PRODUCT INFORMATION

FIBER-OPTIC SENSORS AND FIBERS

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Photoelectric sensors

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SYSTEMS

Proximity system

Through-beam system

DESIGN

Threaded sleeve

Flat design

Smooth sleeve

Long end sleeve

90° deflection

FIELDS OF APPLICATION

Area detection

LCDs/transparent objects/semiconductors

Heat-resistant

Robotics

Oil and chemical resistant

Flexible fibers

Liquid level

3 STEPS TO FINDING SUITABLE FIBERS

1. Icon overview

Select the design or application for the fibers. The applicable characteristics are highlighted in color in the selection table.

➜ Page A-6

2. Fiber categories

Select the fibers that are suitable for your application.

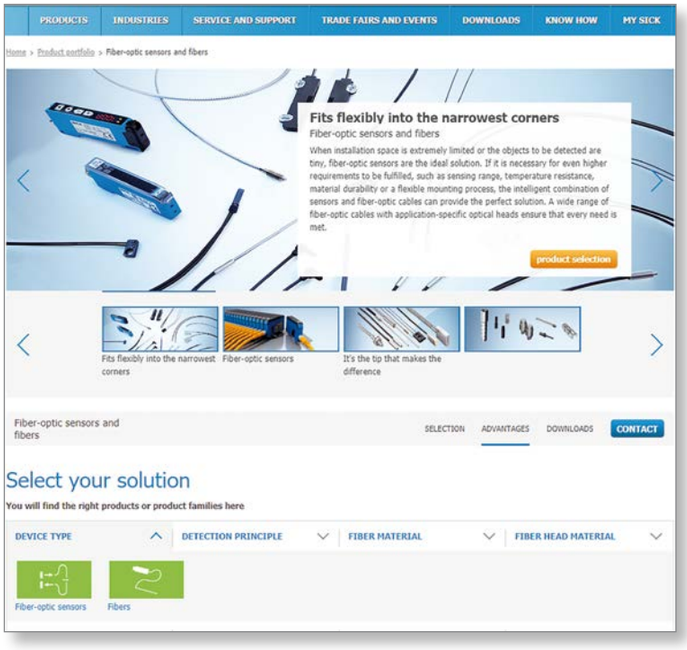
➜ Page B-16

3. Fiber-optic sensors

Select one of the amplifiers.

➜ Page D-86

➜ www.sick.com/lichtleiter



ADDITIONAL PRODUCT INFORMATION

You can find further technical data about fibers along with dimensional drawings and 3D CAD files in the product finder for fibers at www.sick.com.

A

SYSTEMS

Proximity system

- Sender and receiver fibers are enclosed together or combined in a single sensor head
- Recognition of measuring object by detecting the light beam reflected from the object
- Optical axis does not need to be adjusted
- Reflective or transparent measuring object can be detected
- Easy mounting
- Ideal for color and position markings

Through-beam system

- Sender and receiver fibers are mounted separately
- Detection of measuring object by moving the optical axis between sender and receiver
- Very large sensing ranges
- Accurate positioning
- Stable measuring position
- Optically opaque measuring object can be detected regardless of their shape, color, or material
- Strong light beam

DESIGN

Threaded sleeve

- Quick and easy mounting
- Models with hexagonal flange for trouble-free mounting with only one nut
- Optional tip adapter for a larger detection distance and detection of small objects

Smooth sleeve

- For installation in areas with limited space
- The smooth sleeve is simply secured with a setscrew

90° deflection

- Space-saving installation
- Axial cable outlet option available to avoid loops and possible cable damage

Flat design

- Easy mounting
- Flush mounting in a single slot
- Detection of objects in the background are minimized

Long end sleeve

- Sensor tip can be positioned close to the object
- Flexible end sleeves are available
- Fits in tight spaces

FIELDS OF APPLICATION

Area detection

- Detection of objects with different shapes
- Detection of moving and free-falling objects
- Leading edge detection

Heat-resistant

- Heat-resistant plastic and glass fibers
- Glass fibers with metallic sheath
- Suitable for high-temperature applications up to +350 °C

Oil and chemical resistant

- PTFE sheath
- Resistant to a wide range of chemicals and cleaning agents
- Suitable for the food and beverage industry

Liquid level

- Fibers for tube mounting and for immersion into liquids
- Models for immersion are made of PTFE and are suitable for the food industry
- Leakage detection
- Fibers for non-contact detection of liquids (in conjunction with a fiber-optic sensor with infrared sender LED)

LCDs/transparent objects/semiconductors

- Detection of glass lead frames
- Detection of solar wafers
- Indexing, e.g., in FOUP (Front Opening Unified Pod)

Robotics

- Ideal for repeated bending
- Presence detection in the gripper

Flexible fibers

- Easy installation around small corners
- 1 mm bend radius

A

Fiber-optic proximity systems

Type	Design	Application	Page
LL3-DB01	M6		→ B-18
LL3-DB01-10	M6		→ B-18
LL3-DB01-3	M6		→ B-19
LL3-DB01-30	M6		→ B-19
LL3-DB02	M3		→ B-45
LL3-DB03	M6		→ B-19
LL3-DB04	M6		→ B-19
LL3-DB05	M3		→ B-45
LL3-DB06	M3		→ B-46
LL3-DB07	M3		→ B-19
LL3-DB08	M3		→ B-46
LL3-DB09	M3		→ B-32
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LL3-DF05			→ B-61
LL3-DF07			→ B-61
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LL3-DH02	M6	100 °C	→ B-19, B-54
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LL3-DR08	M3		→ B-21, B-69
LL3-DR09			→ B-41, B-66, B-74
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LL3-DR11			→ B-27
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LL3-LM31300	M3		→ B-27
LL3-LM31450	M3		→ B-28
LL3-LM31750	M3		→ B-28
LL3-LM32750	M3		→ B-28, B-30, B-61, B-63
LL3-LM35150	M3		→ B-28
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LL3-LM361000	M3		→ B-33
LL3-LM361250	M3		→ B-33
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LL3-LM37450	M3		→ B-34
LL3-LM37750	M3		→ B-34

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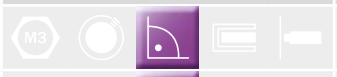
Type	Design	Application	Page
LL3-LM38750			→ B-34, B-35, B-61, B-63
LL3-LM38751			→ B-34, B-35, B-61, B-63
LL3-LM39750			→ B-34, B-35, B-62, B-63
LL3-LM401000			→ B-28
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Fiber-optic through-beam systems

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LL3-TR09			→ B-37, B-67, B-78
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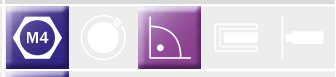
Type	Design	Application	Page
LL3-TV77			→ B-25, B-38, B-79
LL3-TW01			→ B-25, B-57, B-63
LL3-TW01-2			→ B-25, B-57, B-63
LL3-TX01			→ B-25
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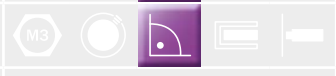
LL3-TY01			→ B-59
LL3-TY02			→ B-38, B-59
LL3-TY03			→ B-38, B-59
LL3-TY05			→ B-59
LL3-TZ05			→ B-52
LL3-TZ06			→ B-52
LL3-TZ09			→ B-52, B-79
LL3-TZ10			→ B-52

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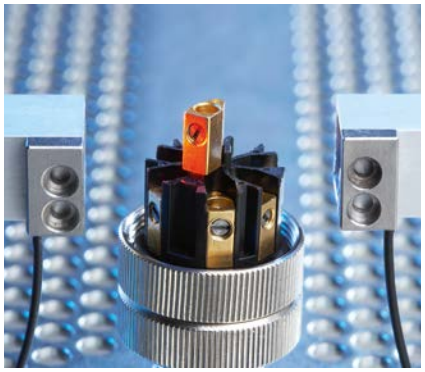
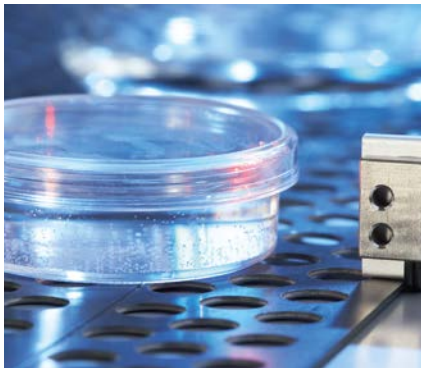
B

FIBERS





Fit flexibly into the narrowest corners

When installation space is extremely limited or the objects to be detected are tiny, fiber-optic sensors are the ideal solution. If it is necessary for even higher requirements to be fulfilled, such as sensing range, temperature resistance, material durability or a flexible mounting process, the intelligent combination of sensors and fibers can provide the perfect solution. A wide range of fibers with application-specific optical heads ensure that every need is met.

Your benefits

- Reliable and accurate detection of the smallest objects thanks to innovative, microcontroller-supported electronics
- EMC, high temperature tolerance and resistance to chemicals, as the evaluation electronics are mounted separately from the fiber-optic head
- Space-saving mounting even in confined spaces
- Multiple setting options provide solutions for practically any application
- Lightweight, suitable for use on a robot arm
- Universal application possibilities due to wide range of fibers

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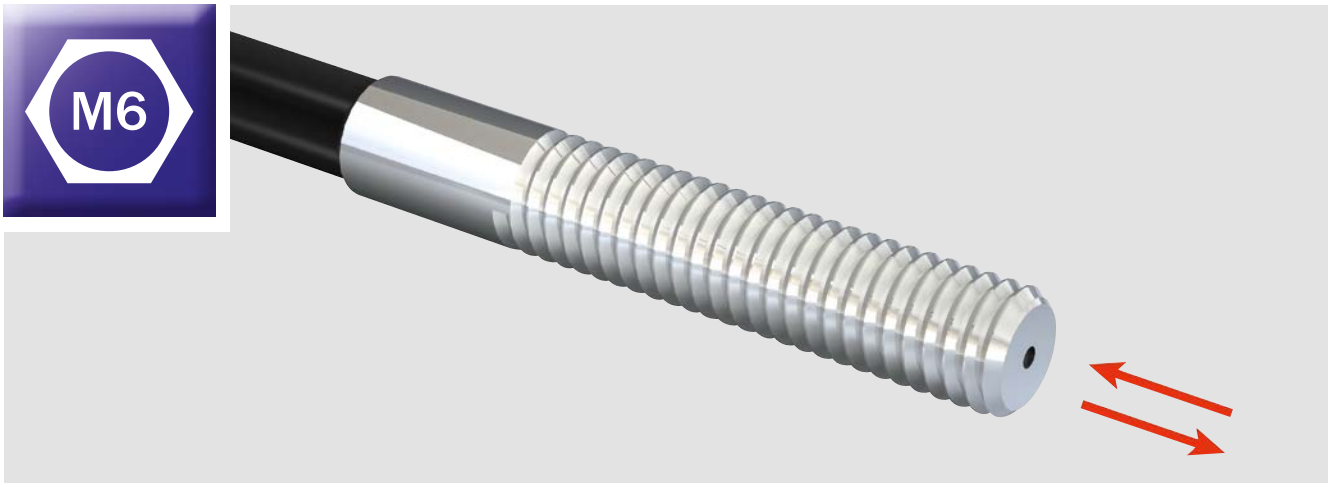
B



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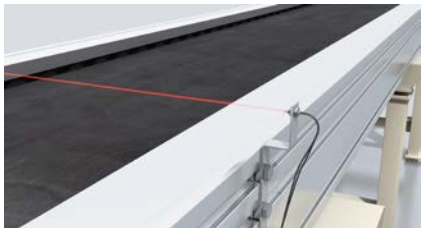

Axial outlet

Fibers with hexagon head for space-saving installation

Threaded sleeve

Fibers with thread are easy to mount, e.g., on a mounting bracket. An even greater sensing range can be achieved with a tip adapter, which can be optionally screwed on to some models.
The LL3-TV05/06/07 and LL3-DV05/06/07 90° models with hexagonal head, for example, are ideal for space-saving mounting. These are also available as highly-flexible and heat-resistant fibers.

Threaded sleeve, proximity system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.015 mm	25 mm	–40 °C ... +70 °C		160 [8]		90 [3]	LL3-DB01	5308074
						150 [9]		280 [4]		
						290 [10]		500 [5]		
					–	–		900 [6]		
					–	–		1,350 [7]	Dimensional drawing ➜ F-114	
	10 m [1]	0.015 mm	25 mm	–40 °C ... +70 °C		100 [8]		50 [3]	LL3-DB01-10	5308075
						70 [9]		140 [4]		
						150 [10]		250 [5]		
					–	–		500 [6]		
					–	–		750 [7]	Dimensional drawing ➜ F-114	

[1] FC fiber optic fiber cutter included in scope of delivery.
[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.
[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.
[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).
[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.
Fiber optic cables with lengths different to the products shown here are available on request.

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Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	3 m [1]	0.015 mm	25 mm	–40 °C ... +70 °C		120 [8]		90 [3]	LL3-DB01-3	5322552
						90 [9]		280 [4]		
						170 [10]		500 [5]		
					–	–		900 [6]		
					–	–		1,350 [7]	Dimensional drawing → F-114	
	30 m [1]	0.015 mm	25 mm	–40 °C ... +70 °C		5 [8]		35 [3]	LL3-DB01-30	5324662
						40 [9]		98 [4]		
						16 [10]		175 [5]		
					–	–		350 [6]		
					–	–		525 [7]	Dimensional drawing → F-114	
	2 m [1]	0.015 mm	25 mm	–40 °C ... +70 °C		160 [8]		90 [3]	LL3-DB03	5313021
						160 [9]		300 [4]		
						300 [10]		500 [5]		
					–	–		900 [6]		
					–	–		1,350 [7]	Dimensional drawing → F-114	
						170 [8]		90 [3]	LL3-DB04	5325990
						180 [9]		280 [4]		
						320 [10]		500 [5]		
					–	–		900 [6]		
					–	–		1,350 [7]	Dimensional drawing → F-115	
		0.02 mm	25 mm	–40 °C ... +60 °C		90 [8]		27 [3]	LL3-DB07	5325988
						50 [9]		88 [4]		
						120 [10]		165 [5]		
					–	–		330 [6]		
					–	–		350 [7]	Dimensional drawing → F-115	
		0.015 mm	35 mm	–40 °C ... +180 °C		150 [8]		120 [3]	LL3-DH01	5308091
						180 [9]		350 [4]		
						320 [10]		600 [5]		
					–	–		980 [6]		
					–	–		1,500 [7]	Dimensional drawing → F-119	
	3 m [1]	0.015 mm	35 mm	–40 °C ... +180 °C		210 [8]		100 [3]	LL3-DH01-03	5321260
						180 [9]		300 [4]		
						330 [10]		500 [5]		
					–	–		850 [6]		
					–	–		1,400 [7]	Dimensional drawing → F-119	
	2 m [1]	0.015 mm	25 mm	–40 °C ... +100 °C		90 [8]		70 [3]	LL3-DH02	5308092
						110 [9]		230 [4]		
						220 [10]		350 [5]		
					–	–		600 [6]		
					–	–		1,000 [7]	Dimensional drawing → F-119	
	1 m	0.02 mm	10 mm	–40 °C ... +60 °C		70 [8]		14 [3]	LL3-DJ01	5325989
						30 [9]		49 [4]		
						70 [10]		99 [5]		
					–	–		190 [6]		
					–	–		210 [7]	Dimensional drawing → F-121	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
 M6	1 m	0.02 mm	10 mm	–40 °C ... +70 °C		150 [8]		38 [3]	LL3-DJ02	5325992
						80 [9]		120 [4]		
						160 [10]		230 [5]		
					–	–		460 [6]		
					–	–		490 [7]	Dimensional drawing → F-121	
 M6	2 m [1]	0.015 mm	15 mm	–40 °C ... +70 °C		170 [8]		100 [3]	LL3-DK06	5313019
						180 [9]		300 [4]		
						310 [10]		500 [5]		
					–	–		900 [6]		
					–	–		1,400 [7]	Dimensional drawing → F-121	
 M3 Suitable for tip adapters	500 mm	0.015 mm	15 mm	–40 °C ... +70 °C		70 [8]		14 [3]	LL3-DK21	5313023
						20 [9]		45 [4]		
						40 [10]		75 [5]		
					–	–		135 [6]		
					–	–		200 [7]	Dimensional drawing → F-121	
 M4	2 m [1]	0.015 mm	2 mm	–40 °C ... +70 °C		120 [8]		90 [3]	LL3-DK66	5313024
						160 [9]		300 [4]		
						290 [10]		500 [5]		
					–	–		900 [6]		
					–	–		1,400 [7]	Dimensional drawing → F-122	
 M6						120 [8]		90 [3]	LL3-DK67	5313025
						160 [9]		300 [4]		
						290 [10]		500 [5]		
					–	–		900 [6]		
					–	–		1,400 [7]	Dimensional drawing → F-122	
 M4	2 m [1]		25 mm	–40 °C ... +70 °C		170 [8]		75 [3]	LL3-DM01	5308071
						130 [9]		255 [4]		
						240 [10]		420 [5]		
					–	–		800 [6]		
					–	–		1,300 [7]	Dimensional drawing → F-122	
 M4 Suitable for tip adapters			15 mm	–40 °C ... +70 °C		70 [8]		40 [3]	LL3-DM02	5308077
						60 [9]		130 [4]		
						110 [10]		200 [5]		
					–	–		350 [6]		
					–	–		600 [7]	Dimensional drawing → F-122	
 M6			4 mm	–40 °C ... +70 °C		140 [8]		90 [3]	LL3-DR01	5308078
						140 [9]		280 [4]		
						260 [10]		450 [5]		
					–	–		880 [6]		
					–	–		1,350 [7]	Dimensional drawing → F-123	
 M3	1 m [1]	0.015 mm	4 mm	–40 °C ... +70 °C		30 [8]		18 [3]	LL3-DR02	5308079
						20 [9]		50 [4]		
						40 [10]		90 [5]		
					–	–		200 [6]		
					–	–		370 [7]	Dimensional drawing → F-123	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.015 mm	4 mm	−40 °C ... +70 °C		40 [8]		18 [3]	LL3-DR06	5308082
						30 [9]		60 [4]		
						60 [10]		100 [5]		
					–	–		220 [6]		
					–	–		360 [7]	Dimensional drawing ➜ F-123	
		0.02 mm	4 mm	−40 °C ... +70 °C		30 [8]		8 [3]	LL3-DR08	5326037
						10 [9]		25 [4]		
						30 [10]		46 [5]		
					–	–		90 [6]		
					–	–		98 [7]	Dimensional drawing ➜ F-124	
		0.015 mm	15 mm	−40 °C ... +70 °C		60 [8]		18 [3]	LL3-DS06	5308073
						50 [9]		55 [4]		
						90 [10]		95 [5]		
					–	–		190 [6]		
					–	–		360 [7]	Dimensional drawing ➜ F-124	
 Suitable for tip adapters						70 [8]		40 [3]	LL3-DT01	5308076
						60 [9]		130 [4]		
						110 [10]		200 [5]		
					–	–		350 [6]		
					–	–		600 [7]	Dimensional drawing ➜ F-125	
 Suitable for tip adapters	5 m [1]	0.015 mm	15 mm	−40 °C ... +70 °C		60 [8]		30 [3]	LL3-DT01-05	5309087
						50 [9]		100 [4]		
						90 [10]		150 [5]		
					–	–		300 [6]		
					–	–		500 [7]	Dimensional drawing ➜ F-125	
	2 m [1]	0.015 mm	25 mm	−40 °C ... +70 °C		50 [8]		25 [3]	LL3-DV05	5322549
						60 [9]		110 [4]		
						100 [10]		185 [5]		
					–	–		400 [6]		
					–	–		650 [7]	Dimensional drawing ➜ F-126	
				−40 °C ... +105 °C		50 [8]		30 [3]	LL3-DV06	5322550
						70 [9]		130 [4]		
						120 [10]		210 [5]		
					–	–		450 [6]		
					–	–		800 [7]	Dimensional drawing ➜ F-126	
			2 mm	−40 °C ... +70 °C		60 [8]		20 [3]	LL3-DV07	5322551
						60 [9]		110 [4]		
						100 [10]		180 [5]		
					–	–		400 [6]		
					–	–		650 [7]	Dimensional drawing ➜ F-126	
	1 m	0.02 mm	25 mm	−40 °C ... +210 °C		142 [8]		20 [3]	LL3-DW01 [11]	5315234
						206 [9]		50 [4]		
						323 [10]		95 [5]		
					–	–		150 [6]		
					–	–		400 [7]	Dimensional drawing ➜ F-126	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

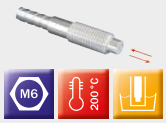
[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m	0.02 mm	25 mm	–40 °C ... +210 °C		153 [8]		20 [3]	LL3-DW01-2 [11]	5324789
						230 [9]		50 [4]		
						352 [10]		95 [5]		
					–	–		150 [6]		
					–	–		400 [7]	Dimensional drawing ➜ F-127	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

B

Threaded sleeve, through-beam system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
 Suitable for tip adapters	2 m [1]	0.5 mm	30 mm	–40 °C ... +70 °C		830 [8]		300 [3]	LL3-TB01	5308050
						770 [9]		950 [4]		
						1,220 [10]		1,700 [5]		
					–	–		3,500 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-135	
 Suitable for tip adapters	10 m [1]	0.5 mm	30 mm	–40 °C ... +70 °C		490 [8]		230 [3]	LL3-TB01-10	5308051
						550 [9]		650 [4]		
						880 [10]		1,200 [5]		
					–	–		2,450 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-135	
 Suitable for tip adapters	30 m [1]	0.5 mm	30 mm	–40 °C ... +70 °C		5 [8]		160 [3]	LL3-TB01-30	5315499
						40 [9]		450 [4]		
						16 [10]		840 [5]		
					–	–		1,700 [6]		
					–	–		2,800 [7]	Dimensional drawing ➜ F-135	
 Suitable for tip adapters	2 m [1]	0.2 mm	25 mm	–40 °C ... +70 °C		610 [8]		225 [3]	LL3-TB02	5308048
						550 [9]		650 [4]		
						890 [10]		1,200 [5]		
					–	–		2,500 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-136	
 Suitable for tip adapters				–40 °C ... +100 °C		410 [8]		55 [3]	LL3-TH01	5308064
						340 [9]		180 [4]		
						580 [10]		320 [5]		
					–	–		680 [6]		
					–	–		1,000 [7]	Dimensional drawing ➜ F-138	
		0.5 mm	35 mm	–40 °C ... +180 °C		460 [8]		230 [3]	LL3-TH02	5308065
						460 [9]		700 [4]		
						780 [10]		1,300 [5]		
					–	–		2,700 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-138	
	1 m	0.05 mm	10 mm	–40 °C ... +60 °C		540 [8]		145 [3]	LL3-TJ01	5325915
						450 [9]		460 [4]		
						710 [10]		830 [5]		
					–	–		1,600 [6]		
					–	–		1,770 [7]	Dimensional drawing ➜ F-140	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
 Suitable for tip adapters	2 m [1]	0.2 mm	2 mm	–40 °C ... +70 °C		420 [8]		220 [3]	LL3-TK77	5313035
						450 [9]		650 [4]		
						760 [10]		1,200 [5]		
					–	–		2,750 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-140	
			25 mm	–40 °C ... +70 °C		550 [8]		220 [3]	LL3-TM01	5308068
						550 [9]		680 [4]		
						890 [10]		1,200 [5]		
					–	–		2,500 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-140	
		0.1 mm	15 mm	–40 °C ... +70 °C		150 [8]		55 [3]	LL3-TM02	5308069
						140 [9]		175 [4]		
						230 [10]		300 [5]		
					–	–		700 [6]		
					–	–		1,100 [7]	Dimensional drawing → F-140	
 Suitable for tip adapters		0.3 mm	4 mm	–40 °C ... +70 °C		470 [8]		200 [3]	LL3-TR01	5308052
						380 [9]		600 [4]		
						680 [10]		1,000 [5]		
					–	–		2,400 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-141	
	5 m [1]	0.3 mm	4 mm	–40 °C ... +70 °C		250 [8]		160 [3]	LL3-TR01-05	5322198
						400 [9]		450 [4]		
						600 [10]		800 [5]		
					–	–		1,900 [6]		
					–	–		2,800 [7]	Dimensional drawing → F-141	
	2 m [1]	0.1 mm	4 mm	–40 °C ... +70 °C		130 [8]		60 [3]	LL3-TR02	5308053
						100 [9]		175 [4]		
						180 [10]		330 [5]		
					–	–		750 [6]		
					–	–		1,100 [7]	Dimensional drawing → F-141	
		0.4 mm	25 mm	–40 °C ... +70 °C		640 [8]		350 [3]	LL3-TV05	5322546
						620 [9]		750 [4]		
						1,410 [10]		1,800 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-144	
				–40 °C ... +105 °C		560 [8]		180 [3]	LL3-TV06	5322547
						460 [9]		550 [4]		
						680 [10]		900 [5]		
					–	–		2,100 [6]		
					–	–		3,500 [7]	Dimensional drawing → F-144	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.4 mm	2 mm	–40 °C ... +70 °C		460 [8]		340 [3]	LL3-TV07	5322548
						840 [9]		1,000 [4]		
						1,290 [10]		1,800 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-144	
						200 [8]		340 [3]	LL3-TV77	5326557
						640 [9]		1,000 [4]		
						1,068 [10]		1,800 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-145	
	1 m	0.4 mm	25 mm	–40 °C ... +210 °C		556 [8]		80 [3]	LL3-TW01 [11]	5315233
						866 [9]		230 [4]		
						1,435 [10]		350 [5]		
					–	–		560 [6]		
					–	–		980 [7]	Dimensional drawing ➜ F-145	
	2 m	0.4 mm	25 mm	–40 °C ... +210 °C		534 [8]		80 [3]	LL3-TW01-2 [11]	5321306
						821 [9]		230 [4]		
						1,393 [10]		350 [5]		
					–	–		560 [6]		
					–	–		980 [7]	Dimensional drawing ➜ F-145	
	20 m [1]	0.5 mm	25 mm	–40 °C ... +60 °C		2,700 [8]		1,000 [3]	LL3-TX01	5324173
						6,890 [9]		3,700 [4]		
						10,810 [10]		7,000 [5]		
					–	–		14,000 [6]		
					–	–		20,000 [7]	Dimensional drawing ➜ F-145	
						2,700 [8]		2,000 [3]	LL3-TX02	5325046
						6,890 [9]		7,500 [4]		
						10,810 [10]		13,500 [5]		
					–	–		27,000 [6]		
					–	–		40,000 [7]	Dimensional drawing ➜ F-145	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

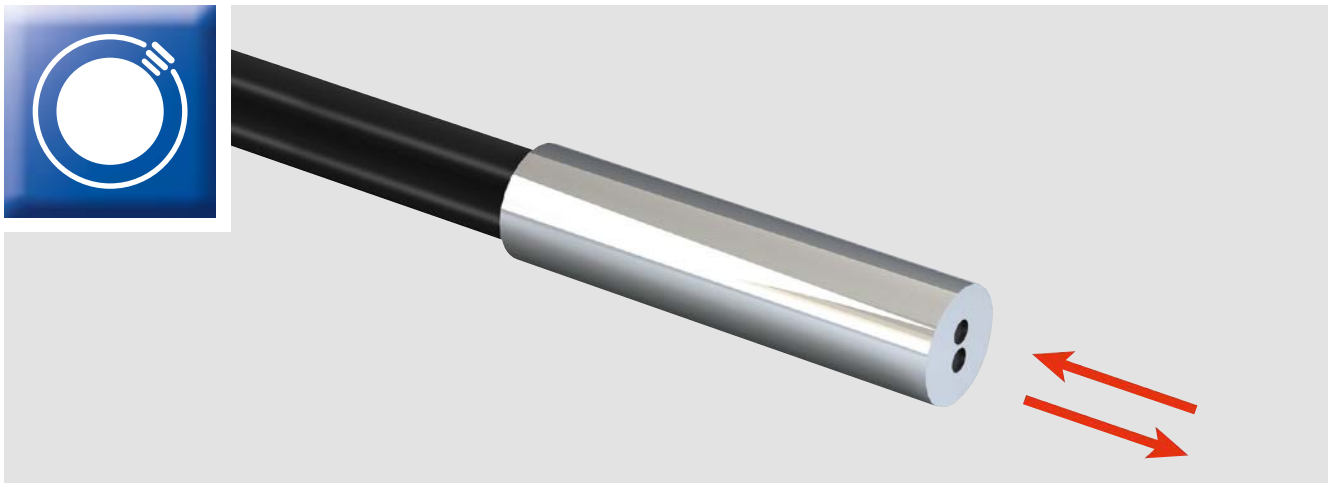
[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

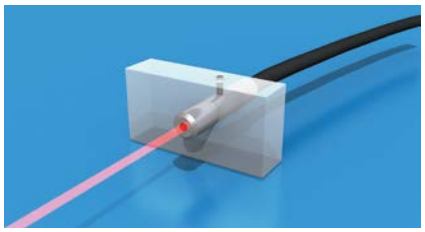
[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

B





Easy to mount with setscrew

Smooth sleeve

Cylindrical fibers are ideal for space-saving mounting. This is carried out by simply securing it with a setscrew.

