LMS12x/LMS13x Security
LMC12x/LMC13x VdS
Laser Measurement Sensors/Systems

Integrator Commissioning Description VdS/VSÖ (certified systems).
Supplement to the operating instructions of LMS1xx product family.
Valid for commissioning according to VdS Guideline and Security Applications.

SICK
Sensor Intelligence.

Software version described

Software/tool	Function	Status
LMS12x/13x LMC12x/13x	Firmware	V 1.15
LMS121/122/123 LMC121/122/123/124	Device specific software module for SOPAS ET	V 01.00.00 or higher
LMS131/132/133 LMC131/132/133	Device specific software module for SOPAS ET	V 01.00.00 or higher
SOPAS ET	Configuration software	V 02.22 or higher

Software access to the LMS/LMC is password protected. In the default delivery status the following passwords are defined:

User level	Password
Operator	–
Operator (maintenance personnel)	main
Integrator (authorized client)	client

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Version of the operating instructions

The latest version of these technical information can be obtained as PDF at **www.mysick.com/en/lms1xx.**

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Abbreviations

CoLa	Communication Language = proprietary SOPAS ET communication language (ASCII = CoLa-A or binary = CoLa-B)
EEPROM	Electrically erasable programmable read-only memory
LED	Light Emitting Diode
LMC	SICK AG laser measurement system VdS certified
LMS	SICK AG laser measurement sensor
RAM	Random access memory = volatile memory with direct access
ROM	Read-only memory (permanent)
SOPAS ET	SICK OPEN PORTAL for APPLICATION and SYSTEMS ENGINEERING TOOL = configuration software for the configuration of the LMS/LMC
VdS	Formerly "Verband der Sachversicherer e.V." — In 1997 the technical departments of the former organization were transferred to VdS Schadenverhütung GmbH, this is a subsidiary of the Gesamtverband der Deutschen Versicherungswirtschaft e.V. (GDV).
VSÖ	Verband der Sicherheitsunternehmen Österreichs (Association of Austrian Security Companies)

Tables

Figures

1　About this document

Please read this chapter carefully before working with this documentation and the laser measurement sensor (LMS) and/or the laser measurement system (LMC), the certified variant.

1.1　Function of this document

This technical information provides installers with instructions on the laser measurement sensors/laser measurement systems:

- LMS121/122/123 (without heating for object protection systems — indoor)
- LMS131/132/133 (with heating and full outdoor capability for object protection systems — outdoor)
- LMC121/122/123/124 (without heating for VdS object protection systems — indoor)
- LMC131/132/133 (with heating for VdS object protection systems — semi-outdoor)

LMS12x/13x　These Integrator Commissioning Description describe the technical options for general use in object security (SECURITY).

LMC12x/13x　LMC12x/LMC13x (Laser Measuring System Certified) are VdS compliant.

For certified systems, the installation instructions describe the VdS requirements and test methods used for the SICK sensors listed below.

The following VdS guidelines apply:

- Vds 2117 requirement (infrared light beams = LS) according to test method VdS 2485
- Vds 2312 requirement (motion detectors = BM)

Testing is carried out for infrared light beam class C environmental class II (indoor).

A distinction is made in different application environments.

- Environmental class II according to VdS is generally designated as "indoor" (LMC12x).
- Environmental class IVa according to VdS is generally designated as "outdoor" (LMC13x).

Important　The laser measuring sensor (LMS) and laser measuring system (LMC) are referred to as "detection sensor" and "laser detector" below if no clear distinction is required. Specific information about the Security and VdS families are indicated in the left column (symbols) and described in detail in the right column. The information applies to both families if not stated otherwise.

1.2　Target group

The intended target group for this document is people in the following positions:

Installers with certified approval for VdS-compliant mounting and installation.

1.3　Depth of information

This technical information is based on the operating instructions "Laser Measurement Systems of the LMS100 Product Family", part no. 8012471/UT27, engl. edition. The latest version of these operating instructions can be obtained as PDF at **www.mysick.com**/**en**/ **lms1xx**.

These installer instructions are limited to the information necessary for VdS-compliant installation or a security installation.

For the certified systems the installer instructions describe the VdS requirements and test methods implemented for the SICK systems LMC12x and LMC13x.

They contain the following information on the LMS/LMC:

- product description
- mounting
- electrical installation
- commissioning and configuration
- ordering information

Notes on device (LMS12x part no. 8013554 and LMS13x part no. 8013727) with the connection diagrams are also included with the devices.

1.4   Symbology used

Recommendation   Recommendations are designed to give you assistance in the decision-making process with respect to a certain function or a technical measure.

Important   Sections marked "Important" provide information about special features of the device.

Explanation   Explanations provide background knowledge on technical relationships.

MENU COMMAND   This typeface indicates a term in the SOPAS ET user interface.

Terminal output   This typeface indicates messages that the LMS/LMC outputs via its interfaces.

➢ **Take action ...**   Here you must do something. This symbol indicates an instruction to perform an action that contains only one action or actions in warnings where a specific sequence does not need to be followed. Instructions to perform actions that contain several steps in a specific sequence are numbered.

This symbol refers to additionally available documentation.

Software notes show where you can make the appropriate settings and adjustments in the SOPAS ET configuration software.

> ## *HINWEIS*

Note!

A note indicates potential hazards that could involve damage or degradation of the functionality of the LMS/LMC or other devices.

> ## ⚠ WARNUNG

Warning!

A warning indicates an actual or potential hazard. They are designed to help you to prevent accidents.

The safety symbol beside the warning indicates the nature of the risk of accident, e.g. due to electricity. The warning category (DANGER, WARNING, CAUTION) indicates the severity of the hazard.

➢   Read carefully and follow the warning notices!

2   For your safety

This chapter deals with your own safety and the safety of the equipment operators.

➢ Please read this chapter carefully before working with the LMS/LMC.

This technical information is based on the operating instructions "Laser Measurement Systems of the LMS100 Product Family" part no. 8012471/UT27, engl. edition. The latest version of these operating instructions can be obtained as PDF at **www.mysick.com**/**en**/ **lms1xx**.

➢ Follow all notes and warnings in the operating instructions on which these instructions are based as well as the notes and warnings in this technical information!

3   Getting started with the LMS/LMC

3.1   Connection buildup

1. Connect the sensor electrically as shown in *chapter 6 "Electrical installation" on page 22*.

2. Establish a connection via Ethernet by connecting the PC and the LMS/LMC.
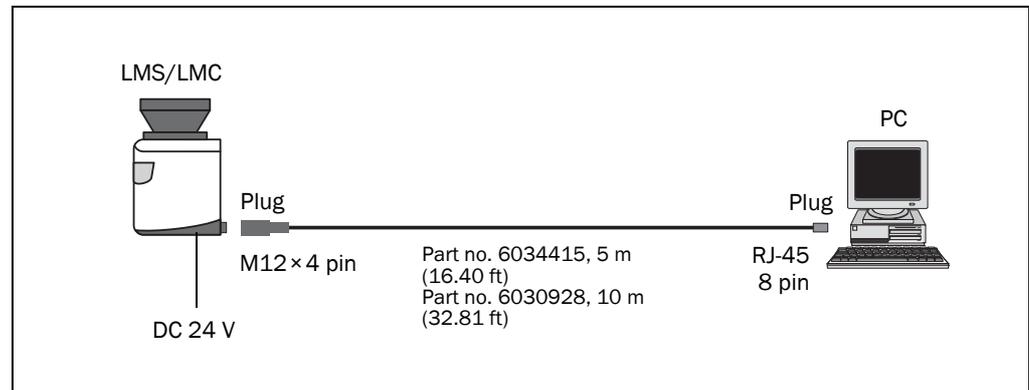
Fig. 1:   LMS/LMC: Ethernet connection using Ethernet cable

3. Insert the installation DVD (if the installation does not start automatically, run the file setup.exe on the DVD). To complete the installation, follow the prompts.

4. Start the configuration software (SOPAS ET) and follow the instructions in the software. A scan is made for SICK systems and the LMS or the LMC are detected with the aid of a scan assistant.

Important   If it is not possible to establish a connection, pay attention to the following notes for Windows XP (the settings are similar for other operating systems). To make changes to the operating system, in general you will need administrator rights on the PC.

HINWEIS

Please document or save the original settings before you make changes to the system settings.

All liability for any faults and damage due to changes to system settings (e.g. to the IP address) is excluded.

➢ Ensure that any "Secure Clients" etc. on your PC/notebook that monitor access are deactivated while the parameters are configured. Check the settings using the START MENU, SETTINGS, NETWORK CONNECTIONS, LOCAL AREA CONNECTION. In the LOCAL AREA CONNECTION STATUS dialog box click PROPERTIES.

Fig. 2:   Local Area Connection Properties in Windows XP

➢ Ensure that the IP address of your PC/notebook is correct. LMS/LMC and notebook must not have the same IP address.
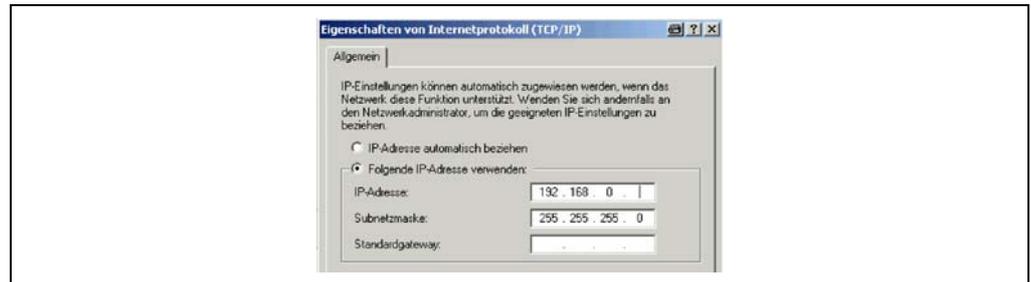
Fig. 3:   IP address in Windows XP

➢ Proxy servers should be disabled or an exception entered for the IP address.

3.2   Configuration

➢ Once the scan assistant has detected the LMS or the LMC, add the device to a new project.

➢ Logon to configure the parameters on the device.
Software access is password protected. In the default delivery status the following passwords are defined:

User level	Password
Operator	–
Operator (maintenance personnel)	main
Integrator (authorized client)	client

➢ Make the necessary settings on the LMS/LMC on the QUICK-START page in SOPAS ET (for the LMS you can also configure the device in the Expert mode).

➢ Setup at least one monitoring field and one monitoring case.

➢ Connect the outputs electrically to the object protection systems as shown in *chapter 6 "Electrical installation" on page 22*.

4   Product description

This chapter provides information on the special features and properties of the LMS/LMC laser measurement sensor/system. It describes the construction and the operating principle of the device. Please read this chapter before mounting, installing and commissioning the device.

4.1   Typical application

The LMS/LMC laser measurement sensors/systems are particularly suitable for use as curtain detectors by using them in front of the objects to be protected, or as intrusion detectors for walls and windows.

They can be used indoors and outdoors for the vertical monitoring of fence systems or for the horizontal monitoring of flat open areas such as lawns, courtyards, paths and drives. They are also suitable for monitoring roofs and ceilings.

People or objects who enter the detection range of the laser scanner will be reliably detected. Interruptions with or without tools are also detected independent of the distance, as are climbing over or climbing through. The sensor also accurately detects people who are walking, running, crawling over an area, or vehicles that are driving over an area.

4.2   Items supplied

4.2.1   LMS12x or LMS13x

The delivery includes the following components:

Quantity	Components	Comment
1	A laser measurement sensor Security	LMS12x or LMS13x, depending on order
5	Sealing strips	Hardware
1	Device instructions with electrical circuit diagram for getting started	Is included in the LMS packaging
1	CD-ROM	Contents see operating instructions "Laser Measurement Systems of the LMS100 Product Family" part no. 8012471/UT27, engl. edition

Tab. 1:   Items supplied LMS12x or LMS13x

4.2.2   LMC12x or LMC13x

The delivery includes the following components:

Quantity	Components	Comment
1	An laser measurement sensor	In conjunction with the mounting kit VdS, either LMC12x or LMC13x, depending on the order
1	VdS mounting kit	Hardware, depending on order
5	Sealing strips	Hardware
1	Device instructions with electrical circuit diagram for getting started	Included in the LMC packaging
1	CD-ROM	Contents see operating instructions "Laser Measurement Systems of the LMS100 Product Family" part no. 8012471/UT27, engl. edition

Tab. 2:   Items supplied LMC12x or LMC13x

4.3   Device variants

- LMS121/122/123 (without heating for object protection systems — indoor)
- LMS131/132/133 (with heating and full outdoor capability for object protection systems — outdoor)
- LMC121/122/123/124 (without heating for VdS object protection systems — indoor)
- LMC131/132/133 (with heating for VdS object protection systems — semi-outdoor)

Indoor   Temperature range 0 °C to +50 °C, no fog filter or particle filter activated as factory default setting

Outdoor   Temperature range –30 °C to +50 °C, fog filter and particle filter are activated as factory default setting

Semi-outdoor   Temperature range –30 °C to +50 °C, fog filter is activated as factory default setting, the particle filter is not activated, in accordance with VdS photoelectric switch guidelines can be set to no multiple sampling (class C) or double multiple sampling (class B).

LMC12x/13x

The LMC is based on the following VdS guidelines:

- VdS 2117 requirement (photoelectric switches = LS) according to test method VdS 2485
- VdS 2312 requirement (movement detectors = BM)

The test was made …

- for LMC12x as per photoelectric switches class C environment class II (indoor),
- for LMC13x as per photoelectric switches class C environment class IVa (outdoor).

