DL100 Pro – PROFIBUS DP
DISTANCE MEASURING DEVICE

SICK
Sensor Intelligence.

Table of contents

Important safety notes

c(UL)us LISTED
IND. CONT. EQ.
4R97

NFPA79 applications only.

UL-listed adapters providing field wiring leads are available.

Refer to the product information. → See "www.sick.com/dl100_pro".

⚠ **CAUTION!**

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

1

2   General

2.1   Information on the operating instructions

These operating instructions offer important notes on handling of the distance measuring devices DL100 Pro of SICK AG. A prerequisite for safe work is compliance with all indicated safety notes and instructions.

Furthermore, the local work safety regulations and general safety provisions applicable for the application of the distance measuring device must be complied with.

The operating instructions must be read carefully before taking up any work! They are part of the product and must be kept in direct proximity of the distance measuring device, accessible for the staff at all times.

When passing on the distance measuring device to third parties, the operating instructions must be passed on as well.

NOTE!

These operating instructions describe all distance measuring devices DL100 Pro with a PROFIBUS interface.

2.2 Explanation of symbols

Warnings

Warnings are marked by icons in the operating instructions. The notes are initiated by signal words that express the degree of danger.

Always comply with the notes and act carefully to avoid accidents, injury and property damage.

DANGER!

… indicates a directly dangerous situation that will lead to death or severe injury if not avoided.

WARNING!

… indicates a possibly dangerous situation that may lead to death or severe injury if not avoided.

CAUTION!

… indicates a potentially dangerous situation that may lead to minor or light injury if not avoided.

ATTENTION!

… indicates a potentially harmful situation that may lead to property damage if not avoided.

Advice and recommendations

NOTE!

… emphasizes useful advice and recommendations, as well as information for efficient and trouble-free operation.

2.3 Limitations of liability

All notes and information in these instructions were collected under consideration of the applicable standards and regulations, the state of the art and our long-term experience and insights.

The manufacturer does not assume any liability for damage due to:

- Non-observation of the operating instructions
- Non-intended use
- Use of untrained staff
- Unauthorized conversions
- Technical changes
- Use of unapproved wear and tear parts

The actual delivery may deviate from the features and presentations described here for special designs, when additional order options are used or due to the latest technical changes.

2.4 Delivery

The following is included in the delivery:

- Distance measuring device DL100 Pro
- Optional: Accessories ($\rightarrow$ page 110, chapter 15).

Included documentation per distance measuring device:

- Quickstart

2.5 Customer service

Our customer service is available for technical information.

You can find your local office on the reverse.

NOTE!

For quick processing of the call, keep the data of the type label, such as type code, serial number, etc. ready.

2.6 EC Declaration of Conformity

$\rightarrow$ The EC Declaration of Conformity can be downloaded from "www.sick.com/dl100_pro".

2.7   Environmental protection

ATTENTION!

Danger for the environment from improper disposal of the distance measuring device!

Improper disposal of the distance measuring device may cause damage for the environment.

Therefore:

- Always observe the applicable environmental protection provisions.
- Upon proper disassembly, send the disassembled components to recycling.
- Separate the materials by type and recycle them.

3 Safety

3.1 Intended use

The distance measuring device DL100Hi is a measuring device consisting of an opto-electronic sensor and assessment electronics. The measuring device is only intended for non-contact recording of distances from linearly moved system parts. Distance measurement is performed by a reflector.

SICK AG assumes no liability for direct or indirect loss or damage resulting from use of the product. This in particular applies for any differing use of the product that does not meet the intended purpose and that is not described or mentioned in this documentation.

3.2 Non-Intended use

The distance measuring device DL100 Pro is no safety component according to the EC Machinery Directive (2006/42/EC).

The distance measuring devices must not be used in explosion-hazardous areas.

All uses not described in intended use are prohibited.

No accessories must be connected or installed that are not expressly specified in amount and characteristics and approved by SICK AG.

> **WARNING!**
>
> **Danger from non-intended use!**
>
> Any non-intended use may cause dangerous situations.
>
> Therefore:
>
> • Only use the distance measuring device according to its intended use.
>
> • All information in the operating instructions must be strictly complied with.

3.3 Changes and conversions

Changes and conversions at the distance measuring device or the installation may cause unexpected dangers.

The manufacturer's written approval is required before any technical changes and expansions of the distance measuring device.

3.4 Requirements to skilled persons and operating staff

⚠️ **WARNING!**

Danger of injury in case of insufficient qualification!

Improper use may cause considerable injury and property damage.

Therefore:

- Any work must be performed by the designated persons only.

The following qualification requirements for the different areas of activity are described in the operating instructions:

- **Instructed persons**
  were instructed in the tasks assigned to them and possible dangers in case of improper conduct in the scope of instruction by the operator.

- **Skilled persons**
  are able to perform the tasks assigned to them based on their technical training, knowledge and experience, as well as knowledge of the relevant provisions, and to independently recognize possible danger.

- **Electricians**
  are able to perform work at electrical systems based on their technical training, knowledge and experience, as well as knowledge of the relevant standards and provisions, and to independently recognize possible dangers.
  In Germany, the electrician must meet the provisions of the accident prevention provisions BGV A3 (e.g. Elektroinstallateur-Meister). Other countries are subject to corresponding regulations that must be observed.

3.5 Work safety and special danger

Observe the safety notes listed here and the warnings in the other chapters of these instructions to reduce dangers to health and avoid dangerous situations.

3.6   Warning at the device

The distance measuring device DL100 Pro has a category 2 laser installed. The measuring device is marked with a warning.
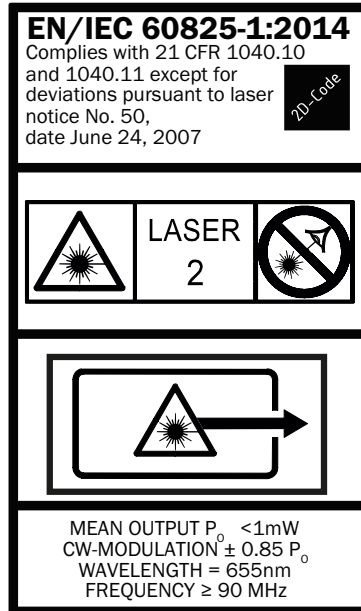
EN/IEC 60825-1:2014 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, date June 24, 2007 [2D-Code]	Complies with 21CFR1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, date June 24, 2007
LASER 2	Laser radiation - Do not look into the laser beam - Laser class 2 (EN/IEC 60825-1:2014)
[Laser aperture symbol]	Laser aperture
MEAN OUTPUT P_o <1mW CW-MODULATION ± 0.85 P_o WAVELENGTH = 655nm FREQUENCY ≥ 90 MHz	

Fig. 1:   Warning at the device: Laser category 2 (EN/IEC 60825-1:2014) Identical laser class for issue EN/IEC 60825-1:2007

3.7 Danger notes and operational safety

Laser irradiation

The following notes must be observed and complied with for your own safety:

CAUTION!

Optical radiation: Laser class 2

The human eye is not at risk when briefly exposed to the radiation for up to 0.25 seconds. Exposure to the laser beam for longer periods of time may cause damage to the retina. The laser radiation is harmless to human skin.

- Do not look into the laser beam intentionally.

- Never point the laser beam at people's eyes.

- If it is not possible to avoid looking directly into the laser beam, e.g., during commissioning and maintenance work, suitable eye protection must be worn.

- Avoid laser beam reflections caused by reflective surfaces. Be particularly careful during mounting and alignment work.

- Do not open the housing. Opening the housing will not switch off the laser. Opening the housing may increase the level of risk.

- Current national regulations regarding laser protection must be observed.

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4 Identification

4.1 Type label

The type label is located on the measuring device.
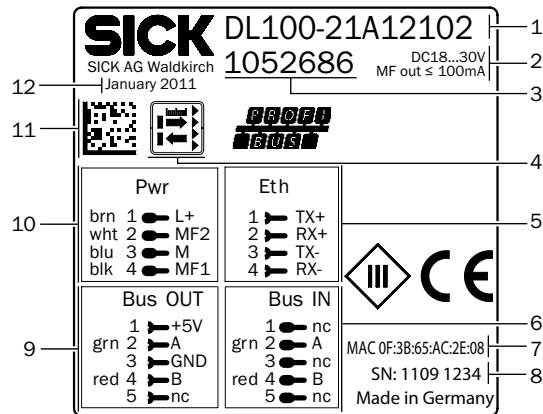
Fig. 2: Type Label

1 *Type code → See page 109, chapter 14.10.*

2 *Supply voltage, multifunction output current*

3 *Device number*

4 *Icon: Distance sensor reflector mode*

5 *Assignment for female connector Ethernet*

6 *Assignment for plug PROFIBUS IN*

7 *MAC address*

8 *Serial number*

9 *Assignment for female connector PROFIBUS OUT*

10 *Assignment for supply voltage plug*

11 *Barcode*

12 *Production year and month*

5 Setup and function

5.1 Setup
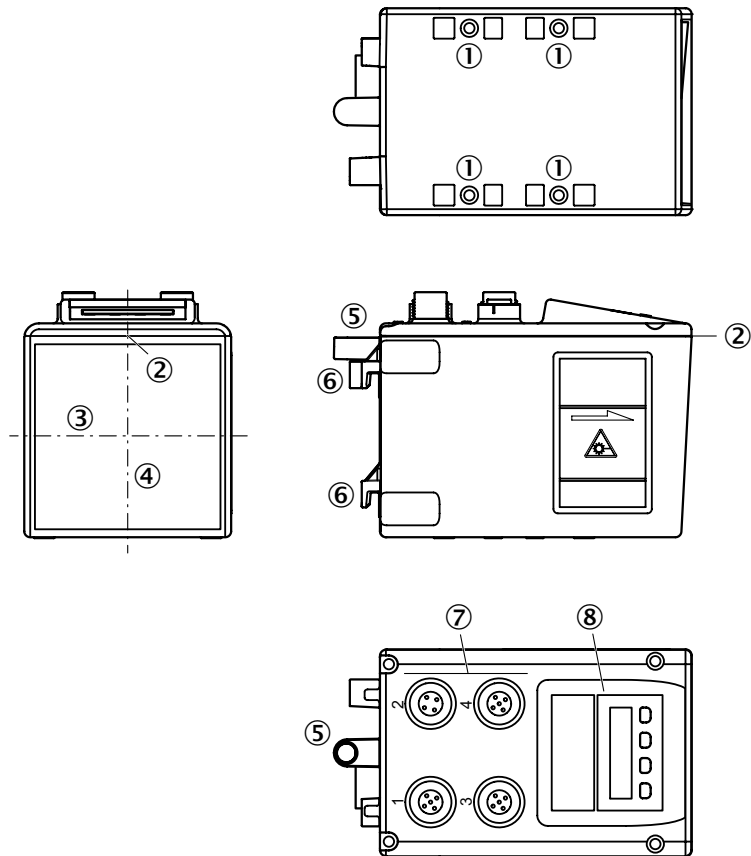
Fig. 3:   Setup "distance measuring device DL100 Pro"

1   *Threaded mounting hole M5*

2   *Device zero point*

3   *Optical axis sender*

4   *Optical axis receiver*

5   *Bore for knurled screw of the optional alignment bracket*

6   *Holder for optional alignment bracket*

7   *Electrical connection*

8   *Display and operating unit*

5.2 Function
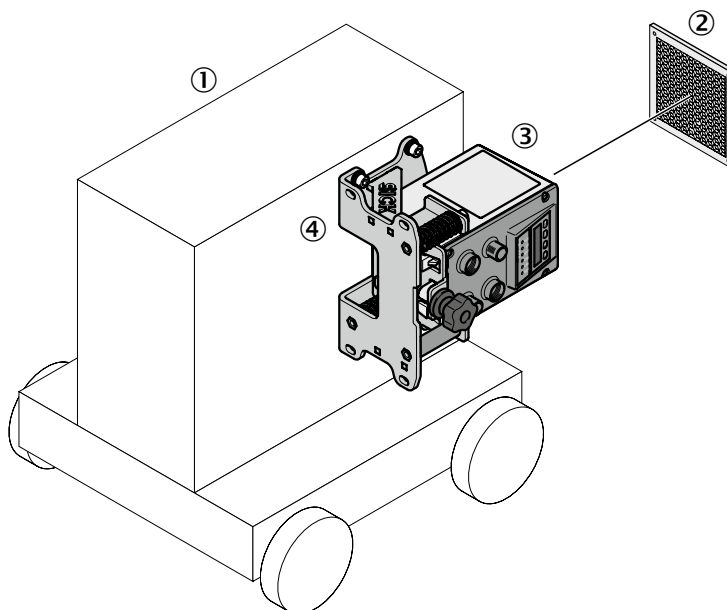
Fig. 4:   Function "distance measuring device DL100 Pro"

1   Vehicle

2   Reflector

3   Distance measuring device DL100 Pro

4   Alignment bracket

The distance measuring device DL100 Pro comprises optics, a sender/ receiver unit and an evaluation unit. The sender emits the laser beam. The receiver receives light reflected by the reflector. The evaluation electrical unit determines the distance between sensor and reflector by time of flight measurement.

For measurement, either the reflector or the measuring device may move linearly along the laser beam.

The measured distance is transferred via the "PROFIBUS" interface and may be used, e.g. for the control unit or a position-control circuit.

5.3 Display and operating elements
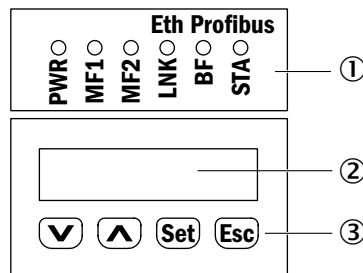
Fig. 5: Display and operating elements

1 LEDs
2 Display
3 Keys

LEDs

LED	Description
PWR	Display of operating status • LED off: No operation • LED green: Trouble-free operation • LED orange flashing: Warning (see warning status, upper level menu) • LED red flashing: Interference (see error status, menu on the top level) → Troubleshooting, see page 100, chapter 12.
MF1	Multifunctional input/output MF1 • LED on: Output high • LED off: Output low
MF2	Multifunction output MF2 • LED on: Output high • LED off: Output low
LNK	Ethernet • LED off: No Ethernet present • LED green: Ethernet present • LED orange flashing: Data transmission
BF	Interface PROFIBUS → See following table "LEDs BF and STA".
STA	Bus status → See following table "LEDs BF and STA".

Table 1: LEDs

LEDs BF and STA

BF	STA	Description
off	off	Status right after switching on
red	off	The PROFIBUS interface was activated. Connection to the master (PLC) not created yet.
off	green	Connection OK, data exchange
flashing red	off	Bus error → Removal of interference, see page 100, chapter 12.1.

Table 2:   LEDs BF and STA

Symbols for operating modes

The distance measuring device differentiates between the two operating modes "measured value display" and "menu operation".

Icon	Description
RUN	The icon RUN is displayed in the operating mode "measured value display". If there is an error and no measurement value can be determined, the icon RUN disappears.
MEN	The icon MEN is displayed in the operating mode "menu operation". The icon is also displayed when there is an error and no measurement value can be determined.

Table 3:   Symbols for operating modes

Keys

Key	Description
(V)	• Select menu, parameters or options. • Reduce value.
(∧)	• Select menu, parameters or options. • Increase value.
(Set)	• Switch to the next lower menu level. • Save parameter change. • Confirm selection.
(Esc)	• Leave parameter without saving. Switch to the next higher menu level.

Table 4:   Keys

5.4 Display

Measured value display

The measurement value is displayed by default:
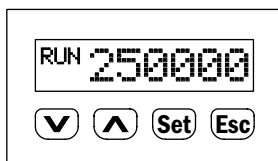
Fig. 6: Measured value display

Menu display
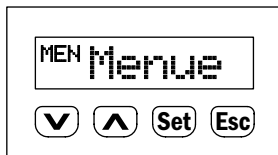
Fig. 7: Menu display

NOTE!

If a value or display has more than six characters, the characters are automatically displayed in sequence.

6 Transport and storage

6.1 Transport

Improper transport

ATTENTION!

Damage to the distance measuring device by improper transport!

Improper transport may cause considerable property damage.

Therefore:

- Only have transport performed by trained workers.
- When unloading and during internal transport, always proceed with the greatest care and caution.
- Observe icons on the packaging.
- Only remove packaging right before commencement of installation.

6.2 Transport inspection

Improper transport

Inspect the delivery for completeness and transport damage without delay upon receipt.

If there is any externally visible transport damage, proceed as follows:

- Do not accept the delivery, or only under reservation.
- Note the scope of the damage on the transport documents or the delivery receipt of the transporter.
- Initiate complaints.

NOTE!

Report every defect as soon as you recognize it. Damages claims can only be asserted within the applicable complaint periods.

6.3 Storage

Store the distance measuring device under the following conditions:

- Do not leave it outside.
- Store dry and dust-free.
- Do not expose to any aggressive media.
- Protect from solar irradiation.
- Avoid mechanical vibrations.
- Storage temperature: –40 to 75 °C
- Relative humidity: max. 95 %, non-condensing
- At storage exceeding 3 months, regularly inspect the general condition of all components and the packaging.

7 Mounting

7.1 Mounting process

1. Determine mounting site under consideration of the mounting notes.
   → See following chapter.

2. Mount alignment bracket and distance measuring device.
   → See page 32, chapter 6.7.

3. Perform electrical connection
   → See page 35, chapter 7.

4. Align distance measuring device and reflector against each other.
   → See page 31, chapter 6.6

5. Align distance measuring device with the reflector using the alignment bracket fine adjustment. → See page 34, chapter 6.8.

6. Fasten alignment of the distance measuring device.
   → See page 34, chapter 6.8.

7.2 Mounting notes

Observe the following mounting notes for trouble-free operation:

- Comply with technical specifications like the measurement range.
  → See page 106, chapter 14.3.

- Use distance measuring device with optional heating in low ambient temperatures, e.g. in deep freeze storage.

- At higher temperatures, use the distance measuring device with optional cooling casing. → See page 116, chapter 15.4.

- Protect the distance measuring device from solar irradiation.

- To avoid condensation, do not expose the distance measuring device to any quick temperature changes.

- Observe the assembly notes for the reflector.
  → See page 26, chapter 6.2.

- Keep sufficient distance to other distance measuring devices.
  → See page 28, chapter 6.4.

