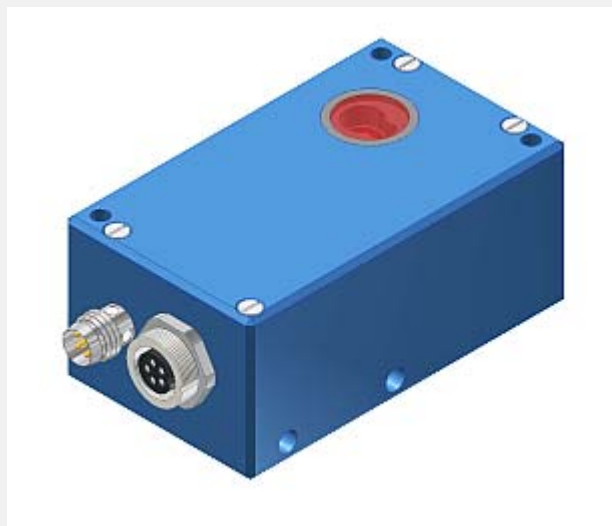# R-LAS Series

▶ R-LAS-LR-O-CL1

- Focused laser beam (<0.4 mW, 670 nm), **laser class 1**
- High sensitivity (typ. 0.1 mm), big range (typ. 500 mm)
- Insensitive to outside light due to red light filter
  and interference filter
- Switching state indication by means of an orange LED
- Analog output and digital output
- Parameterizable under Windows®
- RS232 interface (USB adaptor available)
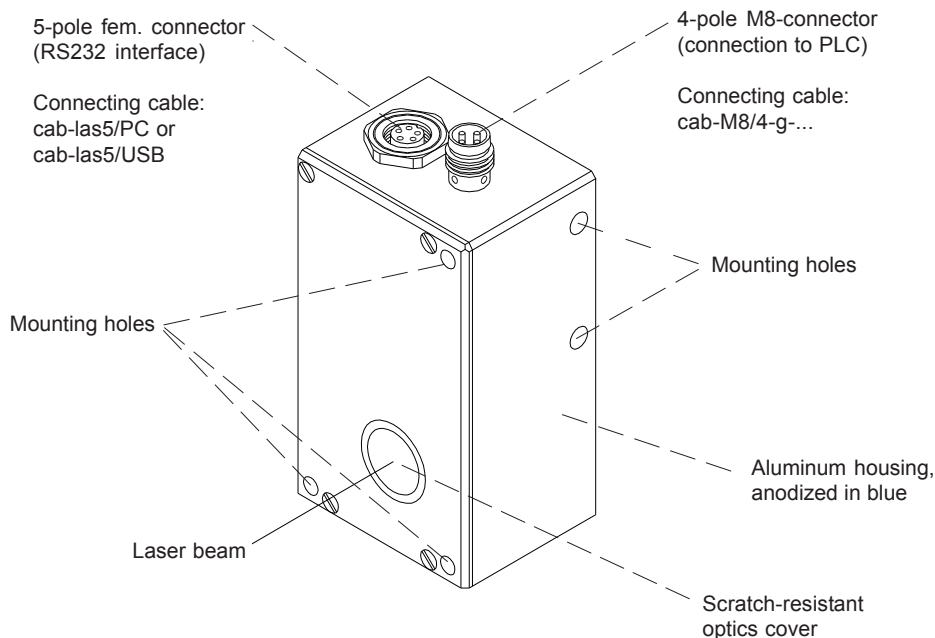- Scratch-resistant optics cover made of glass
- Sturdy aluminum housing

Design

Product name:

R-LAS-LR-O-CL1
(incl. Windows® PC software LR-Scope)

5-pole fem. connector
(RS232 interface)

Connecting cable:
cab-las5/PC or
cab-las5/USB

Mounting holes

Laser beam

4-pole M8-connector
(connection to PLC)

Connecting cable:
cab-M8/4-g-...