The variant LMC12x has the VdS approval number G110045.

The variant LMC13x has the VdS approval number G111032.

The related VSÖ number is GZ01150000211101-10.

The devices are suitable for usage in intrusion detection systems as per EN 50131-1. The devices are suitable as per VdS guidelines for monitoring access to easy-to-enter areas from up to 18 m (59.05 ft).

Important   - The LMC12x/LMC13x have a firmware status that has been approved and documented by the VdS.
- **VdS-compliant installation of the LMC is only possible** using the VdS mounting kit.
- For **VdS-compliant installation of the LMC** the related VdS guidelines, e.g. on planning and installation, are to be followed.

4.3.1   LMS12x Security (indoor)

Type Part number	Special feature
LMS121-10000 Security 1051384	Laser measurement sensor, indoor version Ambient temperature: 0 °C to +50 °C Color: RAL7032 — pebble gray
LMS122-10000 Security 1044322	Laser measurement sensor, indoor version Ambient temperature: 0 °C to +50 °C Color: RAL9005 — jet black
LMS123-10000 Security 1044321	Laser measurement sensor, indoor version Ambient temperature: 0 °C to +50 °C Color: RAL9003 — signal white

Tab. 3:   LMC12x variants

4.3.2   LMS13x Security (outdoor)

Type Part number	Special feature
LMS131-10100 Security 1051379	Laser measurement sensor, outdoor version Ambient temperature: –30 °C to +50 °C Color: RAL7032 — pebble gray
LMS132-10100 Security 1051402	Laser measurement sensor, outdoor version Ambient temperature: –30 °C to +50 °C Color: RAL9005 — jet black
LMS133-10100 Security 1051403	Laser measurement sensor, outdoor version Ambient temperature: –30 °C to +50 °C Color: RAL9003 — signal white

Tab. 4:   LMC13x variants

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4.3.3   LMC12x VdS (indoor)

Type Part number	Special feature
LMC121-11000 - VdS 1051287	Laser measurement system certified, indoor version VdS mounting kit 1 — long Ambient temperature: 0 °C to +45 °C Color: RAL7032 — pebble gray
LMC121-11001 - VdS 1051314	Laser measurement system certified, indoor version VdS mounting kit 2 — short Ambient temperature: 0 °C to +50 °C Color: RAL7032 — pebble gray
LMC122-11000 - VdS 1051300	Laser measurement system certified, indoor version VdS mounting kit 1 — long Ambient temperature: 0 °C to +45 °C Color: RAL9005 — jet black
LMC122-11001 - VdS 1051315	Laser measurement system certified, indoor version VdS mounting kit 2 — short Ambient temperature: 0 °C to +50 °C Color: RAL9005 — jet black
LMC123-11000 - VdS 1051301	Laser measurement system certified, indoor version VdS mounting kit 1 — long Ambient temperature: 0 °C to +45 °C Color: RAL9003 — signal white
LMC123-11001 - VdS 1051316	Laser measurement system certified, indoor version VdS mounting kit 2 — short Ambient temperature: 0 °C to +50 °C Color: RAL9003 — signal white
LMC124-11000 - VdS 1051303	Laser measurement system certified, indoor version Color: RAL9005 — jet black VdS mounting kit 1 — long Color: uncoated aluminium Ambient temperature: 0 °C to +45 °C

Tab. 5:   LMC12x variants

4.3.4   LMC13x VdS (semi-outdoor[1])

Type Part number	Special feature
LMC131-11101 - VdS 1051487	Laser measurement system certified, semi-outdoor version VdS mounting kit 2 — short Ambient temperature: –30 °C to +50 °C Color: RAL7032 — pebble gray
LMC132-11101 - VdS 1051488	Laser measurement system certified, semi-outdoor version VdS mounting kit 2 — short Ambient temperature: –30 °C to +50 °C Color: RAL9005 — jet black
LMC133-11101 - VdS 1051489	Laser measurement system certified, semi-outdoor version VdS mounting kit 2 — short Ambient temperature: –30 °C to +50 °C Color: RAL9003 — signal white

Tab. 6:   LMC13x variants

1)   Semi-outdoor refers to the evaluation time and therefore to the possible multiple sampling settings; this evaluation time is limited to 25 ms for VdS class C for photoelectric switches and to 40 ms for class B!

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4.4   Special features

- field of view: 270°
- angular resolution: 0.25°/0.5°
- scanning frequency: 25 Hz/50 Hz
- interface: RS-232/Ethernet/OPC
- 2 relay outputs (alarm, fault) + 1 sabotage output
- supply voltage: 9 V to 30 V

LMS/LMC12x

- enclosure rating: IP 65

LMS/LMC13x

- enclosure rating: IP 67

4.5   Basic parameters for the measurement of objects

The LMS scans with a scanning frequency of 25 or 50 Hz or with an angular resolution of 0.25° or 0.50°. At a higher scanning frequency or a finer angular resolution the LMS supplies more measured values. This means:

- At higher frequencies the values arrive faster than at lower frequencies.
- With a finer angular resolution there are more values in a scan than with a coarser resolution.

Valid combinations and return values

There are three valid combinations of scanning frequency and angular resolution:

- 50 Hz and 0.5°
- 25 Hz and 0.5°
- 25 Hz and 0.25°

Important   The factory default setting is 50 Hz and 0.5° angular resolution and cannot be modified in the VdS mode for the LMC.

4.5.1   Filter

The LMS has digital filters for the pre-processing and optimization of the measured distance values. You can configure either a fog filter, a hardware blanking window, an n-pulse-to-1-pulse filter, a particle filter or a mean filter.

Important   All filters can be modified in the Expert mode, but only activated and saved in non-volatile memory on the variants LMS12x/LMS13x.

Fog filter

The fog filter suppresses possible glare due to fog. The LMS becomes less sensitive in the near range (up to approx. 4 m (13.12 ft)) with the fog filter.

Important   This function is not active in the VdS mode for the LMC and cannot be activated in the VdS mode.

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Hardware blanking window

Using the blanking window an area in front of the LMS is completely blanked. As a result the LMS only supplies measured values from a configured distance. You can configure a blanking window from 2 to 15 m (3.28 to 49.21 ft).

Important   This function is not active in the VdS mode and cannot be activated in this mode.

N-pulse-to-1-pulse filter

If two pulses are reflected by two objects during a measurement (incident on drops of rain or edges etc.), then this filter filters out the first reflected pulse.

Important   This function is active in the VdS mode and cannot be deactivated in this mode.

Particle filter

The particle filter can be used in dusty surroundings or in case of rain or snow to filter out interference due to particles of dust, rain drops, snow flakes etc.

Due to the particle filter, the reaction to an object in the evaluation field or an infringement of the contour is delayed by the time for a scan. The response time set for the pixel evaluation, blanking and contour evaluation strategies is not changed as a result.

Important   On the LMC this function is not active in the VdS mode and cannot be activated in this mode.

Mean filter

The mean filter acts on the measured value output, not on the field application. If the mean filter is active, the mean is formed from a configured number of scans and then output.

The mean filter reduces the scan data output (not a smoothing mean).

Important   This function is not active in the VdS mode and cannot be activated in this mode.

4.6   Field application

With the aid of the integrated field application, the LMS/LMC evaluates up to 10 evaluation fields within its scan area. Using the field application, along with object protection, you can also realize, e.g., systems for vertical, horizontal or diagonal access monitoring.

The factory default setting includes an evaluation field with pre-configured parameters. In total nine evaluation fields can be configured as monitoring fields. You can change and adapt the size and shape of all nine fields to suit your needs.

You can also configure a 10th field. This field is used for Obstruction protection.

Important   The Obstruction protection function is only possible with the 10th field. The 10th field cannot be used as a monitoring field.

4.6.1   Evaluation cases

An evaluation case defines which output field is evaluated in which way and on which output it acts. You can configure up to ten evaluation cases, all configured evaluation cases are active simultaneously.

For each evaluation case you configure in SOPAS ET:

*   inputs that activate an evaluation case, if necessary

*   the evaluation strategy

*   the evaluation field

*   the output on which the evaluation case acts

*   the response time of the output

Important | For the LMC and the LMS the evaluation cases are already pre-configured in the factory default setting. In the VdS mode all evaluation cases are allocated the same blanking and the same evaluation time.

4.6.2   Inputs

An input combination can be defined for several evaluation cases, e.g. two evaluation cases will then be active simultaneously. The following input assignments are defined for the LMS and the LMC:

Input	Evaluation case
Input 1	Level high, LMS/LMC disarmed
Input 1	Level low, LMS/LMC armed
Input 2	Level high, LMS/LMC inactive (Function test mode)
Input 2	Level low, LMS/LMC active
Input 3	Level high, night configuration
Input 3	Level low, day configuration
Input 4	Level high, teach-in activated
Input 4	Level low, teach-in deactivated

Tab. 7:   Input assignments

Important | The allocation can be modified in the Expert mode, but only activated and saved in non-volatile memory on the variants LMS12x/LMS13x.

Meaning of terms

Armed/disarmed | The sensor is switched active for the alarm management via this input assignment. Alarms are signaled. In this state the display and the RS-232 interface are permanently switched off.

Function test | In this mode the monitoring functions can be tested. The fault output is switched such that the sensor is no longer armed. However the alarm output is active. The display is activated, the 7-segment display can be read.

Teach-in | Using this input, depending on the functionality of the LMC software, it is possible to teach-in without a PC or to perform periodic automatic teach-in. In the configuration it can be defined which field adapts to the new local situation by teaching-in again by activating the input.

The alarm management system is however informed via the fault output that the device is no longer armed during this period. The display is activated, the 7-segment display can be read.

Day configuration/night configuration | Here a differentiation is made between two possible monitoring field configurations. Day and night are only synonyms for the wiring of the input. The total of 9 field configurations can be allocated to the related input assignment as required. Here it is conceivable that the monitoring field and its evaluation case are only activated during the "day", only at "night" or in both cases.

4.6.3   Relay outputs

The LMC and the LMS have two relay outputs. These are configured as an alarm output and fault output. The evaluation cases are all linked to the alarm output.

Important | The allocation can only be modified in the Expert mode.

The outputs can be used as volt-free outputs or as resistance monitored outputs.

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4.7   VdS-compliant construction

The hardware meets special VdS-compliant requirements that are described in the following.

Important   The standard mounting kits 1a, 1b, 2 and 3 for the LMS are not suitable for VdS-compliant mounting!

4.7.1   VdS mounting kit for the LMC12x/13x

The mounting kit VdS is used for VdS-compliant mounting and is included in the items supplied with the LMC.

As per VdS guideline 2312 the fixing screws must not be freely accessible. This requirement is met using the mounting kit such that mechanical tampering can be excluded.

The mounting kit comprises two pieces, the bottom part that is used for wall/ceiling mounting and a flexible top part that is pulled over the LMC12x/13x.

4.7.2   VdS mounting kit 1 — long

It completely encloses the LMC12x. In this way the temperature range in VdS-compliant operation is 0 °C to +45 °C.

Fig. 4:   LMC12x with VdS mounting kit 1 — long

The mounting kit VdS 1 — long can be ordered as an accessory in various colors (see *section 10.2.2 "Mounting kits" on page 50*).

Important   It is not possible to subsequently upgrade an LMS to an LMC using the mounting kit.

4.7.3   VdS mounting kit 2 — short

Mounting kit 2 only partially encloses the top part of the LMC12x/13x. As a consequence, in VdS-compliant operation, the temperature range is from 0 °C to +50 °C for the LMC12x and from –30 °C to +50 °C for the LMC13x; the LMC13x is therefore suitable for usage outdoors.

Fig. 5:   LMC13x with VdS mounting kit 2 — short

Important   The LMC13x is only available with this mounting kit.

4.7.4   Sabotage protection

The LMS and the LMC are equipped with an internal relay against sabotage. This relay is between the top part of the housing and the base housing and monitors the screw joint. If the screws for the top part of the housing are undone, a sabotage signal is sent. The sabotage output is switched off.

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5 Mounting

5.1 Sealing

Important Five sealing stickers are included in the items supplied. These must be applied to the screw joints and screw openings by the installer. VdS-compliant mounting is then ensured.

The sealing of the base housing and top part of the housing using a sealing sticker should be undertaken prior to mounting the mounting kit. Here a position on the front above the RS-232 interface should be selected. The remaining four sealing stickers should be applied over the four outer fastening screws for the VdS mounting kit.

5.2 Mounting the VdS mounting kit

The VdS mounting kit is part of the LMC and is mandatory for a VdS-compliant installation.

1. Secure the mounting bracket to a wall or to another object and adjust as required (1). Details on the tilt angles and mounting kit dimensions supported are provided in see *section 9.2.3 "Dimensional drawings LMS/LMC with mounting kits" on page 45*.

2. Slide the scanner inwards (2) and secure to the base unit using four screws (3).

3. Slide the scanner (on the base unit) into the mounting bracket and screw into place in the required position (4).

4. Slide the hood (5) over the LMS12x/13x (6) and secure using four fixing screws (7).

A type label for the LMC is included in the items supplied. Please use this type label and apply it to the mounting kit (7) for clear identification.