- Keep sufficient distance to data transmission photoelectric switches.
  → See page 30, chapter 6.5.

7.3   Choose and mount reflector

NOTE!

→ *For suitable reflectors and suitable reflective tape, see page 110, chapter 15.11.*

Reflector size

- Select the reflector size so that the light spot does still meet the reflector in case of vibrations.
- If the reflector is installed at a vehicle, a smaller reflector is typically sufficient.

Requirements

- Highly reflective surfaces close to the reflector can cause beam deflections or stray light and thus lead to incorrect measurements. Highly reflective surfaces may be, among others, shelf profiles, palettes wrapped with stretch foil and running rails.

Align the reflector as follows:

- According to the following figure away from the shiny surface
- Depending on placement with an inclination of approx. 1° to 3° in the X- or Y-direction.
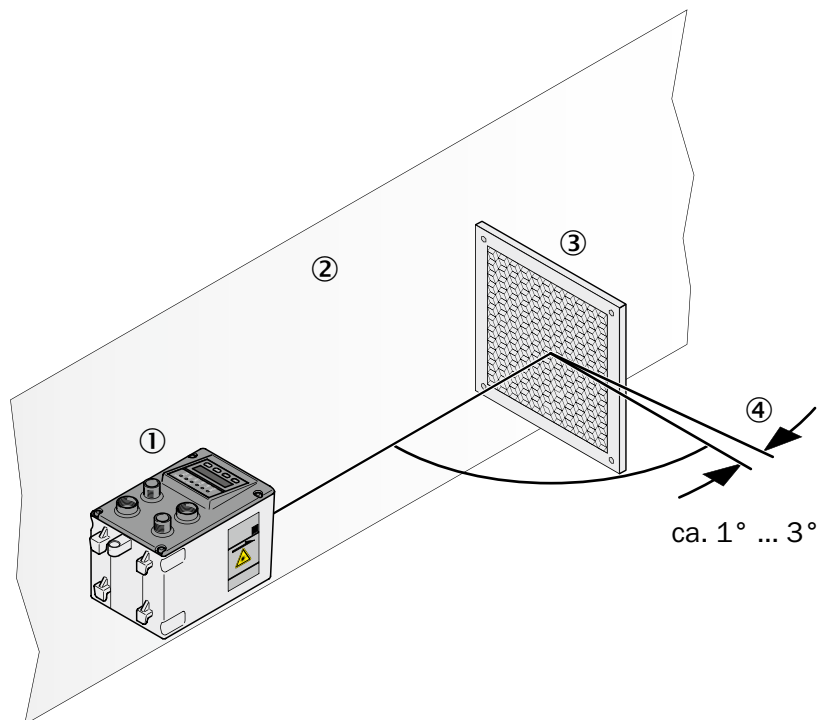
Fig. 8:   Installing the reflector on highly reflective surfaces

1   *Highly reflective surface*

2   *Distance measuring device*

3   *Reflector*

4   *Inclination of approx. 1° to 3°*

7.4   Placement of multiple distance measuring device

Multiple distance measuring device   If you want to mount several distance measuring devices, you have to consider a minimum distance between the distance measuring devices when mounting them. The minimum distance increases with the maximum scanning range of the distance measuring device.

Formula $a \geq 100 \text{ mm} + 0.01 \times s_{max}$ [mm]

Example
- Distance measuring device DL100–21xxxx01
- Measuring range: 0.15 … 100 m
- Maximum measuring distance 60 m
- s_{max} = 60 m

Calculation

$a \geq 100 \text{ mm} + 0.01 \times 60000 \text{ mm} \rightarrow 100 \text{ mm} + 600 \text{ mm} \rightarrow 700 \text{ mm}$

Result

$a \geq 700 \text{ mm}$

Light beams in the same direction
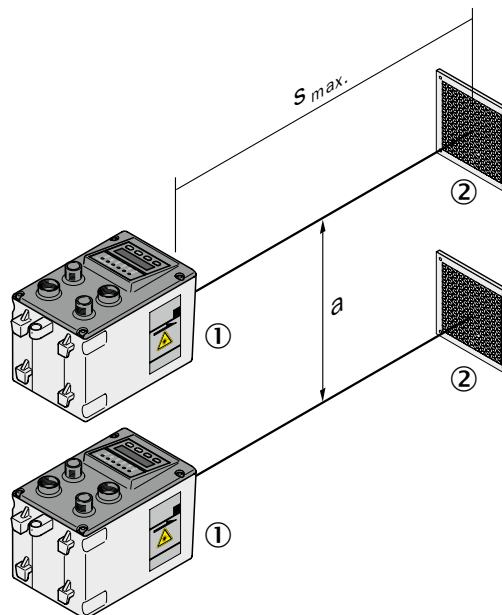
Fig. 9:   Placement of two distance measuring devices with light beams in the same light direction.

1   *Distance measuring device DL100 Pro*

2   *Reflector*

a   *Minimum distance*

s_{max} *Maximum scanning range*

Light beams in the opposite direction
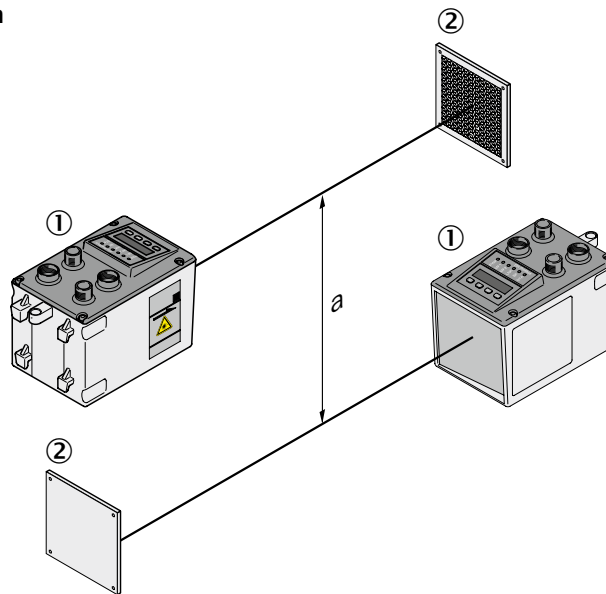
Fig. 10: Placement of two distance measuring devices with light beams in the opposite direction.

1   *Distance measuring device DL100 Pro*

2   *Reflector*

a   Minimum distance

7.5   Place the distance measuring device towards the adjacent data transmission photoelectric switch

When mounting with a data transmission photoelectric switch of the ISD300, ISD400-1xxx and ISD400-6xxx series, a beam separation of at least 100 mm must be complied with at all times. The maximum scanning range does not influence the minimum distance. For devices of the ISD400-7xxx (ISD400 Pro) serie other minimum distances apply. Refer to operating instructions "ISD400 Pro".

Formula $a \geq 100$ mm
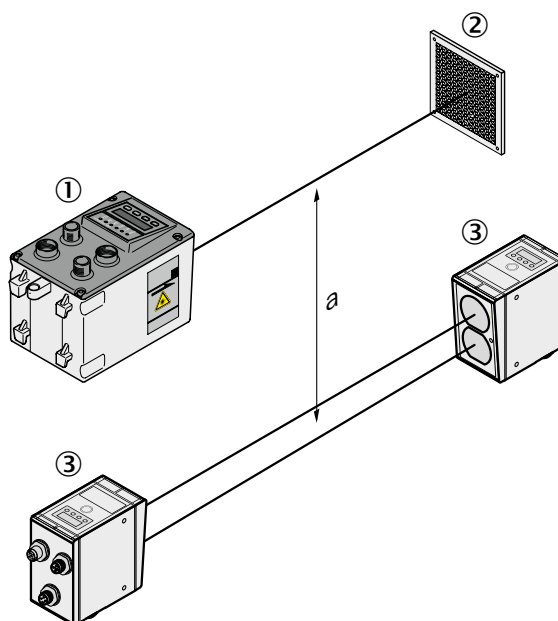
Fig. 11: Placement of the distance measuring device to the data transmission photoelectric switch ISD

1   *Distance measuring device DL100 Pro*

2   *Reflector*

3   *Data transmission photoelectric switch ISD300, ISD400-1xxx or ISD400-6xxx*

a   *Minimum distance*

7.6 Align distance measuring device and reflector against each other

1. Move the distance measuring device and reflector close together.

2. Align the distance measuring device so that the light spot of the sensor hits the center of the reflector.

3. Increase the distance between the distance measuring device and the reflector. The sensor light spot must continue to hit the center of the reflector.

4. Check damping. The damping value must not exceed the value in the table.

Damping value

The following table shows the required damping values depending on the distance between the distance measuring device and the reflector. The values in the "rated level" column should not be undercut. When the measured damping value undercuts the value in the column "warning threshold", a warning is issued.

Distance [m]	Rated level [dB]	Warning threshold [dB]
<10	–30	–42
10	–30	–42
20	–42	–54
35	–54	–66
70	–66	–78
150 [1]	–78	–90
300 [2]	–90	–102

1) For distance measuring devices with a measurement range of 0.15 ... 200 m or 0.15 ... 300 m

2) For distance measuring devices with a measurement range of 0.15 ...300 m

Table 5: Damping values

7.7 Mount alignment bracket and distance measuring device

The distance measuring device is mounted by the optional alignment bracket.

→ For dimensions and item number, see page 105, chapter 14.1.

Observe the following items:

- Mounting notes: → see page 26, chapter 6.2.
- The operation must be accessible.

1. Mount alignment bracket across the four oblong holes. The alignment bracket is suitable for mounting to horizontal and vertical levels.
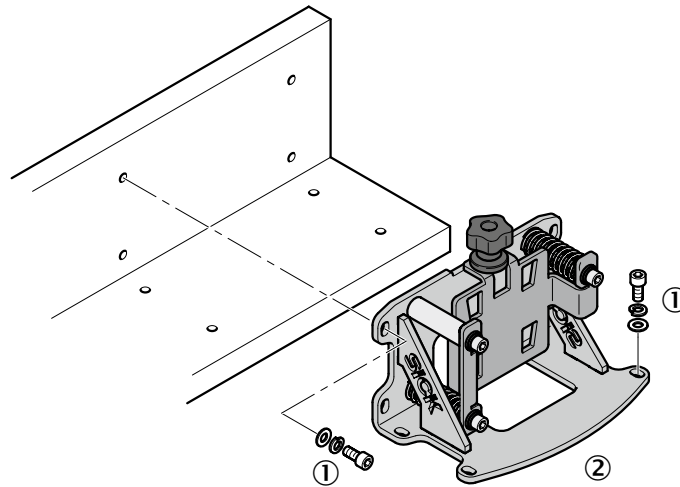
Fig. 12: Mount alignment bracket

1   Mounting screw M5
2   Alignment bracket

2. Turn out knurled screw from the alignment bracket.

3. Move distance measuring device into the alignment bracket.
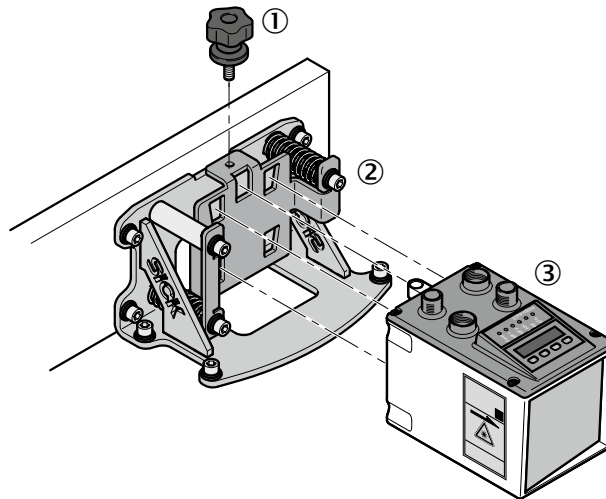
Fig. 13: Mount distance measuring device

1   *Knurled screw*
2   *Alignment bracket*
3   *Distance measuring device*

4. Attach distance measuring device via the knurled screw.
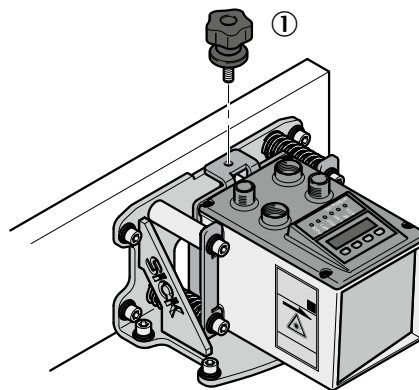
Fig. 14: Attach distance measuring device with the knurled screw

1   *Knurled screw*

7.8   Distance measuring device above alignment bracket

Align the distance measuring device with the alignment bracket according to the following figures. The sensor light spot must hit the center of the reflector.

Alignment in X-direction
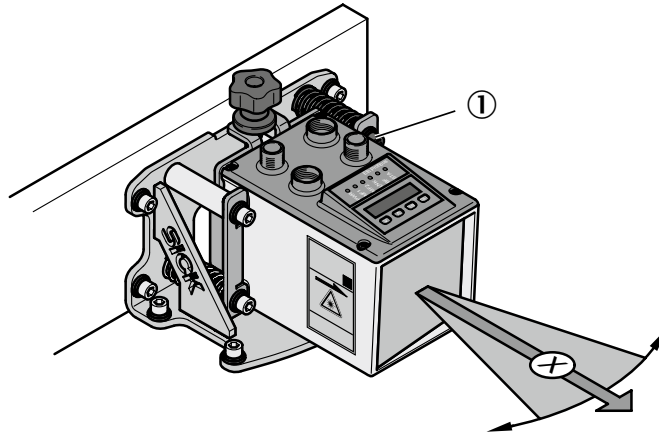
Fig. 15:   Align distance measuring device in X-direction using the alignment bracket

1   Set screw to align the distance measuring device in X-direction

Alignment in Y-direction
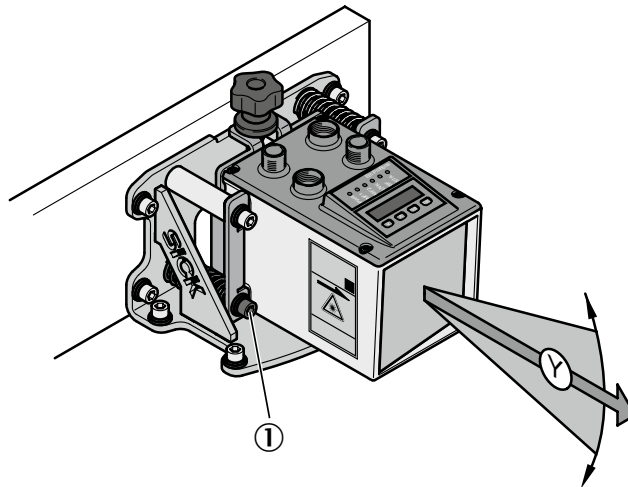
Fig. 16:   Align distance measuring device in Y-direction using the alignment bracket

1   Set screw to align the distance measuring device in Y-direction

8 Electrical connection

8.1 Safety

Wrong supply voltage

ATTENTION!

Device damage from wrong supply voltage!

Incorrect supply voltage may cause damage to the device.

Therefore:

• Only operate the distance measuring device with a protected low voltage and secure electrical insulation of protection class III.

Work under voltage

ATTENTION!

Device damage or unintended operation by work under voltage!

Working under voltage may cause unintended operation.

Therefore:

• Only perform wiring work in the powered down condition.

• Line connections must only be established and disconnected with the supply voltage switched off.

8.2 Wiring Notes

ATTENTION!

Fault from improper wiring!

Improper wiring may cause malfunctions in operation.

Therefore:

• Only use shielded cables with twisted pair wires.

• Observe wiring notes.

WARNING!

Risk of damage to the device resulting from a non-grounded supply voltage or equipotential bonding currents!

A non-grounded supply voltage or potential differences between the supply voltage GND and the distance measuring device housing may result in the device sustaining damage.

For this reason:

- Only operate with a grounded supply voltage.

- Ensure low-impedance and current-carrying equipotential bonding.

NOTE!

→ Ready-made cables, see page 113, chapter 15.2.

All electrical connections of the distance measuring device DL100 Pro are M12 round plugs.

The connection plugs of the distance measuring device are compatible to the SpeedCon™-quick connections and standard-M12 screw connections.

The PROFIBUS cable shields are connected to each other via the PROFIBUS plugs.

Protection class IP65 is only achieved with screwed plug connectors or cover caps.

Observe the following notes for wiring:

- A proper and complete shielding concept is required for interference-free function.

- The cable shield must be applied on either side in the control cabinet and the measuring device. The cable shield of the ready-made cables is connected to the knurled nut and thus the measuring device casing.

- Connect the cable shield in the control cabinet with the operating ground on a large cross-section.

- Potential balancing currents through the cable shield must be prevented by suitable measures.

