

SPECTRO Series

► SPECTRO-1-100-COF-d12

- Measuring range typ. 60 mm ... 240 mm
- Integrated transmitter and receiver optics (confocal)
- Super-bright white-light LED (AC- or DC-operation or OFF for luminous objects, can be switched)
- High scan frequency (max. 200 kHz in DC- or OFF-operation)
- 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 (60 kHz switching frequency)
- 2 analog outputs (0V ... +10V and 4 ... 20mA)
- Switching state indication by means of 2 yellow LEDs
- RS232 interface (USB or ETHERNET adapter available)
- Parameterizable via Windows® software, scope function
- Temperature compensated
- Automatic threshold correction can be activated
- Switching threshold can be parameterized relative or absolute
- Various switching threshold functions (window, upper/lower threshold)
- Intensity control of luminous objects (LEDs, halogen lamps, displays, ...)



Design

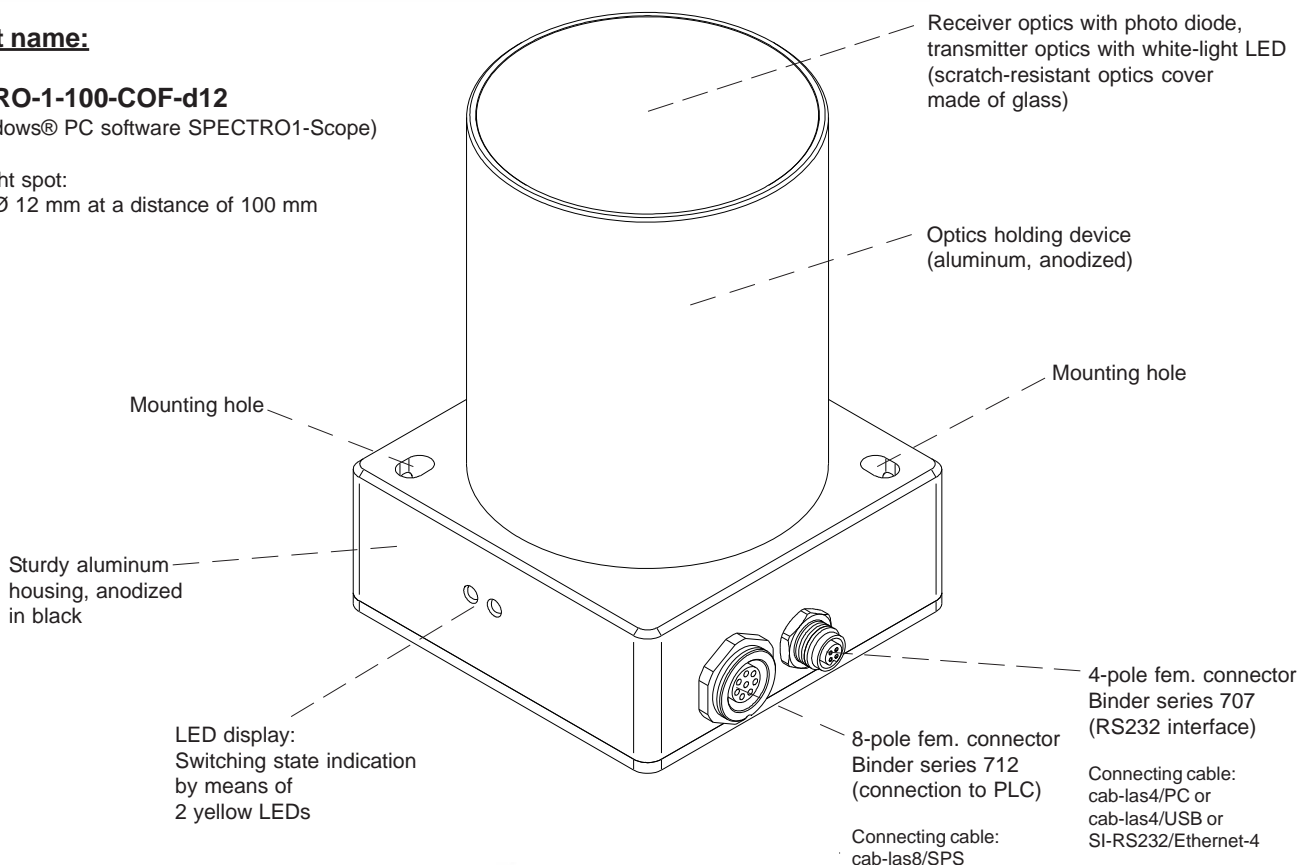
Product name:

