SUPPLEMENT TO THE
OPERATING INSTRUCTIONS

LD-OEM
Laser Measurement System

Description and Technical Data of LD-LRS1000/2100/3100

SICK
Sensor Intelligence.

Described software versions

Software/Tool	Function	Version
LD-LRSxx00	Firmware	V 2.1.8
LD-LRSxx00 device description	Device-specific software module for SOPAS	from V 1.0
SOPAS	**S**ICK **O**pen **P**ortal for **A**pplication and **S**ystems Engineering Tool. Configuration software for LD-LRSxx00	V 2.08

Differences from LD-LRS1000/2100/3100 to LD-OEM (overview)

No.	Feature	See page
1	Modified scanner head	*5, 22*
2	Higher enclosure rating (IP 67 housing for LD-LRS2100/3100)	*5, 22*
3	Smaller tolerance of supply voltage	*5, 22*
4	Lower max. scanning frequency	*5, 22*
5	Supplement: Maximum current consumption of the switching outputs	*5*
6	LD-LRS1000: New signal names of the 6-pin terminal strip	*7*
7	LD-LRS1000: New pin assignment of the 15-pin D-Sub HD plug	*7*
8	LD-LRS2100/3100: new plug connection (20-pin Harting insert)	*8*
9	LD-LRS1000: Switch for data interface RS 232/RS 422	*6*
10	LD-LRS1000: Switch for CAN bus termination	*6*
11	New: SOPAS Configuration software	*18, 20*
12	New: Ethernet interface	*14, 20*
13	Reduced max. cable length for CAN interface	*22*
14	Modified technical data	*22*
15	New dimensional drawings	*24*
16	New accessories	*26*
17	No longer available: Arcnet interface	–

Latest manual version

For the latest version of this manual (PDF), see **www.sick.com**.

Contents

Note From this point on, the Long Range Scanner and all its variants will simply be referred to as “LD-LRSxx00“ (unless a distinction is required).

The LD-LRS2100/3100 is exclusively intended for use in an industrial environment. In case of use in residential areas, RF interference may occur.

Tables

Figures

1 Differences from LD-LRSxx00 to LD-OEM

1.1 Device variants

The LD-LRSxx00 is available in the following variants:

Type	Order No.	Data interface	Enclosure rating	Max. rotation frequency
LD-LRS1000	1028941	RS 232[1], RS 422, CAN and Ethernet	IP 65	10 Hz
LD-LRS2100	1029041	RS 232, CAN[2] and Ethernet	IP 67	10 Hz
LD-LRS3100	1029042	RS 422, CAN[2] and Ethernet	IP 67	10 Hz

1) LD-LRS1000: default setting by factory: RS 232
2) an external termination resistor is required if the LD-LRS2100/3100 is located at the end of the bus

Table 1-1: LD-LRSxx00 variants

LD-LRS1000
(IP 65)

LD-LRS2100/3100 with heater
(IP 67)

Fig. 1-1: Housing design: Modified scanner head/IP 67 housing

1.2 Operating voltage

Electronics (all LD-LRSxx00):

24 V DC ± 15 % according to IEC 364-4-41. Power consumption max. 36 W when the switching outputs are not connected. Max. current consumption 1 A about all connected switching outputs.

Connected outputs	Max. current of each output	Max. current about all
4	0.25 A	1 A
3	0.33 A	1 A
2	0.5 A	1 A
1	0.5 A	**0.5 A**

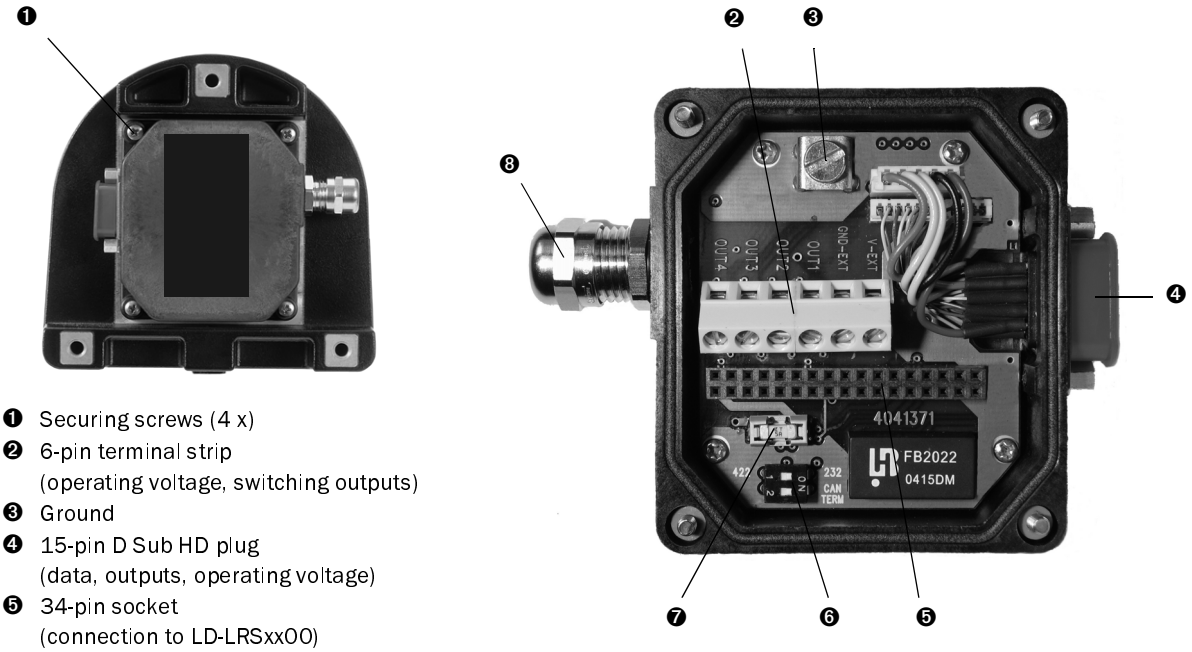
Table 1-2: Max. current consumption of the switching outputs

Heater (LD-LRS2100/3100 only):

DC 24 V (max. 6 V ripple), current consumption max. 6 A (circular).

1.3 Pin assignment

1.3.1 Pin assignment LD-LRS1000



❶ Securing screws (4 x)
❷ 6-pin terminal strip
(operating voltage, switching outputs)
❸ Ground
❹ 15-pin D Sub HD plug
(data, outputs, operating voltage)
❺ 34-pin socket
(connection to LD-LRSxx00)
❻ DIP switch 1 (RS 232/RS 412)
DIP switch 2 (termination CAN bus)
❼ Fuse (operating voltage)
❽ PG 7 cable gland

Fig. 1-2: LD-LRS1000: Design of the interface adapter

Parameter	Default settings
Switch 1 (RS 232/RS 422)	RS 232
Switch 2 (CAN bus termination)	Termination ON*)
*) if an external termination resistor is used, the internal termination in the LD-LRS1000 has to be deactivated.	