- Do not install the cable in parallel to the other lines, in particular not devices with a high electromagnetic interference, such as frequency converters.
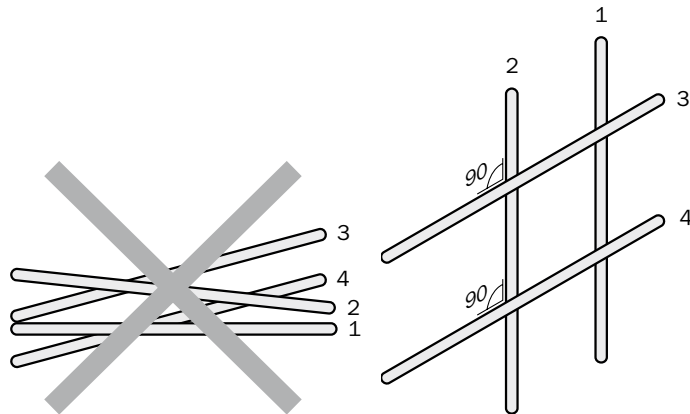
Fig. 17:   Cross lines at a right angle
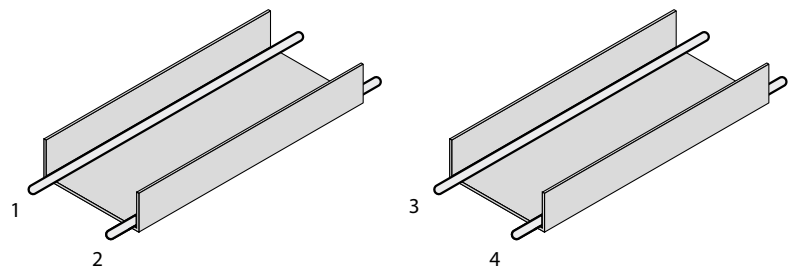
Fig. 18:   Ideal placement –
Place lines in different cable channels
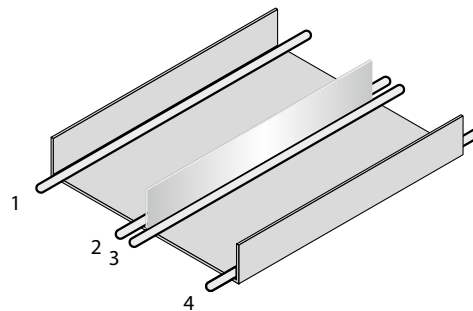
Fig. 19:   Alternative installation – separate lines by metallic separation

1   Cables very sensitive to interference like analog measuring lines

2   Cables sensitive to interference, such as sensor cables, communication signals, bus signals

3   Cables that are sources of interference, such as control cables for inductive loads, motor brakes

4   Cables that are strong sources of interference, such as frequency converter output cables, supply to welding plants; power cables
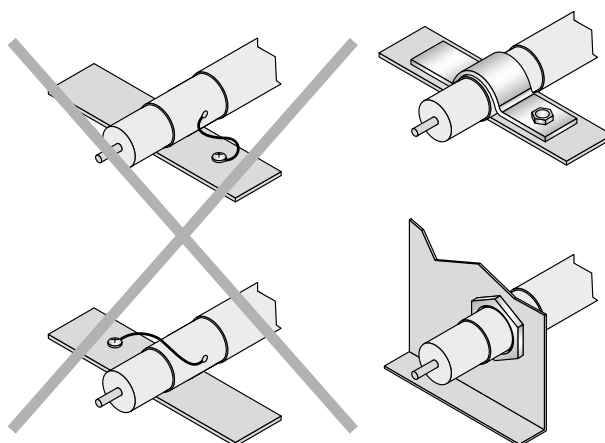
Fig. 20: *Briefly connect shield with a large area - earth both sides*

8.3 Electrically connect distance measuring device

> **NOTE!**
>
> *The distance measuring device has the connection diagram and information on the inputs and outputs on the type sign.*

1. Ensure that there is no voltage applied.

2. Connect the measuring device according to the connection diagram.

   - Connection 1 "Supply voltage"

   - Connection 2 "Ethernet"

   - Connection 3 "PROFIBUS OUT"

   - Connection 4 "PROFIBUS IN"
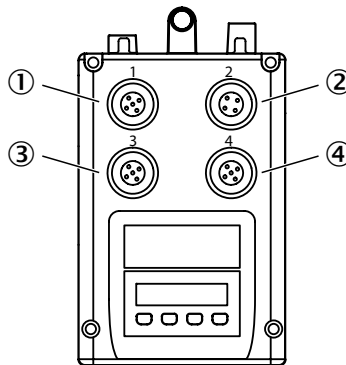
Fig. 21: Position of the electrical connections

1	*Plug for the supply voltage*
2	*Female connector for Ethernet*
3	*Female connector for PROFIBUS OUT*
4	*Plug for PROFIBUS IN*

8.4 Connection diagrams

8.4.1 Connection diagram supply voltage
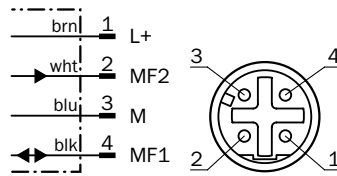
Fig. 22: Connection diagram supply voltage, plug M12, 4-pin, A-coded

Contact	Marking	Wire color	Description
1	L+	brown	Supply voltage: +18 ... +30 V DC
2	MF2	white	Multifunction output MF2
3	M	blue	Supply voltage: 0 V
4	MF1	black	Multifunctional input and output MF1

Table 6: Description plug supply voltage

8.4.2 Connection diagram Ethernet
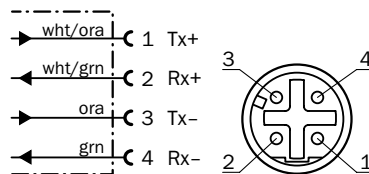
Fig. 23: Connection diagram Ethernet, plug M12, 4-pin, D-coded

Contact	Marking	Wire color	Description
1	Tx+	white/ orange	Send data signal, not inverted
2	Rx+	white/green	Receive data signal, not inverted
3	Tx–	orange	Send data signal, inverted
4	Rx–	green	Receive data signal, inverted

Table 7: Description socket Ethernet

8.4.3 Connection diagram PROFIBUS IN
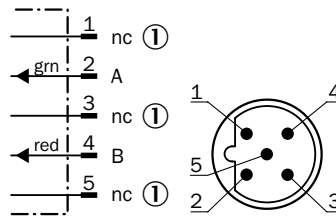
Fig. 24: Connection diagram PROFIBUS IN, plug M12, 5-pin, B-coded

Contact	Marking	Wire color	Description
1	nc	–	–
2	A	green	Data
3	nc	–	–
4	B	red	Data
5	nc	–	–

Table 8: Description plug PROFIBUS IN

8.4.4 Connection diagram PROFIBUS OUT
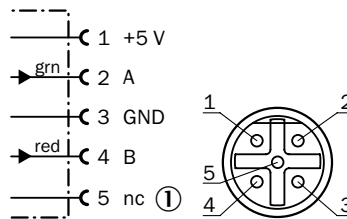
Fig. 25: Connection diagram PROFIBUS OUT, plug M12, 5-pin, B-coded

Contact	Marking	Wire color	Description
1	+5 V	–	Bus voltage +5 V e.for terminating resistor, electrically isolated
2	A	green	Data
3	GND	–	Bus voltage 0 V e.for terminating resistor, electrically isolated
4	B	red	Data
5	nc	–	–

Table 9: Description female connector PROFIBUS OUT

8.5 Terminating resistor

NOTE!

→ PROFIBUS terminating resistors can be procured as accessories, see page 79, chapter 14.2.5.

At the beginning and end of each PROFIBUS segment, the bus is terminated by an active terminating resistor. Interference-free operation requires that the two terminating resistors are always live.

In the distance measuring device, the external terminating resistor is connected to the connection PROFIBUS OUT. → See page 36, chapter 7.4.4.

9 Operation at the measuring device

Damage to operation

ATTENTION!

Damage to the buttons by incorrect handling!

Incorrect handling of the keys may damage the keys. Operation is made difficult or impossible by this.

Therefore:

- Only operate keys with your fingers or a pointer.

- Do not operate buttons with pointed or hard objects.

NOTE!

Once a GSD file is loaded, the parameters entered in the measuring device are overwritten. PROFIBUS address is not overwritten.

9.1 Measured value display

Once the measuring device is supplied with voltage, the display will indicate the current measurement value.

9.2 Choose parameter

Choose a menu, a parameter or an option using the keys ⌷Set and ⌷V. The menu path is indicated in the respective chapter.
→ For the entire menu structure, see page 117, chapter 16.

9.3 Choose option

1. Use the keys ⌷Set and ⌷V to select the desired parameter.

2. Use the key ⌷V or ⌷A to select the desired option.

3. Perform one of the following steps:

   - Push the key ⌷Set to save the changes.

   - Push the key ⌷Esc to cancel the process. The parameter name is displayed again.

4. Perform one of the following steps to return to the measured value display:

   - Push the key ⌷Esc until the measured value is displayed again.

   - Wait for approx. 2 minutes. The display automatically switches back to measured value display without operation of a key. Any settings made are also saved.

9.4 Change value

1. Use the keys (Set) and (V) to select the desired parameter.

2. Push the key (Set). The current value of the parameter is displayed. The first figure on the left flashes.

3. Push the key (A) to increase the figure. Push the key (V) to reduce the figure.

4. Push the key (Set) to save the figure entered. The next figure flashes. Push the key (Esc) to cancel the process.

5. Repeat the steps 3 and 4 until the last figure is saved. The parameter name is displayed.

6. Push the key (Esc) until the measured value is displayed again. Alternatively, you may also wait for a few minutes. The display automatically switches back to measured value display without operation of a key.

9.5 Parameter description

9.5.1 Main menu

The measurement value is displayed by default:

Use the (V)-key to get from the measured value display to the display "Level Bargraph". Use the keys (V) and (A) to browse within the main menu.

Display	Description
Measurement value	Measurement value display in mm
Level Bargraph	Level display (damping value) as bargraph
Level numeric	Level display (damping value) as numeric value → Also see page 31, Table 5.
Temperature	Display of indoor temperature of the measuring device
Operating hours counter	Operating hours display
Warnings	Display of the pending warnings. When a warning is pending, the LED **PWR** flashes orange. When no warnings are pending, no warnings are displayed. → Also see page 101, chapter 12.2, list of possible warnings.
Error	Display of the pending warnings. When an error is pending, the LED **PWR** flashes red. When no errors are pending, no errors are displayed. → Also see page 101, chapter 12.3, list of possible errors.

Table 10: Main menu

9.5.2 Menu "SwVers"

The menu "SwVers" shows all information on the software.

You can get to the menu "SwVers" via the menu path:
Main menu → (Set) → Menu → (V) → SwVers

Push the (Set)-key for at least 2 seconds to get to the "Menu".

Push the (Set)-key so that the parameter "App-uC" is displayed.

Use the keys (V) and (∧) to browse within the menu. Push the (Set)-key to display the respective parameter value.

Parameter	Description
App-uC	Display of the version of the application processor
FPGA	Display of the version of the Field Programmable Gate Array
Com-uC	Indication of the version of the communication processor

Table 11: Menu "SwVers"

9.5.3 Menu "HwVers"

The menu "HwVers" shows all information on the hardware.

You can get to the menu "HwVers" via the menu path:
Main menu → (Set) → Menu → (V) → SwVers → (V) → HwVers

Push the (Set)-key for at least 2 seconds to get to the "Menu".

Push the (Set)-key so that the parameter "HwVers" is displayed.

Parameter	Description
HwVers	Version number display

Table 12: Menu "HwVers"

9.5.4 Menu "BusAdr"

Use the menu "BusAdr" to set the bus address.

You can get to the menu "SwVers" via the menu path:
Main menu → (Set) → Menu → (Set) → Profib → (Set) → BusAdr

Push the (Set)-key for at least 2 seconds to get to the "Menu".

Push the (Set)-key so that the parameter "BusAdr" is displayed.

Use the keys (V) and (∧) to browse within the menu. Push the (Set)-key to display the respective parameter value.

Parameter	Description
BusAdr	Set bus address **Adjustment range** • 001 … 125 **Factory setting** • 006

**Menu "BusAdr"
(continued)**

Options	Description
ResDst	Choose resolution for the output value "Distance" via the digital data interface. The measurement value is multiplied with the resolution. The parameter does not influence the measurement value displayed. **Prerequisite** The parameter is only displayed if the option "Yes" is selected for the parameter "more". **Options** • 0.1 • 0.125 • 1.0 • 10.0 • 100.0 **Factory setting** • 0.1
ResSpd	Choose resolution for the output value "Speed" via the digital data interface. The measurement value is multiplied with the resolution. The parameter does not influence the measurement value displayed. **Prerequisite** • The parameter is only displayed if the option "Yes" is selected for the parameter "more". **Options** • 0.1 • 1.0 • 10.0 • 100.0 **Factory setting** • 0.1 mm/s

Table 13: Menu "BusAdr"

9.5.5 Menu "more"

Use the menu "More" to activate and deactivate the expanded menu view.

You can get to the menu "More" via the menu path:
Main menu → (Set) → Menu → (Set) → Profib → (V) → more

Push the (Set)-key for at least 2 seconds to get to the "Menu".

Push the (Set)-key. The currently set option is displayed here.

Options	Description
Yes / No	Activate and deactivate expanded menu view. **Options** • Yes • No **Factory setting** • No

Table 14: Menu "More"

9.5.6 Menu "MFx On"

Use this menu to activate and deactivate the multifunction input/output MF1 and the multifunction output MF2.

You can get to the menu "MFx On" via the menu path:
Main menu → (Set) → Menu → (Set) → Profib → (V) → more → (V) → MFx On.

Push the (Set)-key for at least 2 seconds to get to the "Menu".

Push the (Set)-key. The currently set option is displayed here.

Requirements for the display

• Menu "more": Option "Yes"

Options	Description
Enable / Disable	Activate or deactivate multifunction input/output MF1 and multifunction output MF2 **Options** • Enable: Multifunction input/output MF1 and multifunction output MF2 are activated. • Disable: Multifunction input/output MF1 and multifunction output MF2 are deactivated. **Factory setting** • Enable

Table 15: Menu "MFx On"

9.5.7 Menu "MF1"

This menu and the associated submenus can be used to set parameters for the multifunction input/output MF1.

You can get to the menu "MF1" via the menu path:
Main menu → ⑤ᵉᵗ → Menu → ⑤ᵉᵗ → Profib → ⓥ → more → ⓥ → MFx On → ⓥ → MF1.

Push the ⑤ᵉᵗ-key for at least 2 seconds to get to the "menu".

Push the ⑤ᵉᵗ-key so that the parameter "ActSta." is displayed.

Use the keys ⓥ and Ⓐ to browse within the menu. Push the ⑤ᵉᵗ-key to display the respective parameter value.

Requirements for the display

- Menu "more": Option "Yes"

- Menu "MFx On": Option "Enable"

Parameter	Description
ActSta	Select level or flank of the multifunction input/output MF1. **Options** • ActLow: LOW-level at active output (normally closed/NC) or activation of the input at dropping flank • ActHi: HIGH-level at active output (normally open/NO) or activation of the input at rising flank **Factory setting** • ActLow
Functn	Select function for the multifunction input/output. Depending on the selection, the corresponding submenu is displayed. **Options** • Dist: MF1 is used as distance switching output. • Speed: MF1 is used as speed switching output. • Srvice: MF1 is used as service output. • LsrOff: MF1 is used as input to deactivate the laser. • Preset: MF1 is used as input for activation of the preset (overwriting the offset). Offset = Preset value - current measured value. **Factory setting** • Dist
Dist / Speed Srvice / LsrOff / Preset	Depending on the selection for the parameter "Functn", the corresponding submenu is displayed. For parameter description, see the respective table. No further submenu is displayed for the option "LsrOff". When the multifunction input MF1 is active, the laser is switched off.

Parameter	Description
Count	Counts the switching events of the multifunction input/output. The counter is reset by deactivation and activation of the distance measuring device.

Table 16: Menu "MF1"

9.5.8   Submenu "MF1 – Dist"

This submenu is used to parameterize the multifunction output MF1 as distance switching output.

You can get to the menu "Dist" via the menu path:
Main menu → (Set) → Menu → (Set) → Profib → (V) → more → (V) → MFx On → (V) → MF1 → (Set) → Actsta → (V) → Functn → (V) → Dist

Push the (Set)-key for at least 2 seconds to get to the "Menu".

Requirements for the display

• Menu "more": Option "Yes"

• Menu "MFx On": Option "Enable"

• Parameter "Functn": Option "Dist"

Parameter	Description
Limit	Set distance-dependent switching threshold
Hysteresis	Set Hysteresis for the switching threshold

Table 17: Submenu "MF1 – Dist"
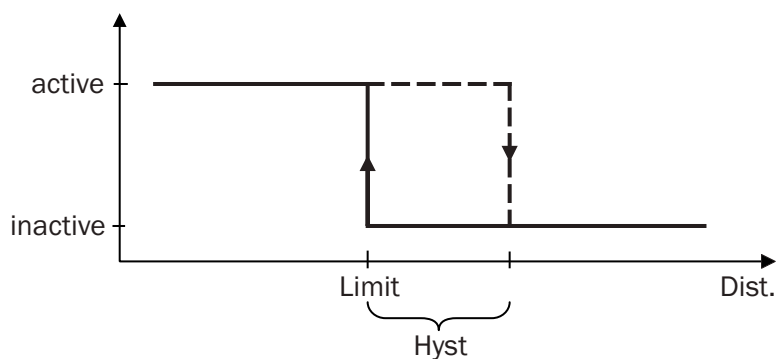
Fig. 26:   Displaying the function "Dist."

Limit   Distance-dependent switching threshold

Hyst: Switching threshold hysteresis

Dist: Measured distance

9.5.9 Submenu "MF1 – Speed"

This submenu is used to parameterize the multifunction output MF1 as speed output.

You can get to the menu "Speed" via the menu path:
Main menu → Ⓢⓔⓣ → Menu → Ⓢⓔⓣ → Profib → Ⓥ → more → Ⓥ →
MFx On → Ⓥ → MF1 → Ⓢⓔⓣ → Actsta → Ⓥ → Functn → Ⓥ → Speed

Push the Ⓢⓔⓣ-key for at least 2 seconds to get to the "Menu".

Requirements for the display

- Menu "more": Option "Yes"

- Menu "MFx On": Option "Enable"

- Parameter "Functn": Option "Speed"

Parameter	Description
Limit	Set speed for the switching threshold The switching output is activated when the current speed exceeds the set speed. The switching hysteresis is set firmly to ± 0.1m/s. **Adjustment range** Range 0.0 ... 9.9 m/s **Factory setting** • 0 [mm]
Sign	Choose the travel direction to be monitored. **Options** • + / –: Once the set speed is exceeded in one direction, the switching output is activated. • +: Once the set speed is exceeded with increasing distance, the switching output is activated. • –: Once the set speed is exceeded with decreasing distance, the switching output is activated. **Factory setting** • + / –

Table 18: Submenu "MF1 – Speed"

9.5.10   Submenu "MF1 – Srvice"

This submenu is used to parameterize the multifunction output MF1 as service output. You may activate (on) or deactivate (off) several options.

You can get to the menu "Srvice" via the menu path:
Main menu → [Set] → Menu → [Set] → Profib → [∨] → more → [∨] → MFx On → [∨] → MF1 → [Set] → Actsta → [∨] → Functn → [∨] → Srvice

Push the [Set]-key for at least 2 seconds to get to the "menu".