SPECTRO-1-100-COF-d12

(incl. Windows® PC software SPECTRO1-Scope)

Size of light spot:

d12: typ. Ø 12 mm at a distance of 100 mm

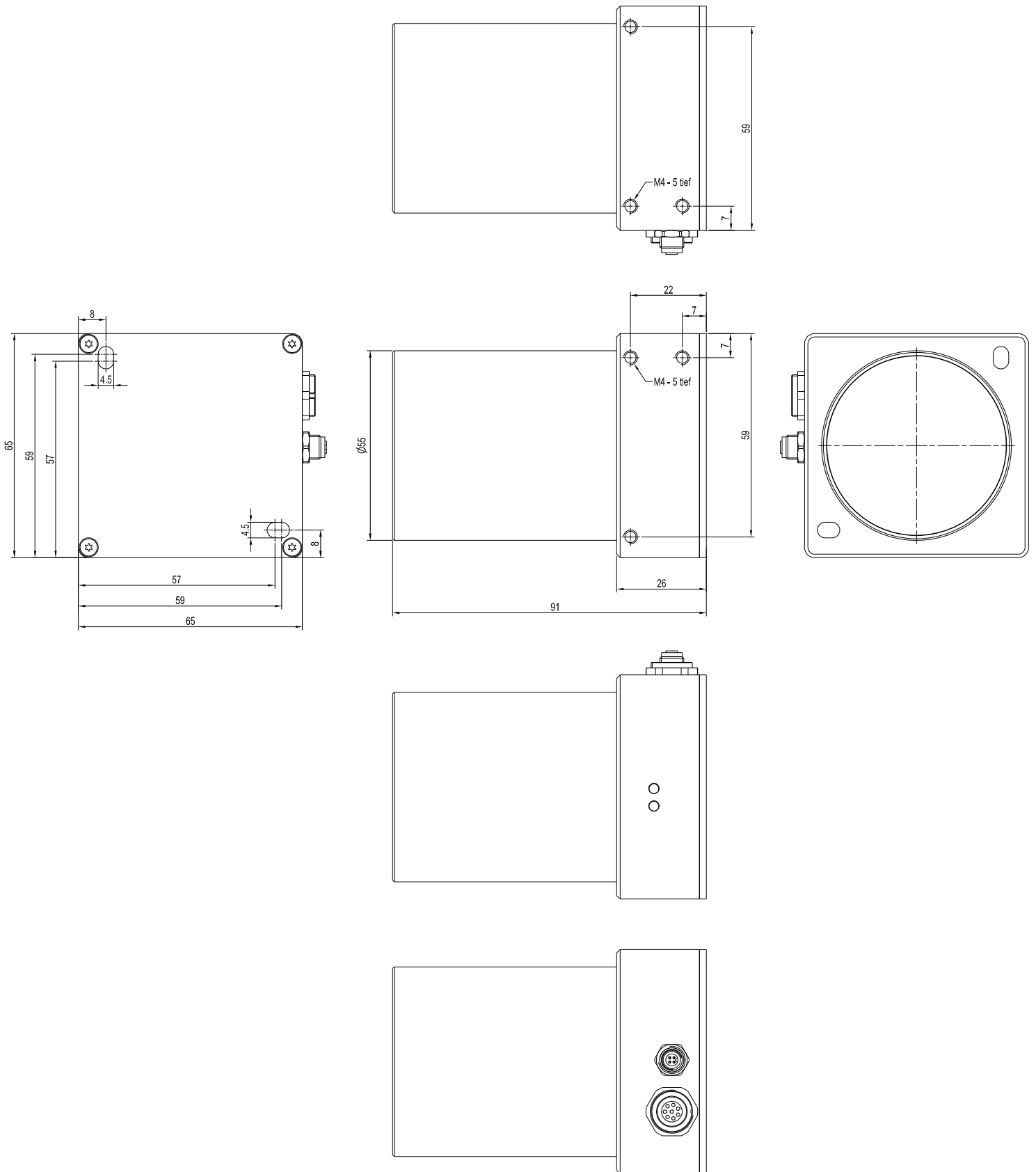




Technical Data

| Model | SPECTRO-1-100-COF-d12 |
|----------------------------|---|
| Voltage supply | +24VDC (± 10%), reverse polarity protected, overcurrent protected |
| Current consumption | < 160 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 |
| Input digital (2x) | IN0 and IN1 (Pin 3 and 4): digital (0V/+24V) |
| Output digital (2x) | OUT0 and OUT1 (Pin 5 and 6): digital (0V/+24V), npn/pnp-able (bright-/dark-switching, can be switched) |
| Output analog (2x) | ANALOG voltage 0 ... +10V (Pin 7) ANALOG current 4 ... 20mA (Pin 8) |
| Interface | RS232 |
| Pulse lengthening | 0 ... 100 ms, adjustable via PC software |
| Averaging | max. 32768 values, adjustable via PC software |
| Scan frequency | LED operation, can be switched via PC software: AC operation: max. 85 kHz (depends on parameterization) DC and OFF operation: max. 200 kHz (depends on parameterization) |
| Switching frequency | typ. 60 kHz |
| Analog band width | typ. 180 kHz (-3 dB) |
| Transmitter (light source) | super-bright white-light LED |
