8.2 Definitions

- A byte is an 8-bit value.
- A word is a 16-bit value.

- Consistency means that all values within a module are updated simultaneously.
- An input value is transmitted cyclically from the device to the master (PLC).
- An output value is transmitted cyclically from the master (PLC) to the device. A configuration value is only transmitted once from the master to the device when the PROFINET device is switched on.
- It is not possible to use a specific module multiple times in the hardware configuration of the Profinet master

8.3 Configuring participants

Each PROFINET IO field device has its own MAC address. The sensor's MAC address can be found on the type label (e.g., 00:06:77:02:00:A7). In addition, a PROFINET IO field device requires a unique, system-specific device name. The device name is used by the IO controller to determine the IP address of the field device.

The IP address is established in two steps:

- You adopt the device name allocated for the sensor by the network engineering tool or you configure a unique, system-specific device name with the aid of the network engineering tool.
- The IO controller assigns the IP address based on the device name.

Stipulate name and IP address of the sensor manually

1. Double-click on the sensor symbol in the network engineering tool.
✓ The PROPERTIES dialog box appears.
2. Select the GENERAL tab.
3. Enter the device name of the sensor.
4. Assign new IP address.

8.4 Load electronic data sheet (EDS)

Before you can configure PROFINET IO for the sensor for the first time, you will have to load the electronic data sheet of the sensor into the hardware catalogue of the network-engineering-tool (e. g., SIMATIC-Manager from Siemens).

1. Download EDS file from the website http://www.mysick.com/en/olm200.
2. Follow instructions in online help or in the user manual of the network engineering tool in order to load the electronic data sheet.

The hardware catalogue is displayed in the network engineering tool.

8.5 Reset device to the factory settings

NOTE

You can reset the sensor to the factory setting using the network engineering tool. On resetting to the factory settings, the IP configuration becomes invalid and the sensor is no longer responsive in the network. In order to be able to establish a connection to the sensor, a valid IP configuration will first need to be assigned via the network engineering tool.

8.6 Module categories

8.6.1 Module category 01_measured values

Module no.	Total size	Type	Contents		
			Name	Type	Size/config. option
1	2 words	Input module	Position	Input	2 words
			Resolution of the position value	Configuration	0.1 mm ... 100 mm
2	1 word	Input module	Position	Input	1 word
			Resolution of the position value	Configuration	0.1 mm ... 100 mm
3	2 words	Input module	Speed	Input	2 words
			Resolution of the speed value	Configuration	0.1 mm/s ... 100 mm/s
4	4 words	Input module	Position	Input	2 words
			Speed	Input	2 words
			Resolution of the position value	Configuration	0.1 mm ... 100 mm
			Resolution of the speed value	Configuration	0.1 mm/s ... 100 mm/s
5	2 words	Input and output module	Position	Input	2 words
			Dynamic preset value	Output	2 words
			Resolution of the position value	Configuration	0.1 mm ... 100 mm

Table 5: Module category "01_measured values"

8.6.2 Module category 02_device status

Module no.	Total size	Type	Contents		
			Name	Type	Size/config. option
10	1 byte	Input module	Status	Input	8 bits
12	4 bytes	Input module	Label	Input	3 bytes
			Reserved	Input	1 byte
13	5 bytes	Input module	Temperature [°C]	Input	2 words
			Measured value quality	Input	2 bytes
			Reserved	Input	2 bytes

Table 6: Module category "02_device status"

8.6.3 Module category 03_device settings

Module no.	Total size	Type	Contents		
			Name	Type	Size/config. option
20	Empty	Setup module	Polarity of output MF1	Parameter	HIGH or LOW
			Function of output MF1	Parameter	position, speed, service, control mark, illumination off
			Position value	Parameter	–10000000 ... 10000000
			Position hysteresis	Parameter	–10000000 ... 10000000
			Speed value	Parameter	–10000 ... 10000
			Speed mode	Parameter	(+), (–), (±)
			Range overrun	Parameter	Switch yes/no
			Temperature overrun	Parameter	Switch yes/no
			No bar code	Parameter	Switch yes/no
			No plausible measured value	Parameter	Switch yes/no
			Pre-failure signal	Parameter	Switch yes/no
21	Empty	Setup module	Polarity of the MF2 input	Parameter	HIGH or LOW
			Function of the MF2 input	Parameter	inactive, preset activation, illumination off
22	Empty	Setup module	Static preset value [mm]	Parameter	–10000000 ... 10000000
			Offset value [mm]	Parameter	–10000000 ... 10000000

Table 7: Module category "03_device settings"

8.6.4 Module category 04_device information

Module no.	Total size	Type	Contents		
			Name	Type	Size/config. option
30	8 bytes	Input module	Serial number	Input	8 characters
31	14 bytes	Input module	Product code	Input	14 characters
32	8 bytes	Input module	Version number of the hardware	Input	8 characters
33	10 words	Input module	Version no. of FPGA	Input	19 characters
			Reserved	Input	1 byte
34	10 words	Input module	Version number of firmware 1	Input	19 characters
			Reserved	Input	1 byte

Table 8: Module category "04_device information"

Module no.	Total size	Type	Contents		
			Name	Type	Size/config. option
35	10 words	Input module	Version number of firmware 2	Input	19 characters
			Dynamic preset value	Input	1 byte

Table 8: Module category "04_device information"

8.7 Module descriptions

8.7.1 Module 1 (position/i2w)

Type

Input module, 2 words, consistent

Description

This module reads the current position value of the tape according to the offset and resolution settings. Corresponds to the Class 1 module of the encoder profile.

Input values

Rel. Address	Type	Description
0	Signed 32-bit number in two's complement	Current position in selected resolution with regard to the offset. Depending on resolution, a digit corresponds to 0.1 mm ... 100 mm.

Module parameters

Name	Value range	Standard value	Description
Resolution	0.1 mm, 1 mm, 10 mm, 100 mm	1 mm	Determines the resolution of the position value.

8.7.2 Module 2 (position/i1w)

Type

Input module, 1 word, consistent

Description

This module reads the current position value of the tape according to the offset and resolution settings, however only as a 16-bit number in contrast to module 1. Corresponds to the optional Class 1 module of the encoder profile.

NOTE

The actual position value may exceed the value range for this module. In this case, the following truncated values are output as an error value.

- If the value is less than –32767 (in the corresponding unit) then –32768 (hexadecimal 0x8000) is output.
- If the value is greater than 32766 (in the corresponding unit) then 32767 (hexadecimal 0x7FFF) is output.

If it is not possible to determine a valid position value, e. g., due to a missing bar code tape or contamination, then the value 0 is output for the position and the corresponding bits are set in the status byte (see "Module 10 (status/i1b)", Page 42).

Input values

Rel. Address	Type	Description
0	Signed 16-bit number in two's complement (tipped)	Current position in selected resolution with regard to the offset. Depending on resolution, a digit corresponds to 0.1 mm ... 100 mm.

Module parameters

Name	Value range	Standard value	Description
Resolution	0.1 mm, 1 mm, 10 mm, 100 mm	1 mm	Determines the resolution of the position value.

8.7.3 Module 3 (speed/i2w)

Type

Input module, 2 words, consistent

Description

This module reads the currently ascertained speed according to the selected resolution.

NOTE
If it is not possible to determine a valid position value, e. g., due to a missing bar code tape or contamination, then the value 0 is output for the speed and the corresponding bits are set in the status byte (see "Module 10 (status/i1b)", Page 42).

Input values

Rel. Address	Type	Description
0	Signed 32-bit number in two's complement	Current speed in selected resolution. Depending on resolution, a digit corresponds to 0.1 mm/s ... 100 mm/s.

Module parameters

Name	Value range	Standard value	Description
Resolution	0.1 mm/s, 1 mm/s, 10 mm/s, 100 mm/s	1 mm/s	Determines the resolution of the speed value.

8.7.4 Module 4 (position/i2w, speed/i2w)

Type

Input module, 4 words, consistent

Description

This module reads both the current position and the currently ascertained speed in accordance with the selected resolution and offset.

NOTE

If it is not possible to determine a valid position value, e. g., due to a missing bar code tape or contamination, then the value 0 is output for both the position and the speed and the corresponding bits are set in the status byte (see "Module 10 (status/i1b)", Page 42).

Input values

Rel. Address	Type	Description
0	Signed 32-bit number in two's complement	Current position in selected resolution with regard to the offset. Depending on resolution, a digit corresponds to 0.1 mm ... 100 mm.
4	Signed 32-bit number in two's complement	Current speed in selected resolution. Depending on resolution, a digit corresponds to 0.1 mm/s ... 100 mm/s.