Requirements for the display

• Menu "more" Option "Yes"

• Menu "MFx On": Option "Enable"

• Parameter "Functn": Option "Srvice"

Parameter	Description
WrnLsr	Activating and deactivating warning messages when the measuring device must be replaced soon because the laser ages. **Options** • On • Off **Factory setting** • On
WrnLvl	Activate or deactivate warning messages when the damping value is undercut, e.g. at contamination. **Options** • On • Off **Factory setting** • On
WrnTemp	Activate or deactivate warning message when the inner temperature of the measuring device is outside of the permissible thresholds. **Options** • On • Off **Factory setting** • On

Submenu "MF1 – Srvice" (continued)

Parameter	Description
WrnPlb	Activate or deactivate warning when the measurement value is not plausible. Possible reasons may be incorrect measurements, interruption of the light beam, optical interferences or electrical interferences. **Options** • On • Off **Factory setting** • On
NotRdy	Activate or deactivate warning when the laser is not ready for operation. Possible causes may be hardware faults or the laser being switched off. This warning message is also output during initialization. **Options** • On • Off **Factory setting** • On
Heat	Activate or deactivate warning when the heating is switched on. This parameter is only displayed for measuring devices with the option "Heating". **Options** • On • Off **Factory setting** • On

Table 19: Submenu "MF1 – Srvice"

9.5.11   Submenu "Preset" – move to initialization position

The function "Preset" permits automation of initialization of shelf supply devices and other rail-bound vehicles during maintenance, commissioning or exchange.

During initialization, the desired output value is set in a defined position (initialization position) (Preset).

This submenu is used to parameterize the multifunction input MF1 as "Preset function".

NOTE!

When activating the "Preset", the measured value output of the distance measuring device is not available for a short time. We recommend performing the "Preset" in standstill or at very low speeds. The maximum activation time is typically at 10000 cycles.

Main menu → (Set) → Menu → (Set) → Profib → (∨) → more → (∨) → MFx On → (∨) → MF1 → (Set) → Actsta → (∨) → Functn → (∨) → Preset

Push the (Set)-key for at least 2 seconds to get to the "menu".

Requirements for the display

- Menu "More" Option "On"

- Menu "MFx On": Option "Enable"

- Parameter "Functn": Option "Preset"

Parameter	Description
sPrset	The preset serves as initialization value. When the multifunction input MF1 is activated, the preset is used. **Adjustment range** • −300000 ... + 300000 Since the display only has six digits, you may only enter negative values up to "−99999" in the display. **Factory setting** • 10

Table 20: Submenu "MF1 – Preset"

1. Select the function "Preset" for the multifunction input MF1

2. Enter the parameter "Preset" for the desired initialization value.

3. Move the vehicle to the initialization position.

4. Activate the multifunction input MF1, e.g. via a proximity initiator, photoelectric sensor or switch.

5. The output value of the distance measuring device corresponds to the value set for "Preset" at the initialization position.

9.5.12 Menu "MF2"

This menu and the associated submenus can be used to set parameters for the multifunction output MF2.

You can get to the menu "MF2" via the menu path:
Main menu → ⒮ᵉᵗ → Menu → ⒮ᵉᵗ → Profib → ⓥ → more → ⓥ →
MFx On → ⓥ → MF1 → ⓥ → MF2

Push the ⒮ᵉᵗ-key for at least 2 seconds to get to the "menu".

Push the ⒮ᵉᵗ key so that the parameter "ActSta." is displayed.

Use the keys ⓥ and ⓐ to browse within the menu. Push the ⒮ᵉᵗ key to display the respective parameter value.

Requirements for the display

• Menu "more": Option "Yes"

• Menu "MFx On": Option "Enable"

Parameter	Description
ActSta	Select multifunction output level MF2. **Options** • ActLow: LOW-level at active output (opener/NC) • ActHi: HIGH-level at active output (closer/NO) **Factory setting** • ActLow
Functn	Select function for the multifunction output. Depending on the selection, the corresponding submenu is displayed. **Options** • Dist • Srvice • Speed **Factory setting** • Srvice
Dist / Srvice / Speed	Depending on the selection for the parameter "Functn", the corresponding submenu is displayed. For parameter description, see the respective table.
Count	No further submenu is displayed for the option "LsrOff". When the multifunction input MF1 is active, the laser is switched off.

Table 21: Menu "MF2"

Submenu "MF2 – Srvice"

This submenu corresponds to the submenu "Srvice" in the menu "MF1".

→ Also see page 52, Table 19.

Submenu "MF2 – Dist"

This submenu corresponds to the submenu "Dist" in the menu "MF1".

→ Also see page 49, Table 17.

Submenu "MF2 – Speed"   This submenu corresponds to the submenu "Speed" in the menu "MF1".

→ Also see page 50, Table 18.

9.5.13 Menu "Offset"

Set an offset via this menu.

You can get to the menu "Offset" via the menu path:
Main menu → (Set) → Menu → (Set) → Profib → (V) → more → (V) →
MFx On → (V) → (MF1 → (V) → MF2 → (V) →) Offset

Push the (Set) key for at least 2 seconds to get to the "Menu".

Push the (Set) key. The currently set offset is displayed here.

Requirements for the display

• Menu "more": Option "Yes"

Value	Description
Offset	Specify offset. The offset is added to the internally determined measurement value. The offset affects all outputs and the display indication.
	When the "Preset" function is activated, the offset is over-written by triggering of the preset input.
	Adjustment range
	• -300000 ... +300.000 mm
	Factory setting
	• 0 [mm]

Table 22: Menu "Offset"

9.5.14 Menu "SpecFu"

Set special functions via this menu.

You can get to the menu "SpecFu" via the menu path:
Main menu → (Set) → Menu → (Set) → Profib → (V) → more → (V) →
MFx On → (V) → (MF1 → (V) → MF2 → (V) →) Offset → (V) → SpecFu

Push the (Set) key for at least 2 seconds to get to the "Menu".

Push the (Set) key so that the parameter "AvgDst" is displayed.

Use the keys (V) and (∧) to browse within the menu.

Requirements for the display

• Menu "more": Option "Yes"

Parameter	Description
AvgDst	Select filter depth for the distance values. **Options** • Medium • Slow • Fast **Factory setting** • Medium
AvgSpd	Select filter depth for the speed values. **Options** • Medium • Slow • Fast **Factory setting** • Medium
ErrRej	Select time for error suppression. During this time, the old measurement value is output. When there still is no valid measurement value after the time selected for the parameter "ErrRej", the value "0" is output. **Options** • 200ms: Error/warning is indicted when the error is present for longer than 200 ms. • 50ms: Error/warning is indicted when the error is present for longer than 50 ms. • Off Error/warning is indicated at once, without delay. **Factory setting** • 200ms

**Menu "SpecFu"
(continued)**

Parameter	Description
Heat	**Requirements for the display** • Only for versions with heating DL100-xxHxxxxx This menu is used to set the temperature at which the heating is to activate. The hysteresis is set firmly to 2 K. **Adjustment range** • -10 ... +40 °C **Factory setting** • -10 °C
FMode	**Requirements for the display** • Only for versions with frequency switching DL100-xxxBxxxx Select frequency range Frequency switching may be required at parallel placement of several distance measuring devices. → also see page 28, chapter 6.4. **Options** • Mode 1 • Mode 2 • Mode 3 • Mode 4 **Factory setting** • Mode 1
Reset	Perform reset → see page 57, chapter 8.6.

Table 23: Menu "SpecFu"

9.6　Perform reset

1. Select the parameter "Reset" in the menu "SpecFu".
   → See page 56, chapter 8.5.14

2. Push the key ⟨Set⟩.

3. The safety request "Sure?" is displayed.

4. Push the button ⟨Set⟩ to reset the measuring device to the delivery state. Push the key ⟨Esc⟩ to cancel the process.

10 Operation via Ethernet (Ethernet interface)

You may parameterize the distance measuring device via the Ethernet interface with the SICK configuration software SOPAS.

> *NOTE!*
>
> *The configuration program SOPAS can be downloaded from "www.mysick.com".*

> *NOTE!*
>
> *Parameters configured by Ethernet (SOPAS) are overwritten with the PROFIBUS parameters once a GSD file is loaded. The PROFIBUS address is not overwritten.*

10.1 IP-network configuration

IP-network configuration – delivery configuration

The distance measuring device is delivered with the following IP-network configuration:

- Static IP-address
- IP address: 192.168.100.236
- IP network mask: 255.255.255.0
- Standard gateway: 192.168.250.100
- DHCP is off.

Invalid IP address

When the system determines an invalid IP network configuration, the delivery configuration is used instead.

IP address assigned by DHCP server

You may specify that the IP addresses are assigned by a DHCP server.

When address assignment by the DHCP server fails, the distance measuring device uses the last set static IP address. If no static IP address was set yet or if this address is invalid (IP address 0.0.0.0), the delivery configuration is used instead. This process may take a few minutes.

The following causes for failed address assignment by the DHCP server are possible:

- No DHCP server present.
- The DHCP server has an interference.
- The DHCP server was not ready yet when the distance measuring device was switched on.
- The network connection has an interference.

10.2 Ethernet parameter list

10.2.1 Device information

Field "Device information"

Parameter	Description
Device type	Display of the device type **Read/Write access** • Read only
Serial number	Display of the device's serial number **Read/Write access** • Read only

Table 24: Page "Device information" – field "Device information"

Field "Product code"

Parameter	Description
Product code	Display of the product code **Read/Write access** • Read only

Table 25: Page "Device information" – field "Product code"

Field "Software Versions"

Parameter	Description
Application controller	Display of the version of the application processor **Read/Write access** • Read only
Communications controller	Indication of the version of the communication processor **Read/Write access** • Read only
FPGA	Display of the version of the Field Programmable Gate Array **Read/Write access** • Read only

Table 26: Page "Device information" – field "Software version"

Field "Hardware Version"

Parameter	Description
Hardware Version	Displaying the hardware version **Read/Write access** • Read only

Table 27: Page "Device information" – field "Hardware version"

10.2.2 User information

NOTE!

Changes on the page "User information only take permanent effect if they are stored via the button "Storage" in the field "Store user information".

Field "Device name"

Parameter	Description
Name	Enter optional device name for device identification. **Read/Write access** • Read and write **Factory setting** • Empty

Table 28: Page "User information" – field "Device name"

Field "User information"

Parameter	Description
User information 1	Enter optional user information **Read/Write access** • Read and write **Factory setting** • Empty
User information 2	→ See parameter "User input 1".
User information 2	→ See parameter "User input 1".

Table 29: Page "Device information" – field "User information"

Field "Store user information"

Parameter	Description
Storage	You may only enter user information at the user level "Maintenance". This requires the password "esick". **Read/Write access** • Write only

Table 30: Page "User information" – field "Store user information"

10.2.3 Measurment values

Field "Visualisation of measurement values"

Parameter	Description
X-Scale	Enter X-axis for graphic display of the distance value. **Read/Write access** • Read and write **Unit** • s
Y min / Y max	Enter minimum and maximum value for the Y-axis. **Read/Write access** • Read and write **Unit** • m
Auto-Scale Y	Click the button "Auto-Scale Y" to adjust the display to the current measurement values. **Read/Write access** • Read and write **Unit** • m

Table 31: Page "Measured data" – field "Distance value"

Field "Measurement values"

Parameter	Description
Distance	Measurement value "Distance" after filter, corrections and offset **Read/Write access** • Read only **Unit** • m
Velocity	Measurement value "Speed" **Read/Write access** • Read only **Unit** • m/s
Acceleration	Measurement value "Acceleration" **Read/Write access** • Read only **Unit** • m/s^2

Table 32: Page "Measured data" – field "Measurement values"

10.2.4   Diagnostic data

Field	Description
Device state	Display device status: ready for operation, warning(s) active, error active, laser activated, MF1 active and MF2 active **Read/Write access** • Read only
Device warning	Display of current warnings: Laser, temperature, level and plausibility **Read/Write access** • Read only
Device error	Display of current errors: Laser, temperature, level and plausibility **Read/Write access** • Read only
Level	Display of the current reception level (damping value) **Read/Write access** • Read only
Temperature	Display of current internal device temperature **Read/Write access** • Read only **Unit** • °C
Operating hours	Display of current operating hours **Read/Write access** • Read only **Unit** • h

Table 33: Page "Diagnosic data"

10.2.5   Parameter settings

NOTE!

Parameter changes only enter into permanent effect if they are saved via the button "Storage".

Field "General settings"

Parameter	Description
Distance offset	Specify offset value for the distance measurement value. **Read/Write access** • Read and write **Input value** • −300000 ... 300000 **Unit** • mm **Factory setting** • 0
Preset	Specify present value for the distance measurement value. **Read/Write access** • Read and write **Input value** • −300000 ... 300000 **Unit** • mm **Factory setting** • 0

Table 34: Page "Parameter settings" – field "General settings"

Field "Measurement value resolution"

Parameter	Description
Distance resolution	Choose resolution for the output value "Distance". The measurement value is multiplied with the resolution. The parameter does not influence the measurement value displayed. **Read/Write access** • Read and write **Input value** • 0: 0.1 / 1: 0.125 / 2: 1.0 / 3: 10.0 / 4: 100.0 **Factory setting** • 0.1 mm
Resolution speed	Choose resolution for the output value "Speed". The measurement value is multiplied with the resolution. The parameter does not influence the measurement value displayed. **Read/Write access** • Read and write **Input value** • 0: 0.1 / 1: 1.0 / 2: 10.0 / 3: 100.0 **Factory setting** • 1 mm/s

Table 35: Page "Parameter settings" – field "Measured value resolution"

Field "Profibus configuration"

Parameter	Description
Device type	Display of the PNO-ID number of the distance measuring device DL100 Pro: 0x0D34. **Read/Write access** • Write only
Bus address	Specify bus address. **Read/Write access** • Read and write **Input value** • 0 ... 256 **Factory setting** • 6

Table 36: Page "Parameter settings" – field "Profibus configuration"

Field "MF1/MF2 activation"

Parameter	Description
MF activation	Activate and deactivate multifunction input and output MF1 and multifunction output MF2. **Read/Write access** • Read and write **Input value** • 0: off / 1: on **Factory setting** • On

Table 37: Page "Parameter settings" – field "MF1/MF2 activation"

Field "MF1 Function configuration"

Requirements for the display

• Parameter "MF1 activation": Option "Enable"

Parameter	Description
Function	Select function for multifunction input and output MF1. **Read/Write access** • Read and write **Input value** • 0: Distance: → See page 65, field "MF1, Threshold distance underflow" • 1: Velocity: → See page 66, field "MF1, Threshold velocity exceeded" • 2: Service: → See page 67, field "MF1, Service configuration" • 3: Laser • 4: Preset **Factory setting** • Distance

Field "MF1 Function configuration" (continued)

Parameter	Description
Active condition	Select level for the active condition for the multifunction input and output MF1. **Read/Write access** • Read and write **Input value** • 0: high / 1: low **Factory setting** • Low

Table 38: Page "Parameter settings" – field "MF1 Function configuration"

Field "MF1, Threshold distance underflow"

Requirements for the display

• Parameter "MF1 activation": Option "Enable"

• Parameter "Function": Option "Distance"

Parameter	Description
Threshold distance	Enter switching threshold for the multifunction output MF1. **Read/Write access** • Read and write **Input value** • –300000 … 300000 **Unit** • mm **Factory setting** • 1990
Hysteresis distance	Enter hysteresis for switching threshold for the multifunction output MF1. **Read/Write access** • Read and write **Input value** • 1 … 300000 **Unit** • mm **Factory setting** • 10

Table 39: Page "Parameter settings" – field "MF1, Threshold distance underflow"

Field "MF1, Threshold velocity exceeded"

Requirements for the display

- Parameter "MF1 activation": Option "Enable"
- Parameter "Function": Option "Velocity"

Parameter	Description
Threshold velocity	Enter switching threshold for the multifunction output MF1. **Read/Write access** • Read and write **Input value** • 0 ... 15000 **Unit** • mm/s **Factory setting** • 5000
Distance change	Choose the travel direction to be monitored. **Read/Write access** • Read and write **Input value** • 0: Increasing (positive values) / 1: decreasing (negative values) / 2: increasing and decreasing **Factory setting** • increasing and decreasing

Table 40: Page "Parameter settings" – field "MF1, Threshold velocity exceeded"

Field "MF1, Service configuration"

Requirements for the display

- Parameter "MF1 activation": Option "Enable"
- Parameter "Function": Option "Service"

Parameter	Description
Configuration device monitoring	Activating and deactivating warning messages. When the event for the warning message occurs, the multifunction switching output MF1 switches. **Read/Write access** • Read and write **Input value** You may activate several warning messages at once. • Warning measurement stability • Warning level • Warning laser • Warning temperature • Device not ready • Heater state (for device model with heating) **Factory setting** • The warning messages "Measurement stability", "Level", "Laser", "Temperature" and "Device not ready" are activated. The message "Heater state" is deactivated.