Table 1-3: LD-LRS1000 interface adapter: Default settings

6-pin terminal strip

Signal	Name on the board	Function
+24 V DC	V-EXT	Operating voltage
GND	GND-EXT	Operating voltage ground
OUT 1	OUT 1	Switching output 1, function depends on application
OUT 2	OUT 2	Switching output 2, function depends on application
OUT 3	OUT 3	Switching output 3, function depends on application
OUT 4	OUT 4	Switching output 4, function depends on application

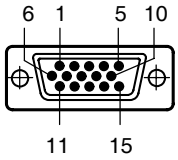
Table 1-4: LD-LRS1000 interface adapter: Terminal assignment of 6-pin terminal strip

Reference: Signal notation of the terminal strip LD-LRS1000/LD-OEM

Notation for LD-LRS1000	Notation for LD-OEM (old)
V-EXT	+24 V
GND-EXT	GND
OUT 1	Alarm 1
OUT 2	Alarm 2
OUT 3	Safe 1
OUT 4	Safe 2

Table 1-5: Comparison: Signal notation of the 6-pin terminal strip LD-LRS1000/LD-OEM

15-pin D Sub HD plug



Pin	Signal	Interface	Function
1	24 V DC		Power supply
2	CAN L	CAN bus (IN/OUT)	CAN bus Low
3	CAN H	CAN bus (IN/OUT)	CAN bus High
4	GND_Data		Data interface ground
5	GND		Power supply ground
6	RD+	RS 422	Receiver+
7	RD–/RxD	RS 422/RS 232	Receiver–
8	TD+	RS 422	Transmitter+
9	TD–/TxD	RS 422/RS 232	Transmitter–
10	OUT 1		Switching output 1, function depends on application
11	TPIP	Ethernet IN	Receiver+
12	TPIN	Ethernet IN	Receiver–
13	TPOP	Ethernet OUT	Transmitter+
14	TPON	Ethernet OUT	Transmitter–
15	OUT 2		Switching output 2, function depends on application
Housing	–	–	Shield

Table 1-6: LD-LRS1000 interface adapter: Pin assignment of 15-pin D Sub HD plug

1.3.2 Pin assignment LD-LRS2100/3100

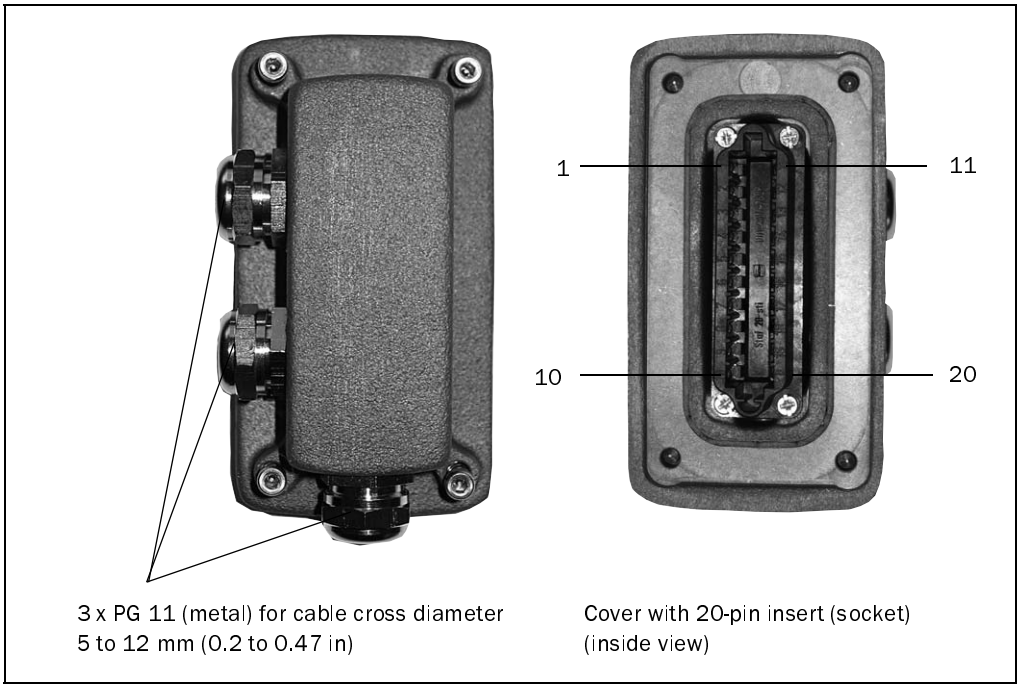
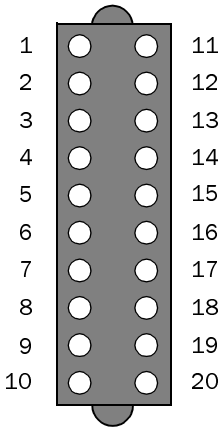


Fig. 1-3: LD-LRS2100/3100: Housing of th 20-pin plug connection with Harting insert (socket)

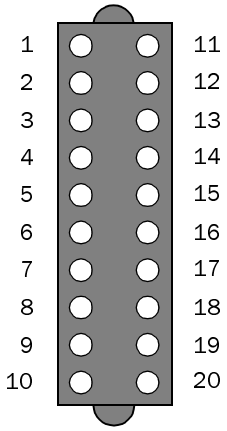
LD-LRS2100: 20-pin Harting socket



Pin	Signal	Interface	Function
1	DC 24 V_HZG		Heater power supply
2	DC 24 V		Electronics power supply
3	OUT 1	Switching output 1	Function depends on application
4	OUT 3	Switching output 3	Function depends on application
5	–	n. c.	–
6	TxD	RS 232	Transmitter–
7	–		Reserved
8	CAN H	CAN bus (IN/OUT)	CAN bus High
9	TPOP	Ethernet OUT	Transmitter+
10	TPON	Ethernet OUT	Transmitter–
11	GND_HZG		Heater ground
12	GND		Electronics ground
13	OUT 2	Switching output 2	Function depends on application
14	OUT 4	Switching output 4	Function depends on application
15	GND_Data		Data interfaces ground
16	RxD	RS 232	Receiver–
17	–		Reserved
18	CAN L	CAN bus (IN/OUT)	CAN bus Low
19	TPIP	Ethernet IN	Receiver+
20	TPIN	Ethernet IN	Receiver–
Housing	–	–	Shield

Table 1-7: LD-LRS2100: Pin assignment ot the 20-pin Harting socket

LD-LRS3100: 20-pin Harting socket



Pin	Signal	Interface	Function
1	DC 24 V_HZG		Heater power supply
2	DC 24 V		Electronics power supply
3	OUT 1	Switching output 1	Function depends on application
4	OUT 3	Switching output 3	Function depends on application
5	–	n. c.	–
6	TD–	RS 422	Transmitter–
7	TD+	RS 422	Transmitter+
8	CAN H	CAN bus (IN/OUT)	CAN bus High
9	TPOP	Ethernet OUT	Transmitter+
10	TPON	Ethernet OUT	Transmitter–
11	GND_HZG		Heater ground
12	GND		Electronics ground
13	OUT 2	Switching output 2	Function depends on application
14	OUT 4	Switching output 4	Function depends on application
15	GND_Data		Data interfaces ground
16	RD–	RS 422	Receiver–
17	RD+	RS 422	Receiver+
18	CAN L	CAN bus (IN/OUT)	CAN bus Low
19	TPIP	Ethernet IN	Receiver+
20	TPIN	Ethernet IN	Receiver–
Housing	–	–	Shield

Table 1-8: LD-LRS3100: Pin assignment ot the 20-pin Harting socket

The cables are routed into the housing via PG cable glands. For connecting the wires, the 20-pin insert (socket) provides screw terminals on its backside.

