SPECTRO Series

► ## SPECTRO-1-30-GN/OR

- Measuring range typ. 10 mm ... 40 mm
- Detection of fluorescent objects
- 9x LED green, 525 nm, focused (AC-/DC-operation or OFF for luminous objects can be switched)
- High scan frequency
- Gray scale detection (12-bit resolution)
- Insensitive to outside light (in AC-operation)
- Brightness correction can be activated (STAT/DYN)
- Averaging can be activated (from 1 up to over 32000 values)
- TEACH via PC or PLC
- 2 digital inputs (0V/+Ub)
- 2 digital outputs (max. 60 kHz switching frequency)
- 1 analog output (0V...+10V or 4...20mA), selectable via softwa
- Switching state indication by means of 2 yellow LEDs
- RS232 interface (USB or ETHERNET converter available)
- Parameterizable via Windows® software, scope function
- Temperature compensated (from 0°C to 60°C)
- Automatic threshold correction can be activated
- Switching threshold can be parameterized relative or absolute
- Various switching threshold functions (window, upper/lower threshold)
- Integrated cooling device for protection against overheating of the sensor

Design

Product name:

SPECTRO-1-30-GN/OR
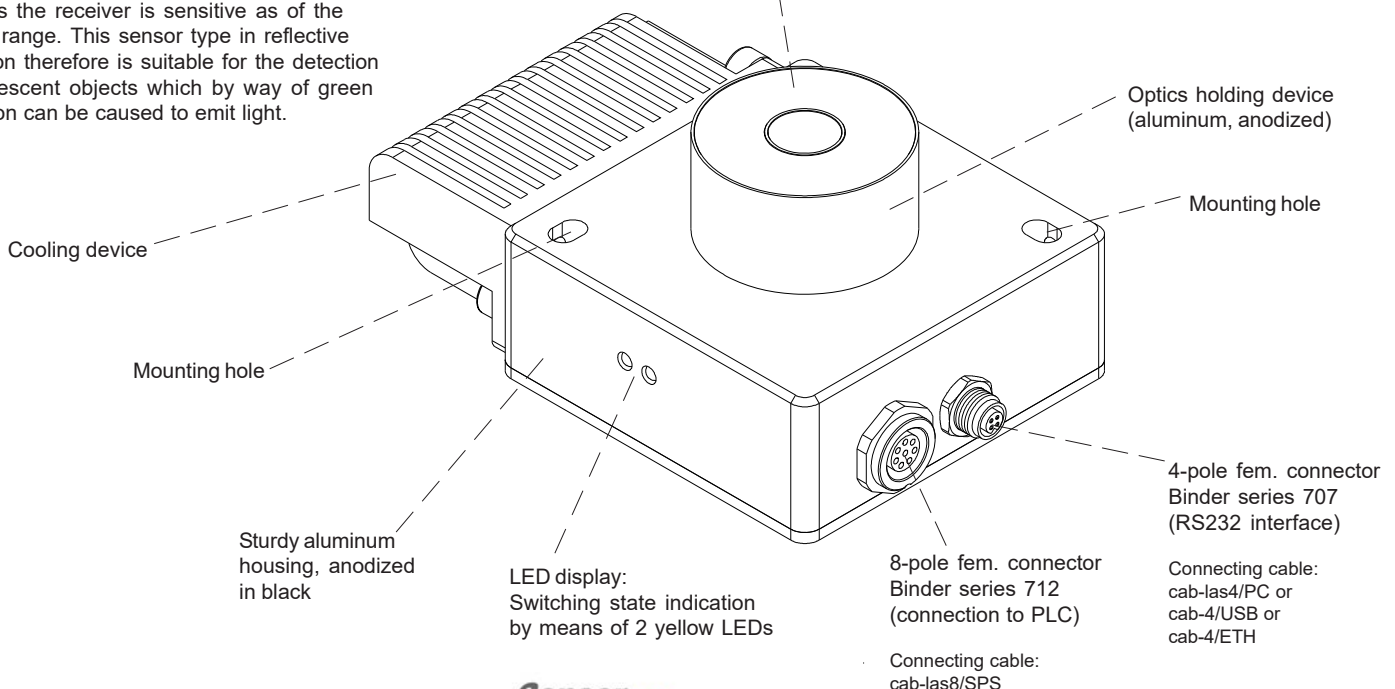(incl. Windows® PC software SPECTRO1-Scope)

GN/OR:
The transmitter operates in the green range, whereas the receiver is sensitive as of the orange range. This sensor type in reflective operation therefore is suitable for the detection of fluorescent objects which by way of green excitation can be caused to emit light.