Smooth sleeve, proximity system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.02 mm	25 mm	–40 °C ... +70 °C		240 [8]		70 [3]	LL3-DB10	5325999
						140 [9]		220 [4]		
						260 [10]		360 [5]		
					–	–		720 [6]		
					–	–		770 [7]	Dimensional drawing ➜ F-116	
		0.015 mm	25 mm	–40 °C ... +70 °C		170 [8]		100 [3]	LL3-DK04	5313020
						180 [9]		300 [4]		
						310 [10]		500 [5]		
					–	–		900 [6]		
					–	–		1,400 [7]	Dimensional drawing ➜ F-121	
			2 mm	–40 °C ... +70 °C		120 [8]		65 [3]	LL3-DK4Z	5313026
						160 [9]		200 [4]		
						290 [10]		350 [5]		
					–	–		650 [6]		
					–	–		1,000 [7]	Dimensional drawing ➜ F-122	

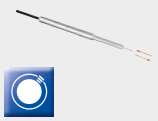
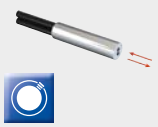
[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	1 m	0.02 mm	10 mm	–40 °C ... +60 °C		4 [8]	–	–	LL3-DP01	5325998
						2 [9]		3 [4]		
						11 [10]		14 [5]		
					–	–		29 [6]		
					–	–		31 [7]	Dimensional drawing ➜ F-123	
	2 m [1]	0.015 mm	4 mm	–40 °C ... +70 °C		40 [8]		30 [3]	LL3-DR03	5308080
						40 [9]		85 [4]		
						80 [10]		140 [5]		
					–	–		300 [6]		
					–	–		600 [7]	Dimensional drawing ➜ F-123	
	1 m	0.015 mm	4 mm	–40 °C ... +70 °C		20 [7]		20 [3]	LL3-DR04	5308081
						30 [8]		70 [4]		
						60 [9]		110 [5]		
					–	–		220 [6]		
					–	–		360 [7]	Dimensional drawing ➜ F-123	
	500 mm	0.015 mm	4 mm	–40 °C ... +70 °C		10 [8]		10 [3]	LL3-DR05	5308087
						10 [9]		30 [4]		
						30 [10]		60 [5]		
					–	–		140 [6]		
					–	–		225 [7]	Dimensional drawing ➜ F-123	
	2 m [1]	0.02 mm	2 mm	–40 °C ... +60 °C		90 [8]		22 [3]	LL3-DR11	5326000
						40 [9]		74 [4]		
						100 [10]		140 [5]		
					–	–		280 [6]		
					–	–		300 [7]	Dimensional drawing ➜ F-124	
			1 mm	–40 °C ... +60 °C		10 [8]		4 [3]	LL3-DR12	5326001
						0 [9]		13 [4]		
						20 [10]		27 [5]		
					–	–		55 [6]		
					–	–		59 [7]	Dimensional drawing ➜ F-124	
		0.015 mm	15 mm	–40 °C ... +70 °C		60 [8]		18 [3]	LL3-DT03	5308072
						50 [9]		55 [4]		
						90 [10]		95 [5]		
					–	–		190 [6]		
					–	–		360 [7]	Dimensional drawing ➜ F-125	
	150 mm	0.5 mm	20 mm	–10 °C ... +60 °C		105 [8]		60 [3]	LL3-LM31150	2073483
						185 [9]		170 [4]		
						279 [10]		270 [5]		
					–	–		370 [6]		
					–	–		400 [7]	Dimensional drawing ➜ F-128	
	300 mm	0.5 mm	20 mm	–10 °C ... +60 °C		95 [8]		50 [3]	LL3-LM31300	2079212
						174 [9]		140 [4]		
						261 [10]		210 [5]		
					–	–		310 [6]		
					–	–		340 [7]	Dimensional drawing ➜ F-128	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	450 mm	0.5 mm	20 mm	–10 °C ... +60 °C		93 [8]		50 [3]	LL3-LM31450	2073484
						168 [9]		140 [4]		
						254 [10]		240 [5]		
					–	–		300 [6]		
					–	–		310 [7]	Dimensional drawing → F-128	
	750 mm	0.5 mm	20 mm	–10 °C ... +60 °C		82 [8]		50 [3]	LL3-LM31750	2073485
						153 [9]		140 [4]		
						236 [10]		240 [5]		
					–	–		220 [6]		
					–	–		220 [7]	Dimensional drawing → F-128	
	1.5 m	0.5 mm	20 mm	–10 °C ... +60 °C		125 [8]		50 [3]	LL3-LM311500	2073486
						217 [9]		140 [4]		
						332 [10]		240 [5]		
					–	–		220 [6]		
					–	–		220 [7]	Dimensional drawing → F-128	
	750 mm	0.5 mm	20 mm	–10 °C ... +60 °C		285 [8]		170 [3]	LL3-LM32750	2073500
						485 [9]		520 [4]		
						811 [10]		580 [5]		
					–	–		580 [6]		
					–	–		580 [7]	Dimensional drawing → F-128	
	150 mm	0.5 mm	20 mm	–10 °C ... +60 °C		175 [8]		60 [3]	LL3-LM35150	2073488
						104 [9]		160 [4]		
						182 [10]		190 [5]		
					–	–		200 [6]		
					–	–		200 [7]	Dimensional drawing → F-129	
	450 mm	0.5 mm	20 mm	–10 °C ... +60 °C		105 [8]		50 [3]	LL3-LM35450	2073489
						54 [9]		160 [4]		
						96 [10]		190 [5]		
					–	–		200 [6]		
					–	–		200 [7]	Dimensional drawing → F-129	
	750 mm	0.5 mm	20 mm	–10 °C ... +60 °C		49 [8]		50 [3]	LL3-LM35750	2073490
						31 [9]		90 [4]		
						58 [10]		100 [5]		
					–	–		100 [6]		
					–	–		100 [7]	Dimensional drawing → F-129	
	1 m	0.5 mm	20 mm	–10 °C ... +60 °C		12 [8]		40 [3]	LL3-LM401000	2082375
						16 [9]		40 [4]		
						20 [10]	–	–		
					–	–	–	–		
					–	–	–	–	Dimensional drawing → F-131	
	450 mm	0.5 mm	20 mm	–10 °C ... +60 °C		93 [8]		50 [3]	LL3-LT31450	2077269
						165 [9]		140 [4]		
						254 [10]		240 [5]		
					–	–		300 [6]		
					–	–		310 [7]	Dimensional drawing → F-131	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

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Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	750 mm	0.5 mm	20 mm	–10 °C ... +60 °C		86 [8]		50 [3]	LL3-LT31750	2074450
						164 [9]		140 [4]		
						270 [10]		240 [5]		
					–	–		220 [6]		
					–	–		220 [7]	Dimensional drawing ➜ F-131	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

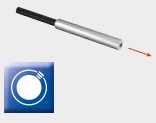
[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Smooth sleeve, through-beam system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	450 mm	0.5 mm	20 mm	–10 °C ... +60 °C		305 [8]		200 [3]	LL3-LM32450	2073499
						623 [9]		550 [4]		
						640 [10]		580 [5]		
					–	–		580 [6]		
					–	–		580 [7]	Dimensional drawing → F-133	
	750 mm	0.5 mm	20 mm	–10 °C ... +60 °C		285 [8]		170 [3]	LL3-LM32750	2073500
						485 [9]		520 [4]		
						811 [10]		580 [5]		
					–	–		580 [6]		
					–	–		580 [7]	Dimensional drawing → F-133	
	2.2 m	0.5 mm	20 mm	–10 °C ... +60 °C		90 [8]		50 [3]	LL3-LT312200	2073487
						157 [9]		140 [4]		
						248 [10]		200 [5]		
					–	–		220 [6]		
					–	–		220 [7]	Dimensional drawing → F-131	
	2 m [1]	0.03 mm	25 mm	–40 °C ... +70 °C		670 [8]		180 [3]	LL3-TB07	5325919
						530 [9]		540 [4]		
						760 [10]		890 [5]		
					–	–		1,700 [6]		
					–	–		1,900 [7]	Dimensional drawing → F-136	
		0.02 mm	1 mm	–40 °C ... +60 °C		40 [8]		13 [3]	LL3-TG05	5325921
						30 [9]		50 [4]		
						60 [10]		85 [5]		
					–	–		170 [6]		
					–	–		180 [7]	Dimensional drawing → F-137	
	1 m [1]	1 mm	10 mm	–40 °C ... +105 °C		20 [8]		6 [3]	LL3-TH06	5325926
						10 [9]		19 [4]		
						20 [10]		38 [5]		
					–	–		74 [6]		
					–	–		130 [7]	Dimensional drawing → F-138	
	2 m [1]	0.2 mm	2 mm	–40 °C ... +70 °C		540 [8]		220 [3]	LL3-TK05	5313034
						450 [9]		650 [4]		
						760 [10]		1,200 [5]		
					–	–		2,750 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-140	
		0.1 mm	15 mm	–40 °C ... +70 °C		150 [8]		55 [3]	LL3-TM03	5308070
						140 [9]		175 [4]		
						230 [10]		300 [5]		
					–	–		700 [6]		
					–	–		1,100 [7]	Dimensional drawing → F-140	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	1 m [1]	0.1 mm	4 mm	–40 °C ... +70 °C		140 [8]		60 [3]	LL3-TR03	5308054
						150 [9]		175 [4]		
						240 [10]		330 [5]		
					–	–		750 [6]		
					–	–		1,100 [7]	Dimensional drawing ➜ F-141	
	2 m [1]	0.1 mm	4 mm	–40 °C ... +70 °C		140 [8]		60 [3]	LL3-TR03-2	5308055
						150 [9]		175 [4]		
						240 [10]		330 [5]		
					–	–		750 [6]		
					–	–		1,100 [7]	Dimensional drawing ➜ F-141	
	500 mm	0.02 mm	4 mm	–40 °C ... +60 °C		40 [8]		5 [3]	LL3-TR04	5325918
						20 [9]		17 [4]		
						50 [10]		28 [5]		
					–	–		56 [6]		
					–	–		60 [7]	Dimensional drawing ➜ F-141	
	2 m [1]	0.02 mm	1 mm	–40 °C ... +60 °C		1,070 [8]		380 [3]	LL3-TR10	5325920
						1,200 [9]		1,220 [4]		
						1,750 [10]		2,000 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-142	
		0.5 mm	30 mm	–40 °C ... +70 °C		830 [8]		275 [3]	LL3-TS07	5308049
						820 [9]		1,000 [4]		
						1,330 [10]		1,800 [5]		
					–	–		3,500 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-143	
		0.05 mm	25 mm	–40 °C ... +60 °C		1,690 [8]		590 [3]	LL3-TV08	5325922
						1,760 [9]		1,790 [4]		
						2,060 [10]		2,400 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-145	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

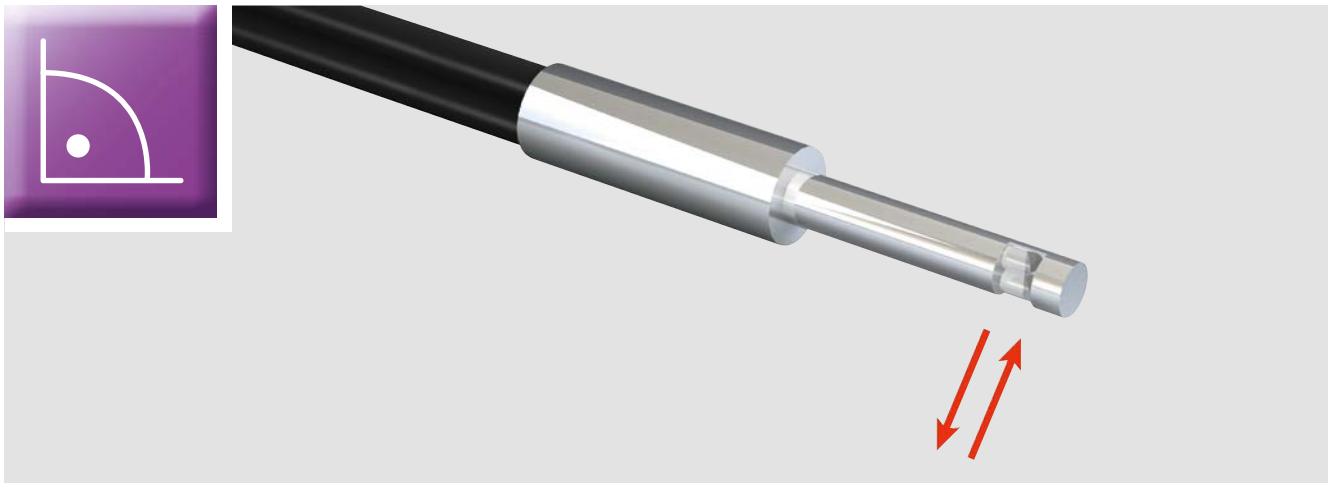
[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

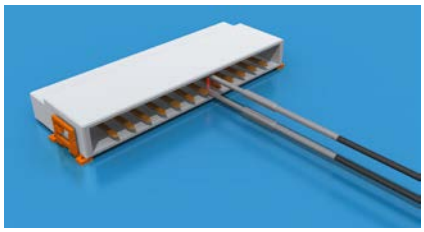
Fiber optic cables with lengths different to the products shown here are available on request.

B

B



Fibers with hexagon head for space-saving installation



The fiber-optic tip can be brought very close to the object

90° deflection

Fibers with integrated 90° deflection are the ideal solution for small installation depths and tight installation spaces. The fiber-optic cable can be installed close to the machine body to save space.

90° deflection, proximity system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.02 mm	25 mm	–40 °C ... +70 °C		170 [8]		47 [3]	LL3-DB09	5325991
						110 [9]		165 [4]		
						200 [10]		285 [5]		
					–	–		575 [6]		
					–	–		610 [7]	Dimensional drawing ➜ F-115	
		0.025 mm	25 mm	–40 °C ... +70 °C		100 [8]		35 [3]	LL3-DK33	5313031
						80 [9]		135 [4]		
						170 [10]		170 [5]		
					–	–		290 [6]		
					–	–		320 [7]	Dimensional drawing ➜ F-121	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

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Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1] 	0.02 mm	1 mm	–40 °C ... +60 °C		10 [8]		4 [3]	LL3-DR12	5326001
					–	–		13 [4]		
						20 [10]		27 [5]		
					–	–		55 [6]		
					–	–		59 [7]	Dimensional drawing → F-124	
		0.025 mm	25 mm	–40 °C ... +70 °C		150 [8]		40 [3]	LL3-DV01	5308088
						200 [9]		135 [4]		
						300 [10]		180 [5]		
					–	–		270 [6]		
					–	–		330 [7]	Dimensional drawing → F-126	
		0.015 mm	15 mm	–40 °C ... +70 °C		20 [8]		10 [3]	LL3-DV02	5308089
						20 [9]		35 [4]		
						40 [10]		70 [5]		
					–	–		125 [6]		
					–	–		290 [7]	Dimensional drawing → F-126	
		0.025 mm	25 mm	–40 °C ... +70 °C		100 [8]		35 [3]	LL3-DV03	5308090
						80 [9]		135 [4]		
						170 [10]		170 [5]		
					–	–		290 [6]		
					–	–		320 [7]	Dimensional drawing → F-126	
		0.015 mm	25 mm	–40 °C ... +70 °C		50 [8]		25 [3]	LL3-DV05	5322549
						60 [9]		110 [4]		
						100 [10]		185 [5]		
					–	–		400 [6]		
					–	–		650 [7]	Dimensional drawing → F-126	
				–40 °C ... +105 °C		50 [8]		30 [3]	LL3-DV06	5322550
						70 [9]		130 [4]		
						120 [10]		210 [5]		
					–	–		450 [6]		
					–	–		800 [7]	Dimensional drawing → F-126	
			2 mm	–40 °C ... +70 °C		60 [8]		20 [3]	LL3-DV07	5322551
						60 [9]		110 [4]		
						100 [10]		180 [5]		
					–	–		400 [6]		
					–	–		650 [7]	Dimensional drawing → F-126	
	1 m	0.5 mm	20 mm	–10 °C ... +60 °C		95 [8]		40 [3]	LL3-LM361000	2073494
						195 [9]		130 [4]		
						329 [10]		160 [5]		
					–	–		180 [6]		
					–	–		190 [7]	Dimensional drawing → F-129	
	1.25 m	0.5 mm	20 mm	–10 °C ... +60 °C		125 [8]		40 [3]	LL3-LM361250	2073495
						252 [9]		130 [4]		
						482 [10]		160 [5]		
					–	–		180 [6]		
					–	–		190 [7]	Dimensional drawing → F-129	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	150 mm	0.5 mm	20 mm	–10 °C ... +60 °C		97 [8]		50 [3]	LL3-LM36150	2073491
						132 [9]		160 [4]		
						229 [10]		210 [5]		
					–	–		240 [6]		
					–	–		260 [7]	Dimensional drawing → F-129	
	450 mm	0.5 mm	20 mm	–10 °C ... +60 °C		70 [8]		50 [3]	LL3-LM36450	2073492
						171 [9]		160 [4]		
						325 [10]		210 [5]		
					–	–		230 [6]		
					–	–		260 [7]	Dimensional drawing → F-130	
	750 mm	0.5 mm	20 mm	–10 °C ... +60 °C		100 [8]		40 [3]	LL3-LM36750	2073493
						140 [9]		150 [4]		
						260 [10]		160 [5]		
					–	–		180 [6]		
					–	–		190 [7]	Dimensional drawing → F-130	
	150 mm	0.5 mm	20 mm	–10 °C ... +60 °C		108 [8]		50 [3]	LL3-LM37150	2073496
						212 [9]		160 [4]		
						290 [10]		240 [5]		
					–	–		320 [6]		
					–	–		340 [7]	Dimensional drawing → F-130	
	450 mm	0.5 mm	20 mm	–10 °C ... +60 °C		84 [8]		50 [3]	LL3-LM37450	2073497
						177 [9]		160 [4]		
						250 [10]		230 [5]		
					–	–		290 [6]		
					–	–		310 [7]	Dimensional drawing → F-130	
	750 mm	0.5 mm	20 mm	–10 °C ... +60 °C		115 [8]		50 [3]	LL3-LM37750	2073498
						123 [9]		160 [4]		
						229 [10]		220 [5]		
					–	–		240 [6]		
					–	–		270 [7]	Dimensional drawing → F-130	
						325 [8]		100 [3]	LL3-LM38750	2073503
						592 [9]		330 [4]		
						992 [10]		650 [5]		
					–	–		1,300 [6]		
					–	–		1,350 [7]	Dimensional drawing → F-130	
						465 [8]		230 [3]	LL3-LM38751	2073504
						780 [9]		690 [4]		
						1,321 [10]		1,320 [5]		
					–	–		1,350 [6]		
					–	–		1,350 [7]	Dimensional drawing → F-131	
						270 [8]		130 [3]	LL3-LM39750	2073506
						441 [9]		390 [4]		
						742 [10]		740 [5]		
					–	–		1,350 [6]		
					–	–		1,350 [7]	Dimensional drawing → F-131	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

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90° deflection, through-beam system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	150 mm	0.5 mm	20 mm	–10 °C ... +60 °C		190 [8]		140 [3]	LL3-LM38150	2073501
						190 [9]		200 [4]		
						190 [10]		200 [5]		
					–	–		200 [6]		
					–	–		200 [7]	Dimensional drawing ➜ F-133	
	450 mm	0.5 mm	20 mm	–10 °C ... +60 °C		270 [8]		140 [3]	LL3-LM38450	2073502
						462 [9]		490 [4]		
						764 [10]		750 [5]		
					–	–		750 [6]		
					–	–		750 [7]	Dimensional drawing ➜ F-134	
	750 mm	0.5 mm	20 mm	–10 °C ... +60 °C		325 [8]		100 [3]	LL3-LM38750	2073503
						592 [9]		330 [4]		
						992 [10]		650 [5]		
					–	–		1,300 [6]		
					–	–		1,350 [7]	Dimensional drawing ➜ F-134	
						465 [8]		230 [3]	LL3-LM38751	2073504
						780 [9]		690 [4]		
						1,321 [10]		1,320 [5]		
					–	–		1,350 [6]		
					–	–		1,350 [7]	Dimensional drawing ➜ F-134	
	450 mm	0.5 mm	20 mm	–10 °C ... +60 °C		318 [8]		130 [3]	LL3-LM39450	2073505
						531 [9]		390 [4]		
						774 [10]		740 [5]		
					–	–		750 [6]		
					–	–		750 [7]	Dimensional drawing ➜ F-134	
	750 mm	0.5 mm	20 mm	–10 °C ... +60 °C		270 [8]		130 [3]	LL3-LM39750	2073506
						441 [9]		390 [4]		
						742 [10]		740 [5]		
					–	–		1,350 [6]		
					–	–		1,350 [7]	Dimensional drawing ➜ F-135	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

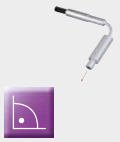
[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.05 mm	25 mm	–40 °C ... +70 °C		590 [8]		150 [3]	LL3-TB06	5325916
						460 [9]		480 [4]		
						660 [10]		770 [5]		
					–	–		1,500 [6]		
					–	–		1,600 [7]	Dimensional drawing → F-136	
		0.06 mm	1 mm	–40 °C ... +55 °C		1,730 [8]		580 [3]	LL3-TG02	5325943
						1,650 [9]		1,670 [4]		
						2,060 [10]		2,400 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-137	
		0.02 mm	1 mm	–40 °C ... +60 °C		40 [8]		13 [3]	LL3-TG05	5325921
						30 [9]		50 [4]		
						60 [10]		85 [5]		
					–	–		170 [6]		
					–	–		180 [7]	Dimensional drawing → F-137	
	1 m [1]	1 mm	10 mm	–40 °C ... +105 °C		20 [8]		6 [3]	LL3-TH06	5325926
						10 [9]		19 [4]		
						20 [10]		38 [5]		
					–	–		74 [6]		
					–	–		130 [7]	Dimensional drawing → F-138	
	2 m	0.1 mm	50 mm	–60 °C ... +200 °C		60 [8]		18 [3]	LL3-TH07	5325977
						50 [9]		30 [4]		
						90 [10]		120 [5]		
					–	–		220 [6]		
					–	–		420 [7]	Dimensional drawing → F-138	
	2 m [1]	0.16 mm	25 mm	–60 °C ... +200 °C		270 [8]		90 [3]	LL3-TH15	5325975
						290 [9]		290 [4]		
						410 [10]		480 [5]		
					–	–		970 [6]		
					–	–		1,000 [7]	Dimensional drawing → F-139	
						270 [8]		90 [3]	LL3-TH16	5325976
						290 [9]		290 [4]		
						410 [10]		480 [5]		
					–	–		970 [6]		
					–	–		1,000 [7]	Dimensional drawing → F-140	
		0.2 mm	25 mm	–40 °C ... +100 °C		590 [8]		180 [3]	LL3-TK16	5313038
						530 [9]		600 [4]		
						790 [10]		1,100 [5]		
					–	–		2,500 [6]		
					–	–		3,300 [7]	Dimensional drawing → F-140	

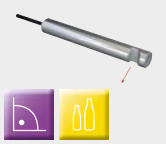
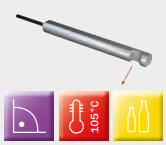
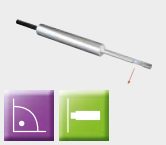
[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1] 	0.06 mm	1 mm	–40 °C ... +60 °C		560 [8]		160 [3]	LL3-TR08	5325984
						470 [9]		480 [4]		
						690 [10]		800 [5]		
					–	–		1,600 [6]		
					–	–		1,700 [7]		Dimensional drawing ➜ F-142
		0.04 mm	1 mm	–40 °C ... +60 °C		1,490 [8]		360 [3]	LL3-TR09	5325985
						1,220 [9]		1,200 [4]		
						1,970 [10]		2,200 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]		Dimensional drawing ➜ F-142
		0.2 mm	25 mm	–40 °C ... +70 °C		410 [8]		170 [3]	LL3-TS08	5308061
						410 [9]		500 [4]		
						710 [10]		1,000 [5]		
					–	–		2,300 [6]		
					–	–		3,000 [7]		Dimensional drawing ➜ F-143
		0.5 mm	25 mm	–40 °C ... +70 °C		350 [8]		170 [3]	LL3-TS12	5308062
						350 [9]		550 [4]		
						350 [10]		1,000 [5]		
					–	–		2,300 [6]		
					–	–		3,000 [7]		Dimensional drawing ➜ F-143
		–	25 mm	–40 °C ... +70 °C		1,470 [8]		390 [3]	LL3-TS22	5325944
						1,130 [9]		1,300 [4]		
						1,980 [10]		2,600 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]		Dimensional drawing ➜ F-144
			10 mm	–40 °C ... +105 °C		1,190 [8]		220 [3]	LL3-TS22M	5325968
						1,040 [9]		760 [4]		
						1,740 [10]		1,500 [5]		
					–	–		2,900 [6]		
					–	–		4,000 [7]		Dimensional drawing ➜ F-144
		0.2 mm	25 mm	–40 °C ... +70 °C		270 [8]		120 [3]	LL3-TV01	5308058
						250 [9]		400 [4]		
						440 [10]		800 [5]		
					–	–		1,800 [6]		
					–	–		2,750 [7]		Dimensional drawing ➜ F-144
		0.1 mm	15 mm	–40 °C ... +70 °C		110 [8]		30 [3]	LL3-TV02	5308059
						90 [9]		130 [4]		
						170 [10]		250 [5]		
					–	–		550 [6]		
					–	–		800 [7]		Dimensional drawing ➜ F-144
						80 [8]		30 [3]	LL3-TV04	5308060
						110 [9]		130 [4]		
						170 [10]		250 [5]		
					–	–		550 [6]		
					–	–		800 [7]		Dimensional drawing ➜ F-144

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1] 	0.4 mm	25 mm	–40 °C ... +70 °C		640 [8]		350 [3]	LL3-TV05	5322546
						620 [9]		750 [4]		
						1,410 [10]		1,800 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-144	
				–40 °C ... +105 °C		560 [8]		180 [3]	LL3-TV06	5322547
						460 [9]		550 [4]		
						680 [10]		900 [5]		
					–	–		2,100 [6]		
					–	–		3,500 [7]	Dimensional drawing → F-144	
			2 mm	–40 °C ... +70 °C		460 [8]		340 [3]	LL3-TV07	5322548
						840 [9]		1,000 [4]		
						1,290 [10]		1,800 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-144	
		0.05 mm	25 mm	–40 °C ... +60 °C		1,690 [8]		590 [3]	LL3-TV08	5325922
						1,760 [9]		1,790 [4]		
						2,060 [10]		2,400 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-145	
		0.4 mm	2 mm	–40 °C ... +70 °C		200 [8]		340 [3]	LL3-TV77	5326557
						640 [9]		1,000 [4]		
						1,068 [10]		1,800 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-145	
	2 m	0.3 mm	60 mm	–40 °C ... +70 °C		730 [8]		300 [3]	LL3-TY02	5308067
						800 [9]		1,000 [4]		
						940 [10]		1,300 [5]		
					–	–		3,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-146	
	3 m [1] 	0.3 mm	20 mm	–55 °C ... +70 °C		1,290 [8]		460 [3]	LL3-TY03	5325982
						1,210 [9]		1,400 [4]		
						2,120 [10]		2,500 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-146	

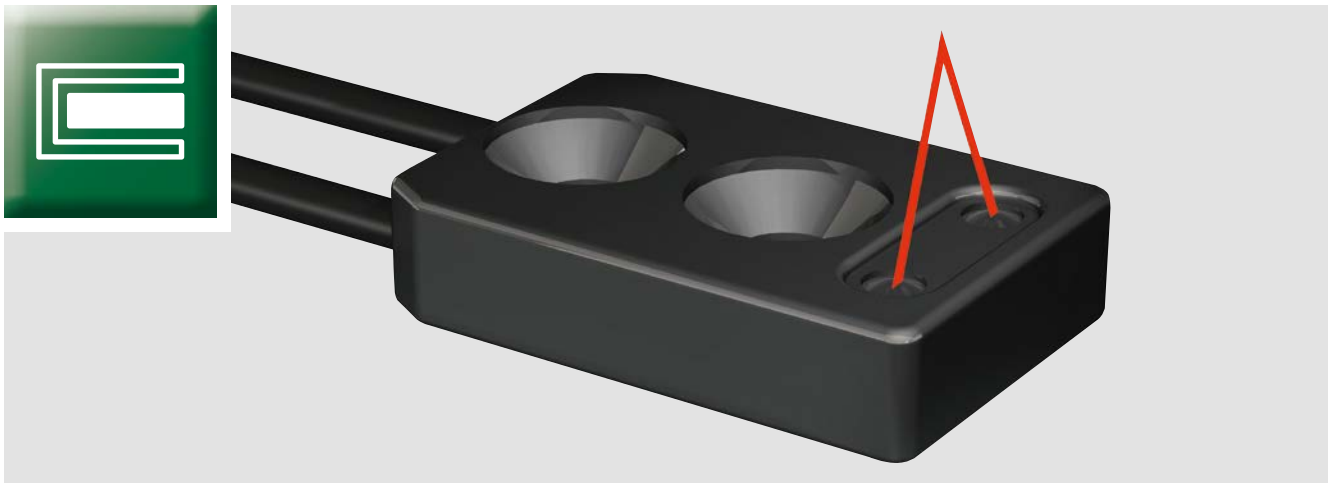
[1] FC fiber optic fiber cutter included in scope of delivery.

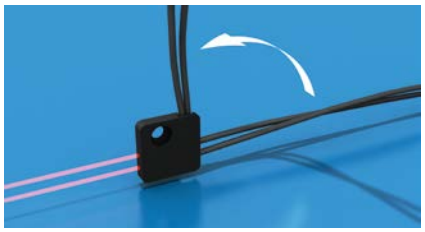
[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

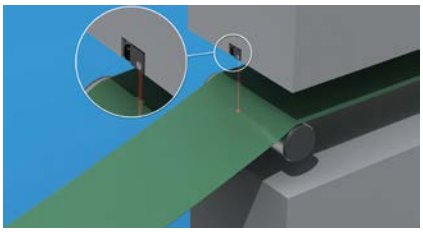
Fiber optic cables with lengths different to the products shown here are available on request.





The adjustable fiber-optic cable allows the same model to be used with the light emission pointing upward or to the side

Flush installation in the side frames

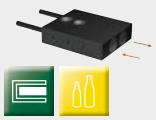


Detection of sheets

Flat design

The rectangular, flat fibers are easy to mount. The fiber-optic cable of the LL3-xE02 and LL3-xE04 models can be adjusted so that the light emission points upward or to the side. This reduces the number of models that need to be stored in the warehouse.

Flat design, proximity system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	4 m [1]	0.3 mm	25 mm	–40 °C ... +60 °C		48 [8]		60 [3]	LL3-DC03	5326020
						48 [9]		75 [4]		
						64 [10]		85 [5]		
					–	–		150 [6]		
					–	–		280 [7]	Dimensional drawing ➜ F-116	
	3 m [1]	–	4 mm	0 °C ... +70 °C		14 [8]		18 [3]	LL3-DC04	5326018
						16 [9]		31 [4]		
						19 [10]		34 [5]		
					–	–		38 [6]		
					–	–		38 [7]	Dimensional drawing ➜ F-116	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

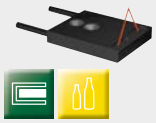
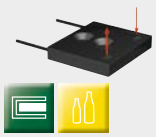
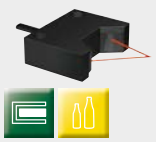
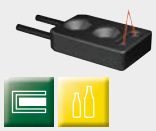
[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Retro-reflective fiber with polarizing filter and reflector.

Fiber optic cables with lengths different to the products shown here are available on request.