Table 41: Page "Parameter settings" – field "MF1, Service configuration"

Field "MF2 Function configuration"

Requirements for the display

- Parameter "MF2 activation": Option "Enable"

Parameter	Description
Function	Select function for the multifunction MF2 output. **Read/Write access** • Read and write **Input value** • 0: Distance / 1: Velocity / 2: Service **Factory setting** • Service
Active state	Select level for the active condition for the multifunction output MF2. **Read/Write access** • Read and write **Input value** • 0: high / 1: low **Factory setting** • Low

Table 42: Page "Parameter settings" – field "MF2 Function configuration"

Field "MF2, Threshold distance underflow" → See page 65, Table 39, "MF1, Threshold distance underflow"

Field "MF2, Threshold exceeded exceeded" → See page 66, Table 40, "MF1, Threshold velocity exceeded"

Field "MF2, Service configuration" → See page 71, Table 50, "MF1, Service configuration"

Field "Number of MF activation"

Parameter	Description
MF1	Counts the switching events of the multifunction input and output MF1. You may reset the counters via the button "Reset MF1". **Read/Write access** • Read and write **Input value** • −2147483648 … 2147483647
M2	Counts the switching events of the multifunction output MF2. You may reset the counters via the button "Reset MF2". **Read/Write access** • Read and write **Input value** • −2147483648 … 2147483647

Table 43: Page "Parameter settings" – field "Number MF activation"

Field "Advanced device functions"

Parameter	Description
Average filter distance	Select filter depth for the distance values. **Read/Write access** • Read and write **Input value** • 0: fast / 1: medium / 2: slow **Factory setting** • Medium
Average filter velocity	Select filter depth for the speed values. **Read/Write access** • Read and write **Input value** • 0: fast / 1: medium / 2: slow **Factory setting** • Medium

Field "Advanced device function" (continued)

Parameter	Description
Error rejection	Select time for error suppression. If there is an error, the measurement value is indicated as "0". **Read/Write access** • Read and write **Input value** • 0: off / 1: 50 ms / 2: 200 ms **Factory setting** • 200 ms

Table 44: Page "Parameter settings" – field "Advanced device function"

Field "Heater"

Requirements for the display

• Devices with the option "Heating" (DL100-xxHxxxxx)

Parameter	Description
Heater thresh-old	Enter power up threshold for heating. **Read/Write access** • Read and write **Input value** • −10 ... +40 **Unit** • °C **Factory setting** • −10

Table 45: Page "Parameter settings" – field "Heater"

Field "Frequency"

Requirements for the display

• Devices with the option "Frequency" (DL100-xxxBxxxx)

Parameter	Description
Freqency set	Select frequency range. **Read/Write access** • Read and write **Input value** • 0: Mode 1 / 1: Mode 2 / 2: Mode 3 / 3: Mode 4 **Unit** • °C **Factory setting** • −10

Table 46: Page "Parameter settings" – field "Frequency"

Field "Store parameter"

Parameter	Description
Storage	Parameter changes only enter into permanent effect if they are saved via the button "Storage". **Read/Write access** • Write only

Table 47: Page "Parameter settings" – field "Store parameter"

Field "Set parameters to default values"

Parameter	Description
Parameter Reset	Click the button "Parameter Reset" to reset the parameters to factory settings. **Read/Write access** • Write only

Table 48: Page "Parameter settings" – field "Set parameters to default values"

10.2.6   Methods

Field	Description
Device reboot	• Click the button "Reboot" to cause the device to restart. **Read/Write access** • Write only
Laser control	Switch the laser on and off as follows: • Use the selection button to select the desired option. • Click the button to perform the option. **Read/Write access** • Write only **Input value** • 0: off / 1: on **Factory setting** • Off
Heating control	Control the heating as follows: • Use the selection button to select the desired option. • Click the button to perform the option. **Read/Write access** • Write only **Input value** • 0: Off / 1: On / 2: Auto **Factory setting** • Auto

Table 49: Page "Methods"

11 PROFIBUS Interface

11.1 Basics

All PROFIBUS participants are connected in a bus structure (line) that may comprise several segments. A segment can contain up to 32 components as masters or slaves.

At the beginning and end of each segment, the bus is terminated by an active terminating resistor. Interference-free operation requires that the two terminating resistors are always live.

In the distance measuring device, the external terminating resistor is connected to the connection BUS OUT. → page 42, chapter 7.5.

If there are more than 32 devices, repeaters must be used to connect the bus segments.

The max. cable length depends on the transmission speed. The distance measuring device supports the following transmission speeds.

Baud rate (Bit/s)	9.6 k	19.2 k	45.45 k	93.75 k	187.5 k
Range [m] /Segment	1200	1200	1200	1200	600

Baud rate (Bit/s)	500 k	1.5 M	3 M	6 M	12 M
Range [m] /Segment	200	200	100	100	100

Table 50: Line length depending on transmission speed

Using repeaters permits longer cables than indicated in the table. We recommend using no more than 3 repeaters in series.

NOTE!

The distance measuring device supports the function "Auto Baud Detection". This function is used to set the distance measuring device to the baudrate specified by the PROFIBUS DP-Master.

11.2 Configure distance measuring device via a configuration program

The distance measuring device is mounted and electrically connected.
→ See page 26, chapter 6 and page 35, chapter 7.

1. Copy the GSD file into the GSD-directory of the configuration program.

2. Update hardware catalogue.

3. DL100 Pro PROFIBUS in the hardware catalogue; PROFIBUS-DP\weitere Feldgeräte\Encoder\ DL100-1x/2x

4. Integrate DL100 Pro into the DP master system.

5. Set PROFIBUS address according to the address set in the distance measuring device. The device address "006" is set in the factory.

6. Select desired GSD modules, e.g. the module "1-Dist/i2w".

7. Enter input and output address of the PLC.

8. Perform parameterization.

9. Perform parameterization in the GSD module. E.g. pick the distance value resolution in the module "1-Dist/i2w".

→ See the operating instructions of the configuration program for steps 1 to 9.

11.3 Set PROFIBUS address

Every PROFIBUS participant must have a unique address assigned for communication.

The address "006" set in the factory may be used for function testing of the device and for connection to a PROFIBUS network in operation. Then you may change this address to integrate other devices.

You may change the PROFIBUS address directly at the measuring panel via the menu "BusAdr". → see page 45, chapter 8.5.4.

11.4 Device master file (GSD)

You may use a PROFIBUS configuration program to configure the distance measuring device for your application. You need the generic station description for this (GSD).

NOTE!

The GSD file for the distance measuring device DL100 Pro can be downloaded from "www.sick.com/dl100_pro".

A generic station description (GSD) contains the description of the properties of a PROFIBUS-device, e.g. the data transfer speed the device supports or the digital information sent to the PLC from the device in what format. The GSD files also include Bitmap files. Using these files, the PROFIBUS device status is illustrated.

The generic station description and the corresponding bitmaps are required for projecting of a PROFIBUS-DP network. Every device receives an ID number by the PROFIBUS user organization (PNO). The name of the device master file is derived from this.

Device name	ID-No.	GSD	Bitmaps
DL100-1x/2x PROFIBUS	0D34 (hex)	SICK0D34.gsd	SICK0D34.bmp

Table 51: Generic station description distance measuring device DL100-1x/2x

11.5 Modules for cyclic data transmission

The distance measuring device is a so-called modular PROFIBUS slave. The sent and received data structure of a modular slave is variable and comprises several individual modules.

The modules can be selected user-defined under consideration of the following conditions:

- Maximum number of modules: 16
- Maximum total length of the process data: 32 byte input and output files each

The distance measuring device can be adjusted flexibly to the different control tasks with the modules. The different modules are described with their respective characteristics in the GSD file.

11.5.1   Module types and module designation

Module types

The distance measuring device offers the following transmission speeds.

Module type	Description
Input modules	Input modules transfer process data to the master. Optionally, input modules may contain configuration data.
Input and output modules	Input and output modules can transfer values to the master and receive values.
Setup modules	Setup modules contain only configuration data Setup modules cannot transfer any process data to the master or receive them from the master.

Table 52: Module types

Designation chart of the modules

<module number>-<description>/<signature>,<description>/<signature>, …

Component	Description
<Description>	The module descriptions are read from the left to the right and indicate the values transported by the module without any gap. A value farther to the left is transferred before a value farther to the right. Input and output values apply independently from each other.
<Signature>	The signature indicates whether the value is an input or output value and how many words or bytes the value comprises. The signature is constructed as follows: <direction><number><unit> <direction> • i: for an input value to the master • o: for an output value from the master to the device <Unit> • b: Bytes • w: Word

Table 53: Description chart description

Example
5-Distance/i2w, Preset Dyn/o2w

Module 5 comprises two values:

• Distance/i2w
Input value to the master, comprising 2 words with the code "Distance"

• Preset Dyn/o2w
Output value from the master to the device, comprising 2 words with the code "Preset Dn"

Example
13-Temp/i1b, Level/i2b, Hrs/i2b

Module 13 comprises three values:

- Distance/i1b
  Input value to the master, comprising 1 byte with the code "Temp"

- Distance/i2b
  Input value to the master, comprising 2 bytes with the code "Level"

- Distance/i2c
  Input value to the master, comprising 2 bytes with the code "Hrs"

Nomenclature

- A byte is an 8-bit value.

- A word is an 16-bit value.

- Consistency means that all values within a module are updated at the same time.

- An input value is cyclically transmitted from device to master (PLC).

- An output value is cyclically transmitted from master (PLC) to device.

- A configuration value is only transferred once by the master to the device when switching on the PROFIBUS device.

Relative address indications

Relative addresses are indicated in the following form:

- <Offset in byte>

- <Offset in byte>.<Bit position within the entry> or

- <Offset in byte>.<Start bit position... end bit position within an entry>.

11.5.2   Module overview

Module number	Overall size	Module type	Table of Contents		
			Code	**Type**	**Size**
1	2 words	Input module	Distance	Input	2 words
			Resolution of the distance value	Configuration	0.1 ... 100 mm
2	1 word	Input module	Distance	Input	1 word
			Resolution of the value	Configuration	0.1 ... 100 mm
3	2 words	Input module	Speed	Input	2 words
			Resolution of the value	Configuration	0.1 ... 100 mm/s
4	4 words	Input module	Distance	Input	2 words
			Speed	Input	2 words
			Resolution of the distance value	Configuration	0.1 ... 100 mm
			Resolution of the speed value	Configuration	0.1 ... 100 mm/s
5	2 words	Input and output modules	Distance	Input	2 words
			Preset dynamic	Output	bit 0 ... 29
			Delete preset	Output	bit 30 ...
			Activate preset	Output	bit 31 ...
			Resolution of the distance and present value	Configuration	0.1 ... 100 mm
6	6 words	Input module	Timestamp	Input	4 words
			Distance	Input	2 words
			Resolution of the distance value	Configuration	0.1 ... 100 mm
7	8 words	Input module	Timestamp	Input	4 words
			Distance	Input	2 words
			Speed	Input	2 words
			Resolution of the distance value	Configuration	0.1 ... 100 mm
			Resolution of the speed value	Configuration	0.1 ... 100 mm/s
10	2 bytes	Input and output modules	Status	Input	16 bit
			Control (Laser Off)	Output	16 bit
13	5 bytes	Input module	Temperature [°C]	Input	1 byte
			Signal level [dB]	Input	2 bytes
			Service hours [10h]	Input	2 bytes

Module number	Overall size	Module type	Table of Contents		
			Code	**Type**	**Size**
20	Empty	Parameter module	MFx	Parameter	enable / disable
			Function MF1	Parameter	See below
			[MF1] Active State	Parameter	High or low
			[MF1 Distance] Threshold [mm]	Parameter	-300000 ... 300000
			[MF1 Distance] Hysteresis [mm]	Parameter	1 ... 300000
			[MF1 Distance] Threshold [mm]	Parameter	0 ... 15000
			[MF1 Speed] Mode	Parameter	[+], [-], [+/-]
			[MF1 Service] Laser Warning	Parameter	Off / on
			[MF1 Service] Level Warning	Parameter	Off / on
			[MF1 Service] Temp. Warning	Parameter	Off / on
			[MF1 Service] Not Ready	Parameter	Off / on
			[MF1 Service] Heating Status	Parameter	Off / on
			Function MF2	Parameter	See below
			[MF2] Active State	Parameter	High or low
			[MF2 Distance] Threshold [mm]	Parameter	-300000 ... 300000
			[MF2 Distance] Hysteresis [mm]	Parameter	1 ... 300000
			[MF2 Speed] Threshold [mm/s]	Parameter	0 ... 15000
			[MF2 Speed] Mode	Parameter	[+], [-], [+/-]
			[MF2 Service] Laser Warning	Parameter	Off / on
			[MF2 Service] Level Warning	Parameter	Off / on
			[MF2 Service] Temp. Warning	Parameter	Off / on
			[MF2 Service] Not Ready	Parameter	Off / on
			[MF2 Service] Heating Status	Parameter	Off / on
22	Empty	Parameter module	Preset Static [mm]	Parameter	-300000 ... 300000
23	Empty	Parameter module	Offset [mm]	Parameter	-300000 ... 300000

Module number	Overall size	Module type	Table of Contents		
			Code	Type	Size
25	Empty	Parameter module	Average filter distance	Parameter	Fast, medium or slow
			Average filter speed	Parameter	Fast, medium or slow
			Error Rejection	Parameter	Off, 50 ms, 200 ms
			Heating temperature threshold [degC]	Parameter	-10 ... 40
			Frequency mode	Parameter	Mode 0, Mode 1 Mode 2, Mode 3
30	8 bytes	Input module	Serial No	Input	8 characters
31	10 words	Input module	Product code	Input	12 characters
			Reserved	Input	8 bytes
32	8 bytes	Input module	Version HW	Input	8 characters
33	10 words	Input module	Version FPGA	Input	12 characters
			Reserved	Input	8 byte
34	10 words	Input module	Version uC	Input	12 characters
			Reserved	Input	8 bytes
35	10 words	Input module	Version uC2	Input	12 characters
			Reserved	Input	8 bytes

Table 54: Module overview

11.6 Module description

11.6.1 Module 1: "Distance /i2w"

Type Input module, 2 words, consistent

Description This module reads the current distance value according to the settings of offset and resolution.

Note If a device error, missing reflector or contamination led to no valid measurement value being present, the value "0" is output for distance and the corresponding bits are set in the status bytes.

Input values

Rel. Adr.	Description
0	Current distance in the current resolution under consideration of offset. Depending on resolution, one digit corresponds to 0.1 to 100 mm. **Type** • Prefix-applied 32 bit digit in a complement of two

Module parameter	Name	Description
	Resolution	Determines the distance value resolution. 1 digit may correspond to 0.1 mm, 0.125 mm, 1 mm, 10 mm or 100 mm.
		Value range
		• 0.1 mm
		• 0.125 mm
		• 1 mm
		• 10 mm
		• 100 mm
		Standard value
		• 0.1 mm

11.6.2 Module 2: "Distance/i1w"

Type   Input module, 1 word, consistent

Description   This module reads the current distance value according to the settings of offset and resolution. In contrast to module 1, this module is only present as a 16 bit figure.

Note   When the permissible value range of 16 bit is exceeded by the distance value, the following cut values are output as error value:

• Value below -32767: -32768 (Hex 0x8000) is output.

• Value above 32766: 32767 (Hex 0x7FFF) is output.

If a device error, missing reflector or contamination led to no valid measurement value being present, the value "0" is output for distance and the corresponding bits are set in the status bytes.

Input values

Rel. Adr.	Description
0	Current distance in the current resolution under consideration of offset. Depending on resolution, one digit corresponds to 0.1 to 100 mm.
	Type
	• Prefix-applied 16 bit digit in a complement of two (cut if applicable)

Module parameter

Name	Description
Resolution	Determines the distance value resolution. 1 digit may correspond to 0.1 mm, 0.125 mm, 1 mm, 10 mm or 100 mm. **Value range** • 0.1 mm • 0.125 mm • 1 mm • 10 mm • 100 mm **Standard value** • 0.1 mm

11.6.3   Module 3: "Speed/i2w"

Type

Input module, 2 words, consistent

Description

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

Note

If a device error, missing reflector or contamination led to no valid measurement value being present, the value "0" is output for distance and the corresponding bits are set in the status bytes.

Input values

Rel. Adr.	Description
0	Current speed in selected resolution. Depending on resolution, one digit corresponds to 0.1m/s to 100 mm/s. **Type** • Prefix-applied 32 bit digit in a complement of two

Module parameter

Name	Description
Resolution	Determines the speed value resolution. 1 digit may correspond to 0.1 mm/s, 1 mm/s, 10 mm/s or 100 mm/s. **Value range** • 0.1 mm/s • 1 mm/s • 10 mm/s • 100 mm/s **Standard value** • 1 mm/s

11.6.4   Module 4: "Distance/i2w, Speed/i2w"

Type	Input module, 4 words, consistent
Description	This module selects both the current distance and the currently determined speed according to the selected resolution and offset.
Note	If a device error, missing reflector or contamination led to no valid measurement value being present, the value "0" is output for distance and the corresponding bits are set in the status bytes.

Input values

Rel. Adr.	Description
0	Current distance in the current resolution under consideration of offset. Depending on resolution, one digit corresponds to 0.1 to 100 mm. **Type** • Prefix-applied 32 bit digit in a complement of two
4	Current speed in selected resolution. Depending on resolution, one digit corresponds to 0.1m/s to 100 mm/s. **Type** • Prefix-applied 32 bit digit in a complement of two

Module parameter

Name	Description
Distance resolution	Determines the distance value resolution; 1 digit may correspond to 0.1 mm, 0.125 mm, 1 mm, 10 mm or 100 mm. **Value range** • 0.1 mm • 0.125 mm • 1 mm • 10 mm • 100 mm **Standard value** • 0.1 mm
Speed resolution	Determines the speed value resolution; 1 digit may correspond to 0.1 mm/s, 1 mm/s, 10 mm/s or 100 mm/s. **Value range** • 0.1 mm/s • 1 mm/s • 10 mm/s • 100 mm/s **Standard value** • 1 mm/s

11.6.5 Module 5: "Distance/i2w, Preset Dyn./o2w"

Type	Input and output module, 2 words, consistent

Description   This module reads the current distance value according to the settings of offset and resolution. The preset Preset-value is changed when the module is written. When the highest value bit (Bit 31) has been set, the preset function can be called to calculate a new offset. Setting Bit 30 resets the present and offset values.

Notes   Every transfer from the module to the device also assumes the preset value into the device, even if Bit 31 has not been set. This can be used to dynamically specify the preset value when there are several calibration distances, if the MF input is used to trigger the preset function.

A preset or offset value changed by this module is always permanently assumed and will not be lost when the device is switched off. Since all changed and unchanged parameters are written into the flash memory, the measurement value output is not available for a short time.

Setting bit 30 resets the preset and offset values to "0". When Bit 30 is set, the setting of Bit 31 is ignored.

If a device error, missing reflector or contamination led to no valid measurement value being present, the value "0" is output for distance and the corresponding bits are set in the status bytes.

Input values

Rel. Adr.	Description
0	Current distance in the current resolution under consideration of offset. Depending on resolution selected, one digit corresponds to 0.1 to 100 mm. **Type** • Prefix-applied 32 bit digit in a complement of two

Output values

Rel. Adr.	Description
0.0 ... 0.29	New preset distance in selected resolution. Depending on the resolution selected, one digit corresponds to 0.1 to 100 mm. **Type** • Prefix-applied 32 bit digit in a complement of two
0.30	• Bit 30 is not set (0): The offset and preset values are left at the original settings. • Bit 31 is set (1): The offset and preset values are reset to "0". **Type** • Bit: 0 or 1

**Output values
(continued)**

Rel. Adr.	Description
0.31	• Bit 31 is not set (0): The value in the Bits 0 … 29 is assumed as new preset value but the offset is not re-calculated. The distance value output is not influenced. • Bit 31 is set (1): The value in the bits 0…29 is assumed as new present value. Additionally, the preset function is called. This function calculates a new offset so that the current distance is now also output as the distance with the newly calculated offset value. All parameters are written in the flash memory. When Bit 30 is set, the Bit 31 is ignored. **Type** • Bit: 0 or 1

Module parameter

Name	Description
Resolution	Determines the distance value resolution; 1 digit may correspond to 0.1 mm, 0.125 mm, 1 mm, 10 mm or 100 mm. **Value range** • 0.1 mm • 0.125 mm • 1 mm • 10 mm • 100 mm **Standard value** • 0.1 mm

11.6.6   Module 6: "Time/i4w, Distance/i2w"

Type

Input module, 6 words, consistent

Description

This module reads the current distance value according to the settings of offset and resolution. Additionally, the module receives the time stamp for the time at which the measurement value was recorded.