Receiver optics with photo diode and long-pass filter (as of orange), transmitter optics with 9x LED green and short-pass filter (as of green), scratch-resistant optics

Accessories: (p. 8)
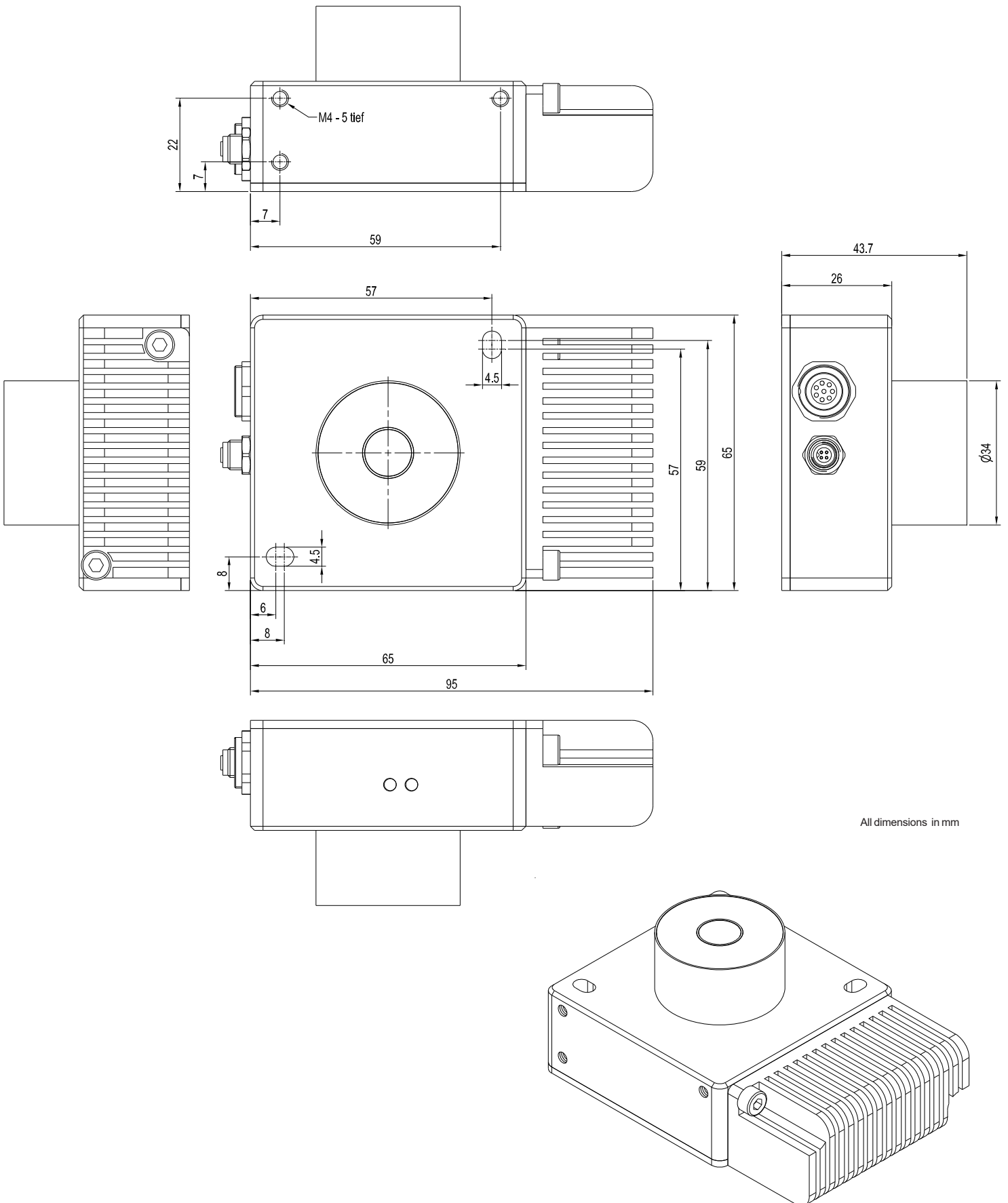
SPECTRO-3-30-OFL
(offline attachment unit/spacer)