| 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. 60 mm ... 240 mm |
| Receiver | photo diode |
| Receiver gain setting | 8 steps (AMP1 ... AMP8), adjustable via PC software |
| Ambient light | max. 5000 Lux |
| Size of light spot | typ. Ø 6 mm at a distance of 60 mm typ. Ø 12 mm at a distance of 100 mm typ. Ø 22 mm at a distance of 160 mm typ. Ø 34 mm at a distance of 240 mm |
| Reproducibility | 2 digits at 12-bit A/D conversion (equates 1/2048) |
| Housing dimensions | LXWxH approx. 65 mm x 65 mm x 91 mm (incl. optics holding device Ø 55 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-las4/USB or cab-las4/USB-w to PC/Ethernet interface: SI-RS232/Ethernet-4 |
| 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 |

Dimensions



All dimensions in mm



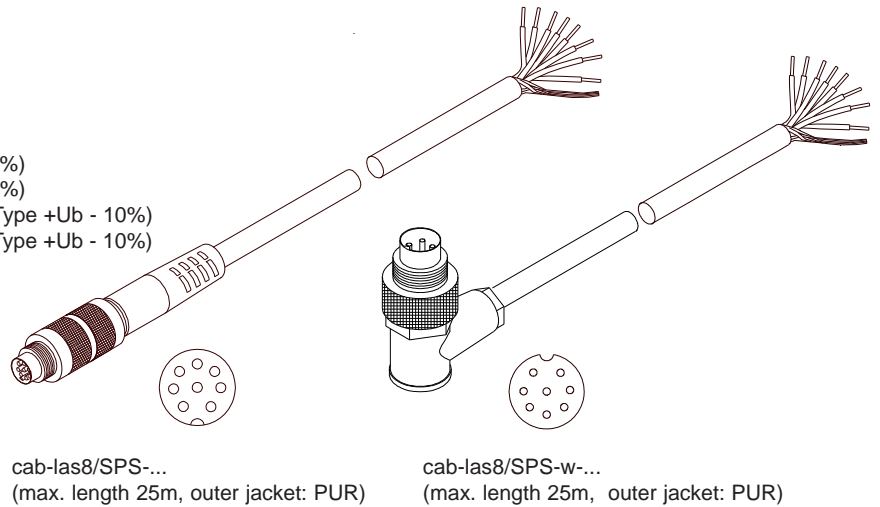
Connector Assignment

Connection to PLC:

8-pole fem. connector Binder series 712

| Pin: | Color: | Assignment: |
|------|--------|--|
| 1 | white | GND (0V) |
| 2 | brown | +24VDC (±10%) |
| 3 | green | IN0 (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 | ANALOG (0 ... +10V) |
| 8 | red | ANALOG (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)

alternative:

