



# FIBER-OPTIC SOLUTIONS



## FIBER-OPTIC SOLUTIONS

Optical fibers are fitted in front of the emitter and receiver (the basic operation is identical for both glass and synthetic optical fibers). These fibers work as the extended "eye" of the photo sensor. As optical fiber conductors are very small and flexible, they provide a truly practical solution to the problem of sensing in highly inaccessible places. Furthermore, they do not carry any electrical potential, and sensing operations are therefore possible without special safety measures, even in areas where there is an explosion risk, or in the presence of strong electrical and magnetic fields (high-voltage equipment, electrical welding equipment). Even the tiniest objects can be detected by using appropriately thin fibers. Optical fibers can act as both through-beam (Fig. 1) and diffuse sensors (Fig. 2).

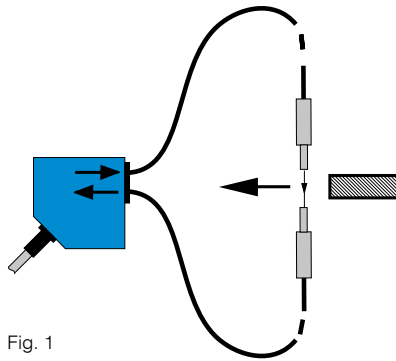


Fig. 1

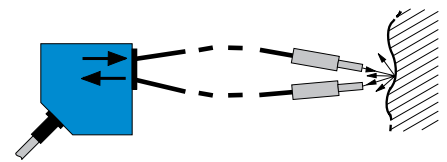


Fig. 2

## FIBER-OPTIC AMPLIFIERS

### SERIES 3030 / 3031

They combine high performance (series 3030), good performance and moderate cost (series 3031) with reduced dimensions (30 x 30 x 15 mm housing). They are intended for general use, particularly where small size is required. Despite their size, they feature all the usual protection functions, are robust and can be used for demanding industrial applications.

### SERIES 3060 / 3065 / 3066

These fiber-optic amplifiers for DIN-rail mounting (DIN/EN 50022) feature large sensing ranges, outstanding detection properties for both long and very short operating distances, high temperature stability and durability, thanks to stabilized light power (teach-in models only), and high switching frequency. For the teach-in versions, built-in adjustable pulse delay and stretching are standard. The exceptionally small housing (31 x 60 x 10 mm) allows for optimum stacking of even a large number of switches. In addition, the devices are optimized for simple and easily understandable operation. Presently, the series offers distance setting by means of potentiometer and teach-in; the latter with additional manual fine adjustment. According to choice, Teach 1 (only on background), Teach 2 (first on target, then on background), or Dynamic Teach may be used. The teach process can also be launched from a distance via a separate input.





## SYNTHETIC OPTICAL FIBERS

This catalog includes a comprehensive range of synthetic optical fibers for the detection of smallest objects, and for use in highly inaccessible places. The fibers can be cut on site to the length required for a specific application.

### APPLICATION-SPECIFIC FIBERS

- Cylindrical light beam
- Background suppression
- Multi-beam
- Liquid level monitoring
- Low and high temperatures

## FIBER-OPTIC AMPLIFIERS WITH POTENTIOMETER

### MAIN FEATURES

- Small, but robust
- Glass window, therefore scratch resistant and easy to clean
- Excellent resistance to environmental influences thanks to polyurethane potting of the electronic module
- High degree of protection: IP 67 (series 3030) / IP 65 (series 3031)
- Convenient sensitivity adjustment by means of the built-in 12-turn potentiometer

### TECHNICAL DATA

Housing size	30 x 30 x 15 mm
Housing material	Glass-fiber reinforced PBTP / polybutylene-terephthalate (Crastin)
Supply voltage range $U_b$	10 ... 36 VDC
Max. ripple content	20 %
Output current	200 mA max.
Output voltage drop	2.0 V max. at 200 mA
Max. switching frequency	1,000 Hz
Switching time ( $\uparrow$ and $\downarrow$ )	0.5 msec
Max. ambient light:	
halogen	5,000 Lux
sun	10,000 Lux
Ambient temperature range	-25 ... +55 °C
Degree of protection	IP 67 (3030) / IP 65 (3031)
EMC protection:	
IEC 60947-5-2	5 kV
IEC 61000-4-2	Level 2 (3030) / 3 (3031)
IEC 61000-4-3	Level 3
IEC 61000-4-4	Level 3

### PROTECTION

The switches are protected against overloads, short-circuits and all possible wire reversals. Furthermore, protection against overvoltages caused by inductive loads on the output and against voltage spikes on the power supply lines are built in. Appropriate technology prevents malfunctions or destruction caused by electrostatic discharges, fast transients, or HF fields. Thanks to optimum sealing, the devices are resistant to environmental influences (IP 67 for series 3030 devices / IP 65 for series 3031 devices).

### LEDS

For reliable operation the green LED (excess-gain indication) must light up. The yellow LED indicates the output state.

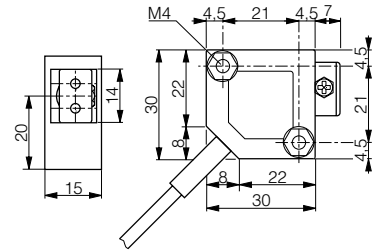
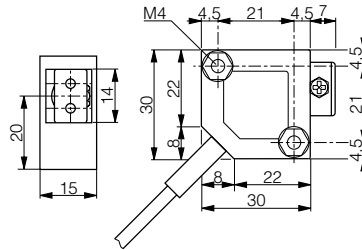
### CONNECTION

Switches with 3 m PVC cable 4 x 0.14 mm<sup>2</sup> or 4-pole S8 connector (series 3030) and 2 m PVC cable 3 x 0.14 mm<sup>2</sup> or 3-pole S8 connector (series 3031) are standard. Other cable types or lengths are available on request.

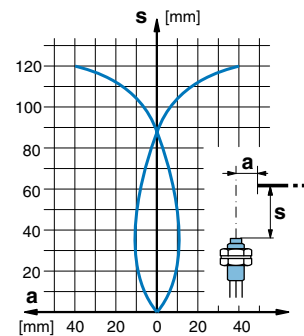
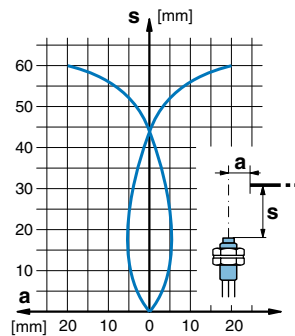
### DOCUMENTATION

Detailed data sheets for these products can be found on the Contrinex website [www.contrinex.com](http://www.contrinex.com) or ordered free of charge from our distributors.

Technical drawings can be downloaded as files from the Contrinex website and directly imported into your construction drawings.



