

TLB Series

▶ TLB-CON2-FIO

Constant light amplifier

- Bright- and dark-switching
- Outputs short-circuit protected
- High switching frequency (typ. 25 kHz)
- Switching state indication by means of a yellow/green-LED
- Push-pull output stage (appropriate for npn and pnp)
- Sturdy aluminum housing
- Fiber optics connector (for connection of fiber optics of FIO Series)



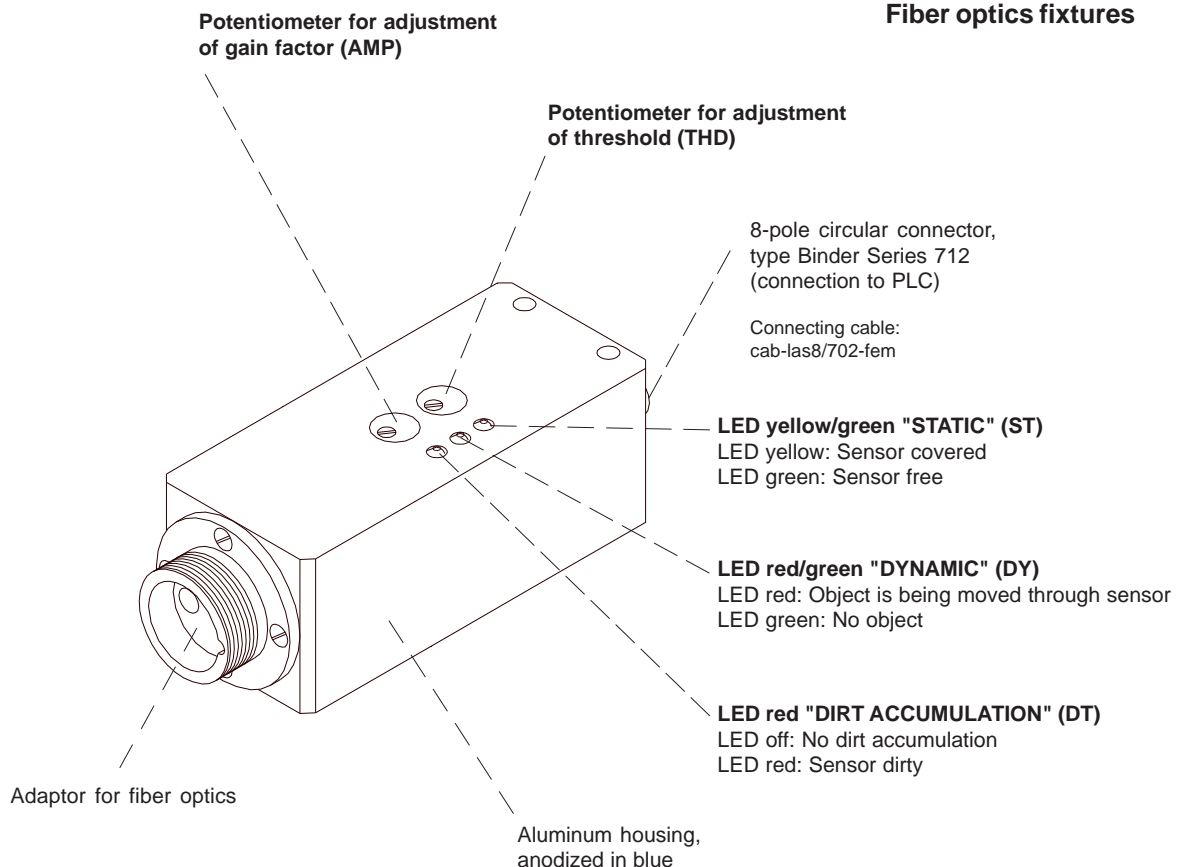
Design

Product name:

TLB-CON2-FIO

Accessories: (p. 4-9)