Mounting holes

Aluminum housing,
anodized in blue

Scratch-resistant
optics cover

Technical Data

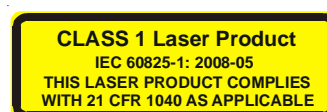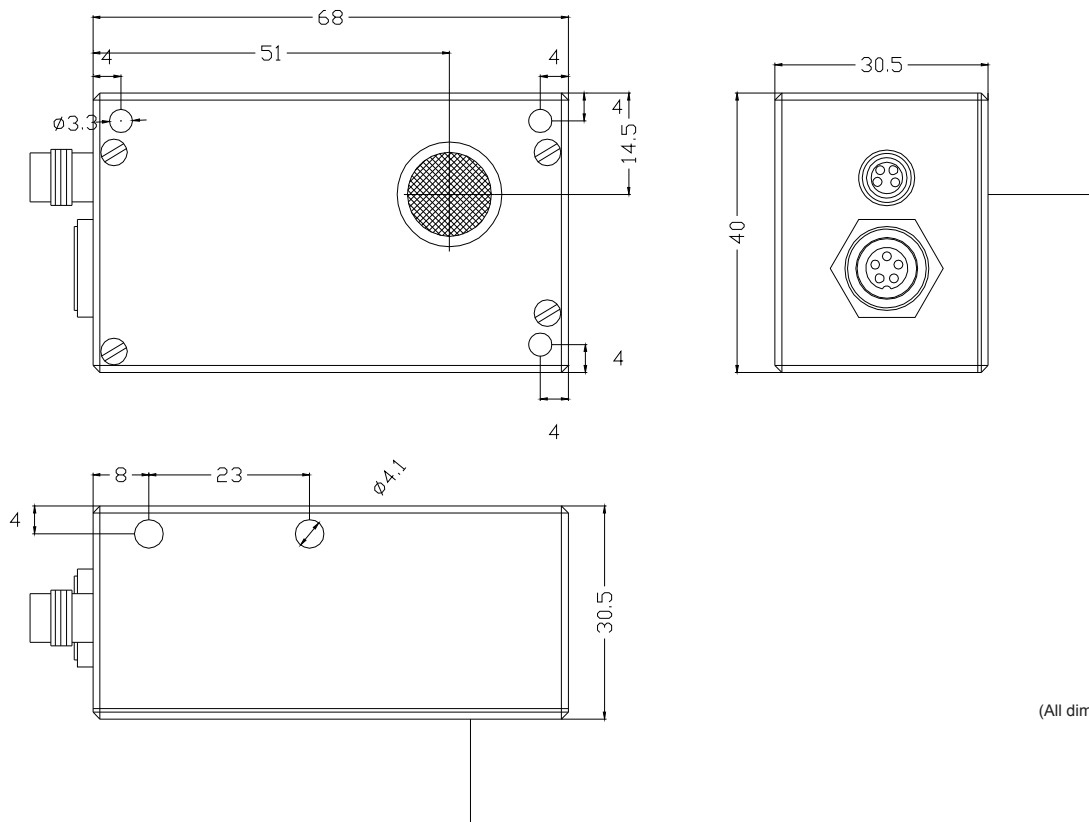| Model	R-LAS-LR-O-CL1
Laser	Solid state laser, 670 nm, DC operation, 0.4 mW max. opt. power, laser class 1 acc. to DIN EN 60825-1. The use of these laser transmitters therefore requires no additional protective measures.
Min. detectable object	typ. 0.1 mm
Reproducibility	typ. 0.05 mm
Optical filter	Red light filter RG630 + interference filter
Threshold correction	can be activated under Windows®
Voltage supply	+12VDC ... +32VDC, protected against polarity reversal, overcurrent protected
Pulsating light operation	100 kHz
Ambient light	up to 5000 Lux
Type of protection	IP67
Current consumption	typ. 110 mA
Interface	RS232, parameterizable under Windows®
EMC test acc. to	DIN EN 60947-5-2 CE
Connector type	Connection to PLC: 4-pole M8-connector, connection to PC: 5-pole female connector Binder Series 712
Operating temperature range	-20°C ... +55°C
Storage temperature range	-20°C ... +85°C
Housing	Aluminum, anodized in blue
Max. switching current	100 mA, short-circuit protected
Switching frequency	typ. 6 kHz (depends on averaging)
Switching state display	by means of an orange LED, intergrated in the M8-plug
Output DIGITAL (1x)	Qinv or Q, adjustable via PC: Qinv: npn bright-switching (npn normally closed) / pnp dark-switching (pnp normally open) Q: pnp bright-switching (pnp normally closed) / npn dark-switching (npn normally open)
Sensitivity (switching threshold)	parameterizable under Windows®
Output ANALOG (1x)	0V ... +10V
Pulse lengthening	0 ms ... 100 ms
Beam geometry	Laser beam focused to 200 mm, spot size in focus: typ. 0.2 mm in diameter
Range	typ. 500 mm (depends on the object measured)

