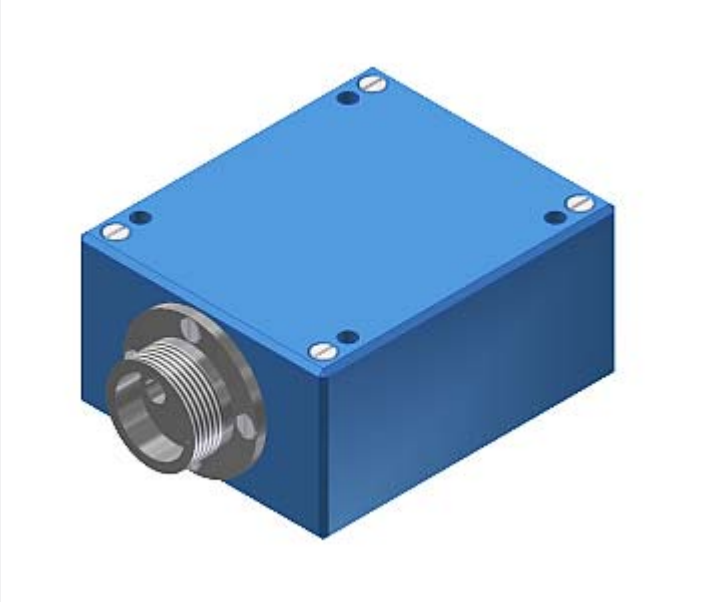
TLB Series

TLB-CON8-FIO-IR Electronic Control Unit



- Electronic control unit for use with fiber optics of FIO series (reflected light and transmitted light fiber optics)
- 100%-check of objects (tolerance band check)
- Object positioning and thickness control (in µm range)
- High trigger accuracy (in µm range)
- High switching frequency (typ. 30 kHz)
- RS232 interface (USB- and Ethernet converter available)
- Parameterizable under Windows®
- Threshold correction can be activated via software
- Setting of trigger threshold and tolerance band via software
- Output polarity can be switched via software
- Dirt acculumation compensation
- Sturdy metal housing