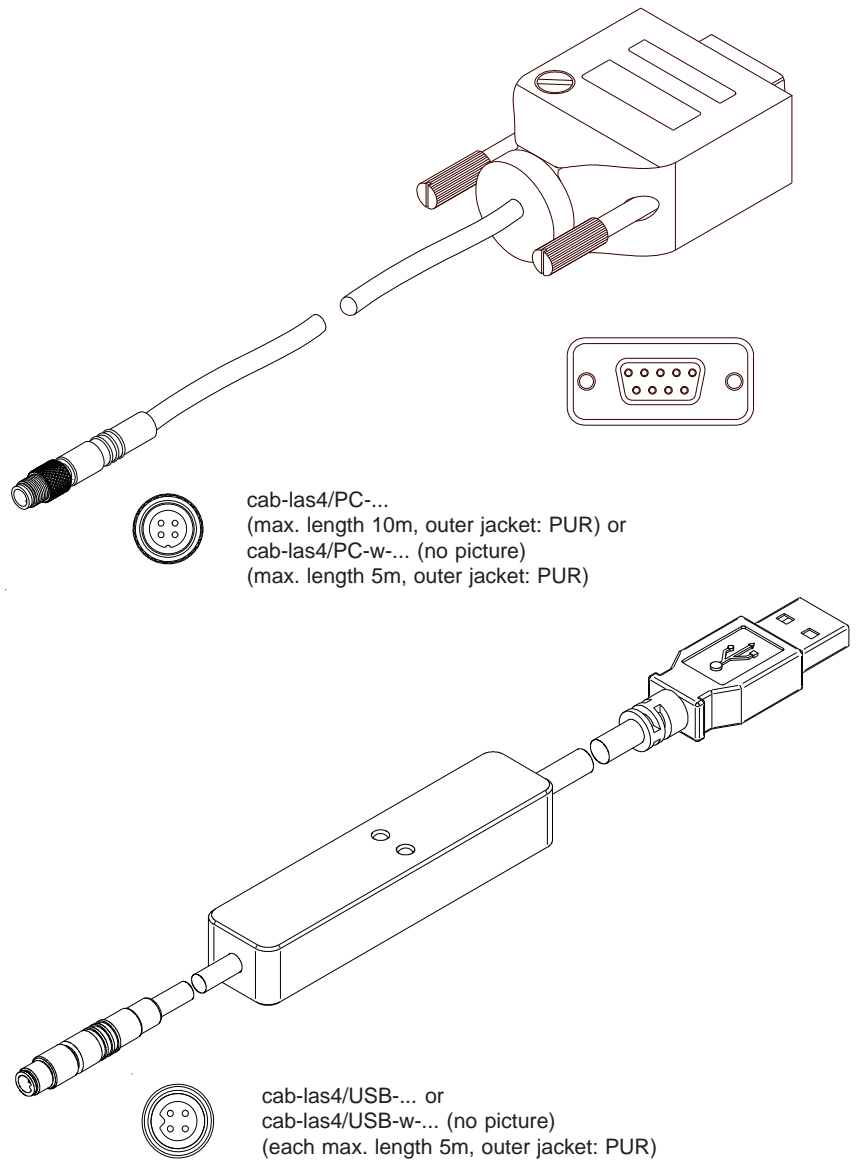
Connection via USB interface at the PC:

Connecting cable (incl. driver software):
 cab-las4/USB-(length)
 cab-las4/USB-w-(length) (angle type 90°)
 (standard length 2m)

alternative:

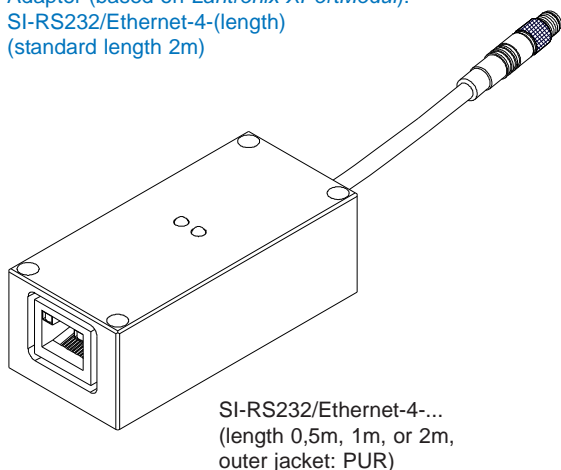
Connection to local network via Ethernet bus:

