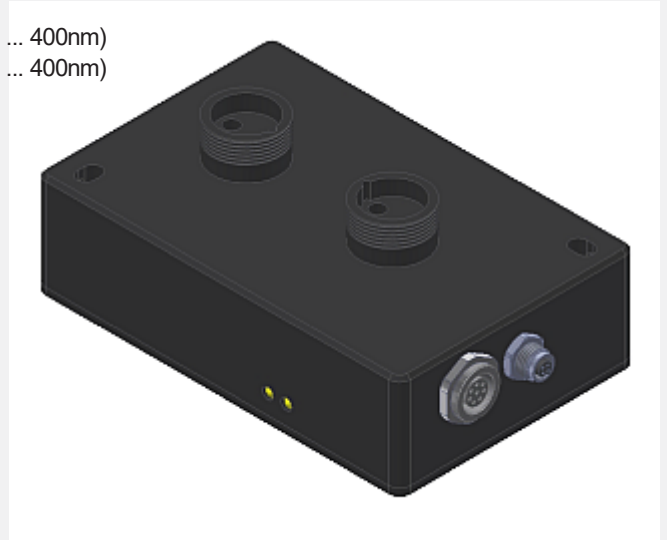


# SPECTRO Series

## ► SPECTRO-2-FIO-(UVC/UV)/(UVC/UV)

- Distance measurement of optically transparent objects (in the visible spectral range) such as glass, Plexiglas, various liquids
- Transmitter channel 0: UV LED (280nm) / Receiver channel 0: UV (190nm ... 400nm)  
Transmitter channel 1: UV LED (280nm) / Receiver channel 1: UV (190nm ... 400nm)
- Various evaluation modes available (in combination with corresponding fiber optics):  
Distance measurement (BICONE),  
contrast comparison (NORM),  
2-channel contrast measurement
- Fast evaluation methods in DC-operation available (up to 130kHz)
- Insensitive to outside light (in AC-operation)
- Parameterizable via Windows® software
- RS232 interface (RS232/Ethernet converter and RS232/USB converter available)
- Suitable for use in hazardous areas (fiber optics)
- 1 analog output (0V... +10V or 4mA...20mA)
- 2 digital outputs (0V/+24V)
- External trigger input and teach input
- Linearization by means of an editable linearization curve



### Design

#### Product name:

#### SPECTRO-2-FIO-(UVC/UV)/(UVC/UV)\*

(incl. Windows® PC software SPECTRO2-Scope)

\* 2-channel system:

(Transmitter channel 0/Receiver channel 0)/

(Transmitter channel 1/Receiver channel 1)

**(UVC/UV)/(UVC/UV):**

Transm. channel 0: UV LED (280nm) /

Receiver channel 0: UV (190nm ... 400nm) /

Transm. channel 1: UV LED (280nm) /

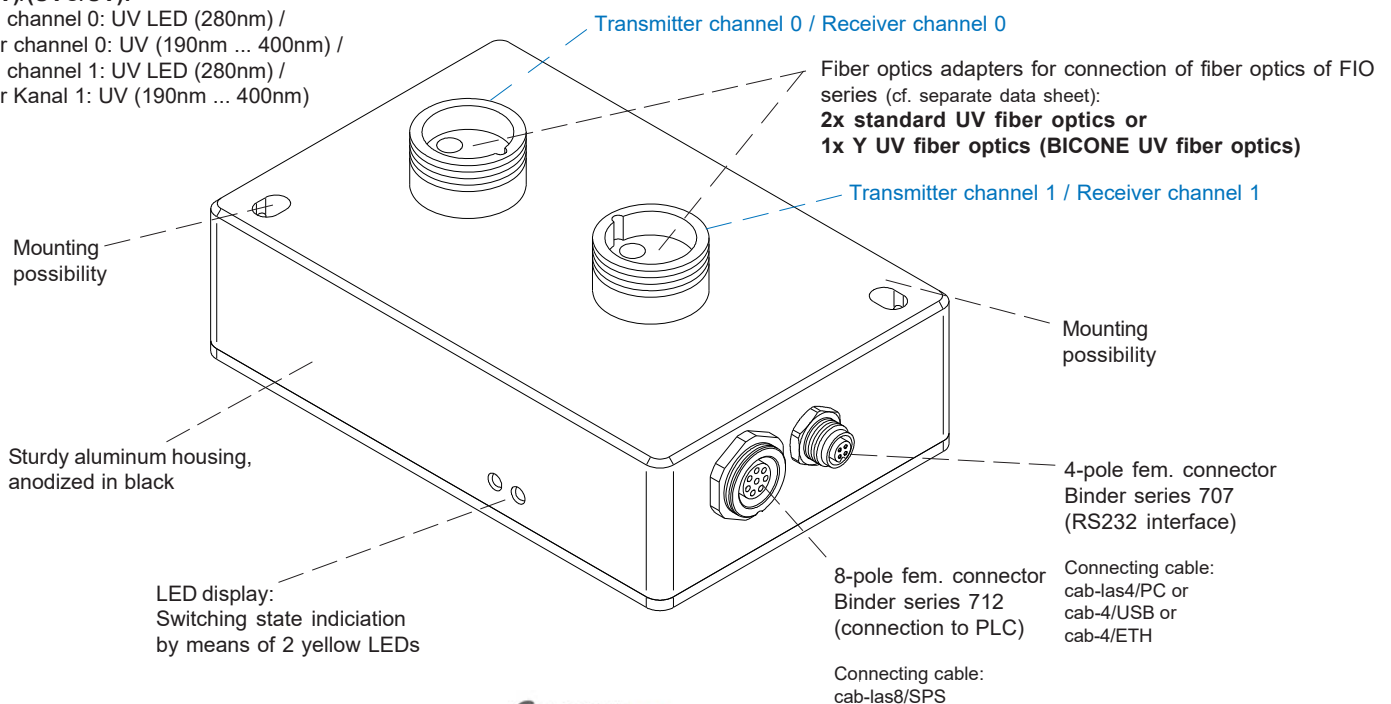
Receiver Kanal 1: UV (190nm ... 400nm)