Module parameters

Name	Value range	Standard value	Description
Position resolution	0.1 mm, 1 mm, 10 mm, 100 mm	1 mm	Determines the resolution of the position value.
Speed resolution	0.1 mm/s, 1 mm/s, 10 mm/s, 100 mm/s	1 mm/s	Determines the resolution of the speed value.

8.7.5 Module 5 (position/i2w, preset dyn/o2w)

Type

Input/output module, 2 words, consistent

Description

This module reads the current position value of the bar code tape according to the resolution settings. Any active dynamic preset or offset is included in the calculation. When the module is written, the preset value is changed and the preset function can be called up if the most significant bit (bit 31) has been set.

NOTE

The preset value is loaded into the device every time the module is transmitted to the device, even if bit 31 has not been set. This can be used for dynamically specifying the preset value if there are several calibration positions present on the section, and the MF input is used for triggering the preset function. A preset or offset value changed by this module is not permanently adopted, and is lost when the device is deactivated.

If it is not possible to determine a valid position value, e. g., due to a missing bar code tape or contamination, then the value 0 is output for the position and the corresponding bits are set in the status byte (see below, see "Module 10 (status/i1b)", Page 42).

Input values

Rel. Address	Type	Description
0	Signed 32-bit number in two's complement	Current position in selected resolution with regard to the offset. Depending on resolution, a digit corresponds to 0.1 mm ... 100 mm.

Output values

Rel. Address	Type	Description
0.31	Bit, 0 or 1	If bit 31 is not set (0) then the value is adopted in bits 0 ... 30 as the new preset value, although the offset is not recalculated. The output position value is not influenced. If bit 31 has been set (1) then the value is also adopted in bits 0 ... 30 as a new preset value, but in this case the preset function is called up as well. This function adapts the offset so that the preset value is output at the current position from now on.
0.0 ... 0.30	Signed 31-bit number in two's complement	New preset position in 1 mm.

Module parameters

Name	Value range	Standard value	Description
Resolution	0.1 mm, 1 mm, 10 mm, 100 mm	1 mm	Determines the resolution of the position value.

8.7.6 Module 10 (status/i1b)

Type

Input module, 1 byte

Description

This module reads out the status byte of the device.

Input values

Rel. Address	Type	Description
0.0	1 bit	Unavailability: If set (1) then no measured value (position or speed) can be read.
0.1	1 bit	Device error: If set (1) then the temperature is outside the permitted range or the sensor is dirty.
0.2	1 bit	Measuring error: If set (1) then there is no plausible measured value present or the sensor cannot detect a bar code tape.
0.3	1 bit	Pre-failure error: If set (1) then the sensor is dirty or the integrated illumination is approaching the maximum service life. However, measured values can still be read.
0.4	1 bit	LED off: If set (1) then the internal illumination is switched off.
0.5	1 bit	If set (1), SmartPOS is active (see "Parameters for output of measured values", Page 31).
0.6	1 bit	MF2: If set (1) then there is an active level present after debouncing on input MF2.
0.7	1 bit	MF1: If set (1) then output MF1 has been activated.

8.7.7 Module 12 (label/i3b and res/i1b)

Type

Input module, 4 bytes, consistent

Description

This module outputs the last fiducial read from the bar code tape.

NOTE
If no fiducial has been read yet then the read value for the label is 0x00,0x00,0x00.

The most recently read value of the fiducial is repeatedly output until a new fiducial has been read. It is not possible to differentiate between several identical fiducials that are in direct succession. It is recommended to cancel each fiducial by means of another fiducial.

Input values

Rel. Address	Type	Description
0	3 bytes	Content of the fiducial
3	1 byte	Reserved

8.7.8 Module 20 (MF1 output)

Type

Setup module, no input/output data

Description

This module defines the behavior of output Q.

Module parameters

Name	Value range	Standard value	Description
Active level	HIGH, LOW	High	Active switching level of the output.
Function	position, speed, service, control mark, illumination off	service	Function of the output: ■ POSITION: Output switches if the position from the module parameter "Position threshold" has been exceeded. ■ SPEED: Output switches if the speed limit from the module parameter "Speed threshold" has been exceeded in the direction specified by "Speed mode". ■ SERVICE: The output switches if at least one of the switched-on service bits has been set. ■ CONTROL MARK: The output switches according to the special switch-on and switch-off control marks (see "Control marks", Page 13). ■ ILLUMINATION OFF: The output switches when the integrated illumination is switched off.
Position threshold	-10,000,000 mm ... 10,000,00 mm	0 mm	Value of the position threshold in [mm].
Position hysteresis	-10,000,000 mm ... 10,000,00 mm	10 mm	Hysteresis of the position threshold in [mm].

Name	Value range	Standard value	Description
Speed threshold	0 mm/s ... 10,000 mm/s	0 mm/s	Speed threshold in [mm/s].
Speed sign	(+) positive direction (–) negative direction (+/–) both directions	(+) positive direction	Mode for detecting the speed overrun.
Service position out of range	disabled, enabled	enabled	If "enabled", the output switches if the position leaves the permitted range of –10 km ... 10 km.
Service temperature failure	disabled, enabled	enabled	If "enabled", the output switches if the device temperature is outside the permitted range.
Service no bar code visible	disabled, enabled	enabled	If "enabled", the output switches if no bar code tape is detected.
Service no plausible position	disabled, enabled	enabled	If "enabled", the output switches if no plausible measured value is present any longer.
Service pre-failure	disabled, enabled	enabled	If "enabled", the output switches if the pre-failure status (sensor dirty or illumination approaching service life limit) has been active.

8.7.9 Module 21 (MF2 input)

Type

Setup module, no input/output data

Description

This module defines the behavior of the multi-function input MF.

Module parameters

Name	Value range	Standard value	Description
Active level	HIGH, LOW	HIGH	Input level that is interpreted as active.
Function	inactive, preset activation, illumination off	inactive	Function of the input: ■ INACTIVE: an active signal at the input does not trigger a response. ■ PRESET ACTIVATION: the preset function is activated via the input. ■ ILLUMINATION OFF: the integrated illumination can be deactivated via the input.

8.7.10 Module 22 (preset stat and offset)

Type

Setup module, no input/output data

Description

This module is used for presetting the preset value and the initial position offset.

NOTE
If module 5 is also active then the parameter data of module 22 is overwritten by the output data from module 5.

Module parameters

Name	Value range	Standard value	Description
Position preset	-10,000,000 mm ... 10,000,000 mm	0 mm	Defines the initial preset value in [mm].
Position offset	-10,000,000 mm ... 10,000,000 mm	0 mm	Defines the initial position value in [mm].

8.7.11 Module 30 (serial no/i8b)

Type

Input module, 8 byte

Description

The serial number of the device can be queried using this module.

Input values

Rel. Address	Type	Description
0	8 ASCII characters	Serial number, unused characters at the end of the string are filled with 0 bytes (0x00).

8.7.12 Module 31 (product code/i14b)

Type

Input module, 14 byte

Description

The product code of the device can be queried using this module.

Input values

Rel. Address	Type	Description
0	14 ASCII characters	String with fixed length. Unused characters at the end of the string are filled with 0 bytes (0x00).

8.7.13 Module 32 (version HW/i8b)

Type

Input module, 8 byte

Description

This module can be used for querying the status of the version number of the device hardware.

Input values

Rel. Address	Type	Description
0	8 ASCII characters	Hardware version number

8.7.14 Module 33 (version FPGA/i10w)

Type

Input module, 10 words

Description

This module can be used for querying the FPGA firmware version number of the device. Corresponds to the SOPAS firmware component `BOARD0/COMPONENT2`.

NOTE
If this value is not present in the device then a zero byte (0x00) is transmitted for each character.

Input values

Rel. Address	Type	Description
0	19 ASCII characters	String with fixed length. Unused characters at the end of the string are filled with 0 bytes (0x00).
19	1 byte	Reserved

8.7.15 Module 34 (version µC/i10w)

Type

Input module, 10 words

Description

This module can be used for querying the firmware version number of the main controller of the device. Corresponds to the SOPAS firmware component `BOARD0/COMPONENT0`.

NOTE
If this value is not present in the device then a zero byte (0x00) is transmitted for each character.

Input values

Rel. Address	Type	Description
0	19 ASCII characters	String with fixed length. Unused characters at the end of the string are filled with 0 bytes (0x00).
19	1 byte	Reserved

8.7.16 Module 35 (version µC2/i10w)

Type

Input module, 10 words

Description

This module can be used for querying the firmware version number of the communication controller in the device. Corresponds to the SOPAS firmware component BOARD1/COMPONENT0.

NOTE
If this value is not present in the device then a zero byte (0x00) is transmitted for each character.

Input values

Rel. Address	Type	Description
0	19 ASCII characters	String with fixed length. Unused characters at the end of the string are filled with 0 bytes (0x00).
19	1 byte	Reserved

9 PROFIBUS interface

The sensor supports transmission speeds from 9.6 kbit/s to 12 Mbit/s and PROFIBUS® version DPV0.

