

# RLS Series

## ▶ RLS-GD-150

- Insensitive to outside light due to clocked white-light
- 1 receiver (0°) and reference
- Storing of up to 31 measured values (switching thresholds)
- Tolerance can be set for each measured value
- Working distance typ. 150 mm ± 20%
- Parameterisable under Windows®
- RS232 interface (USB- or Ethernet converter is available)
- Switching state indication by means of yellow LEDs (5x)
- Transmitter power adjustable (STAT or DYN)
- Averaging can be activated (over up to 32000 values)
- 5 switching outputs (npn-/pnp-able, 100 mA, short-circuit proof)
- 2 analog outputs (0...+10V and 4...20mA, proportional to measured value 0%...100% or via zoom function up to 10-fold zoom)
- Scratch-resistance glass cover of optics, sturdy aluminum housing

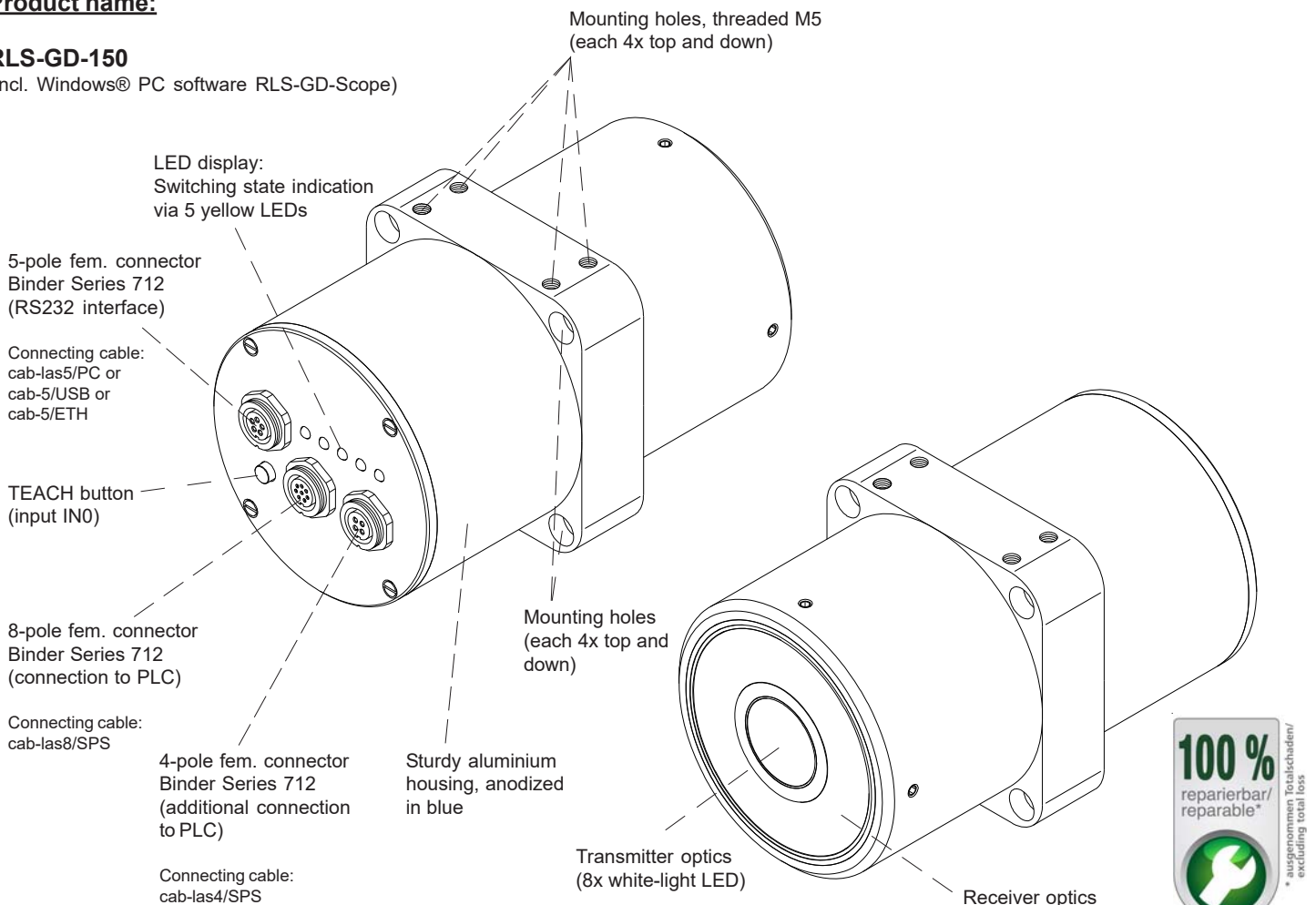


### Design

#### Product name:

#### RLS-GD-150

(incl. Windows® PC software RLS-GD-Scope)

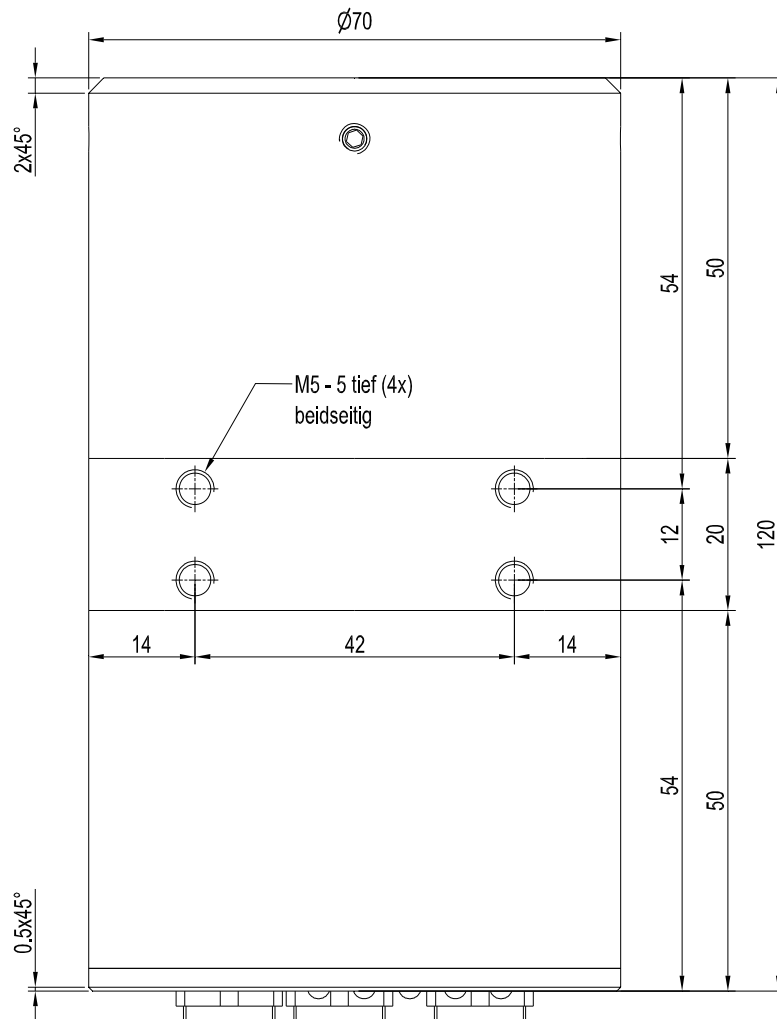
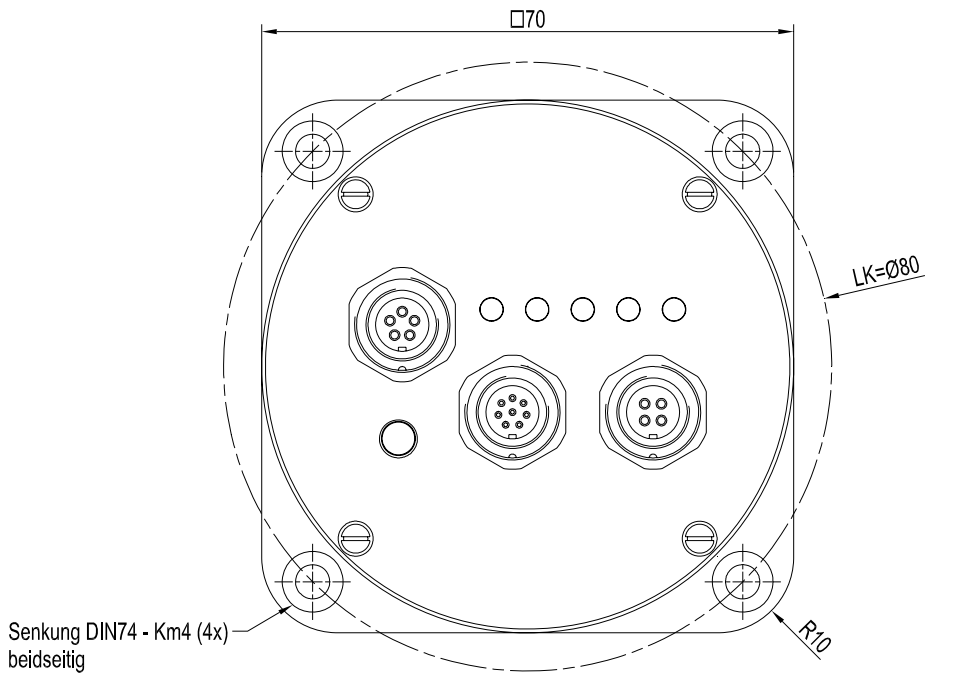