#### Accessories: (p. 8-13)

UV fiber optics

BICONE UV fiber optics

Fiber optics fixtures

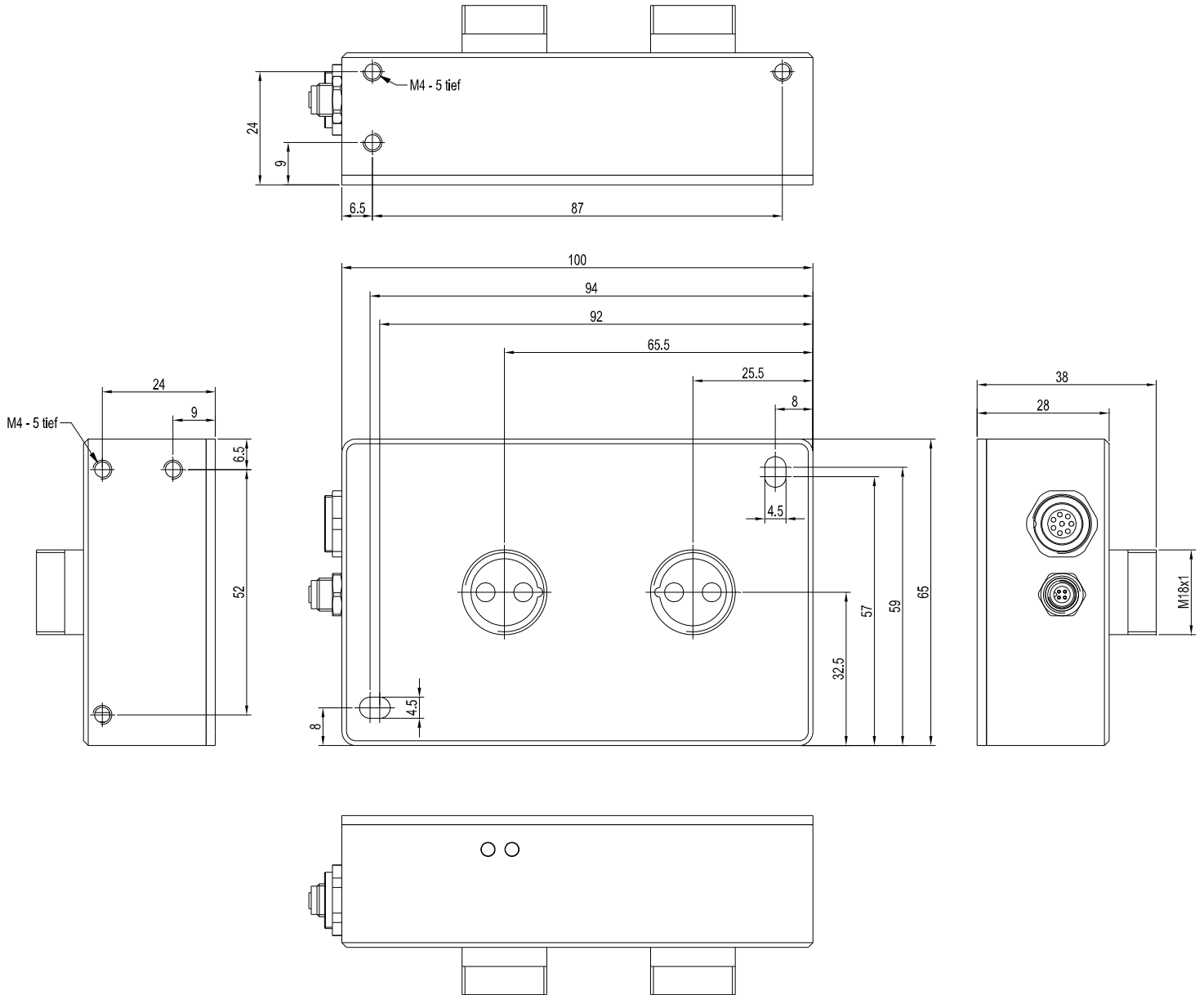




**Technical Data**

| Model  | SPECTRO-2-FIO(UVC/UV)/(UVC/UV)   |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
|--|--|---------------|--|--|---------------|--|--|--|----------------|-----------------|---------------|----------------|-----------------|---------------|-------------|-----|-----|--------------|-----|-----|-------------|----|-----|--------------|----|-----|-------------|-----|----|-------------|-----|----|-------------|----|----|-------------|----|----|
| 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   |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| 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 7): 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<br>(LED mode AC or DC, can be switched via PC software) | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;"></th> <th colspan="3" style="text-align: left; font-weight: normal;">LED mode AC (depends on parameterization):</th> <th colspan="3" style="text-align: left; font-weight: normal;">LED mode DC (depends on parameterization):</th> </tr> <tr> <th style="font-weight: normal;">Frequency [Hz]</th> <th style="font-weight: normal;">Digital outputs</th> <th style="font-weight: normal;">Analog output</th> <th style="font-weight: normal;">Frequency [Hz]</th> <th style="font-weight: normal;">Digital outputs</th> <th style="font-weight: normal;">Analog output</th> </tr> </thead> <tbody> <tr> <td>Max. 50 000</td> <td>Off</td> <td>Off</td> <td>Max. 130 000</td> <td>Off</td> <td>Off</td> </tr> <tr> <td>Max. 48 000</td> <td>On</td> <td>Off</td> <td>Max. 100 000</td> <td>On</td> <td>Off</td> </tr> <tr> <td>Max. 42 000</td> <td>Off</td> <td>On</td> <td>Max. 85 000</td> <td>Off</td> <td>On</td> </tr> <tr> <td>Max. 41 000</td> <td>On</td> <td>On</td> <td>Max. 72 500</td> <td>On</td> <td>On</td> </tr> </tbody> </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 10.</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. 50 000 | Off | Off | Max. 130 000 | Off | Off | Max. 48 000 | On | Off | Max. 100 000 | On | Off | Max. 42 000 | Off | On | Max. 85 000 | Off | On | Max. 41 000 | On | On | Max. 72 500 | On | On |
|  | 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. 50 000  | Off  | Off           | Max. 130 000                               | Off  | Off           |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Max. 48 000  | On   | Off           | Max. 100 000                               | On   | Off           |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Max. 42 000  | Off  | On            | Max. 85 000                                | Off  | On            |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Max. 41 000  | On   | On            | Max. 72 500                                | On   | On            |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Switching frequency  | typ. 60 kHz  |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Analog band width  | typ. 90 kHz (-3 dB)  |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Transmitter (light source)   | Transmitter channel 0: UV-LED (280 nm)<br>Transmitter channel 1: UV-LED (280 nm)   |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Receiver   | Receiver channel 0: Photo diode with black glass filter (190 nm ... 400 nm)<br>Receiver channel 1: Photo diode with black glass filter (190 nm ... 400 nm)   |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Transmitter control  | can be switched via PC software:<br>AC operation (LED MODE-AC), DC operation (LED MODE-DC)   |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Object distance<br>(measurement range)                                 | with reflected light fiber optics: typ. 1 mm ... 50 mm (depends on fiber optics and attachment optics)<br>with transmitted light fiber optics: typ. 10 mm ... 200 mm (depends on fiber optics and attachment optics)   |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Receiver gain setting  | 8 steps (AMP1 ... AMP8), adjustable via PC software  |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Ambient light  | max. 5000 Lux  |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Size of light spot   | depends on fiber optics and attachment optics (cf. catalog FIO series)   |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Reproducibility  | 2 digits at 12-bit A/D conversion  |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Housing dimensions   | LxWxH approx. 100 mm x 65 mm x 38 mm (incl. fiber optics connector M18x1, without connectors)  |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Housing material   | aluminum, anodized in black  |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Enclosure rating   | IP64   |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Connecting cables  | to PLC: cab-las8/SPS or cab-las8/SPS-w<br>to PC/RS232 interface: cab-las4/PC or cab-las4/PC-w<br>to PC/USB interface: cab-4/USB or cab-4/USB-w<br>to PC/Ethernet interface: cab-4/ETH  |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Type of connector  | connection to PLC: 8-pole fem. connector (Binder 712)<br>connection to PC: 4-pole fem. connector (Binder 707)  |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Operating temp. range  | -20°C ... +55°C  |               |  |  |               |  |  |  |                |                 |               |                |                 |               |             |     |     |              |     |     |             |    |     |              |    |     |             |     |    |             |     |    |             |    |    |             |    |    |
| Storage temp. 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**