Optics holding device (aluminum, anodized)

Mounting hole

Cooling device

Mounting hole

Sturdy aluminum housing, anodized in black

LED display:
Switching state indication by means of 2 yellow LEDs

8-pole fem. connector Binder series 712 (connection to PLC)

Connecting cable: cab-las8/SPS

4-pole fem. connector Binder series 707 (RS232 interface)

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

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Technical Data

Model	SPECTRO-1-30-GN/OR	
Voltage supply	+24VDC (± 10%), reverse polarity protected, overcurrent protected	
Current consumption	< 220 mA	
Max. switching current	100 mA, short circuit proof	
Switching state indication	2 yellow LED visualize the physical state of the outputs OUT0 and OUT1	
Digital inputs (2x)	IN0 and IN1 (Pin 3 and 4): digital (0V/+24V)	
Digital outputs (2x)	OUT0 and OUT1 (Pin 5 and 6): digital (0V/+24V), npn-/pnp-able (bright-/dark-switching, can be switched)	
Analog output (1x)	ANALOG (Pin 8): voltage 0 ... +10V or current 4 ... 20mA, adjustable via PC software	
Interface	RS232	
Pulse lengthening	0 ... 100 ms, adjustable via PC software	
Averaging	max. 32768 values, adjustable via PC software	
Scan frequency (LED mode AC, DC or OFF, can be switched via PC software)	LED mode AC (depends on parameterization): Frequency [Hz]　Digital outputs　Analog output Max. 50 000　　Off　　　　　Off Max. 48 000　　On　　　　　Off Max. 42 000　　Off　　　　　On Max. 41 000　　On　　　　　On Measurements were made with the smallest gain at the receiver (AMP1). At the highest gain (AMP8), rthe frequency is reduced by a factor of 10.	LED mode DC / OFF (depends on parameterization): Frequency [Hz]　Digital outputs　Analog output Max. 175 000　　Off　　　　　Off Max. 135 000　　On　　　　　Off Max. 100 000　　Off　　　　　On Max. 85 000　　On　　　　　On The frequency is independent of the gain set at the receiver.
Switching frequency	max. 60 kHz	
Analog band width	max. 90 kHz (-3 dB)	
Transmitter (light source)	9x LED green, 525 nm	
Transmitter control	can be switched via PC software: AC operation (LED MODE-AC), DC operation (LED MODE-DC), OFF operation (LED MODE-OFF)	
Measuring range	typ. 10 mm ... 40 mm	
Receiver	photo diode	
Receiver gain setting	8 steps (AMP1 ... AMP8), adjustable via PC software	
Ambient light	max. 5000 Lux	
Detection range (half intensity width)	typ. 10 mm at a distance of 15 mm typ. 20 mm at a distance of 40 mm	
Reproducibility	2 digits at 12-bit A/D conversion	
Housing dimensions	LxWxH approx. 95 mm x 65 mm x 43.7 mm (incl. optics holding device Ø 34 mm, without connectors)	
Housing material	aluminum, anodized in black (optics holding device: aluminum, anodized)	
Enclosure rating	IP67 (optics), IP64 (electronics)	
Connecting cables	to PLC: cab-las8/SPS or cab-las8/SPS-w to PC/RS232 interface: cab-las4/PC or cab-las4/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 fem. connector (Binder 712) connection to PC: 4-pole fem. connector (Binder 707)	
Operating temp. range	-20°C ... +55°C	
Storage temperature range	-20°C ... +85°C	
EMC test acc. to	DIN EN 60947-5-2　　CE	

Dimensions

M4 - 5 tief

22

7

7

59

57

4.5

4.5

8

6

8

65

95

57

59

65

43.7

26

⌀34

All dimensions in mm

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(1251.02)
Subject to alteration