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	3 m	25 mm	25 mm	0 °C ... +70 °C		25 [8]		18 [3]	LL3-DC05	5326016
						30 [9]		29 [4]		
						33 [10]		35 [5]		
					–	–		40 [6]		
					–	–		43 [7]	Dimensional drawing → F-116	
	2 m [1]	–	4 mm	0 °C ... +70 °C		9 [8]		15 [3]	LL3-DC06	5326017
						11 [9]		22 [4]		
						12 [10]		23 [5]		
					–	–		25 [6]		
					–	–		25 [7]	Dimensional drawing → F-116	
		0.06 mm	10 mm	–40 °C ... +60 °C		9 [8]		8 [3]	LL3-DC07	5326019
						6.5 [9]		12 [4]		
						8 [10]		14 [5]		
					–	–		16 [6]		
					–	–		18 [7]	Dimensional drawing → F-116	
	1 m [1]	0.3 mm	1 mm	–20 °C ... +60 °C		6 [8]		2 [3]	LL3-DC08	5326029
						7 [9]		4 [4]		
						8 [10]		6 [5]		
					–	–		9 [6]		
					–	–		10 [7]	Dimensional drawing → F-117	
	2 m [1]	0.02 mm	10 mm	–40 °C ... +70 °C		9 [8]		8 [3]	LL3-DC09	5326028
						114 [9]		10 [4]		
						19 [10]		11 [5]		
					–	–		13 [6]		
					–	–		17 [7]	Dimensional drawing → F-117	
				–40 °C ... +50 °C		8 [7]		6 [2]	LL3-DC38	5322472
						9 [8]		6 [3]		
						13 [9]		6 [4]		
					–	–		10 [5]		
					–	–		15 [6]	Dimensional drawing → F-117	
						4 [8]	–	–	LL3-DC39	5322513
						6 [9]		4 [4]		
						7 [10]		4 [5]		
					–	–		4 [6]		
					–	–		4 [7]	Dimensional drawing → F-117	
		0.01 mm	1 mm	–40 °C ... +60 °C		32 [8]		12 [3]	LL3-DC47	5324268
						30 [9]		25 [4]		
						52 [10]		37 [5]		
					–	–		75 [6]		
					–	–		90 [7]	Dimensional drawing → F-117	

[1] FC fiber optic fiber cutter included in scope of delivery.

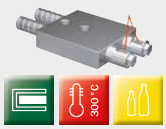
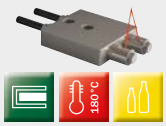
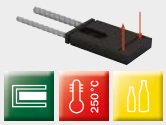
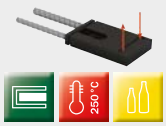
[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Retro-reflective fiber with polarizing filter and reflector.

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	1 m [1]	0.16 mm	1 mm	–40 °C ... +60 °C		40 [8]		11 [3]	LL3-DE01	5325285
						20 [9]		38 [4]		
						50 [10]		78 [5]		
					–	–		150 [6]		
					–	–		160 [7]	Dimensional drawing ➜ F-117	
		0.01 mm	1 mm	–40 °C ... +60 °C		40 [8]		13 [3]	LL3-DE02	5324497
						30 [9]		48 [4]		
						60 [10]		86 [5]		
					–	–		170 [6]		
					–	–		180 [7]	Dimensional drawing ➜ F-118	
	2 m [1]	0.03 mm	1 mm	–40 °C ... +60 °C		150 [8]		45 [3]	LL3-DE03	5325986
						90 [9]		130 [4]		
						180 [10]		250 [5]		
					–	–		510 [6]		
					–	–		550 [7]	Dimensional drawing ➜ F-118	
						150 [8]		50 [3]	LL3-DE04	5325987
						90 [9]		130 [4]		
						180 [10]		250 [5]		
					–	–		500 [6]		
					–	–		540 [7]	Dimensional drawing ➜ F-118	
	2 m	0.02 mm	25 mm	–30 °C ... +300 °C		14 [8]		5 [3]	LL3-DH06	5326026
						20 [9]		10 [4]		
						30 [10]		19 [5]		
					–	–		37 [6]		
					–	–		43 [7]	Dimensional drawing ➜ F-120	
	2 m [1]	0.02 mm	25 mm	–60 °C ... +180 °C		7 [8]		5 [3]	LL3-DH08	5326025
						6 [9]		11 [4]		
						12 [10]		22 [5]		
					–	–		30 [6]		
					–	–		38 [7]	Dimensional drawing ➜ F-120	
	3 m	0.02 mm	25 mm	–20 °C ... +250 °C		16.8 [8]		11 [3]	LL3-DH10	5326023
						9 [9]		18 [4]		
						13 [10]		21 [5]		
					–	–		24 [6]		
					–	–		26 [7]	Dimensional drawing ➜ F-120	
						26 [8]		19 [3]	LL3-DH11	5326024
						14.5 [9]		29 [4]		
						19 [10]		34 [5]		
					–	–		39 [6]		
					–	–		42 [7]	Dimensional drawing ➜ F-120	
	2 m [1]	0.03 mm	1 mm	–20 °C ... +70 °C		370 [8]		110 [3]	LL3-DR09	5325528
						230 [9]		345 [4]		
						400 [10]		560 [5]		
					–	–		1,100 [6]		
					–	–		1,190 [7]	Dimensional drawing ➜ F-124	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Retro-reflective fiber with polarizing filter and reflector.

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.3 mm	1 mm	–25 °C ... +55 °C		410 [8]		290 [3]	LL3-RR01[11]	5326008
						380 [9]		580 [4]		
						520 [10]		720 [5]		
					–	–		1,450 [6]		
					–	–		1,550 [7]	Dimensional drawing ➜ F-132	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Retro-reflective fiber with polarizing filter and reflector.

Fiber optic cables with lengths different to the products shown here are available on request.

B

Flat design, through-beam system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm	Sensing range with WLL180T in mm	Type	Part no.
	2 m [1]	0.01 mm	1 mm	–40 °C ... +60 °C	117 [8] 178 [9] 300 [10] – –	35 [2] 45 [3] 55 [4] 250 [5] 330 [6]	LL3-DC57	5324269
							Dimensional drawing → F-133	
	1 m [1]	0.08 mm	1 mm	–40 °C ... +60 °C	480 [8] 370 [9] 630 [10] – –	120 [3] 350 [4] 620 [5] 1,250 [6] 1,330 [7]	LL3-TE01	5325807
							Dimensional drawing → F-136	
					180 [8] 140 [9] 190 [10] – –	40 [3] 140 [4] 220 [5] 450 [6] 480 [7]	LL3-TE02	5325910
							Dimensional drawing → F-136	
	2 m [1]	0.08 mm	1 mm	–40 °C ... +60 °C	760 [8] 600 [9] 1,010 [10] – –	190 [3] 580 [4] 980 [5] 1,970 [6] 2,100 [7]	LL3-TE03	5325908
							Dimensional drawing → F-136	
		0.03 mm	1 mm	–40 °C ... +60 °C	500 [8] 430 [9] 600 [10] – –	150 [3] 440 [4] 700 [5] 1,400 [6] 1,490 [7]	LL3-TE04	5325911
							Dimensional drawing → F-137	
			4 mm	–40 °C ... +60 °C	570 [8] 450 [9] 720 [10] – –	150 [3] 460 [4] 840 [5] 1,680 [6] 1,780 [7]	LL3-TE05	5325914
							Dimensional drawing → F-137	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1] 	0.03 mm	4 mm	–40 °C ... +60 °C		1,830 [8]		360 [3]	LL3-TR05	5325808
						1,280 [9]		1,300 [4]		
						2,000 [10]		2,300 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-141	
						1,830 [8]		560 [3]	LL3-TR06	5325912
						1,600 [9]		1,600 [4]		
						1,950 [10]		2,200 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-142	
		0.08 mm	1 mm	–40 °C ... +60 °C		1,570 [8]		590 [3]	LL3-TR11	5325906
						1,490 [9]		1,500 [4]		
						1,950 [10]		2,200 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-142	
		0.05 mm	1 mm	–40 °C ... +60 °C		2,130 [8]		600 [3]	LL3-TR12	5325907
						1,410 [9]		1,400 [4]		
						2,000 [10]		2,300 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-142	
		0.04 mm	1 mm	–40 °C ... +60 °C		920 [8]		250 [3]	LL3-TR13	5325909
						720 [9]		730 [4]		
						1,210 [10]		1,280 [5]		
					–	–		2,560 [6]		
					–	–		2,730 [7]	Dimensional drawing ➜ F-143	

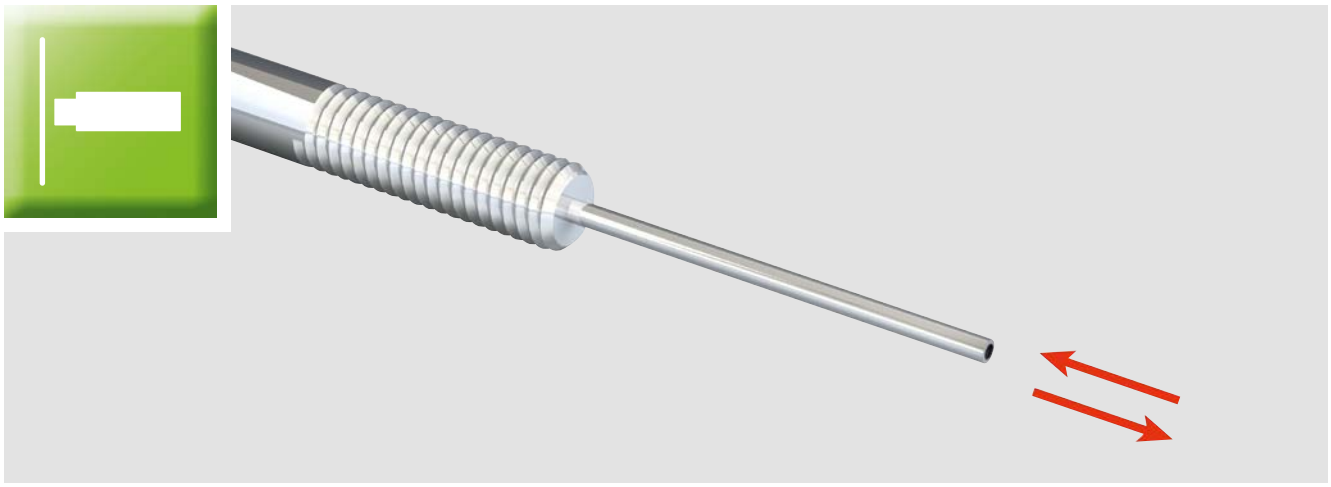
[1] FC fiber optic fiber cutter included in scope of delivery.

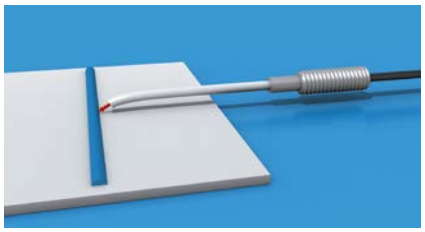
[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

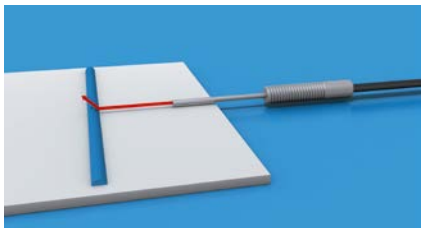
[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.





Bendable end sleeves



Standard model with long end sleeves

Long end sleeve

Fibers with long end sleeves are easy to position even in the tightest of spaces. This provides reliable detection of even the smallest objects. Bendable end sleeves offer maximum flexibility for alignment.

Long end sleeve, proximity system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.015 mm	25 mm	–40 °C ... +70 °C		160 [8]		100 [3]	LL3-DB02	5308083
						180 [9]		350 [4]		
						340 [10]		580 [5]		
					–	–		850 [6]		
					–	–		1,300 [7]	Dimensional drawing ➜ F-114	
	1 m	0.02 mm	25 mm	–40 °C ... +60 °C		20 [8]		8 [3]	LL3-DB05	5326002
						10 [9]		25 [4]		
						30 [10]		52 [5]		
					–	–		100 [6]		
					–	–		110 [7]	Dimensional drawing ➜ F-115	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.02 mm	25 mm	−40 °C ... +70 °C		210 [8]		60 [3]	LL3-DB06	5326006
						140 [9]		210 [4]		
						250 [10]		360 [5]		
					–	–		700 [6]		
					–	–		760 [7]	Dimensional drawing → F-115	
						60 [8]		17 [3]	LL3-DB08	5326004
						30 [9]		55 [4]		
						70 [10]		107 [5]		
					–	–		200 [6]		
					–	–		220 [7]	Dimensional drawing → F-115	
	2 m	0.02 mm	25 mm	−30 °C ... +350 °C		150 [8]		65 [3]	LL3-DH04	5326022
						150 [9]		225 [4]		
						360 [10]		500 [5]		
					–	–		1,000 [6]		
					–	–		1,060 [7]	Dimensional drawing → F-119	
	1 m	0.02 mm	25 mm	−30 °C ... +350 °C		290 [8]		55 [3]	LL3-DH05	5326021
						140 [9]		220 [4]		
						420 [10]		580 [5]		
					–	–		1,170 [6]		
					–	–		1,240 [7]	Dimensional drawing → F-120	
	2 m [1]	0.025 mm	25 mm	−40 °C ... +70 °C		100 [8]		35 [3]	LL3-DK33	5313031
						80 [9]		135 [4]		
						170 [10]		170 [5]		
					–	–		290 [6]		
					–	–		320 [7]	Dimensional drawing → F-121	
		0.015 mm	15 mm	−40 °C ... +70 °C		50 [8]		10 [3]	LL3-DK43	5313030
						40 [9]		28 [4]		
						80 [10]		45 [5]		
					–	–		93 [6]		
					–	–		170 [7]	Dimensional drawing → F-122	
			2 mm	−40 °C ... +70 °C		120 [8]		90 [3]	LL3-DK63Z	5313027
						160 [9]		300 [4]		
						290 [10]		500 [5]		
					–	–		900 [6]		
					–	–		1,400 [7]	Dimensional drawing → F-122	
			15 mm	−40 °C ... +70 °C		50 [8]		10 [3]	LL3-DM03	5308084
						60 [9]		25 [4]		
						90 [10]		45 [5]		
					–	–		90 [6]		
					–	–		170 [7]	Dimensional drawing → F-122	
	500 mm	0.015 mm	4 mm	−40 °C ... +70 °C		10 [8]		10 [3]	LL3-DR05	5308087
						10 [9]		30 [4]		
						30 [10]		60 [5]		
					–	–		140 [6]		
					–	–		225 [7]	Dimensional drawing → F-123	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	1 m	0.015 mm	25 mm	–40 °C ... +70 °C	–	–		5 [3]	LL3-DR07	5326007
						10 [9]		15 [4]		
						20 [10]		35 [5]		
					–	–		65 [6]		
					–	–		120 [7]	Dimensional drawing ➜ F-123	
	2 m [1]	0.02 mm	1 mm	–40 °C ... +60 °C		40 [8]		12 [3]	LL3-DR10	5326005
						20 [9]		40 [4]		
						50 [10]		77 [5]		
					–	–		150 [6]		
					–	–		160 [7]	Dimensional drawing ➜ F-124	
	500 mm [1]	0.015 mm	4 mm	–40 °C ... +70 °C		10 [8]		10 [3]	LL3-DT02	5308085
						10 [9]		30 [4]		
						30 [10]		60 [5]		
					–	–		140 [6]		
					–	–		225 [7]	Dimensional drawing ➜ F-125	
	500 mm	0.015 mm	4 mm	–40 °C ... +70 °C		20 [8]		13 [3]	LL3-DT04	5308086
						20 [9]		45 [4]		
						40 [10]		80 [5]		
					–	–		140 [6]		
					–	–		280 [7]	Dimensional drawing ➜ F-125	
	2 m [1]	0.015 mm	15 mm	–40 °C ... +70 °C		50 [8]		10 [3]	LL3-DT05	5313028
						40 [9]		28 [4]		
						100 [10]		45 [5]		
					–	–		95 [6]		
					–	–		170 [7]	Dimensional drawing ➜ F-125	
		0.025 mm	25 mm	–40 °C ... +70 °C		150 [8]		40 [3]	LL3-DV01	5308088
						200 [9]		135 [4]		
						300 [10]		180 [5]		
					–	–		270 [6]		
					–	–		330 [7]	Dimensional drawing ➜ F-126	
		0.015 mm	15 mm	–40 °C ... +70 °C		20 [8]		10 [3]	LL3-DV02	5308089
						20 [9]		35 [4]		
						40 [10]		70 [5]		
					–	–		125 [6]		
					–	–		290 [7]	Dimensional drawing ➜ F-126	
		0.025 mm	25 mm	–40 °C ... +70 °C		100 [8]		35 [3]	LL3-DV03	5308090
						80 [9]		135 [4]		
						170 [10]		170 [5]		
					–	–		290 [6]		
					–	–		320 [7]	Dimensional drawing ➜ F-126	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

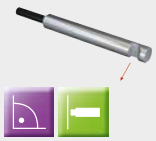
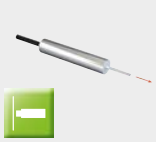
[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Long end sleeve, through-beam system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.2 mm	25 mm	–40 °C ... +70 °C		550 [8]		240 [3]	LL3-TB03	5308056
						580 [9]		700 [4]		
						1,040 [10]		1,400 [5]		
					–	–		2,500 [6]		
					–	–		2,900 [7]	Dimensional drawing → F-136	
		0.03 mm	25 mm	–40 °C ... +70 °C		220 [8]		50 [3]	LL3-TB05	5325924
						150 [9]		140 [4]		
						260 [10]		250 [5]		
					–	–		500 [6]		
					–	–		530 [7]	Dimensional drawing → F-136	
		0.2 mm	25 mm	–40 °C ... +100 °C		590 [8]		180 [3]	LL3-TK16	5313038
						530 [9]		600 [4]		
						790 [10]		1,100 [5]		
					–	–		2,500 [6]		
					–	–		3,300 [7]	Dimensional drawing → F-140	
	500 mm	0.02 mm	5 mm	–40 °C ... +70 °C		8 [8]		2 [3]	LL3-TP01	5325925
						8 [9]		8 [4]		
						12 [10]		14 [5]		
					–	–		28 [6]		
					–	–		30 [7]	Dimensional drawing → F-141	
	2 m [1]	0.2 mm	25 mm	–40 °C ... +70 °C		410 [8]		170 [3]	LL3-TS08	5308061
						410 [9]		500 [4]		
						710 [10]		1,000 [5]		
					–	–		2,300 [6]		
					–	–		3,000 [7]	Dimensional drawing → F-143	
		0.5 mm	25 mm	–40 °C ... +70 °C		350 [8]		170 [3]	LL3-TS12	5308062
						350 [9]		550 [4]		
						350 [10]		1,000 [5]		
					–	–		2,300 [6]		
					–	–		3,000 [7]	Dimensional drawing → F-143	
		0.1 mm	15 mm	–40 °C ... +70 °C		50 [8]		10 [3]	LL3-TT01	5308057
						30 [9]		30 [4]		
						60 [10]		60 [5]		
					–	–		140 [6]		
					–	–		200 [7]	Dimensional drawing → F-144	
		0.2 mm	25 mm	–40 °C ... +70 °C		270 [8]		120 [3]	LL3-TV01	5308058
						250 [9]		400 [4]		
						440 [10]		800 [5]		
					–	–		1,800 [6]		
					–	–		2,750 [7]	Dimensional drawing → F-144	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.1 mm	15 mm	–40 °C ... +70 °C		110 [8]		30 [3]	LL3-TV02	5308059
						90 [9]		130 [4]		
						170 [10]		250 [5]		
					–	–		550 [6]		
					–	–		800 [7]	Dimensional drawing ➜ F-144	
						80 [8]		30 [3]	LL3-TV04	5308060
						110 [9]		130 [4]		
						170 [10]		250 [5]		
					–	–		550 [6]		
					–	–		800 [7]	Dimensional drawing ➜ F-144	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

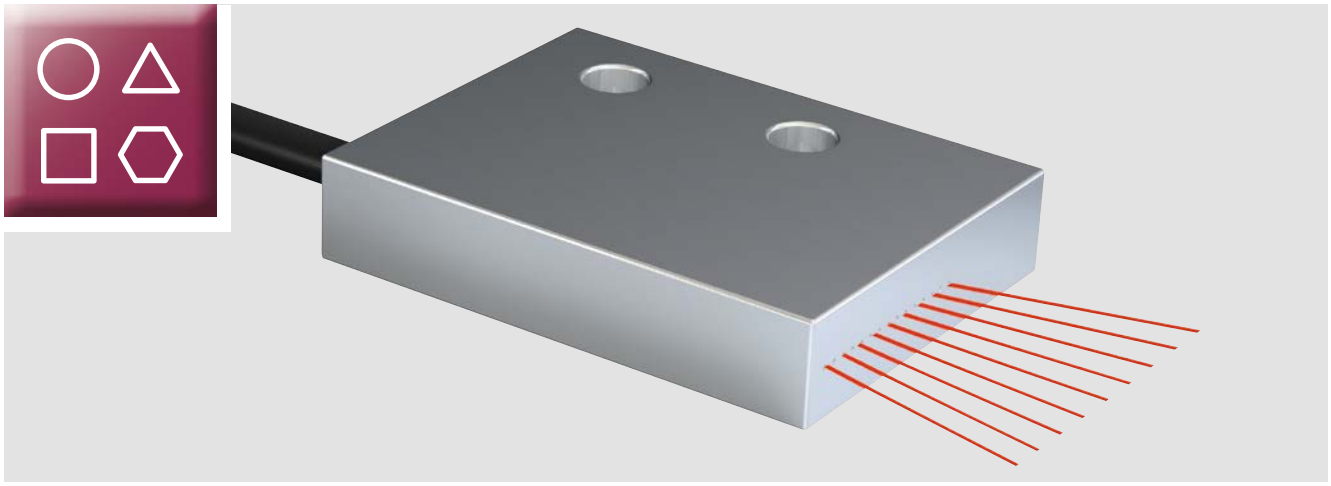
[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

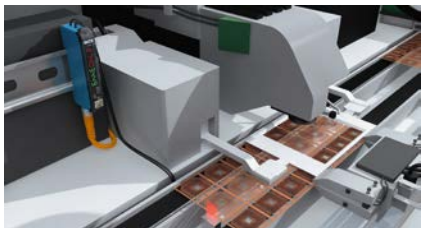
[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

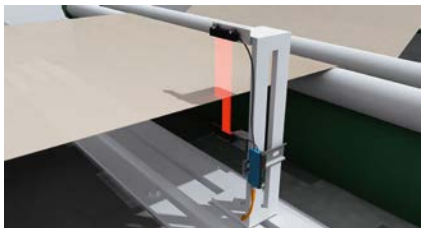
B





Detection of lead frames

Detection of free falling tablets



Monitoring of web edges

Counting pieces on a conveyor

Leading edge detection for PCBs

Area detection

Area detection fibers are ideal for detecting objects at any point in the light array and for comparing height differences. Optional mask for limiting the detection area enable even very small objects to be detected.

Area detection, proximity system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.02 mm	25 mm	–40 °C ... +60 °C	▮	130 [8]	▮	65 [3]	LL3-DZ01	5326013
					▬	160 [9]	▬	240 [4]		
					▬▬	230 [10]	▬	320 [5]		
					–	–	▬▬	650 [6]		
					–	–	▬▬▬	690 [7]	Dimensional drawing → F-127	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

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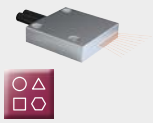
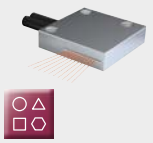
Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.02 mm	25 mm	–40 °C ... +70 °C		210 [8]		57 [3]	LL3-DZ02	5326014
						120 [9]		190 [4]		
						220 [10]		310 [5]		
					–	–		630 [6]		
					–	–		670 [7]	Dimensional drawing ➜ F-127	
						170 [8]		50 [3]	LL3-DZ03	5326015
						100 [9]		160 [4]		
						200 [10]		280 [5]		
					–	–		450 [6]		
					–	–		590 [7]	Dimensional drawing ➜ F-127	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

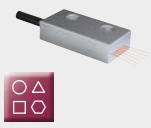
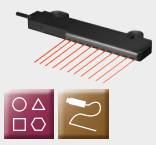
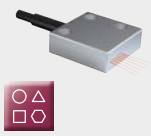
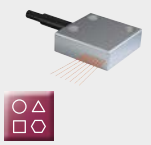
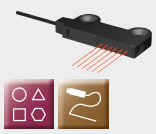
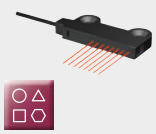
[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Area detection, through-beam system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1] 	1 mm	25 mm	–40 °C ... +70 °C		220 [8]		130 [3]	LL3-TS10	5308063
						230 [9]		400 [4]		
						370 [10]		800 [5]		
					–	–		2,000 [6]		
					–	–		3,500 [7]		
									Dimensional drawing → F-143	
		0.5 mm	25 mm	–40 °C ... +70 °C		450 [8]		130 [3]	LL3-TS14	5313039
						430 [9]		400 [4]		
						1,050 [10]		800 [5]		
					–	–		2,000 [6]		
					–	–		3,500 [7]		
									Dimensional drawing → F-143	
		0.4 mm	2 mm	–40 °C ... +60 °C		350 [8]		3,000 [3]	LL3-TS40	5323971
						350 [9]		4,000 [4]		
						350 [10]		4,000 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]		
									Dimensional drawing → F-144	
		0.45 mm	25 mm	–40 °C ... +70 °C		440 [8]		150 [3]	LL3-TZ05	5325937
						400 [9]		450 [4]		
						680 [10]		740 [5]		
					–	–		1,400 [6]		
					–	–		1,500 [7]		
									Dimensional drawing → F-146	
						550 [8]		150 [3]	LL3-TZ06	5325938
						480 [9]		480 [4]		
						670 [10]		790 [5]		
					–	–		1,500 [6]		
					–	–		1,600 [7]		
									Dimensional drawing → F-146	
		0.25 mm	1 mm	–40 °C ... +55 °C		2,000 [8]		1,300 [3]	LL3-TZ09	5326598
						2,000 [9]		2,500 [4]		
						2,500 [10]		3,000 [5]		
					–	–		3,500 [6]		
					–	–		4,000 [7]		
									Dimensional drawing → F-146	
			10 mm	–40 °C ... +70 °C		2,500 [8]		1,700 [3]	LL3-TZ10	5326599
						2,000 [9]		2,500 [4]		
						2,500 [10]		3,000 [5]		
					–	–		3,500 [6]		
					–	–		4,000 [7]		
									Dimensional drawing → F-147	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

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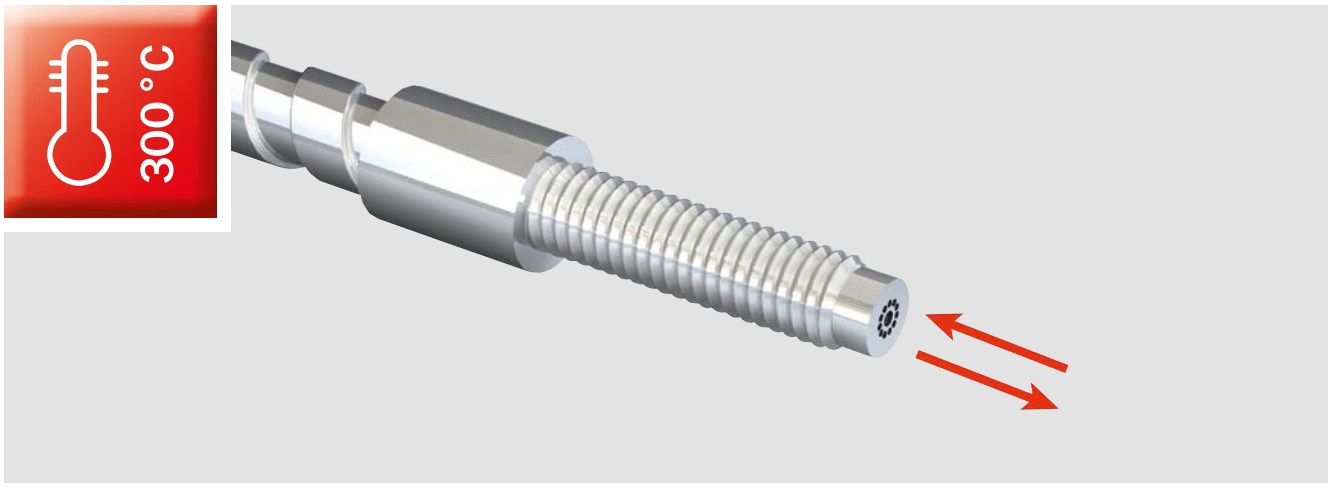


Detection in an oven

Heat-resistant

An extensive range of heat-resistant fibers meet every requirement. These fibers can withstand ambient temperatures of up to 350 °C. The fiber-optic material for fibers used in ambient temperatures of up to +180 °C is plastic; for temperatures above +200 °C it is glass.

Heat resistant, proximity system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.015 mm	35 mm	–40 °C ... +180 °C		150 [8]		120 [3]	LL3-DH01	5308091
						180 [9]		350 [4]		
						320 [10]		600 [5]		
					–	–		980 [6]		
					–	–		1,500 [7]	Dimensional drawing → F-119	
	3 m [1]	0.015 mm	35 mm	–40 °C ... +180 °C		210 [8]		100 [3]	LL3-DH01-03	5321260
						180 [9]		300 [4]		
						330 [10]		500 [5]		
					–	–		850 [6]		
					–	–		1,400 [7]	Dimensional drawing → F-119	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

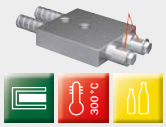
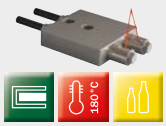
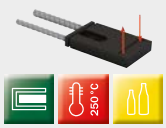
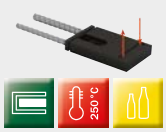
[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.015 mm	25 mm	–40 °C ... +100 °C		90 [8]		70 [3]	LL3-DH02	5308092
						110 [9]		230 [4]		
						220 [10]		350 [5]		
					–	–		600 [6]		
					–	–		1,000 [7]	Dimensional drawing → F-119	
	2 m	0.02 mm	25 mm	–30 °C ... +350 °C		230 [8]		55 [3]	LL3-DH03	5324787
						140 [9]		220 [4]		
						350 [10]		490 [5]		
					–	–		990 [6]		
					–	–		1,050 [7]	Dimensional drawing → F-119	
						150 [8]		65 [3]	LL3-DH04	5326022
						150 [9]		225 [4]		
						360 [10]		500 [5]		
					–	–		1,000 [6]		
					–	–		1,060 [7]	Dimensional drawing → F-119	
	1 m	0.02 mm	25 mm	–30 °C ... +350 °C		290 [8]		55 [3]	LL3-DH05	5326021
						140 [9]		220 [4]		
						420 [10]		580 [5]		
					–	–		1,170 [6]		
					–	–		1,240 [7]	Dimensional drawing → F-120	
	2 m	0.02 mm	25 mm	–30 °C ... +300 °C		14 [8]		5 [3]	LL3-DH06	5326026
						20 [9]		10 [4]		
						30 [10]		19 [5]		
					–	–		37 [6]		
					–	–		43 [7]	Dimensional drawing → F-120	
	1 m	0.02 mm	25 mm	–60 °C ... +200 °C		300 [8]		65 [3]	LL3-DH07	5326031
						170 [9]		260 [4]		
						480 [10]		670 [5]		
					–	–		1,340 [6]		
					–	–		1,430 [7]	Dimensional drawing → F-120	
	2 m [1]	0.02 mm	25 mm	–60 °C ... +180 °C		7 [8]		5 [3]	LL3-DH08	5326025
						6 [9]		11 [4]		
						12 [10]		22 [5]		
					–	–		30 [6]		
					–	–		38 [7]	Dimensional drawing → F-120	
	3 m	0.02 mm	25 mm	–20 °C ... +250 °C		16.8 [8]		11 [3]	LL3-DH10	5326023
						9 [9]		18 [4]		
						13 [10]		21 [5]		
					–	–		24 [6]		
					–	–		26 [7]	Dimensional drawing → F-120	
						26 [8]		19 [3]	LL3-DH11	5326024
						14.5 [9]		29 [4]		
						19 [10]		34 [5]		
					–	–		39 [6]		
					–	–		42 [7]	Dimensional drawing → F-120	

[1] FC fiber optic fiber cutter included in scope of delivery.