Response curve:



TYPE SPECIFIC DATA	STANDARD	TYPE SPECIFIC DATA	HIGH PERFORMANCE
Operating distance	60 mm (with LFP-1002-020)	Operating distance	120 mm (with LFP-1002-020)
Standard target	100 x 100 mm white	Standard target	100 x 100 mm white
No-load supply current	15 mA (typical)	No-load supply current	20 mA (typical)
Emitter	LED red 660 nm	Emitter	LED red 660 nm
Weight (cable / connector model)	78 g / 17 g	Weight (cable / connector model)	78 g / 18 g

**PART REFERENCES**

Part ref.: ( <b>bold</b> : preferred types)		Part ref.: ( <b>bold</b> : preferred types)	
NPN light-ON / cable	<b>LFK-3031-301</b>	NPN changeover / cable	<b>LFK-3030-101</b>
NPN dark-ON / cable	<b>LFK-3031-302</b>	NPN light-ON + excess gain / cable	LFK-3030-102
NPN light-ON / connector S8 3-pole	<b>LFS-3031-301</b>	NPN changeover / conn. S8 4-pole	<b>LFS-3030-101</b>
NPN dark-ON / connector S8 3-pole	<b>LFS-3031-302</b>	NPN light-ON + excess gain / S8 4-p.	LFS-3030-102
PNP light-ON / cable	<b>LFK-3031-303</b>	PNP changeover / cable	<b>LFK-3030-103</b>
PNP dark-ON / cable	<b>LFK-3031-304</b>	PNP light-ON + excess gain / cable	LFK-3030-104
PNP light-ON / connector S8 3-pole	<b>LFS-3031-303</b>	PNP changeover / conn. S8 4-pole	<b>LFS-3030-103</b>
PNP dark-ON / connector S8 3-pole	<b>LFS-3031-304</b>	PNP light-ON + excess gain / S8 4-p.	LFS-3030-104
Wiring (page 23)	Diagram 1	Wiring (page 23)	Diagram 2

## FIBER-OPTIC AMPLIFIERS WITH POTENTIOMETER

### MAIN FEATURES

- Fiber-optic amplifiers for DIN-rail mounting (DIN/EN 50022)
- Ideal for stacking, thanks to 10 mm housing width
- Large sensing range of 0 ... 200 mm (red light) / 0 ... 100 mm (blue light) / 0 ... 140 mm (high switching frequency)
- No blind zone
- Distance setting by means of 12-turn potentiometer with illuminated scale
- Large setting range of 20 ... 200 mm (red light) / 20 ... 100 mm (blue light) / 20 ... 140 mm (high switching frequency)
- Switch selectable light-ON / dark-ON output, as well as excess-gain output
- Fibers (Ø 2.2 mm) connected by quick-locking
- Operating and display elements protected by transparent cover

### TECHNICAL DATA

Housing size	31 x 60 x 10 mm
Housing material	Glass-fiber reinforced PBTP / polybutylene-terephthalate (Crastin)
Supply voltage range $U_B$	10 ... 30 VDC
Max. ripple content	20 %
Output current	200 mA max.
Output voltage drop	2.0 V max. at 200 mA
Max. switching frequency	1,500 Hz / 5,000 Hz (high frequency)
Switching time ( $\uparrow$ and $\downarrow$ )	330 $\mu$ sec / 100 $\mu$ sec (high frequency)
Max. ambient light:	
halogen	5,000 Lux
sun	10,000 Lux
Ambient temperature range	-25 ... +55 °C
Degree of protection	IP 64
EMC protection:	
IEC 60947-5-2	5 kV
IEC 61000-4-2	Level 2
IEC 61000-4-3	Level 3
IEC 61000-4-4	Level 2

### PROTECTION

The switches are protected against overloads, short-circuits and all possible wire reversals. Furthermore, protection against overvoltages caused by inductive loads on the output and against voltage spikes on the power supply lines are built in. Appropriate technology prevents malfunctions or destruction caused by electrostatic discharges, fast transients, or HF fields. Thanks to optimum sealing, the devices are resistant to environmental influences (IP 64).

### LEDS

For reliable operation the green LED (excess-gain indication) must light up. The yellow LED indicates the output state.

### CONNECTION

Devices with 2 m PVC cable 4 x 0.25 mm<sup>2</sup> or 4-pole S8 connector are standard. Other cable types or lengths are available on request.

### DOCUMENTATION

Detailed data sheets for these products can be found on the Contrinex website [www.contrinex.com](http://www.contrinex.com) or ordered free of charge from our distributors.

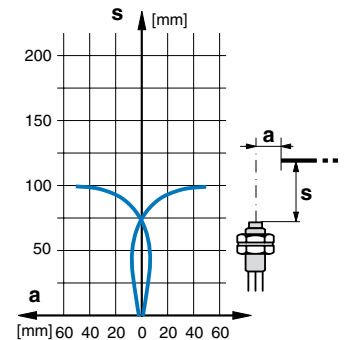
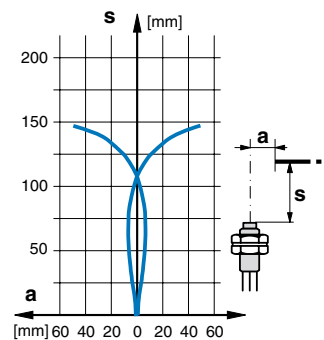
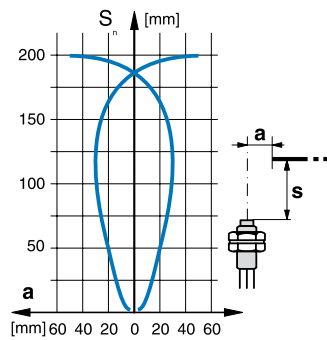
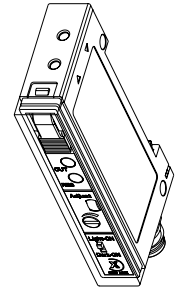
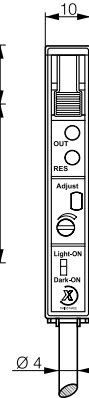
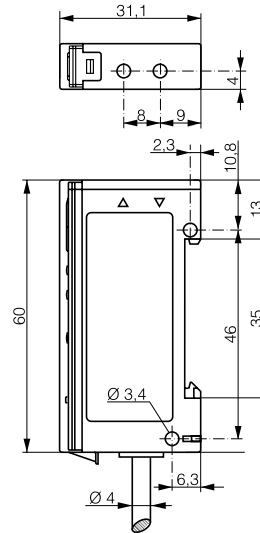
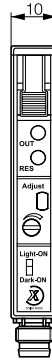
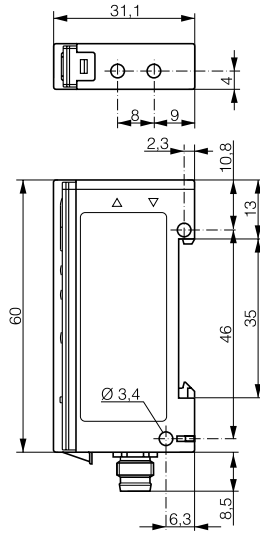
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SERIES 3060

200 mm

140 mm

100 mm



Response curve:

TYPE SPECIFIC DATA	
Operating distance	
Standard target	
No-load supply current (at U <sub>b</sub> =24V)	
Emitter	
Weight (cable / connector model)	

STANDARD	
Operating distance	200 mm (with LFP-1002-020)
Standard target	100 x 100 mm white
No-load supply current (at U <sub>b</sub> =24V)	15 mA (typical)
Emitter	LED red 680 nm
Weight (cable / connector model)	69 g / 18 g

HIGH FREQUENCY	
Operating distance	140 mm (with LFP-1002-020)
Standard target	100 x 100 mm white
No-load supply current (at U <sub>b</sub> =24V)	15 mA (typical)
Emitter	LED red 680 nm
Weight (cable / connector model)	69 g / 18 g

BLUE LIGHT	
Operating distance	100 mm (with LFP-1002-020)
Standard target	100 x 100 mm white
No-load supply current (at U <sub>b</sub> =24V)	15 mA (typical)
Emitter	LED blue 465 nm
Weight (cable / connector model)	69 g / 18 g