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 (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	not connected
8	red	ANALOG (voltage 0...+10V <u>or</u> current 4…20mA)

Connecting cable:
cab-las8/SPS-(length)
cab-las8/SPS-w-(length)
(standard length 2m)
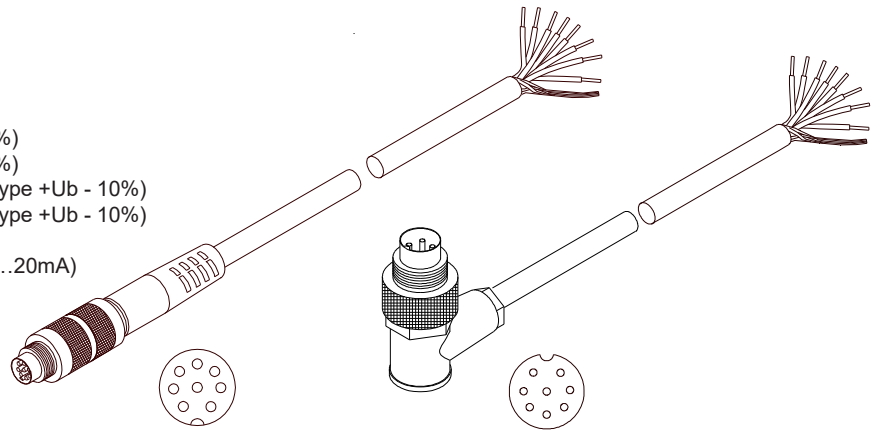
cab-las8/SPS-...
(max. length 25m, outer jacket: PUR)

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

Connection to PC:
4-pole 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)

<u>*alternative:*</u>
Connection via USB interface at the PC:
USB converter (incl. driver software):
cab-4/USB-(length)
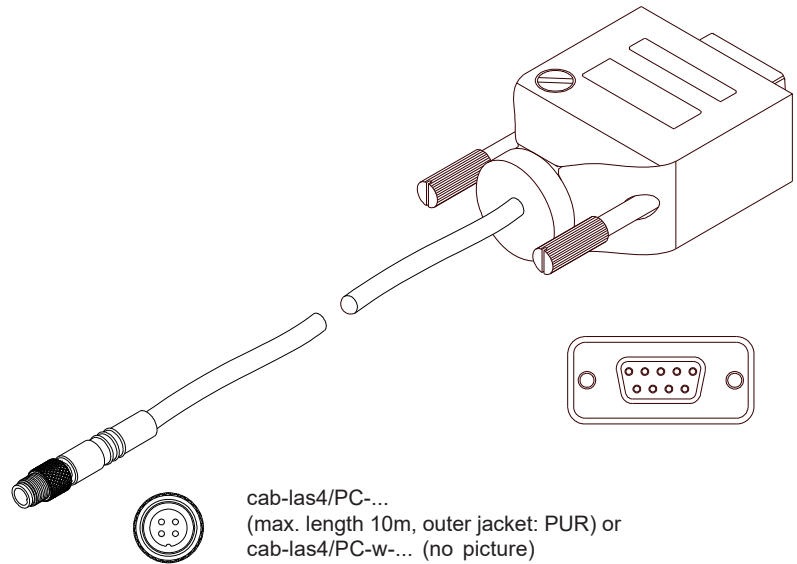cab-4/USB-w-(length) (angle type 90°)
(standard length 2m)