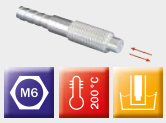
[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.015 mm	25 mm	–40 °C ... +105 °C		50 [8]		30 [3]	LL3-DV06	5322550
						70 [9]		130 [4]		
						120 [10]		210 [5]		
					–	–		450 [6]		
					–	–		800 [7]	Dimensional drawing ➜ F-126	
	1 m	0.02 mm	25 mm	–40 °C ... +210 °C		142 [8]		20 [3]	LL3-DW01 [11]	5315234
						206 [9]		50 [4]		
						323 [10]		95 [5]		
					–	–		150 [6]		
					–	–		400 [7]	Dimensional drawing ➜ F-126	
	2 m	0.02 mm	25 mm	–40 °C ... +210 °C		153 [8]		20 [3]	LL3-DW01-2 [11]	5324789
						230 [9]		50 [4]		
						352 [10]		95 [5]		
					–	–		150 [6]		
					–	–		400 [7]	Dimensional drawing ➜ F-127	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

B

Heat resistant, through-beam system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
 Suitable for tip adapters	2 m [1]	0.2 mm	25 mm	–40 °C ... +100 °C		410 [8]		55 [3]	LL3-TH01	5308064
						340 [9]		180 [4]		
						580 [10]		320 [5]		
					–	–		680 [6]		
					–	–		1,000 [7]	Dimensional drawing → F-138	
		0.5 mm	35 mm	–40 °C ... +180 °C		460 [8]		230 [3]	LL3-TH02	5308065
						460 [9]		700 [4]		
						780 [10]		1,300 [5]		
					–	–		2,700 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-138	
	2 m	0.1 mm	50 mm	–60 °C ... +200 °C		60 [8]		18 [3]	LL3-TH07	5325977
						50 [9]		30 [4]		
						90 [10]		120 [5]		
					–	–		220 [6]		
					–	–		420 [7]	Dimensional drawing → F-138	
	1 m	0.04 mm	25 mm	–30 °C ... +350 °C		560 [8]		150 [3]	LL3-TH08	5325978
						470 [9]		480 [4]		
						680 [10]		790 [5]		
					–	–		1,500 [6]		
					–	–		1,600 [7]	Dimensional drawing → F-138	
						550 [8]		140 [3]	LL3-TH09	5325979
						450 [9]		460 [4]		
						610 [10]		700 [5]		
					–	–		1,400 [6]		
					–	–		1,500 [7]	Dimensional drawing → F-138	
		0.02 mm	10 mm	–60 °C ... +200 °C		190 [8]		50 [3]	LL3-TH10	5325970
						170 [9]		180 [4]		
						250 [10]		300 [5]		
					–	–		600 [6]		
					–	–		640 [7]	Dimensional drawing → F-139	
		0.04 mm	25 mm	–60 °C ... +200 °C		410 [8]		130 [3]	LL3-TH11	5325971
						400 [9]		400 [4]		
						620 [10]		700 [5]		
					–	–		1,400 [6]		
					–	–		1,500 [7]	Dimensional drawing → F-139	

[1] FC fiber optic fiber cutter included in scope of delivery.

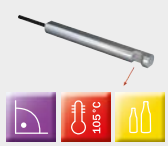
[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.12 mm	25 mm	−60 °C ... +200 °C		410 [8]		100 [3]	LL3-TH12	5325972
						330 [9]		330 [4]		
						490 [10]		570 [5]		
					–	–		1,100 [6]		
					–	–		1,200 [7]	Dimensional drawing → F-139	
						270 [8]		100 [3]	LL3-TH13	5325973
						330 [9]		330 [4]		
						490 [10]		570 [5]		
					–	–		1,100 [6]		
					–	–		1,200 [7]	Dimensional drawing → F-139	
						270 [8]		100 [3]	LL3-TH14	5325974
						330 [9]		330 [4]		
						490 [10]		570 [5]		
					–	–		1,100 [6]		
					–	–		1,200 [7]	Dimensional drawing → F-139	
		0.16 mm	25 mm	−60 °C ... +200 °C		270 [8]		90 [3]	LL3-TH15	5325975
						290 [9]		290 [4]		
						410 [10]		480 [5]		
					–	–		970 [6]		
					–	–		1,000 [7]	Dimensional drawing → F-139	
						270 [8]		90 [3]	LL3-TH16	5325976
						290 [9]		290 [4]		
						410 [10]		480 [5]		
					–	–		970 [6]		
					–	–		1,000 [7]	Dimensional drawing → F-140	
		–	10 mm	−40 °C ... +105 °C		1,190 [8]		220 [3]	LL3-TS22M	5325968
						1,040 [9]		760 [4]		
						1,740 [10]		1,500 [5]		
					–	–		2,900 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-144	
		0.4 mm	25 mm	−40 °C ... +105 °C		560 [8]		180 [3]	LL3-TV06	5322547
						460 [9]		550 [4]		
						680 [10]		900 [5]		
					–	–		2,100 [6]		
					–	–		3,500 [7]	Dimensional drawing → F-144	
	1 m	0.4 mm	25 mm	−40 °C ... +210 °C		556 [8]		80 [3]	LL3-TW01 [11]	5315233
						866 [9]		230 [4]		
						1,435 [10]		350 [5]		
					–	–		560 [6]		
					–	–		980 [7]	Dimensional drawing → F-145	
	2 m	0.4 mm	25 mm	−40 °C ... +210 °C		534 [8]		80 [3]	LL3-TW01-2 [11]	5321306
						821 [9]		230 [4]		
						1,393 [10]		350 [5]		
					–	–		560 [6]		
					–	–		980 [7]	Dimensional drawing → F-145	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

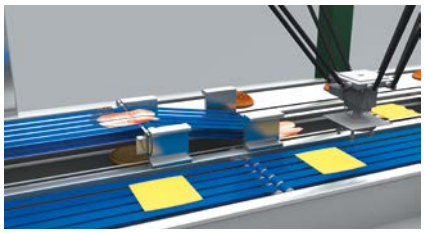
[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

B



Detection of meat products in the food industry

Wafer detection in wet process

Oil/chemical resistant

Applications in areas involving frequent cleaning or use of chemicals require a solution with durable fibers. Fibers with a PTFE sheath are ideal for almost every environment.

Oil/chemical resistant, proximity system

Figure	Length	Min. object diameter [1]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m	0.02 mm	60 mm	–40 °C ... +100 °C		110 [7]		100 [2]	LL3-DY01	5308093
						160 [8]		180 [3]		
						150 [9]		200 [4]		
					–	–		150 [5]		
					–	–		280 [6]	Dimensional drawing ➜ F-127	

[1] Minimum detectable object was determined at optimal measuring distance and optimal setting.
[2] Operating mode: 16 µs.[3] Operating mode: 70 µs.[4] Operating mode: 250 µs.[5] Operating mode: 2 ms.[6] Operating mode: 8 ms.
[7] Operating mode: 250 µs (potentiometer).[8] Operating mode: 50 µs (teach-in).[9] Operating mode: 250 µs (teach-in).
Fiber optic cables with lengths different to the products shown here are available on request.

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Oil/chemical resistant, through-beam system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m	0.3 mm	60 mm	–40 °C ... +70 °C		870 [8]		400 [3]	LL3-TY01	5308066
						800 [9]		1,200 [4]		
						1,370 [10]		2,100 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-146	
						730 [8]		300 [3]	LL3-TY02	5308067
						800 [9]		1,000 [4]		
						940 [10]		1,300 [5]		
					–	–		3,000 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-146	
	3 m [1]	0.3 mm	20 mm	–55 °C ... +70 °C		1,290 [8]		460 [3]	LL3-TY03	5325982
						1,210 [9]		1,400 [4]		
						2,120 [10]		2,500 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-146	
	2 m [1]	4 mm	25 mm	0 °C ... +60 °C		1,920 [8]		850 [3]	LL3-TY05	5325980
						1,150 [9]		2,700 [4]		
						1,820 [10]		3,000 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-146	

[1] FC fiber optic fiber cutter included in scope of delivery.

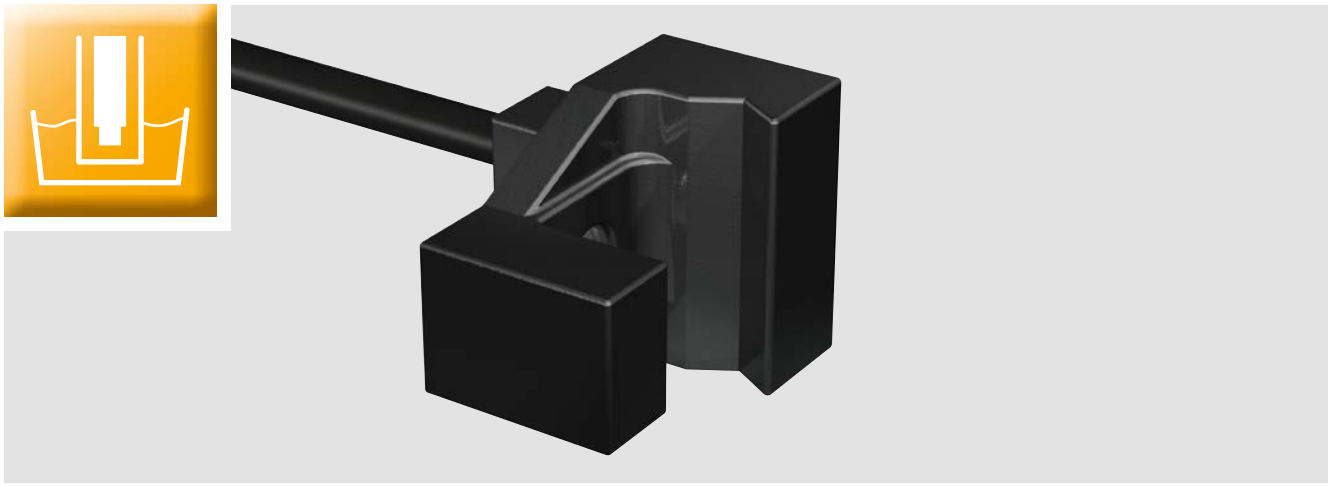
[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

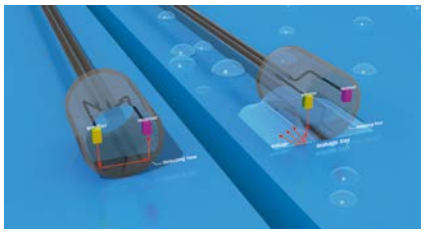
Fiber optic cables with lengths different to the products shown here are available on request.

B



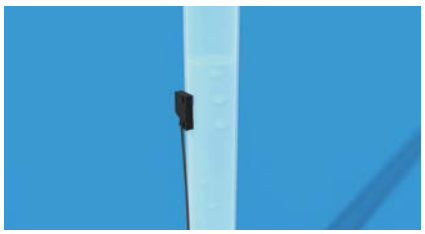
B

Level detection through immersion using LL3-DF02

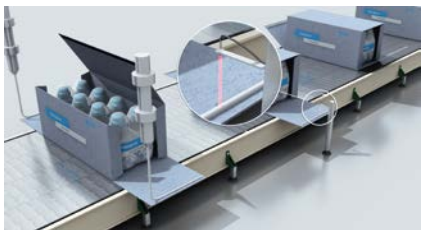


Leak detection (LL3-DW02)

Non-contact level detection using LL3-TW01 (in conjunction with IR sensor)



Level detection on a pipe (LL3-DF07)



Detection of an adhesive strip (humidity detection) using LL3-DW01 and WLL180T IR

Liquid level

A variety of fiber optic solutions are available for detecting liquids and liquid levels. Liquid levels can be detected by immersion or tube mounting of a sender/receiver system. Special fibers are available for leak detection.

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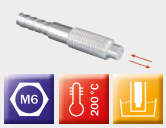
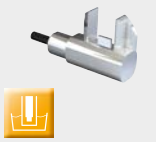
Liquid level, proximity system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	–	30 mm	–40 °C ... +105 °C	–	–	–	–	LL3-DF02-S01	5321924
					–	–	–	–		
					–	–	–	–		
					–	–	–	–		
					–	–	–	–	Dimensional drawing ➜ F-118	
	2 m [1]	–	10 mm	–40 °C ... +100 °C	–	–	–	–	LL3-DF04	5326035
					–	–	–	–		
					–	–	–	–		
					–	–	–	–		
					–	–	–	–	Dimensional drawing ➜ F-118	
					–	–	–	–	LL3-DF05	5326034
					–	–	–	–		
					–	–	–	–		
					–	–	–	–		
					–	–	–	–	Dimensional drawing ➜ F-118	
				–40 °C ... +70 °C	–	–	–	–	LL3-DF07	5326033
					–	–	–	–		
					–	–	–	–		
					–	–	–	–		
					–	–	–	–	Dimensional drawing ➜ F-119	
	1 m	0.02 mm	25 mm	–40 °C ... +210 °C		142 [8]		20 [3]	LL3-DW01 [11]	5315234
						206 [9]		50 [4]		
						323 [10]		95 [5]		
					–	–		150 [6]		
					–	–		400 [7]	Dimensional drawing ➜ F-126	
	2 m	0.02 mm	25 mm	–40 °C ... +210 °C		153 [8]		20 [3]	LL3-DW01-2 [11]	5324789
						230 [9]		50 [4]		
						352 [10]		95 [5]		
					–	–		150 [6]		
					–	–		400 [7]	Dimensional drawing ➜ F-127	
	5 m	–	20 mm	–20 °C ... +50 °C	–	–	–	–	LL3-DW02	5325608
					–	–	–	–		
					–	–	–	–		
					–	–	–	–		
					–	–	–	–	Dimensional drawing ➜ F-127	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	750 mm	0.5 mm	20 mm	–10 °C ... +60 °C		285 [8]		170 [3]	LL3-LM32750	2073500
						485 [9]		520 [4]		
						811 [10]		580 [5]		
					–	–		580 [6]		
					–	–		580 [7]	Dimensional drawing → F-128	
						325 [8]		100 [3]	LL3-LM38750	2073503
						592 [9]		330 [4]		
						992 [10]		650 [5]		
					–	–		1,300 [6]		
					–	–		1,350 [7]	Dimensional drawing → F-130	
						465 [8]		230 [3]	LL3-LM38751	2073504
						780 [9]		690 [4]		
						1,321 [10]		1,320 [5]		
					–	–		1,350 [6]		
					–	–		1,350 [7]	Dimensional drawing → F-131	
	750 mm	0.5 mm	20 mm	–10 °C ... +60 °C		270 [8]		130 [3]	LL3-LM39750	2073506
						441 [9]		390 [4]		
						742 [10]		740 [5]		
					–	–		1,350 [6]		
					–	–		1,350 [7]	Dimensional drawing → F-131	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

Liquid level, through-beam system

Figure	Length	Min. object diameter [1]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	750 mm	0.5 mm	20 mm	–10 °C ... +60 °C		285 [7]		170 [2]	LL3-LM32750	2073500
						485 [8]		520 [3]		
						811 [9]		580 [4]		
					–	–		580 [5]		
					–	–		580 [6]	Dimensional drawing ➜ F-133	
						325 [7]		100 [2]	LL3-LM38750	2073503
						592 [8]		330 [3]		
						992 [9]		650 [4]		
					–	–		1,300 [5]		
					–	–		1,350 [6]	Dimensional drawing ➜ F-134	
						465 [7]		230 [2]	LL3-LM38751	2073504
						780 [8]		690 [3]		
						1,321 [9]		1,320 [4]		
					–	–		1,350 [5]		
					–	–		1,350 [6]	Dimensional drawing ➜ F-134	
						270 [7]		130 [2]	LL3-LM39750	2073506
						441 [8]		390 [3]		
						742 [9]		740 [4]		
					–	–		1,350 [5]		
					–	–		1,350 [6]	Dimensional drawing ➜ F-135	
	2 m	–	20 mm	–20 °C ... +60 °C	–	–	–	–	LL3-TF01	5324242
					–	–	–	–		
					–	–	–	–		
					–	–	–	–		
					–	–	–	–	Dimensional drawing ➜ F-137	
	1 m	0.4 mm	25 mm	–40 °C ... +210 °C		556 [7]		80 [2]	LL3-TW01 [10]	5315233
						866 [8]		230 [3]		
						1,435 [9]		350 [4]		
					–	–		560 [5]		
					–	–		980 [6]	Dimensional drawing ➜ F-145	
	2 m	0.4 mm	25 mm	–40 °C ... +210 °C		534 [7]		80 [2]	LL3-TW01-2 [10]	5321306
						821 [8]		230 [3]		
						1,393 [9]		350 [4]		
					–	–		560 [5]		
					–	–		980 [6]	Dimensional drawing ➜ F-145	

[1] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[2] Operating mode: 16 µs.[3] Operating mode: 70 µs.[4] Operating mode: 250 µs.[5] Operating mode: 2 ms.[6] Operating mode: 8 ms.

[7] Operating mode: 250 µs (potentiometer).[8] Operating mode: 50 µs (teach-in).[9] Operating mode: 250 µs (teach-in).

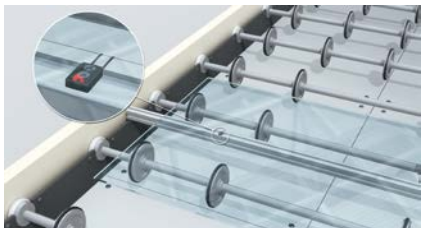
[10] Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Fiber optic cables with lengths different to the products shown here are available on request.

B

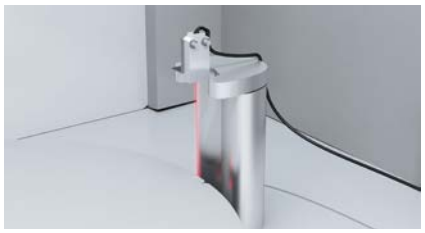
B

Indexing with wafers

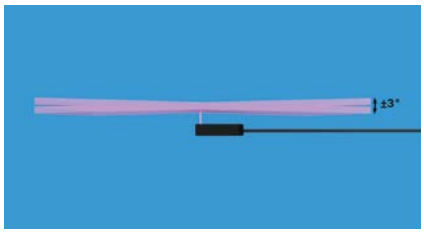


Detection of glass panes, e.g., with LL3-DC38

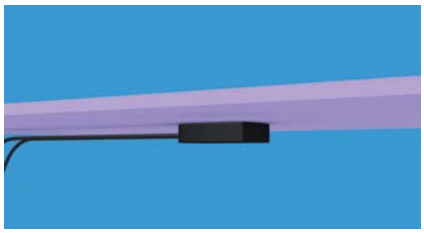
Notch detection



Notch detection, e.g., with LL3-DR09



Safe detection of lead fames, even in a slanted position

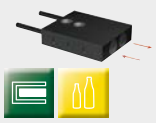


LL3-DC39 does not have a blind zone. The lead frame can be detected at a distance of 0 mm.

LCDs/transparent objects/semiconductors

Fibers with V-optics are ideal for detecting wafers and glass lead frames. They are specially designed to block out background influences.

LCDs/transparent objects/semiconductors, proximity system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	4 m [1]	0.3 mm	25 mm	–40 °C ... +60 °C		48 [8]		60 [3]	LL3-DC03	5326020
						48 [9]		75 [4]		
						64 [10]		85 [5]		
					–	–		150 [6]		
					–	–		280 [7]	Dimensional drawing ➜ F-116	

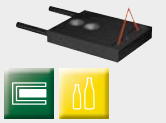
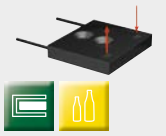
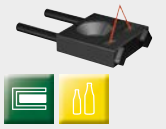
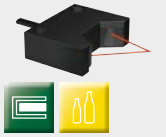
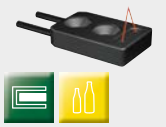
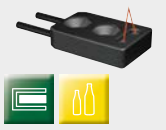
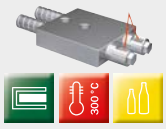
[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	3 m [1]	–	4 mm	0 °C ... +70 °C		14 [8]		18 [3]	LL3-DC04	5326018
						16 [9]		31 [4]		
						19 [10]		34 [5]		
					–	–		38 [6]		
					–	–		38 [7]	Dimensional drawing → F-116	
	3 m	25 mm	25 mm	0 °C ... +70 °C		25 [8]		18 [3]	LL3-DC05	5326016
						30 [9]		29 [4]		
						33 [10]		35 [5]		
					–	–		40 [6]		
					–	–		43 [7]	Dimensional drawing → F-116	
	2 m [1]	–	4 mm	0 °C ... +70 °C		9 [8]		15 [3]	LL3-DC06	5326017
						11 [9]		22 [4]		
						12 [10]		23 [5]		
					–	–		25 [6]		
					–	–		25 [7]	Dimensional drawing → F-116	
		0.06 mm	10 mm	–40 °C ... +60 °C		9 [8]		8 [3]	LL3-DC07	5326019
						6.5 [9]		12 [4]		
						8 [10]		14 [5]		
					–	–		16 [6]		
					–	–		18 [7]	Dimensional drawing → F-116	
	1 m [1]	0.3 mm	1 mm	–20 °C ... +60 °C		6 [8]		2 [3]	LL3-DC08	5326029
						7 [9]		4 [4]		
						8 [10]		6 [5]		
					–	–		9 [6]		
					–	–		10 [7]	Dimensional drawing → F-117	
	2 m [1]	0.02 mm	10 mm	–40 °C ... +70 °C		9 [8]		8 [3]	LL3-DC09	5326028
						114 [9]		10 [4]		
						19 [10]		11 [5]		
					–	–		13 [6]		
					–	–		17 [7]	Dimensional drawing → F-117	
				–40 °C ... +50 °C		8 [7]		6 [2]	LL3-DC38	5322472
						9 [8]		6 [3]		
						13 [9]		6 [4]		
					–	–		10 [5]		
					–	–		15 [6]	Dimensional drawing → F-117	
						4 [8]	–	–	LL3-DC39	5322513
						6 [9]		4 [4]		
						7 [10]		4 [5]		
					–	–		4 [6]		
					–	–		4 [7]	Dimensional drawing → F-117	
	2 m	0.02 mm	25 mm	–30 °C ... +300 °C		14 [8]		5 [3]	LL3-DH06	5326026
						20 [9]		10 [4]		
						30 [10]		19 [5]		
					–	–		37 [6]		
					–	–		43 [7]	Dimensional drawing → F-120	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

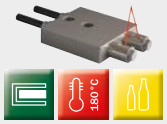
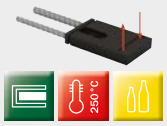
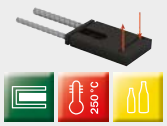
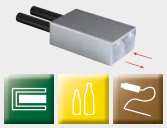
[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.02 mm	25 mm	–60 °C ... +180 °C		7 [8]		5 [3]	LL3-DH08	5326025
						6 [9]		11 [4]		
						12 [10]		22 [5]		
					–	–		30 [6]		
					–	–		38 [7]	Dimensional drawing ➜ F-120	
	3 m	0.02 mm	25 mm	–20 °C ... +250 °C		16.8 [8]		11 [3]	LL3-DH10	5326023
						9 [9]		18 [4]		
						13 [10]		21 [5]		
					–	–		24 [6]		
					–	–		26 [7]	Dimensional drawing ➜ F-120	
						26 [8]		19 [3]	LL3-DH11	5326024
						14.5 [9]		29 [4]		
						19 [10]		34 [5]		
					–	–		39 [6]		
					–	–		42 [7]	Dimensional drawing ➜ F-120	
	2 m [1]	0.03 mm	1 mm	–20 °C ... +70 °C		370 [8]		110 [3]	LL3-DR09	5325528
						230 [9]		345 [4]		
						400 [10]		560 [5]		
					–	–		1,100 [6]		
					–	–		1,190 [7]	Dimensional drawing ➜ F-124	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

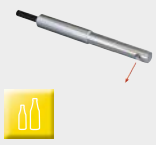
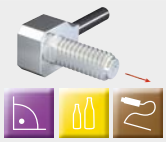
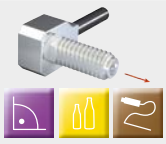
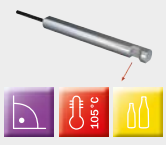
[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

8014999/2019-05-24

LCDs/transparent objects/semiconductors, through-beam system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm	Sensing range with WLL180T in mm	Type	Part no.
	2 m [1] 	0.06 mm	25 mm	–40 °C ... +70 °C	3,500 [8] 2,350 [9] 2,400 [10] – –	880 [3] 2,300 [4] 3,500 [5] 4,000 [6] 4,000 [7]	LL3-TG01	5325940
							Dimensional drawing → F-137	
			1 mm	–40 °C ... +55 °C	1,730 [8] 1,650 [9] 2,060 [10] – –	580 [3] 1,670 [4] 2,400 [5] 4,000 [6] 4,000 [7]	LL3-TG02	5325943
							Dimensional drawing → F-137	
			25 mm	–40 °C ... +60 °C	1,600 [8] 1,950 [9] 2,060 [10] – –	570 [3] 1,980 [4] 2,400 [5] 4,000 [6] 4,000 [7]	LL3-TG03	5325942
							Dimensional drawing → F-137	
		0.02 mm	10 mm	–40 °C ... +60 °C	400 [8] 280 [9] 430 [10] – –	100 [3] 290 [4] 500 [5] 1,000 [6] 1,100 [7]	LL3-TG04	5324499
							Dimensional drawing → F-137	
		0.06 mm	1 mm	–40 °C ... +60 °C	560 [8] 470 [9] 690 [10] – –	160 [3] 480 [4] 800 [5] 1,600 [6] 1,700 [7]	LL3-TR08	5325984
							Dimensional drawing → F-142	
		0.04 mm	1 mm	–40 °C ... +60 °C	1,490 [8] 1,220 [9] 1,970 [10] – –	360 [3] 1,200 [4] 2,200 [5] 4,000 [6] 4,000 [7]	LL3-TR09	5325985
							Dimensional drawing → F-142	
	–		25 mm	–40 °C ... +70 °C	1,470 [8] 1,130 [9] 1,980 [10] – –	390 [3] 1,300 [4] 2,600 [5] 4,000 [6] 4,000 [7]	LL3-TS22	5325944
							Dimensional drawing → F-144	
			10 mm	–40 °C ... +105 °C	1,190 [8] 1,040 [9] 1,740 [10] – –	220 [3] 760 [4] 1,500 [5] 2,900 [6] 4,000 [7]	LL3-TS22M	5325968
							Dimensional drawing → F-144	

[1] FC fiber optic fiber cutter included in scope of delivery.

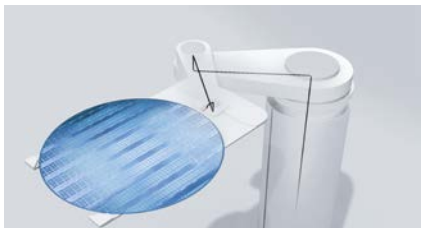
[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B



Detecting parts in the grabber

Robotics

These special fibers are designed for use in robotic applications involving repeated bending. Even after more than 800,000 bending cycles, transmission is reduced by less than 10%.