**PART REFERENCES**

Part ref.: ( <b>bold</b> : preferred types)
NPN potentiometer / cable
NPN potentiometer / conn. S8 4-pole
PNP potentiometer / cable
PNP potentiometer / conn. S8 4-pole
Wiring (page 23)

<b>LFK-3060-101</b>
<b>LFS-3060-101</b>
<b>LFK-3060-103</b>
<b>LFS-3060-103</b>
Diagram 2

<b>LFK-3260-101</b>
<b>LFS-3260-101</b>
<b>LFK-3260-103</b>
<b>LFS-3260-103</b>
Diagram 2

<b>LFK-3360-101</b>
<b>LFS-3360-101</b>
<b>LFK-3360-103</b>
<b>LFS-3360-103</b>
Diagram 2

## FIBER-OPTIC AMPLIFIERS WITH TEACH-IN

### MAIN FEATURES

- Fiber-optic amplifiers for DIN-rail mounting (DIN/EN 50022)
- Ideal for stacking, thanks to 10 mm housing width
- Excellent detection properties across a wide sensing range of 0...200 mm (red light) / 0... 100 mm (blue light) / 0... 140 mm (high switching frequency)
- No blind zone
- Distance setting by means of teach-in with additional manual fine adjustment
- Large setting range of 20 ... 200 mm (red light) / 20 ... 100 mm (blue light) / 20 ... 140 mm (high switching frequency)
- Regulated emitter light power
- Adjustable output switching delay and stretching
- Light-ON / dark-ON selectable
- Signal-strength and excess-gain indication by means of a bargraph
- Fibers (Ø 2.2 mm) connected by quick-locking
- Operating and display elements protected by transparent cover

### TECHNICAL DATA

Housing size	31 x 60 x 10 mm
Housing material	Glass-fiber reinforced PBTP / polybutylene-terephthalate (Crastin)
Supply voltage range $U_B$	10 ... 30 VDC
Max. ripple content	20 %
Output current	200 mA max.
Output voltage drop	2.0 V max. at 200 mA
Max. switching frequency	1,500 Hz / 5,000 Hz (high frequency)
Switching time ( $\uparrow$ and $\downarrow$ )	330 $\mu$ sec / 100 $\mu$ sec (high frequency)
Max. ambient light:	
halogen	5,000 Lux
sun	10,000 Lux
Ambient temperature range	-25 ... +55 °C
Degree of protection	IP 64
EMC protection:	
IEC 60947-5-2	5 kV
IEC 61000-4-2	Level 2
IEC 61000-4-3	Level 3
IEC 61000-4-4	Level 2

### PROTECTION

The switches are protected against overloads, short-circuits and all possible wire reversals. Furthermore, protection against overvoltages caused by inductive loads on the output and against voltage spikes on the power supply lines are built in. Appropriate technology prevents malfunctions or destruction caused by electrostatic discharges, fast transients, or HF fields. Thanks to optimum sealing, the devices are resistant to environmental influences (IP 64).

### LEDS

A yellow LED indicates the switching state. Signal-strength and excess-gain indication by means of a bargraph allow for optimum alignment of the optical fibers. The status LED shows the output state of the device during the teach process, and 8 green LEDs indicate the activated functions.

### CONNECTION

Devices with 2 m PVC cable 4 x 0.25 mm<sup>2</sup> or 4-pole S8 connector are standard. Other cable types or lengths are available on request.

### DOCUMENTATION

Detailed data sheets for these products can be found on the Contrinex website [www.contrinex.com](http://www.contrinex.com) or ordered free of charge from our distributors.

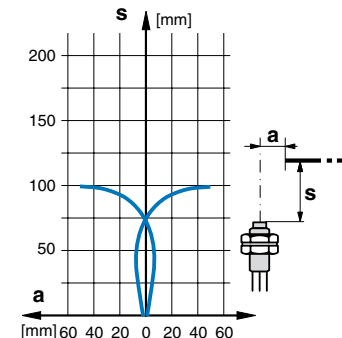
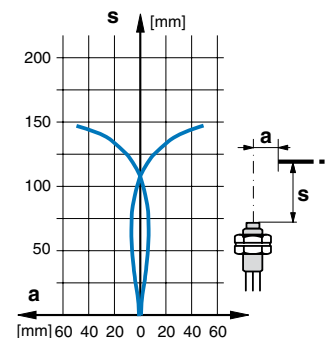
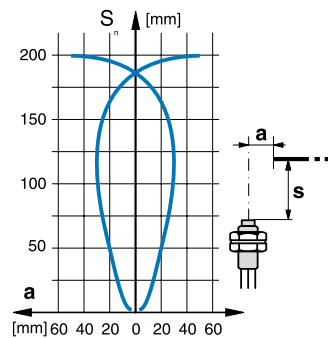
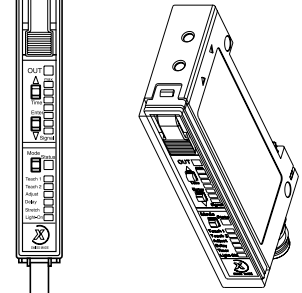
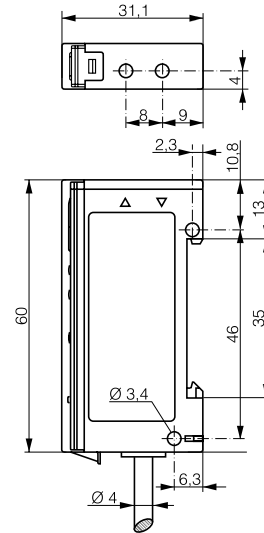
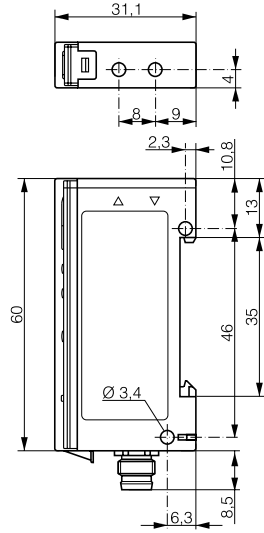
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SERIES 3065

200 mm

140 mm

100 mm



Response curve:

TYPE SPECIFIC DATA	
Operating distance	
Standard target	
No-load supply current (at $U_b=24V$ )	
Emitter	
Weight (cable / connector model)	

STANDARD	
Operating distance	200 mm (with LFP-1002-020)
Standard target	100 x 100 mm white
No-load supply current (at $U_b=24V$ )	25 mA (typical)
Emitter	LED red 680 nm
Weight (cable / connector model)	68 g / 17 g

HIGH FREQUENCY	
Operating distance	140 mm (with LFP-1002-020)
Standard target	100 x 100 mm white
No-load supply current (at $U_b=24V$ )	25 mA (typical)
Emitter	LED red 680 nm
Weight (cable / connector model)	68 g / 17 g

BLUE LIGHT	
Operating distance	100 mm (with LFP-1002-020)
Standard target	100 x 100 mm white
No-load supply current (at $U_b=24V$ )	25 mA (typical)
Emitter	LED blue 465 nm
Weight (cable / connector model)	68 g / 17 g

**PART REFERENCES**

Part ref.: ( <b>bold</b> : preferred types)
NPN teach-in / cable
NPN teach-in / connector S8 4-pole
PNP teach-in / cable
PNP teach-in / connector S8 4-pole
Wiring (page 23)