Notes

If a device error, missing reflector or contamination led to no valid measurement value being present, the value "0" is output for distance and the corresponding bits are set in the status bytes.

Input values

Rel. Adr.	Description
0	Time stamp for the time of measured value recording. **Type** • Time stamp, 32 Bit seconds
4	Time stamp for the time of measured value recording. **Type** • Time stamp, 32 Bit fractions of a second ($1/2^{32}$)

**Input values
(continued)**

Rel. Adr.	Description
8	Current distance in the current resolution under consideration of offset. Depending on resolution selected, one digit corresponds to 0.1 to 100 mm. **Type** • Prefix-applied 32 bit digit in a complement of two

Module parameter

Name	Description
Resolution	Determines the distance value resolution; 1 digit may correspond to 0.1 mm, 0.125 mm, 1 mm, 10 mm or 100 mm. **Value range** • 0.1 mm • 0.125 mm • 1 mm • 10 mm • 100 mm **Standard value** • 0.1 mm

11.6.7   Module 7: "Time/i4w, Distance/i2w/Speed/i2w"

Type

Input module, 8 words, consistent

Description

This module reads the current distance and speed. The distance is read according to the settings of offset and resolution. The speed is read according to the settings of offset and resolution. Additionally, the module receives the time stamp for the time at which the measurement value was recorded.

Notes

If a device error, missing reflector or contamination led to no valid measurement value being present, the value "0" is output for distance and speed, and the corresponding bits are set in the status bytes.

Input values

Rel. Adr.	Description
0	Time stamp for the time of measured value recording. **Type** • Time stamp, 32 Bit seconds
4	Time stamp for the time of measured value recording. **Type** • Time stamp, 32 Bit fractions of a second $(1/2^{32})$

**Input values
(continued)**

Rel. Adr.	Description
8	Current distance in the current resolution under consideration of offset. Depending on resolution selected, one digit corresponds to 0.1 to 100 mm. **Type** • Prefix-applied 32 bit digit in a complement of two
12	Current speed in the current resolution under consideration of offset. Depending on the selected resolution, one digit corresponds to 0.1m/s to 100 mm/s. **Type** • Prefix-applied 32 bit digit in a complement of two

Module parameter

Name	Description
Distance resolution	Determines the distance value resolution; 1 digit may correspond to 0.1 mm, 0.125 mm, 1 mm, 10 mm or 100 mm. **Value range** • 0.1 mm • 0.125 mm • 1 mm • 10 mm • 100 mm **Standard value** • 0.1 mm
Speed resolution	Determines the speed value resolution; 1 digit may correspond to 0.1 mm/s, 1 mm/s, 10 mm/s or 100 mm/s. **Value range** • 0.1 mm/s • 1 mm/s • 10 mm/s • 100 mm/s **Standard value** • 1 mm/s

11.6.8 Module 10: "Status/i2b, Control/o2b"

Type	Input and output module, 2 bytes
Description	This module reads the status bytes of the device and writes the control bytes into the device.

Input values

Rel. Adr.	Description
0.0	Bit = 1: Plausibility warning Measured values are impaired. Occurrence of an error is likely. **Type** • 1 bit
0.1	Bit = 1: Temperature warning The ambient temperature is only just within the permissible range. Occurrence of an error is likely. **Type** • 1 bit
0.2	Bit = 1: Signal level warning The measured signal level is close to the permissible range. Occurrence of an error is likely. **Type** • 1 bit
0.3	Bit = 1: Laser warning The laser has reached its service life. Occurrence of an error is likely. **Type** • 1 bit
0.4	Bit = 1: Plausibility error No valid measurement value can be calculated. **Type** • 1 bit
0.5	Bit = 1: Temperature errors The device is also operated outside of the specified temperature range. **Type** • 1 bit
0.6	Bit = 1: Signal level error The measured signal level is too low. **Type** • 1 bit
0.7	Bit = 1: Laser error A laser error has occurred. The laser may have reached the end of its service life. → see page 87, chapter 10.6.9, operating hours **Type** • 1 bit

Input values (continued)

Rel. Adr.	Description
1.0	Bit = 1: Laser off • 1 bit
1.1	Bit = 1: Heating on **Type** • 1 bit
1.2	Bit = 1: At MF1 either an active input level is pending or the output is avtive. **Type** • 1 bit
1.3	Bit = 1: MF2 output is active. **Type** • 1 bit
1.4 ... 1.6	Reserved **Type** • 1 bit
1.7	• Bit = 1: No distance or speed measurement value can be read. • Bit = 0: Current measurement value is valid. **Type** • 1 bit

Output values

Rel. Adr.	Description
0.1 ... 0.7	Reserved **Type** • 1 bit
1.0	• Bit = 1: Deactivate laser • Bit = 0: Activate laser **Type** • 1 bit
1.1 ... 1.7	Reserved **Type** • 1 bit

11.6.9   Module 13: "13-Temp/i1b, Level/i2b, Hrs/i2b"

Type   Input module, 5 bytes , consistent

Description   In this module, diagnosis data can be read from the device.

Input values

Rel. Adr.	Description
0	Device temperature [°C]
	Type
	• Prefix-applied 8 bit digit in a complement of two
1	Device-specific value for the signal reception quality.
	Type
	• Prefix-applied 16 bit digit in a complement of two
3	Operating hours in 10 hour units.
	Type
	• Prefix-applied 16 bit digit in a complement of two

11.6.10 Module 20: "MFx"

Type

Configuration module, no input and output data

Description

This module determines the ratio between the switchable input and output MF1.

Module parameter "MFx"

Name	Description
MFx	Activate or deactivate switching inputs or switching output.
	Value range
	• enable
	• disable
	Standard value
	• Enable

Module parameter "MF1"

Name	Description
MF1 Function	Select function for input and output MF1.
	Value range
	• [Output] Distance Threshold: Output switches when the distance from module parameter "[MF1 Distance] Threshold" was undercut.
	• [Output] Speed Threshold: Output switches when the speed from module parameter "[MF1 Distance] Speed" was exceeded. The direction is determined in the module parameter "[MF1 Speed] mode".
	• [Output] Service: The output switches when at least one of the service bits activated was set.
	• [Input] Laser Off: The measurement laser is deactivated via the input.
	• [Input] Preset Static: "Preset Static" function is activated via the input.
	Standard value
	• [Output] Distance Threshold:

Module parameter "MF1"

Name	Description
[MF1] Active State	Select switching level for input and output MF1. **Value range** • Low • High **Standard value** • Low
[MF1 Distance] threshold [mm]	Enter value of the distance threshold in "mm". **Value range** • –300,000 … 300,000 mm **Standard value** • 1,990 mm
[MF1 Distance] Hysteresis [mm]	Enter hysteresis of the distance threshold in "mm". **Value range** • 1 … 300,000 mm **Standard value** • 10 mm
[MF1 Speed] Threshold	Enter speed threshold. **Value range** • 0 … 15,000 mm/s **Standard value** • 5,000 mm/s
[MF1 Speed] Mode	Select direction for detection in which the speed is exceeded. **Value range** • Negative direction [-] • Positive direction [+] • Both directions [+/-] **Standard value** • Both directions [+/-]
[MF1 Service] Laser Warning	The output switches when the laser module emits a warning. **Value range** • Off • On **Standard value** • On

Module parameter "MF1"
(continued)

Name	Description
[MF1 Service] Level Warning	The output switches when the level is just within the permissible range. **Value range** • Off • On **Standard value** • On
[MF1 Service] Temp. Warning	The output switches when the device temperature is within the threshold range. **Value range** • Off • On **Standard value** • On
[MF1 Service] Plausib. Warning	The output switches when the probability is high that the measured value is not plausible. **Value range** • Off • On **Standard value** • On
[MF1 Service] Not Ready	The output switches when the device is not ready. **Value range** • Off • On **Standard value** • On
[MF1 Service] Heating Status	The output switches when the device heating is on. **Value range** • Off • On **Standard value** • Off

Module parameter "MF2"

Name	Description
MF2 Function	Select function for the output MF2. **Value range** • [Output] Distance Threshold: Output switches when the distance from module parameter "[MF2 Distance] Threshold" was undercut. • [Output] Speed Threshold: Output switches when the speed from module parameter "[MF2 Distance] Speed" was exceeded. The direction is determined in the module parameter "[MF2 Speed] mode". • [Output] Service: The output switches when at least one of the service bits activated was set. **Standard value** • [Output] Service
[MF2] Active State	Select switching level for input and output MF2. **Value range** • Low • High **Standard value** • Low
[MF2 Distance] Threshold [mm]	Enter value of the distance threshold in "mm". **Value range** • −300,000 ... 300,000 mm **Standard value** • 1,990 mm
[MF2 Distance] Hysteresis [mm]	Enter hysteresis of the distance threshold in "mm". **Value range** • 1 ... 300,000 mm **Standard value** • 10 mm
[MF2 Speed] Threshold	Enter speed threshold. **Value range** • 0 ... 15,000 mm/s **Standard value** • 5,000 mm/s
[MF2 Speed] Mode	Select direction for detection in which the speed is exceeded. **Value range** • Negative direction [-] • Positive direction [+] • Both directions [+/-] **Standard value** • Both directions [+/-]

**Module parameter "MF2"
(continued)**

Name	Description
[MF2 Service] Laser Warning	The output switches when the laser module emits a warning. **Value range** • Off • On **Standard value** • On
[MF2 Service] Level Warning	The output switches when the level is just within the permissible range. **Value range** • Off • On **Standard value** • On
[MF1 Service] Temp. Warning	The output switches when the device temperature is within the threshold range. **Value range** • Off • On **Standard value** • On
[MF1 Service] Plausib. Warning	The output switches when the probability is high that the measured value is not plausible. **Value range** • Off • On **Standard value** • On
[MF1 Service] Not Ready	The output switches when the device is not ready. **Value range** • Off • On **Standard value** • On
[MF2 Service] Heating Status	The output switches when the device heating is on. **Value range** • Off • On **Standard value** • On

11.6.11   Module 22: "Setup Preset Static"

Type	Configuration module, no input and output data
Description	This module is used to pre-set the static preset value.
Notes	When module 5 is also active, the preset value is overwritten at once by the input data of module 5.

Module parameter

Name	Description
Distance Preset Static [mm]	Determine distance Preset value. **Value range** • −300000 ... 300000 **Standard value** • 0

11.6.12   Module 23: "Setup Offset"

Type	Configuration module, no input and output data
Description	This module is used to set the initial offset.
Notes	When module 5 is also active, the offset value is overwritten by the calculated offset when the reset function is triggered. The same applies for a switching process by MF1.

Module parameter

Name	Description
Distance Offset [mm]	Determine initial distance offset value. **Value range** • −300000 ... 300000 **Standard value** • 0

11.6.13   Module 25: "Special Functions"

Type	Configuration module, no input and output data
Description	This module can be used to influence the conduct of the measuring algorithm, temperature stability by setting of the temperature threshold for activation of the heating and the frequency mode.

Module parameter

Name	Description
Average Filter Distance	Select filter strength for the distance measurements. **Value range** • Almost The distance value is output nearly unfiltered • Medium: Short error measurements are filtered. • Slow error measurements are mainly smoothed. **Standard value** • Medium:
Average Filter Speed	Select filter strength speed measurement value. **Value range** • Almost The speed value is output nearly unfiltered • Medium: Short error measurements are filtered. • Slow error measurements are mainly smoothed. **Standard value** • Medium:
Error Rejection	Determine time for error suppression. During this time, the old measurement value is output. If there still is no valid measurement after the set time, the value "0" is output. **Value range** • Off • 50ms • 200ms **Standard value** • 200ms
Heating Threshold [degC]	Switching threshold in degrees Celsius, under which the heating is activated **Value range** • –10 ... 40 °C **Standard value** • -10 °C
Frequency Mode	The area "Frequency Mode" only applies for versions with frequency conversion (DL100-2xxBxxxx). Changing the laser transmission frequency to avoid impairment from interference with adjacent devices **Value range** • Mode 0 • Mode 1 • Mode 2 • Mode 3 **Standard value** • Mode 0

11.6.14   Module 30: "Serial No/i8b"

Type	Input module, 8 bytes
Description	This module can be used to request the device serial number.

Input values

Rel. Adr.	Description
0	Display of serial number, Unused characters at the end of the character chain are filled up by zero bytes (0x00). **Type** • 8 ASCII characters

11.6.15   Module 31: "Product Code/i9w"

Type	Input module, 18 bytes
Description	This module can be used to request the device product code.

Input values

Rel. Adr.	Description
0	Display of the product code, e.g. DL100-XXXX. Unused characters at the end of the character chain are filled up by zero bytes (0x00). **Type** • 18 ASCII characters

11.6.16   Module 32: "Version HW/i8b"

Type	Input module, 8 bytes
Description	This module can be used to request the device hardware serial number.
Note	If the value is not present in the device, a zero byte (0x00) is transferred for every character.

Input values

Rel. Adr.	Description
0	Display version number of the device hardware as character chain in the form of "YYYYWWnnnn" "nnnn" is a serial number. **Type** • 8 ASCII characters

11.6.17 Module 33: "Version FPGA/i10w"

Type	Input module, 10 words
Description	This module can be used to request the version number of the device's FPGA firmware.
Note	If the value is not present in the device, a zero byte (0x00) is transferred for every character.

Input values

Rel. Adr.	Description
0	Display version number of the device hardware as character chain in the form of "V00.000.000." **Type** • 12 ASCII characters
12	Reserved **Type** • 8 Byte

11.6.18 Module 34: "Version uC/i10w"

Type	Input module, 10 words
Description	This module can be used to request the version number of the device's main controller firmware.
Note	If the value is not present in the device, a zero byte (0x00) is transferred for every character.

Input values

Rel. Adr.	Description
0	Display version number of the device's main controller firmware as character chain in the form of "V00.000.000." **Type** • 12 ASCII characters
12	Reserved **Type** • 8 Byte

11.6.19 Module 35: "Version uC2/i10w"

Type   Input module, 10 words

Description   This module can be used to request the version number of the device's second controller firmware.

Note   If the value is not present in the device, a zero byte (0x00) is transferred for every character.

Input values

Rel. Adr.	Description
0	Display version number of the device's second controller firmware as character chain in the form of "V00.000.000." **Type** • 12 ASCII characters
12	Reserved **Type** • 8 Byte

11.7   "Preset" – move to initialization position

The function "Preset" permits automation of initialization of shelf supply devices and other rail-bound vehicles during maintenance, commissioning or exchange.

During initialization, the desired output value is set in a defined position (initialization position) (Preset).

NOTE!

When activating the "Preset", the measured value output of the distance measuring device is not available for a short time. We recommend performing the "Preset" in standstill or at very low speeds. The maximum activation time is typically at 10000 cycles.

After restart, the offset value determined in the preset is maintained.

You may perform static or dynamic preset. The static preset is triggered by the multifunction input MF1. The dynamic preset is triggered via the PROFIBUS interface.

Static preset

For performance of a static preset, you will need the modules "20 Setup MFx" and "22 Setup Preset Static".

1. Select "[Input] Preset Static" for the parameter in module 20.

2. Enter the desired initialization values in module 22. The preset value unit corresponds to the settings of the parameter "Resolution".

3. Move the vehicle to the initialization position.

4. Activate the multifunction input MF1, e.g. via a proximity initiator, photoelectric sensor or switch.

5. The output value of the distance measuring device corresponds to the value set for "Preset" at the initialization position.

Dynamic preset

For performance of a dynamic preset, you will need the module "5 Distance/i2w, Preset Dyn/o2w".

1. Send the desired initialization value to the distance measuring device via the bits 0 to 29 of the output data. The preset value unit corresponds to the settings of the parameter "Resolution".

2. Move the vehicle to the initialization position.

3. Trigger the function "Preset" via the bit 31 of the output data. Bit 31 can be set, e.g. by a proximity initiator, a photoelectric sensor, a switch or the control unit.

4. The output value of the distance measuring device corresponds to the value set for "Preset" at the initialization position.

12 Cleaning and maintenance

12.1 Cleaning

ATTENTION!

Damage to the device from improper cleaning!

Improper cleaning may cause damage to the device.

Therefore:

- Do not use any cleaning agents with aggressive contents.

- Do not use any pointed objects for cleaning.

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

The cleaning interval mainly depends on the ambient conditions.

12.2 Maintenance

The distance measuring device DL100 Pro requires the following maintenance work at regular intervals:

Interval	Maintenance work	To be performed by
Cleaning intervals depending on ambience conditions and climate	Cleaning housing	Skilled person
Every 6 months	Check screw and plug connections at regular intervals.	Skilled person

Table 55: Maintenance plan

13 Troubleshooting

The following table describes possible interferences and measures for removal.

Contact the manufacturer for interferences that cannot be removed based on the following description. You can find your local office on the reverse.

General interferences, warnings and errors

The distance measuring device differentiates between general interferences, warnings and errors. General interferences are not displayed. When a warning is pending, the LED **PWR** flashes orange. A measurement value is output When an error is pending, the LED **PWR** flashes red. The measurement value "0" is output.