**Technical Data**

Model	RLS-GD-150
Light source	8x white-light LED, modulated 30 kHz
Working distance	typ. 150 mm ± 20%
Light spot size	at a distance of 150 mm: typ. Ø 100 mm
Optical filter	2x polarisation filter (transmitter and receiver), day light filter (KG2)
Resolution	0.1 GU (Gloss Unit)
Reproducibility	± 0.1 GU (Gloss Unit), in case of an averaging of 512
Voltage supply	+24VDC (± 10%), protected against polarity reversal, overload protected
Alternating light operation	100 kHz
Ambient light	up to 5000 Lux
Enclosure rating	IP54
Current consumption	typ. 110 mA
Interface	RS232, parameterisable under Windows®
EMC test acc. to	DIN EN 60947-5-2
Type of connector	Connection to PLC: 8-pole circular fem. connector Binder Series 712 Connection to PLC: 4-pole circular fem. connector Binder Series 712 Connection to PC: 5-pole circular fem. connector Binder Series 712
Connecting cables	to PLC: cab-las8/SPS or cab-las8/SPS-w and cab-las4/SPS to PC/RS232 interface: cab-las5/PC or cab-las5/PC-w to PC/USB interface: cab-5/USB or cab-5/USB-w to PC/Ethernet interface: cab-5/ETH-500
Operating temperature range	-20°C ... +55°C
Storage temperature range	-20°C ... +85°C
Housing material	Aluminium, anodized in blue
Housing dimensions	LxØ: approx. 120 mm x Ø 70 (Ø 80) mm
Max. switching current	100 mA, short-circuit proof
Switching frequency	max. 5 kHz (depends on averaging)
Output DIGITAL (5x)	OUT0 ... OUT4: Qinv or Q, can be adjusted via PC: Qinv: npn bright-switching (npn normally closed) / pnp- dark-switching (Schließer) Q: npn-hellschaltend (Öffner) / npn-dunkelschaltend (Schließer)
Output ANALOG (2x)	1x voltage output 0...+10V 1x current output 4...20mA
Input DIGITAL (1x)	IN0 (Pin 3), digital (0V/+24V) or teach push button at the housing
Sensitivity (switching threshold)	parameterisable under Windows® (selection of threshold or tolerance window)
Pulse lengthening	0 ms ... 100 ms
Transmitter light power	adjustable under Windows®
Averaging	up to 32000 (adjustable under Windows®)
Switching state indication	by means of 5 yellow LEDs