LMC12x

LMC12x/13x
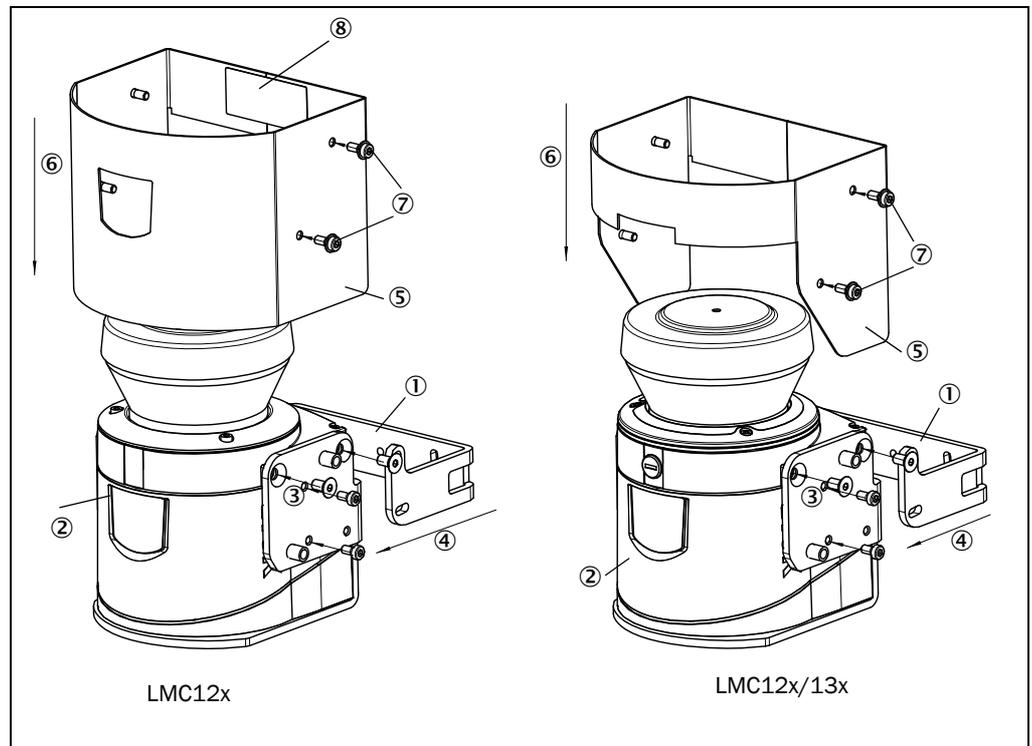
Fig. 6: Mounting with VdS mounting kit

6　　Electrical installation

6.1　　Planning and preparation

System requirements

For commissioning and operating the following system requirements are required at the user:

• LMC12x (with LMS12x): Supply voltage DC 9 ... 30 V

• LMC13x (with LMS13x): Supply voltage DC 10.8 ... 30 V

Both supply voltages are to be generated as per IEC 60364-4-41 (VDE 0100, part 410).

The LMS/LMC draws the following power:

• power consumption of the LMS/LMC12x with maximum output load 20 W

• power consumption of the LMS/LMC13x with maximum heating performance 60 W

6.2 Connections LMS/LMC12x (indoor)

The LMS12x and the LMC12x are equipped with a removable system plug that has a PG7 cable entry on the rear. The connections are made to the screw type terminal in the system plug. In addition these variants have a round M12 plug connector for the connection to Ethernet. You can move the PG7 cable entry and the round plug connector from the rear to the underside of the system plug.

Connections of the LMS/LMC12x
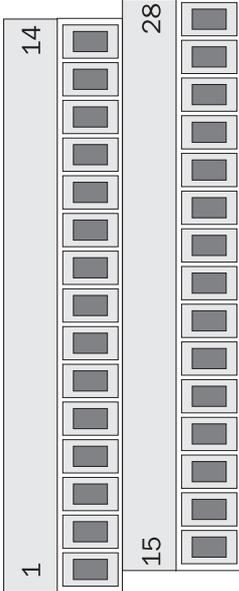
Terminal	Signal	Function
1	Alarm 1	Relay contact 1 of the alarm output
2	Alarm R	Resistance monitored relay contact for the alarm output
3	Alarm 2	Relay contact 2 of the alarm output
4	Sabotage 2[1]	Digital sabotage output 2
5	Sabotage 1[1]	Digital sabotage output 1
6	IN1 (S/U[2])	Digital input 1 armed/disarmed
7	IN1 GND (S/U GND[2])	Ground digital input 1 armed/disarmed
8	IN2 (GT[2])	Digital input 2 Function test
9	IN2 GND (GT GND[2])	Ground for the digital input 2 Function test
10	IN4 (Teach[2])	Digital input 4 Teach-in
11	IN3 (T/N[2])	Digital input 3 day configuration/night configuration
12	IN3/IN4 GND (Teach T/N GND[2])	Ground digital inputs 3 and 4
13	Error R	Resistance-monitored relay contact of the fault output
14	Error 2	Relay contact 2 of the fault output
15	GND	Ground LMS/LMC
16	V_S	Supply voltage LMS/LMC
17	Without function	Do not use
18	Sabotage R[1]	Resistance monitored digital sabotage output
19	GND CAN	Ground CAN bus
20	CAN_H	CAN-BUS High
21	CAN_L	CAN-BUS Low
22	CAN Vs 24 V	CAN supply voltage
23	GND CAN	Ground CAN bus
24	CAN_H	CAN-BUS Low
25	CAN_L	CAN-BUS High
26	CAN V_S 24 V	CAN supply voltage
27	Error 1	Relay contact 1 of the fault output
28	Case	Housing

Tab. 8: Terminal assignments on the LMS/LMC12x

[1] Series configuration of cover contact and semiconductor switch. Fixed assignment.
[2] Labeling on the LMC12x.

"Ethernet" connection M12×4, socket

Pin	Signal	Function
1	Ethernet_TX+	Ethernet interface
2	Ethernet_RX+	Ethernet interface
3	Ethernet_TX−	Ethernet interface
4	Ethernet_RX−	Ethernet interface

Tab. 9: Pin assignment of the "Ethernet" connection on the LMS/LMC12x

"Auxiliary interface" connection M8×4, socket

Pin	Signal	Function
1	–	Not assigned
2	RxD	Serial RS-232 auxiliary interface
3	DC 0 V	Ground
4	TxD	Serial RS-232 auxiliary interface

Tab. 10: Pin assignment of the "Auxiliary interface" connection on the LMS/LMC12x

6.3 Connections LMS/LMC13x (outdoor and semi-outdoor)

The LMS13x and the LMC13x have four multi-pin M12 round plug connectors. The connections are made to the related plug or sockets.

Pre-assembled cables are available as accessories for the connection to the round M12 plug connectors. These comprise the round plug connector and 5, 10 or 20 m (16.40, 32.81 or 65.62 ft) of cable with flying leads.

Recommendation   For the VdS versions a cable without color coding can be supplied on request.

"Power" connection M12×5, plug
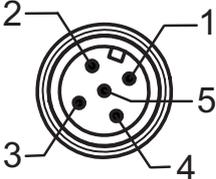
Pin	Signal	Function
1	V_S	Supply voltage LMS
2	V_S heat.	Supply voltage for the heating
3	GND	Ground
4	–	Do not use
5	GND heat.	Ground heating

Tab. 11: Pin assignment of the "Power" connection on the LMS/LMC13x

"Input" connection M12×8, plug
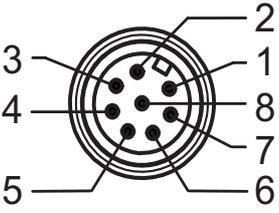
Pin	Signal	Function
1	IN1 (S/U[1])	Digital input 1 armed/disarmed
2	IN2 (GT[1])	Digital input 2 Function test
3	CAN_H	CAN-BUS High
4	CAN_L	CAN-BUS Low
5	GND CAN	Ground CAN bus
6	IN3 (T/N[1])	Digital input 3 day configuration/night configuration
7	IN4 (Teach[1])	Digital input 4 Teach-in
8	IN GND	Ground digital inputs

Tab. 12: Pin assignment of the "Input" connection on the LMS/LMC13x

1) Labeling on the LMC13x.

"Output" connection M12×8, socket
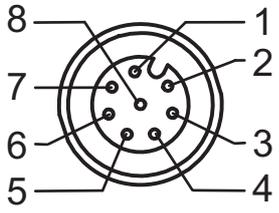
Pin	Signal	Function
1	Alarm 1	Relay contact 1 of the alarm output
2	Alarm 2	Relay contact 2 of the alarm output
3	Alarm R1	Resistance monitored relay contact 1 for the alarm output
4	Alarm R2	Resistance monitored relay contact 2 for the alarm output
5	Error 1	Relay contact 1 of the fault output
6	Error 2	Relay contact 2 of the fault output
7	Sabotage 1	Digital sabotage output 1
8	Sabotage 2	Digital sabotage output 2

Tab. 13: Pin assignment of the "Output" connection on the LMS/LMC13x

"Ethernet" connection M12×4, socket

Pin	Signal	Function
1	Ethernet_TX+	Ethernet interface
2	Ethernet_RX+	Ethernet interface
3	Ethernet_TX–	Ethernet interface
4	Ethernet_RX–	Ethernet interface

Tab. 14: Pin assignment of the "Ethernet" connection on the LMS/LMC13x

"Auxiliary interface" connection M8×4, socket

Pin	Signal	Function
1	–	Not assigned
2	RxD	Serial RS-232 auxiliary interface
3	DC 0 V	Ground
4	TxD	Serial RS-232 auxiliary interface

Tab. 15: Pin assignment of the "Auxiliary interface" connection on the LMS/LMC13x

6.4   Wiring the outputs on the LMS/LMC

The relay outputs on the LMS/LMC are open in the normal state, closed in the energized state.
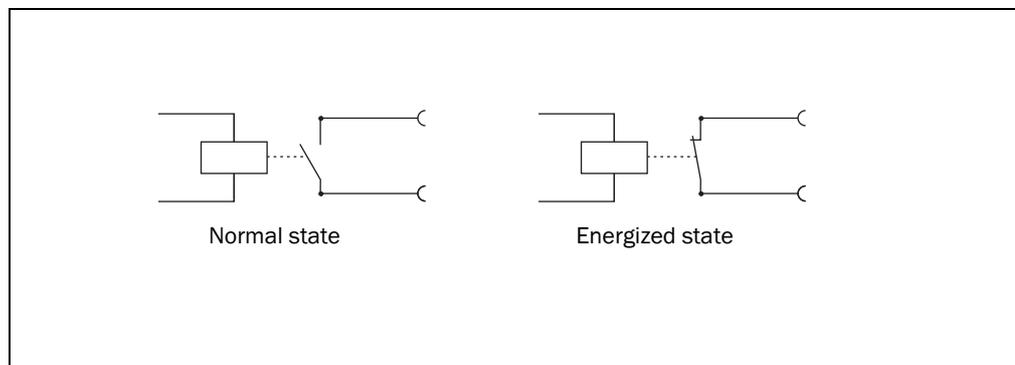
Fig. 7:   Relay outputs of the LMS/LMC

Connection of the LMS/LMC to an object protection system, not resistance monitored
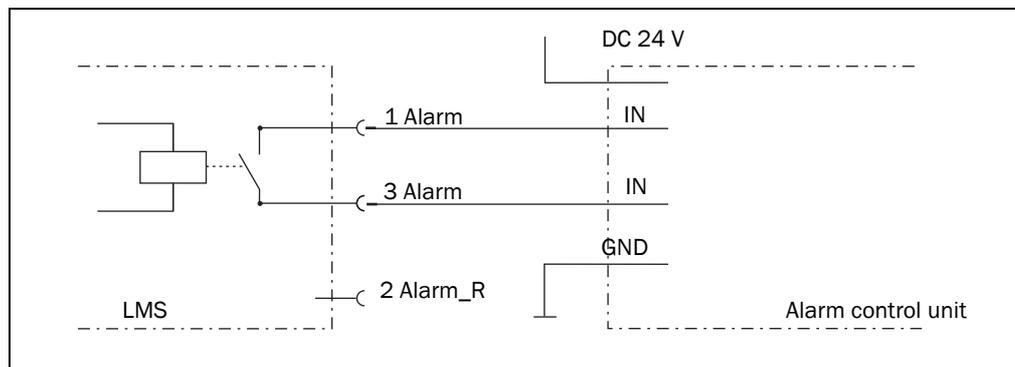
Fig. 8:   Connection of the LMS/LMC to an object protection system, not resistance monitored

Connection of the LMS/LMC to an object protection system, resistance monitored
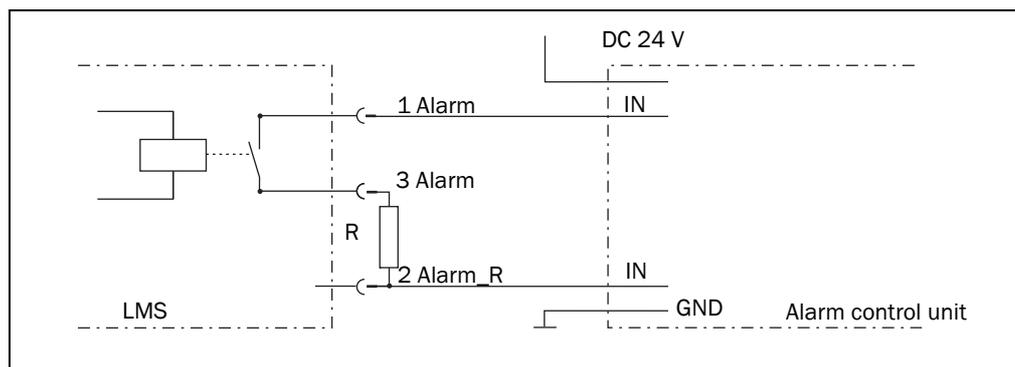
Fig. 9:   Connection of the LMS/LMC to an object protection system, resistance monitored

Important   The resistance R must be adapted to the related security centre and the number of sensors that are connected to an input.