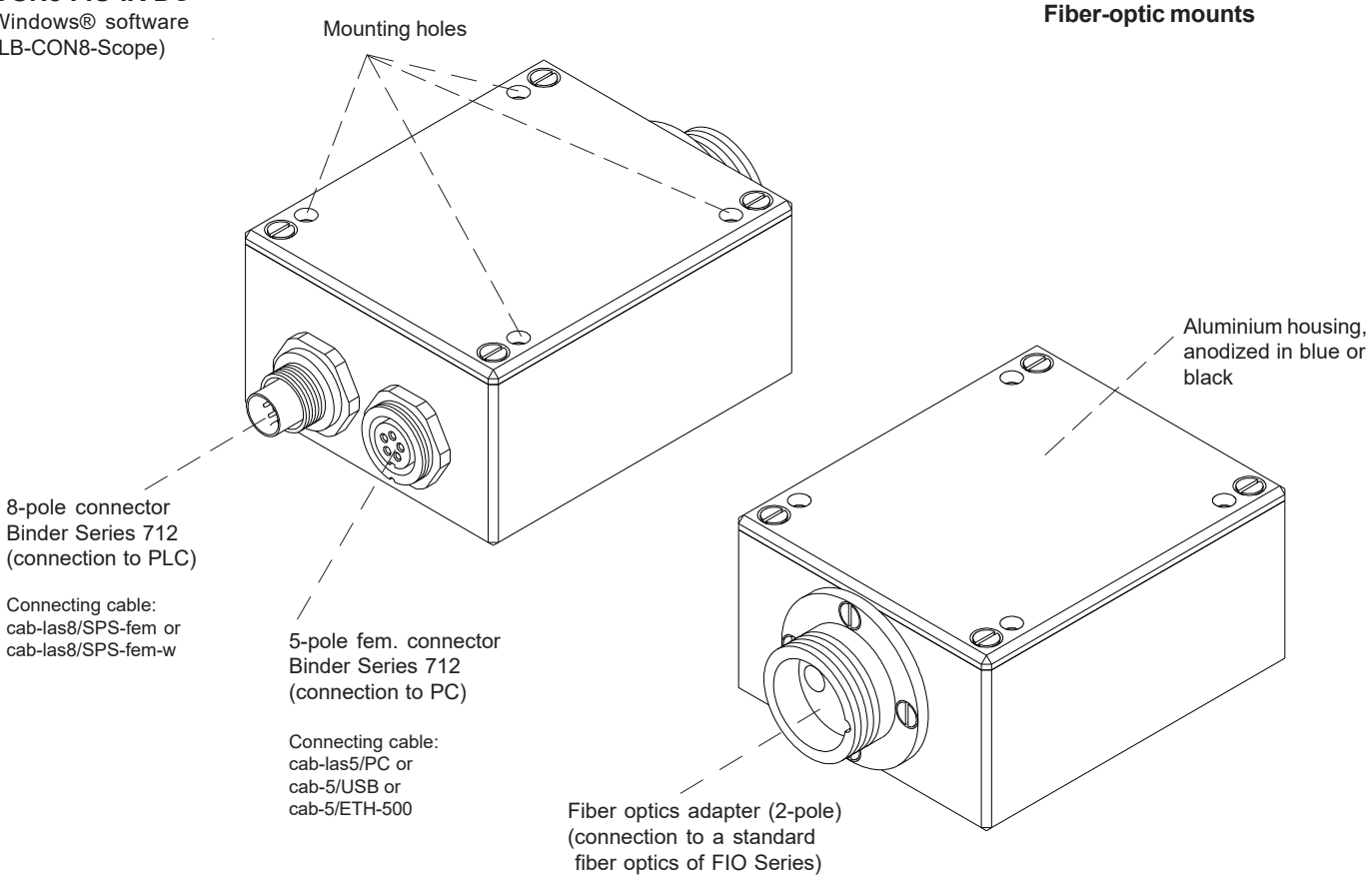
Design

Product name:

TLB-CON8-FIO-IR-AC
TLB-CON8-FIO-IR-DC
(incl. Windows® software FLB-TLB-CON8-Scope)

Accessories: (p. 6-10)

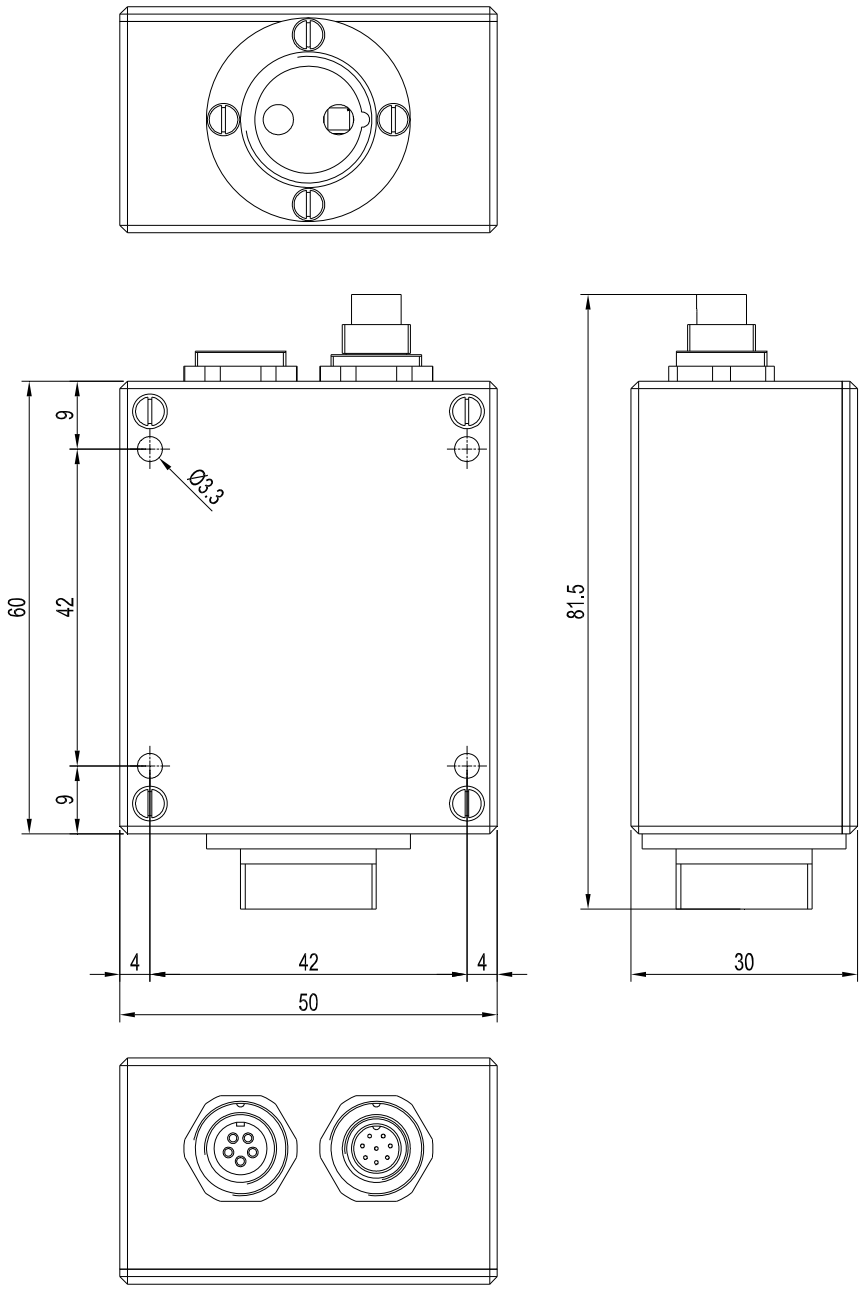
Fiber optics
Attachment optics
Fiber-optic mounts