Fiber optics
Optical frontends
Fiber optics fixtures



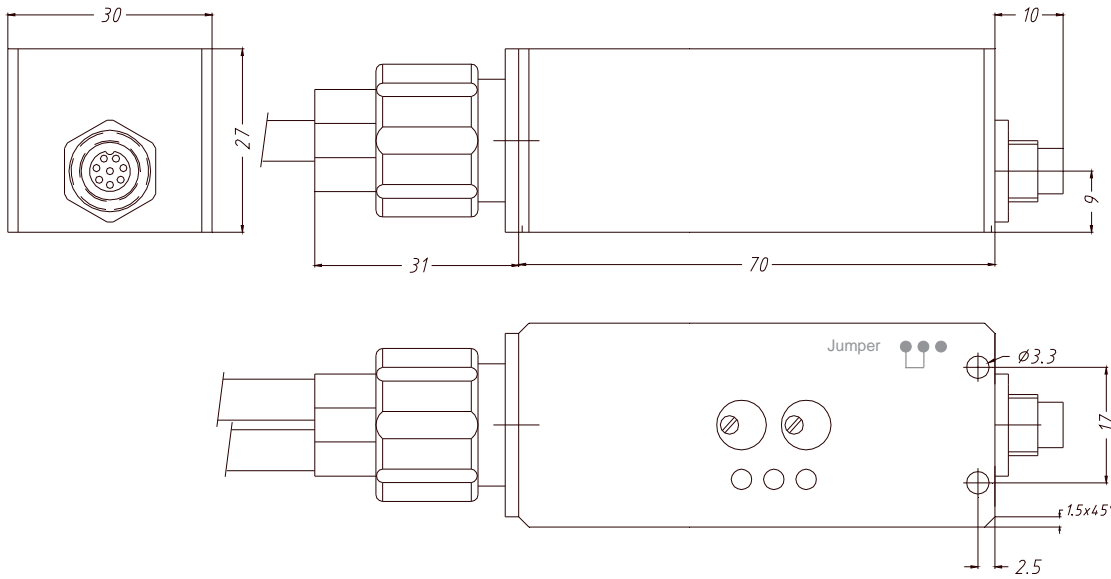
Please order optical fibers separately
(cf. catalog FIO Series)



Technical Data

Model	TLB-CON2-FIO
Voltage supply	+12VDC ... +32VDC Ripple 10% max.
Current consumption	with TLB light barrier: typ. 80 mA
Operating temperature range	-20°C ... +60°C
Storage temperature range	-20°C ... +85°C
Housing	Material: Aluminum, anodized in blue Dimensions: approx. 65 mm x 27 mm x 30 mm
Mechanical protection	IP 64
Threshold correction	Adjustable via integrated jumper
Output ANALOG	0V ... +10V
Output DIGITAL STATIC	2x static: Q: npn dark-switching (npn normally open) / pnp bright-switching (pnp normally closed) Qinv: npn bright-switching (npn normally closed) / pnp dark-switching (pnp normally open)
Output DIGITAL DYNAMIC	1x dynamic (pulse length 15 ms): Q: npn dark-switching (npn normally open) / pnp bright-switching (pnp normally closed) (Alternatively: Qinv: npn bright-switching (npn normally closed) / pnp dark-switching (pnp normally open)
Potentiometer for gain	3-revolutions potentiometer integrated in the housing
Potentiometer for trigger threshold	3-revolutions potentiometer integrated in the housing
Dirt accumulation indication	LED red
Switching state indication STATIC	via yellow/green LED
Switching state indication DYNAMIC	via red/green LED
Connector type	Connection to PLC: 8-pole circular connector, type Binder 712 Connection to optical fiber via adaptor
Switching state indication	Typ. 25 kHz
Max. switching current	200 mA, short circuit protection
Band width analog signal	50 kHz (-3dB)
EMC test acc. to	DIN EN 60947-5-2
Light source	IR diode (905 nm)

Dimensions



(All dimensions in mm)

Setting

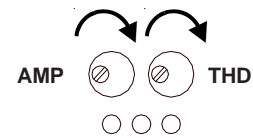
Jumper for adjustment of threshold correction
(Jumper under housing cover)

Jumper setting:

- Jumper at the right = Threshold correction TC (standard adjustment !)
- alternatively: Jumper at the left = Fixed threshold

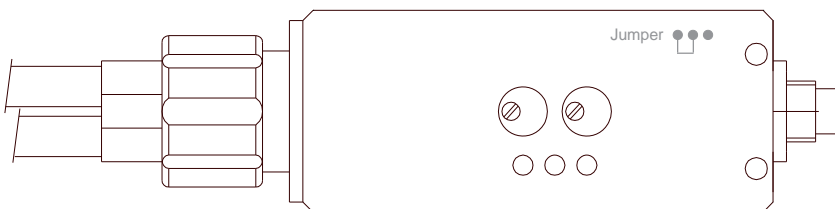
Potentiometer for adjustment of gain factor (AMP)