Robotics, proximity system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	3 m [1]	–	4 mm	0 °C ... +70 °C		14 [8]		18 [3]	LL3-DC04	5326018
						16 [9]		31 [4]		
						19 [10]		34 [5]		
					–	–		38 [6]		
					–	–		38 [7]	Dimensional drawing ➜ F-116	
	2 m [1]	–	4 mm	0 °C ... +70 °C		9 [8]		15 [3]	LL3-DC06	5326017
						11 [9]		22 [4]		
						12 [10]		23 [5]		
					–	–		25 [6]		
					–	–		25 [7]	Dimensional drawing ➜ F-116	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.015 mm	4 mm	–40 °C ... +70 °C		140 [8]		90 [3]	LL3-DR01	5308078
						140 [9]		280 [4]		
						260 [10]		450 [5]		
					–	–		880 [6]		
					–	–		1,350 [7]	Dimensional drawing ➜ F-123	
	1 m [1]	0.015 mm	4 mm	–40 °C ... +70 °C		30 [8]		18 [3]	LL3-DR02	5308079
						20 [9]		50 [4]		
						40 [10]		90 [5]		
					–	–		200 [6]		
					–	–		370 [7]	Dimensional drawing ➜ F-123	
	2 m [1]	0.015 mm	4 mm	–40 °C ... +70 °C		40 [8]		30 [3]	LL3-DR03	5308080
						40 [9]		85 [4]		
						80 [10]		140 [5]		
					–	–		300 [6]		
					–	–		600 [7]	Dimensional drawing ➜ F-123	
	1 m	0.015 mm	4 mm	–40 °C ... +70 °C		20 [8]		20 [3]	LL3-DR04	5308081
						30 [9]		70 [4]		
						60 [10]		110 [5]		
					–	–		220 [6]		
					–	–		360 [7]	Dimensional drawing ➜ F-123	
	500 mm	0.015 mm	4 mm	–40 °C ... +70 °C		10 [8]		10 [3]	LL3-DR05	5308087
						10 [9]		30 [4]		
						30 [10]		60 [5]		
					–	–		140 [6]		
					–	–		225 [7]	Dimensional drawing ➜ F-123	
	2 m [1]	0.015 mm	4 mm	–40 °C ... +70 °C		40 [8]		18 [3]	LL3-DR06	5308082
						30 [9]		60 [4]		
						60 [10]		100 [5]		
					–	–		220 [6]		
					–	–		360 [7]	Dimensional drawing ➜ F-123	
		0.02 mm	4 mm	–40 °C ... +70 °C		30 [8]		8 [3]	LL3-DR08	5326037
						10 [9]		25 [4]		
						30 [10]		46 [5]		
					–	–		90 [6]		
					–	–		98 [7]	Dimensional drawing ➜ F-124	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	500 mm [1]	0.015 mm	4 mm	–40 °C ... +70 °C		10 [8]		10 [3]	LL3-DT02	5308085
						10 [9]		30 [4]		
						30 [10]		60 [5]		
					–	–		140 [6]		
					–	–		225 [7]	Dimensional drawing ➜ F-125	
	500 mm	0.015 mm	4 mm	–40 °C ... +70 °C		20 [8]		13 [3]	LL3-DT04	5308086
						20 [9]		45 [4]		
						40 [10]		80 [5]		
					–	–		140 [6]		
					–	–		280 [7]	Dimensional drawing ➜ F-125	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

8014999/2019-05-24

Robotics, through-beam system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
 Suitable for tip adapters	2 m [1]	0.3 mm	4 mm	–40 °C ... +70 °C		470 [8]		200 [3]	LL3-TR01	5308052
						380 [9]		600 [4]		
						680 [10]		1,000 [5]		
					–	–		2,400 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-141	
	5 m [1]	0.3 mm	4 mm	–40 °C ... +70 °C		250 [8]		160 [3]	LL3-TR01-05	5322198
						400 [9]		450 [4]		
						600 [10]		800 [5]		
					–	–		1,900 [6]		
					–	–		2,800 [7]	Dimensional drawing → F-141	
	2 m [1]	0.1 mm	4 mm	–40 °C ... +70 °C		130 [8]		60 [3]	LL3-TR02	5308053
						100 [9]		175 [4]		
						180 [10]		330 [5]		
					–	–		750 [6]		
					–	–		1,100 [7]	Dimensional drawing → F-141	
	1 m [1]	0.1 mm	4 mm	–40 °C ... +70 °C		140 [8]		60 [3]	LL3-TR03	5308054
						150 [9]		175 [4]		
						240 [10]		330 [5]		
					–	–		750 [6]		
					–	–		1,100 [7]	Dimensional drawing → F-141	
	2 m [1]	0.1 mm	4 mm	–40 °C ... +70 °C		140 [8]		60 [3]	LL3-TR03-2	5308055
						150 [9]		175 [4]		
						240 [10]		330 [5]		
					–	–		750 [6]		
					–	–		1,100 [7]	Dimensional drawing → F-141	
	500 mm	0.02 mm	4 mm	–40 °C ... +60 °C		40 [8]		5 [3]	LL3-TR04	5325918
						20 [9]		17 [4]		
						50 [10]		28 [5]		
					–	–		56 [6]		
					–	–		60 [7]	Dimensional drawing → F-141	
	2 m [1]	0.03 mm	4 mm	–40 °C ... +60 °C		1,830 [8]		360 [3]	LL3-TR05	5325808
						1,280 [9]		1,300 [4]		
						2,000 [10]		2,300 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-141	
						1,830 [8]		560 [3]	LL3-TR06	5325912
						1,600 [9]		1,600 [4]		
						1,950 [10]		2,200 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-142	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

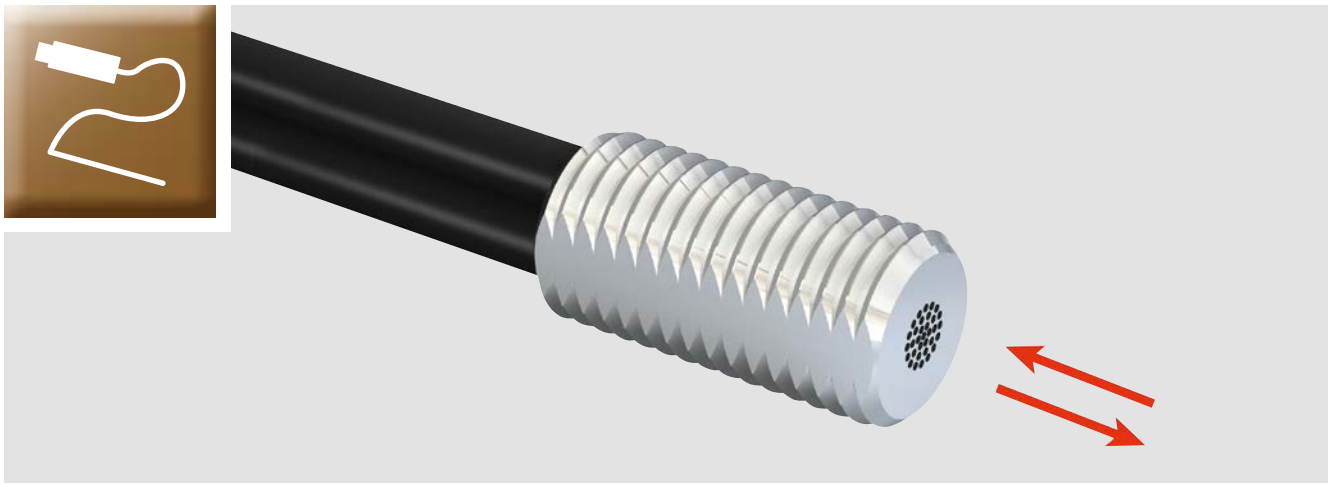
[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

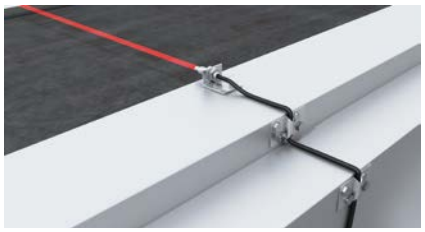
[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

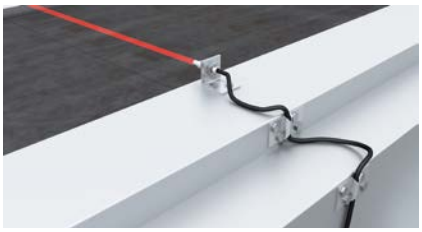
B

B





Highly-flexible fibers



Standard fibers.

Highly-flexible fibers

The highly-flexible fibers can be bent to a minimum bend radius of 1 mm. This means that you do not need to worry about damaging the fibers during installation.

Highly-flexible fibers, proximity system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	3 m [1]	–	4 mm	0 °C ... +70 °C		14 [8]		18 [3]	LL3-DC04	5326018
						16 [9]		31 [4]		
						19 [10]		34 [5]		
					–	–		38 [6]		
					–	–		38 [7]	Dimensional drawing ➜ F-116	
	2 m [1]	–	4 mm	0 °C ... +70 °C		9 [8]		15 [3]	LL3-DC06	5326017
						11 [9]		22 [4]		
						12 [10]		23 [5]		
					–	–		25 [6]		
					–	–		25 [7]	Dimensional drawing ➜ F-116	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Retro-reflective fiber with polarizing filter and reflector.

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.01 mm	1 mm	–40 °C ... +60 °C		32 [8]		12 [3]	LL3-DC47	5324268
						30 [9]		25 [4]		
						52 [10]		37 [5]		
					–	–		75 [6]		
					–	–		90 [7]	Dimensional drawing ➜ F-117	
	1 m [1]	0.16 mm	1 mm	–40 °C ... +60 °C		40 [8]		11 [3]	LL3-DE01	5325285
						20 [9]		38 [4]		
						50 [10]		78 [5]		
					–	–		150 [6]		
					–	–		160 [7]	Dimensional drawing ➜ F-117	
		0.01 mm	1 mm	–40 °C ... +60 °C		40 [8]		13 [3]	LL3-DE02	5324497
						30 [9]		48 [4]		
						60 [10]		86 [5]		
					–	–		170 [6]		
					–	–		180 [7]	Dimensional drawing ➜ F-118	
	2 m [1]	0.03 mm	1 mm	–40 °C ... +60 °C		150 [8]		45 [3]	LL3-DE03	5325986
						90 [9]		130 [4]		
						180 [10]		250 [5]		
					–	–		510 [6]		
					–	–		550 [7]	Dimensional drawing ➜ F-118	
						150 [8]		50 [3]	LL3-DE04	5325987
						90 [9]		130 [4]		
						180 [10]		250 [5]		
					–	–		500 [6]		
					–	–		540 [7]	Dimensional drawing ➜ F-118	
		0.015 mm	2 mm	–40 °C ... +70 °C		120 [8]		65 [3]	LL3-DK4Z	5313026
						160 [9]		200 [4]		
						290 [10]		350 [5]		
					–	–		650 [6]		
					–	–		1,000 [7]	Dimensional drawing ➜ F-122	
						120 [8]		90 [3]	LL3-DK63Z	5313027
						160 [9]		300 [4]		
						290 [10]		500 [5]		
					–	–		900 [6]		
					–	–		1,400 [7]	Dimensional drawing ➜ F-122	
						120 [8]		90 [3]	LL3-DK66	5313024
						160 [9]		300 [4]		
						290 [10]		500 [5]		
					–	–		900 [6]		
					–	–		1,400 [7]	Dimensional drawing ➜ F-122	
						120 [8]		90 [3]	LL3-DK67	5313025
						160 [9]		300 [4]		
						290 [10]		500 [5]		
					–	–		900 [6]		
					–	–		1,400 [7]	Dimensional drawing ➜ F-122	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

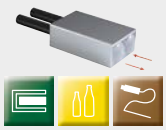
[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Retro-reflective fiber with polarizing filter and reflector.

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.015 mm	4 mm	–40 °C ... +70 °C		140 [8]		90 [3]	LL3-DR01	5308078
						140 [9]		280 [4]		
						260 [10]		450 [5]		
					–	–		880 [6]		
					–	–		1,350 [7]	Dimensional drawing → F-123	
	1 m [1]	0.015 mm	4 mm	–40 °C ... +70 °C		30 [8]		18 [3]	LL3-DR02	5308079
						20 [9]		50 [4]		
						40 [10]		90 [5]		
					–	–		200 [6]		
					–	–		370 [7]	Dimensional drawing → F-123	
	2 m [1]	0.015 mm	4 mm	–40 °C ... +70 °C		40 [8]		30 [3]	LL3-DR03	5308080
						40 [9]		85 [4]		
						80 [10]		140 [5]		
					–	–		300 [6]		
					–	–		600 [7]	Dimensional drawing → F-123	
	1 m	0.015 mm	4 mm	–40 °C ... +70 °C		20 [8]		20 [3]	LL3-DR04	5308081
						30 [9]		70 [4]		
						60 [10]		110 [5]		
					–	–		220 [6]		
					–	–		360 [7]	Dimensional drawing → F-123	
		0.015 mm	4 mm	–40 °C ... +70 °C		40 [8]		18 [3]	LL3-DR06	5308082
						30 [9]		60 [4]		
						60 [10]		100 [5]		
					–	–		220 [6]		
					–	–		360 [7]	Dimensional drawing → F-123	
	2 m [1]	0.03 mm	1 mm	–20 °C ... +70 °C		370 [8]		110 [3]	LL3-DR09	5325528
						230 [9]		345 [4]		
						400 [10]		560 [5]		
					–	–		1,100 [6]		
					–	–		1,190 [7]	Dimensional drawing → F-124	
		0.02 mm	1 mm	–40 °C ... +60 °C		10 [8]		4 [3]	LL3-DR12	5326001
						0 [9]		13 [4]		
						20 [10]		27 [5]		
					–	–		55 [6]		
					–	–		59 [7]	Dimensional drawing → F-124	
	500 mm [1]	0.015 mm	4 mm	–40 °C ... +70 °C		10 [8]		10 [3]	LL3-DT02	5308085
						10 [9]		30 [4]		
						30 [10]		60 [5]		
					–	–		140 [6]		
					–	–		225 [7]	Dimensional drawing → F-125	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Retro-reflective fiber with polarizing filter and reflector.

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	500 mm	0.015 mm	4 mm	–40 °C ... +70 °C		20 [8]		13 [3]	LL3-DT04	5308086
						20 [9]		45 [4]		
						40 [10]		80 [5]		
					–	–		140 [6]		
					–	–		280 [7]	Dimensional drawing ➜ F-125	
	2 m [1]	0.015 mm	2 mm	–40 °C ... +70 °C		60 [8]		20 [3]	LL3-DV07	5322551
						60 [9]		110 [4]		
						100 [10]		180 [5]		
					–	–		400 [6]		
					–	–		650 [7]	Dimensional drawing ➜ F-126	
		0.3 mm	1 mm	–25 °C ... +55 °C		410 [8]		290 [3]	LL3-RR01 [11]	5326008
						380 [9]		580 [4]		
						520 [10]		720 [5]		
					–	–		1,450 [6]		
					–	–		1,550 [7]	Dimensional drawing ➜ F-132	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

[11] Retro-reflective fiber with polarizing filter and reflector.

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Highly-flexible fibers, through-beam system

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1]	0.01 mm	1 mm	–40 °C ... +60 °C	▮	117 [8]	▮	35 [3]	LL3-DC57	5324269
					▬	178 [9]	▬	45 [4]		
					▬▬	300 [10]	▬	55 [5]		
					–	–	▬▬	250 [6]		
					–	–	▬▬▬	330 [7]	Dimensional drawing → F-133	
	1 m [1]	0.08 mm	1 mm	–40 °C ... +60 °C	▬	480 [8]	▮	120 [3]	LL3-TE01	5325807
					▮	370 [9]	▬	350 [4]		
					▬▬	630 [10]	▬	620 [5]		
					–	–	▬▬	1,250 [6]		
					–	–	▬▬▬	1,330 [7]	Dimensional drawing → F-136	
					▬	180 [8]	▮	40 [3]	LL3-TE02	5325910
					▮	140 [9]	▬	140 [4]		
					▬▬	190 [10]	▬	220 [5]		
					–	–	▬▬	450 [6]		
					–	–	▬▬▬	480 [7]	Dimensional drawing → F-136	
	2 m [1]	0.08 mm	1 mm	–40 °C ... +60 °C	▬	760 [8]	▮	190 [3]	LL3-TE03	5325908
					▮	600 [9]	▬	580 [4]		
					▬▬	1,010 [10]	▬	980 [5]		
					–	–	▬▬	1,970 [6]		
					–	–	▬▬▬	2,100 [7]	Dimensional drawing → F-136	
		0.03 mm	1 mm	–40 °C ... +60 °C	▬	500 [8]	▮	150 [3]	LL3-TE04	5325911
					▮	430 [9]	▬	440 [4]		
					▬▬	600 [10]	▬	700 [5]		
					–	–	▬▬	1,400 [6]		
					–	–	▬▬▬	1,490 [7]	Dimensional drawing → F-137	
			4 mm	–40 °C ... +60 °C	▬	570 [8]	▮	150 [3]	LL3-TE05	5325914
					▮	450 [9]	▬	460 [4]		
					▬▬	720 [10]	▬	840 [5]		
					–	–	▬▬	1,680 [6]		
					–	–	▬▬▬	1,780 [7]	Dimensional drawing → F-137	
		0.06 mm	1 mm	–40 °C ... +55 °C	▬	1,730 [8]	▮	580 [3]	LL3-TG02	5325943
					▮	1,650 [9]	▬	1,670 [4]		
					▬▬	2,060 [10]	▬	2,400 [5]		
					–	–	▬▬▬	4,000 [6]		
					–	–	▬▬▬	4,000 [7]	Dimensional drawing → F-137	
		0.02 mm	10 mm	–40 °C ... +60 °C	▬	400 [8]	▮	100 [3]	LL3-TG04	5324499
					▮	280 [9]	▬	290 [4]		
					▬▬	430 [10]	▬	500 [5]		
					–	–	▬▬	1,000 [6]		
					–	–	▬▬▬	1,100 [7]	Dimensional drawing → F-137	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

8014999/2019-05-24
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Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	2 m [1] 	0.02 mm	1 mm	−40 °C ... +60 °C		40 [8]		13 [3]	LL3-TG05	5325921
						30 [9]		50 [4]		
						60 [10]		85 [5]		
					–	–		170 [6]		
					–	–		180 [7]	Dimensional drawing ➜ F-137	
		0.2 mm	2 mm	−40 °C ... +70 °C		540 [8]		220 [3]	LL3-TK05	5313034
						450 [9]		650 [4]		
						760 [10]		1,200 [5]		
					–	–		2,750 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-140	
 Suitable for tip adapters						420 [8]		220 [3]	LL3-TK77	5313035
						450 [9]		650 [4]		
						760 [10]		1,200 [5]		
					–	–		2,750 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-140	
	500 mm	0.02 mm	5 mm	−40 °C ... +70 °C		8 [8]		2 [3]	LL3-TP01	5325925
						8 [9]		8 [4]		
						12 [10]		14 [5]		
					–	–		28 [6]		
					–	–		30 [7]	Dimensional drawing ➜ F-141	
 Suitable for tip adapters	2 m [1] 	0.3 mm	4 mm	−40 °C ... +70 °C		470 [8]		200 [3]	LL3-TR01	5308052
						380 [9]		600 [4]		
						680 [10]		1,000 [5]		
					–	–		2,400 [6]		
					–	–		4,000 [7]	Dimensional drawing ➜ F-141	
	5 m [1] 	0.3 mm	4 mm	−40 °C ... +70 °C		250 [8]		160 [3]	LL3-TR01-05	5322198
						400 [9]		450 [4]		
						600 [10]		800 [5]		
					–	–		1,900 [6]		
					–	–		2,800 [7]	Dimensional drawing ➜ F-141	
	2 m [1] 	0.1 mm	4 mm	−40 °C ... +70 °C		130 [8]		60 [3]	LL3-TR02	5308053
						100 [9]		175 [4]		
						180 [10]		330 [5]		
					–	–		750 [6]		
					–	–		1,100 [7]	Dimensional drawing ➜ F-141	
	1 m [1] 	0.1 mm	4 mm	−40 °C ... +70 °C		140 [8]		60 [3]	LL3-TR03	5308054
						150 [9]		175 [4]		
						240 [10]		330 [5]		
					–	–		750 [6]		
					–	–		1,100 [7]	Dimensional drawing ➜ F-141	
	2 m [1] 	0.1 mm	4 mm	−40 °C ... +70 °C		140 [8]		60 [3]	LL3-TR03-2	5308055
						150 [9]		175 [4]		
						240 [10]		330 [5]		
					–	–		750 [6]		
					–	–		1,100 [7]	Dimensional drawing ➜ F-141	

[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

B

B

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm		Sensing range with WLL180T in mm		Type	Part no.
	500 mm	0.02 mm	4 mm	–40 °C ... +60 °C		40 [8]		5 [3]	LL3-TR04	5325918
						20 [9]		17 [4]		
						50 [10]		28 [5]		
					–	–		56 [6]		
					–	–		60 [7]	Dimensional drawing → F-141	
	2 m [1] 	0.03 mm	4 mm	–40 °C ... +60 °C		1,830 [8]		360 [3]	LL3-TR05	5325808
						1,280 [9]		1,300 [4]		
						2,000 [10]		2,300 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-141	
						1,830 [8]		560 [3]	LL3-TR06	5325912
						1,600 [9]		1,600 [4]		
						1,950 [10]		2,200 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-142	
		0.06 mm	1 mm	–40 °C ... +60 °C		560 [8]		160 [3]	LL3-TR08	5325984
						470 [9]		480 [4]		
						690 [10]		800 [5]		
					–	–		1,600 [6]		
					–	–		1,700 [7]	Dimensional drawing → F-142	
		0.04 mm	1 mm	–40 °C ... +60 °C		1,490 [8]		360 [3]	LL3-TR09	5325985
						1,220 [9]		1,200 [4]		
						1,970 [10]		2,200 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-142	
		0.02 mm	1 mm	–40 °C ... +60 °C		1,070 [8]		380 [3]	LL3-TR10	5325920
						1,200 [9]		1,220 [4]		
						1,750 [10]		2,000 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-142	
		0.08 mm	1 mm	–40 °C ... +60 °C		1,570 [8]		590 [3]	LL3-TR11	5325906
						1,490 [9]		1,500 [4]		
						1,950 [10]		2,200 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-142	
		0.05 mm	1 mm	–40 °C ... +60 °C		2,130 [8]		600 [3]	LL3-TR12	5325907
						1,410 [9]		1,400 [4]		
						2,000 [10]		2,300 [5]		
					–	–		4,000 [6]		
					–	–		4,000 [7]	Dimensional drawing → F-142	
		0.04 mm	1 mm	–40 °C ... +60 °C		920 [8]		250 [3]	LL3-TR13	5325909
						720 [9]		730 [4]		
						1,210 [10]		1,280 [5]		
					–	–		2,560 [6]		
					–	–		2,730 [7]	Dimensional drawing → F-143	

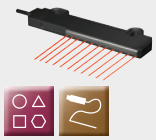
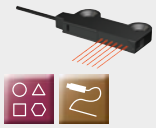
[1] FC fiber optic fiber cutter included in scope of delivery.

[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

Figure	Length	Min. object diameter [2]	Bend radius, fiber-optic cable	Ambient temperature, operation	Sensing range with GLL170 in mm	Sensing range with WLL180T in mm	Type	Part no.
	2 m [1] 	0.4 mm	2 mm	−40 °C ... +60 °C	350 [8]	3,000 [3]	LL3-TS40	5323971
					350 [9]	4,000 [4]		
					350 [10]	4,000 [5]		
					–	4,000 [6]		
					–	4,000 [7]	Dimensional drawing ➜ F-144	
				−40 °C ... +70 °C	460 [8]	340 [3]	LL3-TV07	5322548
					840 [9]	1,000 [4]		
					1,290 [10]	1,800 [5]		
					–	4,000 [6]		
					–	4,000 [7]	Dimensional drawing ➜ F-144	
					200 [8]	340 [3]	LL3-TV77	5326557
					640 [9]	1,000 [4]		
					1,068 [10]	1,800 [5]		
					–	4,000 [6]		
					–	4,000 [7]	Dimensional drawing ➜ F-145	
		0.25 mm	1 mm	−40 °C ... +55 °C	2,000 [8]	1,300 [3]	LL3-TZ09	5326598
					2,000 [9]	2,500 [4]		
					2,500 [10]	3,000 [5]		
					–	3,500 [6]		
					–	4,000 [7]	Dimensional drawing ➜ F-146	

[1] FC fiber optic fiber cutter included in scope of delivery.

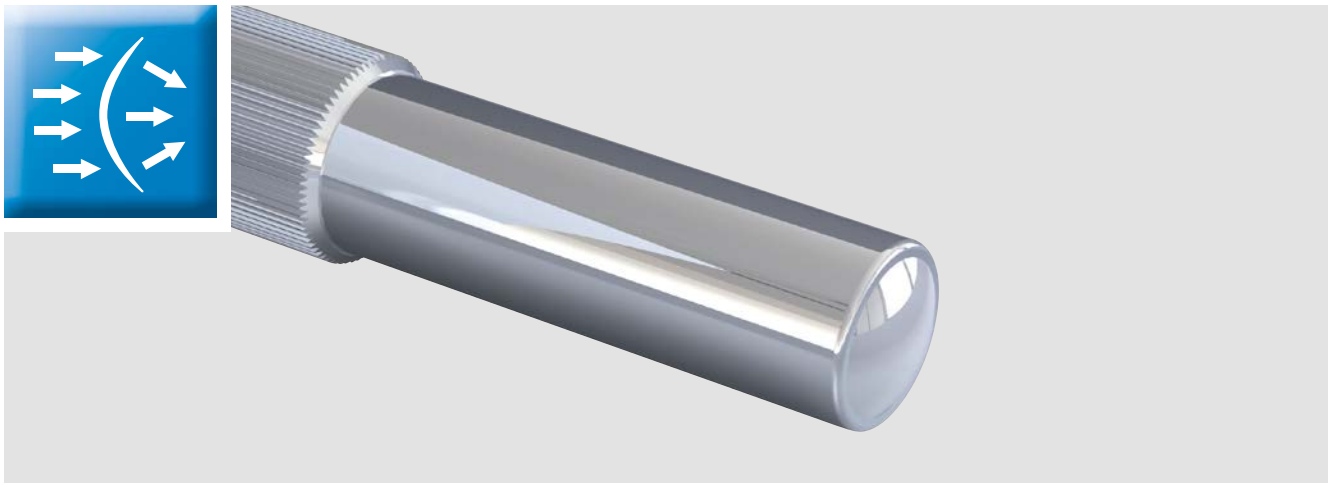
[2] Minimum detectable object was determined at optimal measuring distance and optimal setting.

[3] Operating mode: 16 µs.[4] Operating mode: 70 µs.[5] Operating mode: 250 µs.[6] Operating mode: 2 ms.[7] Operating mode: 8 ms.

[8] Operating mode: 250 µs (potentiometer).[9] Operating mode: 50 µs (teach-in).[10] Operating mode: 250 µs (teach-in).

Fiber optic cables with lengths different to the products shown here are available on request.

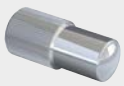
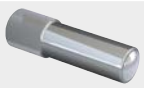
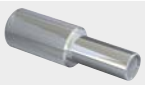
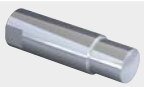
B



Tip adapters, proximity system

C

Tip adapters are available for a variety of fibers. They focus the light beam at a defined distance. For proximity style fibers, a very small light spot is created for detecting fine and small objects. The LL3-DA07 tip adapter also deflects the light by 90°.

Figure	Temperature	Light spot size			Focal length	Type	Part no.
		LL3-DK21	LL3-DT01	LL3-DM02	[mm]		
	–40 °C ... +70 °C	Ø 0.2 mm	Ø 0.4 mm	–	6	LL3-DA01	5308127
	–40 °C ... +70 °C	Ø 1.2 mm	Ø 1.4 mm	–	15	LL3-DA02	5308130
	-20 °C ... +60 °C	Ø 0. mm	Ø 0.4 mm	–	7	LL3-DA03	5326465
	–40 °C ... +70 °C	Ø 0.3 mm	Ø 0.5 mm	–	7.5	LL3-DA04	5326466
	–40 °C ... +70 °C	–	–	Ø 0.5 mm	6	LL3-DA05	5326467
	–40 °C ... +70 °C	–	–	Ø 0.7 mm ... 0.85 mm	~ 20	LL3-DA06	5326468
	–40 °C ... +70 °C	–	–	Ø 0.5 mm ... 0.8 mm	~ 14	LL3-DA07	5326469

Dimensional drawings ➜ Page F-149

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C

Adapter lenses

C

Tip adapters, through-beam system

Tip adapters are available for a variety of fibers. They focus the light beam. The sensing range of through-beam fibers can be considerably increased by using tip adapters. Focusing the light beam also minimizes the risk of the light being directed past any highly reflective surfaces on the object. The LL3-TA02 and LL3-TA05 models enable an additional 90° deflection.

Sensing ranges with GLL170 amplifier

Figure	Temperature	LL type/sensing range (mm)											
		LL3-TB01		LL3-TB01-10		LL3-TB01-30		LL3-TB02		LL3-TB06		LL3-TH01	
	–40 °C ... +100 °C	> 3,500 [1] > 3,500 [2] > 3,500 [3]		2,500 [1] 3,800 [2] 2,700 [3]		1,200 [1] 1,800 [2] 1,300 [3]		3,100 [1] > 3,500 [2] 3,000 [3]		3000 [1] > 3,500 [2] 2,950 [3]		–	–
	–40 °C ... +100 °C	> 3,500 [1] > 3,500 [2] > 3,500 [3]		2,500 [1] 3,800 [2] 2,700 [3]		1,200 [1] 1,800 [2] 1,300 [3]		3,100 [1] > 3,500 [2] 3,000 [3]		3000 [1] > 3,500 [2] 2,950 [3]		–	–
	–40 °C ... +70 °C	1,000 [1] 1,800 [2] 1,030 [3]		650 [1] 1,100 [2] 620 [3]		310 [1] 530 [2] 300 [3]		810 [1] 1,250 [2] 700 [3]		780 [1] 1,230 [2] 690 [3]		–	–
	–40 °C ... +350 °C	> 3,500 [1] > 3,500 [2] > 3,500 [3]		2,200 [1] 3,300 [2] 2,500 [3]		1,000 [1] 1,600 [2] 1,200 [3]		2,600 [1] > 3,500 [2] 2,800 [3]		2,700 [1] > 3,500 [2] 2,750 [3]		1,800 [1] 2,600 [2] 1,800 [3]	
	–60 °C ... +350 °C	> 3,500 [1] > 3,500 [2] > 3,500 [3]		10,300 [1] 15,000 [2] 9,400 [3]		5,000 [1] 7,400 [2] 4,500 [3]		3,500 [1] 3,500 [2] 3,500 [3]		3,500 [1] 3,500 [2] 3,500 [3]		3,500 [1] 3,500 [2] 3,500 [3]	
	–60 °C ... +300 °C	1,000 [1] 1,500 [2] 930 [3]		620 [1] 940 [2] 570 [3]		300 [1] 450 [2] 270 [3]		770 [1] 1,050 [2] 650 [3]		740 [1] 1,050 [2] 640 [3]		500 [1] 750 [2] 420 [3]	

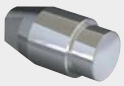
[1] Operating mode: 250 µs (potentiometer).[2] Operating mode: 50 µs (teach-in).[3] Operating mode: 250 µs (teach-in).Mounting material included.