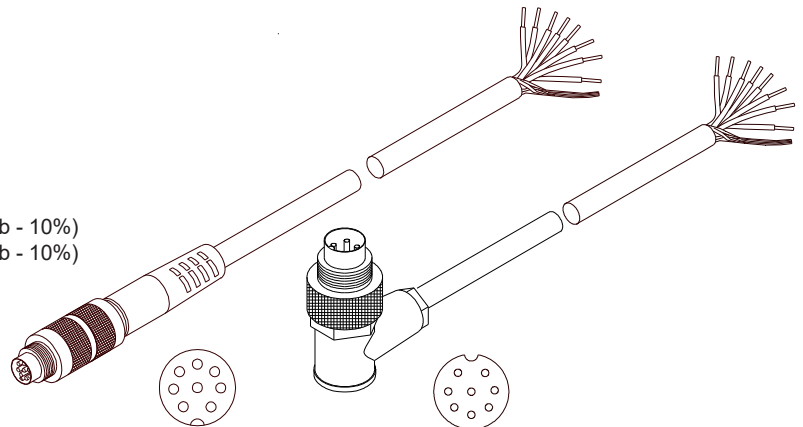
| Pin: | Color: | Assignment:  |
|------|--------|--|
| 1    | white  | GND (0V)   |
| 2    | brown  | +24VDC ( $\pm 10\%$ )                                      |
| 3    | green  | IN0 (Digital 0: 0 ... 1V, Digital 1: +Ub - 10%)            |
| 4    | yellow | IN1 (Digital 0: 0 ... 1V, Digital 1: +Ub - 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   | ANALOG (0 ... +10V or 4 ... 20mA)                          |
| 8    | red    | n.c.   |

**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-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:**

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:**

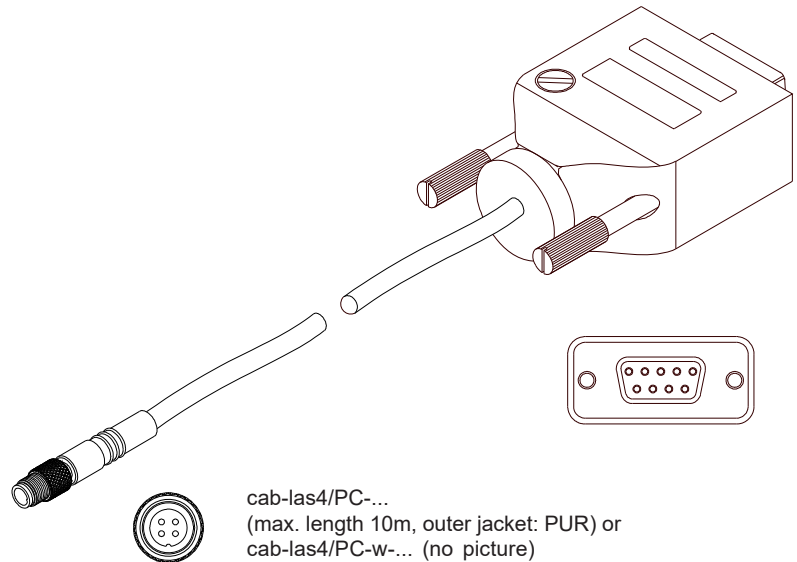
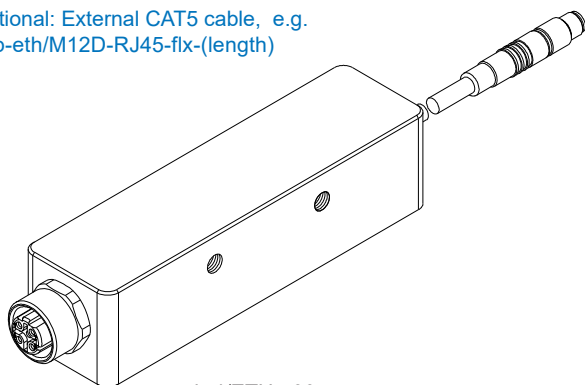
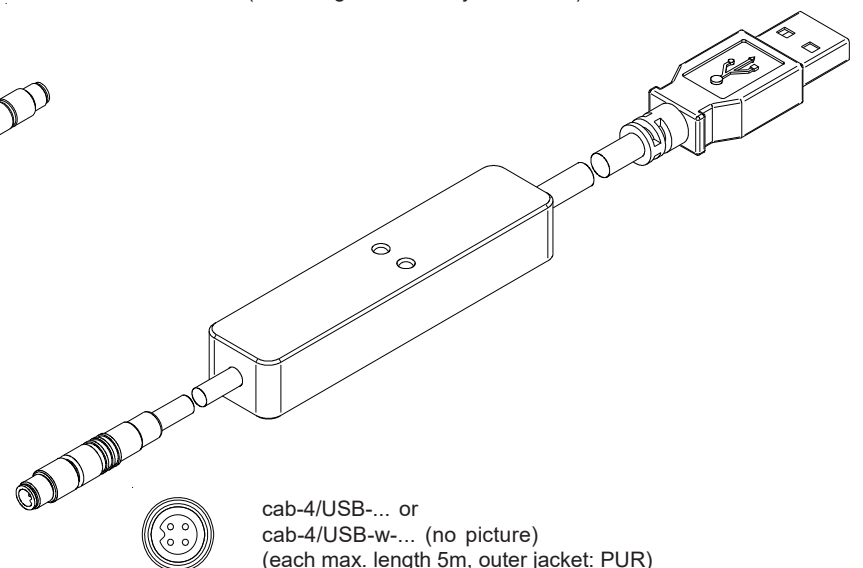
Ethernet converter (incl. software „SensorFinder“):

cab-4/ETH-500

(standard length 0.5m)

Optional: External CAT5 cable, e.g.

cab-eth/M12D-RJ45-flx-(length)

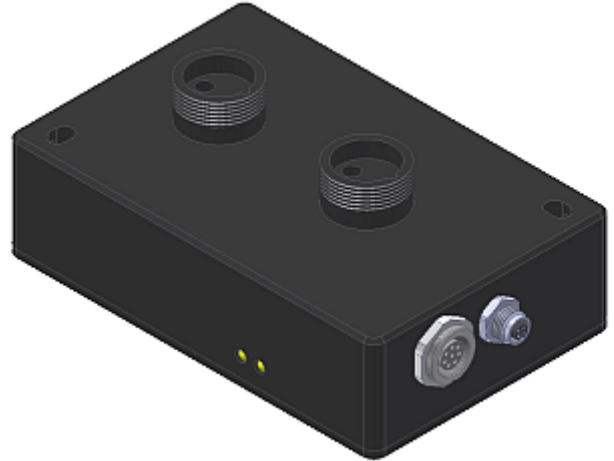
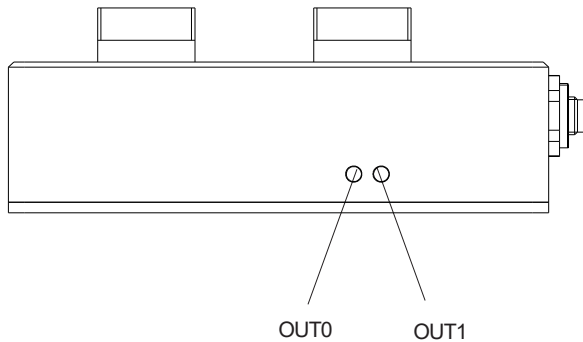
cab-las4/PC-...  
(max. length 10m, outer jacket: PUR) or  
cab-las4/PC-w-... (no picture)  
(max. length 5m, outer jacket: PUR)cab-4/ETH-500  
(length 0.5m, outer jacket: PUR)  
4-pole M12 fem. conn. (D-coded)  
for connection of an external  
CAT5 cable, e.g.  
cab-eth/M12D-RJ45-flx-(length)cab-4/USB-... or  
cab-4/USB-w-... (no picture)  
(each max. length 5m, outer jacket: PUR)



## 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-2 series:

The sensors of the SPECTRO-2 series feature a two-channel design, which means they acquire the analog signals of two receivers and evaluate these signals. They also have two independently adjustable transmitter sources. Various light sources such as e.g. white light, UV light, or IR light, are available as transmitters. The receiver is correspondingly matched to the transmitter. The acquired analog signal is provided through a voltage output or a current output.