1.3.3 Pre-fabricated cables for RS 232/RS 422/CAN

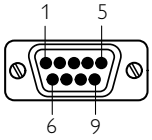
Temperature range 0 to +40 °C (+32 to +104 °F).

LD-LRS1000:

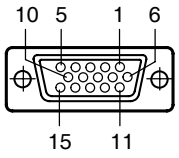
Connection	Cable no.	Length	Description
Connection diagram of previous LD-OEM (without Arcnet)	6032507	0.2 m (0.79 in)	Adapter cable for RS 232/RS 422/CAN, shielded, 15-pin D-Sub HD socket to 9-pin D Sub plug. Pin assignment see *Table 1-10*.
LD-LRS1000 to PC (RS 232) via cable no. 6032507	2014054	3 m (9.84 ft)	RS 232 null modem cable, 3-core, shielded, 9-pin D Sub socket to 9-pin D Sub socket. Pin 2 (RxD) and Pin 3 (TxD) are corssed. For configuring the LD-LRS1000 using a PC.
LD-LRS1000 to PC (RS 232)	6032508	3 m (9.84 ft)	RS 232 null modem cable, 3-core, shielded, 15-pin D Sub HD socket to 9-pin D Sub socket, for configuring the LD-LRS1000 using a PC. Pin assignment see *Table 1-11, Page 11*.

Table 1-9: Adapter cable/Data cables (RS 232) for connecting the LD-LRS1000

Pin assignment of adapter cable no. 6032507



Connection diagramm of old LD-OEM

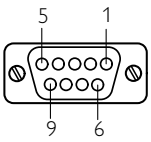


to LD-LRS1000

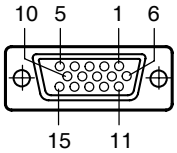
9-pin D Sub plug		15-in. D Sub HD socket (LD-LRS1000)	
Pin assignment LD-OEM (old)	Signal	Pin assignment	Signal
1	–	1	24 V DC
2	RD–/RxD	7	RD–/RxD
3	TD–/TxD	9	TD–/TxD
4	TD+	8	TD+
5	GND_Data	4	GND_Data
6	–	5	GND
7	CAN L	2	CAN L
8	CAN H	3	CAN H
9	RD+	6	RD+
		10	OUT 1
		11	TPIP
		12	TPIN
		13	TPOP
		14	TPON
		15	OUT 2
Housing	Shield	Housing	Shield

Table 1-10: Pin assignment of adapter cable no. 6032507

Pin assignment RS 232 null modem cable no. 6032508



to PC (RS 232)



to LD-LRS1000

9-pin D Sub socket (PC)		15-pin D Sub HD socket (LD-LRS1000)	
Pin assignment (RS 232)	Signal	Pin assignment	Signal
1	–	1	24 V DC
2	RxD	9	TD–/TxD
3	TxD	7	RD–/RxD
4	–	8	TD+
5	GND_Data	4	GND_Data
6	–	5	GND
7	–	2	CAN L
8	–	3	CAN H
9	–	6	RD+
		10	OUT 1
		11	TPIP
		12	TPIN
		13	TPOP
		14	TPON
		15	OUT 2
Housing	Shield	Housing	Shield

Table 1-11: Pin assignment of RS 232 null modem cable no. 6032508

Overview: Connecting the data cable (RS 232) to LD-LRS1000

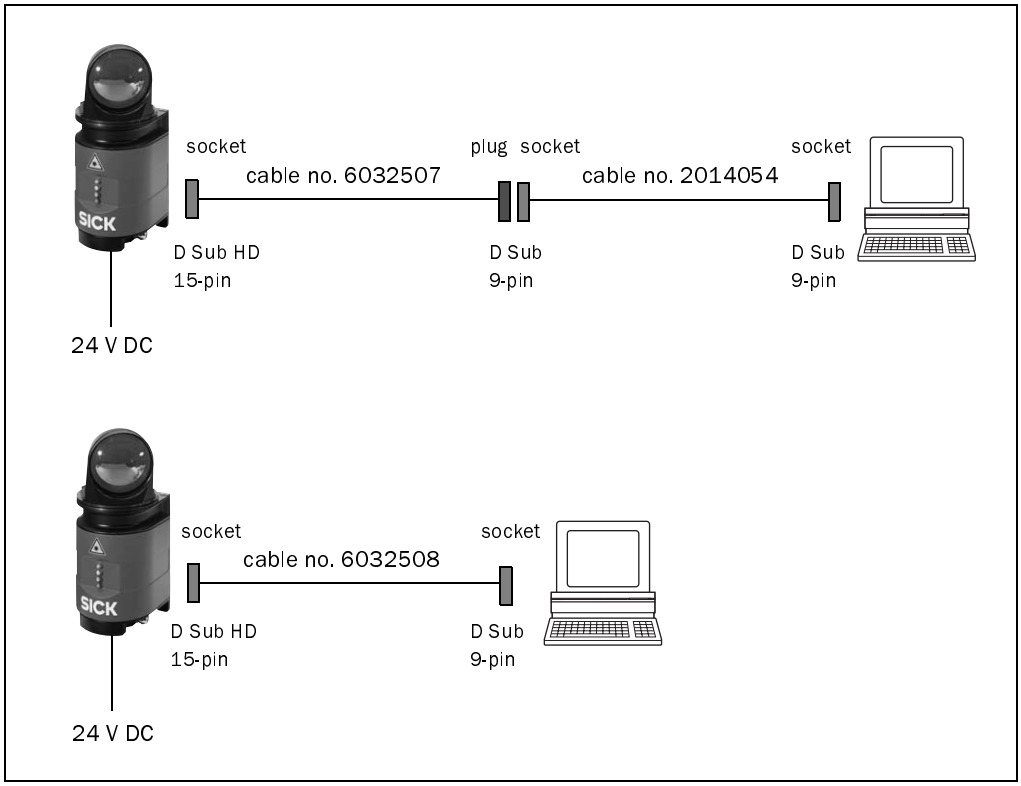


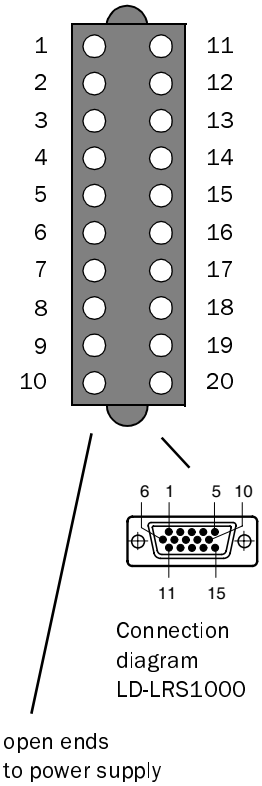
Fig. 1-4: LD-LRS1000: Pre-fabricated cables for connecting the PC (RS 232)

LD-LRS2100/3100:

Connection	Cable no.	Length	Description
Connection diagram of LD-LRS1000 PC (RS 232) and power supply	6032770	0.2 m (0.79 in) 3 m (9.84 ft)	Configuration cable (Y design), shielded, constisting of a plug housing with a 20-pin Harting insert (socket), splitted into: – 1 x adapter cable for RS 232/RS 422/CAN/Ethernet, shielded, with 15-pin D HD Sub plug – 1 x power supply cable for the electronics, 2-core, shielded, with open ends Pin assignment see *Table 1-13*.
LD-LRS2100 to PC (RS 232) via cable no. 6032770	6032508	3 m (9.84 ft)	RS 232 null modem cable, 3-core, shielded, 15-pin D Sub HD socket to 9-pin D Sub socket, for configuring the LD-LRS1000 using a PC. Pin assignment see *Table 1-11, Page 11*.