Rotation clockwise:
Increase of analog signal
(3-revolutions potentiometer)



Potentiometer for adjustment of threshold (THD)

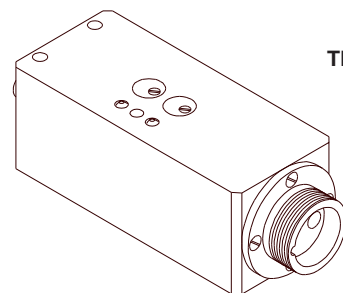
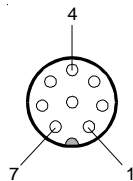
Rotation clockwise:
Increase of sensitivity
(3-revolutions potentiometer)



Connector Assignment

8-pin circular connector, type Binder 712 (connection to PLC):

Pin-No.:	(Color)	Assignment:
1	(wht)	GND (0V)
2	(brn)	+Ub
3	(grn)	THD
4	(yel)	DIRT
5	(gry)	OUT
6	(pnk)	OUT/
7	(blu)	PULSE
8	(red)	ANALOG (0V ... +10V)



TLB-CON2-FIO

Connecting cable: cab-las8/702-fem (l=2m)



Fiber Optics

Field of use:

Optical fibers offer solutions for difficult tasks in optoelectronics. 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



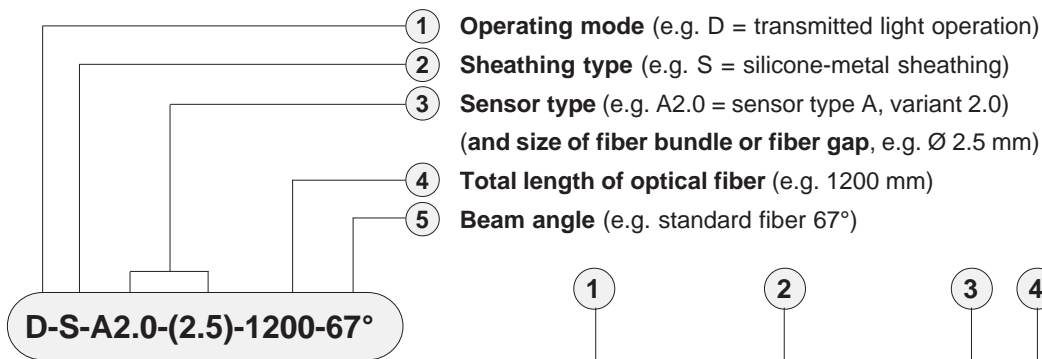
Characteristics:

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).

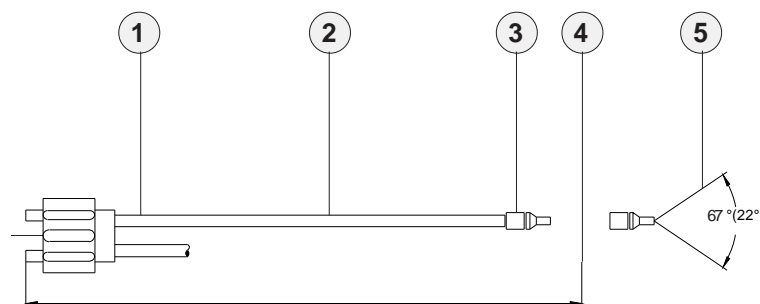
The highly flexible optical fibers are made of bundled individual glass fibers. The ends are each glued into a sensor head and a connector. The faces are optically polished. For protection against mechanical, chemical, or thermal destruction the optical fibers are provided with a corresponding protective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

Order Code:



Order code for optical fiber

(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



Optical Frontends

Overview: Optical frontends for fiber optics





Optical Frontends

Optical frontends for reflected light or transmitted light fiber optics:

Part number:	Suitable for fiber optics type: (R, T = reflected light, D= transmitted light)	Characteristics:
KL-1-A2.0 (2 pcs. necessary)	D-S-A2.0-(2.5)-...-67° or 22°	Transmitter/receiver distance typ. 50 mm ... 200 mm
KL-2-A2.0	R-S-A2.0-(2.5)-...-67° or 22°	Transmitter/receiver distance max. 300 mm, beam divergency ± 7,5°
KL-2-A2.0 (2 pcs. necessary)	D-S-A2.0-(2.5)-...-67° or 22°	Transmitter/receiver distance max. 300 mm, beam divergency ± 7,5°
KL-3-A2.0	R-S-A2.0-(2.5)-...-67° or 22°	Working distance typ. 10 mm ... 20 mm
KL-D-3/30-R/D-A2.0	R/D-S-A2.0-(2.5)-1200-67° <i>Special version*</i>	Working distance typ. 30 mm
KL-4-A1.1	R-S-A1.1-(0.6)-...-67° or 22°	Working distance typ. 10 mm ... 15 mm
KL-4-A1.1	R-S-A1.1-(1.1)-...-67° or 22°	Working distance typ. 10 mm ... 15 mm
KL-4-A1.1	R-S-A1.1-(1.5)-...-67° or 22°	Working distance typ. 10 mm ... 15 mm
KL-5-R1.1	R-S-R1.1-(3x0.5)-...-67° or 22°	Working distance typ. 8 mm ... 20 mm
KL-8-R2.1	R-S-R2.1-(6x1)-...-67° or 22°	Working distance typ. 8 mm ... 25 mm
KL-8-N-R2.1	R-S-R2.1-(6x1)-...-67° or 22°	Working distance typ. 8 mm ... 25 mm <i>with guide slot (adjustment aid)</i>
KL-9-A3.0	R-S-A3.0-(3.0)-...-67° or 22°	Working distance typ. 8 mm ... 25 mm
KL-90-A2.0 (2 pcs. necessary)	D-S-A2.0-(2.5)-...-67° or 22°	Working distance typ. 20 mm ... 100 mm - <i>prismatic optics</i>
KL-52-XL-A3.0	R-S-A3.0-(3.0)-...-67°	Optics diameter 52 mm
KL-M8-A1.1	R-S-A1.1-(1.5)-...-67°	Working distance typ. 8 mm ... 20 mm
KL-M12-A1.1	R-S-A1.1-(1.5)-...-67°	Working distance typ. 8 mm ... 40 mm
KL-M12-A2.0	R-S-A2.0-(2.5)-...-67°	Working distance typ. 8 mm ... 40 mm
KL-M12-A3.0	R-S-A3.0-(3.0)-...-67°	Working distance typ. 8 mm ... 40 mm
KL-M12-R1.1	R-S-R1.1-(3x0.5)-...-67°	Working distance typ. 8 mm ... 40 mm
KL-M12-XL-A1.1	R-S-A1.1-(1.5)-...-67°	Working distance typ. 10 mm ... 100 mm
KL-M12-XL-A2.0	R-S-A2.0-(2.5)-...-67°	Working distance typ. 10 mm ... 100 mm
KL-M12/90°-XL-A2.0	R-S-A2.0-(2.5)-...-67°	Working distance typ. 10 mm ... 100 mm
KL-M12-XL-R1.1	R-S-R1.1-(3x0.5)-...-67°	Working distance typ. 10 mm ... 100 mm
KL-M18-A1.1	R-S-A1.1-(1.5)-...-67°	Working distance typ. 20 mm ... 60 mm
KL-M18-A2.0	R-S-A2.0-(2.5)-...-67°	Working distance typ. 20 mm ... 60 mm
KL-M18-A3.0	R-S-A3.0-(3.0)-...-67°	Working distance typ. 20 mm ... 60 mm
KL-M18-M5.0	T-S-M5.0-(5.0)-...-67° <i>Special version*</i>	Working distance typ. 20 mm ... 60 mm
KL-M18-M6.0	T-S-M6.0-(6.0)-...-67° <i>Special version*</i>	Working distance typ. 20 mm ... 60 mm
KL-M18-M8.0	T-S-M8.0-(8.0)-...-67° <i>Special version*</i>	Working distance typ. 20 mm ... 60 mm
KL-M18-R1.1	R-S-R1.1-(3x0.5)-...-67°	Working distance typ. 20 mm ... 60 mm
KL-M18-R2.1	R-S-R2.1-(6x1)-...-67°	Working distance typ. 20 mm ... 60 mm
KL-M18-XL-A1.1	R-S-A1.1-(1.5)-...-67°	Working distance typ. 10 mm ... 200 mm
KL-M18-XL-A2.0	R-S-A2.0-(2.5)-...-67°	Working distance typ. 10 mm ... 200 mm
KL-M18-XL-A3.0	R-S-A3.0-(3.0)-...-67°	Working distance typ. 10 mm ... 200 mm
KL-M18-XL-M5.0	T-S-M5.0-(5.0)-...-67° <i>Special version*</i>	Working distance typ. 10 mm ... 200 mm
KL-M18-XL-M6.0	T-S-M6.0-(6.0)-...-67° <i>Special version*</i>	Working distance typ. 10 mm ... 200 mm
KL-M18-XL-M8.0	T-S-M8.0-(8.0)-...-67° <i>Special version*</i>	Working distance typ. 10 mm ... 200 mm
KL-M18-XL-R1.1	R-S-R1.1-(3x0.5)-...-67°	Working distance typ. 10 mm ... 200 mm
KL-M18-XL-R2.1	R-S-R2.1-(6x1)-...-67°	Working distance typ. 10 mm ... 200 mm
KL-M18-XL--0°/(17°-60°)-30-M5.0	2x T-S-M5.0-(5.0)-...-67° <i>Special version*</i>	Angle between the two fiber optics is adjustable from 17° to 60°