Connecting to the fault output (optocoupler)
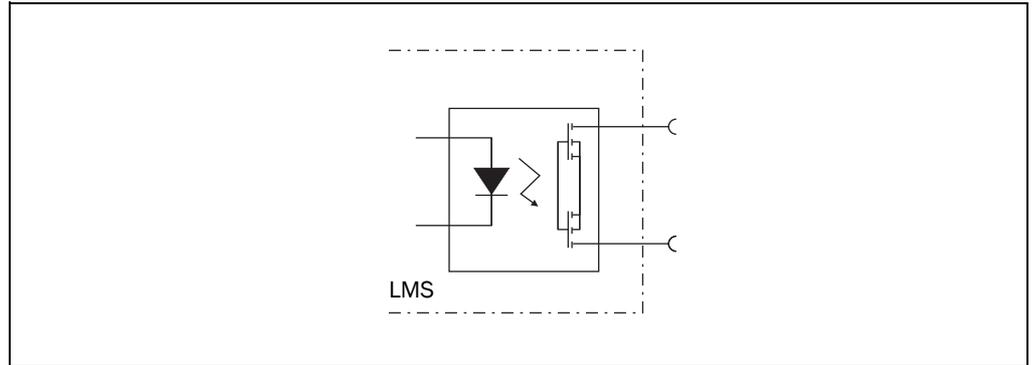
Fig. 10:   The fault output with optocoupler

The fault output is an optocoupler output that can be used for volt-free switching.

6.5   Wire cross-sections

Wire all connections with copper cables!

Use the following wire cross-sections:

- supply voltage at least 0.25 mm² (approx. 24 AWG), if local power supply in the immediate vicinity
- supply voltage at least 1.0 mm² (approx. 18 AWG) at maximum length of 20 m (65.62 ft), if the connection is made to an existing 24 V DC supply
- switching outputs minimum 0.25 mm² (approx. 24 AWG), maximum cable length 40 m (164.04 ft) with 0.5 mm² (approx. 22 AWG)
- data interface minimum 0.25mm² (approx. 24 AWG)
- For the LMS the outside diameter of the common cable must be a maximum of 9 mm (0.35 in) due to the cable entry.

Important   If you use flexible connecting cables with stranded wire, then you must not use ferrules when connecting the wires to the terminals on the LMS/LMC12x.

7   Commissioning and configuration

⚠️ ⚠️ **WARNUNG**

The LMS/LMC must be commissioned only by adequately qualified personnel.

Before you operate a machine/system equipped with the LMS/LMC for the first time, make sure that the system is first checked and released by qualified personnel. On this issue, observe the notes in chapter *chapter 2 "For your safety" on page 9*.

7.1   Configuration (parameterization)

To use the VdS functions, the SOPAS ET configuration software is available. During this process only VdS-compliant parameters can be selected as per VdS certification.

Once configured, no further software is required for operation. The settings are saved in non-volatile memory and protected against tampering in the device.

7.1.1   QUICK START LMC12x/13x

The VdS-compliant LMC12x/13x have a simple configuration interface, the so-called QUICK-START page.
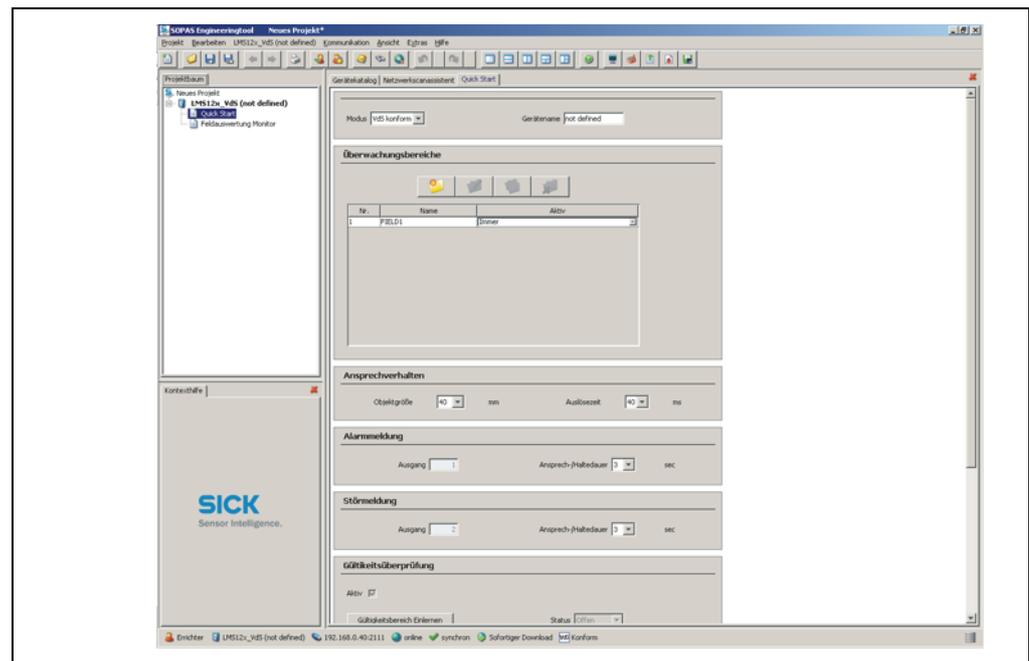
Fig. 11:   QUICK-START page

Using this page you can set up the monitoring fields. One monitoring field and the related field evaluation set are pre-defined.

In addition a field with the name OBSTRUCTION PROTECTION can be setup for so-called "cover monitoring". It is used to monitor for unauthorized covering and provides protection against sabotage and obstruction that is not mandatory for class B sensors according to VdS (see *section 7.2 "Obstruction protection" on page 31*). For class C sensors, cover monitoring and removal from the installation surface must be detected and notified.

If the OBSTRUCTION PROTECTION field is configured, the alarm output is switched if the sensor is covered.

7.1.2   Login

Only by logging in as an installer on the QUICK-START page changes can be made to the following parameters.

7.1.3   Mode

VdS-compliant

You must activate this menu command in case of VdS-compliant installation.
The activation is indicated in the status bar in SOPAS ET in the form of a VdS symbol.
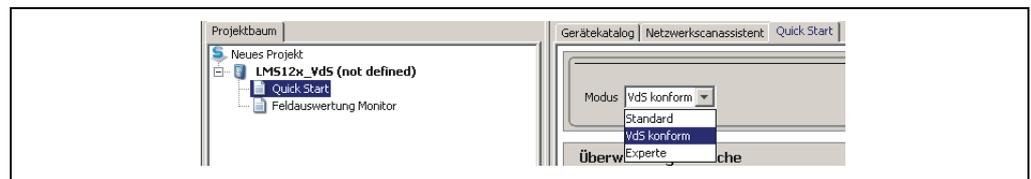
Fig. 12:   Selection of the configuration mode

As a result only parameters as per the VdS guidelines are displayed for configuration.

The system operates in the VdS-compliant mode as factory default setting.

Expert mode

If the Expert mode is selected, all parameters are available.
However then VdS-compliant installation cannot be achieved.

Using the Expert mode further settings such as filters and the like can be made. This aspect is described in more detail in the operating instructions "Laser Measurement Systems of the LMS100 Product Family", part no. 8012471/UT27.

Important
- If you change back from the Expert mode to the VdS-compliant mode, all parameters are reset to the default settings. This means that changes will be lost.

- Changes in the Expert mode are only accepted by the variants LMS12x/13x.

7.1.4   Monitored areas
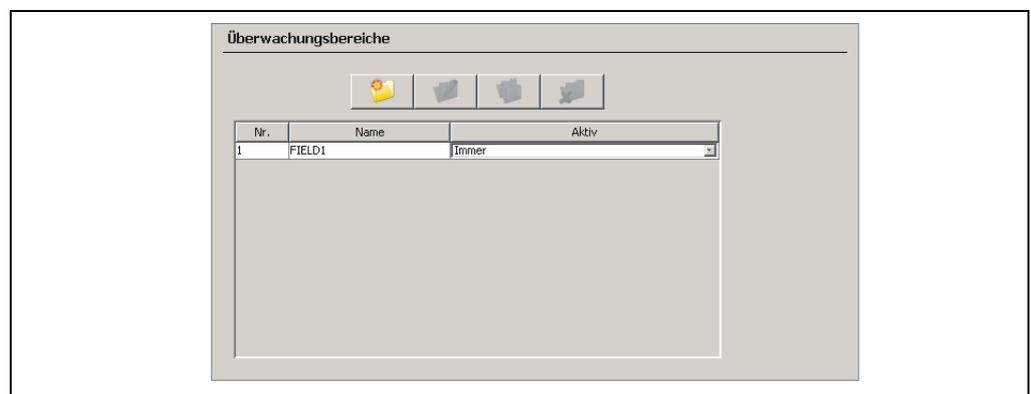
Fig. 13:   Monitored areas

A pre-defined field already exists; the shape and size of this field can be modified. A rectangular field is pre-defined as the factory default setting.

Important   If a segmented field (arbitrary shape) is required, the pre-defined rectangular field must be deleted first. Only then can a segmented field be created on the same field number.
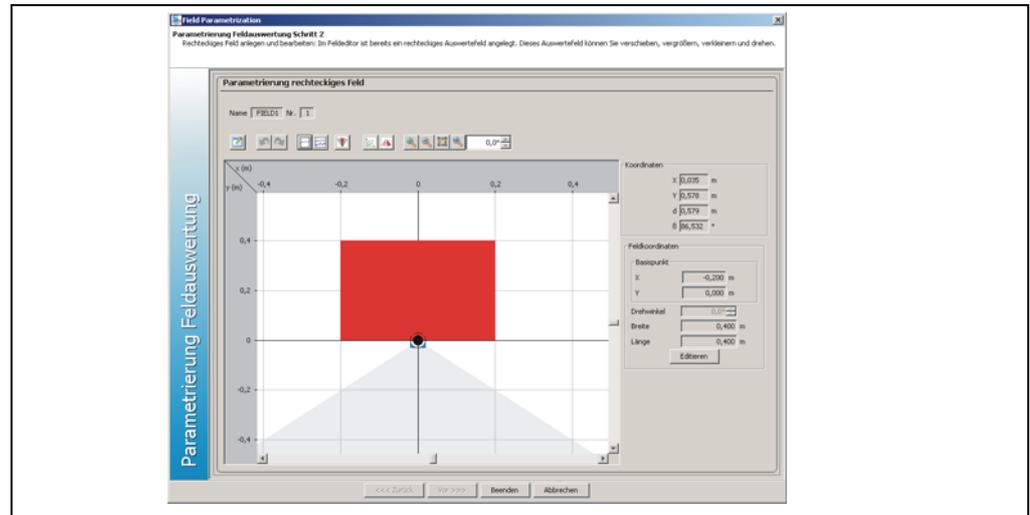
Fig. 14:   Monitoring fields

Up to eight monitoring fields (a total of nine can be configured) can be created. The field numbers can be selected as required.
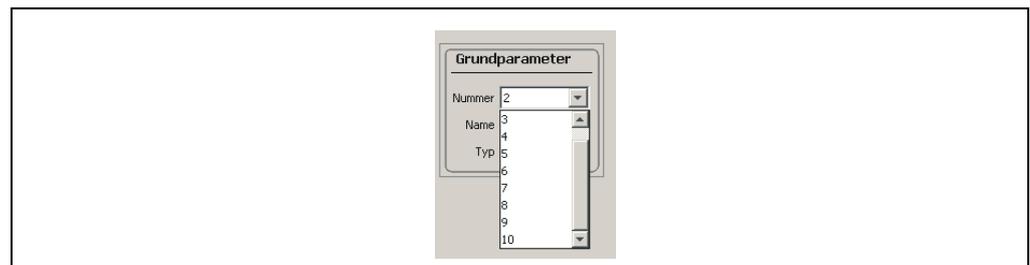
Fig. 15:   Field numbers

Important   The field with the number 10 is a contour field. This means that the contour as reference function is reserved for this field.

An evaluation case especially for obstruction protection is saved for the field with the number 10.

The creation, editing and deletion of fields and field parameters is described in the online help on the LMS.

7.1.5   Response behavior
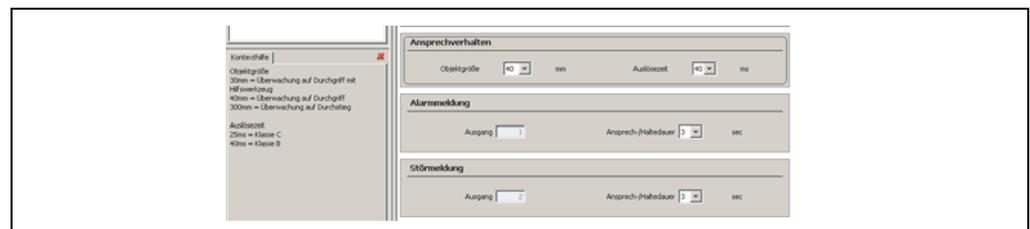
Fig. 16:   Response behavior

In the response behavior a differentiation is made between the object size and the trigger time. In the VdS-compliant mode three adjustable object sizes can be selected:

- 30 mm (1.18 in)

- 40 mm (1.57 in) (factory default setting)

- 300 mm (11.81 in)

This feature corresponds to VdS guideline 2312.

Two times can be selected as trigger times:

- 20 ms, corresponds to VdS class C
- 40 ms, corresponds to VdS class B (factory default setting)

7.1.6   Alarm message

The alarm signal has a fixed assignment to output 1 (Alarm output) and cannot be changed. How long the alarm signal remains set on the output can be changed in the following steps:

- 1 s
- 3 s
- 10 s

The parameter is set to 3 seconds as factory default setting.