Adapter (based on Lantronix XPortModul):
 SI-RS232/Ethernet-4-(length)
 (standard length 2m)



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

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

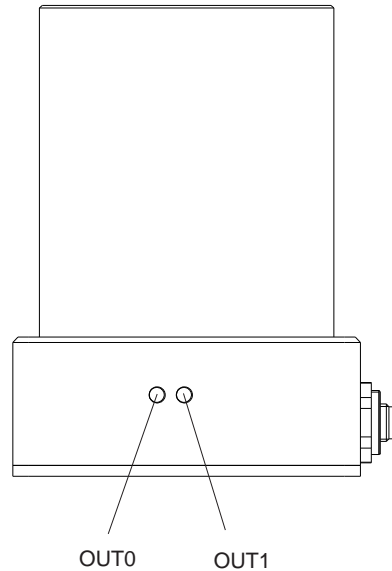


SI-RS232/Ethernet-4-...
 (length 0,5m, 1m, or 2m,
 outer jacket: PUR)

LED Display

LED display:

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



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, 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".

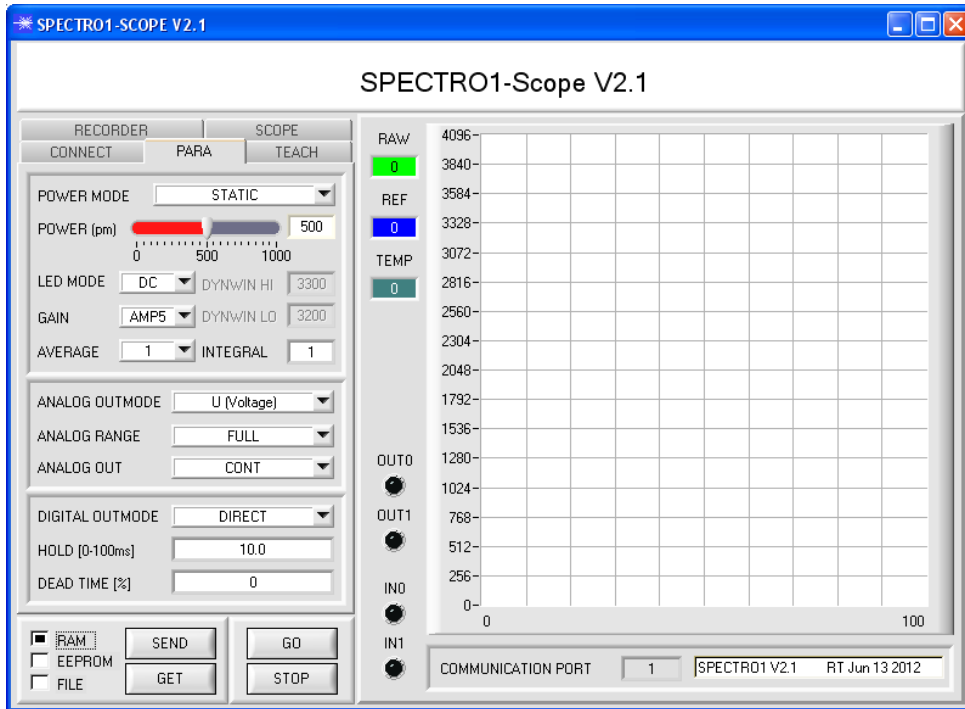
A micro-controller performs 12-bit analog/digital conversion of the analog signal, which allows recording and evaluation of the signal. Furthermore the SPECTRO-1 sensor offers various options for intelligent signal processing such as e.g. dirt accumulation compensation.

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.