Dimensions



All dimensions in mm

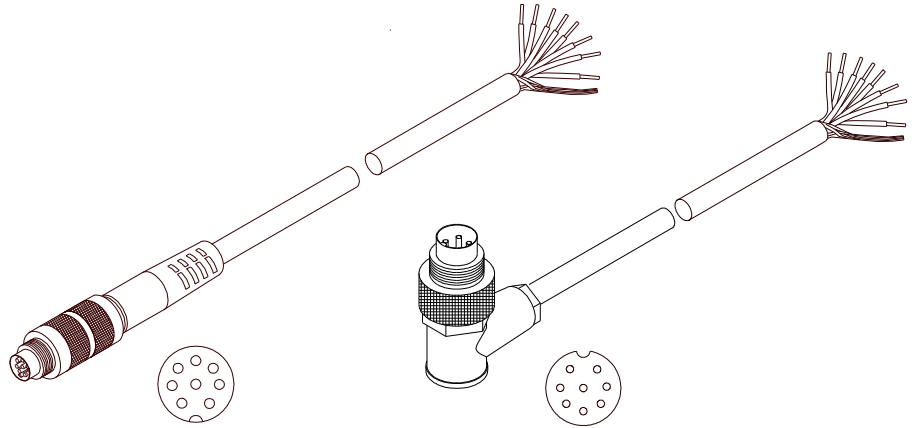


**Connector Assignment**

**Connection to PLC:  
8-pole fem. connector Binder Series 712**

Pin:	Color:	Assignment:
1	white	GND (0V)
2	brown	+24VDC (±10%)
3	green	IN0
4	yellow	OUT0
5	grey	OUT1
6	pink	OUT2
7	blue	OUT3
8	red	OUT4

Connecting cable:  
cab-las8/SPS-(length)  
cab-las8/SPS-w-(length) (angle type, 90°)  
(standard length 2m)



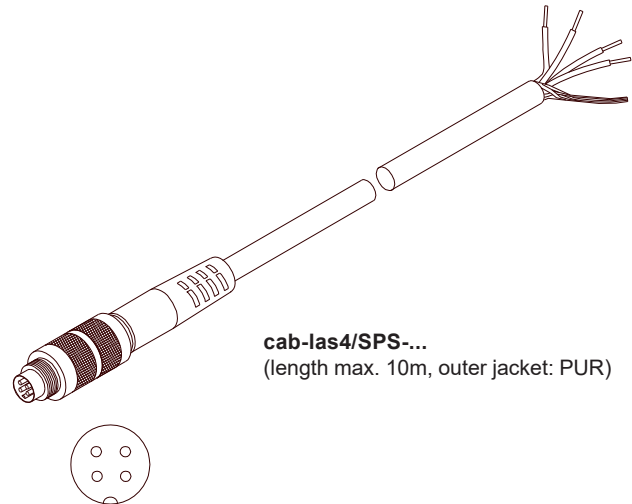
cab-las8/SPS-...  
(max. length 25m, outer jacket: PUR)

cab-las8/SPS-w-...  
(max. length 25m, outer jacket: PUR)

**Additional connection to PLC:  
4-pole fem. connector Binder Series 712**

Pin:	Color:	Assignment:
1	white	GND (0V)
2	brown	not connected
3	black	Analog output voltage (0...+10V)
4	blue	Analog output current (4...20mA)

Connecting cable:  
cab-las4/SPS-(length)  
(Standard length 2m)



cab-las4/SPS-...  
(length max. 10m, outer jacket: PUR)



**Connector Assignment**

**Connection to PC:  
5-pole fem. connector Binder Series 712**

Pin:	Assignment:
1	GND (0V)
2	TxD
3	RxD
4	+24VDC (+Ub, OUT)
5	not connected

**Connection via RS232 interface at the PC:**

Connecting cable:  
 cab-las5/PC-(length)  
 cab-las5/PC-w-(length) (angle type 90°)  
 (standard length 2m)

