

In Proud Partnership with Sensor Instruments


# GLOSS Series

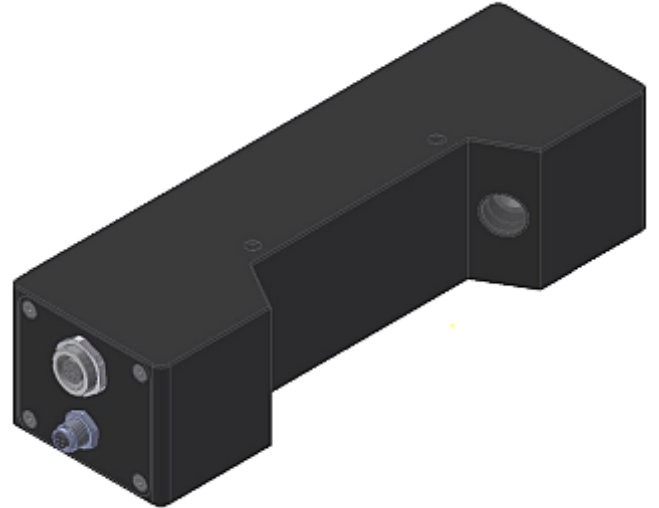
**PAQUIN**  
SENSORS

For technical support, sales & distribution  
within the USA & Canada

## ► GLOSS-LAS-15-60°

Gloss control sensor

- Detection of very narrow stripes (scoring) of varying degrees of gloss
- Surface color influences the gloss value
- 60° gloss detection, working distance 15 mm ± 10%
- Laser, **laser class 2** ( $P_{opt.} < 1$  mW, wave length 670 nm) 
- Visible red laser line, typ. 0.1 mm x 3 mm in the focus
- Teaching of up to 7 gloss degrees (or norm vectors)
- Parameterisable under Windows®
- RS232 interface (USB or Ethernet converter is available)
- 3 switching outputs (npn-/pnp-able, 100 mA, short circuit proof)  
Transmitter power adjustable or controllable (STATIC or DYNAMIC)
- Averaging can be activated (over up to approx. 32000 values)
- 1 analog output (0...+10V or 4...20mA, selectable) parameterizable under Windows® proportional to gloss degree
- Digital input IN0 for teaching or optionally for scope function
- Digital input IN1 for the defined output of the analog signal
- Scratch-resistance glass cover of optics
- Calibration function (black glass) by means of calibration unit (optional)
- Offline unit as well as blast-air top available (optional)