Table 1-12: Adapter cable/data cable (RS 232) for connecting the LD-LRS2100/3100

Pin assignment of configuration cable no. 6032770



20-pin Harting insert (socket) (to LD-LRS2100)			15-pin D Sub HD plug			Power supply (open end)	
Pin assignment	Signal		Pin assignment	Signal		Colour	Signal
1	DC 24 V_HZG		1	DC 24 V		red	24 V DC (electronics)
2	DC 24 V		2	CAN L		black	GND (electronics)
3	OUT 1		3	CAN H			
4	OUT 3		4	GND_Data			
5	–		5	GND			
6	TD–/TxD		6	RD+			
7	TD+		7	RD–/RxD			
8	CAN H		8	TD+			
9	TPOP		9	TD–/TxD			
10	TPON		10	OUT 1			
11	GND_HZG		11	TPIP			
12	GND		12	TPIN			
13	OUT 2		13	TPOP			
14	OUT 4		14	TPON			
15	GND_Data		15	OUT 2			
16	RD–/RxD						
17	RD+						
18	CAN L						
19	TPIP						
20	TPIN						
Housing	Shield		Housing	Shield			

Table 1-13: LD-LRS2100/3100: Pin assignment of configuration cable no. 6032770

Overview: Connecting the data cable (RS 232) to LD-LRS2100

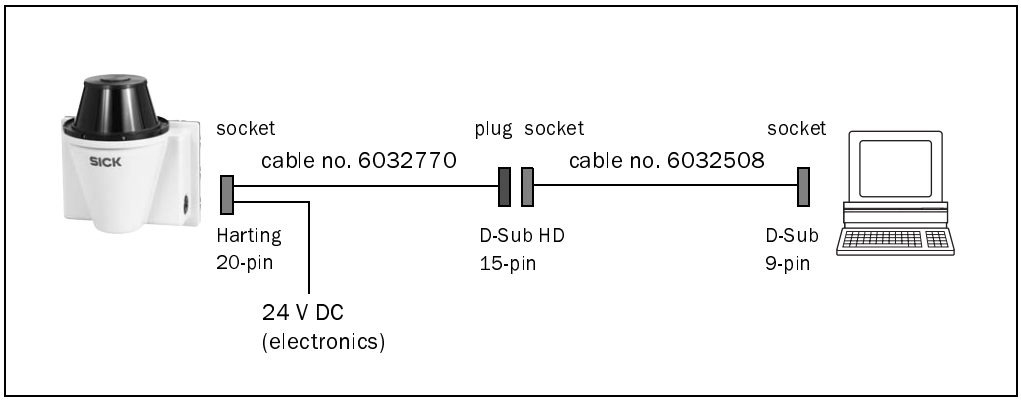


Fig. 1-5: LD-LRS2100: Pre-fabricated cables for connecting the PC (RS 232)

1.3.4 Ethernet interface

A local-area network (LAN) architecture, developed by Xerox Corporation in cooperation with DEC and Intel in 1976, uses a bus or star topology and supports data transfer rates of 10 Mbit/s. The Ethernet specification served as the basis for the IEEE 802.3 standard, which specifies the physical and lower software layers. Ethernet uses the CSMA/CD method to handle simultaneous demands. It is one of the most widely implemented standards.
The connection will be established via the logical Port 49152.

The LD-LRSxx00 supports a data transfer rate of 10 Mbit/s.

The SOPAS configuration software will be used to set the parameters for the IP adress, sub-net mask and for the gateway.

The Structure of the UPF packet for the USP (User Service Protocol) is presented as follows. The Service Code and Service Data are conform to the format that is described in the *Telegram listing LD-OEM1000* (no. 8011576, English edition).

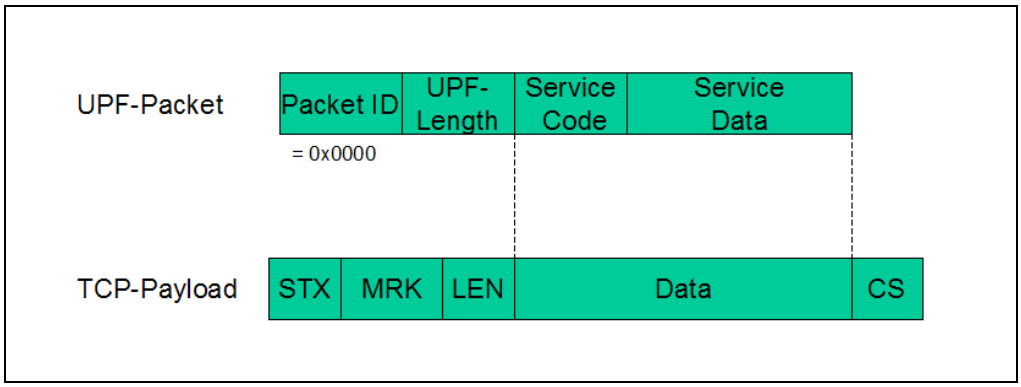


Fig. 1-6: Ethernet: Structure of the UPF packet in the User Service Protocol

STX "Start of Text", will be transferred as a single byte 0x02.

MRK Definition of the transmission format "USP"= 0x55, 0x53,0x50 (3 Bytes).

LEN UPF-Length = the number of the following bytes in <data>, coded as 32 Bit integer (four bytes) without leading sign, the MSB (most significant byte) must be transmitted first of all.

CS Checksum (single byte), calculated as exclusive-or-relation of all bytes contained in "Data".

Connecting the LD-LRSxx00 to Ethernet

According to *Table 1-14* for LD-LRS1000 and *Table 1-15* for LRS2100/3100, you can make an IEEE 802.3-compatible network interface using a shielded RJ45 connection.

The pin assignments correspond to an MDI port, so that the connection to the hub or switch is accomplished using 1:1 shielded patch cable.

LD-LRS1000:

Signal LD-LRS1000	Pin (15-pin D Sub HD plug)	Pin (8-pin RJ-45 socket)
TPIP	11	3
TPIN	12	6
TPOP	13	1
TPON	14	2

Table 1-14: LD-LRS1000 pin assignment of the 15-pin D Sub HD plug for Ethernet connection (MDI interface)

LD-LRS2100/3100:

Signal LD-LRS2100/3100	Pin (20-pin Harting socket)	Pin (8-pin RJ-45 socket)
TPIP	19	3
TPIN	20	6
TPOP	9	1
TPON	10	2

Table 1-15: LD-LRS2100/3100 pin assignment of the 20-pin Harting socket for Ethernet connection (MDI interface)

Pre-fabricated cables for connecting the PC directly (peer-to-peer)

Temperature range 0 to +40 °C (+32 to +104 °F).