**alternative:**

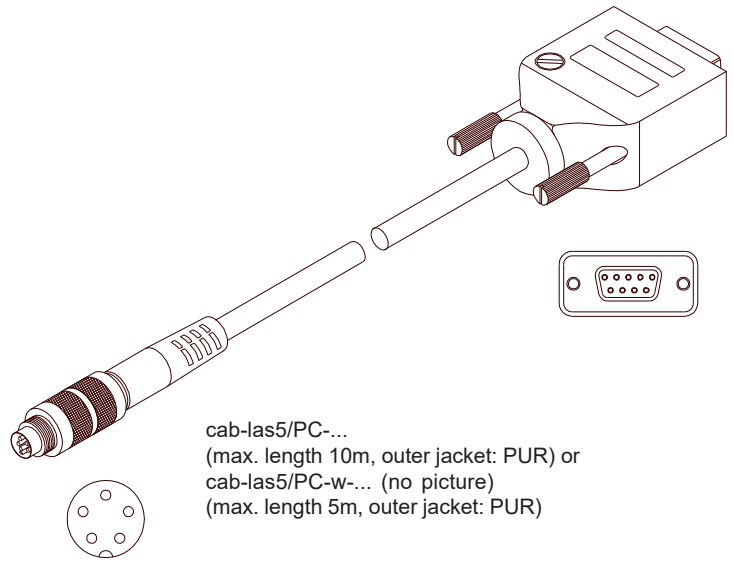
**Connection via USB interface at the PC:**

USB converter (incl. driver software):  
 cab-5/USB-(length)  
 cab-5/USB-w-(length) (angle type 90°)  
 (standard length 2m)

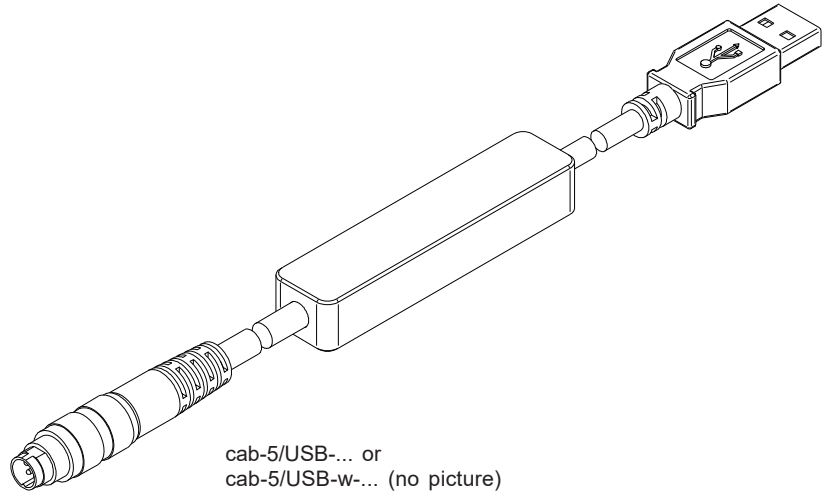
**Connection to local network via Ethernet bus:**

Ethernet converter (incl. software „SensorFinder“):  
 cab-5/ETH-500  
 (standard length 0.5m)

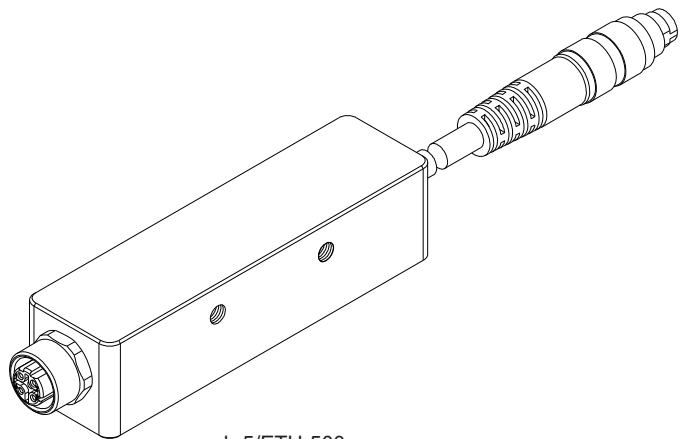
Optional: External CAT5 cable, e.g.  
 cab-eth/M12D-RJ45-flx-(length)