<b>LFK-3065-101</b>
<b>LFS-3065-101</b>
<b>LFK-3065-103</b>
<b>LFS-3065-103</b>
Diagram 3

<b>LFK-3265-101</b>
<b>LFS-3265-101</b>
<b>LFK-3265-103</b>
<b>LFS-3265-103</b>
Diagram 4

<b>LFK-3365-101</b>
<b>LFS-3365-101</b>
<b>LFK-3365-103</b>
<b>LFS-3365-103</b>
Diagram 3

## FIBER-OPTIC AMPLIFIERS WITH DIGITAL DISPLAY

### MAIN FEATURES

- Fiber-optic amplifiers for DIN-rail mounting (DIN/EN 50022)
- Ideal for stacking, thanks to 10 mm housing width
- Setting range of 20 ... 200 mm
- Distance setting by means of teach-in with additional manual fine adjustment
- Teach 1 (background), Teach 2 (target and background), or Dynamic Teach
- Signal-strength and threshold indication by means of a LC display
- Adjustable output switching delay and stretching
- High switching frequency up to 4 kHz
- Light-ON / dark-ON selectable
- IO-link (PNP version)
- Fibers (Ø 2.2 mm) connected by quick-locking
- Operating and display elements protected by transparent cover

### TECHNICAL DATA

Housing size	31 x 60 x 10 mm
Housing material	Glass-fiber reinforced PBTP / polybutylene-terephthalate (Crastin)
Supply voltage range $U_B$	10 ... 30 VDC
Max. ripple content	20 %
Output current	200 mA max.
Output voltage drop	2.0 V max. at 200 mA
Max. switching frequency	4,000 Hz
Switching time (↑ and ↓)	≥ 80 µsec
Max. ambient light:	
halogen	5,000 Lux
sun	10,000 Lux
Ambient temperature range	-5 ... +55 °C
Degree of protection	IP 64
EMC protection:	
IEC 60947-5-2 (7.2.3.1)	5 kV
IEC 61000-4-2	Level 2
IEC 61000-4-3	Level 3
IEC 61000-4-4	Level 2
IEC 61000-4-6	Level 2

### PROTECTION

The switches are protected against overloads, short-circuits and all possible wire reversals. Furthermore, protection against overvoltages caused by inductive loads on the output and against voltage spikes on the power supply lines are built in. Appropriate technology prevents malfunctions or destruction caused by electrostatic discharges, fast transients, or HF fields. Thanks to optimum sealing, the devices are resistant to environmental influences (IP 64).

### LED / LC DISPLAY

A yellow LED indicates the switching state. The 8-digit, 14 segment digital LCD indicates the signal strength as well as the switching threshold.

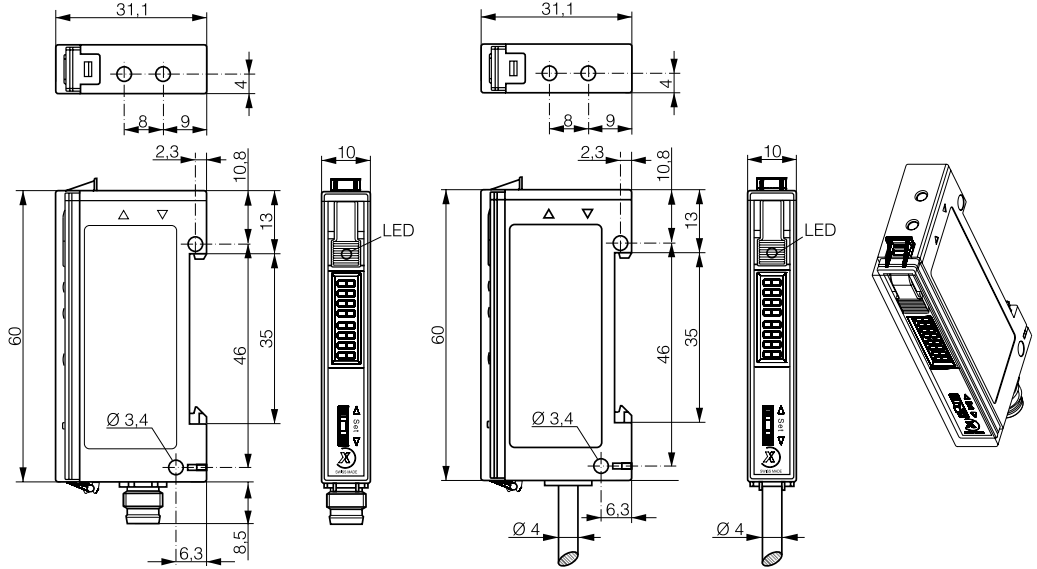
### CONNECTION

Devices with 2 m PVC cable 4 x 0.25 mm<sup>2</sup> or 4-pole S8 connector are standard. Other cable types or lengths are available on request.

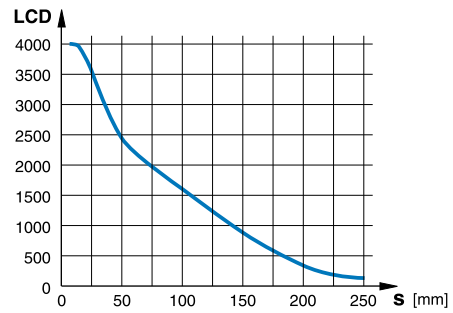
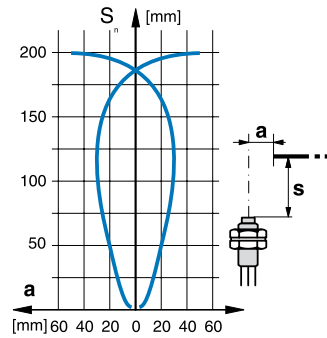
### DOCUMENTATION

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**IO-Link**



Response curve:

Display value as a function of the distance

TYPE SPECIFIC DATA	DIGITAL DISPLAY		
Operating distance	200 mm (with LFP-1002-020)		
Standard target	100 x 100 mm white		
No-load supply current (at $U_B=24V$ )	$\leq 30$ mA		
Emitter	LED red 680 nm		
Weight (cable / connector model)	68 g / 17 g		

**PART REFERENCES**

Part ref.: ( <b>bold</b> : preferred types)			
NPN teach-in / cable	<b>LFK-3066-101</b>		
NPN teach-in / connector S8 4-pole	<b>LFS-3066-101</b>		
PNP teach-in / cable	<b>LFK-3066-103</b>		
PNP teach-in & IO-link / cable	<b>LFK-3066-403*</b>		
PNP teach-in / S8 4-pole	<b>LFS-3066-103</b>		
PNP teach-in & IO-link / S8 4-pole	<b>LFS-3066-403*</b>		
Wiring (page 23)	Diagram 3		

\* Please check availability

## SYNTHETIC OPTICAL FIBERS

### MAIN FEATURES

- Very small dimensions
- Long operating distances
- Low bending radii
- Can be cut on site
- Wide range of types
- High degree of protection of the sensing head

### TECHNICAL DATA

Ambient temperature range	-25 ... +70 °C / -55 ... + 105 °C*
Protection degree of sensing head	IP 67 (IP 68 for LFP-1010-020)
Standard length	2 m ± 0.1 m (other lengths on request)
Fiber bending radii:	
miniature / multi-beam	15 mm
standard / coaxial	25 mm
low & high temperature resistant	25 mm
liquid level monitoring	25 mm
flexible / background suppression	2 mm
luminous	40 mm
Bending radius of light-outlet tube	25 mm
Tensile load	30 N max.
Fiber material	PMMA
Sleeve material	Polyethylene
Sensing head material	Stainless steel V2A / PBTP**
Sensing head light-outlet tube material	Stainless steel V2A
Optical attenuation:	
standard / luminous	0.2 dB / m max. at 660 nm
miniature	0.22 dB / m max. at 660 nm
flexible	0.4 dB / m max. at 660 nm
coaxial	0.42 dB / m max. at 660 nm
multi-beam	0.65 dB / m max. at 660 nm
Angle of incidence	See data sheets
Tightening torque:	
M3	1 Nm
M4	2 Nm
M5	3 Nm
M6	4 Nm
M8	10 Nm

\* LFP-1002-020-002 / LFP-2002-020-002

\*\* LFP-1108/1109/1011-020

### DOCUMENTATION

Detailed data sheets for these products can be found on the Contrinex website [www.contrinex.com](http://www.contrinex.com) or ordered free of charge from our distributors.