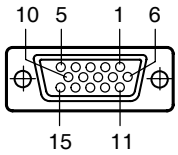
LD-LRS1000:

Connection	Cable no.	Length	Description
LD-LRS1000 to PC (Ethernet)	6032509	3 m (9.84 ft)	Ethernet cross-over cable, shielded, 15-pin D Sub HD socket to 8-pin RJ-45 plug, for configuring the LD-LRS1000 using a PC. Pin assignment see *Table 1-17*

Table 1-16: Data cables (Ethernet) for connecting the LD-LRS1000

Pin assignment of Ethernet cross-over cable Nr. 6032509

RJ-45



to LD-LRS1000

RJ-45 plug (PC)		15-pin D Sub HD socket (LD-LRS1000)	
Pin assignment (Ethernet)	Signal	Pin assignment	Signal
		1	24 V DC
		9	TD–/TxD
		7	RD–/RxD
		8	TD+
		4	GND_Data
		5	GND
		2	CAN L
		3	CAN H
		6	RD+
		10	OUT 1
1	TPOP	11	TPIP
2	TPON	12	TPIN
3	TPIP	13	TPOP
6	TPIN	14	TPON
		15	OUT 2
Housing	Shield	Housing	Shield

Table 1-17: Pin assignment of Ethernet cross-over cable Nr. 6032509

LD-LRS2100/3100:

Connection	Cable no.	Length	Description
Connection diagram of LD-LRS1000 PC (RS 232) and power supply	6032770	0.2 m (0.79 in) 3 m (9.84 ft)	Configuration cable (Y design), shielded, constisting of a plug housing with a 20-pin Harting insert (socket), splitted into: – 1 x adapter cable for RS 232/RS 422/CAN/Ethernet, shielded, with 15-pin D HD Sub plug – 1 x power supply cable for the electronics, 2-core, shielded, with open ends Pin assignment see *Table 1-13, Page 12*.
LD-LRS1000 to PC (Ethernet) via cable no. 6032770	6032509	3 m (9.84 ft)	Ethernet cross-over cable, shielded, 15-pin D Sub HD socket to 8-pin RJ-45 plug, for configuring the LD-LRS1000 using a PC. Pin assignment see *Table 1-17*

Table 1-18: Adapter cable/data cable (Ethernet) for connecting the LD-LRS2100/3100

Overview: Connecting the data cable (Ethernet) to LD-LRS1000/2100/3100

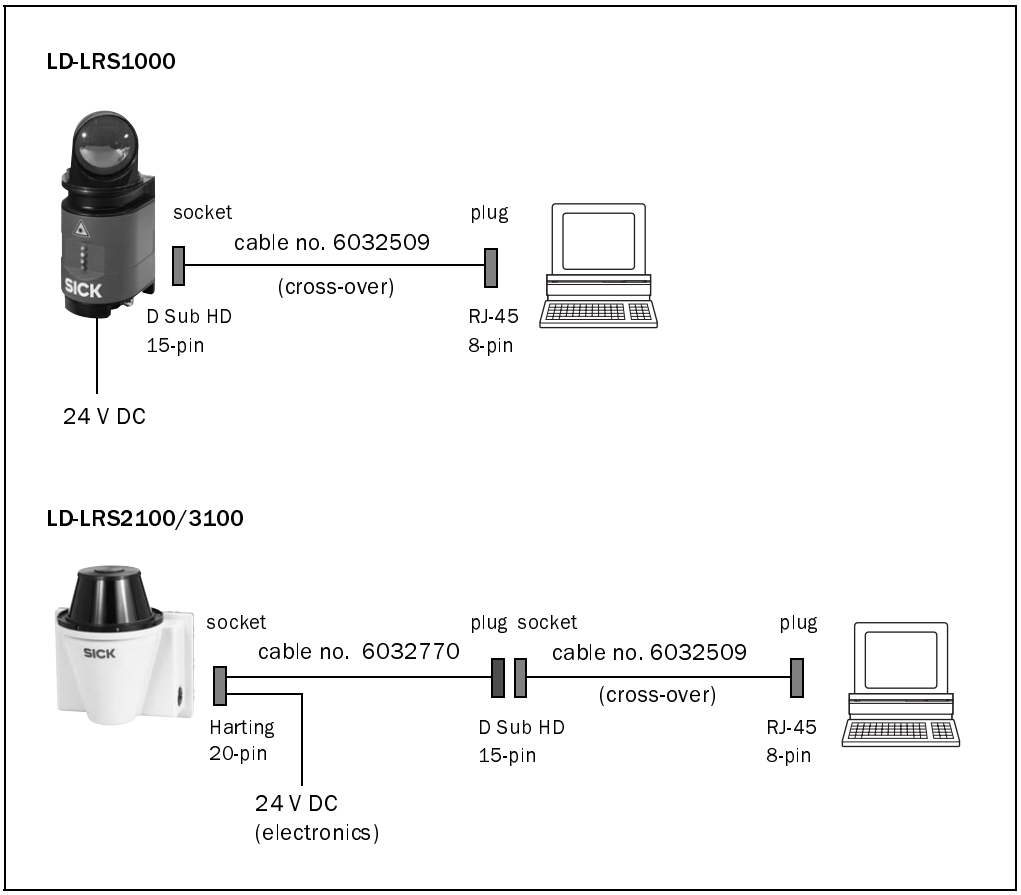


Fig. 1-7: Pre-fabricated cables for connecting the PC (Ethernet)

Note For connecting the LD-LRSxx00 to a hub/switch additionally an RJ-45 coupler (2 x socket) and a standard cross-over cable are required.

Fig. 1-8: Ethernet: RJ-45 coupler (2 x socket)

1.4 Mounting

Note **Do not open the device. The producer warranty will be forfeited if the device is opened.**

1.4.1 Selecting the installation location

Mount the LD-LRS2100/3100 in such a way that it is protected from direct sunlight (if required use a suitable cover). This reduces the risk of an unpermissible rise of temperature inside of the system housing.

1.4.2 Mounting the LD-LRS2100/3100

Mount the LD-LRS2100/3100 in such a way that the black scanning window is positioned downwards. Thus ensuring that any condensation on the scanning window will run off and additionally reduces the risk of dust collection on the window.

Fig. 1-9: LD-LRS2100/3100: Preferred mounting position

Note **Prerequisites for the enclosure rating IP 67**

To maintain the enclosure rating IP 67 do not remove the scanning window (refer to the producer warranty conditions above). The connector on the back plane must be tightened. The not used cable glands of the connector must be covered.

1.5 Quick start with default settings by factory

1.5.1 Quick start using the RS 232/RS 422 data interface

LD-LRS1000:

1. Unscrew the interface adapter (at bottom of the device).
2. Select the data interface (RS 232 or RS 422) using the DIP switch 1 inside of the interface adapter.
3. Connect the 24 DC V power supply cable to the 6-pin terminal strip via the cable gland of the interface adapter. Use a wire cross-section of at least 1 mm² (18 AWG) at a maximum of 20 m (65.6 ft) cable lenght.
4. Tighten the interface adapter.
5. Connect the 15-pin D Sub HD plug of the interface adapter to the RS 232 or RS 422 interface of the PC using an appropriate interface cable (depends on the selected interface type). An RS 232/RS 422 converter may be required.
   For RS 232 the 3-core null modem cable no. 6032508 (15-pin D-Sub HD socket to 9-pin D-Sub socket) is available. See also *Table 1-9, Page 10* and *Fig. 1-4, Page 11*.

LD-LRS2100/3100:

1. Connect the 24 DC V power supply for the electronics to the 20-pin socket of the Harting plug connection.
2. If the LD-LRS2100/3100 is used in the outdoor, connect the heater. To do so, use a seperate 24 V DC power supply unit.
3. Connect the RS 232 data interface (LD-LRS2100) or the RS 422 data interface (LD-LRS3100) of the 20-pin socket to the PC (cross the wires for transmitter and receiver). An RS 232/RS 422 converter may be required.
   For RS 232 the configuration cable no. 6032770 (20-pin Harting socket to 15pin D Sub HD plug as well as to open ends for power supply of the electronics) in combination with the cable no. 6032508 is available. See also *Table 1-12, Page 12* and *Fig. 1-5, Page 13*.