*Special version:

Version is different to the standard version (e.g. no standard fiber adapter) and therefore is suitable only for certain sensors or applications



Optical Frontends

Optical frontends for reflected light or transmitted light fiber optics:

Part number:	Suitable for fiber optics type: (R, T = reflected light, D= transmitted light)	Characteristics:
KL-M34-A1.1	R-S-A1.1-(1.5)-...-67°	Working distance typ. 100 mm ... 250 mm
KL-M34-A2.0	R-S-A2.0-(2.5)-...-67°	Working distance typ. 100 mm ... 250 mm
KL-M34-A3.0	R-S-A3.0-(3.0)-...-67°	Working distance typ. 100 mm ... 250 mm
KL-M34-M5.0	T-S-M5.0-(5.0)-...-67° <i>Special version*</i>	Working distance typ. 100 mm ... 250 mm
KL-M34-M6.0	T-S-M6.0-(6.0)-...-67° <i>Special version*</i>	Working distance typ. 100 mm ... 250 mm
KL-M34-M8.0	T-S-M8.0-(8.0)-...-67° <i>Special version*</i>	Working distance typ. 100 mm ... 250 mm
KL-M34-R1.1	R-S-R1.1-(3x0.5)-...-67°	Working distance typ. 100 mm ... 250 mm
KL-M34-R2.1	R-S-R2.1-(6x1)-...-67°	Working distance typ. 100 mm ... 250 mm
KL-M34-XL-A1.1	R-S-A1.1-(1.5)-...-67°	Working distance typ. 50 mm ... 400 mm
KL-M34-XL-A2.0	R-S-A2.0-(2.5)-...-67°	Working distance typ. 50 mm ... 400 mm
KL-M34-XL-A3.0	R-S-A3.0-(3.0)-...-67°	Working distance typ. 50 mm ... 400 mm
KL-M34-XL-M5.0	T-S-M5.0-(5.0)-...-67° <i>Special version*</i>	Working distance typ. 50 mm ... 400 mm
KL-M34-XL-M6.0	T-S-M6.0-(6.0)-...-67° <i>Special version*</i>	Working distance typ. 50 mm ... 400 mm
KL-M34-XL-M8.0	T-S-M8.0-(8.0)-...-67° <i>Special version*</i>	Working distance typ. 50 mm ... 400 mm
KL-M34-XL-(M25x1.5)-M8.0	T-S-M8.0-(8.0)-...-67° <i>Special version*</i>	as above but with cable screw fitting M25x1.5
KL-M34-XL-R1.1	R-S-R1.1-(3x0.5)-...-67°	Working distance typ. 50 mm ... 400 mm
KL-M34-XL-R2.1	R-S-R2.1-(6x1)-...-67°	Working distance typ. 50 mm ... 400 mm
KL-M34/62-A1.1	R-S-A1.1-(1.5)-...-67°	Working distance typ. 80 mm ... 200 mm
KL-M34/62-A2.0	R-S-A2.0-(2.5)-...-67°	Working distance typ. 80 mm ... 200 mm