9.1 Nomenclature

- A byte is an 8-bit value.
- A word is a 16-bit value.
- Consistency means that all values within a module are updated simultaneously.
- An input value is transmitted cyclically from the device to the master (PLC).
- An output value is transmitted cyclically from the master (PLC) to the device.
- A configuration value is only transmitted once from the master to the device when the PROFIBUS® device is switched on.

9.2 Description of PROFIBUS modules for configuration and IO data

For flexible adjustment to various control tasks, the linear measurement sensor offers various PROFIBUS® modules with a range of module types:

- Straightforward input modules that only transmit values to the master and, optionally, can contain configuration data
- Input and output modules that can transmit values to the master as well as receiving values, and can optionally contain configuration data and
- Setup modules that only contain configuration data, and do not transfer any process data to the master or receive process data from the master.

The modules are named according to the following scheme: <Module number>-<Name>/<Signature>, <Name>/<Signature>, ...

The module names are read from left to right, and specify the values without any gaps which are transported by the module. A value further to the left is transmitted before a value further to the right in this case, and input and output values count independently of one another. The signature specifies whether the value is an input or an output value, and how many words or bytes the value contains. The signature has the structure: <direction><number><unit> Direction is:

- "i" for an input value from the device to the master
- "o" for an output value from the master to the device.

Unit is:

- "b" for bytes
- "w" for words

Examples:

1 5-Position/i2w, Preset dyn/o2w
2 13-Temp/i1b, Level/i2b, res/i2b

The first example deals with the module with number 5 which contains two values:

- an input value two words long to the master called "Position"
- an output value two words long from the master to the device called "Preset dyn".

The second example is module number 13 with 3 values:

- an input value "Temp" 1 byte long for "Temperature"
- an input value "Level" 2 bytes long
- a reserved area 2 bytes long.

Module overview

Module number	Total size	Type	Contents		
			Name	Type	Size/configuration option
1	2 words	Input module	Position	Input	2 words
			Resolution of the position value	Configuration	0.1 mm ... 100 mm
2	1 word	Input module	Position	Input	1 word
			Resolution of the position value	Configuration	0.1 mm ... 100 mm
3	2 words	Input module	Speed	Input	2 words
			Resolution of the value	Configuration	0.1 mm/s, 100 mm/s
4	4 words	Input module	Position	Input	2 words
			Speed	Input	2 words
			Resolution of the position value	Configuration	0.1 mm ... 100 mm
			Resolution of the speed value	Configuration	0.1 mm/s ... 100 mm/s
5	2 words	Input/output module	Position	Input	2 words
			Dynamic preset value	Output	2 words
			Resolution of the position value	Configuration	0.1 mm ... 100 mm
10	1 byte	Input module	Status	Input	8 bits
12	4 bytes	Input module	Label	Input	3 bytes
			Reserved	Input	1 byte
13	5 bytes	Input module	Temperature [°C]	Input	1 byte
			Measured value quality	Input	2 bytes
			Reserved	Input	2 bytes
20	Empty	Setup module	Polarity of output MF1	Parameter	HIGH or LOW
			Function of output MF1	Parameter	position, speed, service, control mark, illumination off
			Position value	Parameter	-10000000 ... 10000000
			Position hysteresis	Parameter	-10000000 ... 10000000
			Speed value	Parameter	-10000 ... 10000
			Speed mode	Parameter	(+), (-), (±)
			Range overrun	Parameter	Switch yes/no
			Temperature overrun	Parameter	Switch yes/no
			No bar code	Parameter	Switch yes/no
			No plausible measured value	Parameter	Switch yes/no
			Pre-failure signal	Parameter	Switch yes/no

Module number	Total size	Type	Contents		
			Name	Type	Size/configuration option
21	Empty	Setup module	Polarity of the MF2 input	Parameter	HIGH or LOW
			Function of the MF2 input	Parameter	inactive, preset activation, illumination off
			Static preset value [mm]	Parameter	-10000000 ... 10000000
			Offset value [mm]	Parameter	-10000000 ... 10000000
30	8 bytes	Input module	Serial number	Input	8 characters
31	14 bytes	Input module	Product code	Input	14 characters
32	8 bytes	Input module	Version number of the hardware	Input	8 characters
33	10 words	Input module	Version no. of FPGA	Input	19 characters
			Reserved	Input	1 byte
34	10 words	Input module	Version number of firmware 1	Input	19 characters
			Reserved	Input	1 byte
35	10 words	Input module	Version number of firmware 2	Input	19 characters
			Reserved	Input	1 byte

9.3 Module descriptions

9.3.1 Module 1 (position/i2w)

Type

Input module, 2 words, consistent

Description

This module reads the current position value of the tape according to the offset and resolution settings. Corresponds to the Class 1 module of the encoder profile.

Input values

Rel. Address	Type	Description
0	Signed 32-bit number in two's complement	Current position in selected resolution with regard to the offset. Depending on resolution, a digit corresponds to 0.1 mm ... 100 mm.

Module parameters

Name	Value range	Standard value	Description
Resolution	0.1 mm, 1 mm, 10 mm, 100 mm	1 mm	Determines the resolution of the position value.

9.3.2 Module 2 (position/i1w)

Type

Input module, 1 word, consistent

Description

This module reads the current position value of the tape according to the offset and resolution settings, however only as a 16-bit number in contrast to module 1. Corresponds to the optional Class 1 module of the encoder profile.

NOTE

The actual position value may exceed the value range for this module. In this case, the following truncated values are output as an error value.

- If the value is less than –32767 (in the corresponding unit) then –32768 (hexadecimal 0x8000) is output.
- If the value is greater than 32766 (in the corresponding unit) then 32767 (hexadecimal 0x7FFF) is output.

If it is not possible to determine a valid position value, e. g., due to a missing bar code tape or contamination, then the value 0 is output for the position and the corresponding bits are set in the status byte (see "Module 10 (status/i1b)", Page 42).

Input values

Rel. Address	Type	Description
0	Signed 16-bit number in two's complement (tipped)	Current position in selected resolution with regard to the offset. Depending on resolution, a digit corresponds to 0.1 mm ... 100 mm.

Module parameters

Name	Value range	Standard value	Description
Resolution	0.1 mm, 1 mm, 10 mm, 100 mm	1 mm	Determines the resolution of the position value.

9.3.3 Module 3 (speed/i2w)

Type

Input module, 2 words, consistent

Description

This module reads the currently ascertained speed according to the selected resolution.

NOTE

If it is not possible to determine a valid position value, e. g., due to a missing bar code tape or contamination, then the value 0 is output for the speed and the corresponding bits are set in the status byte (see "Module 10 (status/i1b)", Page 42).

Input values

Rel. Address	Type	Description
0	Signed 32-bit number in two's complement	Current speed in selected resolution. Depending on resolution, a digit corresponds to 0.1 mm/s ... 100 mm/s.

Module parameters

Name	Value range	Standard value	Description
Resolution	0.1 mm/s, 1 mm/s, 10 mm/s, 100 mm/s	1 mm/s	Determines the resolution of the speed value.

9.3.4 Module 4 (position/i2w, speed/i2w)

Type

Input module, 4 words, consistent

Description

This module reads both the current position and the currently ascertained speed in accordance with the selected resolution and offset.

NOTE
If it is not possible to determine a valid position value, e. g., due to a missing bar code tape or contamination, then the value 0 is output for both the position and the speed and the corresponding bits are set in the status byte (see "Module 10 (status/i1b)", Page 42).

Input values

Rel. Address	Type	Description
0	Signed 32-bit number in two's complement	Current position in selected resolution with regard to the offset. Depending on resolution, a digit corresponds to 0.1 mm ... 100 mm.
4	Signed 32-bit number in two's complement	Current speed in selected resolution. Depending on resolution, a digit corresponds to 0.1 mm/s ... 100 mm/s.

Module parameters

Name	Value range	Standard value	Description
Position resolution	0.1 mm, 1 mm, 10 mm, 100 mm	1 mm	Determines the resolution of the position value.
Speed resolution	0.1 mm/s, 1 mm/s, 10 mm/s, 100 mm/s	1 mm/s	Determines the resolution of the speed value.

9.3.5 Module 5 (position/i2w, preset dyn/o2w)

Type

Input/output module, 2 words, consistent

Description

This module reads the current position value of the bar code tape according to the resolution settings. Any active dynamic preset or offset is included in the calculation. When the module is written, the preset value is changed and the preset function can be called up if the most significant bit (bit 31) has been set.