The software can be used to select various evaluation modes for the analog signal.

The status of the output 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-2 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-2 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 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.

SPECTRO-2 sensors are temperature-compensated over a range of 0°C to 80°C.

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

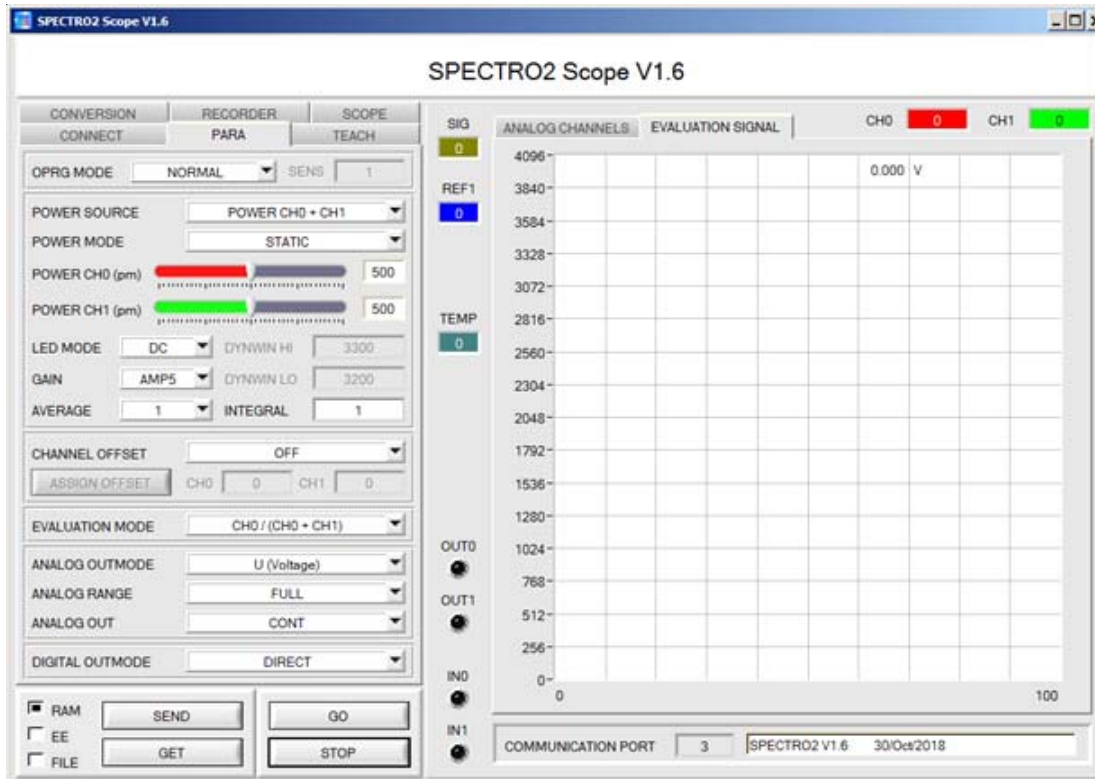


## Parameterization

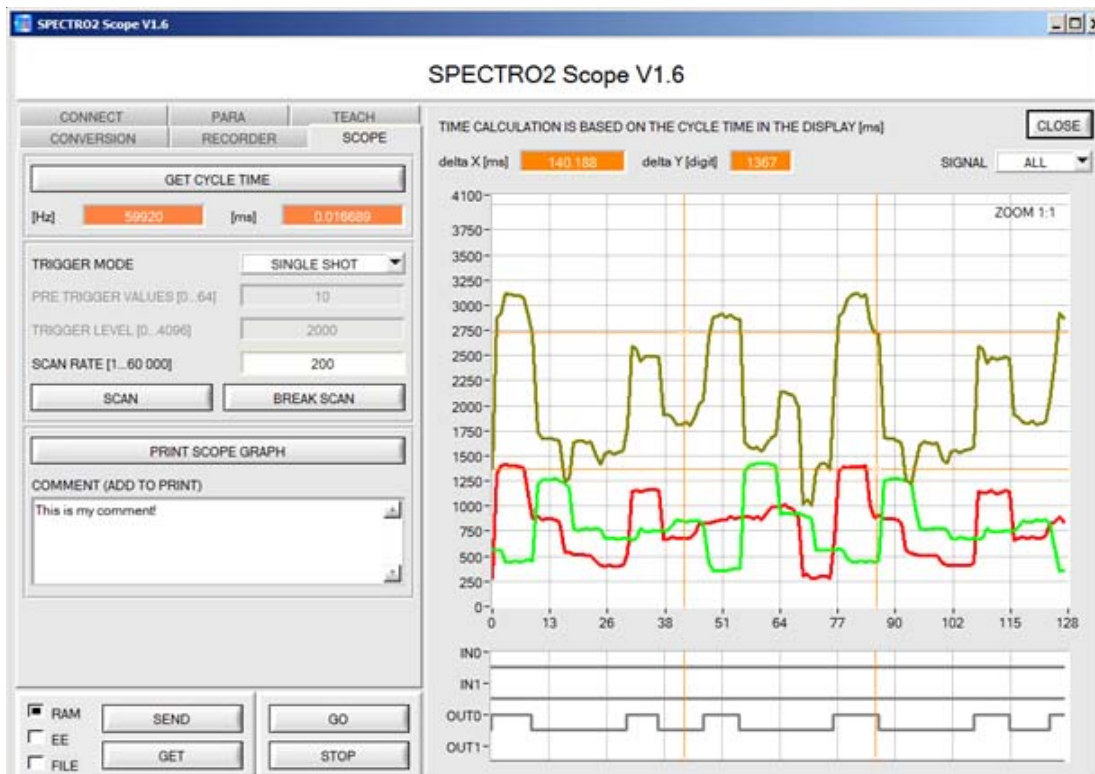
### Windows® user interface:

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

The PC software SPECTRO2-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 the Ethernet converter cab-4/ETH-500). Through the interface all the parameters can be stored in the non-volatile EEPROM of the sensor.



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.