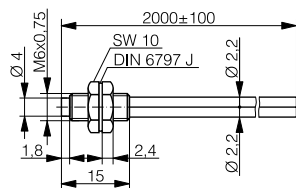
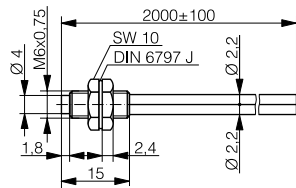
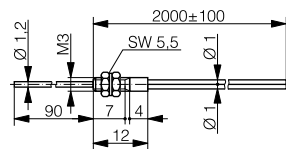
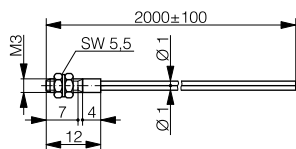
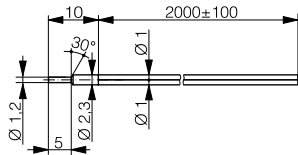
Technical drawings can be downloaded as files from the Contrinex website and directly imported into your construction drawings.

Individual fiber (10 m)	No sensing head	
<b>Part reference</b>	LFP-0004-100	
Operating distance	with series 3030	400 mm (2 m fiber, through-beam sensing)
	with series 3031	200 mm (2 m fiber, through-beam sensing)
	with series 3060/65/66	700 mm (2 m fiber, through-beam sensing)
Outside fiber	individual fiber, Ø 2.2 mm	
Inner fiber	Ø 1.0 mm	
Special characteristics	Long operating distance	

Double fiber (10 m)	No sensing head	
<b>Part reference</b>	LFP-0005-100	
Operating distance	with series 3030	120 mm (2 m fiber, diffuse sensing)
	with series 3031	60 mm (2 m fiber, diffuse sensing)
	with series 3060/65/66	200 mm (2 m fiber, diffuse sensing)
Outside fiber	separable double fiber, Ø 2.2 mm	
Inner fiber	Ø 1.0 mm	
Special characteristics	Long operating distance	

## SYNTHETIC OPTICAL FIBERS DIFFUSE SENSORS

Part reference (**bold**: preferred types)



Housing size: Ø 2,3 mm	Miniature	
<b>Part reference</b>	<b>LFP-1012-020</b>	
Operating distance	with series 3030	40 mm
	with series 3031	20 mm
	with series 3060/65/66	70 mm
Outside fiber	1 separable double fiber, Ø 1 mm	
Inner fiber	Ø 0.5 mm	
Special characteristics	Highest resolution	

Housing size: M3	Miniature	
<b>Part reference</b>	<b>LFP-1001-020</b>	
Operating distance	with series 3030	40 mm
	with series 3031	20 mm
	with series 3060/65/66	70 mm
Outside fiber	1 separable double fiber, Ø 1 mm	
Inner fiber	Ø 0.5 mm	
Special characteristics	Highest resolution	

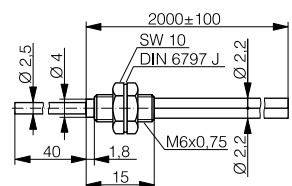
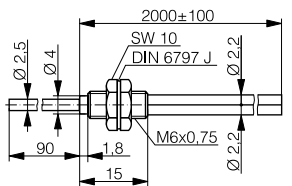
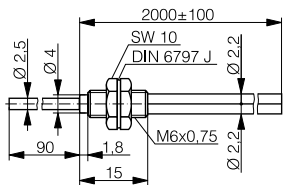
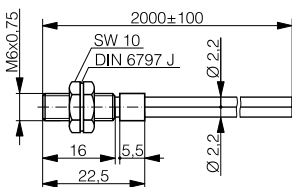
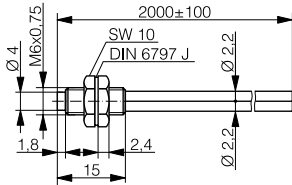
Housing size: M3	Miniature	
<b>Part reference</b>	<b>LFP-1004-020</b>	
Operating distance	with series 3030	40 mm
	with series 3031	20 mm
	with series 3060/65/66	70 mm
Outside fiber	1 separable double fiber, Ø 1 mm	
Inner fiber	Ø 0.5 mm	
Special characteristics	Sensing head with bendable light-outlet tube for ease of positioning Highest resolution	

Housing size: M6	Standard	
<b>Part reference</b>	<b>LFP-1002-020</b>	
Operating distance	with series 3030	120 mm
	with series 3031	60 mm
	with series 3060/65/66	200 mm
Outside fiber	1 separable double fiber, Ø 2.2 mm	
Inner fiber	Ø 1.0 mm	
Special characteristics	Long operating distance	

Housing size: M6	Flexible	
<b>Part reference</b>	<b>LFP-1102-020</b>	
Operating distance	with series 3030	90 mm
	with series 3031	45 mm
	with series 3060/65/66	150 mm
Outside fiber	1 separable double fiber, Ø 2.2 mm	
Inner fiber	151 x Ø 75 µm	
Special characteristics	Very small bending radius	

## SYNTHETIC OPTICAL FIBERS DIFFUSE SENSORS

Part reference (**bold:** preferred types)



Housing size: M6	Luminous
<b>Part reference</b>	LFP-1202-020
Operating distance	with series 3030 160 mm with series 3031 80 mm with series 3060/65/66 260 mm
Outside fiber	1 separable double fiber, Ø 2.2 mm
Inner fiber	Ø 1.5 mm
Special characteristics	Longest operating distance

Housing size: M6	Coaxial
<b>Part reference</b>	LFP-1003-020
Operating distance	with series 3030 120 mm with series 3031 60 mm with series 3060/65/66 200 mm
Outside fiber	1 separable double fiber, Ø 2.2 mm
Inner fiber	Ø 1.0 mm
Special characteristics	Coaxial arrangement of fibers, thus axially symmetric beam

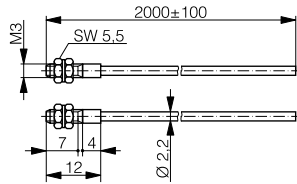
Housing size: M6	Standard
<b>Part reference</b>	<b>LFP-1005-020</b>
Operating distance	with series 3030 120 mm with series 3031 60 mm with series 3060/65/66 200 mm
Outside fiber	1 separable double fiber, Ø 2.2 mm
Inner fiber	Ø 1.0 mm
Special characteristics	Sensing head with bendable light-outlet tube for ease of positioning Long operating distance