Dimensional drawings ➜ Page F-148

C

LL model name/sensing range (mm)													Type	Part no.
LL3-TH08		LL3-TH10		LL3-TH11		LL3-TJ01		LL3-TK77		LL3-TR01				
–	–	–	–	–	–	> 1,500 [1]		2,100 [1]		2,300 [1]			LL3-TA01	5308128
						> 1,500 [2]		3,500 [2]		3,200 [2]				
						> 1,500 [3]		2,450 [3]		2,050 [3]				
–	–	–	–	–	–	> 1,500 [1]		2,100 [1]		2,300 [1]			LL3-TA01S	5326461
						> 1,500 [2]		3,500 [2]		3,200 [2]				
						> 1,500 [3]		2,450 [3]		2,050 [3]				
–	–	–	–	–	–	700 [1]		550 [1]		600 [1]			LL3-TA02	5308129
						980 [2]		1,050 [2]		950 [2]				
						560 [3]		560 [3]		480 [3]				
	2,500 [1]		870 [1]		> 1,500 [1]		> 1,500 [1]		1,800 [1]		2,000 [1]		LL3-TA03	5326462
	3,100 [2]		1,200 [2]		> 1,500 [2]		> 1,500 [2]		3,200 [2]		2,800 [2]			
	2,500 [3]		960 [3]		> 1,500 [3]		> 1,500 [3]		2,200 [3]		1,900 [3]			
	3,500 [1]		> 1,500 [1]		> 1,500 [1]		> 1,500 [1]		3,500 [1]		3,500 [1]		LL3-TA04	5326463
	3,500 [2]		> 1,500 [2]		> 1,500 [2]		> 1,500 [2]		3,500 [2]		3,500 [2]			
	3,500 [3]		> 1,500 [3]		> 1,500 [3]		> 1,500 [3]		3,500 [3]		3,500 [3]			
	700 [1]		240 [1]		500 [1]		680 [1]		520 [1]		580 [1]		LL3-TA05	5326464
	870 [2]		330 [2]		800 [2]		840 [2]		900 [2]		800 [2]			
	590 [3]		220 [3]		500 [3]		530 [3]		520 [3]		440 [3]			

Sensing ranges with WLL180T amplifier

Figure	Tempera-ture	LL model name/sensing range (mm)											
		LL3-TB01		LL3-TB01-10		LL3-TB01-30		LL3-TB02		LL3-TB06		LL3-TH01	
	–40 °C ... +100 °C	800 [1]		720 [1]		570 [1]		1,800 [1]		1,500 [1]		500 [1]	
		2,500 [2]		2,250 [2]		1,800 [2]		4,000 [2]		4,000 [2]		1,400 [2]	
		4,000 [3]		3,600 [3]		2,880 [3]		4,000 [3]		4,000 [3]		2,500 [3]	
		4,000 [4]		3,600 [4]		2,880 [4]		4,000 [4]		4,000 [4]		4,000 [4]	
		4,000 [5]		3,600 [5]		2,880 [5]		4,000 [5]		4,000 [5]		4,000 [5]	
	–40 °C ... +100 °C	800 [1]		720 [1]		570 [1]		1,800 [1]		1,500 [1]		500 [1]	
		2,500 [2]		2,250 [2]		1,800 [2]		4,000 [2]		4,000 [2]		1,400 [2]	
		4,000 [3]		3,600 [3]		2,880 [3]		4,000 [3]		4,000 [3]		2,500 [3]	
		4,000 [4]		3,600 [4]		2,880 [4]		4,000 [4]		4,000 [4]		4,000 [4]	
		4,000 [5]		3,600 [5]		2,880 [5]		4,000 [5]		4,000 [5]		4,000 [5]	
	–40 °C ... +70 °C	200 [1]		180 [1]		150 [1]		300 [1]					
		650 [2]		585 [2]		460 [2]		1,000 [2]					
		1,200 [3]		1,080 [3]		860 [3]		1,800 [3]		–	–	–	–
		2,500 [4]		2,250 [4]		1,800 [4]		3,500 [4]					
		3,600 [5]		3,240 [5]		2,600 [5]		4,000 [5]					
	–40 °C ... +350 °C	360 [1]		324 [1]		260 [1]		1,200 [1]		1,200 [1]		1,200 [1]	
		2,000 [2]		1,800 [2]		1,440 [2]		4,000 [2]		4,000 [2]		2,000 [2]	
		4,000 [3]		3,600 [3]		2,880 [3]		4,000 [3]		4,000 [3]		4,000 [3]	
		4,000 [4]		3,600 [4]		2,880 [4]		4,000 [4]		4,000 [4]		4,000 [4]	
		4,000 [5]		3,600 [5]		2,880 [5]		4,000 [5]		4,000 [5]		4,000 [5]	
	–60 °C ... +350 °C	4,000 [1]		3,600 [1]		2,880 [1]		4,000 [1]		4,000 [1]		4,000 [1]	
		4,000 [2]		3,600 [2]		2,880 [2]		4,000 [2]		4,000 [2]		4,000 [2]	
		4,000 [3]		3,600 [3]		2,880 [3]		4,000 [3]		4,000 [3]		4,000 [3]	
		4,000 [4]		3,600 [4]		2,880 [4]		4,000 [4]		4,000 [4]		4,000 [4]	
		4,000 [5]		3,600 [5]		2,880 [5]		4,000 [5]		4,000 [5]		4,000 [5]	
	–60 °C ... +300 °C	250 [1]		225 [1]		180 [1]		250 [1]				160 [1]	
		800 [2]		720 [2]		570 [2]		800 [2]				450 [2]	
		1,200 [3]		1,080 [3]		860 [3]		1,200 [3]		–	–	800 [3]	
		2,400 [4]		2,160 [4]		1,700 [4]		2,400 [4]				1,500 [4]	
		4,000 [5]		3,600 [5]		2,880 [5]		4,000 [5]				4,000 [5]	

[1] Operating mode: 16 µs.[2] Operating mode: 70 µs.[3] Operating mode: 250 µs.[4] Operating mode: 2 ms.[5] Operating mode: 8 ms.Mounting material included.

Dimensional drawings ➜ Page F-148

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LL model name/sensing range (mm)												Type	Part no.
LL3-TH08		LL3-TH10		LL3-TH11		LL3-TJ01		LL3-TK77		LL3-TR01			
–	–	–	–	–	–	750 [1]		2,000 [1]		1,800 [1]		LL3-TA01	5308128
						2,000 [2]		4,000 [2]		4,000 [2]			
						2,000 [3]		4,000 [3]		4,000 [3]			
						2,000 [4]		4,000 [4]		4,000 [4]			
						2,000 [5]		4,000 [5]		4,000 [5]			
–	–	–	–	–	–	650 [1]		2,000 [1]		1,800 [1]		LL3-TA01S	5326461
						2,000 [2]		4,000 [2]		4,000 [2]			
						2,000 [3]		4,000 [3]		4,000 [3]			
						2,000 [4]		4,000 [4]		4,000 [4]			
						2,000 [5]		4,000 [5]		4,000 [5]			
–	–	–	–	–	–	200 [1]		300 [1]		200 [1]		LL3-TA02	5308129
						600 [2]		950 [2]		900 [2]			
						950 [3]		1,800 [3]		1,500 [3]			
						1,900 [4]		3,500 [4]		3,300 [4]			
						4,000 [5]		4,000 [5]		4,000 [5]			
	800 [1]		750 [1]		1,000 [1]		600 [1]		600 [1]		800 [1]	LL3-TA03	5326462
	2,000 [2]		2,000 [2]		2,000 [2]		2,000 [2]		2,000 [2]		2,000 [2]		
	4,000 [3]		2,000 [3]		2,000 [3]		2,000 [3]		4,000 [3]		4,000 [3]		
	4,000 [4]		2,000 [4]		2,000 [4]		2,000 [4]		4,000 [4]		4,000 [4]		
	4,000 [5]		2,000 [5]		2,000 [5]		2,000 [5]		4,000 [5]		4,000 [5]		
	4,000 [1]		2,000 [1]		2,000 [1]		2,000 [1]		4,000 [1]		4,000 [1]	LL3-TA04	5326463
	4,000 [2]		2,000 [2]		2,000 [2]		2,000 [2]		4,000 [2]		4,000 [2]		
	4,000 [3]		2,000 [3]		2,000 [3]		2,000 [3]		4,000 [3]		4,000 [3]		
	4,000 [4]		2,000 [4]		2,000 [4]		2,000 [4]		4,000 [4]		4,000 [4]		
	4,000 [5]		2,000 [5]		2,000 [5]		2,000 [5]		4,000 [5]		4,000 [5]		
	170 [1]		100 [1]		150 [1]		200 [1]		200 [1]		160 [1]	LL3-TA05	5326464
	550 [2]		300 [2]		400 [2]		600 [2]		600 [2]		550 [2]		
	800 [3]		600 [3]		700 [3]		950 [3]		950 [3]		850 [3]		
	1,600 [4]		1,100 [4]		1,400 [4]		1,900 [4]		1,900 [4]		1,700 [4]		
	4,000 [5]		2,000 [5]		4,000 [5]		4,000 [5]		4,000 [5]		4,000 [5]		

C

FIBER-OPTIC SENSORS

D

Fit flexibly into the narrowest corners

When installation space is extremely limited or the objects to be detected are tiny, fiber-optic sensors are the ideal solution. If it is necessary for even higher requirements to be fulfilled, such as sensing range, temperature resistance, material durability or a flexible mounting process, the intelligent combination of sensors and fibers can provide the perfect solution. A wide range of fibers with application-specific optical heads ensure that every need is met.

Your benefits

- Reliable and accurate detection of the smallest objects thanks to innovative, microcontroller-supported electronics
- EMC, high temperature tolerance and resistance to chemicals, as the evaluation electronics are mounted separately from the fiber-optic head
- Space-saving mounting even in confined spaces
- Multiple setting options provide solutions for practically any application
- Lightweight, suitable for use on a robot arm
- Universal application possibilities due to wide range of fibers

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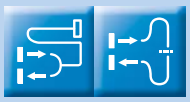
PRODUCT FAMILY OVERVIEW



GLL170

Simple, flexible detection

WLL180T

A global leader when it comes to sensing range and performance

Technical data overview		
Dimensions (W x H x D)	10 mm x 31.7 mm x 72.5 mm	10.5 mm x 34.6 mm x 71.9 mm
Type of light	Visible red light	Visible red light/infrared
Enclosure rating	IP 66	IP 50
Housing material	Plastic	Plastic
Setting	Potentiometer, teach-in button, cable	Menu-controlled, single teach-in button, cable
Response time	≤ 250 µs / ≤ 50 µs, selectable via menu	≤ 16 µs, ≤ 70 µs, ≤ 250 µs, ≤ 2,000 µs, ≤ 8,000 µs
At a glance		
	• Intuitive operating concept • Rapid response time of 50 µs • Switching threshold adjustment via potentiometer, or teach-in via pushbutton or cable • IP 66 enclosure rating for high degree of ruggedness • PNP/NPN switchover (teach-in variant) • 4-digit digital display (teach-in variant) • Variable fixing concept • Various connection types available	• Selectable response time up to 16 µs • Sensing range up to 20 m (through-beam system); up to 1400 mm (proximity system) • Bus-compatible with anti-interference • 2 x 4-digit digital display • Adjustable hysteresis • Rotatable display screen • High-resolution signal processing • Programmable time delays
Detailed information	➜ D-92	➜ D-98

D

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Subject to change without notice

Fast response time

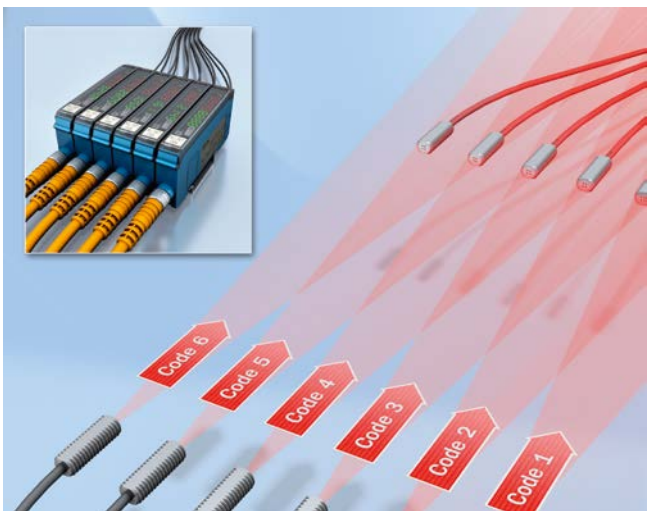
The world's fastest fiber-optic sensor in its class with a 16 µs response time for precise object positioning and detection in fast processes. It reliably detects up to 31,250 workpieces per second.

D

High sensing ranges and robustness against contamination

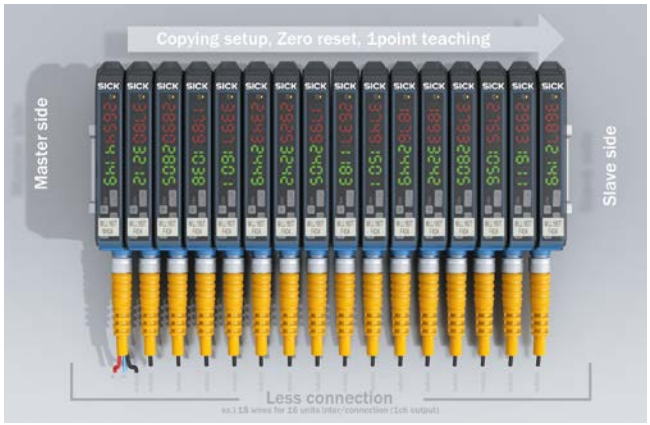
Even sensing ranges of up to 20 m can be achieved with the WLL180T and the corresponding fiber. The powerful light beam penetrates particles in the air. Workpieces are detected even under difficult conditions, such as dust, mist or spray.

Anti-interference



Synchronization of the transmission pulse pattern of up to 16 devices in bus mode. This prevents mutual interference when fiber-optic heads are mounted close to one another (anti-interference).

Efficient configuration



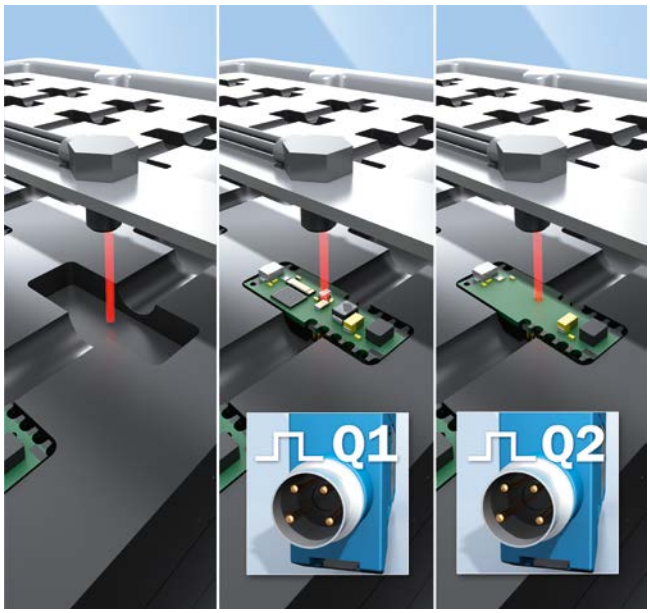
The copy function simplifies commissioning. When required, all settings can be copied to the other bus devices at the touch of a button.
All connected WLL180T sensors can be individually configured on the device or via the relevant teach-in cable. If all devices should be taught-in simultaneously, this can be done via bus coupling with a single teach-in cable.
In bus mode, the expansion units are supplied with voltage by the base unit which reduces the wiring work.

Variable display

Easy reading guaranteed: The 7-segment display can be turned upside down in difficult installation conditions.

D

Variant with 2 switching outputs



The WLL180T variant with two switching outputs allows each of the two switching outputs to be independently configured. This eliminates the need for a separate trigger photoelectric sensor. Furthermore, it allows more information to be recorded that is available to the switching outputs. It is therefore possible to detect different object states.

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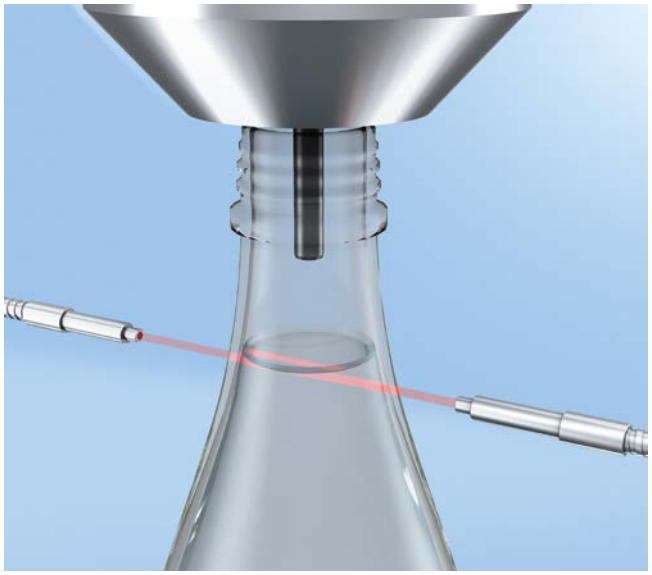
Variant with infrared emitted light

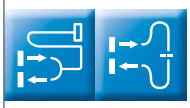


Fiber-optic amplifiers with optimized infrared emitted light (in conjunction with suitable glass fibers) enable a desired, specific liquid level to be indicated without the sensor having to come into contact with the liquid medium. Because water-based liquids almost completely absorb infrared emitted light, no undesirable optical effects (due to the liquid or transparent container) arise, which guarantees reliable detection.

General advantages

- The male/female connector design means installation on a mounting rail is extremely easy.
- ASC for maintenance-free operation: If, for example, the light intensity is reduced by dust, this is detected and the switching threshold compensates accordingly. The switching threshold is automatically recalibrated after the optics are cleaned.
- Adjustable hysteresis: The hysteresis can be adjusted from 1% to 40%. This allows flexible configuration for the detection of complex objects.
- Anti-blooming function to prevent overload

SIMPLE, FLEXIBLE DETECTION



Product description

The GLL170 fiber-optic sensor is the reliable solution for all detection tasks in combination with the fibers in the LL3 product family. With its simple operating concept, the sensor is ideal for applications in harsh environments as well as when rapid response times are crucial. Different variants are available to suit all requirements: The GLL170 variant with potentiometer enables quick and easy commissioning thanks to its intuitive operation. The GLL170T variant with teach-in function features a display for direct sensor feedback and provides solutions for numerous applications with its range of adjustments. With a switching frequency of up to 10 kHz, this sensor can even handle rapid processes with ease.

At a glance

- Intuitive operating concept
- Rapid response time of 50 µs
- Switching threshold adjustment via potentiometer, or teach-in via push-button or cable
- IP 66 enclosure rating for high degree of ruggedness
- PNP/NPN switchover (teach-in variant)
- 4-digit digital display (teach-in variant)
- Variable fixing concept
- Various connection types available

Your benefits

- User-friendly handling enables fast commissioning
- Reliable detection even in rapid processes
- Easy to adjust with intuitive potentiometer or teach-in button
- Rugged sensor housing enables mounting outside the control cabinet
- Sensor parameters can be flexibly adapted to a diverse range of applications (teach-in variant)
- Easy monitoring of process parameters (teach-in variant)
- Quick and easy mounting on a mounting rail or using the fixing holes on the sensor
- Can be combined with fibers from the extensive SICK portfolio to form solutions for numerous applications

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More information

→ www.sick.com/GLL170

For more information, simply enter the link or scan the QR code to get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.

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Detailed technical data

Features

	GLL170	GLL170T
Sensor principle	Fiber-optic sensor	
Device type	Standalone	
Dimensions (W x H x D)	10 mm x 31.7 mm x 72.5 mm	
Housing design (light emission)	Cuboid	
Sensing range max.	0 mm ... 190 mm, proximity system [1) 2)] 0 mm ... 800 mm, through-beam system [3)]	0 mm ... 400 mm, proximity system [1) 2)] 0 mm ... 1,320 mm, through-beam system [3)]
Sensing range	0 mm ... 160 mm, proximity system [1) 2)] 0 mm ... 700 mm, through-beam system [3)]	0 mm ... 350 mm, proximity system [1) 2)] 0 mm ... 1,100 mm, through-beam system [3)]
Type of light	Visible red light	
Light sender [4)]	LED	
Wavelength	632 nm	
Setting	Potentiometer, 8 rotations [5)]	Teach-in button Cable Plus/minus button
Time type	Without time delay, switch-off delay	Switch-on delay, switch-off delay, one-shot, without time delay
Delay time	Selectable using rotary switch, 0 ms, 40 ms	Programmable, 0 ms, 100 ms
Display	LED	Display
Display	Status LEDs	Status LEDs, 4-digit digital display, display can be selected between percentage value, absolute digit value and bar graph/display of the parameters

[1)] Object with 90% remission (based on standard white, DIN 5033).

[2)] NF-DK06.

[3)] NF-TB02.

[4)] Average service life: 100,000 h at T_U = +25 °C.

[5)] Sensitivity level 230°.

Mechanics/electronics

	GLL170	GLL170T
Supply voltage [1)]	10 V DC ... 30 V DC	
Residual ripple [2)]	≤ 10%	
Current consumption [3)]	≤ 30 mA	≤ 40 mA
Switching output	PNP/NPN (depending on type)	PNP/NPN (selectable via menu)
Number of switching outputs	1	
Input	–	Teach-in input
Switching mode	Light/dark switching	
Selectable switching mode	Selectable via rotary switch	Selectable via menu
Output current $I_{max.}$	≤ 100 mA	
Response time [4)]	≤ 250 µs	≤ 250 µs ≤ 50 µs, selectable via menu
Switching frequency	2 kHz	2 kHz, 10 kHz
Connection type	Cable, 2 m [5)] Male connector, M8 (depending on type)	
Circuit protection	A [6)], B [7)], C [8)], D [9)]	
Protection class	III	

	GLL170	GLL170T
Weight		
Cable, 3-wire	63 g	66 g
Male connector, M8, 3-pin	19 g	22 g
M8 male connector, 4-pin	19 g	22 g
Housing material	PC/POM	
Max. tightening torque	0.5 Nm	
Enclosure rating [10]	IP 66	
Scope of delivery	Mounting bracket BEF-WLL180	
Ambient temperature, operation	–25 °C ... +55 °C	
Ambient temperature, storage	–40 °C ... +70 °C	

[1] Limit values.
[2] Must not exceed or fall short of U_V tolerances.
[3] Without load.
[4] Signal propagation time with ohmic load.
[5] Do not bend cables below 0 °C.
[6] A = U_V connections reverse polarity protected.
[7] B = inputs and outputs reverse-polarity protected.
[8] C = Interference suppression.
[9] D = outputs overcurrent and short-circuit protected.
[10] With correctly attached LL3 fibers.

Ordering information

Other device versions available here ➜ www.mysick.com/GLL170

GLL170

Sensing range max.	Configuration [4]	Switching mode	Connection	Connection diagram	Type	Part no.
0 mm ... 190 mm (proximity system) [1] [2] 0 mm ... 800 mm (through-beam system) [3]	Potentiometer, 8 rotations	PNP	Cable, 3-pin, 2 m	cd-043	GLL170-P332	6063334
			Male connector, M8, 3-pin	cd-045	GLL170-P333	6063336
			Male connector, M8, 4-pin	cd-066	GLL170-P334	6063335
		NPN	Cable, 3-pin, 2 m	cd-043	GLL170-N332	6063337
			Male connector, M8, 3-pin	cd-045	GLL170-N333	6063339
			Male connector, M8, 4-pin	cd-066	GLL170-N334	6063338

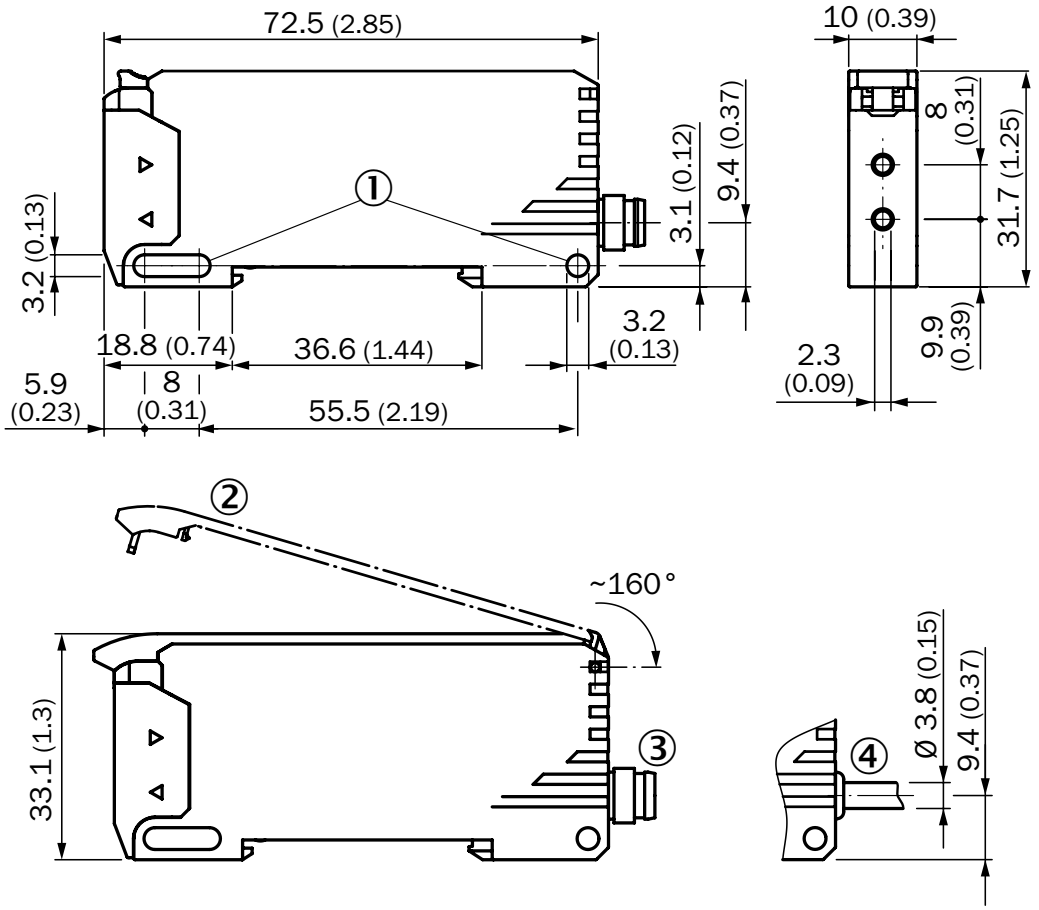
[1] Object with 90% remission (based on standard white, DIN 5033).
[2] NF-DK06.
[3] NF-TB02.
[4] Sensitivity level 230°.

GLL170T

Sensing range max.	Setting	Switching mode	Connection	Connection diagram	Type	Part no.
0 mm ... 400 mm (proximity system) [1] [2] 0 mm ... 1,320 mm (through-beam system) [3]	Teach-in button Cable Plus/minus button	PNP, NPN	Cable, 4-pin, 2 m	cd-093	GLL170T-B432	6063340
			Male connector, M8, 3-pin	cd-045	GLL170T-B333	6063342
			Male connector, M8, 4-pin	cd-092	GLL170T-B434	6063341

[1] Object with 90% remission (based on standard white, DIN 5033).
[2] NF-DK06.
[3] NF-TB02.

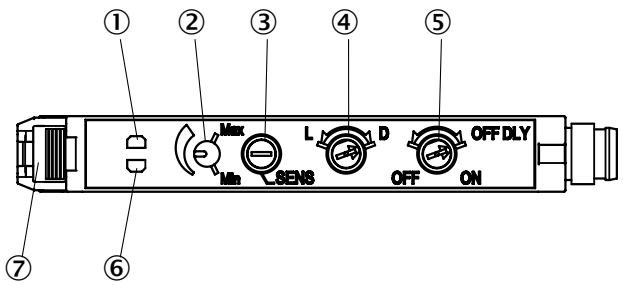
Dimensional drawing (dimensions in mm)



① Fixing holes
② Protective hood (optional) opens approx. 160°
③ Male connector, M8
④ Cable

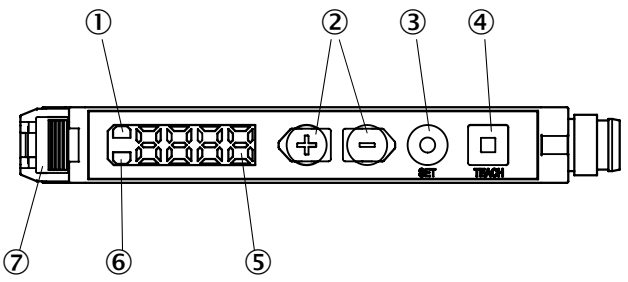
Adjustments

GLL170



① Orange LED indicator: Lights up when the switching output is active
② Sensitivity scale 230°
③ Sensitivity control: potentiometer, 8 rotations
④ Selector switch: “L.ON” (light switching) / “D.ON” (dark switching)
⑤ Selector switch for switch-off delay: “ON” / “OFF”, 40 ms fixed
⑥ Green receive indicator LED: Lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
⑦ Optical fiber interlocking

GLL170T



① Orange LED indicator: Lights up when the switching output is active
② Plus/minus button
③ SET button
④ Teach-in button
⑤ Display
⑥ Green LED indicator: Supply voltage active
⑦ Optical fiber interlocking

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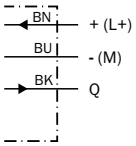
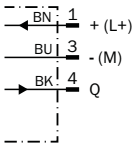
Connection diagram

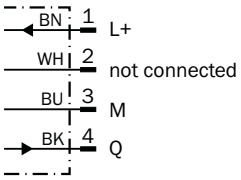
Cd-043



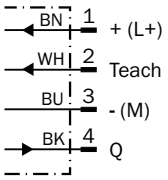
Cd-045



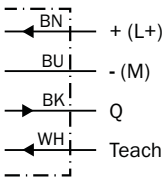
Cd-066



Cd-092



Cd-093



Recommended accessories

Mounting systems

Mounting brackets and plates

Figure	Material	Description	Type	Part no.
	Steel, zinc coated	Mounting bracket	BEF-WLL180	5325812

Other mounting accessories

Figure	Description	Type	Part no.
	Fiber cutting device, included in LL3 scope of delivery	FC	5304141
	Protective hood for GLL170, opens approx. 160°	BF-GLL170	5336263

Connectivity

Plug connectors and cables

Connecting cables with female connector

M8, 3-pin, PVC, resistant to chemicals

- **Cable material:** PVC
- **Material, plug connector:** TPU

Figure	Head A connection type	Head B connection type	Connecting cable	Material, knurled nut	Type	Part no.
	Female connector, M8, 3-pin, straight, unshielded	Cable, flying leads	2 m, 3-wire	CuZn, nickel-plated	YF8U13-020VA1XLEAX	2095860
			5 m, 3-wire	CuZn, nickel-plated	YF8U13-050VA1XLEAX	2095884
			10 m, 3-wire	CuZn, nickel-plated	YF8U13-100VA1XLEAX	2095885
	Female connector, M8, 3-pin, angled, unshielded	Cable, flying leads	2 m, 3-wire	CuZn, nickel-plated	YG8U13-020VA1XLEAX	2096165
			5 m, 3-wire	CuZn, nickel-plated	YG8U13-050VA1XLEAX	2096166
			10 m, 3-wire	CuZn, nickel-plated	YG8U13-100VA1XLEAX	2096209

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M8, 4-pin, PVC, resistant to chemicals

- **Cable material:** PVC
- **Material, knurled nut:** CuZn, nickel-plated

Figure	Head A connection type	Head B connection type	Connecting cable	Material, plug connector	Type	Part no.
	Female connector, M8, 4-pin, straight, unshielded	Cable, flying leads	2 m, 4-wire	TPU	YF8U14-020VA3XLEAX	2095888
			5 m, 4-wire	TPU	YF8U14-050VA3XLEAX	2095889
			10 m, 4-wire	TPU	YF8U14-100VA3XLEAX	2095890
	Female connector, M8, 4-pin, angled, unshielded	Cable, flying leads	2 m, 4-wire	PVC	YG8U14-020VA3XLEAX	2095962
			5 m, 4-wire	PVC	YG8U14-050VA3XLEAX	2095963
			10 m, 4-wire	PVC	YG8U14-100VA3XLEAX	2095964

Female connector (ready to assemble)

M8, 3-pin

Figure	Head A connection type	Head B connection type	Material, plug connector	Material, knurled nut	Type	Part no.
	Female connector, M8, 3-pin, straight, unshielded	Screw terminals	PBT/PA	CuZn	DOS-0803-G	7902077
	Female connector, M8, 3-pin, angled, unshielded	Solder connection	PA/zinc die cast	CuZn	DOS-0803-W	7902078

M8, 4-pin

Figure	Head A connection type	Head B connection type	Material, plug connector	Material, knurled nut	Type	Part no.
	Female connector, M8, 4-pin, straight, unshielded	Screw terminals	PBT/PA	CuZn	DOS-0804-G	6009974
	Female connector, M8, 4-pin, angled, unshielded	Solder connection	PA/zinc die cast	CuZn	DOS-0804-W	6009975

Male connector (ready to assemble)

M8, 3-pin

Figure	Head A connection type	Head B connection type	Material, plug connector	Material, knurled nut	Type	Part no.
	Male connector, M8, 3-pin, straight, unshielded	Screw terminals	PBT/PA	CuZn	STE-0803-G	6037322

M8, 4-pin

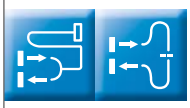
Figure	Head A connection type	Head B connection type	Material, plug connector	Material, knurled nut	Type	Part no.
	Male connector, M8, 4-pin, straight, unshielded	Screw terminals	PBT/PA	CuZn	STE-0804-G	6037323

Dimensional drawings ➜ Page F-114

A further selection of accessories can be found here ➜ E-104

D

A GLOBAL LEADER WHEN IT COMES TO SENSING RANGE AND PERFORMANCE



D

Product description

The WLL180T provides the world's fastest response time - only 16 µs. At the same time, the sensor offers maximum values for sensing range and operating reserve due to its high light intensity and resolution. This considerably increases process reliability, for example when used in dusty or moist environments. Commissioning is simple – either via the external teach-in input or directly on the unit. All programming steps, status displays, and target and actual values are shown on two four-digit displays. The WLL180T can be operated either as a stand-alone sensor or in a bus configuration, depending on your requirements. In a bus configuration, several sensors are networked via an internal bus, enabling the settings on one WLL180T to be copied to all other devices on the bus. Mutual interference by fiber-optic heads installed in close proximity is prevented by the integrated anti-interference logic.