7.1.7   Fault signal

The fault signal has a fixed assignment to the "Fault" output and cannot be changed.

How long the fault signal remains set can be changed in the following steps:

- 1 s
- 3 s
- 10 s

The parameter is set to 3 seconds as factory default setting.

7.2   Obstruction protection

7.2.1   General

If pixel evaluation is configured, glare and shading can make it impossible to continue monitoring a field. If blanking is configured, small objects in the near range of the LMS/LMC can cause large shadows.

If you use evaluation fields at a distance from the LMS/LMC, then the object or the object erroneously measured due to glare is outside the evaluation field and will not be detected.

To prevent this situation arising, you can configure the OBSTRUCTION PROTECTION option. The obstruction protection expands the evaluation field from the object or the contour to the sensor. In this way there can be no unmonitored areas (gaps) between the sensor and the evaluation fields.
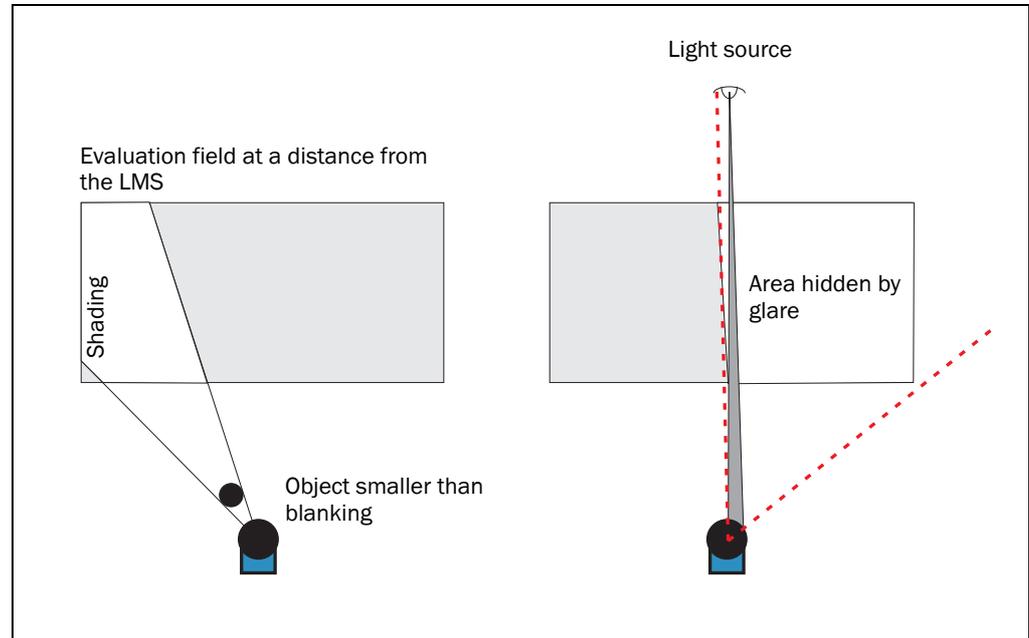
Fig. 17:   Obstruction protection

The Obstruction protection option switches the evaluation field if ...

- an object that is smaller than or equal to the blanked object size is in front of the laser output aperture for the configured response time for Obstruction protection.

- the LMS/LMC is dazzled for longer than the configured response time for Obstruction protection.

Evaluation field

Choose field no. 10 from the evaluation fields already configured for the evaluation case.

Notes
- On the VdS-compliant LMC12x/LMC13x the obstruction protection is already activated (factory default setting). In the VdS mode this setting cannot be changed by the installer.

- If tampering is detected, the detection sensor sets the alarm output low (0 V).

- On the LMS the output used can be configured, on the LMC it cannot be configured.

7.2.2   Obstruction protection using contour as reference

With the **contour as reference** function an evaluation field is placed around the scanned contour of an object. The actual function is activated by the strategy for the evaluation case. Evaluation case and evaluation field must therefore match.

During the evaluation of the field, the contour of an object (e.g. a house wall) must always be within the field. I.e. an object must be present continuously (the scanned contour is used as a reference).

You can either teach-in or set manually an evaluation field for the contour as reference.

Teaching-in evaluation field for contour as reference.
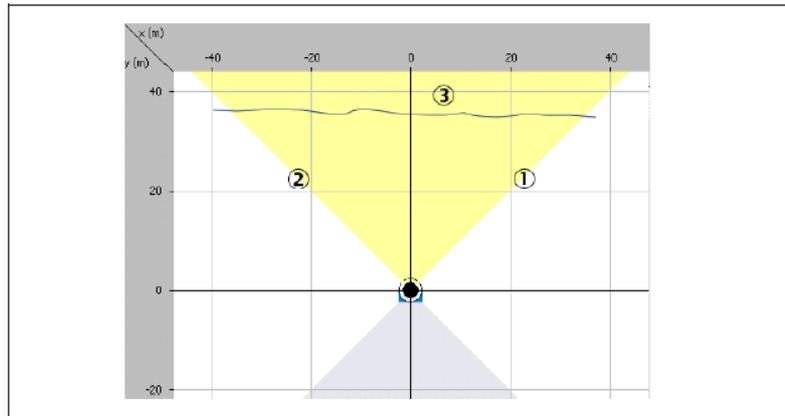
Fig. 18:   Start angle and end angle of the contour

In SOPAS ET you can define the start angle (1) and the end angle (2) used during teach-in and therefore pre-define the size of the field. The field you are creating is displayed in yellow.

Important   An evaluation field can only be taught-in for the contour as reference function if you have selected the SEGMENTED option in the basic parameters for the field.

Recommendation   Show the scan line for the LMS/LMC in the field editor. You can then see the scanned contour and use it to orientate yourself.

Important   In the case of VdS-compliant installation in accordance with class B, contour as reference can be set as an option. Field set no. 10 is reserved for this purpose. In the case of VdS-compliant class C equipment, the contour must be set as a reference.

For the contour you must define the positive (2) and the negative (3) distance in relation to the scanned contour (1). The distance should be at least 100 mm (3.94 in), otherwise the contour will be continuously infringed.
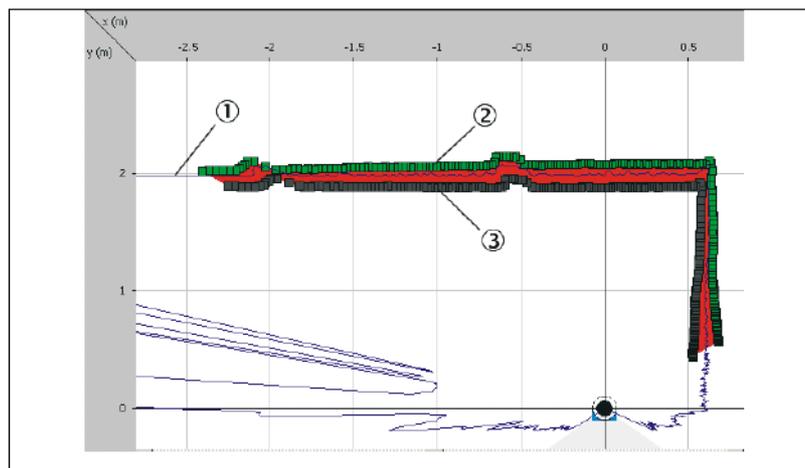
Fig. 19:   Positive and negative distance to the contour

How to teach-in an evaluation field for the contour as reference function:

1. In the selection field on the top right in the field editor choose the TEACH-IN CONTOUR option.
   The TEACH-IN CONTOUR dialog box is opened.

2. Enter the values for FIRST ANGLE and LAST ANGLE as well as for the POSITIVE DISTANCE and the NEGATIVE DISTANCE.

3. Click the START button.
   The contour will be scanned.

4. Then, click the STOP button.
   The evaluation field with its end points and start points is placed around the contour and displayed.

Manually editing evaluation field for contour as reference

Recommendation   Show the scan line for the LMS/LMC in the field editor. You can then see the scanned contour and use it to orientate yourself.
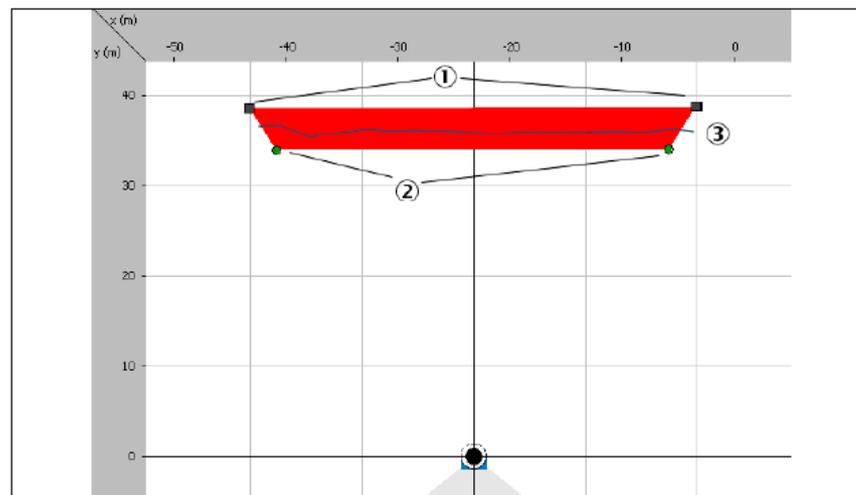
Fig. 20:   Evaluation field for contour as reference

With end points (1) and start points (2) you can define the size of the field that you want to place around the contour of the object (3).

How to manually edit an evaluation field for the contour as reference:

1. In the selection field on the top right in the field editor choose the MANUAL option.

2. Set the end points of the evaluation field.

3. Set the start points of the evaluation field.

4. Ensure the positive and negative distance to the scanned contour for the field is sufficient (> 100 mm (3.94 in)).

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7.3   Validity check

The validity check is mandatory on the LMC12x/13x and cannot be deactivated as it can on the security devices.

Tampering within the monitored field areas is prevented with this function.

It is used for final testing and prevents incorrect set-up of the monitoring fields. In a VdS-compliant installation the TEACH-IN VALIDITY AREA function must be run once at the end.
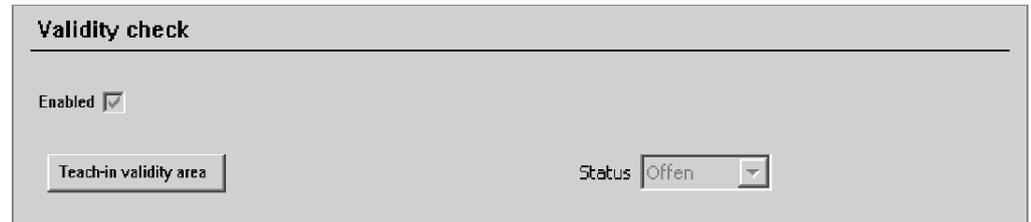
Fig. 21:   Validity check on the LMC12x/13x

The following status can be indicated:

- Open
  Validity check has not yet been undertaken (new fields have been defined, existing fields have been modified or deleted).

- Invalid
  Taught-in contour is invalid (e.g. half of the beams for a field are invalid).

- Valid
  Contour has been successfully taught-in.
  Validity signifies that every laser beam in every angular segment is checked for valid and stable measured values. This test is however only performed for the angular areas in which monitoring fields have been defined. In this way it is ensured that sufficient measured values are available that the LMS can evaluate.

During the validity check all set-up fields are checked for validity.

If all fields are valid, the fault output is cleared and as a result the fault signal removed. If the monitoring fields configured are not found to be valid, the fault output remains activated and generates a fault message.

In the SOPAS ET user interface the outputs are changed from orange to gray.

Important   If new fields are defined, or existing fields are modified or deleted, the validity check must be performed again. If this action is not undertaken by the installer, the fault output remains active.

7.4 Contamination measurement

The detection sensor has an optics cover for protection. This optics cover can become contaminated. For this reason the contamination is measured continuously while the device is in operation. From a certain contamination level, initially a contamination warning is output; if the contamination becomes worse, a contamination error is output and the detection sensor disables the measurement mode.

Depending on the application in which the detection sensor is used, you can choose between various strategies for the contamination measurement:

PROJECT TREE, LMS/LMC, PARAMETER, CONTAMINATION MEASUREMENT

- INACTIVE: No contamination measurement

- HIGHLY AVAILABLE: Contamination warning and contamination error are only output on even contamination of the optics cover.

- AVAILABLE: Contamination warning and contamination error are only output on partial contamination of the optics cover.

- SENSITIVE: Contamination warning and contamination error are output even with isolated contamination.

You will find further information on the various strategies for contamination measurement in the operating instructions for the detection sensor.

7.5 Additional settings for the LMS12x/13x

In the Expert mode special settings for reducing the false alarm rate can be set. Here among others a fog filter, hardware blanking window, N-pulse-to-1-pulse filter, particle filter or mean value filter can be activated, and also different object sizes can be set specifically for blanking.

As on the security variants it is possible to make changes in the Expert mode, it is imperative the settings on these devices are checked in relation to the specific application prior to commissioning.

8   Maintenance

Important   **Claims under the warranty rendered void!**

The housing screws of the detection sensor are sealed. Claims under the warranty against SICK AG will be rendered void if the seals are damaged or the device opened. The housing is only allowed to be opened by authorized service personnel.

8.1   Maintenance during operation

8.1.1   Cleaning the optics cover

The detection sensor is largely maintenance-free. The optics cover on the detection sensor should however be cleaned regularly and if it is contaminated (see *section 7.4 "Contamination measurement" on page 36*). The frequency of cleaning is defined by the local ambient conditions.