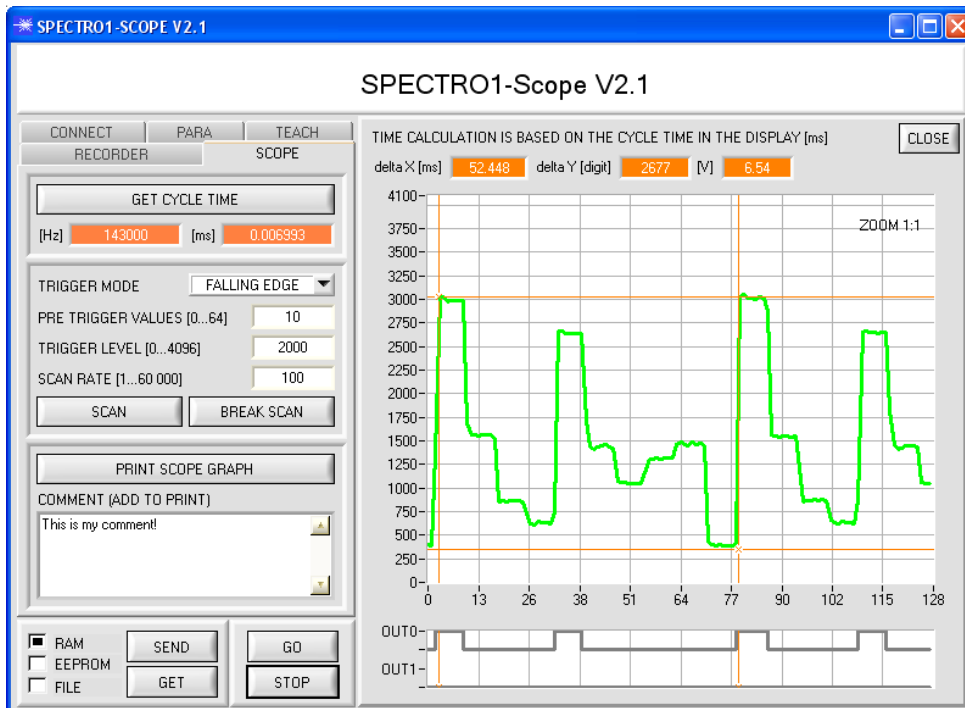
Parameterization

Windows® user interface:



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 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 SCOPE tab visualises 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.

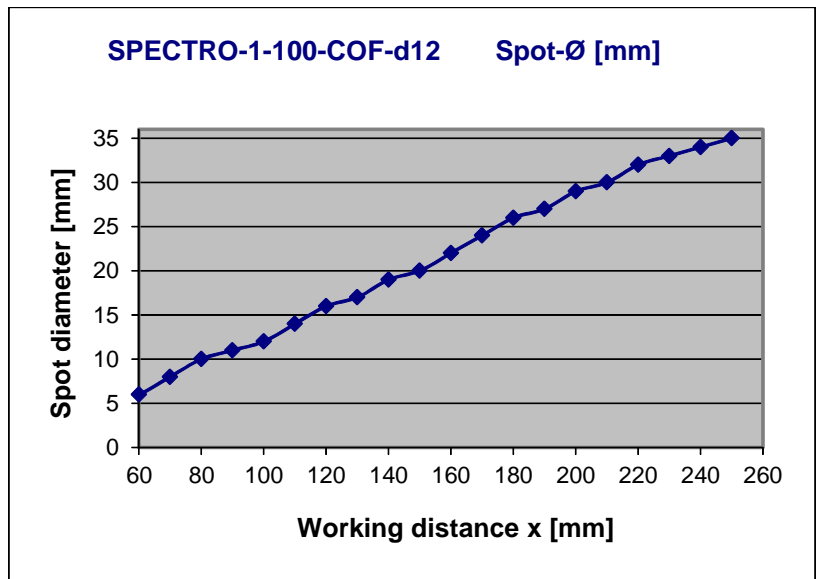


Diagrams

Diagrams: SPOT DIAMETER and RELATIVE INTENSITY
SPECTRO-1-100-COF-d12

Spot diameter

SPECTRO-1-100-COF-d12:
12 mm (typ.) at a working distance of 100 mm



Relative intensity

SPECTRO-1-100-COF-d12:
100% at a working distance of 90 mm
(INTENSITY 3634)