<u>*alternative:*</u>
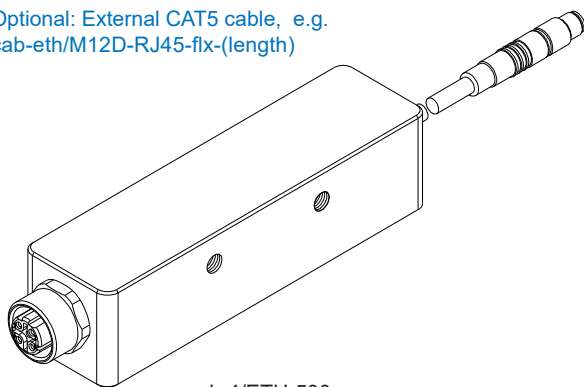*Connection to local network via Ethernet bus:*
Ethernet converter (incl. software „SensorFinder"):
cab-4/ETH-500
(standard length 0.5m)
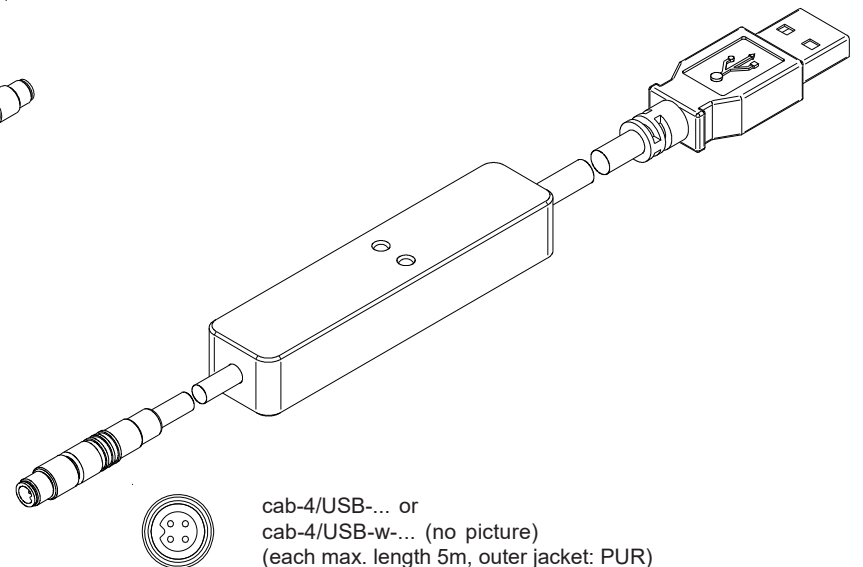
Optional: External CAT5 cable, e.g.
cab-eth/M12D-RJ45-flx-(length)

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 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)

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

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LED Display

LED display:

By means of the two LEDs
the physical state of the two outputs
OUT0 and OUT1 is visualized:

OUT0   OUT1
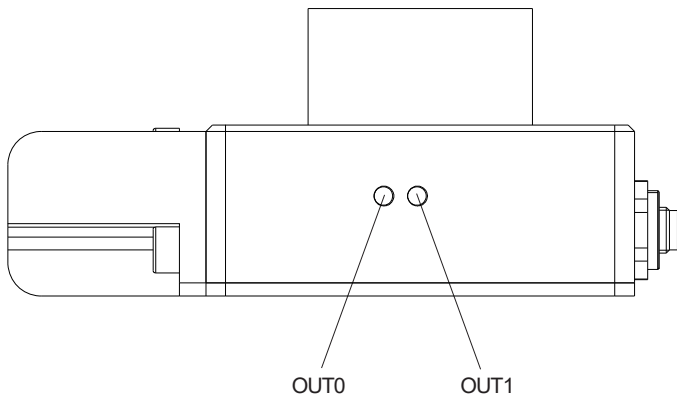
Measuring Principle

Measuring principle of the sensors of SPECTRO-1 series:

The sensors of the SPECTRO-1 series are of single-channel design, i.e. they acquire the analog signal that comes from a receiver and evaluate this signal. Various light sources such as white light, blue light, green light, UV light, IR light, or a laser can be used as a transmitter. The receiver is correspondingly matched to the transmitter. The acquired analog signal is provided through a voltage output and a current output.

The software can be used to select various evaluation modes for the analog signal. The status of the analog signal is provided through 2 digital outputs in accordance with the selected evaluation mode. A digital input allows external "teaching" of the sensor. An additional input allows the "freezing" of the analog output signal upon a positive input edge.

The SPECTRO-1 sensor allows 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. An OFF function deactivates the sensor's integrated light source and changes to DC mode, which allows the sensor to detect so-called "self-luminous objects". 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 or any "self-luminous object".

A micro-controller performs 12-bit analog/digital conversion of the analog signal, which allows recording and evaluation of the signal. Furthermore the SPECTRO-1 sensor offers various options for intelligent signal processing such as e.g. dirt accumulation compensation.