➢ Do not use aggressive detergents.

➢ Do not use abrasive cleaning agents.

Important   Static charges cause dust particles to be attracted to the optics cover. You can diminish this effect by using the anti-static plastic cleaner (SICK part no. 5600006) and the SICK lens cloth (part no. 4003353).

How to clean the optics cover:

➢ Use a clean and soft brush to remove dust from the optics cover.

➢ Then wipe the view window of the optics cover with a clean and damp cloth.

8.2   Troubleshooting

8.2.1   Error displays of the LEDs

Important   On the LMS/LMC the status indicators are switched off so that as far as possible it cannot be seen that the device is part of an object protection system. In the Function test mode and in the unarmed state these are switched on.

9   Technical specifications

9.1   Data sheet LMS/LMC laser measurement sensor/laser measurement system

	Minimum	Typical	Maximum
Functional data			
Scan angle			270°
Scanning frequency	25 Hz		50 Hz
Remission	10%		Several 1,000%[1] (reflectors)
Angular resolution			
With 25 Hz	0.25°		0.5°
With 50 Hz		0.5°	
Measurement error 1st reflected pulse[2]			
Systematic error		±30 mm (1.18 in)	±50 mm (1.97 in)
Temperature drift	0 mm (0 in)/ °C		0.32 mm (0.013 in)/ °C
Statistical error (1σ)		12 mm (0.47 in)	20 mm (0.79 in)
Immunity to external light		40 klx	
Evenness of the scan field (25 Hz)			
Cone		±0.5°	±1°
Inclination		±1°	±2°
Distance from mirror axis of rotation (zero point on the X and Y axis) to the rear of the device		55 mm (2.17 in)	
Distance between centre of the scan plane and the bottom edge of the housing		116 mm (4.57 in)	
Distance measuring range	0.5 m (1.64 ft)		20 m (65.62 ft)
Hardware blanking window	0 m (0 ft)		15 m (49.21 ft)
Step width		1 m (3.28 ft)	
Power-up delay			60 s
Of a configured device		15 s	
Configurable restart after	2 s		60 s
General data			
Laser protection class	Laser class 1 according IEC 60825-1 (2007-3)		
Enclosure rating	As per EN 60529 (1991-10); A1 (2002-02)		
LMS/LMC12x	IP 65		
LMS/LMC13x	IP 67		
Protection class	III as per EN 50178 (1997-10)		
EMC test	As per EN 61000-6-2 (2005-08), EN 61000-6-3 (2007-03)		
Electrical safety	As per EN 50178 (1997-10)		

Tab. 16:   Data sheet LMS/LMC

	Minimum	Typical	Maximum
Operating temperature range			
LMS/LMC12x	0 °C		+50 °C
LMS/LMC13x	–30 °C		+50 °C
LMC12x with mounting kit 1	–30 °C		+45 °C
LMC12x with mounting kit 2	–30 °C		+50 °C
Storage temperature range	–30 °C		+70 °C (max. 24 h)
Humidity (taking into account the operating temperature range)	DIN EN 60068-2-61, method 1		
Vibration resistance	As per EN 60068-2-6 (1995-04)		
Frequency range	10 Hz		150 Hz
Amplitude	5 g RMS		
Shock resistance	As per EN 60068-2-27 (1993-03), EN 60068-2-29 (1993-04)		
Single shock	15 g, 11 ms		
Continuous shock	10 g, 16 ms		
Sender	Pulsed laser diode		
Wave length	895 nm	905 nm	915 nm
Divergence of the collimated beam (solid angle)		15 mrad	
Light spot size at the optics cover		8 mm (0.31 in)	
Light spot size at 18 m (59.05 ft) scanning range		300 mm (11.81 in)	
Housing			
Material	GD-ALSI12 3.2582.05		
Color LMS/LMC121/131	RAL 7032 (pebble gray)		
Color LMS/LMC122/132	RAL 9005 (jet black)		
Color LMS/LMC123/133	RAL 9003 (signal white)		
Color LMS/LMC124	RAL 9005 (jet black) Mounting kit: uncoated aluminium		
Alloy	Excellent weather resistance as per DIN EN 106:1988, plate 3		
Optics cover			
Material	Polycarbonate		
Surface finish	Outside with scratch-resistant coating		
System plug (LMS/LMC12x)			
Material	GD-ALSI12 3.2582.05		
Color	RAL 9005 (jet black)		
Cable entries (LMS/LMC13x)			
Material	Stainless steel/plastic		

Tab. 16:   Data sheet LMS/LMC (cont.)

	Minimum	Typical	Maximum
Dimensions[3]			
Height LMS/LMC12x			152 mm (5.98 in)
Height LMS/LMC13x			162 mm (6.38 in)
Width			102 mm (4.02 in)
Depth			106 mm (4.17 in)
Total weight (without connecting cables)		1.1 kg	
Electrical data			
Supply voltage LMS/LMC SELV or PELV as per IEC 60364-4-41 (2005-12)	9 V	24 V	30 V
Permissible residual ripple			±5 %
Supply voltage for the heating LMS/LMC13x	19.2 V	24 V	28.8 V
Switch on current			2 A
Operating current at 24 V without output load		0.35 A	0.5 A
Operating current with max. output load		0.65 A	0.8 A
Operating current with maximum heating performance		2.3 A	2.5 A
Power consumption without output load		8.4 W	12 W
Power consumption with maximum output load		16 W	20 W
Power consumption with maximum heating performance		55 W	60 W
Electrical connection LMS/LMC13x	Round M12 plug connector		
Electrical connection LMS/LMC12x	System plug with screw terminal block		
Technical specifications, screw terminals			
Cross-section of rigid cores (American Wire Gauge — AWG)	0.14 mm² (approx. 26 AWG)		1.5 mm² (approx. 16 AWG)
Cross-section of flexible cores (American Wire Gauge — AWG)	0.14 mm² (approx. 26 AWG)		1.0 mm² (approx. 18 AWG)
Insulation stripping length for the cores		5 mm (0.20 in)	
Screw tightening torque	0.22 Nm		0.3 Nm
Cable length for device power supply at 24 V			
With 1 mm² wire cross-section (approx. 18 AWG)			220 m (721.78 ft)
With 0.5 mm² wire cross-section (approx. 22 AWG)			110 m (360.89 ft)
With 0.25 mm² wire cross-section (approx. 24 AWG)			50 m (164.04 ft)
Cable length for heating at 24 V			
With 1 mm² wire cross-section (approx. 18 AWG)			45 m (147.64 ft)
With 0.5 mm² wire cross-section (approx. 22 AWG)			20 m (65.62 ft)

Tab. 16:   Data sheet LMS/LMC (cont.)

	Minimum	Typical	Maximum
With 0.25 mm² wire cross-section (approx. 24 AWG)			10 m (32.81 ft)
Cable length for device power supply at 12 V			
With 1 mm² wire cross-section (approx. 18 AWG)			20 m (65.62 ft)
With 0.5 mm² wire cross-section (approx. 22 AWG)			10 m (32.81 ft)
With 0.25 mm² wire cross-section (approx. 24 AWG)			5 m (16.40 ft)
Switching inputs			
Number	2		
Input resistance on HIGH		2 kΩ	
Voltage for HIGH	11 V	24 V	30 V
Voltage for LOW		0 V	5 V
Input capacity		15 nF	
Static input current	6 mA		15 mA
Relay switching outputs (semiconductor relay/ MOSFET) LMS/LMC13x, from 2012 also LMS/LMC12x			
Number	2		
Switching voltage			DC/AC 40 V
Switching current			0.5 A
Contact resistance		0.34 Ω	0.7 V
Output capacitance			220 pF
Input/output dielectric strength			1500 VAC
Power-up delay		1.3 ms	0.1 ms
Switch off time		0.1 ms	0.5 ms
Relay switching outputs LMS/LMC12x up to 2012			
Number	2		
Switching capacity			DC 30 W/ AC 37.5 VA
Switching voltage			DC 110 V/ AC 125 V
Switching current			0.5 A at 30 V
Contact resistance		0.34 Ω	0.7 Ω
Switching cycles	10^5		
Power-up delay		2 ms	4 ms
Switch off time		2 ms	4 ms

Tab. 16: Data sheet LMS/LMC (cont.)

	Minimum	Typical	Maximum
Serial auxiliary interface			
Communication protocol	RS-232 (proprietary)		
Transmission speed	9.600 Baud	57.6 kBd	115.2 kBd
Serial host interface			
Communication protocol	RS-232 (proprietary)		
Transmission speed (selectable)	9.600 Baud	57.6 kBd	115.2 kBd
Cable length at 38.400 kBd and wire cross-section 0.25 mm² (approx. 24 AWG)			15 m (49.21 ft)
Galvanic de-coupling	Yes		
Wire cross-section of the connecting cable			0.25 mm² (approx. 24 AWG)
Ethernet	10/100 Mbit/s		

Tab. 16:   Data sheet LMS/LMC (cont.)

1)   Corresponds to Diamond Grade 3000X™ (approx. 1,250 cd/lx × m²).
2)   The time after the first reflected pulse from which measurement can be performed with full accuracy is dependent on the target that reflected the first reflected pulse.
3)   Without fixing screws and projection of cable glands with system plug mounted.

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9.2   Dimensional drawings

9.2.1   Dimensional drawing LMS/LMC12x
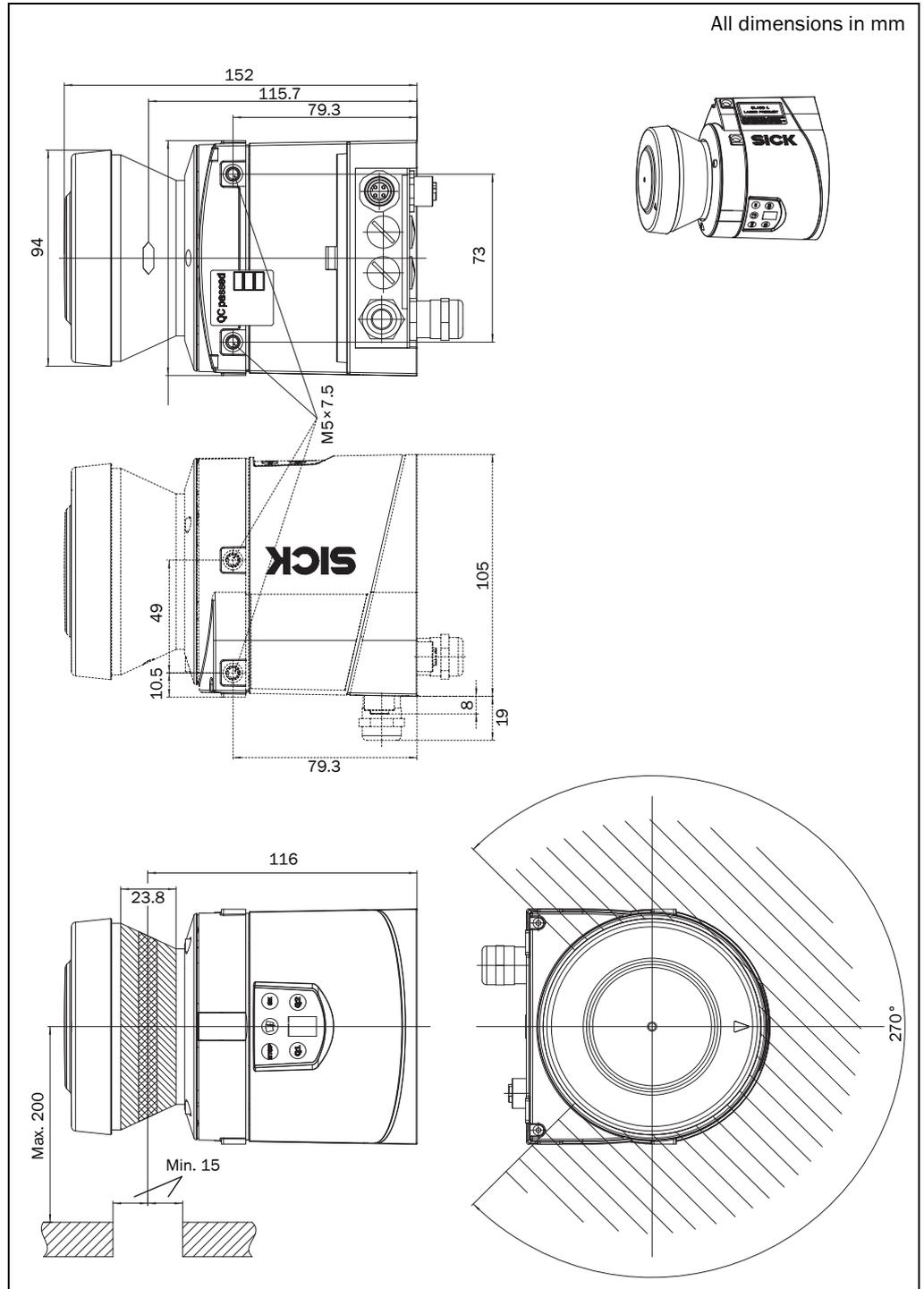
Fig. 22:   Dimensional drawing LMS/LMC12x