Housing size: M6	Flexible
<b>Part reference</b>	LFP-1105-020
Operating distance	with series 3030 90 mm with series 3031 45 mm with series 3060/65/66 150 mm
Outside fiber	1 separable double fiber, Ø 2.2 mm
Inner fiber	151 x Ø 75 µm
Special characteristics	Sensing head with bendable light-outlet tube for ease of positioning Very small bending radius

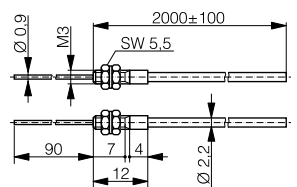
Housing size: M6	Standard
<b>Part reference</b>	<b>LFP-1013-020</b>
Operating distance	with series 3030 120 mm with series 3031 60 mm with series 3060/65/66 200 mm
Outside fiber	1 separable double fiber, Ø 2.2 mm
Inner fiber	Ø 1.0 mm
Special characteristics	Sensing head with bendable light-outlet tube for ease of positioning Long operating distance

## SYNTHETIC OPTICAL FIBERS THROUGH-BEAM SENSORS

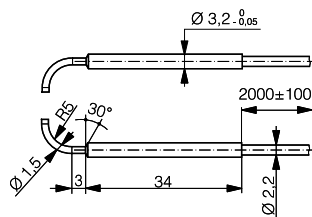
Part reference (**bold**: preferred types)



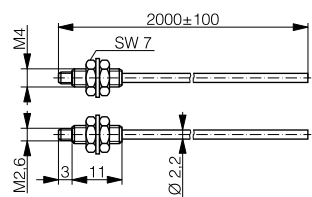
Housing size: M3	Miniature	
<b>Part reference</b>	<b>LFP-2001-020</b>	
Operating distance	with series 3030	120 mm
	with series 3031	60 mm
	with series 3060/65/66	200 mm
Outside fiber	2 individual fibers, Ø 2.2 mm	
Inner fiber	Ø 0.5 mm	
Special characteristics	Highest resolution	



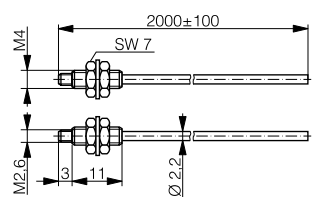
Housing size: M3	Miniature	
<b>Part reference</b>	<b>LFP-2003-020</b>	
Operating distance	with series 3030	120 mm
	with series 3031	60 mm
	with series 3060/65/66	200 mm
Outside fiber	2 individual fibers, Ø 2.2 mm	
Inner fiber	Ø 0.5 mm	
Special characteristics	Sensing head with bendable light-outlet tube for ease of positioning Highest resolution	



Housing size: Ø 3.2 mm	Standard 90°	
<b>Part reference</b>	<b>LFP-2006-020</b>	
Operating distance	with series 3030	120 mm
	with series 3031	60 mm
	with series 3060/65/66	200 mm
Outside fiber	2 individual fibers, Ø 2.2 mm	
Inner fiber	Ø 1.0 mm	
Special characteristics	Lateral sensing	



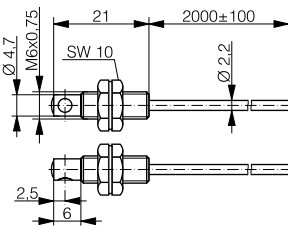
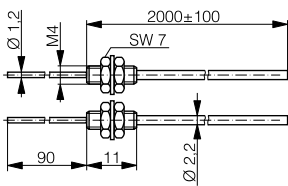
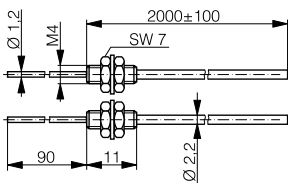
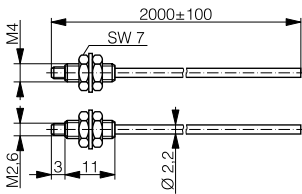
Housing size: M4	Standard	
<b>Part reference</b>	<b>LFP-2002-020</b>	
Operating distance	with series 3030	400 mm
	with series 3031	200 mm
	with series 3060/65/66	700 mm
Outside fiber	2 individual fibers, Ø 2.2 mm	
Inner fiber	Ø 1.0 mm	
Special characteristics	Long operating distance	



Housing size: M4	Flexible	
<b>Part reference</b>	<b>LFP-2102-020</b>	
Operating distance	with series 3030	300 mm
	with series 3031	150 mm
	with series 3060/65/66	550 mm
Outside fiber	2 individual fibers, Ø 2.2 mm	
Inner fiber	151 x Ø 75 µm	
Special characteristics	Very small bending radius	

## SYNTHETIC OPTICAL FIBERS THROUGH-BEAM SENSORS

Part reference (**bold:** preferred types)



Housing size: M4		Luminous	
<b>Part reference</b>	<b>LFP-2202-020</b>		
Operating distance	with series 3030	500 mm	
	with series 3031	250 mm	
	with series 3060/65/66	900 mm	
Outside fiber	2 individual fibers, Ø 2.2 mm		
Inner fiber	Ø 1.5 mm		
Special characteristics	Longest operating distance		

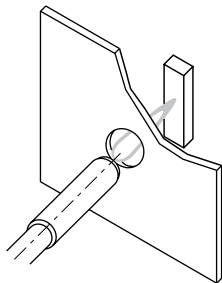
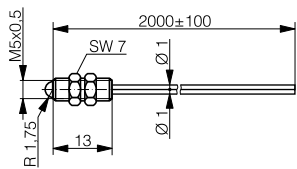
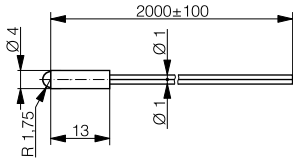
Housing size: M4		Standard	
<b>Part reference</b>	<b>LFP-2004-020</b>		
Operating distance	with series 3030	400 mm	
	with series 3031	200 mm	
	with series 3060/65/66	700 mm	
Outside fiber	2 individual fibers, Ø 2.2 mm		
Inner fiber	Ø 1.0 mm		
Special characteristics	Sensing head with bendable light-outlet tube for ease of positioning Long operating distance		

Housing size: M4		Flexible	
<b>Part reference</b>	<b>LFP-2104-020</b>		
Operating distance	with series 3030	300 mm	
	with series 3031	150 mm	
	with series 3060/65/66	500 mm	
Outside fiber	2 individual fibers, Ø 2.2 mm		
Inner fiber	151 x Ø 75 µm		
Special characteristics	Sensing head with bendable light-outlet tube for ease of positioning Very small bending radius		

Housing size: M6		Standard 90°	
<b>Part reference</b>	<b>LFP-2005-020</b>		
Operating distance	with series 3030	1100 mm	
	with series 3031	550 mm	
	with series 3060/65/66	1800 mm	
Outside fiber	2 individual fibers, Ø 2.2 mm		
Inner fiber	Ø 1.0 mm		
Special characteristics	Lateral sensing Long operating distance		

## APPLICATION-SPECIFIC FIBERS CYLINDRICAL LIGHT BEAM

Part reference (**bold**: preferred types)