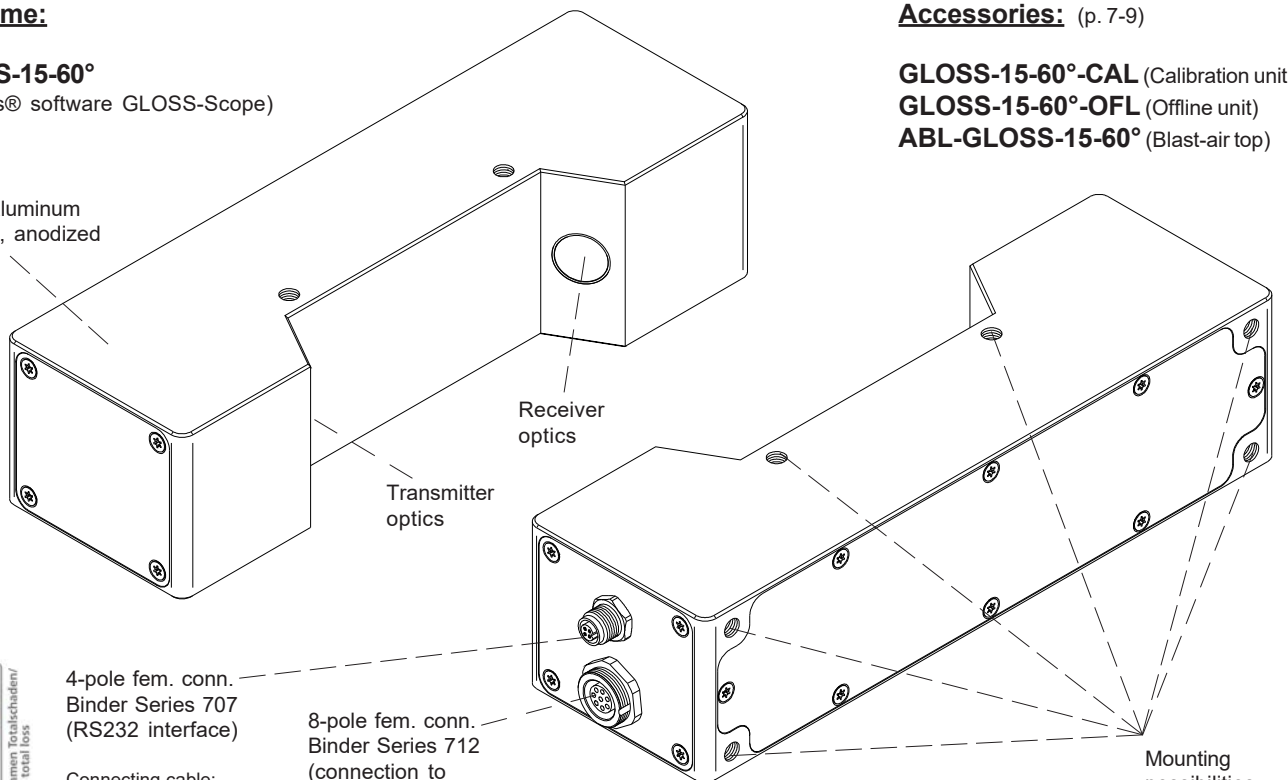
### Design

#### Product name:

#### GLOSS-LAS-15-60°

(incl. Windows® software GLOSS-Scope)

Sturdy aluminum housing, anodized in black



Receiver optics

Transmitter optics

4-pole fem. conn. Binder Series 707 (RS232 interface)

Connecting cable: cab-las4/PC or cab-4/USB or cab-4/ETH

8-pole fem. conn. Binder Series 712 (connection to PLC)

Connecting cable: cab-las8/SPS

Mounting possibilities (threaded M5)