NOTE

The preset value is loaded into the device every time the module is transmitted to the device, even if bit 31 has not been set. This can be used for dynamically specifying the preset value if there are several calibration positions present on the section, and the MF input is used for triggering the preset function. A preset or offset value changed by this module is not permanently adopted, and is lost when the device is deactivated.

If it is not possible to determine a valid position value, e. g., due to a missing bar code tape or contamination, then the value 0 is output for the position and the corresponding bits are set in the status byte (see below, see "Module 10 (status/i1b)", Page 42).

Input values

Rel. Address	Type	Description
0	Signed 32-bit number in two's complement	Current position in selected resolution with regard to the offset. Depending on resolution, a digit corresponds to 0.1 mm ... 100 mm.

Output values

Rel. Address	Type	Description
0.31	Bit, 0 or 1	If bit 31 is not set (0) then the value is adopted in bits 0 ... 30 as the new preset value, although the offset is not recalculated. The output position value is not influenced. If bit 31 has been set (1) then the value is also adopted in bits 0 ... 30 as a new preset value, but in this case the preset function is called up as well. This function adapts the offset so that the preset value is output at the current position from now on.
0.0 ... 0.30	Signed 31-bit number in two's complement	New preset position in 1 mm.

Module parameters

Name	Value range	Standard value	Description
Resolution	0.1 mm, 1 mm, 10 mm, 100 mm	1 mm	Determines the resolution of the position value.

9.3.6 Module 10 (status/i1b)

Type

Input module, 1 byte

Description

This module reads out the status byte of the device.

Input values

Rel. Address	Type	Description
0.0	1 bit	Unavailability: If set (1) then no measured value (position or speed) can be read.
0.1	1 bit	Device error: If set (1) then the temperature is outside the permitted range or the sensor is dirty.
0.2	1 bit	Measuring error: If set (1) then there is no plausible measured value present or the sensor cannot detect a bar code tape.
0.3	1 bit	Pre-failure error: If set (1) then the sensor is dirty or the integrated illumination is approaching the maximum service life. However, measured values can still be read.
0.4	1 bit	LED off: If set (1) then the internal illumination is switched off.
0.5	1 bit	If set (1), SmartPOS is active (see "Parameters for output of measured values", Page 31).
0.6	1 bit	MF2: If set (1) then there is an active level present after debouncing on input MF2.
0.7	1 bit	MF1: If set (1) then output MF1 has been activated.

9.3.7 Module 12 (label/i3b and res/i1b)

Type

Input module, 4 bytes, consistent

Description

This module outputs the last fiducial read from the bar code tape.

NOTE
If no fiducial has been read yet then the read value for the label is 0x00,0x00,0x00.

The most recently read value of the fiducial is repeatedly output until a new fiducial has been read. It is not possible to differentiate between several identical fiducials that are in direct succession. It is recommended to cancel each fiducial by means of another fiducial.

Input values

Rel. Address	Type	Description
0	3 bytes	Content of the fiducial
3	1 byte	Reserved

9.3.8 Module 20 (MF1 output)

Type

Setup module, no input/output data

Description

This module defines the behavior of output Q.

Module parameters

Name	Value range	Standard value	Description
Active level	HIGH, LOW	High	Active switching level of the output.
Function	position, speed, service, control mark, illumination off	service	Function of the output: ■ POSITION: Output switches if the position from the module parameter "Position threshold" has been exceeded. ■ SPEED: Output switches if the speed limit from the module parameter "Speed threshold" has been exceeded in the direction specified by "Speed mode". ■ SERVICE: The output switches if at least one of the switched-on service bits has been set. ■ CONTROL MARK: The output switches according to the special switch-on and switch-off control marks (see "Control marks", Page 13). ■ ILLUMINATION OFF: The output switches when the integrated illumination is switched off.
Position threshold	-10,000,000 mm ... 10,000,00 mm	0 mm	Value of the position threshold in [mm].
Position hysteresis	-10,000,000 mm ... 10,000,00 mm	10 mm	Hysteresis of the position threshold in [mm].
Speed threshold	0 mm/s ... 10,000 mm/s	0 mm/s	Speed threshold in [mm/s].
Speed sign	(+) positive direction (–) negative direction (+/–) both directions	(+) positive direction	Mode for detecting the speed overrun.
Service position out of range	disabled, enabled	enabled	If "enabled", the output switches if the position leaves the permitted range of –10 km ... 10 km.
Service temperature failure	disabled, enabled	enabled	If "enabled", the output switches if the device temperature is outside the permitted range.
Service no bar code visible	disabled, enabled	enabled	If "enabled", the output switches if no bar code tape is detected.
Service no plausible position	disabled, enabled	enabled	If "enabled", the output switches if no plausible measured value is present any longer.
Service pre-failure	disabled, enabled	enabled	If "enabled", the output switches if the pre-failure status (sensor dirty or illumination approaching service life limit) has been active.

9.3.9 Module 21 (MF2 input)

Type

Setup module, no input/output data

Description

This module defines the behavior of the multi-function input MF.

Module parameters

Name	Value range	Standard value	Description
Active level	HIGH, LOW	HIGH	Input level that is interpreted as active.
Function	inactive, preset activation, illumination off	inactive	Function of the input: ■ INACTIVE: an active signal at the input does not trigger a response. ■ PRESET ACTIVATION: the preset function is activated via the input. ■ ILLUMINATION OFF: the integrated illumination can be deactivated via the input.

9.3.10 Module 22 (preset stat and offset)

Type

Setup module, no input/output data

Description

This module is used for presetting the preset value and the initial position offset.

NOTE
If module 5 is also active then the parameter data of module 22 is overwritten by the output data from module 5.

Module parameters

Name	Value range	Standard value	Description
Position preset	-10,000,000 mm ... 10,000,000 mm	0 mm	Defines the initial preset value in [mm].
Position offset	-10,000,000 mm ... 10,000,000 mm	0 mm	Defines the initial position value in [mm].

9.3.11 Module 30 (serial no/i8b)

Type

Input module, 8 byte

Description

The serial number of the device can be queried using this module.

Input values

Rel. Address	Type	Description
0	8 ASCII characters	Serial number, unused characters at the end of the string are filled with 0 bytes (0x00).

9.3.12 Module 31 (product code/i14b)

Type

Input module, 14 byte

Description

The product code of the device can be queried using this module.

Input values

Rel. Address	Type	Description
0	14 ASCII characters	String with fixed length. Unused characters at the end of the string are filled with 0 bytes (0x00).

9.3.13 Module 32 (version HW/i8b)

Type

Input module, 8 byte

Description

This module can be used for querying the status of the version number of the device hardware.

Input values

Rel. Address	Type	Description
0	8 ASCII characters	Hardware version number

9.3.14 Module 33 (version FPGA/i10w)

Type

Input module, 10 words

Description

This module can be used for querying the FPGA firmware version number of the device. Corresponds to the SOPAS firmware component `BOARD0/COMPONENT2`.

NOTE
If this value is not present in the device then a zero byte (0x00) is transmitted for each character.

Input values

Rel. Address	Type	Description
0	19 ASCII characters	String with fixed length. Unused characters at the end of the string are filled with 0 bytes (0x00).
19	1 byte	Reserved

9.3.15 Module 34 (version µC/i10w)

Type

Input module, 10 words

Description

This module can be used for querying the firmware version number of the main controller of the device. Corresponds to the SOPAS firmware component BOARD0/COMPONENT0.

NOTE
If this value is not present in the device then a zero byte (0x00) is transmitted for each character.

Input values

Rel. Address	Type	Description
0	19 ASCII characters	String with fixed length. Unused characters at the end of the string are filled with 0 bytes (0x00).
19	1 byte	Reserved

9.3.16 Module 35 (version µC2/i10w)

Type

Input module, 10 words

Description

This module can be used for querying the firmware version number of the communication controller in the device. Corresponds to the SOPAS firmware component BOARD1/COMPONENT0.

NOTE
If this value is not present in the device then a zero byte (0x00) is transmitted for each character.

Input values

Rel. Address	Type	Description
0	19 ASCII characters	String with fixed length. Unused characters at the end of the string are filled with 0 bytes (0x00).
19	1 byte	Reserved

10 EtherNet/IP interface

10.1 EtherNet/IP interface

EtherNet/IP is a fieldbus, which is 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. The data exchange can be cyclic or acyclic. The cyclic communication is carried out for EtherNet/IP using Implicit Messaging via UDP (User Datagram Protocol) and is used for the transfer of time-critical process data such as, e.g., distance value. The acyclic communication is carried out using Explicit Messaging via TCP (Transport Control Protocol) and is used for the transfer of data that is not time-critical such as, e.g., device configuration or diagnosis.

There are two equal Ethernet interfaces available on the device. They lead to an internal switch and are used for communication via EtherNet/IP. They can also be used for communication via the configuration software SOPAS ET.