cab-las5/PC-...  
 (max. length 10m, outer jacket: PUR) or  
 cab-las5/PC-w-... (no picture)  
 (max. length 5m, outer jacket: PUR)



cab-5/USB-... or  
 cab-5/USB-w-... (no picture)  
 (each max. length 5m, outer jacket: PUR)



cab-5/ETH-500  
 (length 0.5m, outer jacket: PUR)  
 4-pole M12 fem. conn. (D-coded)  
 for connection of an external  
 CAT5 cable, e.g.  
 cab-eth/M12D-RJ45-flx-(length)



LED Display

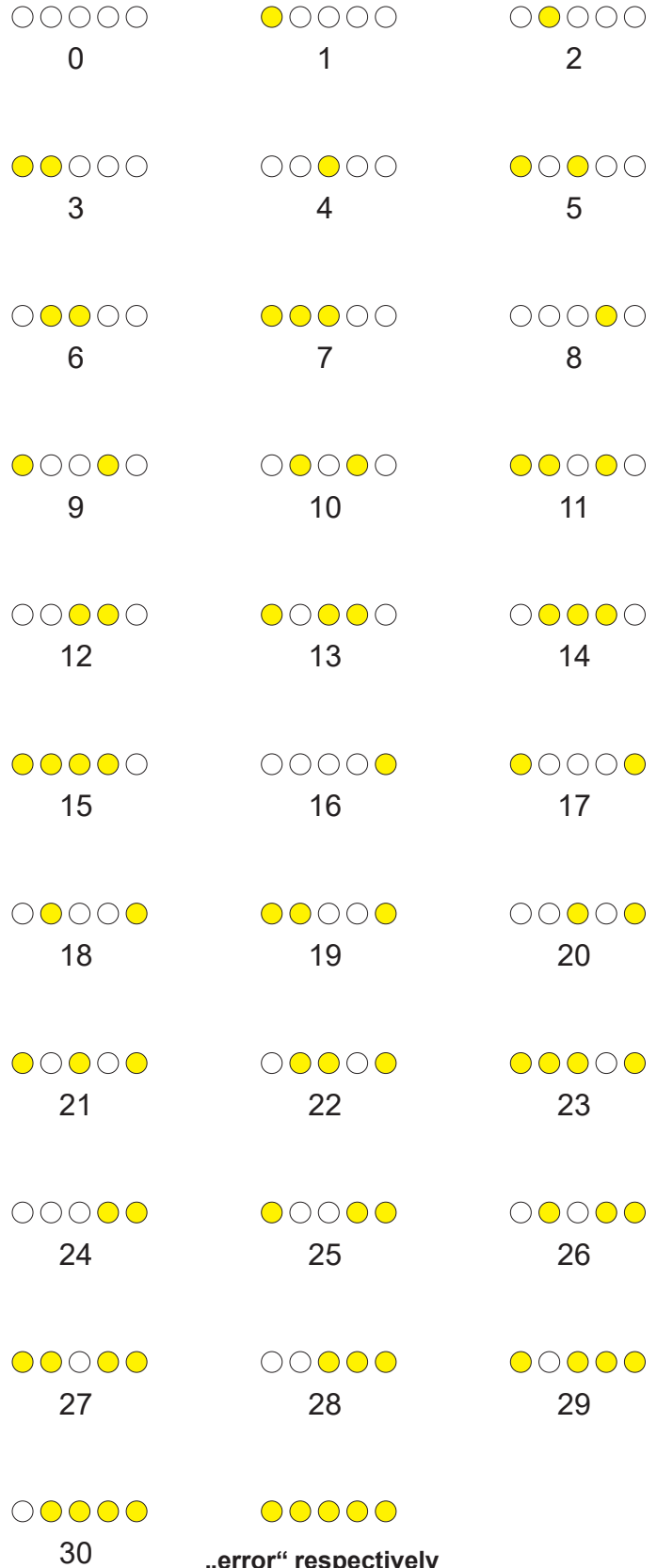
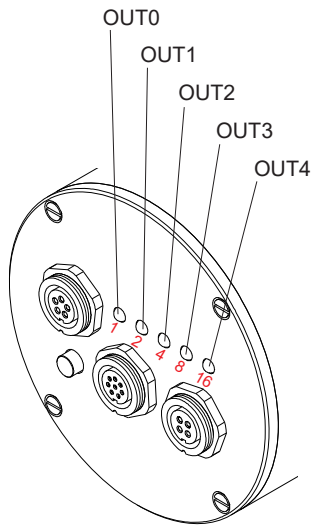
**LED display:**