KL-M34/62-A3.0	R-S-A3.0-(3.0)-...-67°	Working distance typ. 80 mm ... 200 mm
KL-M34/62-R1.1	R-S-R1.1-(3x0.5)-...-67°	Working distance typ. 80 mm ... 200 mm
KL-M34/62-R2.1	R-S-R2.1-(6x1)-...-67°	Working distance typ. 80 mm ... 200 mm
KL-D-0°/2.5°-300-A2.0	D-S-A2.0-(2.5)-...-67°	Working distance typ. 100 mm ... 500 mm
KL-D-0°/40°-9-A2.0	D-S-A2.0-(2.5)-...-67°	(to be supplemented)
KL-D-0°/42°-9-A2.0	D-S-A2.0-(2.5)-...-67°	(to be supplemented)
KL-D-0°/45°-30-A2.0	D-S-A2.0-(2.5)-...-67°	(to be supplemented)
KL-D-0°/45°-30-A3.0	D-S-A3.0-(3.0)-...-67°	(to be supplemented)
KL-D-5°-85-POL-A2.0	D-S-A2.0-(2.5)-...-67°	(to be supplemented)
KL-D-5°-85-POL-A3.0	D-S-A3.0-(3.0)-...-67°	(to be supplemented)
KL-D-6°-200-A2.0	D-S-A2.0-(2.5)-...-67°	Working distance typ. 100 mm ... 230 mm
KL-D-14°-84-A2.0	D-S-A2.0-(2.5)-...-67°	Working distance typ. 60 mm ... 120 mm
KL-D-14°-84-A2.0-T400	D-S-A2.0-(2.5)-1200-67°-T400	Working distance typ. 60 mm ... 120 mm <i>thermally stable up to 400°C</i>
KL-D-17°-49-A2.0	D-S-A2.0-(2.5)-...-67°	Working distance typ. 30 mm ... 80 mm
KL-D-20°-31-A2.0	D-S-A2.0-(2.5)-...-67°	Working distance typ. 10 mm ... 50 mm
KL-D-28°-26-A2.0	D-S-A2.0-(2.5)-...-67°	Working distance typ. 20 mm ... 50 mm
KL-D-28°-26-KG2-A2.0	D-S-A2.0-(2.5)-...-67°	Working distance typ. 20 mm ... 50 mm
KL-D-30°-23-A2.0	D-S-A2.0-(2.5)-...-67°	Working distance typ. 20 mm ... 30 mm
KL-D-30°-23-KG2-A2.0	D-S-A2.0-(2.5)-...-67°	Working distance typ. 20 mm ... 30 mm
KL-D-40°-13-A2.0	D-S-A2.0-(2.5)-...-67°	Working distance typ. 15 mm ... 25 mm
KL-D-40°-23-5/DIF-A2.0	D-S-A2.0-(2.5)-...-67°	(to be supplemented)
KL-D-40°-23-5/DIF-A3.0	D-S-A3.0-(3.0)-...-67°	(to be supplemented)
KL-D-45°-14-A2.0	D-S-A2.0-(2.5)-...-67°	(to be supplemented)
KL-D-M12-0°/30°-9-A2.0	D-S-A2.0-(2.5)-...-67°	(to be supplemented)
KL-D-M12-0°/30°-9-A3.0	D-S-A3.0-(3.0)-...-67°	(to be supplemented)
KL-D-M12-XL-0°/30°-30-A2.0	D-S-A2.0-30°/30-A2.0 <i>Special version*</i>	Working distance typ. 10 mm ... 100 mm