UV Fiber Optics

Available standard UV fiber optics:

- R-S-A3.0-(3.0)-600-22°-UV
- R-S-A3.0-(3.0)-1200-22°-UV
- R-S-R2.1-(6x1)-600-22°-UV
- R-S-R2.1-(6x1)-1200-22°-UV
- D-S-A2.0-(2.5)-600-22°-UV
- D-S-A2.0-(2.5)-1200-22°-UV
- D-S-A3.0-(3.0)-600-22°-UV
- D-S-A3.0-(3.0)-1200-22°-UV
- D-S-R2.1-(6x1)-600-22°-UV
- D-S-R2.1-(6x1)-1200-22°-UV

Available BICONE UV fiber optics:

- R-S-A3.0-(d2/d4)-1200-Y-22°-UV-(1P+1BP)/2P
- R-S-A3.0-(2xd3/2)-1200-Y-22°-UV-(1P+1BP)/2P
- R-S-A3.0-2x(3x1)-1200-Y-22°-UV-(1P+1BP)/2P

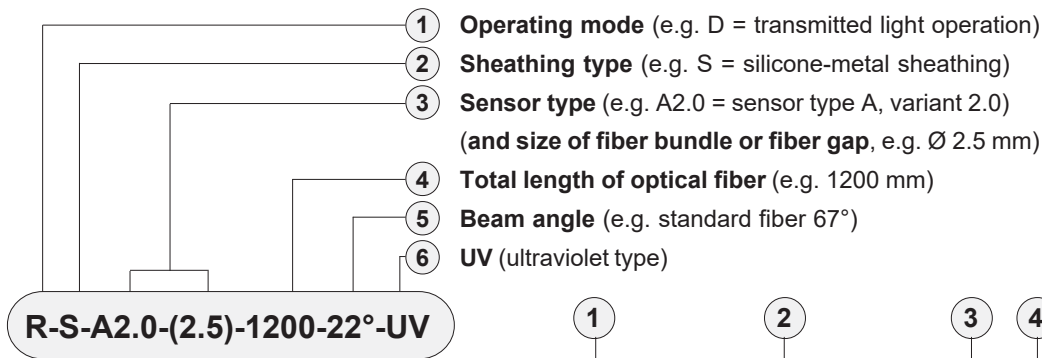
(weitere Lichtleiter-Typen auf Anfrage erhältlich)



Characteristics:

Light-conducting glass fibers are optical components that allow the transmission of light through any curved path based on the principle of total reflection. The individual fiber is composed of high-break core glass and low-break cladding glass. The light beams entering the core glass within the critical angle are guided through the fiber by way of reflection at the core/cladding contact surfaces (step index fiber). The highly flexible optical fibers are made of bundled individual glass fibers. The ends are each glued into a sensor head and a connector. The faces are optically polished. For protection against mechanical, chemical, or thermal destruction the optical fibers are provided with a corresponding protective sheath.

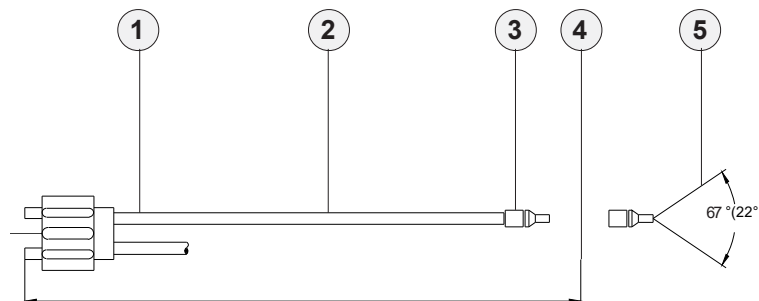
Order code:



**R-S-A2.0-(2.5)-1200-22°-UV**

Order code for optical fiber

(For detailed description of the various types of fiber optics, please cf. catalog „FIO Series“)



Dimensions of adapter

Attachment optics (e.g. focus lens, reflex optics, prism optics)

Fiber optics for reflex light operation

Fiber optics for transmitted light operation

Mounting hints

cf. catalog FIO Series

cf. catalog FIO Series

cf. catalog FIO Series

cf. catalog FIO Series

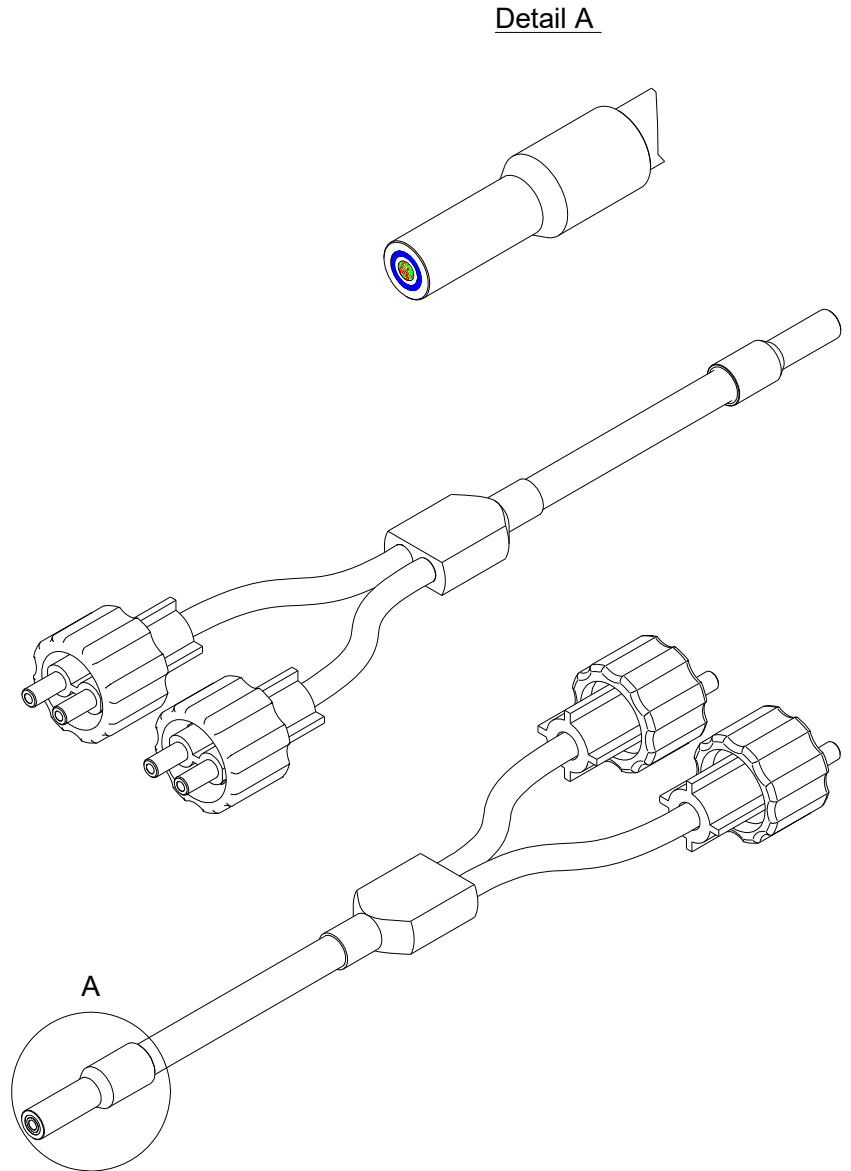
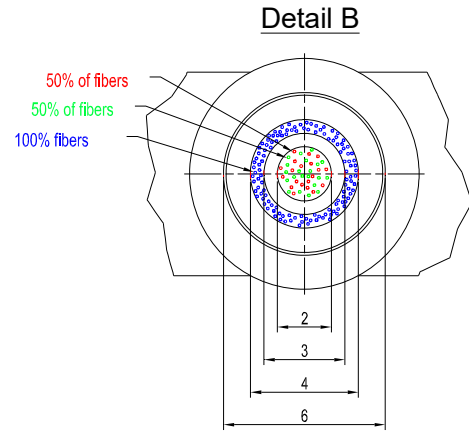
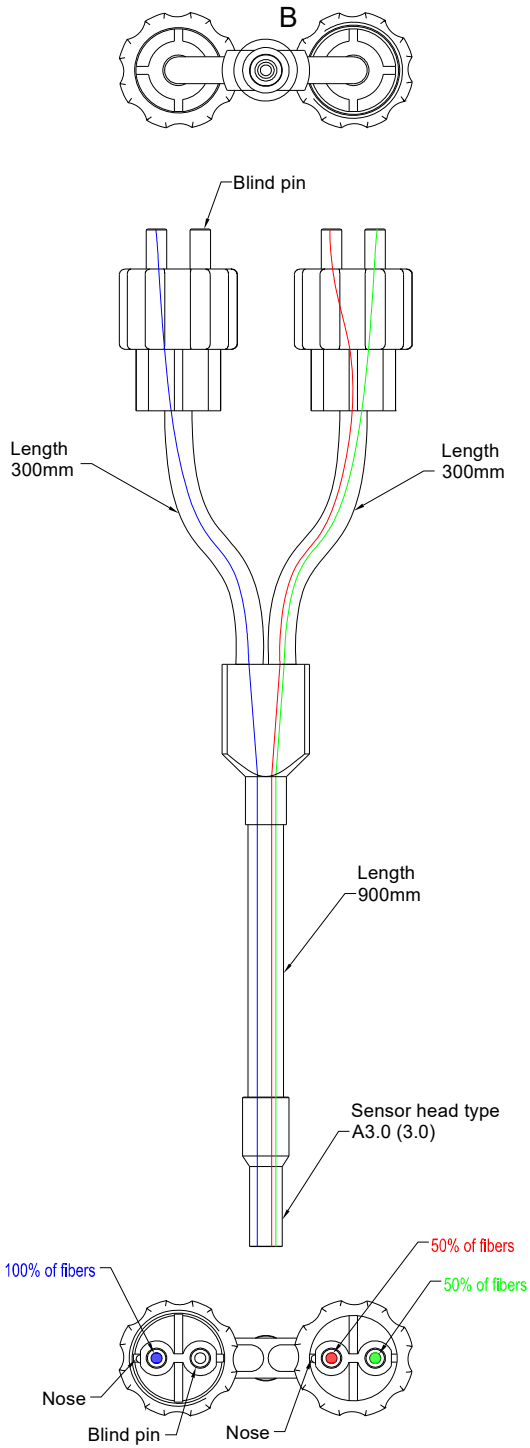
cf. catalog FIO Series