The Ethernet interfaces have the following features:

- Transfer rate 10 or 100 MBit, half or full duplex
- Auto-negotiation (automatic adjustment of transfer rate and duplex procedures)
- Auto-crossover (automatic adjustment in the case of crossed lines)

EtherNet/IP interface

EtherNet/IP is a fieldbus, which is 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. The data exchange can be cyclic or acyclic. The cyclic communication is carried out for EtherNet/IP using Implicit Messaging via UDP (User Datagram Protocol). The acyclic communication is carried out using Explicit Messaging via TCP (Transport Control Protocol).

The device supports the following EtherNet/IP performance features:

- One "listen only", one "input only", and one "exclusive owner" connection
- Cycle time (request packet interval) ≥ 2 ms
- DLR (device level ring/ring topology)
- DHCP (dynamic host configuration protocol/dynamic address allocation)
- ACD (address conflict detection)
- EDS (electronic data sheet/description of the device)

Address conflict detection

The device supports the "Address Conflict Detection (ACD)" performance feature. In the factory setting, the feature "ACD" is activated. In order to deactivate the feature "ACD", you will need to set attribute "10" to “FALSE (Disable ACD)" in the object "TCP/IP Interface" (classID 0xF5). This setting is saved in the device in a non-volatile manner.

NOTE

Every time the sensor detects there is an address conflict present via ACD, this event will be written into the internal memory (flash memory) of the sensor as diagnosis information. The number of permitted write processes is limited. It is recommended that the feature "ACD" should be deactivated in networks in which address conflicts frequently occur.

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 sign in two's complement
INT	2	Integer with sign in two's complement
DINT	4	Integer with sign in two's complement
USINT	1	Integer without sign
UINT	2	Integer without sign
DINT	4	Integer without sign
ENGUINT	2	Physical unit, see next section
SHORT_STRING	1+n	Chain with n characters, 1 byte length data prefixed

Table 9: Data types used

Specific units of measure (engineering units)

Value	unit
0x0801	0.1 mm
0x2203	1 mm
0x2203	10 mm
0x0806	100 mm
0x1001	Counts (0.1 mm)

Table 10: Position

Value	unit
0x0816	0.1 mm/s
0x0810	1 mm/s
0x2B01	10 mm/s
0x0811	100 mm/s
0x1F04	Counts (0.1 mm/s)

Table 11: Speed

10.2 Description of the individual attributes

"Operating status" (attribute-ID 41)

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

Table 12: "Operating status"

"Alarms" (attribute ID 44) and "supported alarms" (attribute ID 45)

The attribute "alarms" (attribute ID 44) can have the following values:

NOTE
The same bit layout applies for the attribute "supported alarms" (attribute ID 45).

Bit	Name	Description	Supported by OLM200
0	Position error	increasing (0) decreasing (1)	Yes
1	Diagnostic error		No
2 to 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

Table 13: "Alarms" and "supported alarms"

"Warnings" (Attribute ID 47) and "supported warnings" (attribute ID 48)

The attribute "warnings" (attribute ID 47) can have the following values:

NOTE
The same bit layout applies for the attribute "supported warnings" (attribute ID 48).

Bit	Name	Description	Supported by OLM200
0	Frequency exceeded		No
1	Diagnostic error		No
2	Reserved by CIP		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 to 12	Reserved by CIP	Always 0	–
13	Vendor specific	F5: Pollution	Yes
14	Vendor specific	F2: SmartPOS active	Yes
15	Vendor specific		No

Table 14: "Alarms" and "supported alarms"

"Label" (attribute-ID 100)

The "label" attribute supplies the value of the last read control code

"Warning" and "alarm flags" (attribute ID 103)

Bit	Name	Description	Supported by OLM200
0	Alarm flag identical to attribute ID 46		Yes
1	Warning flag identical to attribute ID 49		Yes
2 to 4	Reserved by CIP		–
5 to 7	Vendor specific		No

Table 15: "Warning" and "alarm flags"

Switching output MF1 (attribute ID 120 ... 130)

Attribute	Value	Meaning
Active Level 0 (Default) HIGH (attribute D 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

Table 16: Switching output MF1

Switching input MF2 (attribute ID 140 ... 141)

Attribute	Value	Meaning
Active level (attribute ID 140)	0 (default)	HIGH
	1	LOW
Function (attribute ID 141)	0 (default)	INACTIVE
	1	PRESET ACTIVATION
	2	ILLUMINATION OFF

Table 17: Switching input MF2

"Dynamic preset control" (attribute ID 143)

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 to 7	–	Reserved for future use	–

Table 18: Dynamic preset control

10.3 Acyclic data exchange

10.3.1 Standard objects

From the CIP standard and the EtherNet/IP standard, the following objects are available for the acyclic 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)

10.3.2 Objects from the encoder profile

The following objects are available in the CIP profile "Encoder":

- Assembly object
- Position sensor object

Assembly object (classID 0x04)

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

Table 19: Assembly object class attributes

Position sensor object (classID 0x23)

Attribute ID	Name	Data type	Size [byte]
1	Revision	UNIT	2

Table 20: Position sensor object class attributes

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: 0x1001 (counts, 0.1 mm), range: 0x1001 (counts), 0x0801 (0.1 mm), 0x2203 (1 mm), 0x2202 (10 mm), 0x0805 (100 mm)	ENGUNIT (UINT)	2		X
19	Preset value [1]	DINT	4		X
24	Velocity value	DINT	4	X	
25	Velocity format default value: 0x1F04 (counts/s, 0.1 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

Table 21: Standard instance attributes for position sensor object

Attribute ID	Name	Data type	Size [byte]	Get	Set
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	

Table 21: Standard instance attributes for position sensor object

1 Must be activated by MF

10.3.3 OLM-specific attributes

The OLM200 EtherNet/IP also provides the following attributes:

Attribute ID	Name	Data type	Size [byte]	Get	Set
100[1]	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
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

Table 22: Manufacturer-specific instance attributesposition sensor object

Attribute ID	Name	Data type	Size [byte]	Get	Set
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	

Table 22: Manufacturer-specific instance attributesposition sensor object

1 Hexadecimal value of the last control mark to be read.
2 Only the first 19 characters of 20 possible characters will be used.

10.3.4 Preset functionality

There are two options for setting a preset value.

Via a control bit of the "Dynamic preset control" attribute with cyclic or acyclic data exchange

The preset can be dynamically activated via bit 1 "Set preset" of the attribute "Dynamic preset control" (ID 143). The preset can be deleted again via bit 0 "Clear preset". The following steps are required for this purpose:

- Write the value for the preset for the attribute "Dynamic preset value" (ID 142).
- Set preset: First set attribute "Dynamic preset control" (ID 143) to 0x00 and then to 0x02. Delete preset: First set attribute "Dynamic preset control" (ID 143) to 0x00 and then to 0x01.

The preset is activated with transition of the control bit from 0 to 1 (calculation of the offset). The calculated offset can be read via the attribute "Offset value" (ID 51).

Via the switching input MF2

The preset can be activated via switching input MF2. The following steps are required:

- Write the value for the preset for the attribute "Dynamic preset value" (ID 19).
- Set attribute "MF2 input preset" (ID 141) to 0x01 ("PRESET ACTIVATION"). The preset is activated as soon as an active level is present at switching input MF2 (calculation of the offset). The calculated offset can be read via the attribute "Offset value" (ID 51).

10.4 Cyclic data exchange

Special CIP objects, which are also known as assemblies, are used for the cyclic data exchange (Implicit Messaging). Each assembly is made up of one or more attributes of CIP objects of the device. **The OLM200 EtherNet/IP only provides the static assemblies.** A CIP object with the name "Assembly" (classID 0x04) is used to set the cyclic data exchange with predefined assemblies. In each case, precisely one assembly can be used for the input, output and configuration for the cyclic data exchange. **For OLM200 EtherNet/IP, all assemblies from the attributes of the CIP object "Position Sensor" are combined together.**

Input assemblies

Instance ID	Description	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

Table 23: Input assemblies

Output assembly

Instance ID	Description	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	–

Table 24: Output assembly

The following table shows examples of the values for the output assembly "Dynamic Preset". In this case, the preset value is neither set nor deleted.

Description	Attribute name	Data type	Value
Dynamic preset	Dynamic preset value	DINT	0
	Dynamic Preset Control	BYTE	0x00
	Reserved	3 BYTE	0x00, 0x00, 0x00

Table 25: Example: Output assembly

Configuration assembly

Instance ID	Description	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	BOOL	122
			[MF1 output] position hysteresis	BOOL	123
			[MF1 output] velocity threshold	BOOL	124
			[MF1 output] velocity sign	BOOL	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

Table 26: Configuration assembly

The attributes must be set according to the following table in order to get a valid basic configuration. Ensure that a valid value is entered for the attributes "Position Format" and "Velocity Format". The default value according to the CIP specification must not be used.