Parameters and measurement values can be exchanged between PC and sensor either through RS232 or Ethernet (using an Ethernet adaptor, e.g. SI-RS232/Ethernet-4-...). 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. SPECTRO-1 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.

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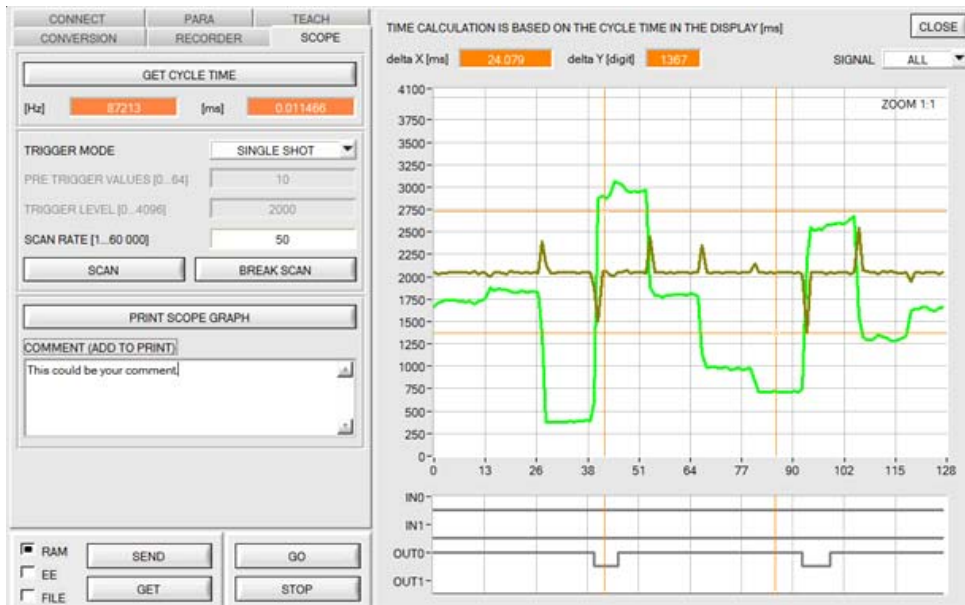
Parameterization

Windows® user interface:
(The current software version is available for download on our website.)
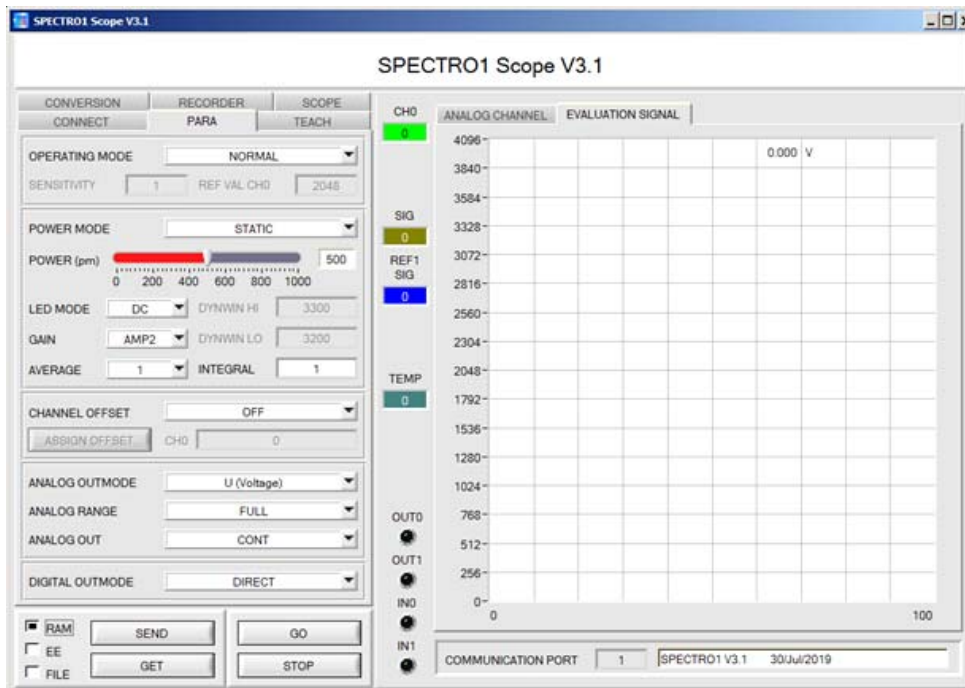
The PC software SPECTRO1-Scope facilitates the parameterization, the diagnosis, and the adjustment of the sensor system (oscilloscope function). Moreover, the software features a data recorder function that allows the automatic recording of recorded data and the saving of those at the hard disk of the PC.