Laser Information

The laser transmitter of the reflex light barriers R-LAS-LR-O-CL1 comply with laser class 1 according to EN 60825-1. Under reasonably foreseeable conditions a class 1 laser is safe. The reasonably foreseeable conditions are kept during specified normal operation. The use of these laser transmitters therefore requires no additional protective measures.

The laser reflex light barriers R-LAS-LR-O-CL1 are supplied with an information label „CLASS 1 Laser Product".

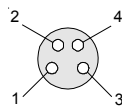**CLASS 1 Laser Product**
IEC 60825-1: 2008-05
THIS LASER PRODUCT COMPLIES
WITH 21 CFR 1040 AS APPLICABLE

Dimensions

(All dimensions in mm)

Connector Assignment

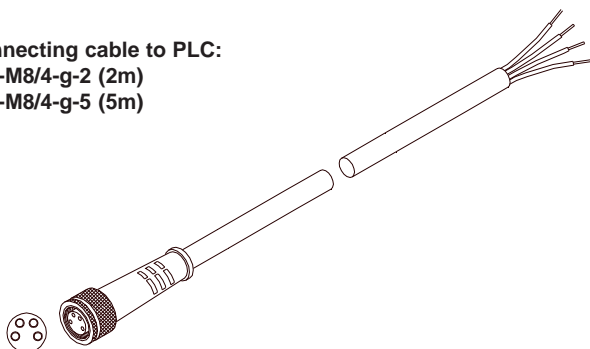## Connection to PLC:

4-pole M8 connector

Pin No.: (Color)   Assignment:
1   (brown)   +Ub (+12VDC ... +30VDC)
2   (white)   ANALOG (0V ... +10V)
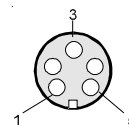3   (blue)   GND (0V)
4   (black)   TOLOUT (DIGITAL)

Connecting cable to PLC:
cab-M8/4-g-2 (2m)
cab-M8/4-g-5 (5m)

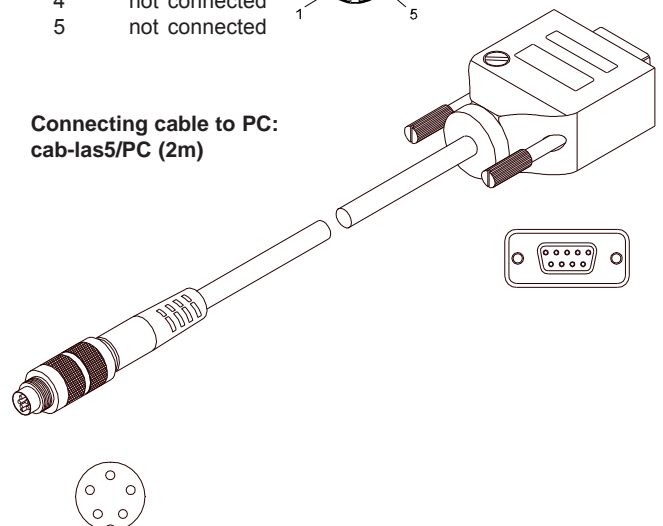## Connection to PC:

5-pole fem. connector Binder Series 712

Pin No.: Assignment:
1   GND (0V)
2   TX0
3   RX0
4   not connected
5   not connected

Connecting cable to PC:
cab-las5/PC (2m)

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Parameterization

Parameterization under Windows® with software LR-Scope:

The laser reflex light barrier R-LAS-LR-O-CL1 is parameterized under Windows® with software LR-Scope.
The RS232 interface parameters and measured values can be exchanged between PC and R-LAS-LR-O-CL1.
All the parameters can be stored in the non-volatile EEPROM of the R-LAS-LR-O-CL1.