#### Accessories: (p. 7-9)

**GLOSS-15-60°-CAL** (Calibration unit)

**GLOSS-15-60°-OFL** (Offline unit)

**ABL-GLOSS-15-60°** (Blast-air top)



ausgenommen Totalschaden/ excluding total loss

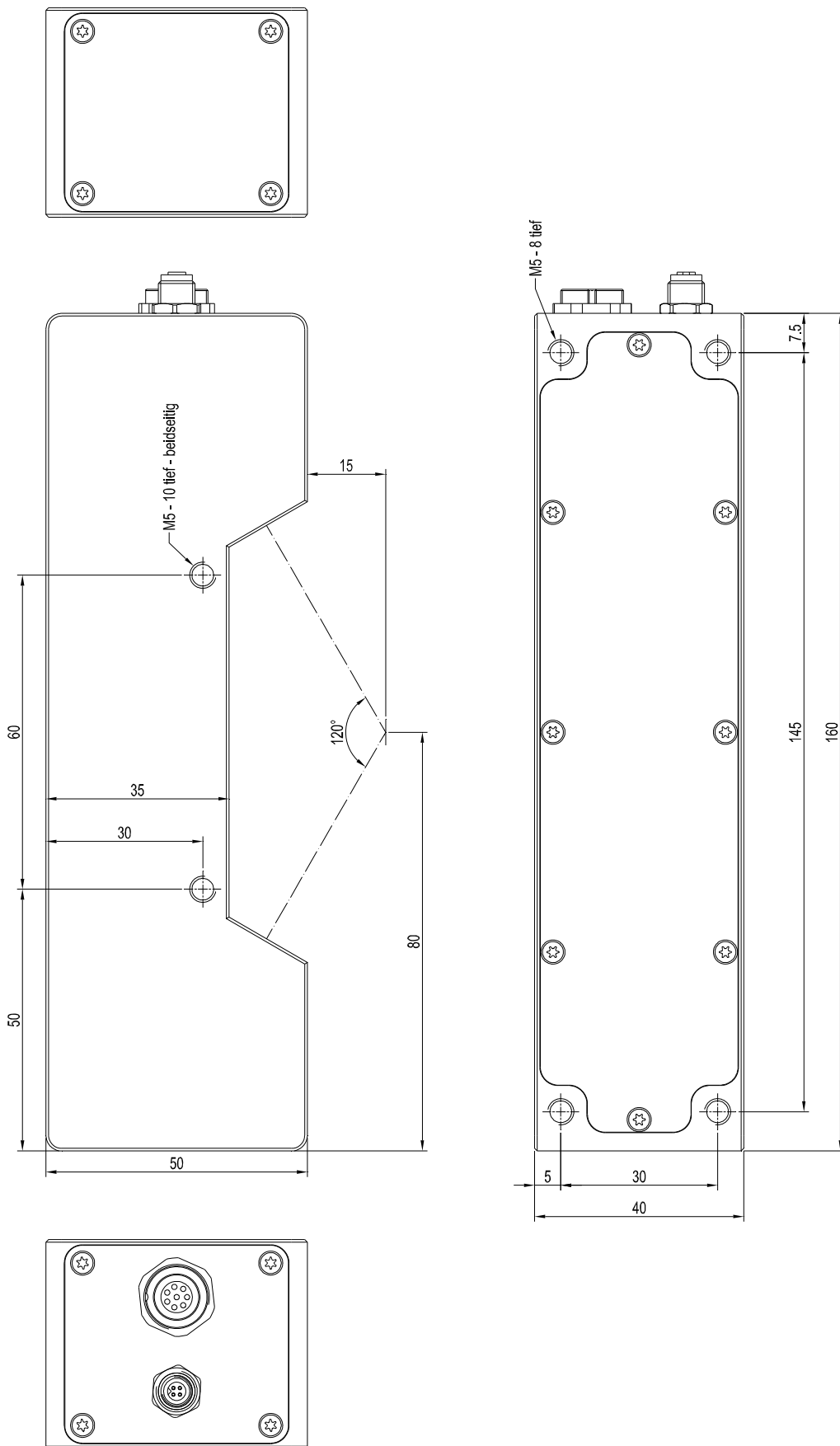




**Technical Data**

Type	GLOSS-LAS-15-60°																				
Voltage supply	+24VDC (± 10%), protected against polarity reversal, overload protected																				
Current consumption	typ. 100 mA																				
Max. switching current	100 mA, short-circuit proof																				
Interface	RS232, parameterisable under Windows®																				
Digital inputs (2x)	digital input IN0: for teaching or optionally for scope function digital input IN1: for the defined output of the analog signal																				
Digital outputs (3x)	OUT0 ... OUT2: Q <sub>inv</sub> or Q, (adjustable via PC): Q <sub>inv</sub> : npn bright-switching (npn n.c.) / pnp dark-switching (pnp n.o.) Q: pnp bright-switching (pnp n.c.) / npn dark-switching (npn n.o.)																				
Analog output (1x)	voltage output 0V...+10V or current output 4mA...20mA (can be switched under Windows®)																				
Analog band width	max. 90 kHz (-3 dB)																				
Tolerance range for digital outputs	parameterisable under Windows®																				
Switching state indication	2 yellow LED visualize the physical state of the outputs OUT0 and OUT1																				
Scan frequency	<table border="0" style="width: 100%;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%;">LED mode AC (depends on parameterization):</td> <td style="width: 33%;">LED mode DC (depends on parameterization):</td> </tr> <tr> <td></td> <td>Frequency [Hz] Digital outputs Analog output</td> <td>Frequency [Hz] Digital outputs Analog output</td> </tr> <tr> <td>Max. 22 100</td> <td>Off Off</td> <td>Max. 61 750 Off Off</td> </tr> <tr> <td>Max. 22 000</td> <td>On Off</td> <td>Max. 52 800 On Off</td> </tr> <tr> <td>Max. 20 300</td> <td>Off On</td> <td>Max. 49 700 Off On</td> </tr> <tr> <td>Max. 20 200</td> <td>On On</td> <td>Max. 43 700 On On</td> </tr> </table> <p>Measurements were made with the smallest gain at the receiver (AMP1). At the highest gain (AMP8), the frequency is reduced by a factor of 5.</p> <p>The frequency is independent of the gain set at the receiver.</p>				LED mode AC (depends on parameterization):	LED mode DC (depends on parameterization):		Frequency [Hz] Digital outputs Analog output	Frequency [Hz] Digital outputs Analog output	Max. 22 100	Off Off	Max. 61 750 Off Off	Max. 22 000	On Off	Max. 52 800 On Off	Max. 20 300	Off On	Max. 49 700 Off On	Max. 20 200	On On	Max. 43 700 On On
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Switching frequency	max. 60 kHz																				
Averaging	max. 32768 values, adjustable under Windows®																				
Transmitter (light source)	Semiconductor laser, 670 nm, 1mW max. optical power, laser class 2 acc. to DIN EN 60825-1. The use of this laser transmitter therefore requires no additional protective measures.																				
Working distance	typ. 15 mm ± 10%																				
Laser line geometry	focused laser line: typ. 0.1 mm x 3 mm (at 15 mm working distance)																				
Control mode for light source	AC operation (LED MODE-AC) or DC operation (LED MODE-DC), can be switched via PC software																				
Transmitter power	parameterisable under Windows (STATIC or DYNAMIC)																				
Optical filter	day light filter (KG2)																				
Pulse lengthening	0 ... 100 ms (parameterisable under Windows®)																				
Ambient light	up to 5000 Lux																				
Housing dimensions	LxWxH approx. 160 mm x 50 mm x 40 mm																				
Housing material	aluminum, anodized in black																				
Enclosure rating	IP67																				
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-4/USB or cab-4/USB-w to PC/Ethernet interface: cab-4/ETH																				
Type of connector	connection to PLC: 8-pole female connector Binder Series 712 connection to PC: 4-pole female connector Binder Series 707																				
Operating temperature range	-20°C ... +55°C																				
Storage temperature range	-20°C ... +85°C																				
EMC test acc. to	DIN EN 60947-5-2																				