Technical Data

Model	**TLB-CON8-FIO-IR-...**
Voltage supply	+24VDC (± 10%), reversed-polarity protected, overload protected
Alternating light/direct light operation (illumination mode)	type -AC: modulated type -DC: not modulated
Current consumption	max. 150 mA
Resolution	depends on the fiber optics used
Operating temperature range	-20°C ... +55°C
Storage temperature range	-20°C ... +85°C
Enclosure rating	IP64
Threshold correction	can be activated via PC
ANALOG output	0V ... 10V
DIGITAL output	OUT0 (Digital 0: typ. 0 ... 1V, Digital 1: typ. +Ub - 10%)
Current control input (I-CONTROL)	transmitting power can be adjusted via PC
Type of connector	connetion to PLC: 8-pole connector Binder Series 712 connection to PC: 5-pole female connector Binder Series 712 connection to fiber optics: 2-pole fiber optics adapter
Connecting cables	zur PLC: cab-las8/702-fem or cab-las8/702-fem-w to PC/RS232 interface: cab-las5/PC or cab-las4/PC-w to PC/USB interface: cab-5/USB or cab-5/USB-w to PC/Ethernet interface: cab-5/ETH-500
Dynam. switching input (pulse lengthening)	can be activated via PC (0ms ... 100ms)
Switching frequency	typ. 30 kHz
Max. switching current	100 mA, short-circuit protected
Band with analog signal	1 kHz (-3 dB)
Scan frequency	max. 200 kHz
Interface	RS232, parameterizable under Windows®
Housing material	aluminium, anodized in blue or black
Housing dimensions	approx. 60 mm x 50 mm x 30 mm (without connector flanges)
EMC test acc. to	DIN EN 60947-5-2 CE

Dimensions



All dimensions in mm

Sensor Instruments Entwicklungs- und Vertriebs-GmbH
D-94169 Thurmansbang • Schlinding 15
Tel. +49 (0)8544 9719-0 • info@sensorinstruments.de

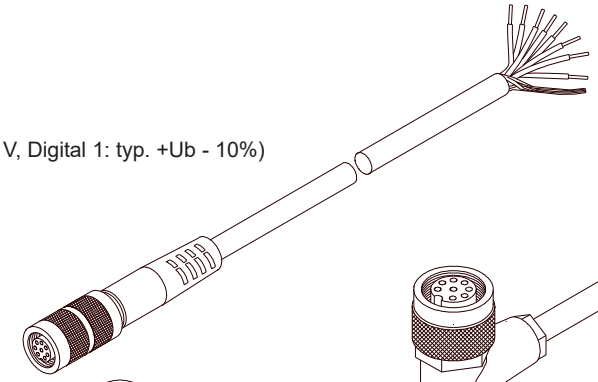
Connector Assignment

Connection TLB-CON8-FIO-IR-... to PLC:

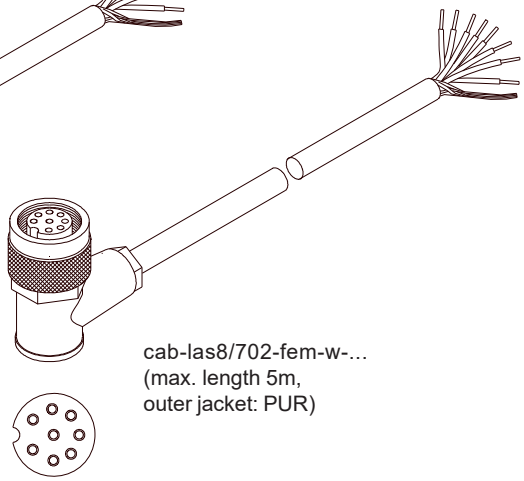
8-pole connector Binder series 712

Pin:	Wire color:	Assignment:
1	white	GND (0V)
2	brown	+24VDC (±10%)
3	green	IN0
4	yellow	OUT0 (Digital 0: typ. 0 ... 1V, Digital 1: typ. +Ub - 10%)
5	grey	not connected
6	pink or black	ANALOG (0V ... +10V)
7	blue	not connected
8	red	not connected