Description	Attribute name	Data type	Recommended initial value
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	BOOL	0
	[MF1 output] position hysteresis	BOOL	10
	[MF1 output] velocity threshold	BOOL	0
	[MF1 output] velocity sign	BOOL	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)

Table 27: Example: Sample configuration

11 Maintenance

11.1 Cleaning

ATTENTION
Sensor damage due to improper cleaning.

Improper cleaning may result in damage to the sensor.

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

▶ Clean the front screens at regular intervals with a lint-free cloth and plastic cleaning agent. The cleaning interval essentially depends on the ambient conditions.

Bar code tape

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

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

11.2 Maintenance

The sensor requires the following maintenance work at regular intervals:

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

Table 28: Maintenance schedule

12 Troubleshooting

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

General faults, warnings and errors

General faults are subdivided into warnings and errors. For active warnings, current measured values are output, for active errors, measurement is no longer possible. Warnings and errors are signaled by the STATUS LED. Warnings and errors can also be output via the multifunctional outputs or the data interface. They are not stored in the sensor. The POWER LED signals that the sensor is connected to the power supply.

12.1 Warning and error messages

Indication on display (meaning)	LED indicator	Possible causes	Troubleshooting
Error F1 (Over or under temperature)	■ Power LED: red ■ Status LED: off	The internal temperature of the sensor is outside the permissible range.	■ Check ambient temperature. Provide better ventilation if necessary. ■ Shield the device from radiated heat, e. g. shade the device from direct sunlight. ■ Where ambient temperatures are low, wait for warm up phase (at temperatures ≤ –20 °C).
Warning F2 SmartPOS active	■ Power LED: green ■ Status LED: green, flashing	SmartPOS function is active Position not determined from bar codes, but from processing raw images or extrapolation see "Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)", Page 31.	Check bar code tape and sensor. Remove contamination and rectify damage.
Error F3 (no bar code tape detected)	■ Power LED: green ■ Status LED: red	■ No bar code tape present. ■ Sensor poorly aligned. ■ Sensor or bar code tape totally contaminated. ■ Working distance too small/large.	■ Mount bar code tape in front of sensor. ■ Align sensor with the bar code tape. ■ Clean the optical limit surfaces of the sensor and the bar code tapes. ■ Check the distance between the sensor and the bar code tape.
Error F4 (error during position value calculation/read error)	■ Power LED: green ■ Status LED: red	■ Alignment of bar code not detected. ■ Bar code tape damaged. ■ Unsuitable bar code tape used.	■ Interrupt the supply voltage or send cold start command. ■ Renew bar code tape. ■ Use original bar code tape see "Bar code tape", Page 80.

Table 29: Warning and error messages

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

Table 29: Warning and error messages

12.2 Communication problems

12.2.1 PROFINET IO problems

The LEDs BF and SF signal the PROFINET status:

LED indication BF	LED indication SF	Status	Actions
Off	On	Status directly after switching on.	-
On	On	The PROFINET IO interface has been activated but no PROFINET IO master has connected yet.	Check network settings. Ensure that there is a valid IP configuration present see "Reset device to the factory settings", Page 36.
Off	Off	The device has been incorporated into the bus and can exchange data.	-
Flashing	On	There is a bus error.	■ Check cabling. ■ Check master (PLC) function.

Table 30: LED BF and SF

12.2.2 PROFIBUS problems

The LEDs BF and STA signal the PROFIBUS status:

LED indication BF (red)	LED indication STA (green)	Status	Actions
Off	On	Status directly after switching on.	-
On	Off	The PROFIBUS interface has been activated but no PROFIBUS master has connected yet.	■ Check whether at least one module of the sensor has been activated. ■ Check whether the bus address of the sensor has been entered correctly into the master (PLC).

Table 31: LED BF and STA

LED indication BF (red)	LED indication STA (green)	Status	Actions
Off	On	The device has been incorporated into the bus and can exchange data.	-
Flashing	Off	There is a bus error.	■ Check cabling. ■ Check master (PLC) function.

Table 31: LED BF and STA

12.2.3 EtherNet/IP faults

The LEDs MOD (module status) and NET (network status) signal the EtherNet/IP status:

Indication	Status	Actions
Off	No supply voltage or IP address assigned.	■ Check supply voltage. ■ Check Ethernet connection. ■ Check IP settings.
Flashing green	Connection established and IP settings made but no CIP connection established.	Check control configuration.
Lit green	Sensor is working correctly.	–
Flashing red	Connection error (timeout) in exclusive owner CIP connection.	Establish new CIP connection or perform power reset.
Lit red	IP address assigned twice.	Check IP settings.
Flashing red/ green	Self-testing. Takes place when sensor starts.	–

Table 32: LED NET

Indication	Status	Actions
Off	Supply voltage not available.	Check supply voltage.
Flashing green	■ Device is on standby. ■ No suitable IP settings assigned. ■ Device is not configured.	■ Check IP settings. ■ Check control configuration.
Lit green	Connection established.	–
Flashing red	Incorrect or inconsistent configuration.	Check control configuration.
Lit red	Serious error.	Contact service. For contacts, see back page.
Flashing red/ green	Self-testing. Takes place when sensor starts.	–

Table 33: LED MOD

12.2.4 Ethernet problems

The LED LINK signals the connection status (link) of Ethernet ports 1 and 2.

Indication	Status	Actions
Off	No physical connection available to the next participant.	Check Ethernet wiring.

Table 34: LED LINK

12.3 Returns

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

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

12.4 Repairs

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

12.4.1 Repairing damage to bar code tape

Replace bar code tape

For a high-quality and long-lasting result, the use of original SICK bar code tape is recommended see "Order notes and variants of the bar code tape", Page 81. The minimum ordering length is 5 m.

Using repair codes

PDF documents with bar codes that can be printed are available to quickly repair damaged areas on bar code tape. These can be printed on self-adhesive DIN A4 blank labels see "Blank labels for repair codes or control marks", Page 82.

The PDF documents are available for download at:

▶ **http://www.mysick.com/en/olm200**

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

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

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

Using SmartPOS repair bar code tape

Temporary repairs to damaged areas can be achieved by covering them with SmartPOS repair bar code tape see "Order notes and variants of the bar code tape", Page 81. This is a special repair tape that, unlike the normal bar code tape, does not contain any absolute position values and can therefore be used anywhere. When traveling over this tape, the sensor detects the position incrementally.

NOTE

The SMARTPOS function must be active when using SmartPOS tape see "Configuration and servicing with SOPAS Engineering Tool (SOPAS ET)", Page 31.

NOTE

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

12.5 Disposal

Observe the following points for disposal:

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

13 Technical data

NOTE

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

▶ http://www.mysick.com/en/olm200

13.1 Type-specific data

Type designation	Interface	Bar code tape reading distance	Bar code width
OLM200-xx02	PROFIBUS	100 mm ± 20 mm	30 mm
OLM200-xx52	PROFIBUS	130 mm ± 20 mm	40 mm
OLM200-xxx9	PROFINET IO	100 mm ± 20 mm	30 mm
OLM200-xxx8	Ethernet/IP	100 mm ± 20 mm	30 mm

13.2 Performance

Resolution	0.1 mm, 1 mm, 10 mm, 100 mm
Repeatability[1]	0.15 mm
Response time[2]	10 ms
Output rate	2.5 ms
Light sender	LED, red
Measurement range of the product travel path[3]	0 m - 10000 m
Max. traverse speed	10 m/s
Accuracy of speed output	± 5 mm/s

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

13.3 Interfaces

13.3.1 PROFIBUS

Data interface	PROFIBUS DP-V0
Maximum data transmission rate	12 baud
Switching input	Multifunctional input MF2
Switching output	▪ Multifunctional output MF1: PNP ▪ Multifunctional output MF1: NPN
Data transmission rate	3 Mbit/s

13.3.2 PROFINET IO

Data interface	PROFINET IO/RT[1]
Switching input	Multifunctional input MF2

Switching output	■ Multifunctional output MF1: PNP ■ Multifunctional output MF1: NPN
Data transmission rate	100 Mbit/s

1 Conformance class B, PN specification V2.25

13.3.3 Ethernet/IP

Data interface	Ethernet/IP [1]
Maximum data transmission rate	12 baud
Switching input	Multifunctional input MF2
Switching output	■ Multifunctional output MF1: PNP ■ Multifunctional output MF1: NPN
Data transmission rate	100 Mbit/s