Dimensions



All dimensions in mm



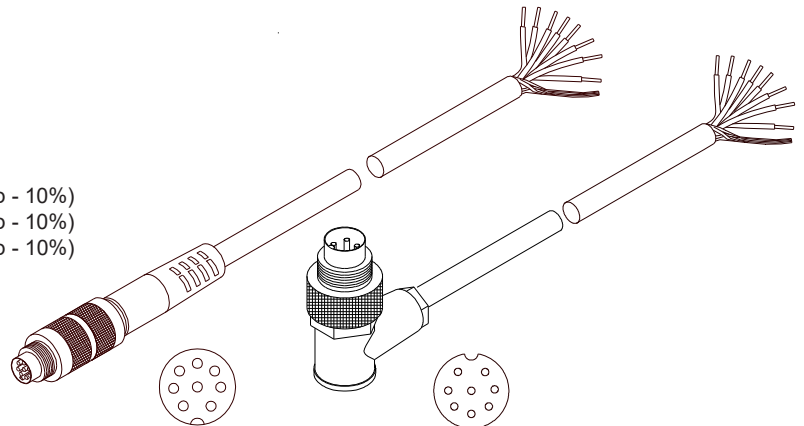
**Connector Assignment**

**Connection to PLC:**

**8-pole fem. connector Binder Series 712**

Pin:	Color:	Assignment:
1	white	GND (0V)
2	brown	+24VDC ( $\pm 10\%$ )
3	green	IN0 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)
4	yellow	IN1 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)
5	grey	OUT0 (digital 0: Type 0 ... 1V, digital 1: Type +Ub - 10%)
6	pink	OUT1 (digital 0: Type 0 ... 1V, digital 1: Type +Ub - 10%)
7	blue	OUT2 (digital 0: Type 0 ... 1V, digital 1: Type +Ub - 10%)
8	red	ANALOG (0...+10V or 4 ... 20mA)

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)

**Connection to PC:**

**4-pol. fem. connector Binder Series 707**

Pin:	Assignment:
1	+24VDC (+Ub, OUT)
2	GND (0V)
3	RxD
4	TxD

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

Connecting cable:  
 cab-las4/PC-(length)  
 cab-las4/PC-w-(length) (angle type 90°)  
 (standard length 2m)

**alternative:**

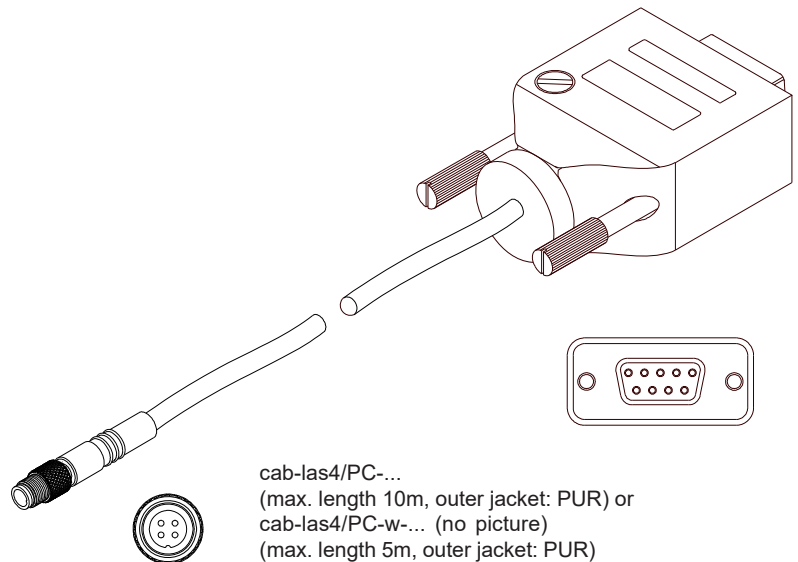
**Connection via USB interface at the PC:**

USB converter (incl. driver software):  
 cab-4/USB-(length)  
 cab-4/USB-w-(length) (angle type 90°)  
 (standard length 2m)