Connecting cables:
cab-las8/702-fem-(length) or
cab-las8/702-fem-w-(length) (90° angle type)
(standard length 2m)



cab-las8/702-fem-...
(max.length 25m,
outer jacket: PUR)



cab-las8/702-fem-w-...
(max. length 5m,
outer jacket: PUR)

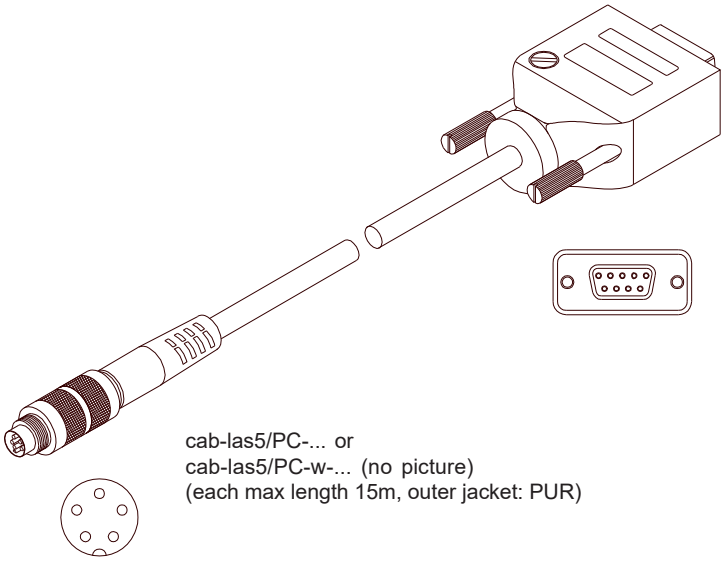
Connection TLB-CON8-FIO-IR-... to PC:

5-pole fem. connector Binder series 712

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

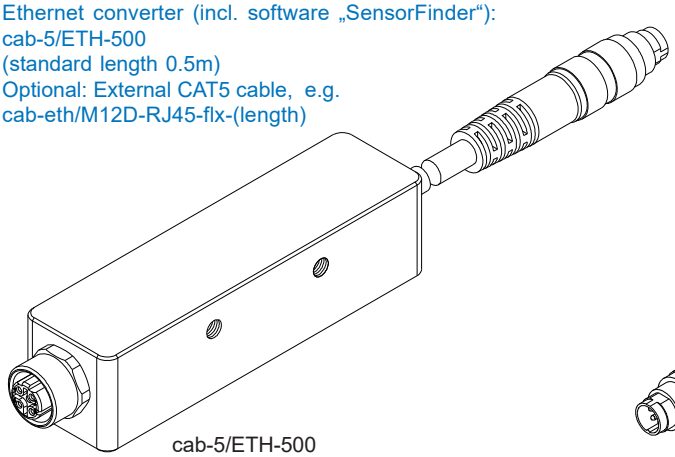
Connecting cable:
cab-las5/PC-(length)
cab-las5/PC-w-(length) (angle type 90°)
(standard length 2m)

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)

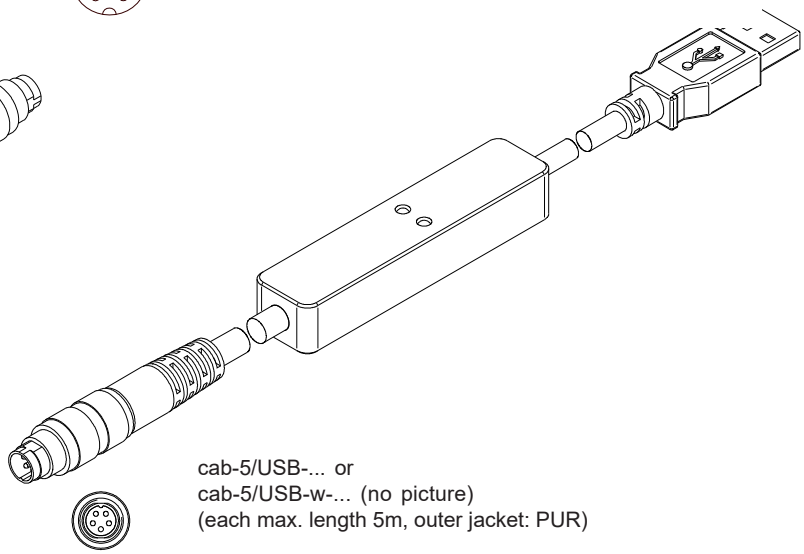


cab-las5/PC-... or
cab-las5/PC-w-... (no picture)
(each max length 15m, outer jacket: PUR)

alternative:
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-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)