1 Industrial level with device level ring (DLR)

13.4 Ambient data

Protection class	 Suitable for operation in PELV (Protective Extra Low Voltage) systems with safe separation.
Electromagnetic compatibility	EN 61000-6-2, EN 61000-6-4
Ambient temperature range[1] [2]	–30 °C - +60 °C
Storage temperature range	–40 °C - +75 °C
Typical ambient light immunity[3]	≤ 30000 lx
Enclosure rating	IP 65
Vibration resistance	EN 60068-2-6, EN 60068-2-64
Shock resistance	EN 60086-2-27

Table 35: Ambient data

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

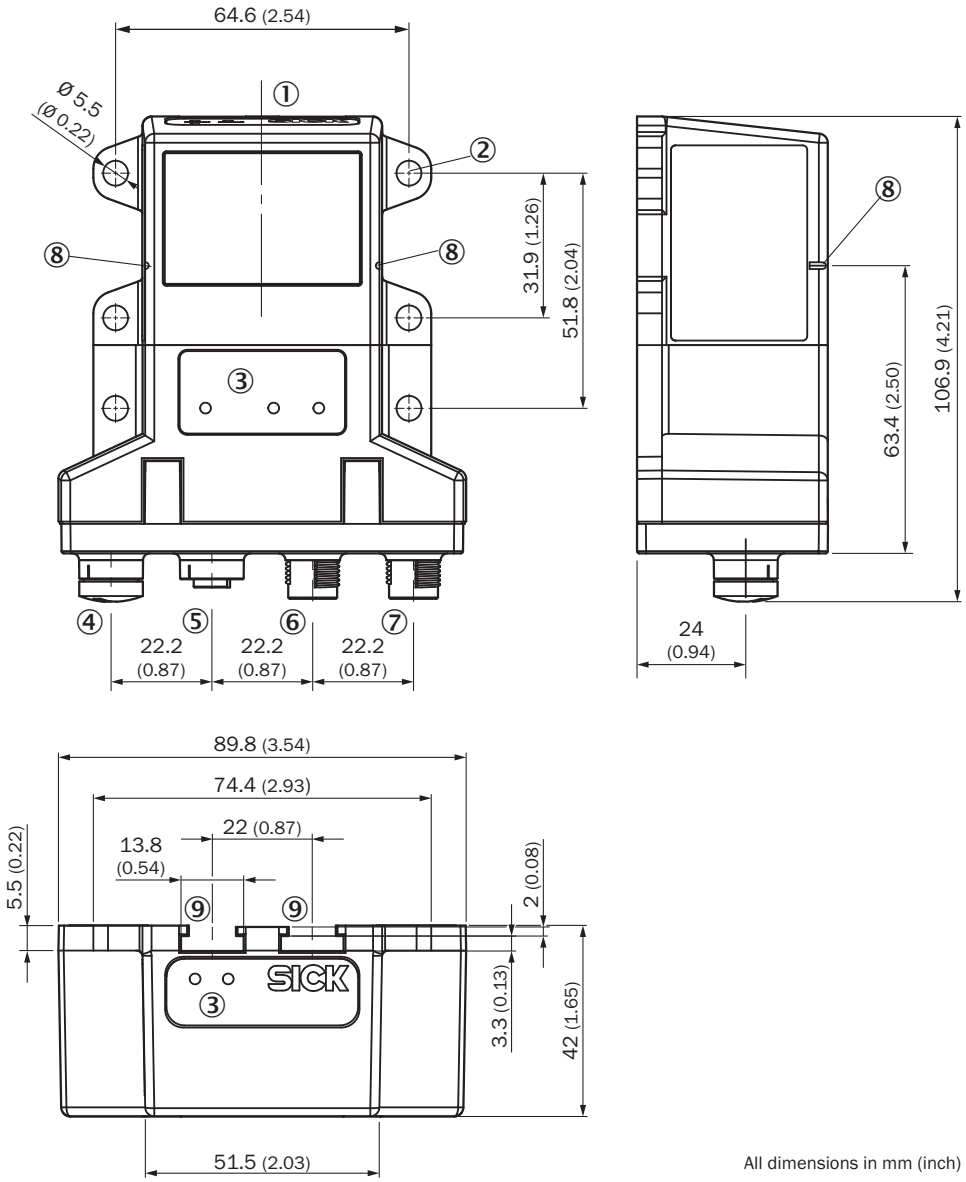
13.5 Mechanics/electronics

Output current I_A[1]	100 mA
Supply voltage U_V[2]	DC 18 V ... 30 V
Residual ripple[3]	≤ 5 Vss
Power consumption	< 5.5 W
Initialization time	Approx. 10 s
Weight	Approx. 290 g
Housing material	■ Housing: magnesium, zinc ■ Front screen: PMMA

Connections	M12, SpeedCon™

1 MF1 switching outputs, short-circuit protected
2 Limit values, reverse-polarity protected
3 May not fall below or exceed U_V tolerances

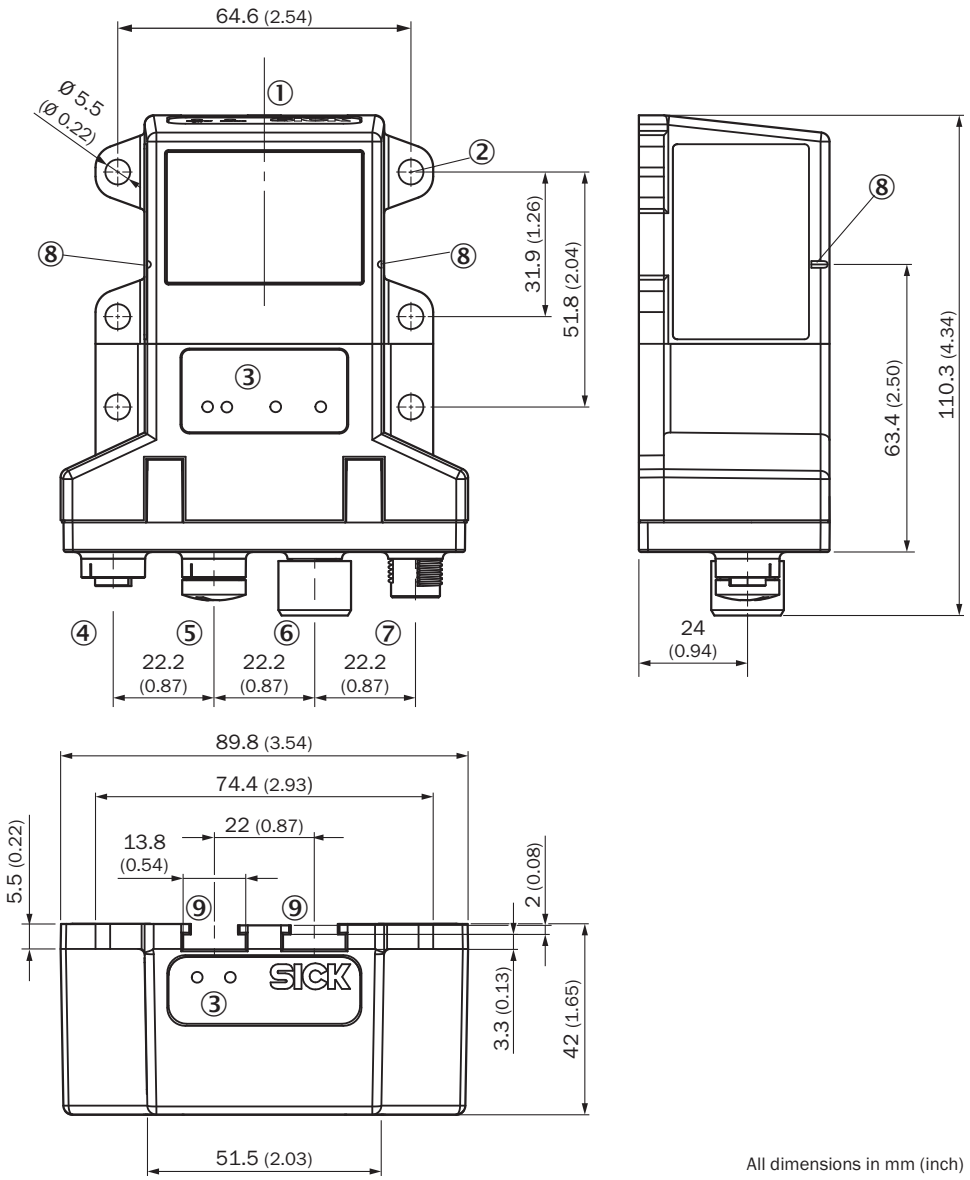
13.6 Dimensional drawing



All dimensions in mm (inch)

Figure 21: PROFIBUS device dimensions

① Reference axis position measurement
② Fixing hole
③ LED display
④ Ethernet female connector, M12, 4 pin
⑤ Field bus connection, female connector M12, 5-pin
⑥ Field bus connection, female connector M12, 5-pin
⑦ Connection: male connector M12, 5-pin
⑧ Adjustment aid (slot)
⑨ T-slot