All LD-LRSxx00:

1. Switch on the power supply for the LD-LRSxx00.
   The LD-LRSxx00 iniates a self-test. After the initialisation the green LED begins to flash. The scanning head does not yet rotate.
2. Switch on your PC and start Windows™ (at least W98SE™).
3. Install the “SOPAS Engineering Tool“ configuration software on the PC and start the program.
4. In the dialog box select the NEW PROJECT option.
5. Under SCAN ASSISTANT, CONFIGURATION, SERIAL PORT/STANDARD PROTOCOL click the ENABLE SERIAL COMMUNICATION option.
6. Click the ADVANCED... button.
7. For CoLa dialect, select the BINARY option.
   Disable all preselected baud rates and enable the “115 kBd“ option.
   Port settings: 8 data bits, 1 stop bit, no parity.
   Confirm with OK.
8. Click the SCAN button.
9. Select the listed sensor (LD-LRSxx00). Confirm with ADD DEVICE.

10. Wait for synchronisation SYNC CHECK.
    SOPAS loads the current parameter values and displays them on the tabs.

Displaying measurement values:

11. In the PROJECT TREE on left-hand side, click the (+) symbol from LD-LRSxx00.
    The tree displays more branches.
12. In the PROJECT TREE, click the (+) symbol from MONITOR.
13. Under MONITOR, double-click the SCAN VIEW option.
    In the section on right-hand side, a dialog box is opened.
14. To start measurement operation, click the green arrow button below the graphic (if required, scroll the display).
    The LD-LRSxx00 begins the regular measurement operation.
    The green LED flashes with higher frequency.
    SOPAS displays the transferred measurement values.
15. To stop measurement operation, click the red square button below the graphic (if required, scroll the display).

The LD-LRSxx00 is ready with the factory defaults.

Configuring the LD-LRSxx00:

- In the OPTIONS menu, select the LOGIN TO DEVICE command.
- In the LOGIN dialog box, select the AUTORIZED CLIENT user level and enter the password “client“.
  Click the LOGIN button.
  The parameter values in the tabs can now be modified.

1.5.2 Quick start using the Ethernet interface (10 Mbit/s)

Note See also *Chapter 1.3.4 Ethernet interface, Page 13*.

LD-LRS1000:

1. Unscrew the interface adapter (at bottom of the device).
2. Connect the 24 DC V power supply cable to the 6-pin terminal strip via the cable gland of the interface adapter. Use a wire cross-section of at least 1 mm² (18 AWG) at a maximum of 20 m (65.6 ft) cable lenght.
3. Tighten the interface adapter.
4. Connect the Ethernet cross-over cable no. 6032509 with the 15-pin D Sub HD socket to the interface adapter and with the 8-pin RJ-45 plug to the PC. See also *Table 1-16, Page 15* and *Fig. 1-7, Page 16*.
   For connecting the LD-LRS1000 to a hub/switch additionally an RJ-45 coupler (2 x socket) and a standard cross-over cable is required.

LD-LRS2100/3100:

1. Connect the 24 DC V power supply for the electronics to the 20-pin socket of the Harting plug connection.
2. If the LD-LRS2100/3100 is used in the outdoor, connect the heater. To do so, use a seperate 24 V DC power supply unit.
3. Connect the Ethernet interface of the 20-pin socket to the PC (cross the wires for transmitter and receiver).
   To do so, use the configuration cable no. 6032770 (20-pin Harting socket to 15pin D Sub HD plug as well as to open ends for power supply of the electronics) in combination with the cable no. 6032509. See also *Table 1-18, Page 15* and *Fig. 1-7, Page 16*.
   For connecting the LD-LRS2100/3100 to a hub/switch additionally an RJ-45 coupler (2 x sokket) and a standard cross-over cable are required.

All LD-LRSxx00:

1. Switch on the power supply for the LD-LRSxx00.
   The LD-LRSxx00 iniates a self-test. After the initialisation the green LED begins to flash. The scanning head does not yet rotate.
2. Switch on your PC and start Windows™ (at least W98SE™).
3. Check whether the TCP/IP protocol is enabled under Windows.
   (Windows XP: Start > Settings > Control Panel > Network Connections > LAN Connenction > Properties > Internet Protocol (TCP/IP)).
4. If not, start now the Internet protocol (TCP/IP).
5. Set the link speed of the network card to “Auto detect“ or “10 Mbps/Full duplex“.
6. Under Start > Settings > Control Panel > Network Connections, select the LAN connection to which the LD-LRSxx00 is connected.
7. Under “Properties“ activate the Internet protocol (TCP/IP).
8. Click the “Properties“ button and enter the PC address “192.168.1.1“ and the sub-net mask “255.255.255.0“ under “IP address“.
9. Install the “SOPAS Engineering Tool“ configuration software on the PC and start the program.
10. In the dialog box select the NEW PROJECT option.
11. Under SCAN ASSISTANT, CONFIGURATION, INTERNET PROTOCOL/IP COMMUNICATION click the ENABLE IP COMMUNICATION option.

12. Click the ADD button.
    In the dialog box enter the address “192.168.1.10“ and confirm with OK.
13. Click the ADVANCED... button.
    For CoLa dialect, select the BINARY option and confirm with OK.
14. Click the SCAN button.
15. Select the listed sensor (LD-LRSxx00). Confirm with ADD DEVICE.
16. Wait for synchronisation SYNC CHECK.
    SOPAS loads the current parameter values and displays them on the tabs.

Displaying measurement values:

17. In the PROJECT TREE on left-hand side, click the (+) symbol from LD-LRSxx00.
    The tree displays more branches.
18. In the PROJECT TREE, click the (+) symbol from MONITOR.
19. Under MONITOR, double-click the SCAN VIEW option.
    In the section on right-hand side, a dialog box is opened.
20. To start measurement operation, click the green arrow button below the graphic (if required, scroll the display).
    The LD-LRSxx00 begins the regular measurement operation. The green LED flashes with higher frequency.
    SOPAS displays the transferred measurement values.
21. To stop measurement operation, click the red square button below the graphic (if required, scroll the display).

The LD-LRSxx00 is ready with the factory defaults.

Configuring the LD-LRSxx00:

- In the OPTIONS menu, select the LOGIN TO DEVICE command.
- In the LOGIN dialog box, select the AUTORIZED CLIENT user level and enter the password “client“.
  Click the LOGIN button.
  The parameter values in the tabs can now be modified.

1.6 Technical data

Note New/modified data are marked in **bold**.