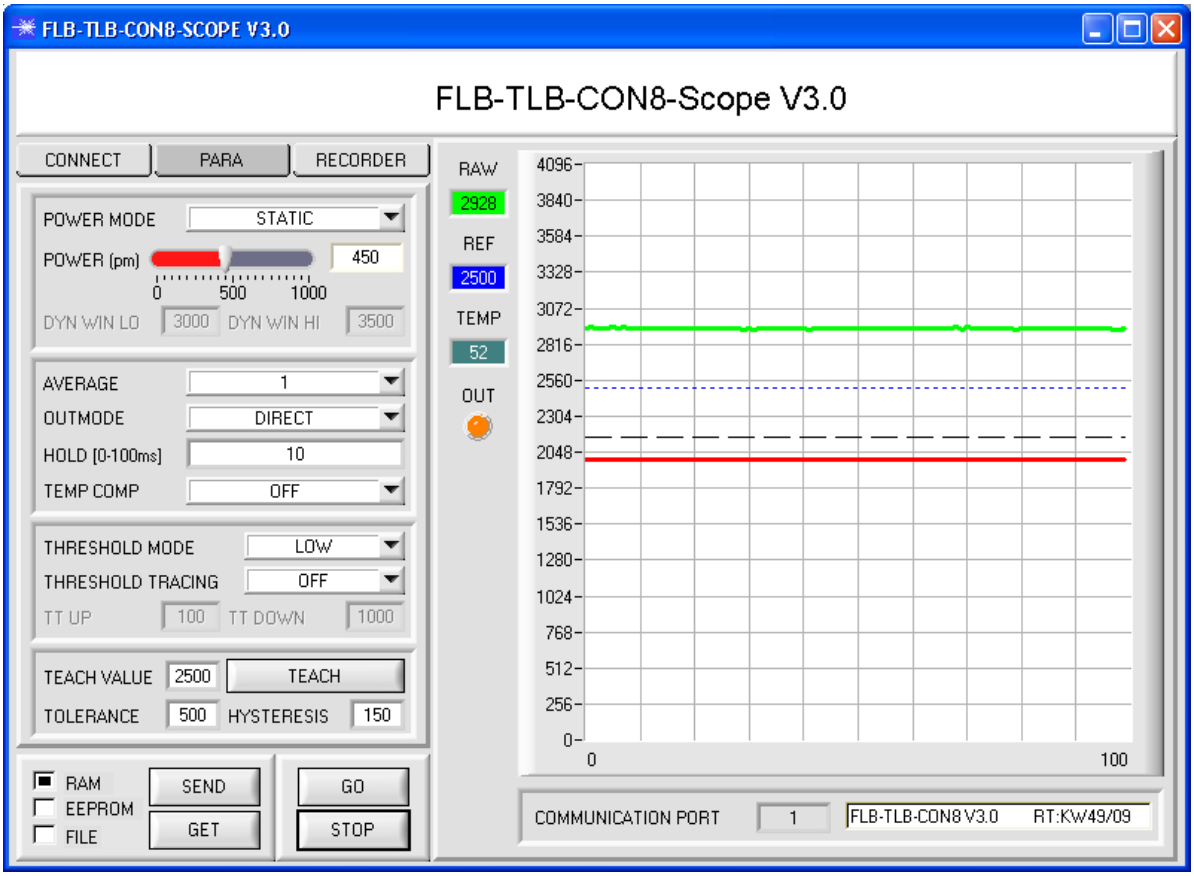
cab-5/USB-... or
cab-5/USB-w-... (no picture)
(each max. length 5m, outer jacket: PUR)

Windows® Software

Windows®-Software FLB-TLB-CON8-Scope:

Mit Hilfe der Windows®-Bedieneroberfläche kann die TLB-CON8-FIO-IR Kontrollelektronik sehr einfach parametrisiert werden. Zu diesem Zweck wird die FLB-CON8 über das serielle Schnittstellenkabel cab-las5/PC (bzw. über das USB-Kabel cab-las5/USB) mit dem PC verbunden. Nach erfolgter Parametrisierung kann der PC wieder abgetrennt werden.