13.1 LED status indicators

Display	Possible causes	Troubleshooting
The display shows the value "0000".	The measuring device's light spot does not hit the reflector.	Correct alignment between measuring device and reflector.
	The obstacle is in the light path.	Remove obstacle from the light path.
	Distance between distance measuring device and reflector exceeds the maximum scanning range indicated in the technical data. → see page 106, chapter 14.3.	• Decrease the distance between the distance measuring device and the reflector. • Select a distance measuring device with a larger maximum scanning range.
LED **PWR** is not lit. Display is lit.	Measuring device defective.	Send in device for repair.
LED **PWR** flashes orange.	A warning is pending.	→ For possible causes and their removal, see page 101, chapter 12.2.
LED **PWR** flashes red.	An error is pending.	→ For possible causes and their removal, see page 101, chapter 12.3.
LED **BF** is not lit. LED **STA** not lit.	No data traffic	Status right after switching on Wait for a few minutes.
LED **STA** is not lit.	The PROFIBUS address of a device was not correctly entered in the master (PLC).	Correct PROFIBUS address in the master (PLC).
	No module was activated in the device.	Activate at least one module in the device.
LED **BF** is lit.	The PROFIBUS interface was activated. Connection to the master (PLC) not created yet.	• Wait for a few minutes. • Check wiring
LED **BF** flashes.	A bus error is present.	• Check wiring • Check shielding • Check function master (PLC).

Table 56: LED status display

13.2   Warning messages

Display	Meaning / possible causes	Troubleshooting
NoWrn	No warnings	–
wPlb	Measured value not plausible. Light path between measuring device and reflector interrupted.	Observe light spot on the reflector. The light spot must not move from the reflector. If required, re-align measuring device and reflector or use a larger reflector. → For alignment and mounting, see page 26, chapter 6.
	Optical interferences	• Remove optical interferences. • Re-align distance measuring device and reflector. → For alignment and mounting, see page 26, chapter 6.
wLaser	The measurement laser is still operational but at the end of its service life.	Keep replacement device ready.
wLevel	Current damping value is below the recommended damping value. The recommended damping value depends on the distance between measuring device and reflector. → For recommended damping values, see page 31, Table 5.	• Clean external lens surfaces like the reflector and the lens • Decrease the distance between the measuring device and the reflector. • Use a distance measuring device with a higher range. → See page 109, chapter 14.10.
wTemp	Internal device temperature is close to the permissible range. → For the permissible ambient temperature, see page 108, chapter 14.8.	• Check ambience temperature, improve ventilation if applicable. • Shield against radiation heat, e.g. share the measuring device in case of direct solar irradiation. • Use device with heating at low ambient temperatures. • Use cooling housings for high ambient temperatures.

Table 57: Warning messages

13.3   Error messages

Display	Meaning / possible causes	Troubleshooting
NoErr	No error	–
ePlb	Measured value not plausible. Light path between measuring device and reflector interrupted.	Observe light spot on the reflector. The light spot must not move from the reflector. If required, re-align measuring device and reflector or use a larger reflector. → For alignment and mounting, see page 26, chapter 6.
	Optical interferences	• Remove optical interferences. • Re-align distance measuring device and reflector. → For alignment and mounting, see page 26, chapter 6.
eLaser	The service life of a measurement laser is exceeded.	Interchange measuring device.

Display	Meaning / possible causes	Troubleshooting
eLevel	Current damping value is below the warning threshold. The warning threshold depends on the distance between measuring device and reflector. → For recommended damping values, see page 31, Table 5.	• Clean external lens surfaces like the reflector and the lens. • Decrease the distance between the measuring device and the reflector. • Use a distance measuring device with a higher range. → see page 109, chapter 14.10.
eTemp	The internal devicetemperature is outside of the permissible range. → For the permissible ambient temperature, see page 108, chapter 14.8.	• Check ambience temperature, improve ventilation if applicable. • Shield against radiation heat, e.g. shade the measuring device in case of direct solar irradiation. • Use device with heating at low ambient temperatures. • Use cooling housings for high ambient temperatures.

Table 58: Error messages

13.4 PROFIBUS error messages

Display	Meaning / possible causes	Troubleshooting
Device error	Hardware	• Check supply voltage and wiring. → For electrical connection, see page 35, chapter 7. • Switch supply voltage on and off. • Send in measuring device for repair.
	The internal devicetemperature is outside of the permissible range. → For the permissible ambient temperature, see page 108, chapter 14.8.	• Wait for warm-up phase of the measuring device. Let the measuring device cool down. • Check ambience temperature, improve ventilation if applicable. • Shield against radiation heat, e.g. shade the measuring device in case of direct solar irradiation. • Use device with heating at low ambient temperatures. • Use cooling housings for high ambient temperatures.
Measuring error	Light path between measuring device and reflector interrupted.	Keep replacement device ready.
	Current damping value is below the recommended damping value. The recommended damping value depends on the distance between measuring device and reflector. → For recommended damping values, see page 31, Table 5.	Clean external lens surfaces like the reflector and the lens
	Lens or reflector contaminated.	Clean external lens surfaces like the reflector and the lens
	Movement too fast.	Check maximum movement speed.

Display	Meaning / possible causes	Troubleshooting
Pre-failure recognition	The measurement laser is still operational but at the end of its service life.	Keep replacement device ready.
	Current damping value is below the recommended damping value. The recommended damping value depends on the distance between measuring device and reflector. → For recommended damping values, see page 29, table 5.	Clean external lens surfaces like the reflector and the lens
	Lens or reflector contaminated.	Clean external lens surfaces like the reflector and the lens
	The internal devicetemperature is within the threshold range. → For the permissible ambient temperature, see page 106, chapter 14.8.	Check ambient temperature.

Table 59: PROFIBUS error messages

13.5 Return

For efficient processing and quick determination of causes, include the following in your return:

• Information on a contact

• A description of the application

• A description of the error that occurred

13.6 Disposal

Observe the following items for disposal:

• The distance measuring device must not be disposed of in the household waste.

• Dispose of the distance measuring device according to the respective country-specific provisions.

14 Repair

Repairs must only be performed by the manufacturer. The manufacturer's warranty will lapse in case of interruptions and changes to the device.
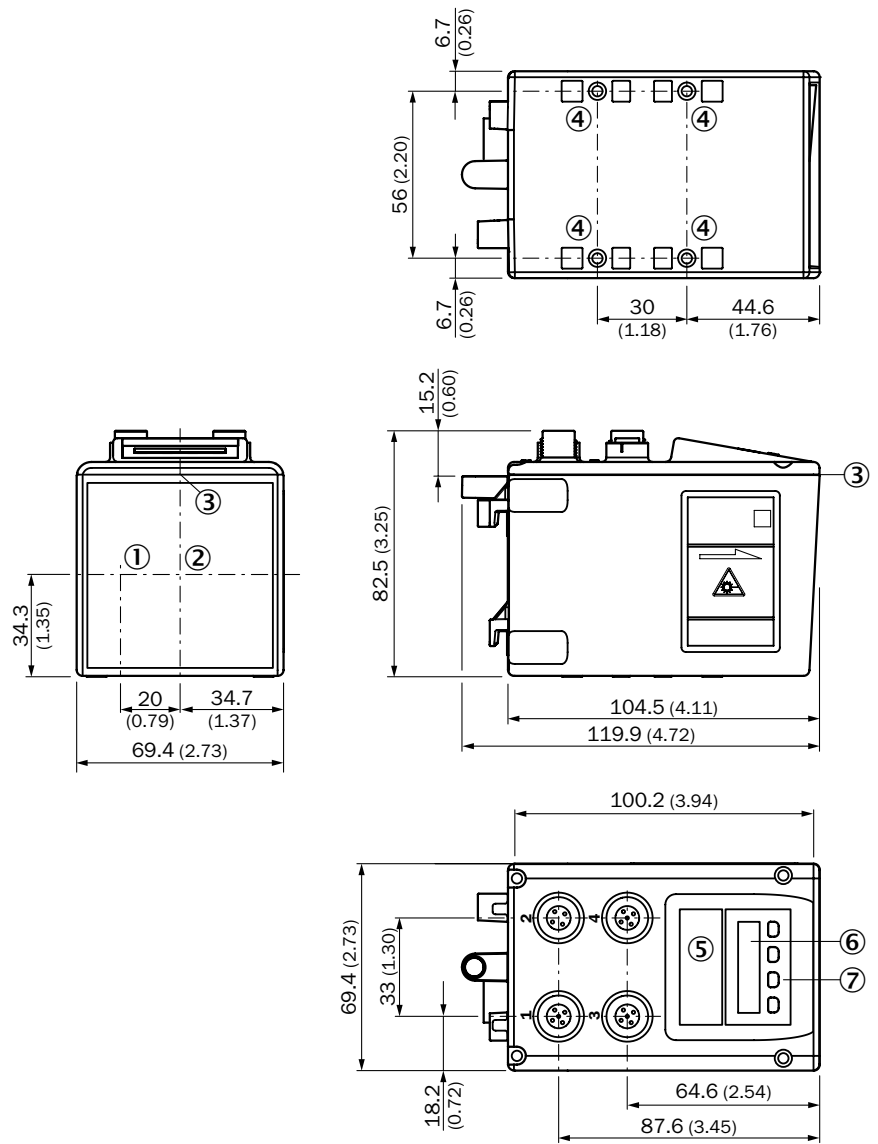
15 Technical data

> *NOTE!*
>
> *You may download, save and print the online datasheet with technical data, dimensions and connection diagrams for your distance measuring device online at "www.sick.com/dl100_pro".*

15.1 Dimensions

All dimensions in mm (inch)

Fig. 27: Dimensions distance measuring device DL100 Pro

1   *Optical axis sender*

2   *Optical axis receiver*

3   *Device zero point*

4   *Threaded mounting hole M5*

5   *LED "Status"*

6   *Display*

7   *Operating elements*

15.2 Laser/optics

Light source	Laser diode, red light
Laser protection class	2 pursuant to EN 60825-1 /CDRH
CW modulation	± 0.85 Po sine-shape modulated
Maximum output	≤ 1.9 mW
Pulse duration	6.8 ns
Wave length	655 nm
Frequency	≥ 90 MHz
Light spot dimensions	Typical 5 mm + (2 mm x distance [m])

Table 60: Laser/Optics

15.3 Performance

Measurement ranges	• DL100–21XXXXXX: 0.15 m … 100 m • DL100–22XXXXXX: 0.15 m … 200 m • DL100–23XXXXXX: 0.15 m … 300 m
Measuring accuracy	• Measuring range 0.15 m … 100 m: ± 2.0 mm • Measuring range 0.15 m … 200 m: ± 2.5 mm • Measuring range 0.15 m … 300 m: ± 3.0 mm
Repeatability	• Measuring range 0.15 m … 100 m: 0.50 mm • Measuring range 0.15 m … 200 m: 1.00 mm • Measuring range 0.15 m … 300 m: 2.00 mm
Initialization time	• Typical 1.5 s • After reflector loss: < 40 ms
Reaction time/dead time	2 ms
Resolution	Adjustable: 0.1 mm / 0.125 mm / 1.0 mm / 10 mm / 100 mm
Output rate	1 ms

Table 61: Performance data

15.4 Supply

Supply voltage U_V)	18 V DC … 30 V DC
Current consumption	• Without heating: < 250 mA at 24 V DC • With heating : < 1.000 mA at 24 V DC
Residual ripple	< 5 V_{ss} within the permissible supply voltage U_V

Table 62: Supply

15.5   Inputs

Inputs	Multifunction input MF1, adjustable
	• Hi > 12 V
	• Lo < 3 V
	→ See page 49, Table 16, parameter "ActSta".
Protective circuit	No, not reverse polarity protected

Table 63: Inputs

15.6   Outputs

Outputs	Multifunction outputs MF1 and MF2, type: B (push/pull), adjustable
	• Hi > UV – 3 V
	• Lo < 2 V
	→ See page 49, Table 16 and page 54, Table 21, parameter "ActSta2.
Maximum output current	Max. 100 mA
Output load	• Capacity: 100 nF
	• Inductive 20 mH

Table 64: Outputs

15.7   Interfaces

PROFIBUS DP	Process data interface
Baudrate PROFIBUS DP	Depending on length of cable
Ethernet	Configuration interface

Table 65: Interfaces

15.8   Ambient conditions

Protection class	III Suitable for operation in PELV systems (Protective Extra Low Voltage - safety extra-low voltage) with secure separation.
Electromagnetic compatibility [1]	EN 61000-6-2, EN 55011, category A
Ambient temperature range	See type-specific data
Storage temperature range	–40 °C ... +75 °C
Enclosure rating	IP65
Air pressure influence	0.3 ppm/hPa
Temperature influence	1 ppm/K
Temperature drift	Typical 0.1 mm/K
Maximum movement speed	15 m/s
Maximum acceleration	15 m/s^2
Vibration resistance (sine)	EN60068-2-6
Noise	EN60068-2-64
Shock resistance	EN 60086-2-27

1) When used in the household area, the device may cause interferences.

Table 66: Ambient conditions

15.9   Constructive setup

Dimensions	→ See page 105, chapter 14.1.
Weight	• Distance measuring device: 800 g • Alignment bracket (optional): 800 g
Materials	• Casing: Cast aluminium GD-AlSi12Cu1 (3.2982.05) • Front screen: PMMA
Connections	M12, SpeedCon™
Display	• 6 points with a 5 x 7 point matrix • Overflow is displayed with the maximum value that can be displayed, –99999 bzw. 999999.

Table 67: Constructive setup

15.10 Device selection

Ambient temperature)	Power consumption at 24 V DC	Measuring range	Accuracy	Repeatability [1]	Interface	Order no.	Type code
[°C]	[mA]	[m]	[mm]	[mm]			
–20 … +55 [2]	<250	0.15 … 100	± 2.0	0.5	SSI	1052684	DL100-21AA2101
					PROFIBUS	1052686	DL100-21AA2102
					RS-422	1052688	DL100-21AA2103
		0.15 … 200	± 2.5	1.0	SSI	1052690	DL100-22AA2101
					PROFIBUS	1052692	DL100-22AA2102
					RS-422	1052692	DL100-22AA2103
		0.15 … 300	± 3.0	2.0	SSI	1052696	DL100-23AA2101
					PROFIBUS	1052698	DL100-23AA2102
					RS-422	1052700	DL100-23AA2103
–40 … +55	<1000	0.15 … 100	± 2.0	0.5	SSI	1052685	DL100-21HA2101
					PROFIBUS	1052687	DL100-21HA2102
					RS-422	1052689	DL100-21HA2103
		0.15 … 200	± 2.5	1.0	SSI	1052691	DL100-22HA2101
					PROFIBUS	1052693	DL100-22HA2102
					RS-422	1052695	DL100-22HA2103
		0.15 … 300	± 3.0	2.0	SSI	1052697	DL100-23HA2101
					PROFIBUS	1052699	DL100-23HA2102
					RS-422	1052701	DL100-23HA2103

1) Statistic error 1 σ

2) For temperatures below –10 °C, a start-up time of typically 7 minutes is required.
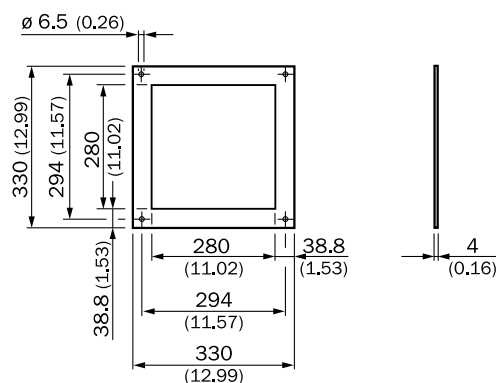
Table 68: Device selection

NOTE!

→ For more information on the versions "SSI" and RS-422", see "www.sick.com/dl100_pro".

16 Accessories
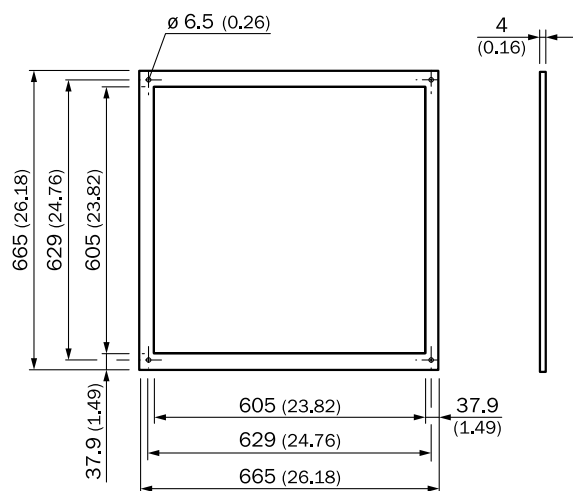
16.1   Reflectors and reflective tape

16.1.1   Reflectors

All dimensions in mm (inch)

Fig. 28:   Reflector 0.3 x 0.3 m² Diamond Grade, mounted
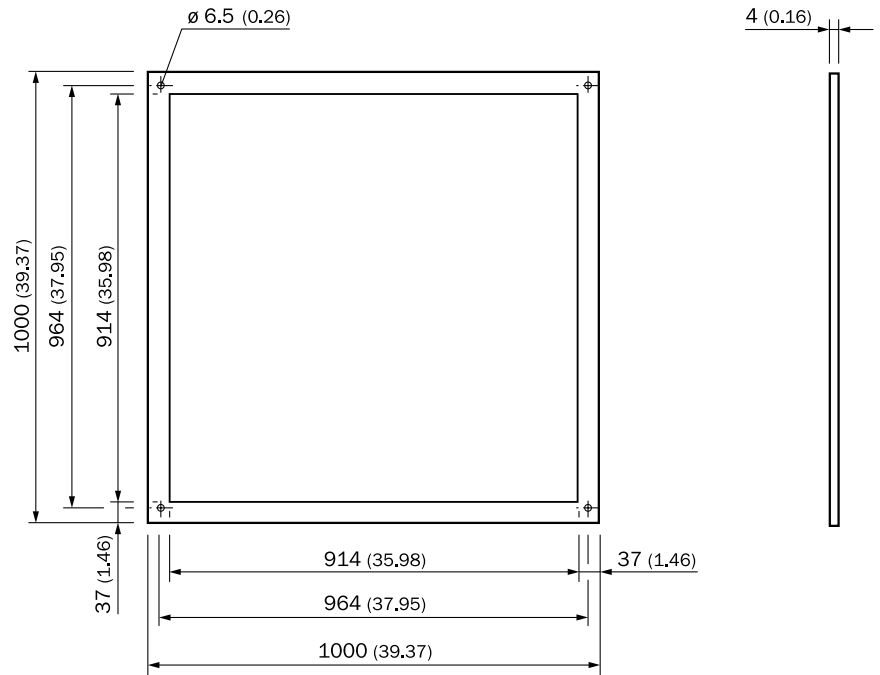
Description	Reflector 0.3 x 0.3 m² Diamond Grade, mounted on base plate ALMG3
Type	PL240DG
Part no.	1017910