**BICONE UV Fiber Optics**

R-S-A3.0-(d2/d4)-1200-Y-22°-UV-(1P+1BP)/2P



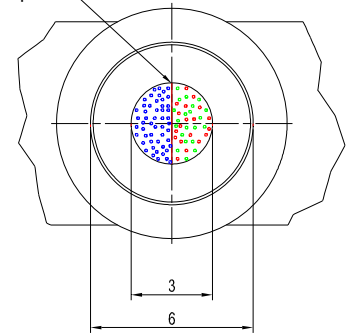
All dimensions in mm

**BICONE UV Fiber Optics**

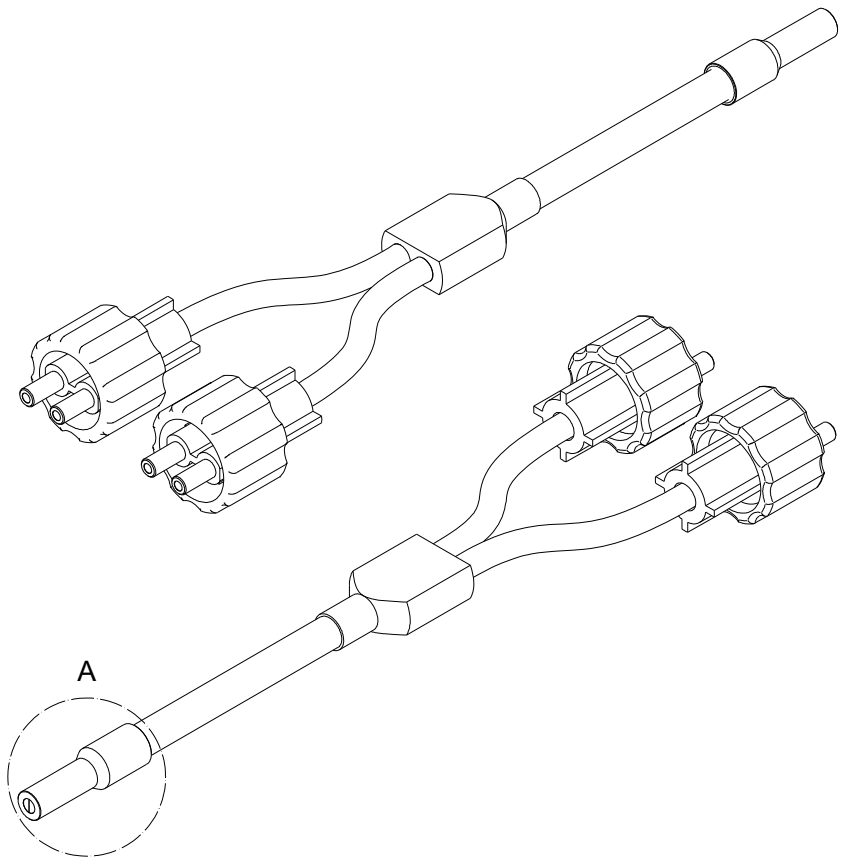
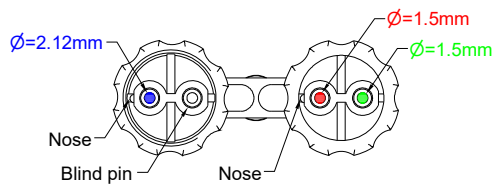
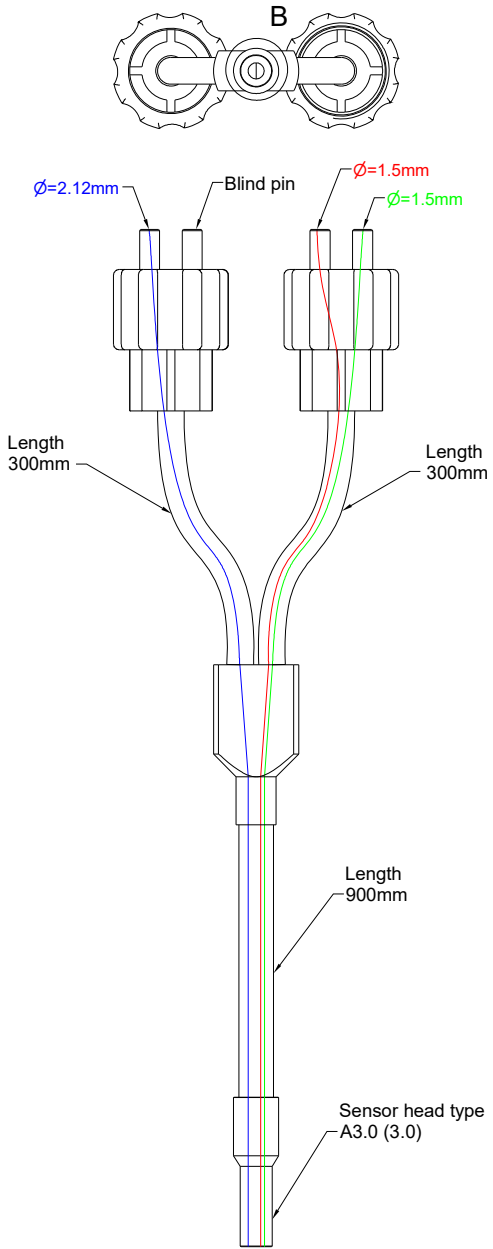
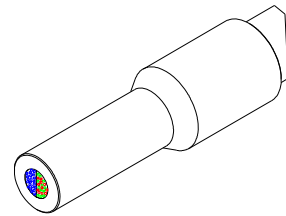
R-S-A3.0-(2xd3/2)-1200-Y-22°-UV-(1P+1BP)/2P

No separating layer between, but fiber optics are divided into two sectors!