Type	LD-LRS1000	LD-LRS2100/3100
Measurement range[1][2]	**2.5 m (8.2 ft) to 80 m (262.5 ft) on 10 % reflection** **2.5 m (8.2 ft) to 110 m (360.9 ft) on 20 % reflection** **Max. distance 250 m (820 ft)**	
Useful scanning angle	360°	**300°**
Angular resolution (increment)	0.125°, selectable **0.125° to 1.5°**	
Scanning frequency	5 to **10 Hz** ± 5 % in increments of 1 Hz	
Measurement resolution	3.9 mm (=1/256 m) (0. 15 in/=1/840 ft)	
System error[1]	±38 mm (1.5 in) with 20 to 90 % reflection (±63 mm from 80 m (262.5 ft) upwards)	
Statistical errors (1 sigma)	25 mm (0.98 in) with 20 to 90 % reflection	
Beam divergence	**2.8 mrad (0.160°)**	
Light emission	Via rotating scanner head	
Laser diode (wavelength)	Infrared light (λ = 905 nm)	
Puls frequency	Max. 14.4 kHz (10.8 kHz with mean across 360°)	
Laser class	Class 1 (to EN/IEC 60825-1), eye safe	
Optical indicators	4 x LED (status indicators)	–
Serial data interface	RS 232/RS 422	LD-LRS2100: RS 232 LD-LRS3100: RS 422
Data transfer rate	4,800; 9,600; 19,200; 38,400; 57,600; 115,200 Bd	
Data format	8 data bits, 1 stop bit, no parity, fixed output format	
CAN data transfer rate	10 Bit/s to 1 MBit/s, max. cable length **30 m (98.4 ft)**	
Ethernet data interface	10 MBit/s, TCP/IP	
Switching outputs	4 x ("**OUT 1**"to "**OUT 4**") "Highside" semi-conductor, max. output current as a result of load per 0.5 A at 24 V DC	
Electrical connections	– 1 x 6-pin terminal strip via PG 7 cable gland (∅ max. 5.6 mm (0.22 in)), for power supply and 4 switching outputs OUT 1 to OUT 4 – **1 x 15-pin D Sub HD plug for data interfaces, power supply and 2 switching outputs OUT 1 and OUT 2**	**1 x 20-pin Harting plug connection**
Operating voltage electronics	24 V DC ± **15 %** to IEC 364-4-41 (VDE 0100, Part 410)	
Operating voltage heater	–	**DC 24 V (max. 6 V ripple)/max. 6 A (circular)**
Power consumption electronics	When switched on: max. 36 W (1.5 A)[3] at 24 V DC, **peak at start-up 2.1 A**	
Housing	Die-cast aluminium	**PUR-IHS**[4]
Enclosure rating	**IP 65** (to DIN 40 050)	**IP 67** (to DIN 40 050)
Protection class	Class 3	Class 3
EMC test	To EN 61000-6-2/EN 61000-6-3	To EN 61000-6-2/**EN 61000-6-4**
Vibration test[5]	To IEC 68, part 2-26, table 2c (frequency range 10 to 150 Hz, amplitude 0.35 mm or 5 g)	To IEC 68, part 2-26, table 2c (frequency range 10 to 55 Hz, amplitude 2 g)
Shock test[5]	Single impact: to IEC 68, part 2-27, table 2 (15 g/11 ms) Permanent vibration: to IEC 68, part 2-29 (10 g/16 ms)	
Weight	**Approx. 4.1 kg (approx. 9.02 lb)**	**Approx. 9.1 kg (approx. 20.02 lb)**

Table 1-19: Technical specifications of LD-LRSxx00

Type	LD-LRS1000	LD-LRS2100/3100
Operating /storage temperature	0 to +45 °C (+32 to +133 °F)/ –20 to +80 °C (–4 to +176 °F)	**–25 to +45 °C (–13 to +133 °F)**[6]/ **–25 to +80 ° (–13 to +176 °F)**
Max. rel. humidity	5 to 85 %, non condensing	
Color	SICK blue (RAL 5012), black	**Gray (RAL 7032), black**
Attachment	8 x securing threads M6 x 12 mm (0.47 in)	4 x securing threads M8 x 9 mm (0.35 in)

1) condition: Laser spot completely on the object, **warming-up time of 30 min has been elapsed**

2) when operated without short range suppression

3) when switching outputs are not connected

4) PUR-IHS: polyurethane intergral foam

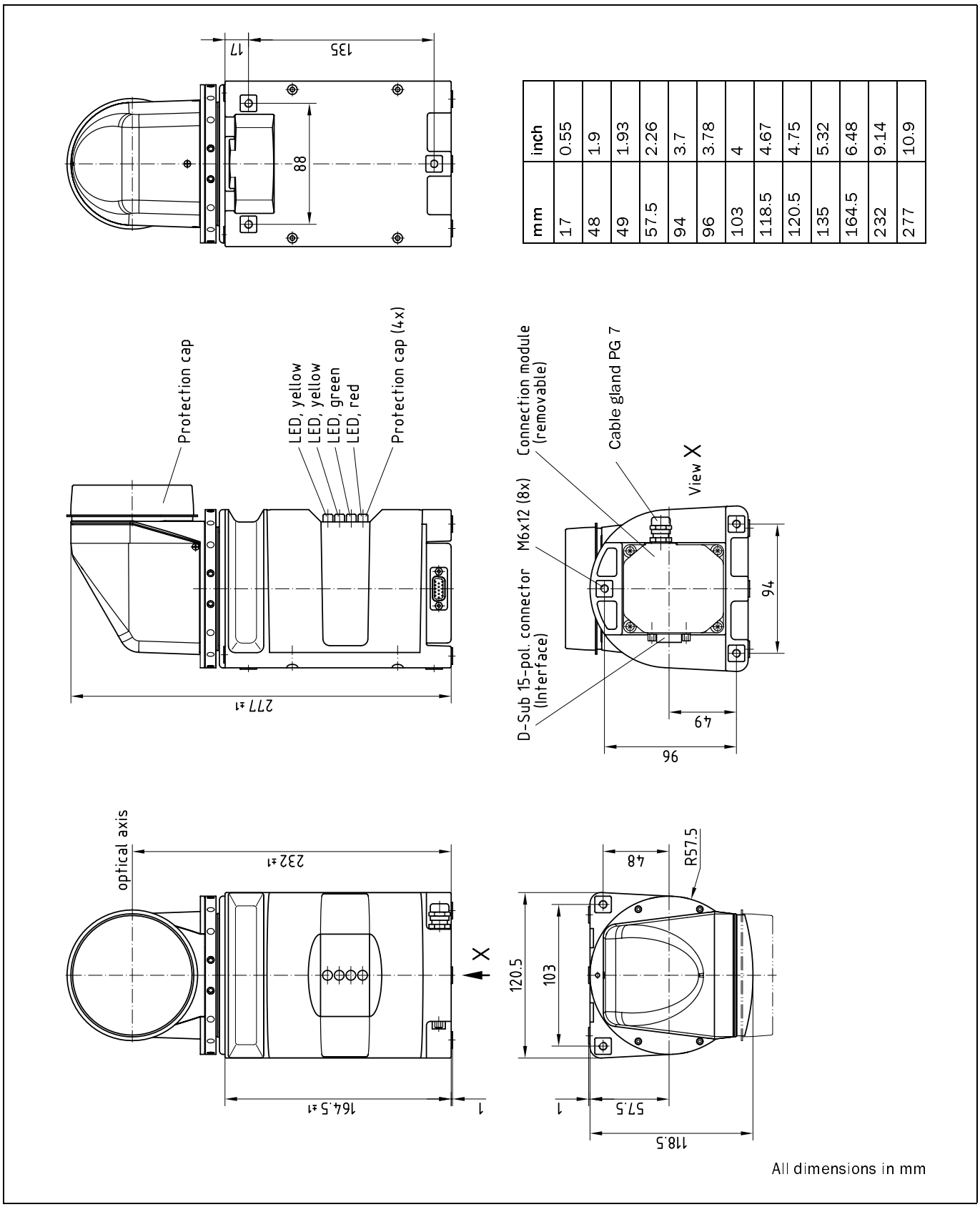
5) **shock absorbers are recommended for heavy vibration and impact demands (e.g. AVG application)**