All dimensions in mm (inch)

Figure 22: PROFINET IO/EtherNet IP device dimensions

① Reference axis position measurement
② Fixing hole
③ LED display
④ Ethernet/EtherNet/IP, female connector M12, 4-pin
⑤ Ethernet/EtherNet/IP, female connector M12, 4-pin
⑥ Not assigned
⑦ Connection, male connector M12, 5-pin
⑧ Adjustment aid (slot)
⑨ T-slot

13.7 Bar code tape

Upper material	Polyester film, white, matt, silicone-free
Foil thickness acc. to ISO 534	56 µm ± 10 %

Table 36: Bar code tape

Upper material thickness incl. adhesive	Approx. 102 µm	
Tear resistance acc. to ISO 1184	> 150 N/15 mm	
Adhesive	Permanent adhesive based on modified acrylates. Suitable for problem substrates.	
Adhesive force (adhesive force level T acc. to DIN 30646, measured on stainless steel)	Steel	> 9.3 N/10 mm
	Aluminum	> 8.0 N/10 mm
	Polypropylene	> 6.2 N/10 mm
	HD polyethylene	> 4.3 N/10 mm
	Smooth powder paint	> 7.8 N/10 mm
Min. adhesion temperature	> +4 °C	
Temperature Resistance	-40 °C - +150 °C	
Chemical resistance	Resistant to most oils and greases, fuels, aliphatic solvents and dilute acids.	
Load test (bonded to stainless steel), no issues	Relative humidity 98 %	120 h at 38 °C
	Diesel oil	4 h at 23 °C
	Glass cleaner	4 h
	Isopropanol	4 h
	DOT brake fluid 4	4 h
	Heptane	4 h
	Engine oil SAE 15W40	4 h
	Toluol	4 h
	Industrial cleaner	4 h
	Kerosene (US), paraffin (GB)	4 h
	Washing-up liquid	24 h
	Salt spray test acc. to DIN 50021 SS	150 h
	Climatic stress acc. to DIN 50018 SFW 2.0	No change after 2 stress cycles
Base corrosion	No corrosion on the glued base	
Dimensional stability	Key figure 02 (checked to DIN 30646) Shrinkage < 0.2%	

Table 36: Bar code tape

14 Accessories

NOTE
Accessories can be found online at:

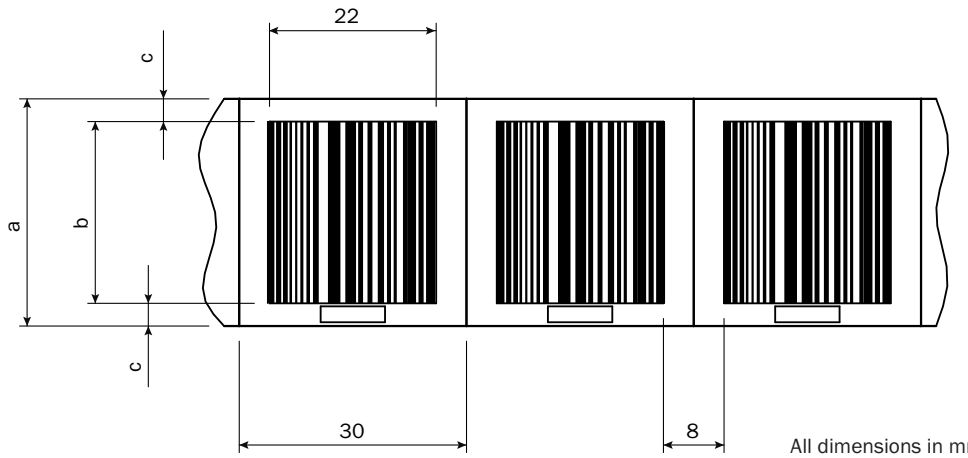
▶ http://www.mysick.com/en/olm200

14.1 Bar code tape

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

For correct mounting of the bar code tape see "Mount the bar code tape", Page 18.

Dimensions of the bar code tape



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

Bar code tape printing

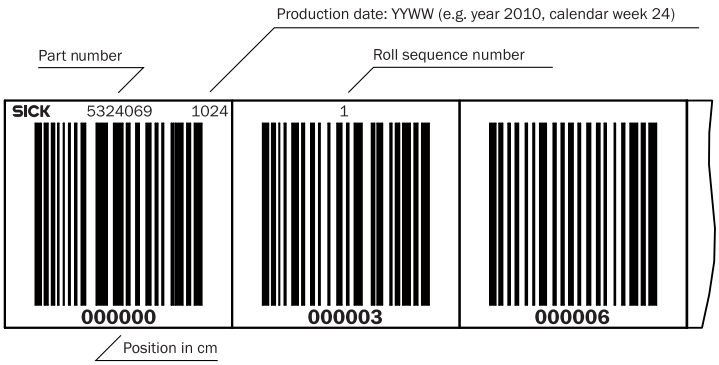


Figure 23: Bar code tape, height 30/40/60/100 mm

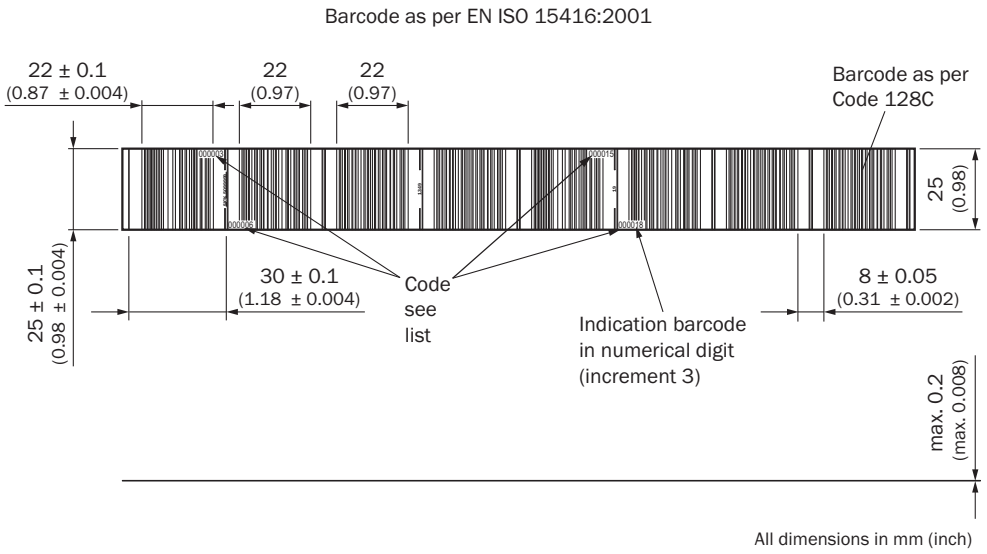


Figure 24: Bar code tape, 25 mm height

14.2 Order notes and variants of the bar code tape

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

NOTE

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

▶ http://www.mysick.com/en/olm200

Customer specific bar code tape

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

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

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

Example:

Start of the measuring range = 251 cm

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

End of the measuring range = 986 cm

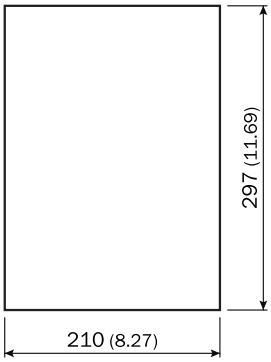
1. 1. 986 / 3 = 328.667 (divide by 3).
2. 2. 328.667 → 329 (round up to next whole number).
3. 3. 329 x 3 = 987 x 3 (multiply by 3). **End code = 987 cm**

SmartPOS repair bar code tape

Bar code tape	Part no.
Height 25 mm Width 30 mm	5329017
Height 30 mm Width 30 mm	5329018
Height 40 mm Width 30 mm	5329019
Height 60 mm Width 30 mm	5329020
Height 100 mm Width 30 mm	5329021

14.3 Blank labels for repair codes or control marks

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

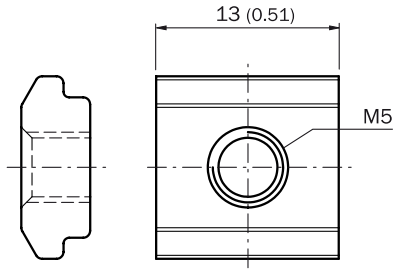


All dimensions in mm (inch)

Table 37: Blank labels

14.4 Sliding nuts

Type	Part number
Sliding nuts M5 (4 items)	2017550



All dimensions in mm (inch)

Table 38: Sliding nuts, M5

15 Appendix

15.1 EC declaration of conformity

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

- http://www.mysick.com/en/olm200

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