Detail B



Detail A

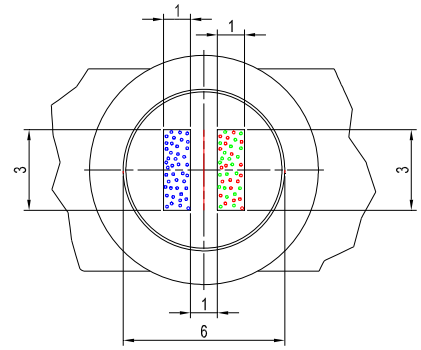


All dimensions in mm

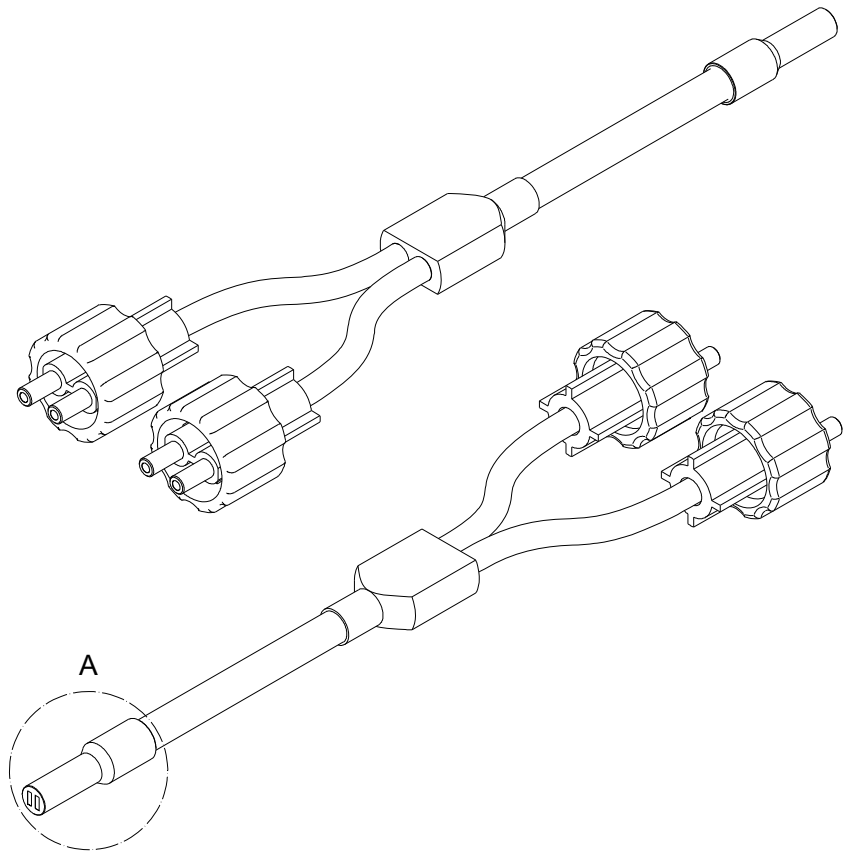
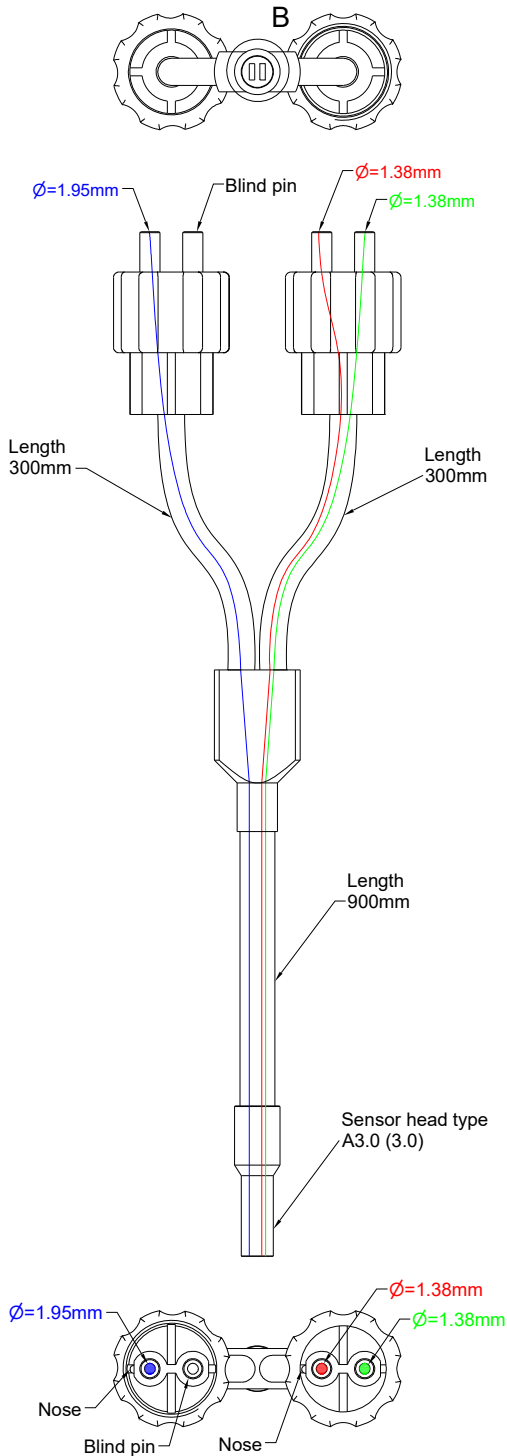
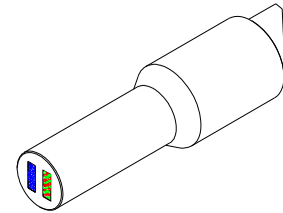
**BICONE UV Fiber Optics**