6) warming-up time approx. 90 min at –25°C (–13 °F), approx. 80 min at –20 °C (–4 °F)

Table 1-19: Technical specifications of LD-LRSxx00

1.7 Dimensional drawings

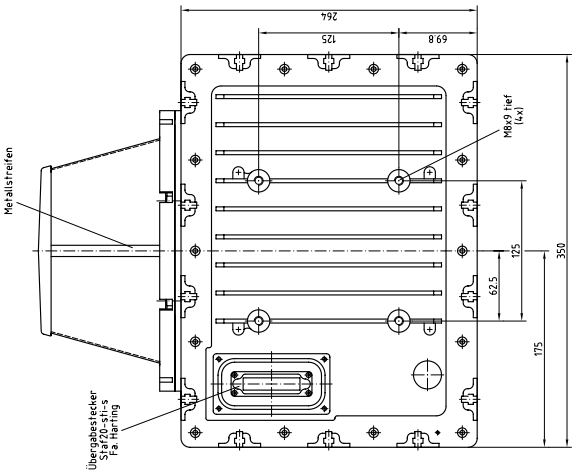
1.7.1 LD-LRS1000



mm	inch
17	0.55
48	1.9
49	1.93
57.5	2.26
94	3.7
96	3.78
103	4
118.5	4.67
120.5	4.75
135	5.32
164.5	6.48
232	9.14
277	10.9

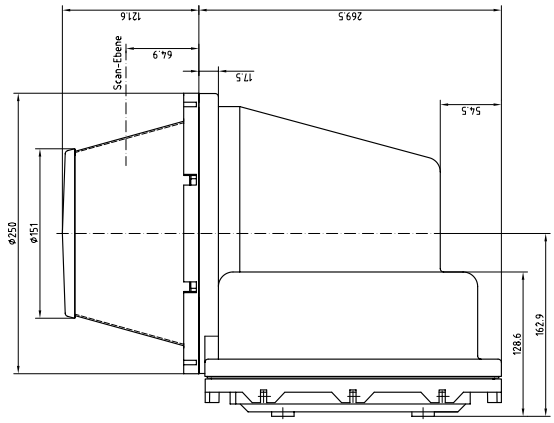
Fig. 1-10: LD-LRS1000: Dimensions of the IP 65 housing

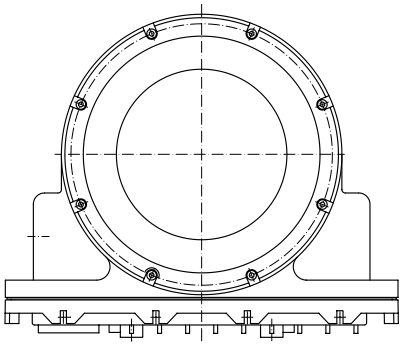
1.7.2 LD-LRS2100/3100

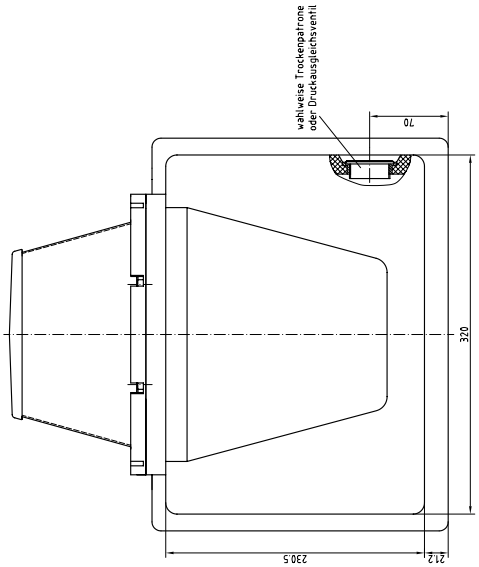


mm	inch
151	5.95
162.9	6.14
175	6.89
230.5	9
250	9.85
264	10.4
269.5	10.62
320	12.6
350	13.79

mm	inch
17.5	0.68
21.2	0.83
54.5	2.15
62.5	2.46
64.9	2.56
69.8	2.75
70	2.75
121.6	4.77
125	4.92
128.6	5







All dimensions in mm

Fig. 1-11: LD-LRS2100/3100: Dimensions of the IP 67 housing

1.8 Accessories

Order No.	Description
6032507	Adapter cable for LD-LRS1000, 0.2 m (0.79 in), twisted pair, shielded, 15-pin D Sub HD socket to 9-pin D Sub plug. Show the connection diagram of the old LD-OEM on the 9-pin D Sub plug. Pin assignment see *Table 1-10, Page 10*.
2014054	RS 232 null modem cable for LD-LRS1000 in combination with cable no. 6032507, 3-core, 3 m (9.84 ft), twisted pair, shielded, 9-pin D Sub socket to 9-pin D Sub-socket.
6032508	RS 232 null modem cable for LD-LRS1000, 3-core, 3 m (9.84 ft), twisted pair, shielded, 15-pin D Sub HD socket to 9-pin D Sub socket, for configuring the LD-LRS1000 using a PC. Pin assignment see *Table 1-11, Page 11*.
6032509	Ethernet cross-over cable for LD-LRS1000, 3 m (9.84 ft), twisted pair, shielded, 15-pin D Sub HD socket to 8-pin RJ-45 plugt, for configuring the LD-LRS1000 using a PC. Pin assignment see *Table 1-17, Page 15*.
6032770	Configuration cable (Y design) for LD-LRS2100/3100 with 20-pin Harting socket. Consists of an adapter cable for RS 232/RS 422/CAN/Ethernet, shielded, 0.2 m (0.79 in) as well as a power supply cable for the electronics with open ends, 3 m (9.84 ft). For Design see also *Table 1-13, Page 12*
2035130	Interface adapter (spare part)
6025934	Fuse (spare part) with holder T5A0, 125 V SMD
2039808	CD-ROM “Manuals & Software LD-LRS1000/2100/3100“

Table 1-20: Available accessories

2 EC Declaration of Conformity

2.1 Fulfillment of the EU Machine Guidelines

SICK AG confirms that the LD-LRSxx00 conforms to the specifications of the EU machine guidelines in accordance with EU Machine Guideline 89/392/EEC, Appendix IIC.

2.1.1 EC Declaration of Conformity

Fig. 2-1, Page 28 shows a scaled down copy of the EC Declaration of conformity, page 1.

➢ Complete copy of the EC Declaration of conformity on request.

SICK

EC Declaration of conformity

en

Ident-No. : 9105241

The undersigned, representing the following manufacturer

SICK IBEO GmbH
Fahrenkrön 125
22179 Hamburg
Germany

herewith declares that the product

LD-OEM.... / LD-LRS.... / LD-PDS....

is in conformity with the provisions of the following EC directive(s) (including all applicable amendments), and that the standards and/or technical specifications referenced overleaf have been applied.

Hamburg, 08.12.2005

Joachim Leins
(General Manager SICK IBEO GmbH)

ppa. Hans Ulrich Fritsch
(R&D Manager SICK IBEO GmbH)

Fig. 2-1: Copy of the EC Declaration of Conformity, page 1 (scaled down)

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