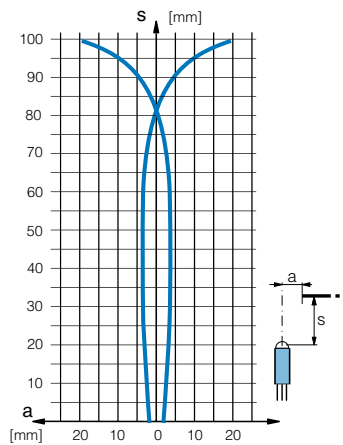
Detection through holes and gaps

## MAIN FEATURES

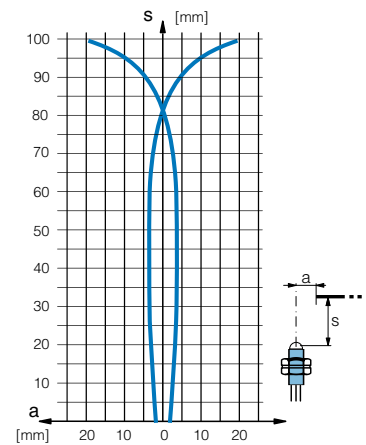
- Diffuse sensor particularly suitable for the detection of objects in recesses and behind covers (through holes and gaps)
- Extremely small sensing heads
- Quasi-cylindrical light beam
- Recessed mounting possible
- Sapphire optical parts, thus easy to clean

Housing size: $\varnothing$ 4 mm		Miniature / spherical optics	
<b>Part reference</b>		<b>LFP-1006-020</b>	
Operating distance	with series 3030	100 mm	
	with series 3031	60 mm	
	with series 3060/65/66	140 mm	
Outside fiber	1 separable double fiber, $\varnothing$ 1 mm		
Inner fiber	$\varnothing$ 0.5 mm		
Special characteristics	Spherical optics for cylindrical light beam		

Housing size: M5		Miniature / spherical optics	
<b>Part reference</b>		<b>LFP-1007-020</b>	
Operating distance	with series 3030	100 mm	
	with series 3031	60 mm	
	with series 3060/65/66	140 mm	
Outside fiber	1 separable double fiber, $\varnothing$ 1 mm		
Inner fiber	$\varnothing$ 0.5 mm		
Special characteristics	Spherical optics for cylindrical light beam		



LFP-1006-020

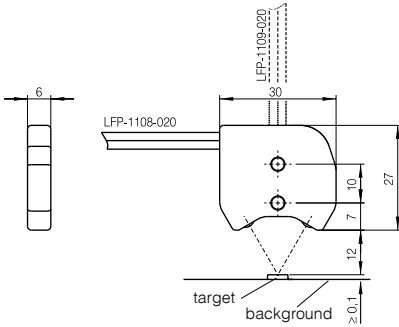


LFP-1007-020

Response curves

## APPLICATION-SPECIFIC FIBERS BACKGROUND SUPPRESSION

Part reference (**bold**: preferred types)



### MAIN FEATURES

- Diffuse sensor with background suppression
- Factory adjusted operating distance of 12 mm
- Fully potted optical parts
- Recognition of position and thickness differences of only 0.1 mm
- Suitable for rough environments, thanks to glass-fiber reinforced PBTP housing
- Scratch resistant, easy-to-clean glass lenses

Housing size: □ 27 x 30	Background suppression / flexible / 90°	
<b>Part reference</b>	LFP-1108-020	
Operating distance	Fixed	12 mm
Outside fiber	2 separate fibers, Ø 2.2 mm	
Inner fiber	151 x Ø 75 µm	
Special characteristics	Lateral sensing	
	Detectable height difference: 0.1 mm	
	Minimum detectable target size: 0.15 mm <sup>2</sup>	
	Minimum detectable wire diameter: 0.1 mm	

Housing size: □ 27 x 30	Background suppression / flexible	
<b>Part reference</b>	LFP-1109-020	
Operating distance	Fixed	12 mm
Outside fiber	2 separate fibers, Ø 2.2 mm	
Inner fiber	151 x Ø 75 µm	
Special characteristics	Lateral sensing	
	Detectable height difference: 0.1 mm	
	Minimum detectable target size: 0.15 mm <sup>2</sup>	
	Minimum detectable wire diameter: 0.1 mm	

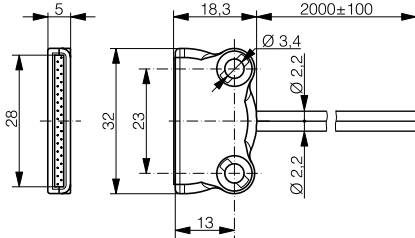


## APPLICATION-SPECIFIC FIBERS MULTI-BEAM

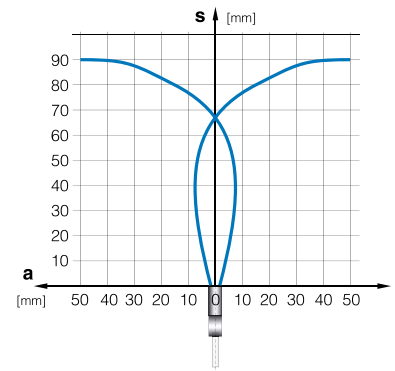
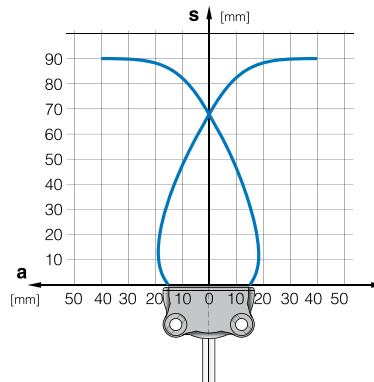
### MAIN FEATURES

- Multi-beam diffuse sensor
- Detection of objects across the whole width of the sensing head (28 mm)
- Suitable for rough environments, thanks to PBTP housing
- Lateral mounting

Part reference (**bold**: preferred types)



Housing size: <input type="checkbox"/> 18 x 32	Multi-beam
<b>Part reference</b>	<b>LFP-1011-020</b>
Operating distance	with series 3030 90 mm
	with series 3031 45 mm
	with series 3060/65/66 150 mm
Outside fiber	2 separate fibers, $\varnothing$ 2.2 mm
Inner fiber	16 x $\varnothing$ 0.265 mm
Special characteristics	Wide detection range



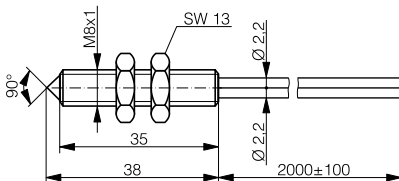
Response curve:

## APPLICATION-SPECIFIC FIBERS LIQUID LEVEL MONITORING

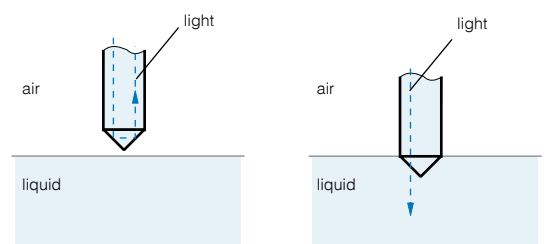
### MAIN FEATURES

- Contact liquid detection (with the exception of white milky liquids)
- Fully potted optical parts
- Scratch-resistant, easy-to-clean glass prism
- Impervious (degree of protection: IP 68)

Part reference (**bold**: preferred types)