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.
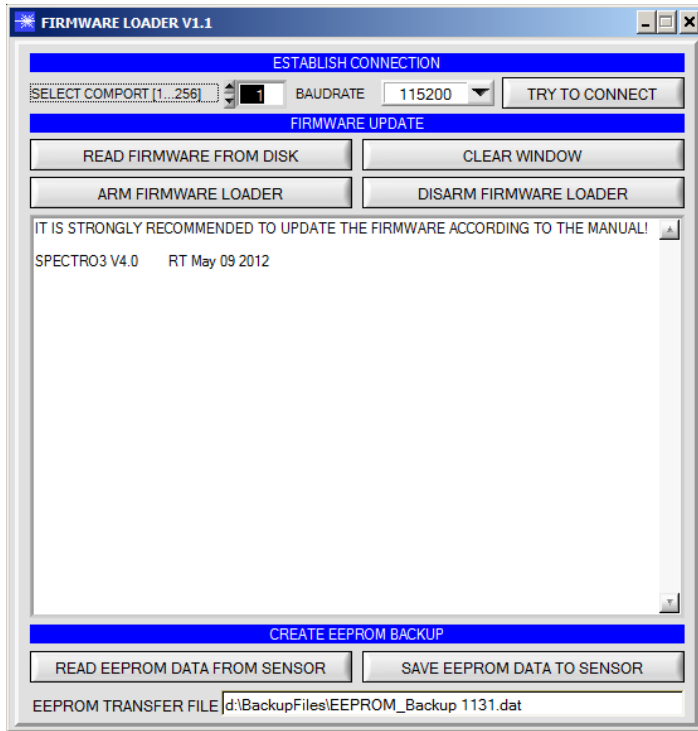

The SCOPE tab visualises an oscilloscope.

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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.

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Accessories

SPECTRO-3-30-OFL
Offline attachment unit/spacer (optics top part)
(please order separately)

The spacer is mounted onto the sensor optics, thus the sensor can be used as a hand-held unit.

For the purpose of control of a measurement object, the sensor with the spacer is put directly on the surface to be checked.

By means of the spacer directly put on the surface, the sensor works at a reference distance of 30 mm to the measurement object.

46.5

Ø44

Ø59
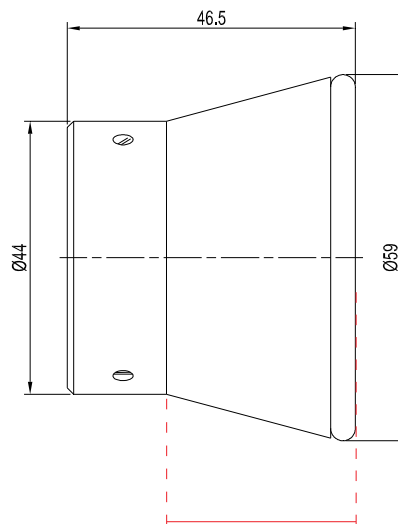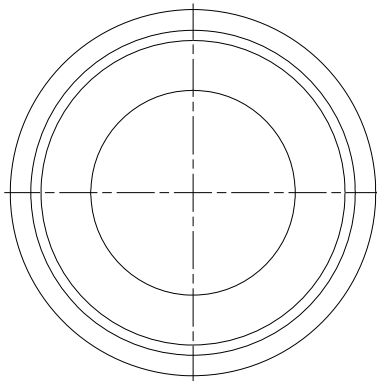
Reference distance 30 mm

All dimensions in mm

Application example:

Offline attachment unit SPECTRO-3-30-OFL, mounted on SPECTRO-3-30-DIL

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