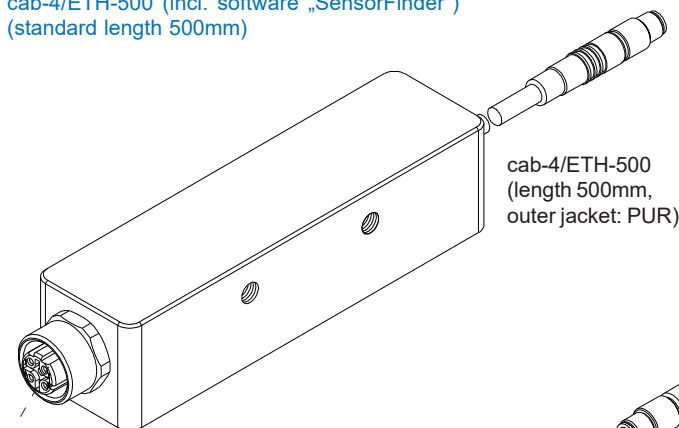
**alternative:**

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

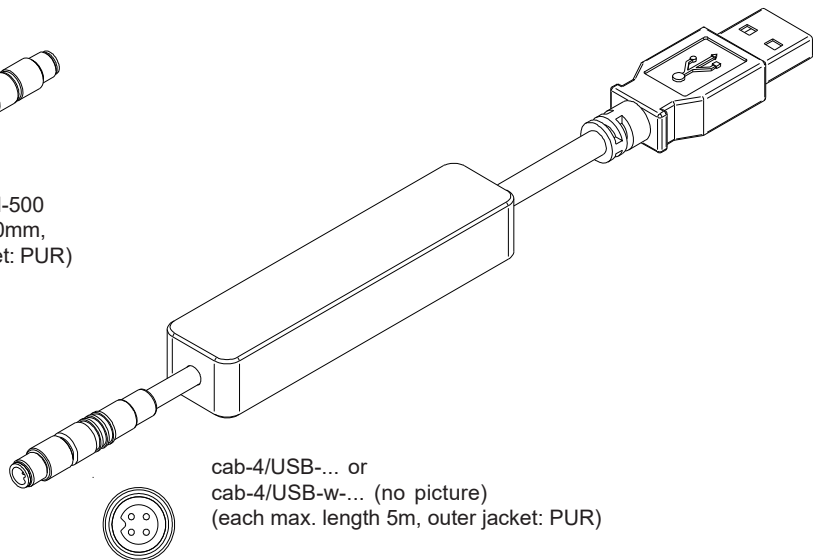
Ethernet converter (incl. software „SensorFinder“):  
 cab-4/ETH-500 (incl. software „SensorFinder“)  
 (standard length 500mm)



cab-las4/PC-...  
 (max. length 10m, outer jacket: PUR) or  
 cab-las4/PC-w-... (no picture)  
 (max. length 5m, outer jacket: PUR)



cab-4/ETH-500  
 (length 500mm,  
 outer jacket: PUR)



cab-4/USB-... or  
 cab-4/USB-w-... (no picture)  
 (each max. length 5m, outer jacket: PUR)

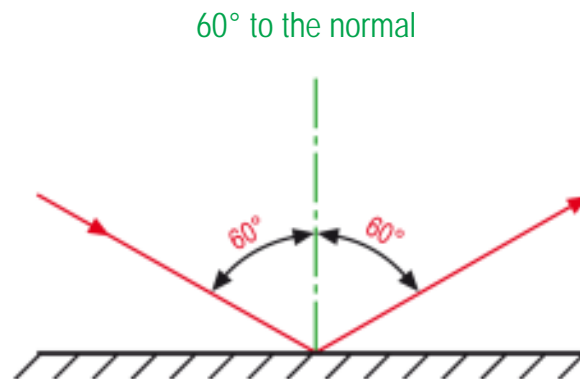
4-pole M12 fem. connector (D-coded) for  
 connection of an external CAT5 cable, e.g.  
 cab-eth/M12D-RJ45-flx-(length)  
 (available in length 2m, 5m, 10m, or 20m)



## Measuring Angle

### Measuring angle of the gloss control sensor GLOSS-LAS:

60° For all common surfaces



## Measuring Principle

### Measuring principle of the gloss measurement sensors GLOSS-... and the gloss control sensors GLOSS-LAS-...:

A white-light LED projects a white light spot onto the surface to be inspected. A part of the light that is directly reflected from the measuring object is directed onto a receiver by the receiver optics (the receiver optics is arranged at the same angle from the vertical as the transmitter optics). Furthermore, diffuse reflection is determined by means of an additional optics.

A special case are the GLOSS-LAS sensors which use a laser as light source. These allow a very fine spot on the surface to be checked. The direct reflection of the laser is also detected here. As the laser diode has an internal monitor diode, no further optics are needed to detect the diffuse reflection. Here the reference value for the laser intensity can be used as a reference.

The GLOSS series sensors optionally can be „taught“ up to 7 gloss levels or norm vectors. The gloss level or the detected norm vector is provided at the digital outputs. In addition the gloss level also is provided in analog form from 0 to 10V or from 4mA to 20mA. A digital input allows external „teaching“ of the sensor. As an alternative the sensor also can be triggered with the same input. An additional input allows the „freezing“ of the analog output signal upon a positive input edge.

The GLOSS series sensors allow highly flexible signal acquisition. The sensor, for example, can be operated in alternating-light mode (AC mode), which means the sensor is not influenced by external light, or in constant-light mode (DC mode), which provides outstanding high-speed sensor operation. With the stepless adjustment of the integrated light source, the selectable gain of the receiver signal, and an INTEGRAL function the sensor can be adjusted to almost any surface.