The gloss grade is visualized by means of 5 yellow LEDs at the housing of the gloss sensor.

In the BINARY mode the line vector indicated on the LED display is output as 5-bit binary information at the digital outputs OUT0 to OUT4 of the 8-pin RLS-GD/PLC socket.

The RLS-GD-150 sensor is able to process a maximum of 31 line vectors (0 ... 30) in accordance with the corresponding lines in the TEACH TABLE. An "error" or a "not detected" is displayed by the lighting of all LED (OUT0 ... OUT4) digital outputs are set to HIGH-level).

In the DIRECT mode the maximum number of gloss grades to be taught is 5. These 5 gloss grades can be directly output at the 5 digital outputs. The respective detected gloss grade is displayed by means of the 5 yellow LEDs at the gloss sensor housing.

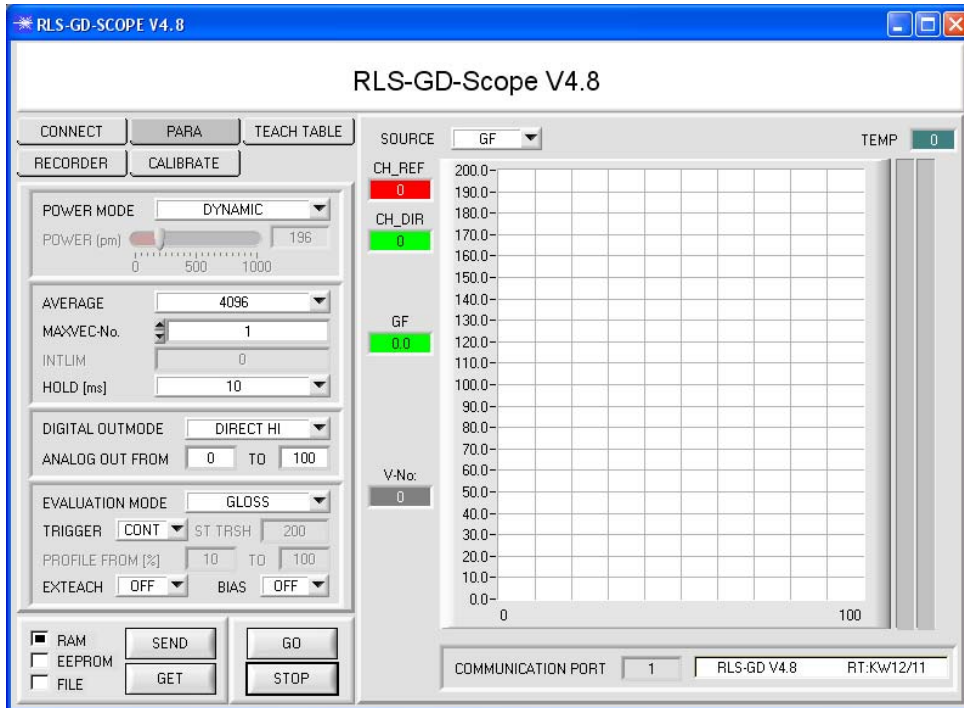




**Parameterization**

**Windows® user interface:**

The RLS-GD gloss sensor is parameterized under Windows® with the RLS-GD-Scope software. The Windows® user interface facilitates the teach-in process at the sensor and supports the operator in the task of adjustment and commissioning of the sensor.