9.2.2   Dimensional drawing LMS/LMC13x
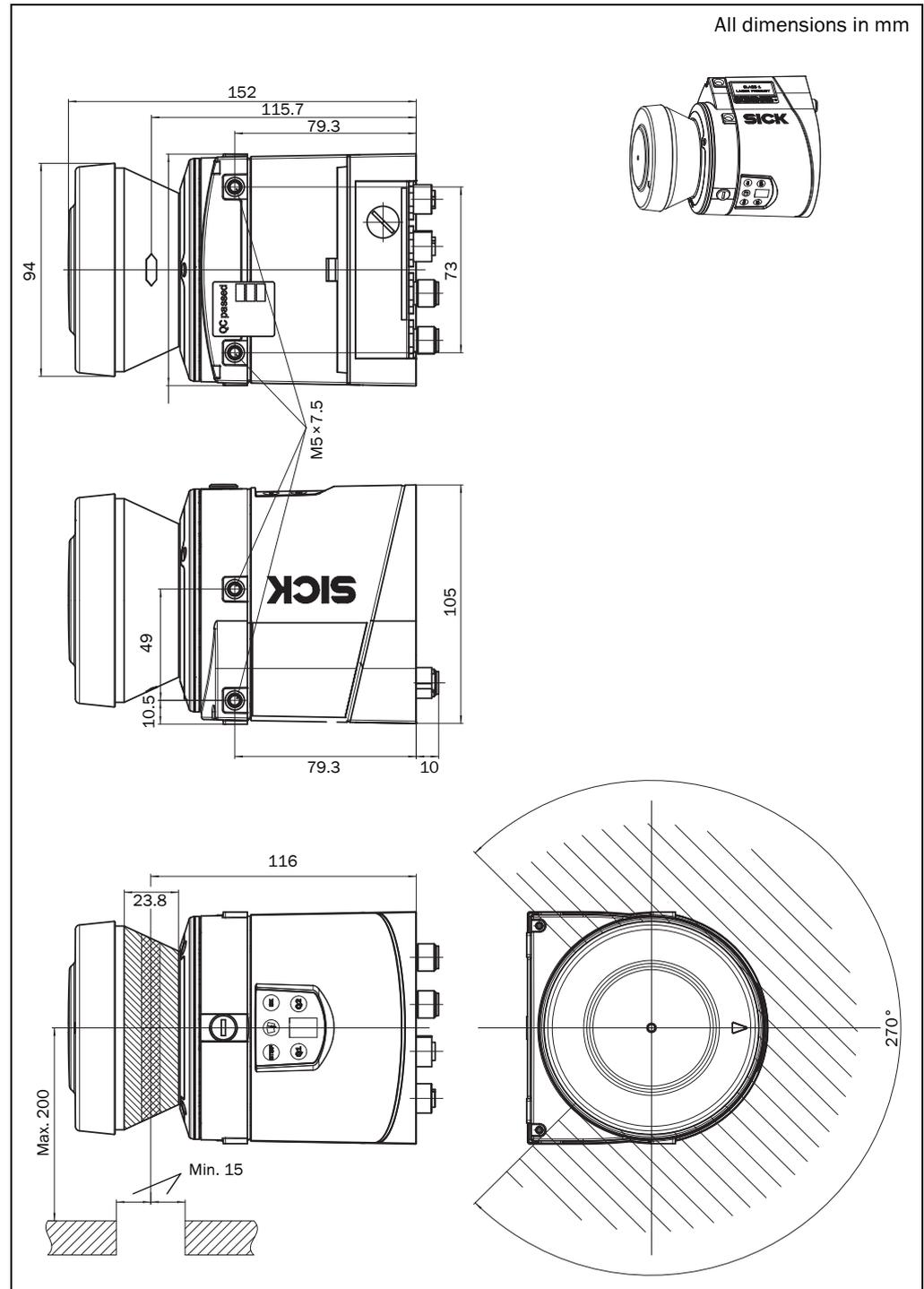
Fig. 23:   Dimensional drawing LMS/LMC13x

9.2.3   Dimensional drawings LMS/LMC with mounting kits
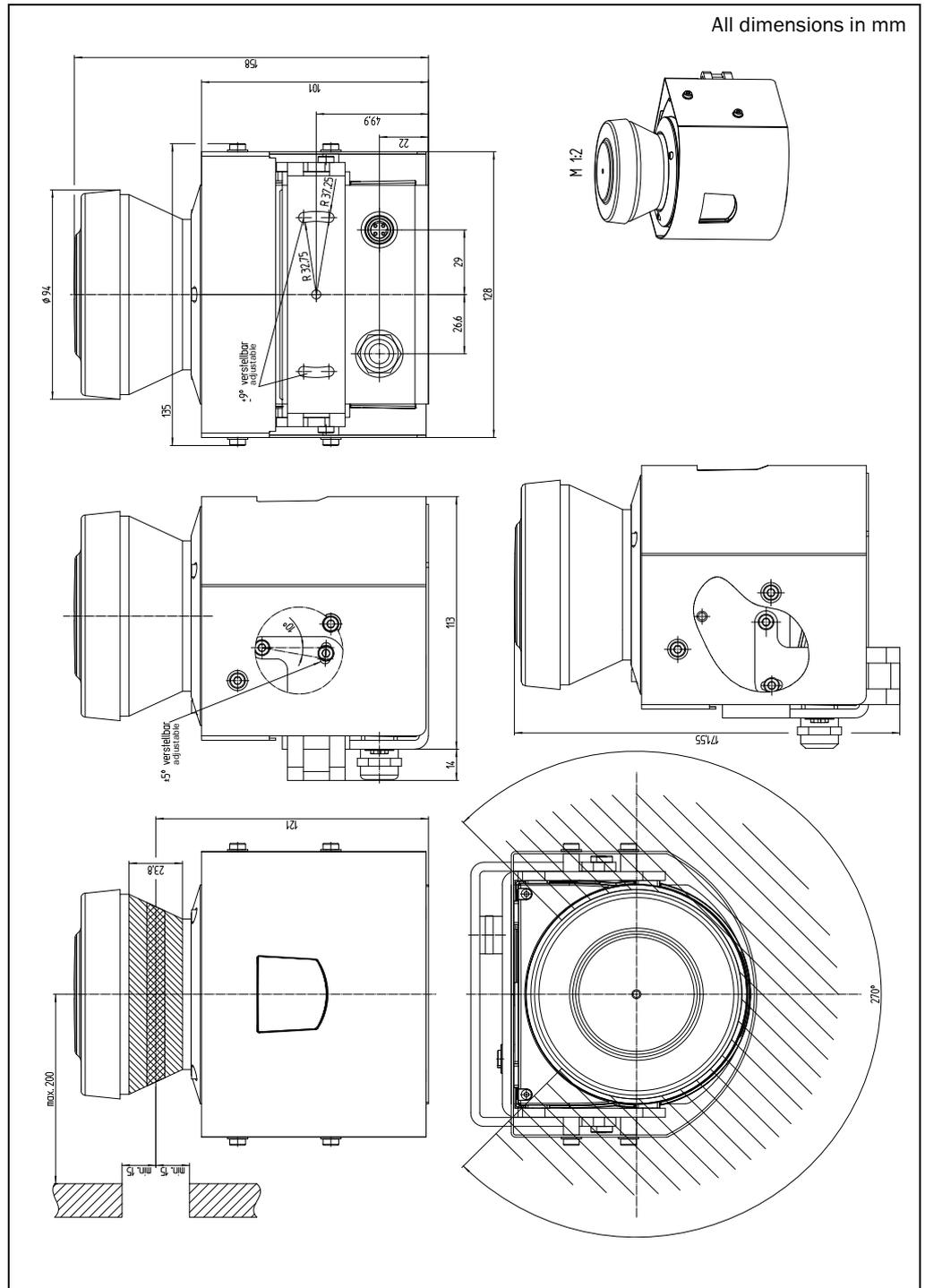
Fig. 24:   Dimensional drawing LMC12x with VdS mounting kit 1

Technical specifications

All dimensions in mm

Fig. 25:   Dimensional drawing LMC12x with VdS mounting kit 2

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All dimensions in mm
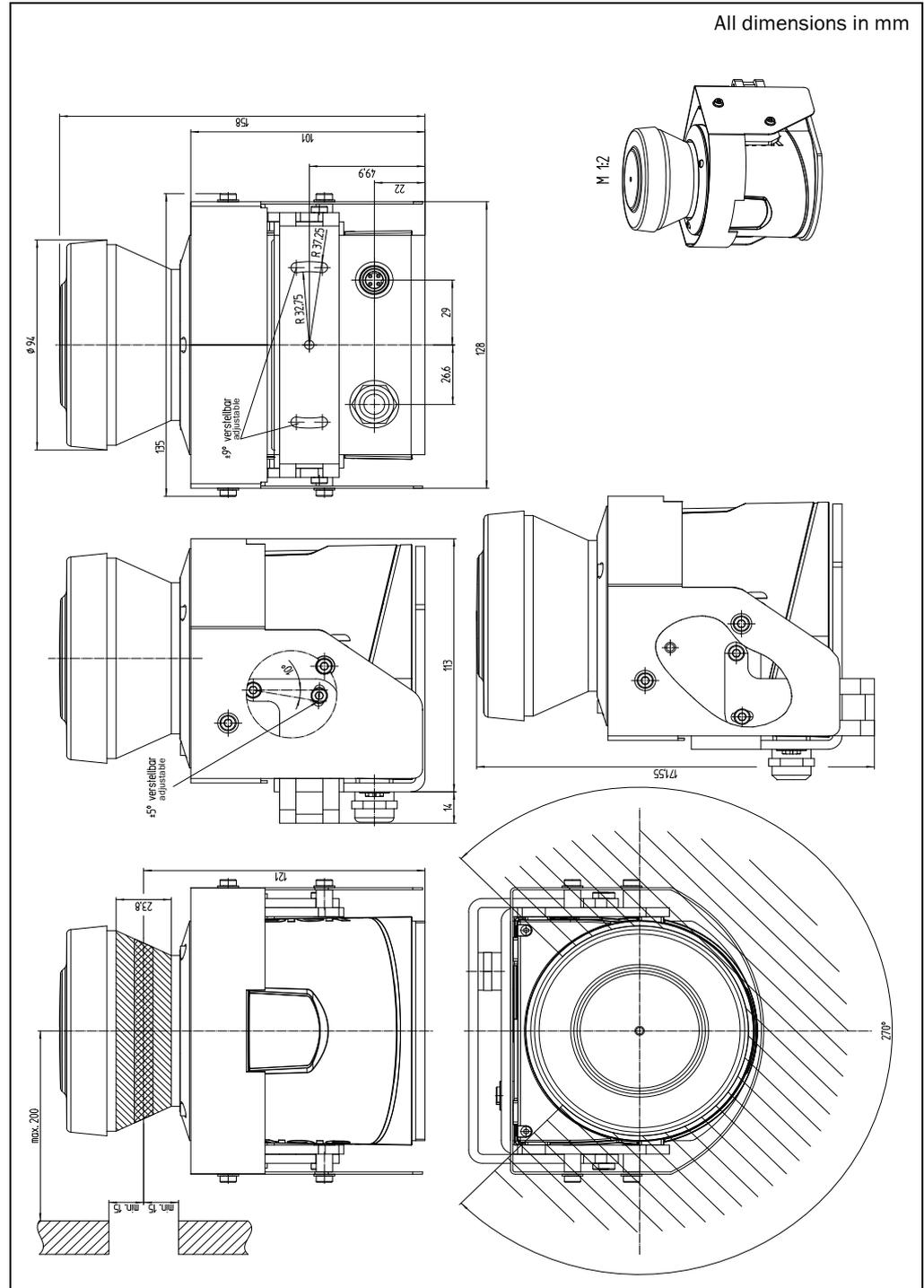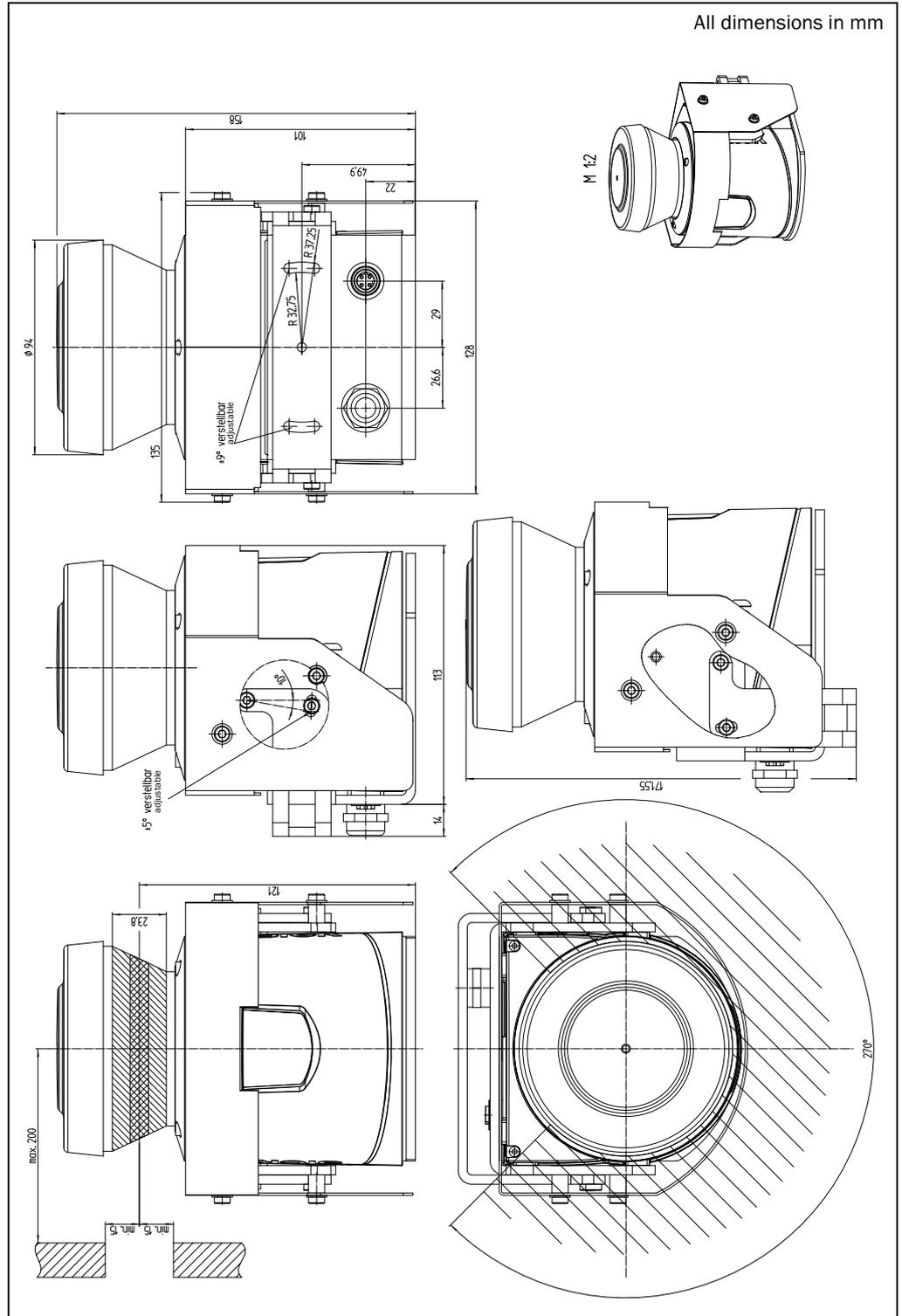
Fig. 26:   Dimensional drawing LMC13x with VdS mounting kit 2