The GLOSS as well as the GLOSS-LAS sensor must be calibrated for gloss level detection. For this purpose a reference surface is required which by definition has a gloss level of 100GU (Gloss Units). Calibration then is performed with the PC software. The sensor also can be calibrated to foreign systems, which can be optionally activated in the PC software.

The GLOSS series sensors are factory calibrated. When establishing the connection, the date of the next calibration is displayed in the status window in the CONNECT tab. For continuously accurate measurement results, we recommend having the calibration renewed every 18 months and sending in the sensors for calibration. **[Factory calibration not applicable for the GLOSS-LAS sensor.]**

Parameters and measurement values can be exchanged between PC and sensor either through RS232 or Ethernet (using an Ethernet converter). Through the interface all the parameters can be stored in the non-volatile EEPROM of the sensor.

The PC software facilitates the parameterisation, diagnostics, and adjustment of the sensor system (oscilloscope function). The software furthermore provides a data recorder function that automatically records data and stores them on the hard disk of the PC.

GLOSS sensors as well as GLOSS-LAS sensors are temperature-compensated over a range of 0°C to 80°C.

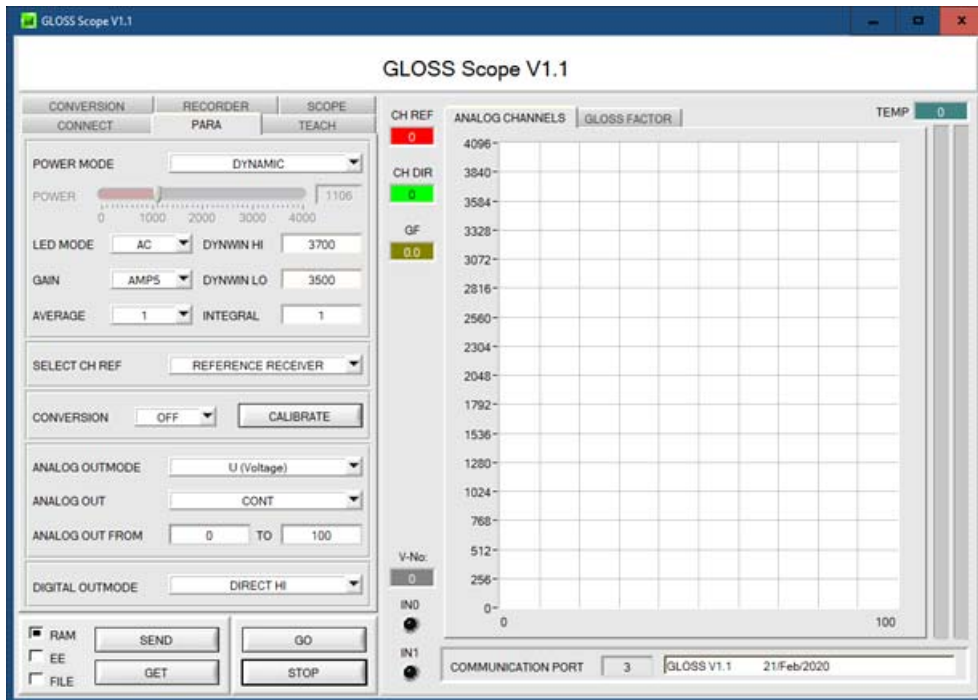
Possible firmware updates can be easily performed through the RS232 interface, even with the sensor system in installed condition.

When parameterisation is finished, the color sensor continues to operate with the current parameters in STAND-ALONE mode without a PC.

## Parameterization

### Windows® user interface:

(The current software version is available for download on our website.)



The gloss sensor is parameterized under Windows® with the GLOSS-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 software provides various display elements and a graphic window for the visualisation of all the data that are important for parameterisation.

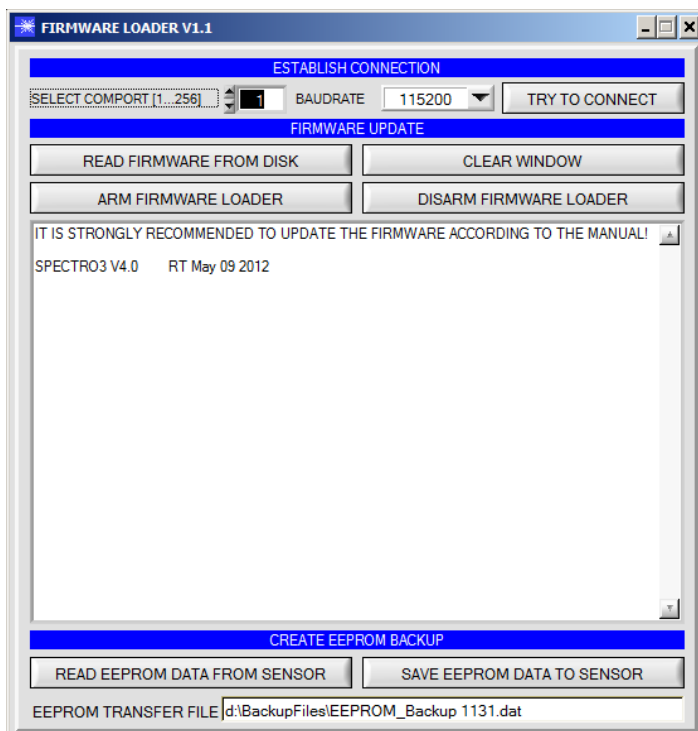
In the CONVERSION tab a certain conversion value can be assigned to the gloss factor GF signal.