Windows®-Bedieneroberfläche:



The fiber optics of the LWL Series can be connected to the electronic control unit FLB-CON8-FIO-IR. The electronic control unit guarantees a stable voltage supply for the respective fiber optics of LWL Series.
The electronic control unit also amplifies and processes the analog signal of the receiver in a suitable manner. A micro-controller performs 12-bit analog/digital conversion of the analog signal, allowing recording and evaluation of the signal characteristics at the sensor. Furthermore the electronic control unit offers various options for intelligent transmitting power control (dirt accumulation compensation) at the sensor.

Parameters and measured values can be exchanged between the PC and the electronic control unit through either the RS232 interface or Ethernet interface (by means of an Ethernet adapter). All the parameters can be stored in the non-volatile EEPROM of the electronic control unit through the interface.
The FLB/TLB-CON8-Scope V3.0 Windows software facilitates parameterisation, diagnostics, and adjustment of the sensor system. The FLB/TLB-CON8-Scope V3.0 software furthermore features the function of a data recorder that automatically records data and saves them on the PC's hard disk.

The sensor system comprising sensor and electronic control unit is temperature-compensated in a range from 0°C to 80°C.

Firmware updates can be easily performed through the RS232 interface even when the sensor system is installed.

When parameterisation is finished, the electronic control unit continues to run in STAND-ALONE operation, without a PC.

Fiber Optics

Field of use:

Optical fibers offer solutions for difficult tasks in optoelectronis. They can be used universally and allow flexible applications.

Advantages:

- Highest quality
- Selection from different fiber types
- Thermal stability
- Great variety of available standard sensor heads
- Special designs
- Various attachment optics available

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).

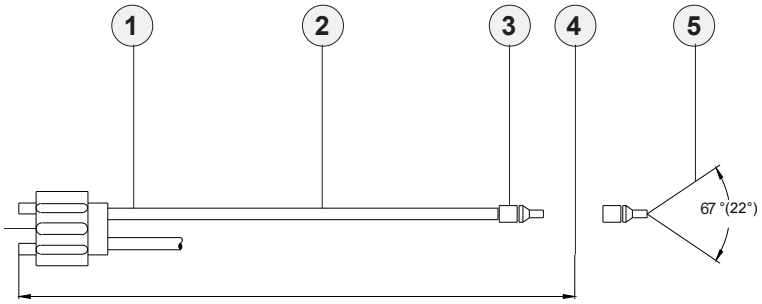
The highly flexible optical fibers are made of bundled individual glass fibers. The ends are each glued into a sensor head and a connector. The faces are optically polished. For protection against mechanical, chemical, or thermal destruction the optical fibers are provided with a corresponding protective sheath.

Order Code:

Order code for optical fiber

1 **Operating mode** (e.g. D = transmitted light operation)
2 **Sheathing type** (e.g. S = silicone-metal sheathing)
3 **Sensor type** (e.g. A2.0 = sensor type A, variant 2.0)
(**and size of fiber bundle or fiber gap**, e.g. Ø 2.5 mm)
4 **Total length of optical fiber** (e.g. 1200 mm)
5 **Beam angle** (e.g. standard fiber 67°)

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



Dimensions of adapter	cf. catalog LWL Series
Attachment optics (e.g. focus lens, reflex optics, prismn optics)	cf. catalog LWL Series
Fiber optics for reflex light operation	cf. catalog LWL Series
Fiber optics for transmitted light operation	cf. catalog LWL Series
Mounting hints	cf. catalog LWL Series

Attachment Optics

Overview: Attachment optics for reflective light fiber optics (please also cf. data sheet FIO Series):