R-S-A3.0-2x(3x1)-1200-Y-22°-UV-(1P+1BP)/2P

**Detail B**



**Detail A**



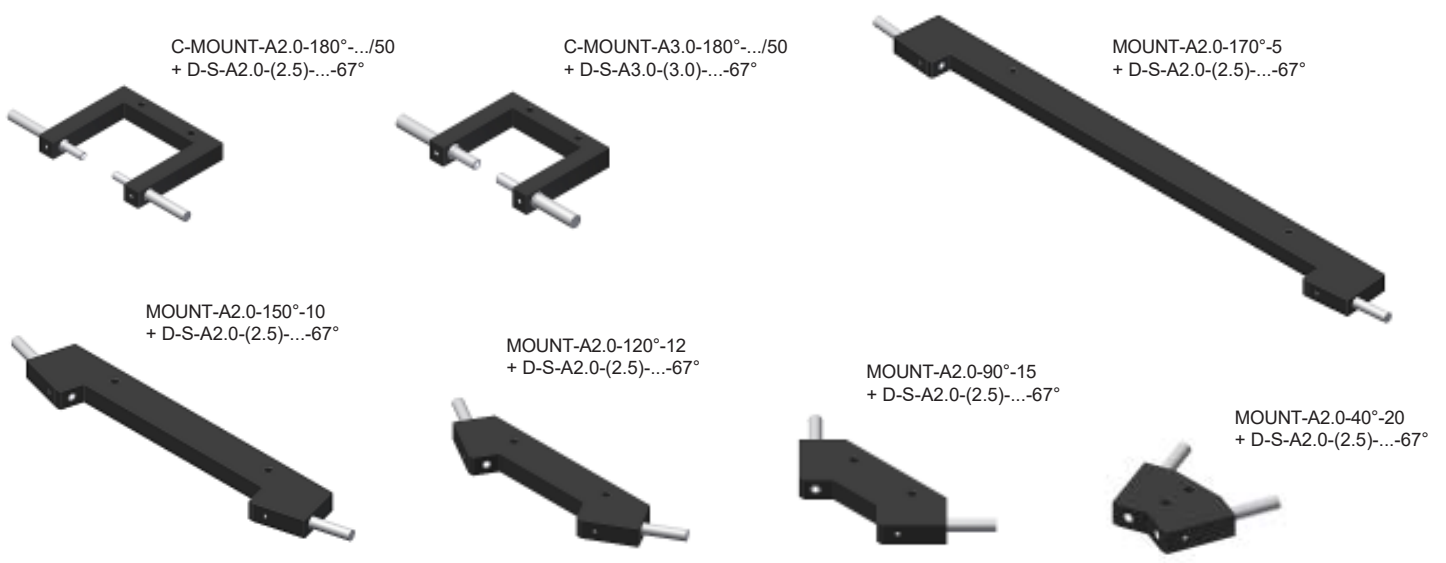
All dimensions in mm



Fiber Optics Fixtures

Mounting brackets (fixtures) for transmitted light fiber optics with sensor head type „A2.0“, „A3.0“, or „R2.1“:

| Part number:             | Suitable for fiber optics type:<br>(D= transmitted light) | Characteristics:  |
|--------------------------|---|---|
| C-MOUNT-A2.0-180°-22/50  | D-S-A2.0-(2.5)-...-67°                                    | Transmitter/receiver distance 22 mm, fork width/depth: 50/50 mm   |
| C-MOUNT-A2.0-180°-60/50  | D-S-A2.0-(2.5)-...-67°                                    | Transmitter/receiver distance 60 mm, fork width/depth: 60/50 mm   |
| C-MOUNT-A2.0-180°-100/50 | D-S-A2.0-(2.5)-...-67°                                    | Transmitter/receiver distance 100 mm, fork width/depth: 100/50 mm   |
| C-MOUNT-A3.0-180°-16/50  | D-S-A3.0-(3.0)-...-67°                                    | Transmitter/receiver distance 16 mm, fork width/depth: 50/50 mm   |
| C-MOUNT-A3.0-180°-60/50  | D-S-A3.0-(3.0)-...-67°                                    | Transmitter/receiver distance 60 mm, fork width/depth: 94/50 mm   |
| C-MOUNT-A3.0-180°-100/50 | D-S-A3.0-(3.0)-...-67°                                    | Transmitter/receiver distance 100 mm, fork width/depth: 100/50 mm   |
| MOUNT-A2.0-170°-5        | D-S-A2.0-(2.5)-...-67°                                    | Angle of incidence 85° to the vertical in a distance of 5 mm to the object, gloss control of extremely rough surfaces       |
| MOUNT-A3.0-170°-5        | D-S-A3.0-(3.0)-...-67°                                    | Angle of incidence 85° to the vertical in a distance of 5 mm to the object, gloss control of extremely rough surfaces       |
| MOUNT-A2.0-150°-10       | D-S-A2.0-(2.5)-...-67°                                    | Angle of incidence 75° to the vertical in a distance of 10 mm to the object, gloss control of rough surfaces                |
| MOUNT-A3.0-150°-10       | D-S-A3.0-(3.0)-...-67°                                    | Angle of incidence 75° to the vertical in a distance of 10 mm to the object, gloss control of rough surfaces                |
| MOUNT-A2.0-120°-12       | D-S-A2.0-(2.5)-...-67°                                    | Angle of incidence 60° to the vertical in a distance of 12 mm to the object, gloss control of matt to light glossy surfaces |
| MOUNT-A3.0-120°-12       | D-S-A3.0-(3.0)-...-67°                                    | Angle of incidence 60° to the vertical in a distance of 12 mm to the object, gloss control of matt to light glossy surfaces |
| MOUNT-R1.1-120°-12       | D-S-R1.1-(3x0.5)-...-67°                                  | Angle of incidence 60° to the vertical in a distance of 12 mm to the object, gloss control of matt to light glossy surfaces |
| MOUNT-R2.1-120°-12       | D-S-R2.1-(6x1)-...-67°                                    | Angle of incidence 60° to the vertical in a distance of 12 mm to the object, gloss control of matt to light glossy surfaces |
| MOUNT-A2.0-90°-15        | D-S-A2.0-(2.5)-...-67°                                    | Angle of incidence 45° to the vertical in a distance of 15 mm to the object, gloss control of matt to glossy surfaces       |
| MOUNT-A3.0-90°-15        | D-S-A3.0-(3.0)-...-67°                                    | Angle of incidence 45° to the vertical in a distance of 15 mm to the object, gloss control of matt to glossy surfaces       |
| MOUNT-A2.0-40°-20        | D-S-A2.0-(2.5)-...-67°                                    | Angle of incidence 20° to the vertical in a distance of 20 mm to the object, gloss control of very glossy surfaces          |
| MOUNT-A3.0-40°-20        | D-S-A3.0-(3.0)-...-67°                                    | Angle of incidence 20° to the vertical in a distance of 20 mm to the object, gloss control of very glossy surfaces          |





## Fiber Optics Fixtures

Mounting brackets (fixtures) for BICONE fiber optics or special fiber optics with sensor head type „A3.0“:

| Part number:            | Suitable for fiber optics type:<br>(BICONE or special fiber optics)  | Characteristics:  |
|-------------------------|--|---|
| MOUNT-A3.0/A3.0-0°/0°-9 | R-S-A3.0-(3.0)-1200-Y-67°-(1P+1BP)/2P<br>R-S-A3.0-(d2/d4)-1200-Y-22°-(1P+1BP)/2P<br>R-S-A3.0-(d2/d4)-1200-Y-67°-(1P+1BP)/2P<br>R-S-A3.0-(2xd3/2)-1200-Y-22°-(1P+1BP)/2P<br>R-S-A3.0-(2xd3/2)-1200-Y-67°-(1P+1BP)/2P<br>R-S-A3.0-2x(3x1)-1200-Y-22°-(1P+1BP)/2P<br>R-S-A3.0-2x(3x1)-1200-Y-67°-(1P+1BP)/2P<br>R-S-A3.0-(2xd3/2)-1200-Y-67°-2P/2P<br>R-S-A3.0-2x(3x1)-1200-Y-67°-2P/2P<br>R-S-A3.0-(3.0)-1200-Y-67°-2P/2P<br>D-S-A3.0-(3.0)-1200-Y-67°-2P/2P | Parallel alignment of the fiber optics, distance of the fiber optics bundles (centers) to each other = 9 mm |