The GLOSS-Scope software features a data recorder (RECORDER tab).

The SCOPE tab visualizes an oscilloscope.

## Firmware Update

### Firmware update by means of the software „FirmwareLoader“:

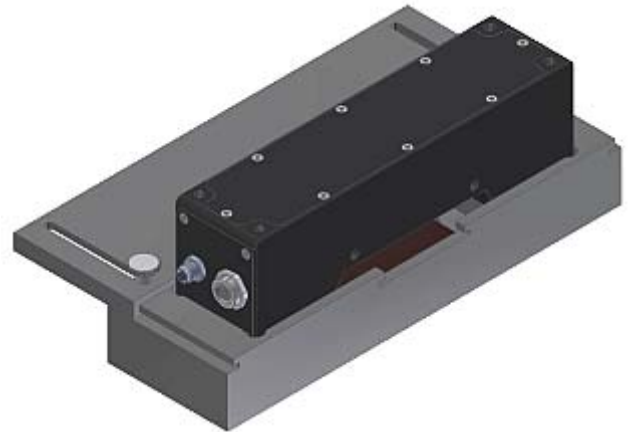
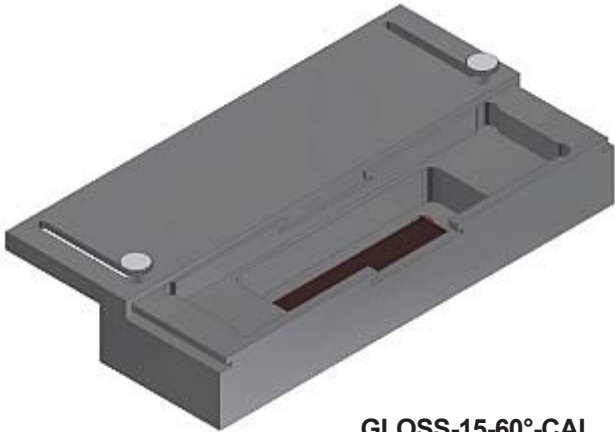


The software „Firmware Loader“ allows the user to perform an automatic firmware update. The update will be carried out through the RS232 interface.

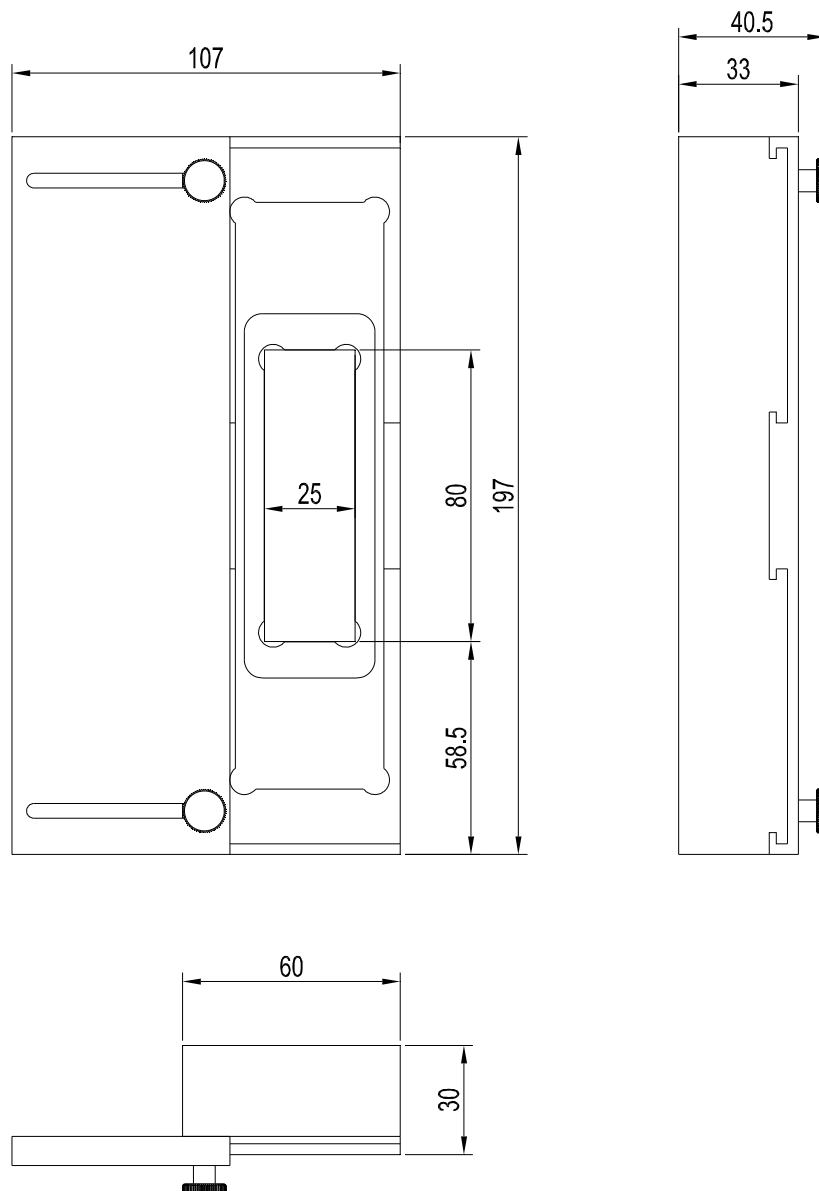
An initialisation file (xxx.ini) and a firmware file (xxx.elf.S) are required for performing a firmware update. These files can be obtained from your supplier. In some cases an additional firmware file for the program memory (xxx.elf.p.S) is also needed, and this file will be automatically provided together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