Part No.	Working distance	Suitablefor fiber optics type ... (R = reflective light operation)	Working range or characteristics
KL-2		R-S-A2.0-(2.5)-...-67° or 22°	Focussing on a small light spot - *focus lens*
KL-3	typ. 11 mm	R-S-A2.0-(2.5)-...-67°	Working range typ. 10 mm ... 20 mm
KL-3/30	typ. 11 mm	R/D-S-A2.0-(2.5)-...-67°	Working range typ. 30 mm - *for control of fluids*
KL-4	typ. 11 mm	R-S-A1.1-(1.5)-...-67°	Working range typ. 10 mm ... 15 mm
KL-5	typ. 11 mm	R-S-R1.1-(3x0.5)-...-67°	Working range typ. 8 mm ... 20 mm
KL-8	typ. 11 mm	R-S-R2.1-(6x1)-...-67°	Working range typ. 8 mm ... 25 mm
KL-8-N		R-S-R2.1-(6x1)-...-67°	with neutral glass filter
KL-9	typ. 11 mm	R-S-A3.0-(3.0)-...-67°	Working range typ. 8 mm ... 25 mm
KL-M8-A1.1		R-S-A1.1-(1.5)-...-67°	
KL-M12-A1.1		R-S-A1.1-(1.5)-...-67°	
KL-M12-A2.0		R-S-A2.0-(2.5)-...-67°	
KL-M12-A3.0		R-S-A3.0-(3.0)-...-67°	
KL-M12-R1.1		R-S-R1.1-(3x0.5)-...-67°	
KL-M12-XL-A1.1		R-S-A1.1-(1.5)-...-67°	
KL-M12-XL-A2.0		R-S-A2.0-(2.5)-...-67°	
KL-M12-XL-R1.1		R-S-R1.1-(3x0.5)-...-67°	
KL-M18-A1.1	typ. 20 mm	R-S-A1.1-(1.5)-...-67°	Working range typ. 10 mm ... 60 mm
KL-M18-A2.0	typ. 20 mm	R-S-A2.0-(2.5)-...-67°	Working range typ. 10 mm ... 80 mm
KL-M18-A3.0	typ. 20 mm	R-S-A3.0-(3.0)-...-67°	Working range typ. 10 mm ... 80 mm
KL-M18-R1.1	typ. 20 mm	R-S-R1.1-(3x0.5)-...-67°	Working range typ. 10 mm ... 60 mm
KL-M18-R2.1	typ. 20 mm	R-S-R2.1-(6x1)-...-67°	Working range typ. 10 mm ... 80 mm
KL-M18-XL-A1.1		R-S-A1.1-(1.5)-...-67°	
KL-M18-XL-A2.0		R-S-A2.0-(2.5)-...-67°	
KL-M18-XL-A3.0		R-S-A3.0-(3.0)-...-67°	
KL-M18-XL-R1.1		R-S-R1.1-(3x0.5)-...-67°	
KL-M18-XL-R2.1		R-S-R2.1-(6x1)-...-67°	
KL-M34-A1.1	typ. 130 mm	R-S-A1.1-(1.5)-...-67°	Working range typ. 50 mm ... 200 mm
KL-M34-A2.0	typ. 130 mm	R-S-A2.0-(2.5)-...-67°	Working range typ. 50 mm ... 250 mm
KL-M34-A3.0	typ. 130 mm	R-S-A3.0-(3.0)-...-67°	Working range typ. 50 mm ... 300 mm
KL-M34-R1.1		R-S-R1.1-(3x0.5)-...-67°	
KL-M34-R2.1		R-S-R2.1-(6x1)-...-67°	
KL-M34-M5.0			
KL-M34-M6.0			
KL-M34-M16x1			
KL-M34/62-A1.1		R-S-A1.1-(1.5)-...-67°	
KL-M34/62-A2.0	typ. 120 mm	R-S-A2.0-(2.5)-...-67°	Working range typ. 80 mm ... 150 mm
KL-M34/62-A3.0		R-S-A3.0-(3.0)-...-67°	
KL-M34/62-R1.1		R-S-R1.1-(3x0.5)-...-67°	
KL-M34/62-R2.1		R-S-R2.1-(6x1)-...-67°	

Attachment Optics

Overview: Attachment optics for transmitted light fiber optics (please also cf. data sheet FIO Series):

Part No.	Working distance	Suitablefor fiber optics type ... (R = transmitted light operation)	Working range or characteristics
KL-0/90°-A2.0		D-S-A2.0-(2.5)-...-67°	
KL-0/90°-A3.0		D-S-A3.0-(3.0)-...-67°	
KL-1		D-S-A2.0-(2.5)-...-67° oder 22°	Focussing on a small light spot - *focus lens*
KL-2 (2 Stk.)		D-S-A2.0-(2.5)-...-67° oder 22°	Focussing on a small light spot - *focus lens*
KL-3/30	typ. 11 mm	R/D-S-A2.0-(2.5)-...-67°	Working range typ. 30 mm - *for control of fluids*
KL-5/85°-A2.0		D-S-A2.0-(2.5)-...-67°	
KL-5/85°-A3.0		D-S-A3.0-(3.0)-...-67°	
KL-10/75°-A2.0		D-S-A2.0-(2.5)-...-67°	
KL-10/75°-A3.0		D-S-A3.0-(3.0)-...-67°	
KL-12/60°-A2.0		D-S-A2.0-(2.5)-...-67°	
KL-12/60°-A3.0		D-S-A3.0-(3.0)-...-67°	
KL-12/60°-R2.1		D-S-R2.1-(6x1)-...-67°	
KL-15/45°-A2.0		D-S-A2.0-(2.5)-...-67°	
KL-15/45°-A3.0		D-S-A3.0-(3.0)-...-67°	
KL-20/20°-A2.0		D-S-A2.0-(2.5)-...-67°	
KL-20/20°-A3.0		D-S-A3.0-(3.0)-...-67°	
KL-90 (2 Stk.)	typ. 100 mm	D-S-A2.0-(2.5)-...-67°	Can be focused, high light efficiency - *prismn optics*
KL-D-2.5	typ. 300 mm	D-S-A2.0-(2.5)-...-67°	Working range typ. 100 mm ... 500 mm
KL-D-6	typ. 200 mm	D-S-A2.0-(2.5)-...-67°	Working range typ. 100 mm ... 250 mm
KL-D-14	typ. 80 mm	D-S-A2.0-(2.5)-...-67°	Working range typ. 60 mm ... 120 mm
KL-D-14-T400	typ. 80 mm	D-S-A2.0-(2.5)-1200-67°-T400	Working range typ. 60 mm ... 120 mm - *high temperature resistant*
KL-D-17	typ. 50 mm	D-S-A2.0-(2.5)-...-67°	Working range typ. 30 mm ... 80 mm
KL-D-20	typ. 30 mm	D-S-A2.0-(2.5)-...-67°	Working range typ. 20 mm ... 40 mm
KL-D-28	typ. 25 mm	D-S-A2.0-(2.5)-...-67°	Working range typ. 20 mm ... 30 mm
KL-D-30		D-S-A2.0-(2.5)-...-67°	
KL-D-40	typ. 20 mm	D-S-A2.0-(2.5)-...-67°	Working range typ. 15 mm ... 25 mm