At a glance

- Selectable response time up to 16 µs
- Sensing range up to 20 m (through-beam system); up to 1400 mm (proximity system)
- Bus-compatible with anti-interference
- 2 x 4-digit digital display
- Adjustable hysteresis
- Rotatable display screen
- High-resolution signal processing
- Programmable time delays

Your benefits

- Reliable, rapid process detection
- Workpieces are detected reliably, even under the most difficult of ambient conditions such as dust or spray mist
- No mutual effects from fiber-optic cable heads mounted in close proximity on account of bus communication
- Easy monitoring of process parameters
- Hysteresis can be adapted to suit the application, e.g., when detecting tiny or transparent objects
- Easy-to-read display, even under difficult installation conditions

More information

→ www.sick.com/WLL180T

For more information, simply enter the link or scan the QR code to get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.

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Detailed technical data

Features

	Visible red light	Infrared light
Sensor principle	Fiber-optic sensor	
Device type	Standalone Base unit [1] Expansion unit (depending on type)	Standalone
Dimensions (W x H x D)	10.5 mm x 34.6 mm x 71.9 mm	
Housing design (light emission)	Cuboid	
Sensing range max.	0 m ... 20 m, through-beam system [2] [3]	0 mm ... 1,000 mm, through-beam system [2] [4]
Sensing range	0 mm ... 1,400 mm, proximity system [5] [6] 0 ... 18 m, through-beam system [2] [3]	0 mm ... 400 mm, proximity system [5] [7] 0 m ... 850 mm, through-beam system [2] [4]
Type of light	Visible red light	Infrared light
Light sender [9]	LED	
Wavelength	650 nm	1,450 nm
Setting	Menu-controlled Single teach-in button Cable (depending on type)	
Time type	Without time delay, switch off delay, on delay, switch on and off delay, one-shot	
Delay time	Programmable, 0 ms, 9,999 ms	
Display	Display	
Display	LED status display, 2x 4-digit digital dual display, target value (green) and actual value (red) are displayed at the same time, display of the parameters	

[1] Up to 15 expansion units can be connected.

[2] Sensing range at 8 ms response time. Reduced at shorter response times (see LL3/WLL180T tables).

[3] LL3-TX01.

[4] LL3-TW01.

[5] Object with 90% remission (based on standard white, DIN 5033). Sensing range at 8 ms response time. Reduced at shorter response times (see LL3/WLL180T tables).

[6] LL3-DK06.

[7] LL3-DW01.

[8] See LL3 fiber data.

[9] Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

	Visible red light	Infrared light
Supply voltage [1]	12 V DC ... 24 V DC	
Residual ripple [2]	≤ 10%	
Current consumption [3]	≤ 50 mA	
Switching output	PNP/NPN (depending on type)	
Number of switching outputs	1	
input	Multifunction input MF / - (depending on type)	
Switching mode	Light/dark switching function (can be selected manually)	
Output current $I_{max.}$	< 100 mA	
Response time [4]	≤ 16 µs, ≤ 70 µs, ≤ 250 µs, ≤ 2,000 µs, ≤ 8,000 µs	
Switching frequency	31.2 kHz, 7.1 kHz, 2 kHz, 250 Hz, 62.5 Hz	
Connection type	Cable, 2 m [5], male connector, M8 (depending on type)	
Circuit protection	A [6], B [7], C [8], D [9]	
Protection class	III	

Weight		
Cable, 4-wire	25 g	–
M8 male connector, 4-pin	20 g	
Cable, 2-wire	25 g	–
Housing material	ABS/PC	
Enclosure rating [10]	IP 50	
Scope of delivery	Mounting bracket BEF-WLL180	
Ambient temperature, operation	–25 °C ... +55 °C [11] (depending on type)	
Ambient temperature, storage	–40 °C ... +70 °C	

[1] +– 10%.
[2] Must not exceed or fall short of U_V tolerances.
[3] Without load.
[4] Can be selected.
[5] Do not bend cables below 0 °C.
[6] A = U_V connections reverse polarity protected.
[7] B = inputs and outputs reverse-polarity protected.
[8] C = Interference suppression.
[9] D = outputs overcurrent and short-circuit protected.
[10] With correctly attached LL3 fibers and closed protection hood.
[11] Operating temperature varies according to the number of devices connected: 4–8 devices: –25 °C ... +50 °C (output current 50 mA) / 9–16 devices: –25 °C ... +45 °C (output current 20 mA).

Ordering information

Other device versions available here ➜ www.sick.com/WLL180T

Visible red light

- **Max sensing range:** 0 m to 20 m, through-beam system (sensing range at 8 ms response time. Reduced at shorter response times (see LL3/WLL180T tables))

D

Device type	Setting	Switching output	Connection	Connection diagram	Type	Part no.
Standalone	Menu-controlled Single teach-in button Cable	PNP	Cable, 4-wire, 2 m	cd-136	WLL180T-P432	6039093
			Male connector, M8, 4-pin	cd-134	WLL180T-P434	6039095
		NPN	Cable, 4-wire, 2 m	cd-136	WLL180T-N432	6039094
			Male connector, M8, 4-pin	cd-134	WLL180T-N434	6039096
Base unit	Menu-controlled Single teach-in button Cable	PNP	Cable, 4-wire, 2 m	cd-138	WLL180T-M432	6039097
			Male connector, M8, 4-pin	cd-140	WLL180T-M434	6039101
		NPN	Cable, 4-wire, 2 m	cd-138	WLL180T-L432	6039099
			Male connector, M8, 4-pin	cd-140	WLL180T-L434	6039103
	Menu-controlled Single teach-in button	PNP	Male connector, M8, 3-pin	cd-045	WLL180T-M333	6042428
		NPN	Male connector, M8, 3-pin	cd-045	WLL180T-L333	6049837
Expansion unit	Menu-controlled Single teach-in button Cable	PNP	Cable, 2-wire, 2 m	cd-138	WLL180T-F232	6039098
			Male connector, M8, 4-pin	cd-140	WLL180T-F434	6039102
		NPN	Cable, 2-wire, 2 m	cd-138	WLL180T-E232	6039100
			Male connector, M8, 4-pin	cd-140	WLL180T-E434	6039104
	Menu-controlled Single teach-in button	PNP	Male connector, M8, 3-pin	cd-362	WLL180T-F333	6042429
		NPN	Male connector, M8, 3-pin	cd-045	WLL180T-E333	6049838

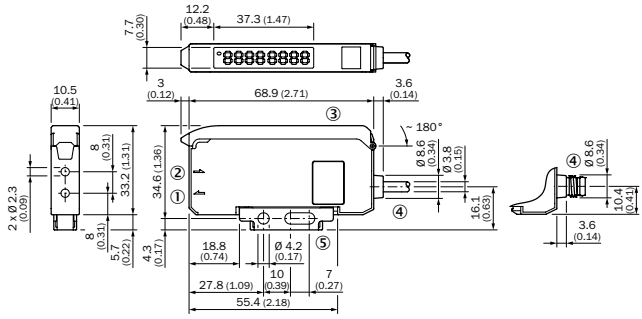
Infrared light

- **Max sensing range:** 0 m to 1000 mm, through-beam system (sensing range at 8 ms response time. Reduced at shorter response times (see LL3/WLL180T tables))

Device type	Setting	Switching output	Connection	Connection diagram	Type	Part no.
Standalone	Menu-controlled Single teach-in button Cable	PNP	Male connector, M8, 4-pin	cd-134	WLL180T-P474	6039618
		NPN	Male connector, M8, 4-pin	cd-134	WLL180T-N474	6039619

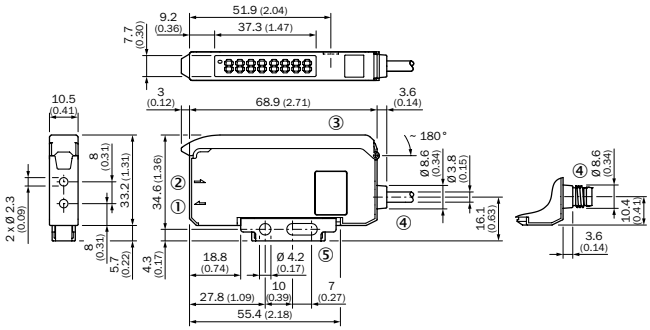
Dimensional drawings (dimensions in mm)

Standalone



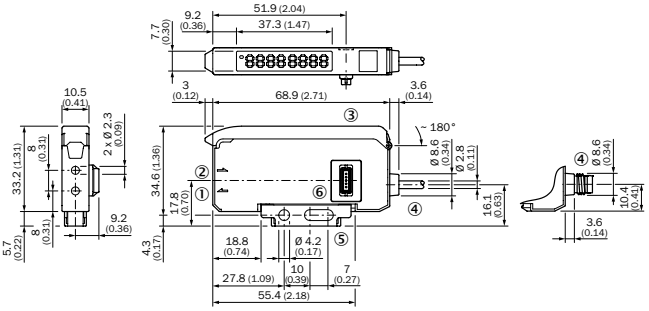
① LED emitter, installation of LL3 (emitter fiber)
② Receiver, installation of LL3 fibers (receiver fiber)
③ Protective hood opens approx. 180°
④ Connection
⑤ Mounting bracket, included in scope of delivery

Bus version



① LED emitter, installation of LL3 (emitter fiber)
② Receiver, installation of LL3 fibers (receiver fiber)
③ Protective hood opens approx. 180°
④ Connection
⑤ Mounting bracket, included in scope of delivery

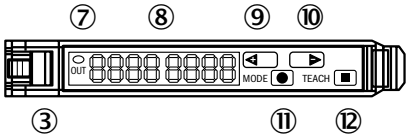
Expansion unit



① LED emitter, installation of LL3 (emitter fiber)
② Receiver, installation of LL3 fibers (receiver fiber)
③ Protective hood opens approx. 180°
④ Connection
⑤ Mounting bracket, included in scope of delivery
⑥ Bus male connector

D

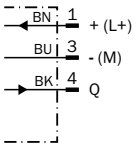
Adjustments



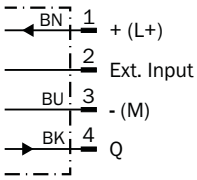
③ Fiber-optic locking mechanism
⑦ Orange LED indicator: Lights up when the switching output is active
⑧ Numeric display 2 x 4 digit; green: switching threshold, operating mode; red: actual value, teach-in/function parameter
⑨ Step button > (manual switching threshold: higher/next function parameter)
⑩ Step button < (manual switching threshold: lower/previous function parameter)
⑪ Mode/enter button (programming button)
⑫ Teach-in button

Connection diagram

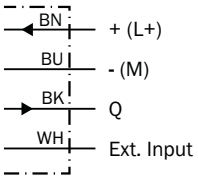
Cd-045



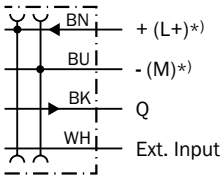
Cd-134



Cd-136

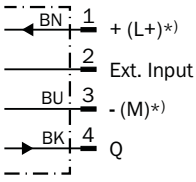


Cd-138



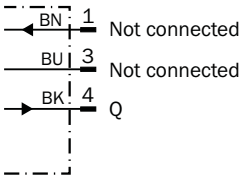
*) Only base unit

Cd-140



*) Only base unit

Cd-362



D

Recommended accessories

Mounting systems

Mounting brackets and plates

Figure	Material	Description	Type	Part no.
	Steel, zinc coated	Mounting bracket	BEF-WLL180	5325812

Other mounting accessories

Figure	Description	Type	Part no.
	Rail end cap for block mounting, stainless steel, incl. mounting hardware	BF-EB01-W190	5313011
	Fiber cutting device, included in LL3 scope of delivery	FC	5304141

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Connectivity

Plug connectors and cables

Connecting cables with female connector

M8, 3-pin, PVC, resistant to chemicals

- **Cable material:** PVC
- **Material, plug connector:** TPU

Figure	Head A connection type	Head B connection type	Connecting cable	Material, knurled nut	Type	Part no.
	Female connector, M8, 3-pin, straight, unshielded	Cable, flying leads	2 m, 3-wire	CuZn, nickel-plated	YF8U13-020VA1XLEAX	2095860
			5 m, 3-wire	CuZn, nickel-plated	YF8U13-050VA1XLEAX	2095884
	Female connector, M8, 3-pin, angled, unshielded	Cable, flying leads	2 m, 3-wire	CuZn, nickel-plated	YG8U13-020VA1XLEAX	2096165
			5 m, 3-wire	CuZn, nickel-plated	YG8U13-050VA1XLEAX	2096166

M8, 4-pin, PVC, resistant to chemicals

- **Cable material:** PVC
- **Material, knurled nut:** CuZn, nickel-plated

Figure	Head A connection type	Head B connection type	Connecting cable	Material, plug connector	Type	Part no.
	Female connector, M8, 4-pin, straight, unshielded	Cable, flying leads	2 m, 4-wire	TPU	YF8U14-020VA3XLEAX	2095888
			5 m, 4-wire	TPU	YF8U14-050VA3XLEAX	2095889
	Female connector, M8, 4-pin, angled, unshielded	Cable, flying leads	2 m, 4-wire	PVC	YG8U14-020VA3XLEAX	2095962
			5 m, 4-wire	PVC	YG8U14-050VA3XLEAX	2095963

A further selection of accessories can be found here ➜ E-104

D

SENSORS AND ACCESSORIES FROM SICK

A perfect match: For optimal integration of sensors in your systems, the use of perfectly matched accessories is indispensable.

Reliable signal transmission guarantees productivity – high-quality connectivity components with long service life reduce costs. With this in mind, SICK provides suitable connection technology for every application and industry. The comprehensive range of plug connectors provides the right cabling for every application.

When it comes to mounting and adapting the sensors, SICK has the ideal solution.

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Accessories

Mounting systems

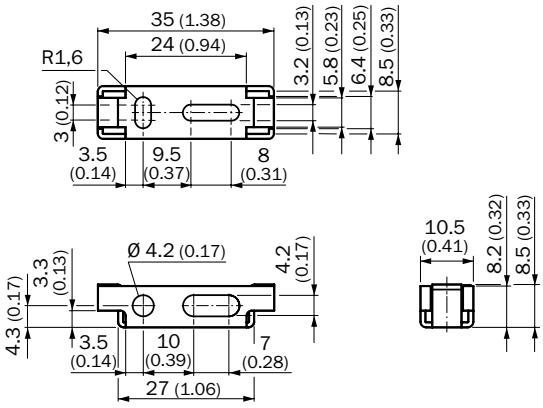
Mounting brackets and plates

Mounting bracket

- **Description:** Mounting bracket

Figure	Material	Type	Part no.	GLL170	WLL180T
	Steel, zinc coated	BEF-WLL180	5325812	●	●

BEF-WLL180



Other mounting accessories

Other info

Figure	Brief description	Type	Part no.	LL3	GLL170	WLL180T
	Rail end cap for block mounting, stainless steel, incl. mounting hardware	BF-EB01-W190	5313011	–	–	●
	Adapter sleeve for Ø 1.0 mm LL3 fiber, included in LL3 scope of delivery	BF-WLL160-10	5305479	●	–	–
	Adapter sleeve for Ø 1.3 mm LL3 fiber, included in LL3 scope of delivery	BF-WLL160-13	5306094	●	–	–
	Fiber cutting device, included in LL3 scope of delivery	FC	5304141	●	–	–
	Protective metal sheathing for LL3 fiber with M6 threaded head; length 500 mm	BEF-LL3M6500	5331290	●		
	Protective metal sheathing for LL3 fiber with M6 threaded head; length 1000 mm	BEF-LL3M61000	5331291	●		

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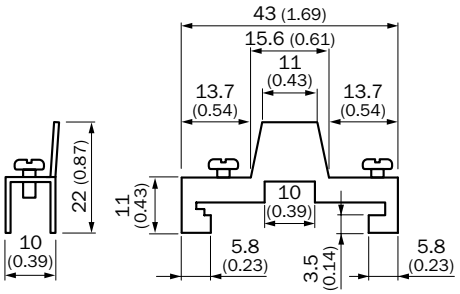
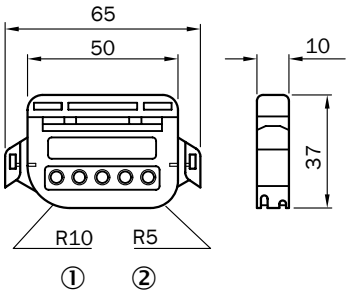
BF-EB01-W190

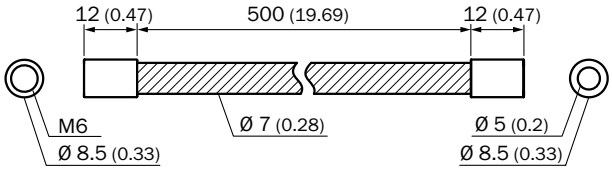


FC

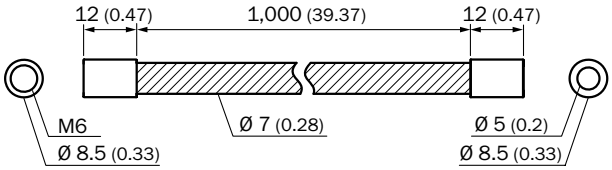


① Template for R10 mm bend radius for end sleeves of Ø 1.5 mm and Ø 2.5 mm
② R5 mm bend radius

BEF-LL3M6500



BEF-LL3M61000

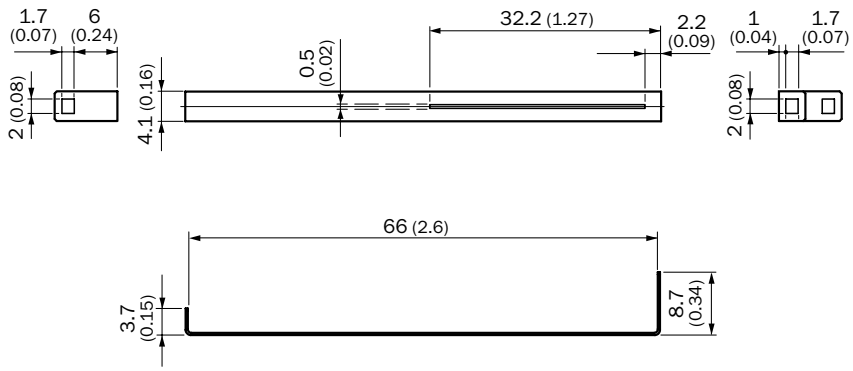


Reflectors and optics

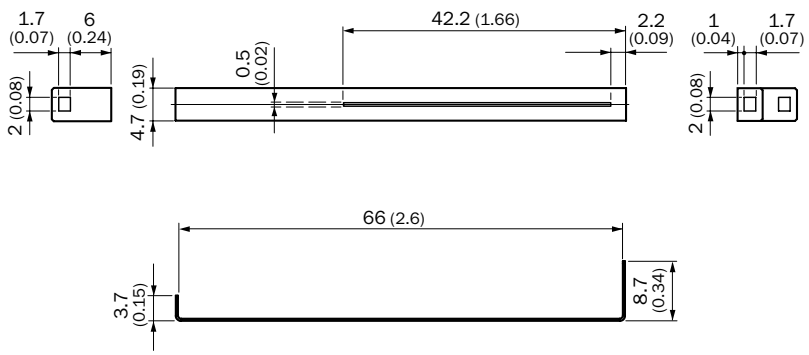
Diaphragms

Material	Description	Type	Part no.	LL3
Stainless steel	Mask, 0.5 mm x 30 mm, for LL3-TS40	BL-TS40-30	5324719	●
	Mask, 0.5 mm x 40 mm, for LL3-TS40	BL-TS40-40	5334439	●

BL-TS40-30



BL-TS40-40



E

Connectivity

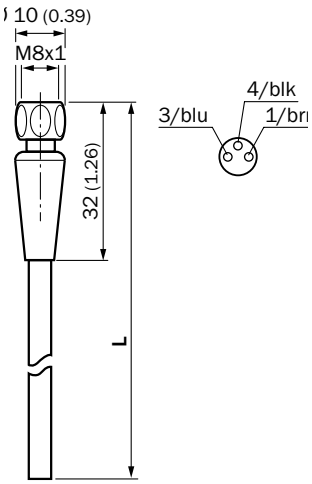
Plug connectors and cables

Connecting cables with M8 female connector, 3-pin, PP, hygiene applications

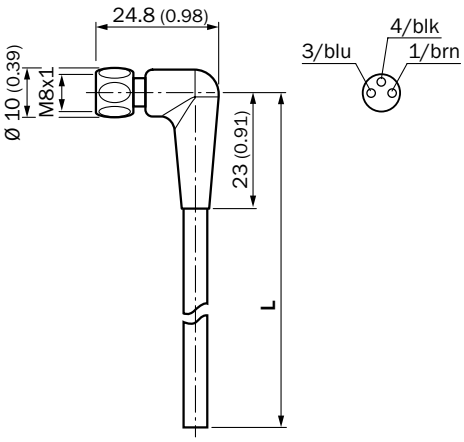
- **Cable material:** PP
- **Material, plug connector:** PP
- **Material, knurled nut:** stainless steel (V4A/1.4404/316L)

Figure	Head A connection type	Head B connection type	Connecting cable	Type	Part no.	GLL170	WLL180T
	Female connector, M8, 3-pin, straight, unshielded	Cable, flying leads	2 m, 3-wire	DOL-0803-G02MRN	6058504	●	●
			5 m, 3-wire	DOL-0803-G05MRN	6058505	●	●
			10 m, 3-wire	DOL-0803-G10MRN	6058506	●	●
	Female connector, M8, 3-pin, angled, unshielded	Cable, flying leads	2 m, 3-wire	DOL-0803-W02MRN	6058507	●	●
			5 m, 3-wire	DOL-0803-W05MRN	6058508	●	●
			10 m, 3-wire	DOL-0803-W10MRN	6058509	●	●

DOL-0803-GxxMRN



DOL-0803-WxxMRN



Connecting cables with M8 female connector, 3-pin, PUR, halogen-free, resistant to oil/lubricants

- **Cable material:** PUR, halogen-free
- **Material, plug connector:** TPU
- **Material, knurled nut:** nickel plated zinc die cast

Figure	Head A connection type	Head B connection type	Connecting cable	Type	Part no.	GLL170	WLL180T
	Female connector, M8, 3-pin, straight, unshielded	Cable, flying leads	1 m, 3-wire	YF8U13-010UA1XLEAX	2094779	●	●
			2 m, 3-wire	YF8U13-020UA1XLEAX	2094782	●	●
			3 m, 3-wire	YF8U13-030UA1XLEAX	2094787	●	●
			5 m, 3-wire	YF8U13-050UA1XLEAX	2094788	●	●
			10 m, 3-wire	YF8U13-100UA1XLEAX	2094789	●	●
			20 m, 3-wire	YF8U13-200UA1XLEAX	2094790	●	●
	Female connector, M8, 3-pin, angled, unshielded	Cable, flying leads	2 m, 3-wire	YG8U13-020UA1XLEAX	2094794	●	●
			5 m, 3-wire	YG8U13-050UA1XLEAX	2095586	●	●
			10 m, 3-wire	YG8U13-100UA1XLEAX	2095588	●	●

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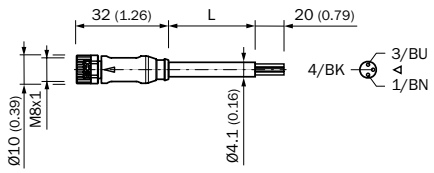
YF8U13-xxxUA1XLEAX



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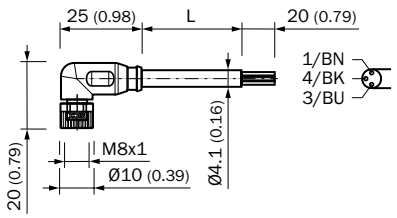
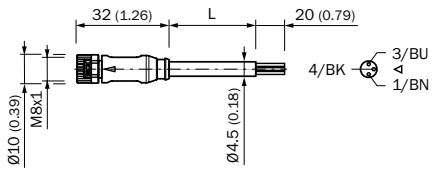


Connecting cables with M8 female connector, 3-pin, PVC, resistant to chemicals

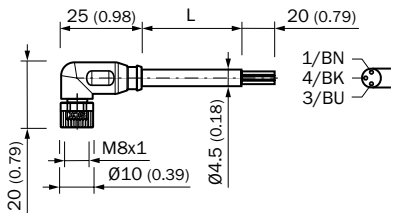
- **Cable material:** PVC
- **Material, plug connector:** TPU
- **Material, knurled nut:** CuZn, nickel-plated

Figure	Head A connection type	Head B connection type	Connecting cable	Type	Part no.	GLL170	WLL180T
	Female connector, M8, 3-pin, straight, unshielded	Cable, flying leads	2 m, 3-wire	YF8U13-020VA1XLEAX	2095860	●	●
			5 m, 3-wire	YF8U13-050VA1XLEAX	2095884	●	●
			10 m, 3-wire	YF8U13-100VA1XLEAX	2095885	●	●
			15 m, 3-wire	YF8U13-150VA1XLEAX	2095886	●	●
	Female connector, M8, 3-pin, angled, unshielded	Cable, flying leads	2 m, 3-wire	YG8U13-020VA1XLEAX	2096165	●	●
			5 m, 3-wire	YG8U13-050VA1XLEAX	2096166	●	●
			10 m, 3-wire	YG8U13-100VA1XLEAX	2096209	●	●
			15 m, 3-wire	YG8U13-150VA1XLEAX	2096210	●	●

YF8U13-xxxVA1XLEAX



YG8U13-xxxVA1XLEAX



Connecting cables with M8 female connector, 4-pin, PP, hygiene applications

- **Cable material:** PP
- **Material, plug connector:** PP
- **Material, knurled nut:** stainless steel (V4A/1.4404/316L)

Figure	Head A connection type	Head B connection type	Connecting cable	Type	Part no.	GLL170	WLL180T
	Female connector, M8, 4-pin, straight, unshielded	Cable, flying leads	2 m, 4-wire	DOL-0804-G02MRN	6058510	●	●
			5 m, 4-wire	DOL-0804-G05MRN	6058511	●	●
			10 m, 4-wire	DOL-0804-G10MRN	6058512	●	●
			25 m, 4-wire	DOL-0804-G25MRN	6058513	●	●
	Female connector, M8, 4-pin, angled, unshielded	Cable, flying leads	2 m, 4-wire	DOL-0804-W02MRN	6058514	●	●
			5 m, 4-wire	DOL-0804-W05MRN	6058515	●	●
			10 m, 4-wire	DOL-0804-W10MRN	6058517	●	●
			25 m, 4-wire	DOL-0804-W25MRN	6058518	●	●

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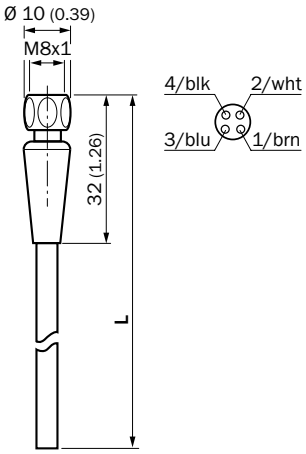
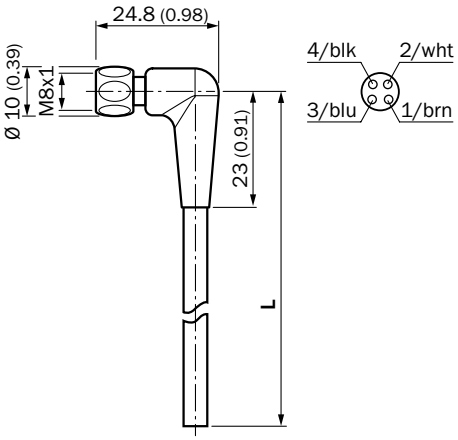
DOL-0804-GxxMRN



DOL-0804-WxxMRN



Connecting cables with M8 female connector, 4-pin, PUR, halogen-free, resistant to oil/lubricants

- **Cable material:** PUR, halogen-free
- **Material, plug connector:** TPU
- **Material, knurled nut:** nickel plated zinc die cast

Figure	Head A connection type	Head B connection type	Connecting cable	Type	Part no.	GLL170	WLL180T
	Female connector, M8, 4-pin, straight. shielded	Cable, flying leads	5 m, 4-wire	YF8UA4-050UB4XLEAX	2096200	●	●
			10 m, 4-wire	YF8UA4-100UB4XLEAX	2096201	●	●
	Female connector, M8, 4-pin, straight, unshielded	Cable, flying leads	2 m, 4-wire	YF8U14-020UA3XLEAX	2094791	●	●
			5 m, 4-wire	YF8U14-050UA3XLEAX	2094792	●	●
			10 m, 4-wire	YF8U14-100UA3XLEAX	2094793	●	●
			15 m, 4-wire	YF8U14-150UA3XLEAX	2095580	●	●
			20 m, 4-wire	YF8U14-200UA3XLEAX	2095582	●	●
	Female connector, M8, 4-pin, angled, unshielded	Cable, flying leads	2 m, 4-wire	YG8U14-020UA3XLEAX	2095589	●	●
			5 m, 4-wire	YG8U14-050UA3XLEAX	2095590	●	●
			10 m, 4-wire	YG8U14-100UA3XLEAX	2095591	●	●

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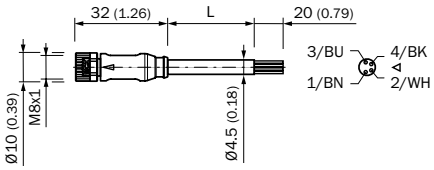
YF8U14-xxxUA3XLEAX



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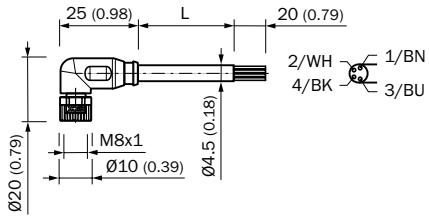