*Special version:

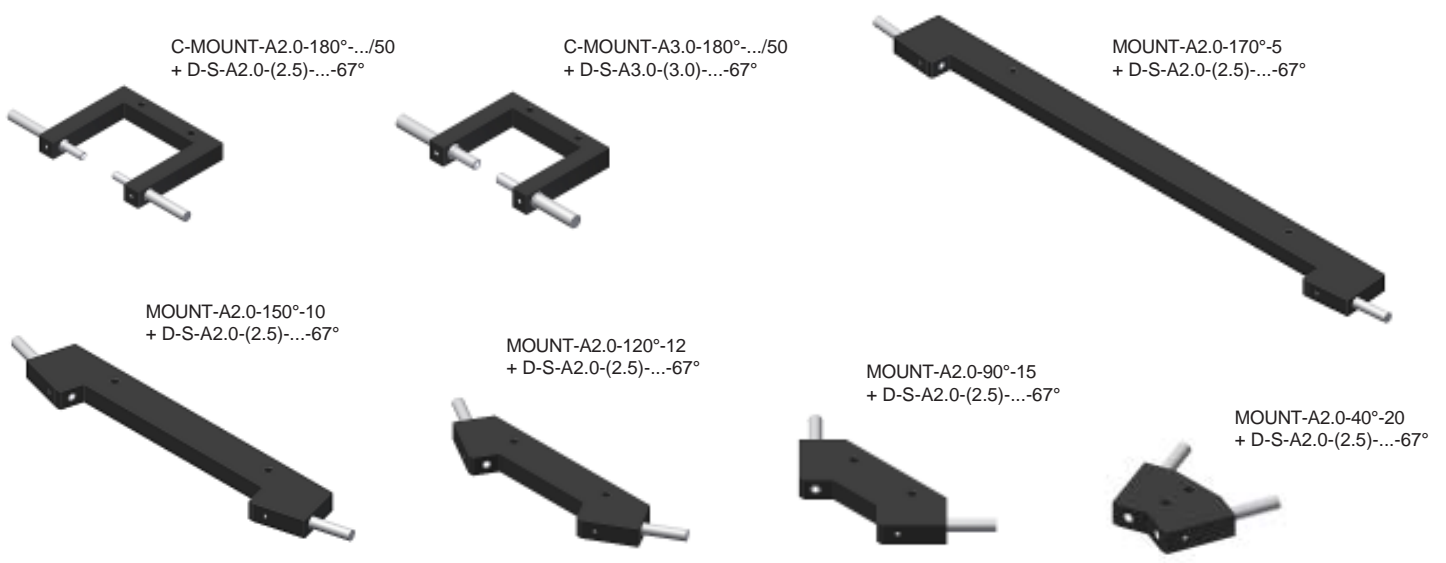
Version is different to the standard version (e.g. no standard fiber adapter) and therefore is suitable only for certain sensors or applications



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: (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

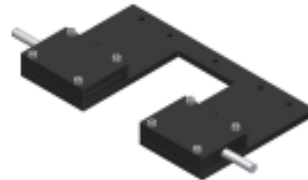
Mounting brackets (fixtures) for transmitted light fiber optics with sensor head type „Q....“ (cross-section converter):

Part number: **Suitable for fiber optics type: Characteristics:**
(D= transmitted light)

C-MOUNT-Q1-180°-50/50	D-S-Q1-(5x0.5)-...-67°	Width of measuring range: 5 mm, transmitter/receiver distance: 50 mm, distance beginning of measurement range (inner side) to inner edge of housing: 50 mm
C-MOUNT-Q2-180°-50/50	D-S-Q2-(10x0.3)-...-67°	Width of measuring range: 10 mm, transmitter/receiver distance: 50 mm, distance beginning of measurement range (inner side) to inner edge of housing: 50 mm
C-MOUNT-Q3-180°-50/50	D-S-Q3-(18x0.3)-...-67°	Width of measuring range: 18 mm, transmitter/receiver distance: 50 mm, distance beginning of measurement range (inner side) to inner edge of housing: 50 mm
C-MOUNT-Q4-180°-50/50	D-S-Q4-(28x0.2)-...-67°	Width of measuring range: 28 mm, transmitter/receiver distance: 50 mm, distance beginning of measurement range (inner side) to inner edge of housing: 50 mm
C-MOUNT-Q5-180°-50/50	D-S-Q5-(38x0.15)-...-67°	Width of measuring range: 38 mm, transmitter/receiver distance: 50 mm, distance beginning of measurement range (inner side) to inner edge of housing: 50 mm
C-MOUNT-Q6-180°-50/50	D-S-Q6-(48x0.15)-...-67°	Width of measuring range: 48 mm, transmitter/receiver distance: 50 mm, distance beginning of measurement range (inner side) to inner edge of housing: 50 mm



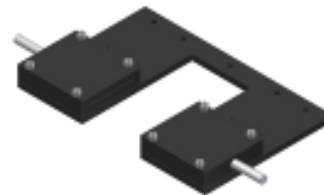
KL-50/50-5
+ D-S-Q1-(5x0.5)-...-67°



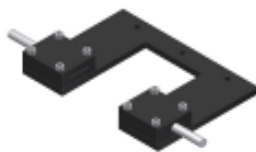
KL-50/50-28
+ D-S-Q4-(28x0.2)-...-67°



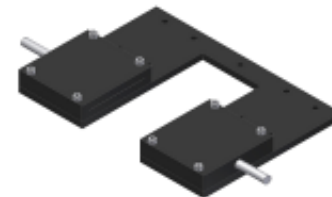
KL-50/50-10
+ D-S-Q2-(10x0.3)-...-67°



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



KL-50/50-18
+ D-S-Q3-(18x0.3)-...-67°



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