Parameter setting:

REF 128

Reference:
After a mouse-click on this edit-box the reference value can be specified here by entering a numerical value. The REF value (setpoint value) corresponds with the laser power that is reflected to the receiver from the respective object.

TOL 20

Tolerance:
With this edit-box a tolerance band can be applied around the currently specified reference value (setpoint value of the laser power reflected from the object). If the set tolerance limit is exceeded, this leads to a change of switching state at pin 4 of the 4-pole M8 connector (digital output TOLOUT).
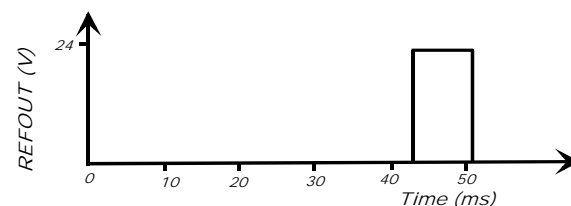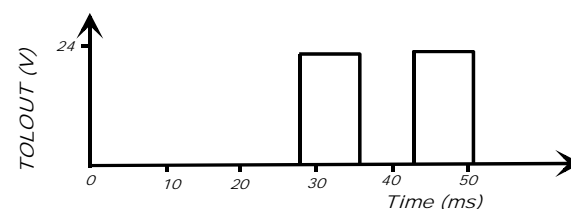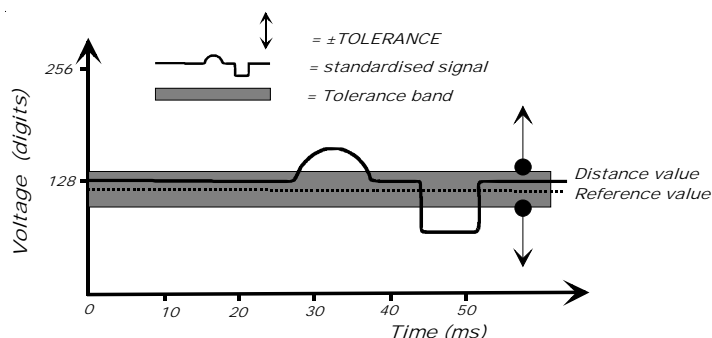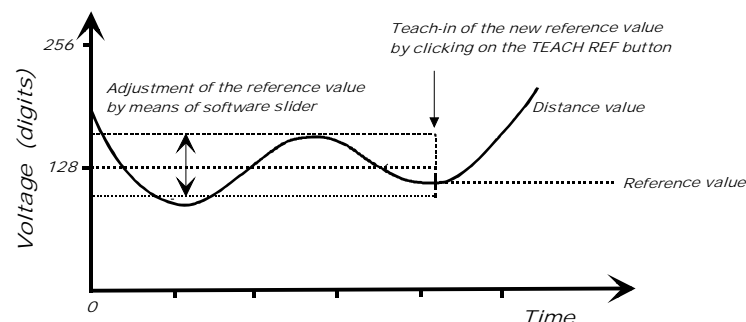
LASMOD
STAT
● DYN
POWER
◄200
◄100
◄0
128

Laser power, laser power correction (LASMOD, POWER):
The laser power and laser power correction can also be adjusted by means of a software slider.
It must be noted that the laser power can only be changed, if the software switch for automatic laser power correction LASMOD is set to STAT. Furthermore automatic laser power correction can be switched ON (DYN) or OFF (STAT) under Windows® with a mouse-click in the software field LASMOD. If automatic laser power correction is active, the laser sensor tries to bring the two input singals ("RAW data") to the value of 256.

HOLD[ms]
● 0
● 1
● 2
● 3
● 5
● 10
● 50
● 100

Pulse lengthening, bright-/dark-switching (HOLD, POLARITY):
With a minimum scan time of 100µs most PLC have problems with the detection of the relatively short switching pulse. With the laser light barriers of R-LAS Series pulse lengthening can be activated under Windows® by means of a software switch in the HOLD[ms] field. Pulse lengthening can be selected between 0ms and 100ms. The POLARITY software switch is used for switching over between bright- and dark-switching.