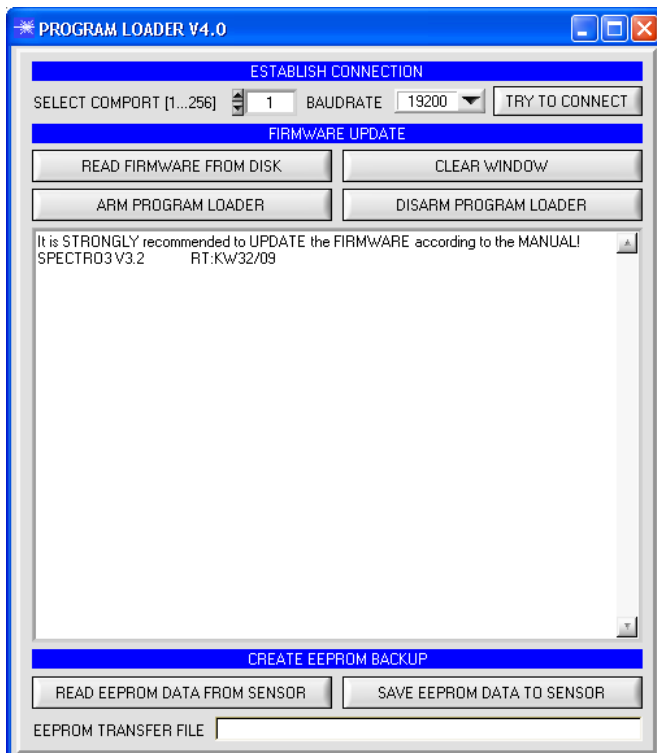


The RS232 interface (PARA) is used for setting parameters such as:

- MAXVEC-No.:  
Number of gloss degrees (normalized vectors) to be checked
- POWER MODE:  
Light power of the white-light LED
- EVALUATION MODE:  
The RLS-GD sensor can be operated with two different evaluation modes (NORM\_INT or GLOSS)
- AVERAGE:  
Averaging over a maximum of 32768 values
- TRIGGER:  
Continuous or external or self trigger
- DIGITAL OUTMODE:  
Triggering of the digital outputs
- INTLIM:  
Minimum intensity required for gloss evaluation
- HOLD:  
Pulse lengthening up to 100ms max.

Under Windows® representation of the gloss value on a PC in numeric form and in a color chart, and representation of RGB values in a time chart. In addition the current RGB values are displayed as a bar chart.

**Firmware Update by means of the software Program Loader:**



The software „Program Loader“ allows the user to perform an automatic firmware update. The update will be carried out through the RS232 interface.

An initialisation file (xxx.ini) and a firmware file (xxx.elf.S) are required for performing a firmware update. These files can be obtained from your supplier. In some cases an additional firmware file for the program memory (xxx.elf.p.S) is also needed, and this file will be automatically provided together with the other two files.

A plausibility check is performed after the initialisation file has been loaded with the Program Loader. If the initialisation file was changed or damaged, it will not be possible to perform a firmware update.

When the plausibility check is successfully completed, the instructions contained in the initialisation file will be carried out step by step.

The complete memory contents of the micro-controller in the sensor will be deleted in a firmware update. This means that both the program in the program memory and the data in the data memory will be lost.

The new firmware automatically writes the correct data to the program memory again.

However, the parameter settings, temperature curves, linearization curves, etc. that are stored in the data memory (EEPROM) will be deleted.

With the Program Loader V4.0 software the data will be saved in the EEPROM, and can be written back again after successful firmware update. For this purpose the software creates an EEPROM backup file.



**Application Example****Monitoring the chocolate layer thickness on a calender roller**

The chocolate coating of a calender roller is determined with an RLS-GD-150. At the sensor output an analog signal provides information about the coating thickness.

From a distance of approx. 150 mm polarised white light is vertically directed onto the calender roller. The white light that is diffusely reflected from the calender roller is detected by way of a receiver ring that encircles the white light source. The receiver also features a linear polarisation filter, the polarisation direction of which, however, is rotated by 90° with respect to the transmitter's polarisation filter.

The analog output of the sensor provides a signal that is proportional to the received quantity of light.