Attachment Optics

Overview: Attachment optics for standard fiber optics (please also cf. data sheet FIO Series):

KL-1

KL-2

KL-3
KL-4
KL-5
KL-8
KL-9

KL-3/30

KL-0/90°-A2.0
KL-0/90°-A3.0

KL-5/85°-A2.0
KL-5/85°-A3.0

KL-10/75°-A2.0
KL-10/75°-A3.0

KL-12/60°-A2.0
KL-12/60°-A3.0
KL-12/60°-R2.1

KL-15/45°-A2.0
KL-15/45°-A3.0

KL-20/20°-A2.0
KL-20/20°-A3.0

KL-90

KL-D-2.5

KL-D-6

KL-D-14

KL-D-17

KL-D-20

KL-D-28

KL-D-40

KL-M8-A1.1

KL-M12-A1.1
KL-M12-A2.0
KL-M12-A3.0
KL-M12-R1.1

KL-M12-XL-A1.1
KL-M12-XL-A2.0
KL-M12-XL-R1.1

KL-M18-A1.1
KL-M18-A2.0
KL-M18-A3.0
KL-M18-R1.1
KL-M18-R2.1

KL-M18-XL-A1.1
KL-M18-XL-A2.0
KL-M18-XL-A3.0
KL-M18-XL-R1.1
KL-M18-XL-R2.1

KL-M34-A1.1
KL-M34-A2.0
KL-M34-A3.0
KL-M34-R1.1
KL-M34-R2.1

KL-M34/62-A1.1
KL-M34/62-A2.0
KL-M34/62-A3.0
KL-M34/62-R1.1
KL-M34/62-R2.1

KL-M34-M5.0
KL-M34-M6.0

KL-M34-M16x1

Fiber-Optic Mounts

Overview: Fiber-optic mounting plates for transmitted-light fibers with a "Q..." type sensor head (cross-section converter)
(also cf. catalog FIO series):

Product name	Working distance	Suitable for fiber optics type ... (D = Transmitted-light fiber optics, Q = Cross-sectional converter)	Working range
KL-50/50-5	50 mm	D-S-Q1-(5x0.5)-...-67°	5 mm
KL-50/50-10	50 mm	D-S-Q2-(10x0.3)-...-67°	10 mm
KL-50/50-18	50 mm	D-S-Q3-(18x0.3)-...-67°	18 mm
KL-50/50-28	50 mm	D-S-Q4-(28x0.2)-...-67°	28 mm
KL-50/50-38	50 mm	D-S-Q5-(38x0.15)-...-67°	38 mm
KL-50/50-48	50 mm	D-S-Q6-(48x0.15)-...-67°	48 mm

KL-50/50-5
+ D-S-Q1-(5x0.5)-...-67°

KL-50/50-10
+ D-S-Q2-(10x0.3)-...-67°

KL-50/50-18
+ D-S-Q3-(18x0.3)-...-67°

KL-50/50-28
+ D-S-Q4-(28x0.2)-...-67°

KL-50/50-38
+ D-S-Q5-(38x0.15)-...-67°

KL-50/50-48
+ D-S-Q6-(48x0.15)-...-67°