All dimensions in mm (inch)

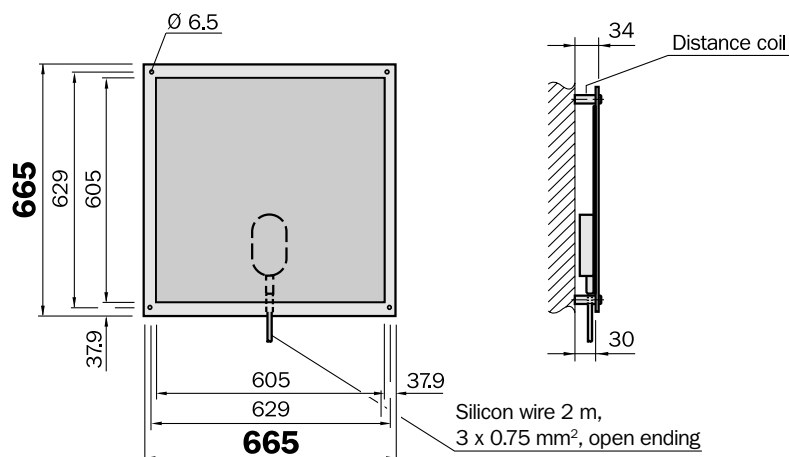*Fig. 29: Reflector 0.6 x 0.6 m² Diamond Grade, mounted*

Description	Reflector 0.6 x 0.6 m² Diamond Grade, mounted on base plate ALMG3
Type	PL560DG
Part no.	1016806

ø 6.5 (0.26) 4 (0.16)

1000 (39.37)
964 (37.95)
914 (35.98)

37 (1.46)

914 (35.98) 37 (1.46)
964 (37.95)
1000 (39.37)

All dimensions in mm (inch)

Fig. 30: Reflector 1.0 x 1.0 m² Diamond Grade, mounted

Description	Reflector 1.0 x 1.0 m² Diamond Grade, mounted on base plate ALMG3
Type	PL880DG
Part no.	1018975

ø 6.5 (0.26) 34 (1.34) Distance coil

330 (12.99)
294 (11.57)
280 (11.02)

38.8 (1.53)

280 (11.02) 38.8 (1.53)
294 (11.57)
330 (12.99)

30 (1.18)

Silicon wire 2 m, 3 x 0.75 mm², open ending
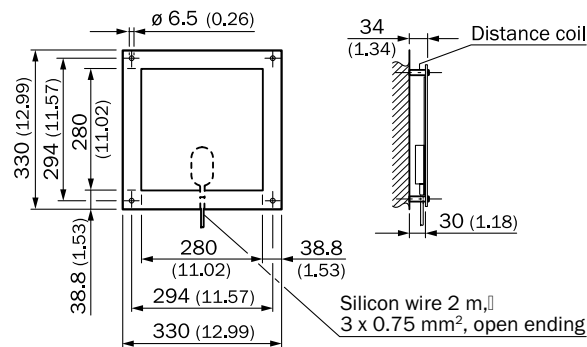
All dimensions in mm (inch)

Fig. 31: Reflector 0.3 x 0.3 m² Diamond Grade, mounted, including heating

Description	Reflector 0.3 x 0.3 m² Diamond Grade, mounted, on base plate ALMG3, including controlled heating +20 °C, 230 V AC, 200 W, IP 64
Type	PL240DG-H
Part no.	1022926

Fig. 32: Reflector 0.6 x 0.6 m² Diamond Grade, mounted, including heating

Description	Reflector 0.6 x 0.6 m² Diamond Grade, mounted, on base plate ALMG3, including controlled heating +20 °C, 230 V AC, 200 W, IP 64
Type	PL560DG-H
Part no.	1023888

16.1.2 Reflevtive tape

Fig. 33: "Diamond grade" reflective tape

Description	"Diamond grade" reflective tape, size customizable
Type	REF-DG-
Part no.	4019634

Description	"Diamond grade" reflective tape, curve 749 x 914 mm²
Type	REF-DG-
Part no.	5320565

16.2   Connection systems

16.2.1   PROFIBUS terminating resistor
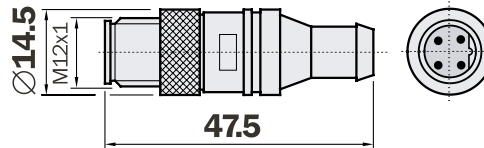
Fig. 34: PROFIBUS terminating resistor M12, B-code

Description	PROFIBUS terminating resistor M12, B-code
Type	PR-STE-END
Part no.	6021156

16.2.2   PROFIBUS cable plug and socket
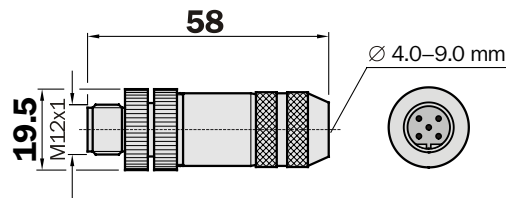
Fig. 35: PROFIBUS BUS OUT, M12, 5-pin, B-code, shielded

Description	PROFIBUS BUS OUT, M12, 5-pin, B-code, shielded
Type	PR-STE-1205-G
Part no.	6021354
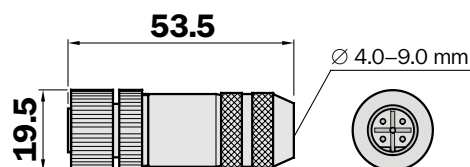
Fig. 36: PROFIBUS BUS OUT, M12, 5-pin, B-code, shielded

Description	PROFIBUS BUS OUT, M12, 5-pin, B-code, shielded
Type	PR-DOS-1205-G
Part no.	6021353

16.2.3   PROFIBUS lines

Description	PROFIBUS line, 2 x 0.34 mm^2, yard goods
Type	LTG-2102-MW
Part no.	6021355
Temperature range	• Mobile: -5 ... +80 °C
	• Stationary: -40 ... +80 °C
Sleeve	• PUR violet
	• Diameter: 8 mm
Shield	AL-PT-foil

16.2.4   PROFIBUS cable socket, straight, with cable
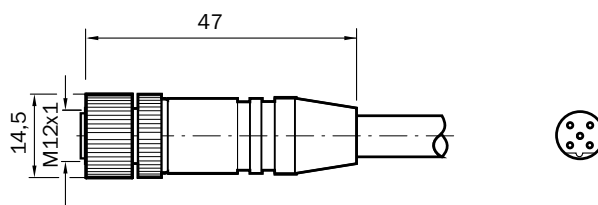
Fig. 37:   BUS IN, cable socket with PROFIBUS cable, 5 m, B-code

Description	BUS IN, cable socket with PROFIBUS cable, 5 m, B-code, shielded
Type	DOL-12PR-G05
Part no.	6026006
Description	BUS IN, cable socket with PROFIBUS cable, 10 m, B-code, shielded
Type	DOL-12PR-G12
Part no.	6026008

16.2.5   PROFIBUS cable socket, straight, with cable
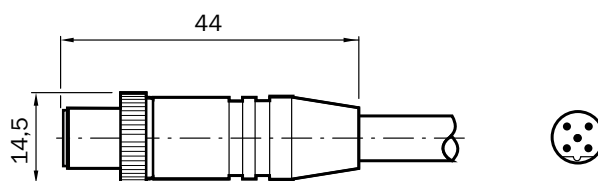
Fig. 38:   BUS OUT, cable socket with PROFIBUS cable, 5 m, B-code

Description	BUS OT, cable plug with PROFIBUS cable, 5 m, B-code, shielded
Type	STL-12PR-G05
Part no.	6026005

Description	BUS OT, cable plug with PROFIBUS cable, 10 m, B-code, shielded
Type	STL-12PR-G10
Part no.	6026007

16.3   Mounting systems
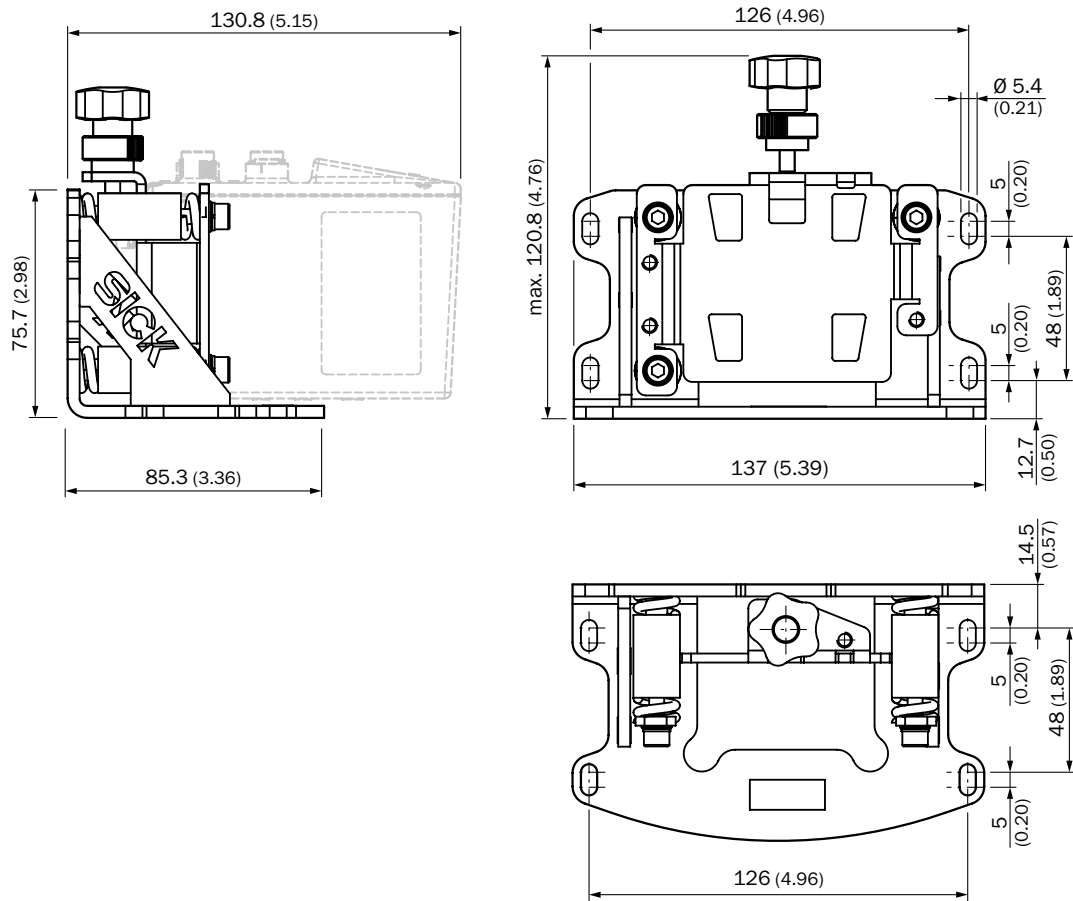
All dimensions in mm (inch)

Fig. 39:   Alignment bracket

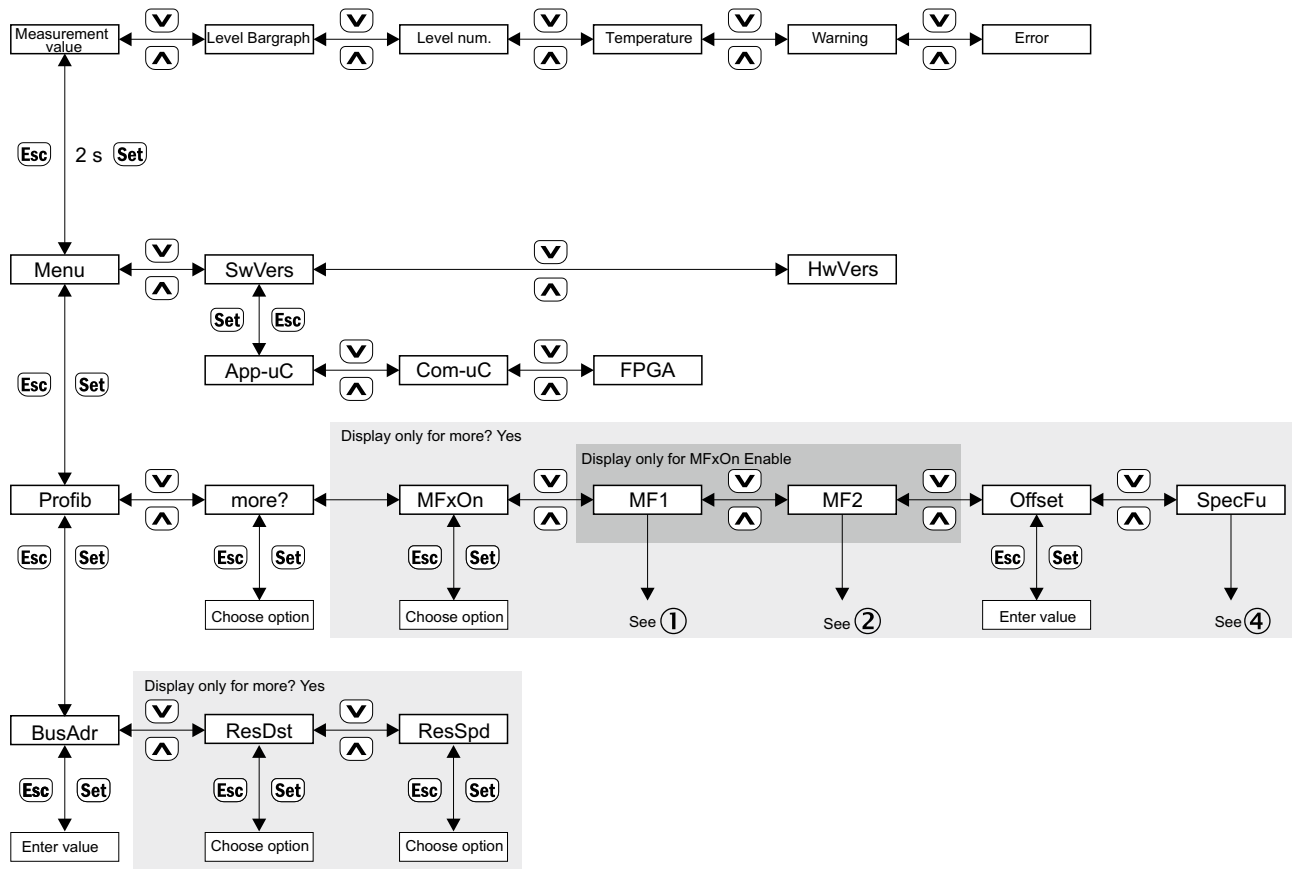| Description	Alignment bracket
Type	BEF-AH-DX100
Part no.	2058653
Material:	Zinc-plated steel sheet

16.4 Other accessories
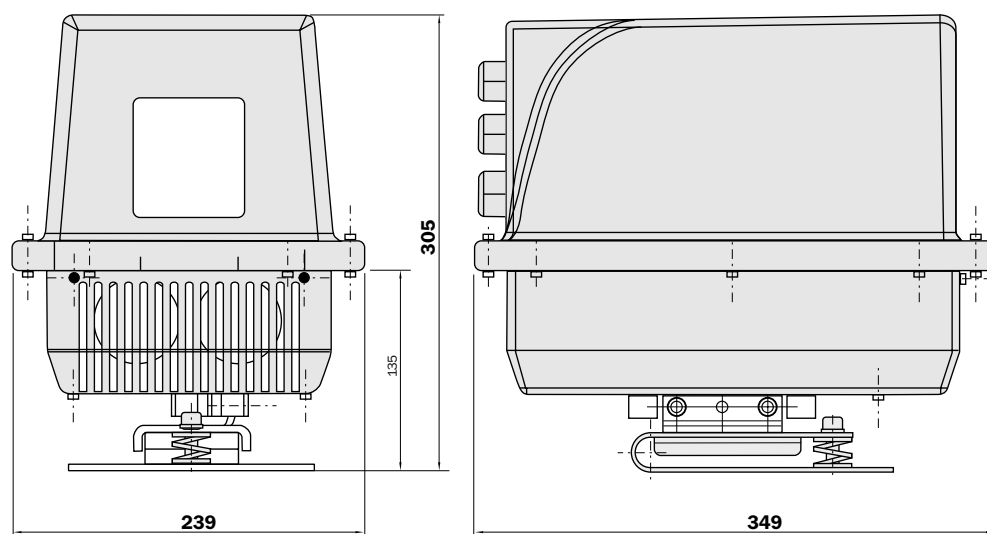
Fig. 40: Cooling Casing

Description	Cooling Casing
Type	TPCC-Dx100
Part no.	6036180
Material:	Glass-fiber reinforced plastic (GFK)
Operating ambience temperature	–20 ... +75 °C (short-term +80 °C)
Supply voltage	24 V DC ± 20 %
Power intake	15 A at 24 V DC
Enclosure rating	IP 54

17 Menu structure

③ Dist
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Limit ⌄⌃ Hyst
[Esc] [Set]   [Esc] [Set]
Choose option   Choose option

③ Speed
[Esc] [Set]
Limit ⌄⌃ Sign
[Esc] [Set]   [Esc] [Set]
Set value   Choose option

③ Preset
[Esc] [Set]
sPrset
[Esc] [Set]
Enter value

③ Srvice
[Esc] [Set]
WrnLsr ⌄⌃ WrnLvl ⌄⌃ WrnTemp ⌄⌃ WrnPlb ⌄⌃ NotRdy ⌄⌃ Heat
[Esc] [Set]   [Esc] [Set]   [Esc] [Set]   [Esc] [Set]   [Esc] [Set]   [Esc] [Set]
Choose option   Choose option   Choose option   Choose option   Choose option   Choose option

④ SpecFu
[Esc] [Set]
AvgDst ⌄⌃ AvgSpd ⌄⌃ ErrRej ⌄⌃ Heat ⌄⌃ FreqSet ⌄⌃ Reset
Only versions DL100-xxHxxxxx   Only versions DL100-xxxBxxxx
[Esc] [Set]   [Esc] [Set]   [Esc] [Set]   [Esc] [Set]   [Esc] [Set]   [Esc] [Set]
Choose option   Choose option   Choose option   Set value   Choose option   Sure?
[Esc] [Set]
OK

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