10   Annex

10.1   Overview of the annexes

The annex contains the following supplementary information:

- ordering information
- glossary
- illustration containing the EU Declaration of Conformity
- illustration of the VdS certificate
- illustration of the VSÖ certificate

10.2   Ordering information

10.2.1   Available systems

LMS12x Security (indoor)

Type	Description	Part no.
LMS121-10000	Laser measurement sensor Security pebble gray (RAL7032)	1051384
LMS122-10000	Laser measurement sensor Security jet black (RAL9005)	1044322
LMS123-10000	Laser measurement sensor Security signal white (RAL9003)	1044321

Tab. 17:   Ordering information for the LMS12x variants

LMS13x Security (outdoor)

Type	Description	Part no.
LMS131-10100	Laser measurement sensor Security pebble gray (RAL7032)	1051379
LMS132-10100	Laser measurement sensor Security jet black (RAL9005)	1051402
LMS133-10100	Laser measurement sensor Security signal white (RAL9003)	1051403

Tab. 18:   Ordering information for the LMS13x variants

LMC12x VdS (indoor)

Type	Description	Part no.
LMC121-11000	Laser measurement system VdS pebble gray (RAL7032) incl. VdS mounting kit 1	1051287
LMC122-11000	Laser measurement system VdS jet black (RAL9005) incl. VdS mounting kit 1	1051300
LMC123-11000	Laser measurement system VdS signal white (RAL9003) incl. VdS mounting kit 1	1051301
LMC124-11000	Laser measurement system VdS jet black (RAL9005) incl. VdS mounting kit 1 (uncoated aluminium)	1051303
LMC121-11001	Laser measurement system VdS pebble gray (RAL7032) incl. VdS mounting kit 2	1051314
LMC122-11001	Laser measurement system VdS jet black (RAL9005) incl. VdS mounting kit 2	1051315
LMC123-11001	Laser measurement system VdS signal white (RAL9003) incl. VdS mounting kit 2	1051316

Tab. 19:   Ordering information for the LMC12x variants

LMC13x VdS (outdoor)

Type	Description	Part no.
LMC131-11101	Laser measurement system VdS pebble gray (RAL7032) incl. VdS mounting kit 2	1051487
LMC132-11101	Laser measurement system VdS jet black (RAL9005) incl. VdS mounting kit 2	1051488
LMC133-11101	Laser measurement system VdS signal white (RAL9003) incl. VdS mounting kit 2	1051489

Tab. 20:   Ordering information for the LMC13x variants

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10.2.2   Mounting kits

Description	Part no.
VdS mounting kit 1 pebble gray (RAL7032)	2056270
VdS mounting kit 1 jet black (RAL9005)	2056271
VdS mounting kit 1 signal white (RAL9003)	2052396
VdS mounting kit 1 — uncoated aluminium	2056272

Tab. 21:   Mounting kits

Important   It is not possible to subsequently upgrade an LMS to an LMC using the mounting kits.

10.2.3   Available accessories

Number	Description
6032508	RS-232 null modem cable for LMS/LMC, 3-core, 3 m (9.84 ft), twisted-pair, screened, 15 pin D-Sub HD socket to 9 pin D-Sub socket for configuration using PC
6032509	Ethernet cross-over cable for LMS/LMC, 3 m (9.84 ft), twisted-pair, screened, 15 pin D-Sub HD socket to 8 pin RJ-45 plug for configuration using PC
5311055	Fixing bracket for LMS/LMC, complete with mounting material and tools

Tab. 22:   Available accessories

10.2.4   Consumables

Part number	Type	Description
4003353	Lens cloth	Special cloth for correctly cleaning the window
5600006	Plastic detergent	Antistatic, mild detergent solution

Tab. 23:   Consumables

10.2.5   Cables for LMS/LMC

Part number	Type	Description
6034415	SSL-2J04-G10ME	M12 4 pin, Ethernet, RJ45 on host, 5 m (16.40 ft) (plug/plug) connection cable
6030928	SSL-2J04-G10ME	M12 4 pin, Ethernet, RJ45 on host, 10 m (32.81 ft) (plug/plug) connection cable
6036158	SSL-2J04-G20ME	M12 4 pin, Ethernet, RJ45 on host, 20 m (65.62 ft) (plug/plug) connection cable
6021195	DSL-8D04G02M025KM1	Configuration cable for connection to the PC, 9-pin, Sub-D, 4 pin, M8, 2 m (6.56 ft)
2027649	DSL-8D04G10M025KM1	Configuration cable for connection to the PC, 9-pin, Sub-D, 4 pin, M8, 10 m (32.81 ft)

Tab. 24:   Cables for LMS/LMC

10.2.6   Cables for LMS13x

Part number	Description
6036159	Supply cable M12×5, 4-core, flying leads, 5 m (16.40 ft) connection cable (socket-open)
6036161	Supply cable M12×5, 4-core, flying leads, 20 m (65.62 ft) connection cable (socket-open)
6036160	Supply cable M12×5, 4-core, flying leads, 10 m (32.81 ft) connection cable (socket-open)
6036155	I/O cable M12×8, 8-core, flying leads, 5 m (16.40 ft) connection cable (plug-open)
6036156	I/O cable M12×8, 8-core, flying leads, 10 m (32.81 ft) connection cable (plug-open)
6036157	I/O cable M12×8, 8-core, flying leads, 20 m (65.62 ft) connection cable (plug-open)
6036153	RS-232 cable M12×8, 8-core, flying leads, 5 m (16.40 ft) connection cable (plug-open)
6028420	RS-232 cable M12×8, 8-core, flying leads, 10 m (32.81 ft) connection cable (plug-open)
6036154	RS-232 cable M12×8, 8-core, flying leads, 20 m (65.62 ft) connection cable (plug-open)

Tab. 25:   Cables for LMS13x

Important   • For the VdS versions a cable without color coding can be supplied on request.

• In case of VdS-compliant installation, the power supply must be designed correspondingly.

10.3   Glossary

Download

Transmission of the parameter set that has been modified offline in the SOPAS ET configuration software from the PC to the LMS/LMC. SOPAS ET transmits either always a complete copy to the memory (RAM) of the LMS/LMC (menu COMMUNICATION, DOWNLOAD ALL PARAMETERS TO DEVICE) or only the parameter that has just been edited (menu COMMUNICATION, DOWNLOAD MODIFIED PARAMETERS TO DEVICE). With menu LMS/LMC, PARAMETER, SAVE PERMANENT, the parameter set is saved permanently in the EEPROM of the LMS/LMC.

Parameter set

Data set using which the functions implemented in the LMS/LMC are initialized and activated. Is transmitted from the LMS/LMC to SOPAS ET and in the reverse direction using UPLOAD or DOWNLOAD respectively.

Remission

Remission is the quality of reflection at a surface. The basis is the Kodak standard, known worldwide in, among other areas, photography. The surface-related magnitude of the remission is the remission value.

Scan

A scan includes all measured values determined related to the scan angle.

SOPAS ET

Configuration software, used for the offline configuration (adaptation to the read situation on-site) and the online operation of the LMS/LMC in dialog mode.

Upload

Transmission of the parameter set from the LMS/LMC to the PC into the SOPAS ET configuration software. The values for the parameters are displayed on the file cards of the configuration software. Prerequisite for the modification of the current parameter set.

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10.4   EC Declaration of Conformity

Fig. 27 shows page 1 of the EC Declaration of Conformity (size reduced).

If necessary you can download the complete EC declaration of conformity (with list of the device variants and the standards met) as a PDF from the related product page on the SICK website www.sick.com.
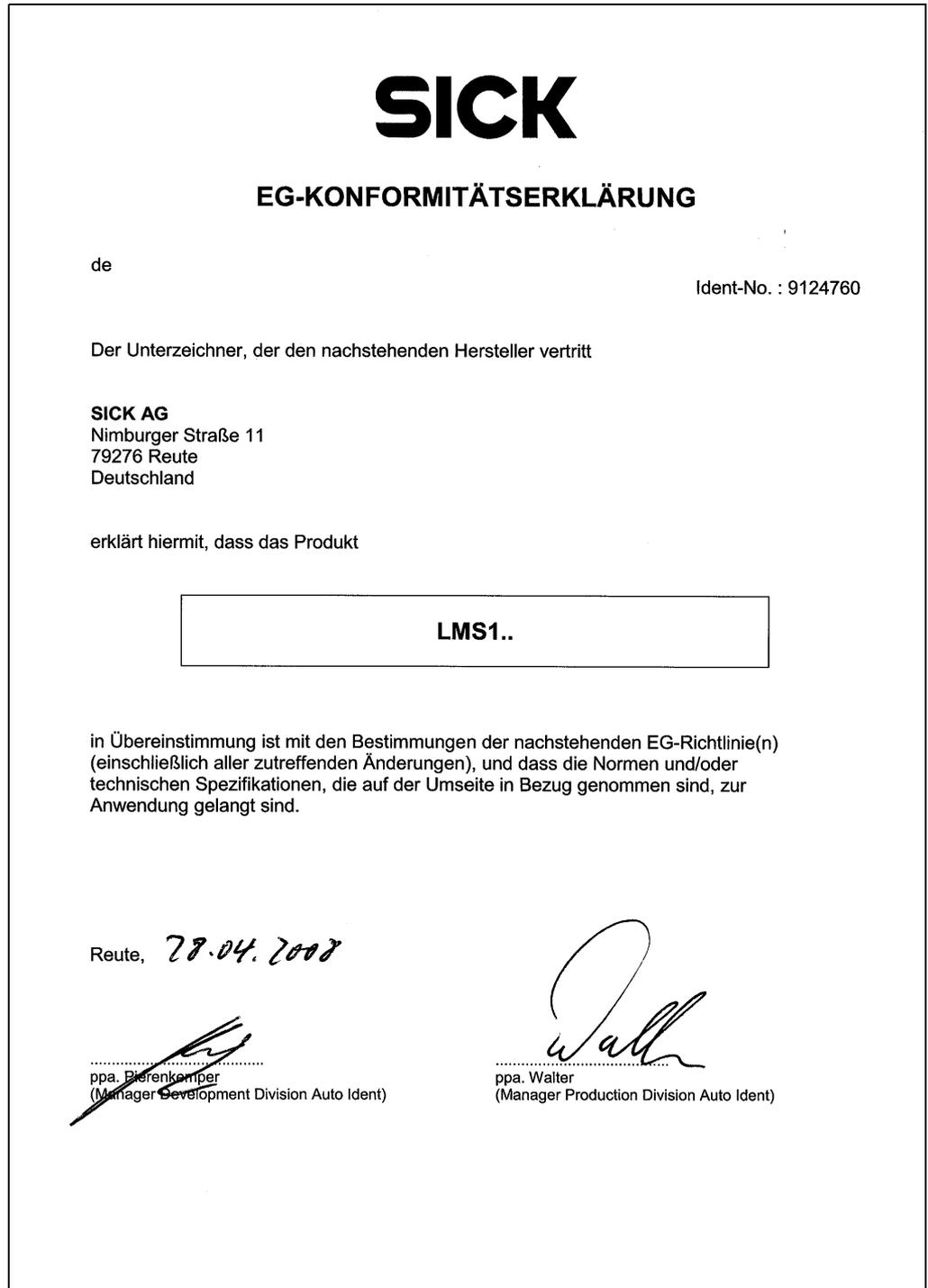
Fig. 27:   Illustration containing the EU Declaration of Conformity

10.5   VdS certificate

Fig. 28 shows a reduced version of the VdS certificate.

Fig. 28:   VdS certificate

Important   There are two different certificates for the two laser measurement systems LMC12x and 13x. The LMC12x has the approval number G110045, the LMC13x has the approval number G111032.

10.6   Attestation to EN 50131

Fig. 29 shows a reduced version of the Attestation to EN 50131.

Fig. 29:   Attestation to EN 50131

10.7   VSÖ certificate

Fig. 30 shows a reduced version of the VSÖ certificate.

Fig. 30:   VSÖ certificate

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