HYSTERESIS 5

Switching hysteresis (HYSTERESIS):
It may be possible that different applications require an adjustable switching hysteresis. For this purpose a software field is provided for switching hysteresis adjustment.

POLARITY LO

POLARITY:
Determines the polarity change of digital output TOLOUT in case of exceeding of a tolerance threshold.
LO = low-active, HI = high-active.

AVERAGING -4-

AVERAGING:
Determines the number of measured values (raw data) over which the sensor signal arriving at the receiver is averaged (noise suppression).

MAXMODE ON

Automatic threshold correction (MAXMODE):
With this function field automatic correction of the monitoring thresholds can be switched on and off.

Sensor Instruments

Parameterization

### LR-Scope as an aid for sensor adjustment (graphic display):

Fine adjustment of the R-LAS-LR-O-CL1 is facilitated by the graphic display of the analog signal (raw signal from the receiver diode).
For this purpose measurement data transfer from the R-LAS-LR-O-CL1 to the PC must first be activated by clicking on the GO button.

Starting graphical representation (GO/STOP):
Graphical representation under Windows® is started by clicking on the GO field. Clicking on the STOP field stops the graphical representation on the PC monitor.
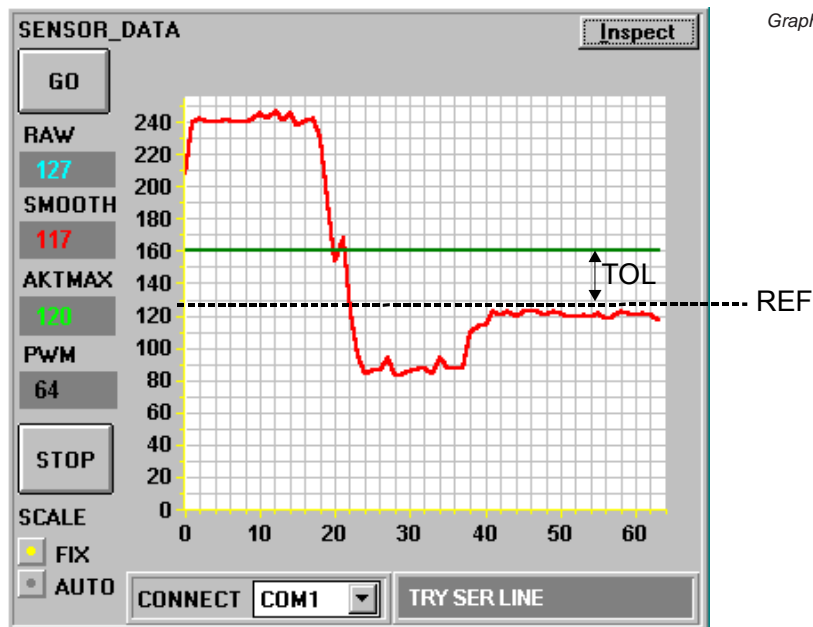
Graphical representation of the calculated MEASURE signal
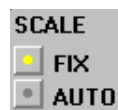
Display mode (SCALE):
In the SCALE software field a selection can be made between FIX, i.e. display over 256 digits (complete 8 bit range) and AUTO, which only displays the area that is of interest with respect to the signal.

Interface selection (CONNECT):
In the CONNECT software field the serial interface that is used can be selected (COM1 to COM4). The LINE OK or TIME OUT message provides information about success or failure of connection setup between laser sensor and PC.

Print mode (Inspect):
Clicking on the Inspect field starts a printout of the signals displayed on the monitor.

Parameter readout and storing (MEM) from the laser sensor or file:
After a mouse-click on the GET "software button" the parameters can be read out from the RAM or EEPROM of the laser sensor or from a file on the harddisk or on a floppy disk, depending on the switch position.
With the SEND software button the parameters entered with software sliders or software switches can be transferred to the RAM or EEPROM of the laser sensor. If the FILE switch is activated, the parameters can be stored in a freely selectable file on floppy disk or hard disk.
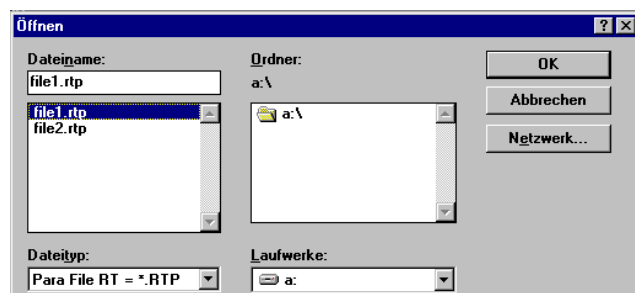
When the FILE switch in the MEM field is activated a pc_file_name field will appear in the graphic windows which provides information about the file currently selected. Another file can be selected or created by clicking on FILE on the pc_file_name field.