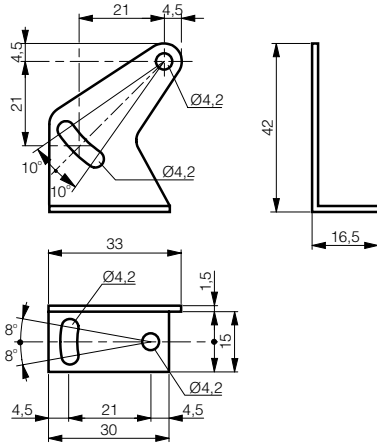
Housing size: M8	Liquid level monitoring
<b>Part reference</b>	<b>LFP-1010-020</b>
Outside fiber	2 separate fibers, $\varnothing$ 2.2 mm
Inner fiber	$\varnothing$ 0.5 mm
Special characteristics	Contact liquid detection



Operating principle:

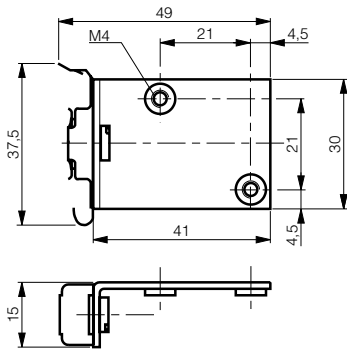


## ACCESSORIES FOR FIBER-OPTIC AMPLIFIERS



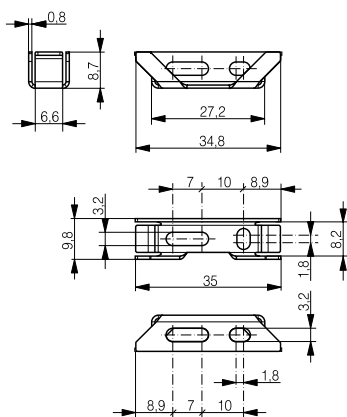
### Universal mounting bracket

<b>Part reference</b>	<b>LXW-3030-000</b>
Material	Stainless steel V2A
Can be used for	series 3030 and 3031 devices



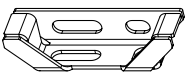
### DIN-rail mounting bracket

<b>Part reference</b>	<b>LXW-3030-001</b>
Material	Stainless steel V2A
Can be used for	series 3030 and 3031 devices



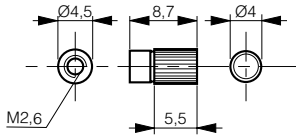
### Universal mounting bracket

<b>Part reference</b>	<b>LXW-3060-000</b>
Material	Stainless steel V2A
Can be used for	series 3060, 3065 and 3066 devices



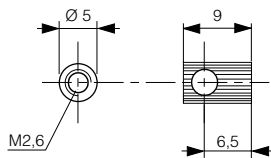
## ACCESSORIES FOR SYNTHETIC OPTICAL FIBERS

Part reference (**bold**: preferred types)



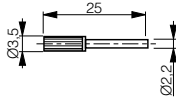
### Axial front lens

<b>Part reference</b>	<b>LFP-0001-000</b>	
Operating distance	with series 3030	3000 mm
	with series 3031	1500 mm
	with series 3060/65/66	5000 mm (5 m fibers)
Can be used with	LFP-2#02-020	
Special characteristics	1 pair	



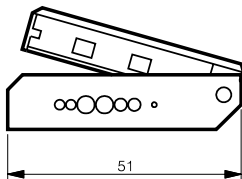
### 90° front lens

<b>Part reference</b>	<b>LFP-0002-000</b>	
Operating distance	with series 3030	1000 mm
	with series 3031	500 mm
	with series 3060/65/66	1700 mm
Can be used with	LFP-2#02-020	
Special characteristics	1 pair	



### Adaptor

<b>Part reference</b>	<b>LFP-0003-000</b>
Can be used with	fine synthetic optical fibers



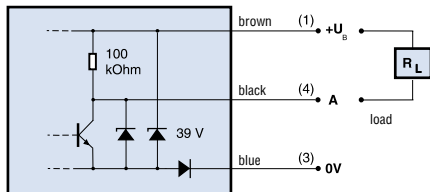
### Cutting tool

<b>Part reference</b>	<b>LXF-0000-000</b>
Can be used with	all synthetic optical fibers

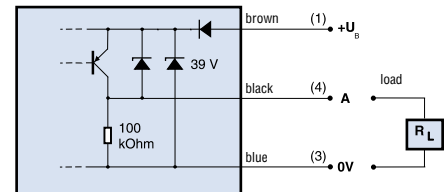
# WIRING DIAGRAMS FIBER-OPTIC AMPLIFIERS

NPN light-ON / dark-ON output

Diagram 1

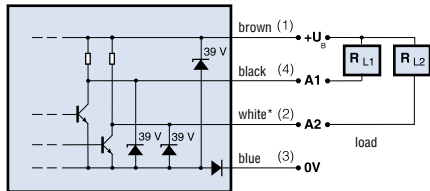


PNP light-ON / dark-ON output



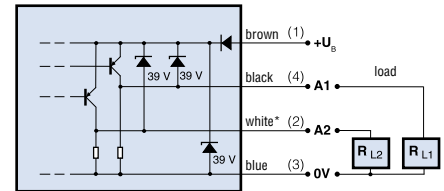
NPN changeover outputs  
NPN light-ON (/dark-ON) + excess-gain outputs

Diagram 2



\* pink for LFK-3#60-10#

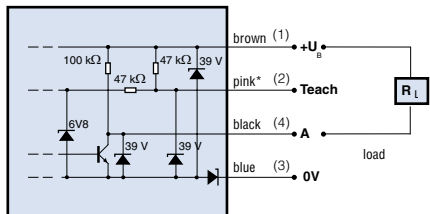
PNP changeover outputs  
PNP light-ON (/dark-ON) + excess-gain outputs



\* pink for LFK-3#60-10#

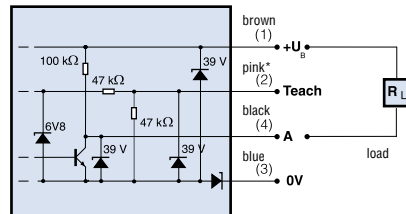
NPN light-ON/dark-ON output with teach-in

Diagram 3



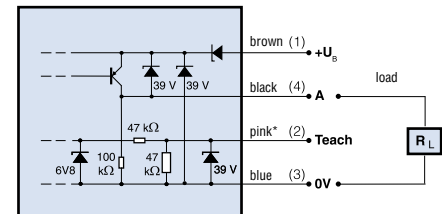
\* white for LFS-3#65-10#

NPN light-ON/dark-ON output with teach-in,  
series 3066



\* white for LFS-3066-10#

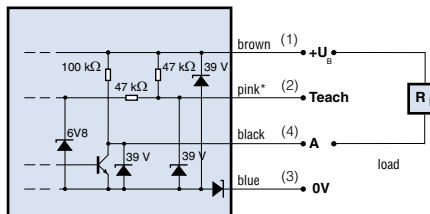
PNP light-ON/dark-ON output with teach-in



\* white for LFS-3#65-10# / LFS-3066-#0#

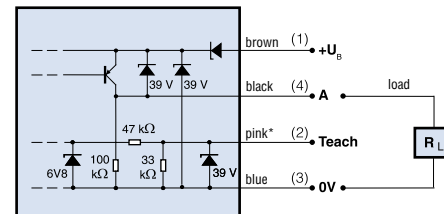
NPN light-ON/dark-ON output with teach-in

Diagram 4



\* white for LFS-3265-10#

PNP light-ON/dark-ON output with teach-in



\* white for LFS-3265-10#



# CONTRINEX

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