Calibration Unit



**GLOSS-15-60°-CAL**  
(Calibration unit, optional)



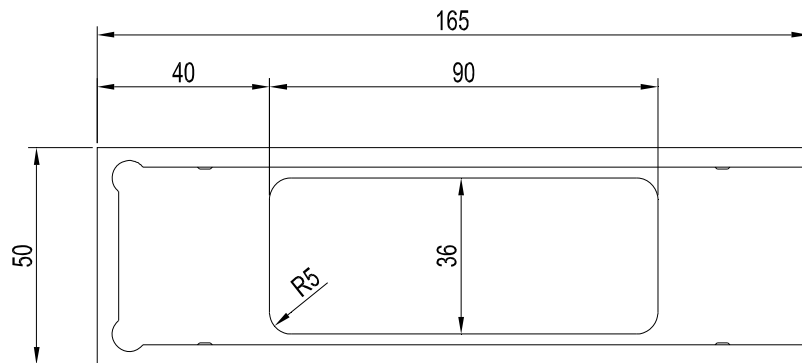
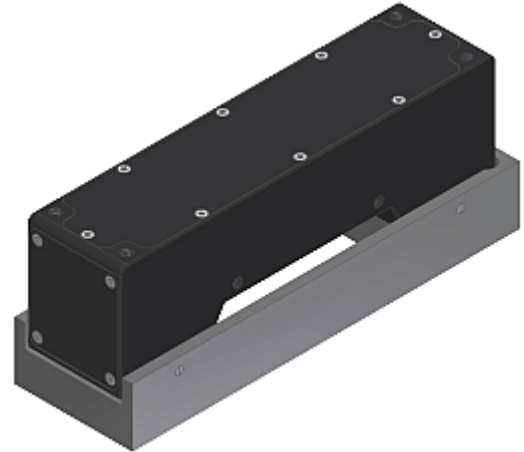
All dimensions in mm



Offline Unit



**GLOSS-15-60°-OFL**  
(Offline unit / spacer, optional)



All dimensions in mm

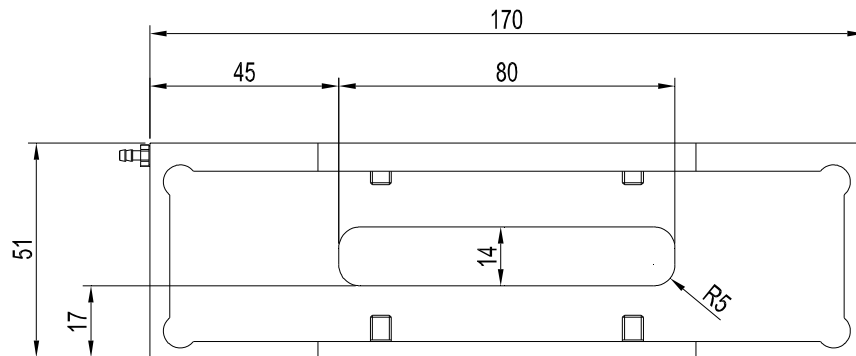
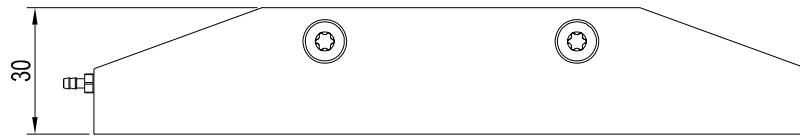




**Blast-air Top**



**ABL-GLOSS-15-60°**  
(Blast-air top, optional)



All dimensions in mm