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(2014-06-27)　*R-LAS-LR-O-CL1 / Page 5 of 6*
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Parameterization

## LR-Scope as an aid for threshold setting:

Threshold mode THDMODE HI:
In this mode the monitoring threshold lies above the current reference value.
The distance of the TOL threshold from the reference value REF is determined by the TOL presetting value.
In this mode the hysteresis range lies below the TOL threshold.
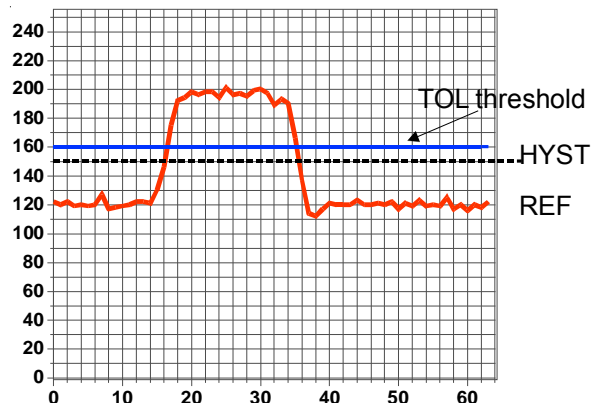
Threshold mode THDMODE LOW:
In this mode the monitoring threshold lies below the current reference value.
The distance of the monitoring threshold from the reference value REF is determined by the TOL presetting value.
In this mode the hysteresis range lies above the TOL threshold.
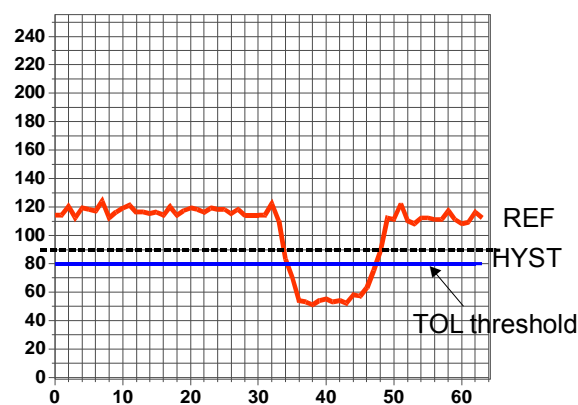
Threshold mode THDMODE WIN:
This mode operates with two monitoring thresholds that lie symmetrically around the current reference value REF. The distance of the monitoring thresholds from the reference value REF is determined by the TOL presetting value.
In this mode the two hysteresis ranges lie within the tolerance band.
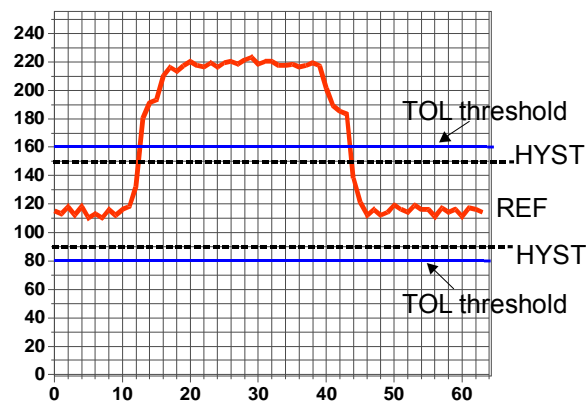
Working with the laser reflex light barrier R-LAS-LR-O-CL1:

After parameter input and sensor adjustment with the help of graphical representation on the PC display the PC is no longer necessary for the actual measuring task.

The PC with the interface cable can then be disconnected from the sensor.