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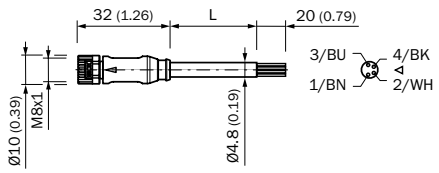
Connecting cables with M8 female connector, 4-pin, PVC, resistant to chemicals

- **Cable material:** PVC
- **Material, knurled nut:** CuZn, nickel-plated

Figure	Head A connection type	Head B connection type	Connecting cable	Material, plug connector	Type	Part no.	GLL170	WLL180T
	Female connector, M8, 4-pin, straight, unshielded	Cable, flying leads	2 m, 4-wire	TPU	YF8U14-020VA3XLEAX	2095888	●	●
			3 m, 4-wire	TPU	YF8U14-030VA3XLEAX	2095896	●	●
			5 m, 4-wire	TPU	YF8U14-050VA3XLEAX	2095889	●	●
			10 m, 4-wire	TPU	YF8U14-100VA3XLEAX	2095890	●	●
			1.5 m, 4-wire	TPU	YF8U14-015VA3XLEAX	2095894	●	●
			2.5 m, 4-wire	TPU	YF8U14-025VA3XLEAX	2095876	●	●
	Female connector, M8, 4-pin, angled, unshielded	Cable, flying leads	2 m, 4-wire	PVC	YG8U14-020VA3XLEAX	2095962	●	●
			5 m, 4-wire	PVC	YG8U14-050VA3XLEAX	2095963	●	●
			10 m, 4-wire	PVC	YG8U14-100VA3XLEAX	2095964	●	●

YF8U14-xxxVA3XLEAX



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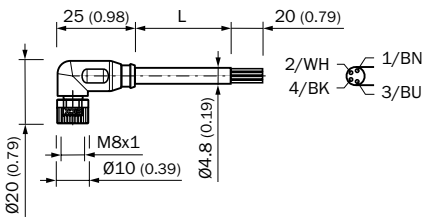
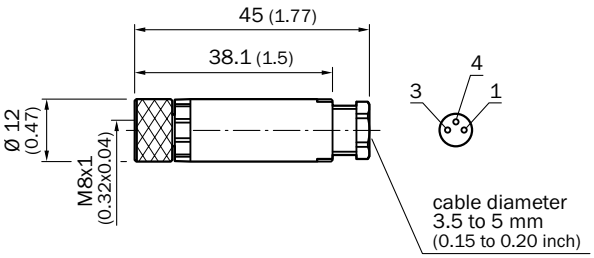


Female connectors (ready to assemble), M8, 3-pin

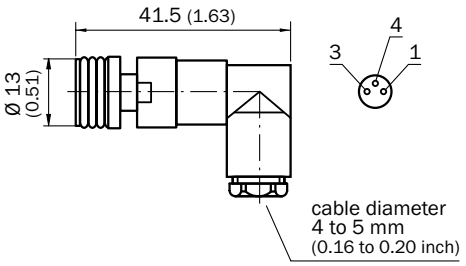
- **Material, knurled nut:** CuZn

Figure	Head A connection type	Head B connection type	Material, plug connector	Type	Part no.	GLL170	WLL180T
	Female connector, M8, 3-pin, straight, unshielded	Screw terminals	PBT/PA	DOS-0803-G	7902077	●	●
	Female connector, M8, 3-pin, angled, unshielded	Solder connection	PA/zinc die cast	DOS-0803-W	7902078	●	●

DOS-0803-G



DOS-0803-W



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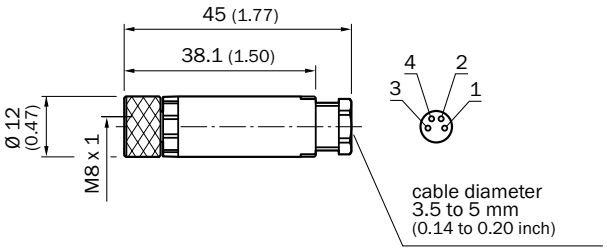
Female connectors (ready to assemble), M8, 4-pin

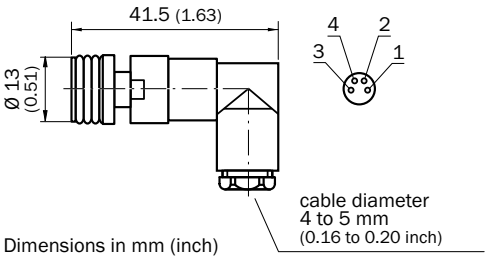
- **Material, knurled nut:** CuZn

Figure	Head A connection type	Head B connection type	Material, plug connector	Type	Part no.	GLL170	WLL180T
	Female connector, M8, 4-pin, straight, unshielded	Screw terminals	PBT/PA	DOS-0804-G	6009974	●	●
	Female connector, M8, 4-pin, angled, unshielded	Solder connection	PA/zinc die cast	DOS-0804-W	6009975	●	●

DOS-0804-G



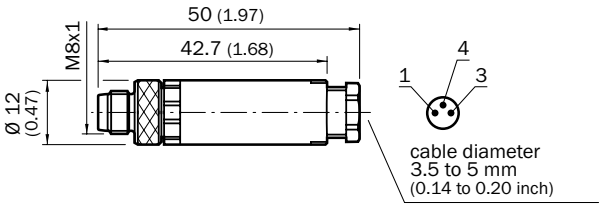
DOS-0804-W



Male connectors (ready to assemble), M8, 3-pin

Figure	Head A connection type	Head B connection type	Material, plug connector	Material, knurled nut	Type	Part no.	GLL170	WLL180T
	Male connector, M8, 3-pin, straight, unshielded	Screw terminals	PBT/PA	CuZn	STE-0803-G	6037322	●	●

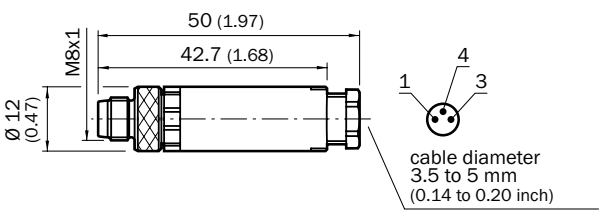
STE-0803-G



Male connectors (ready to assemble), M8, 4-pin

Figure	Head A connection type	Head B connection type	Material, plug connector	Material, knurled nut	Type	Part no.	GLL170	WLL180T
	Male connector, M8, 4-pin, straight, unshielded	Screw terminals	PBT/PA	CuZn	STE-0804-G	6037323	●	●

STE-0804-G



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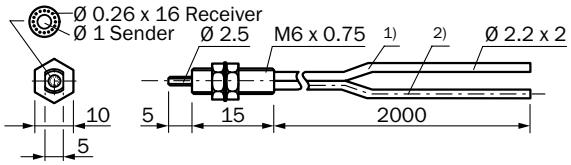
Dimensional drawings (dimensions in mm)

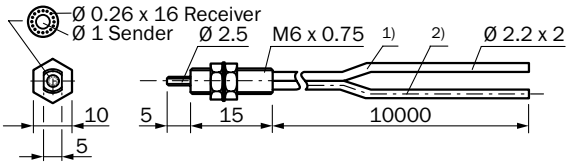
Fiber-optic proximity systems

LL3-DB01



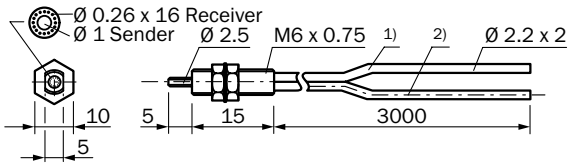
1) Receiver
2) Sender

LL3-DB01-10



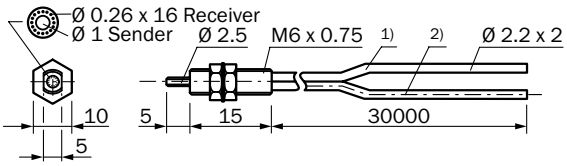
1) Receiver
2) Sender

LL3-DB01-03



1) Receiver
2) Sender

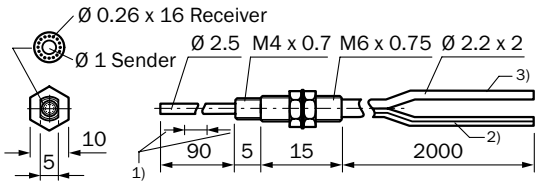
LL3-DB01-30



1) Receiver
2) Sender

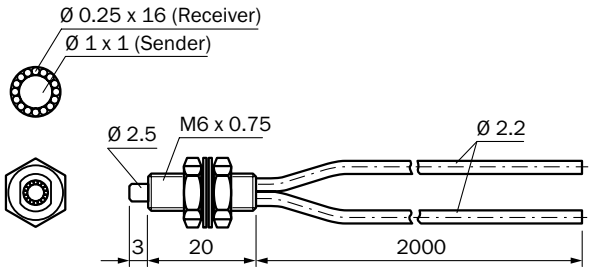
All dimensions in mm

LL3-DB02



1) Flexible end tip, do not bend in this area (10 mm), bend radius R10 mm
2) Sender (marked blue)
3) Receiver

LL3-DB03



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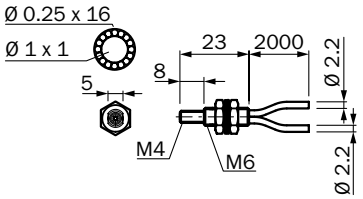
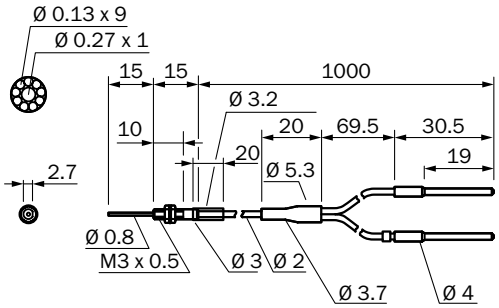
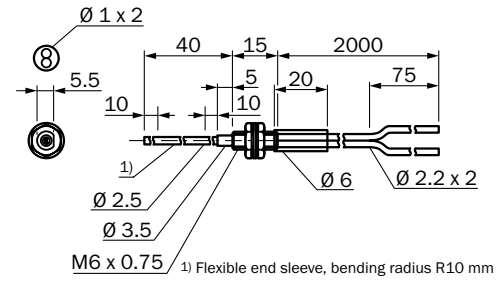
LL3-DB04



LL3-DB05

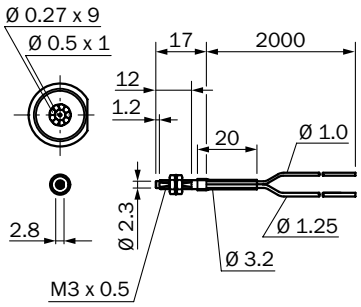


LL3-DB06

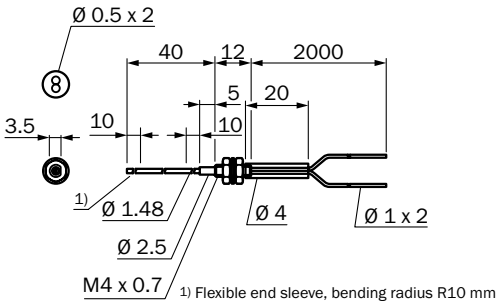


1) Flexible end sleeve, bending radius R10 mm

LL3-DB07

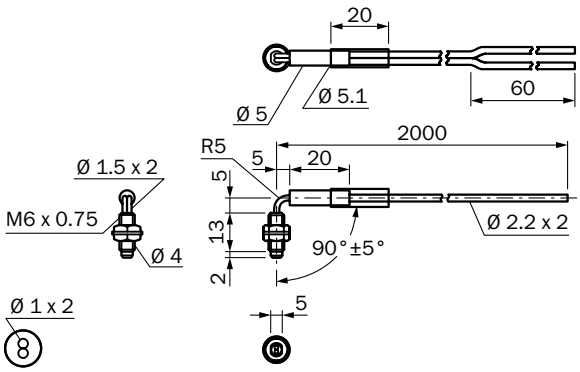


LL3-DB08



1) Flexible end sleeve, bending radius R10 mm

LL3-DB09



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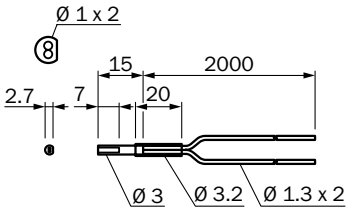
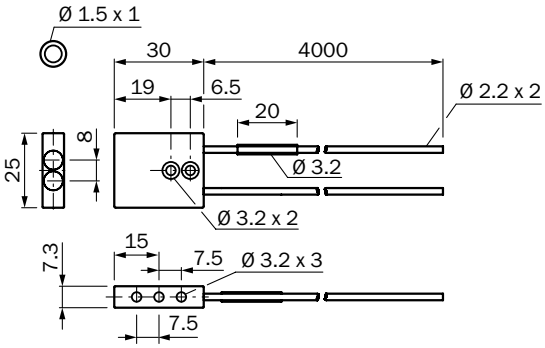
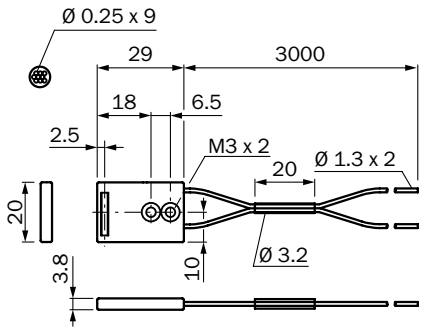
LL3-DB10



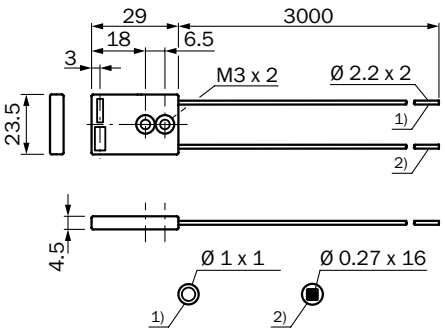
LL3-DC03



LL3-DC04

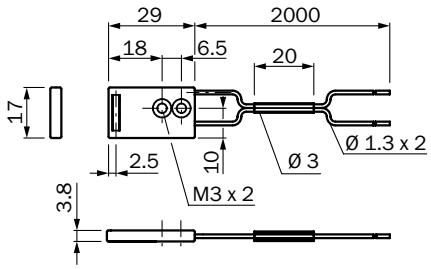


LL3-DC05

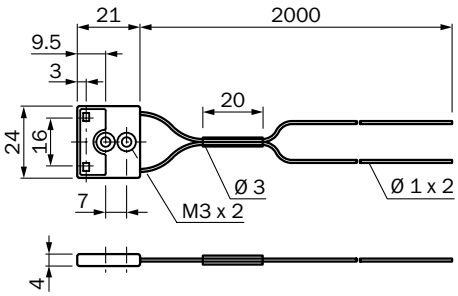


1) Sender
2) Receiver

LL3-DC06



LL3-DC07



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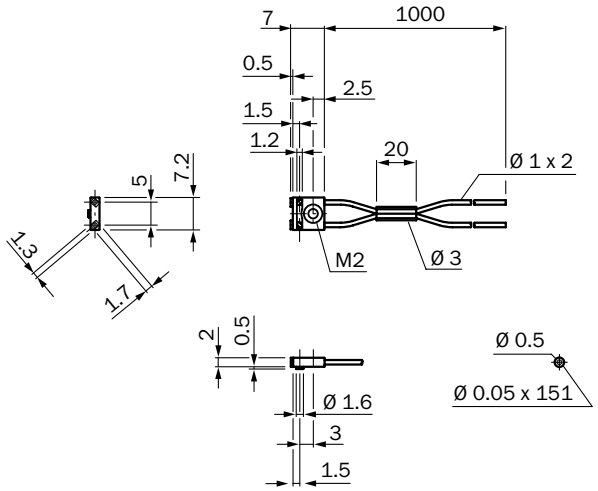
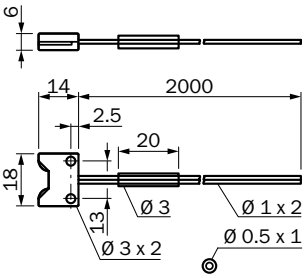
Subject to change without notice

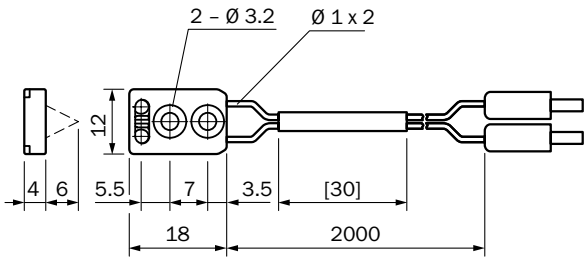
LL3-DC08



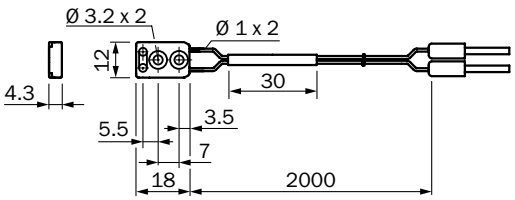
LL3-DC09



LL3-DC38



LL3-DC39



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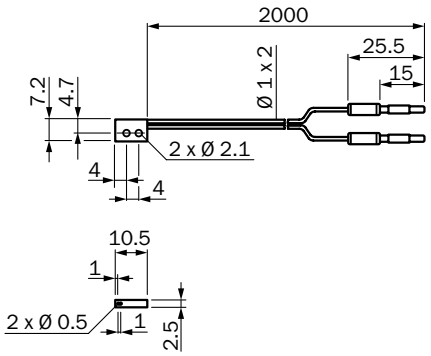
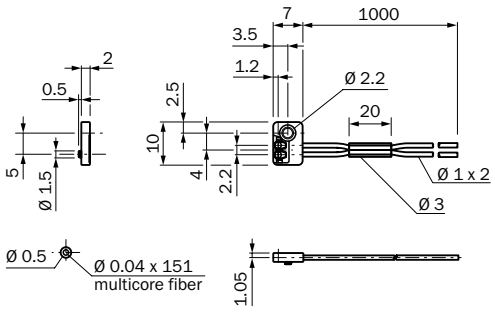


LL3-DE01



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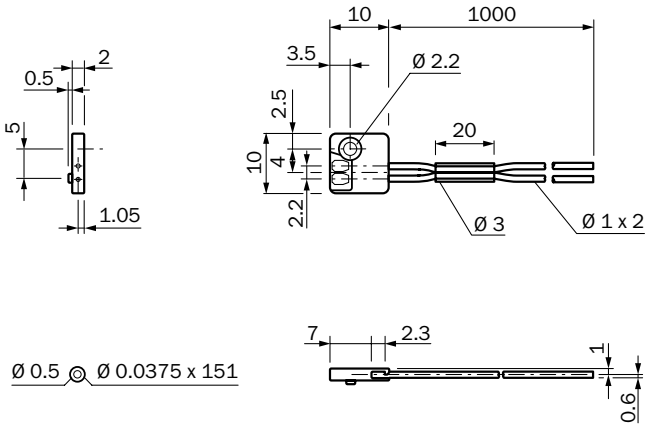
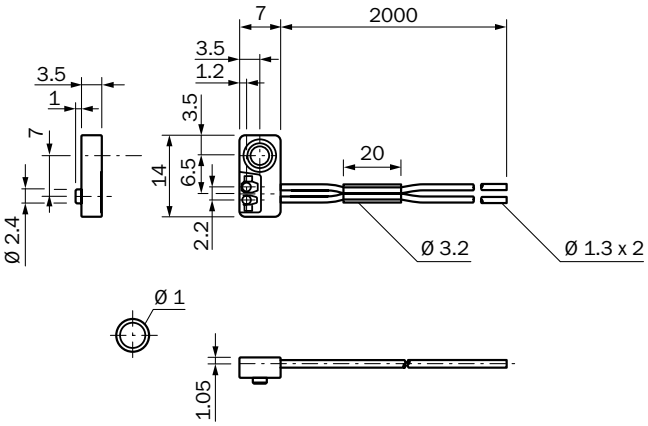
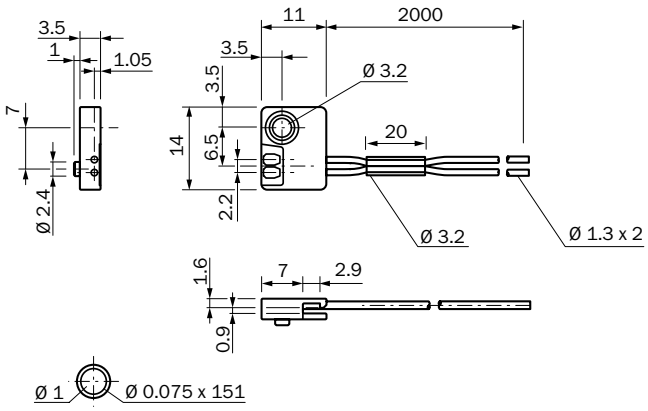
LL3-DE02



LL3-DE03



LL3-DE04



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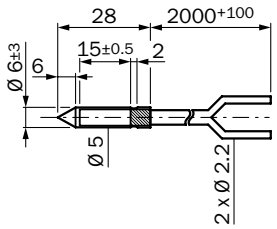

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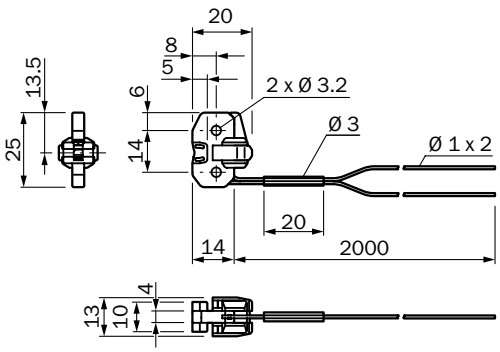
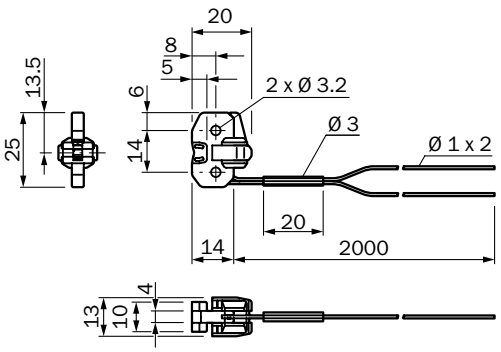


LL3-DF05



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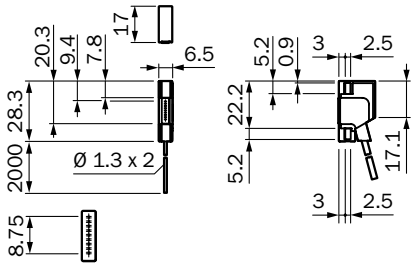
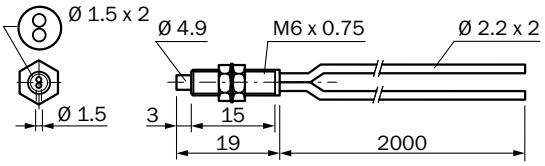
LL3-DF07



LL3-DH01



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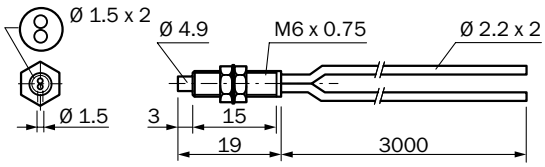

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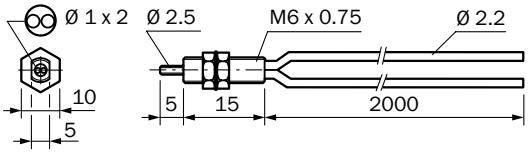
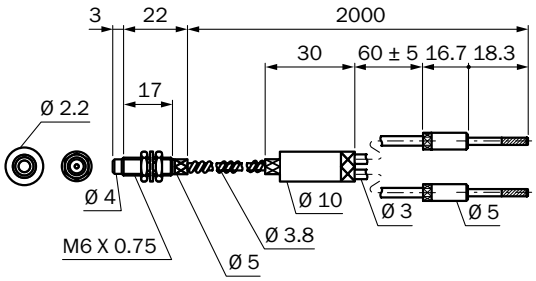
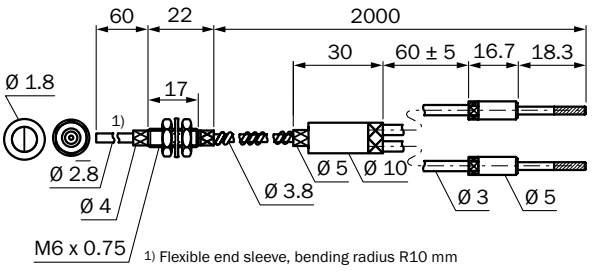


LL3-DH03



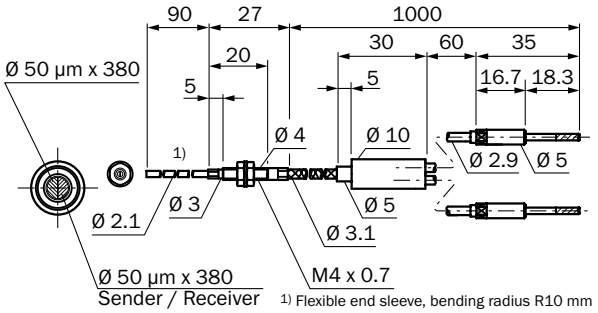
LL3-DH04



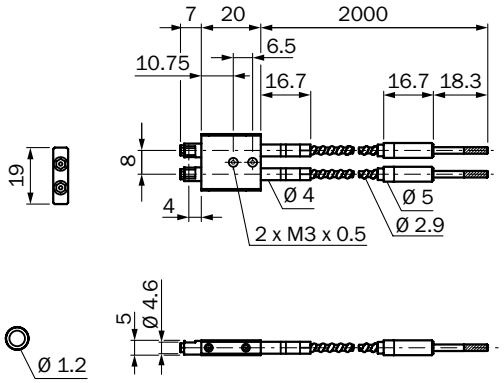
1) Flexible end sleeve, bending radius R10 mm

F

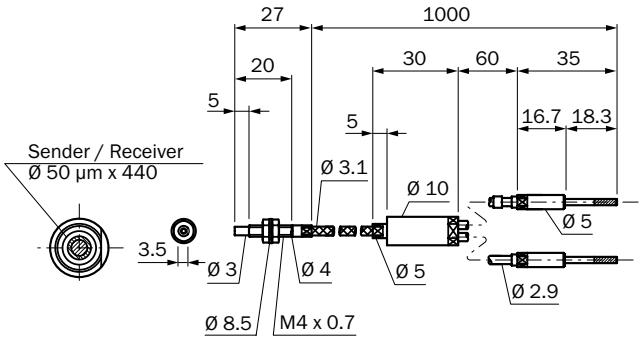
LL3-DH05



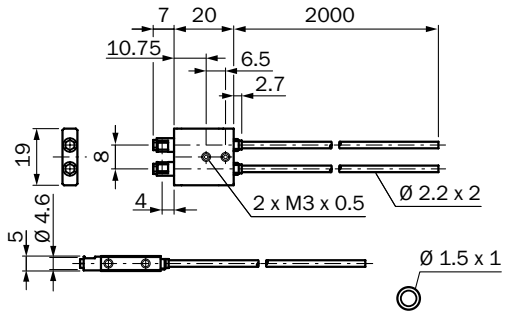
LL3-DH06



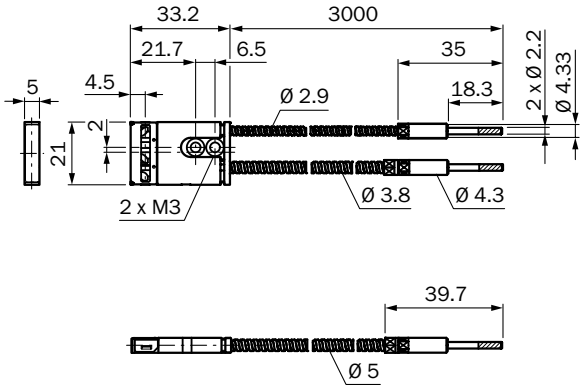
LL3-DH07



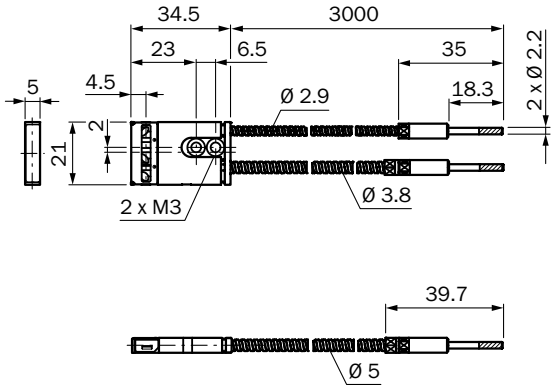
LL3-DH08



LL3-DH10



LL3-DH11



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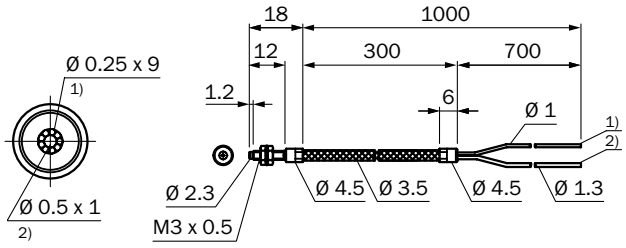
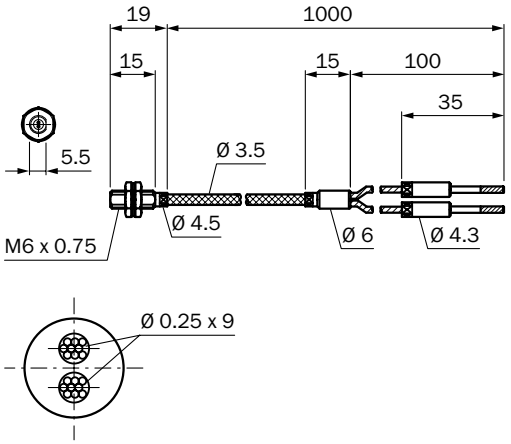
LL3-DJ01

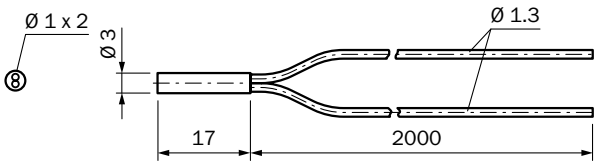


1) Receiver
2) Sender

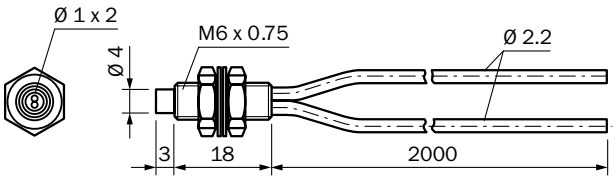
LL3-DJ02



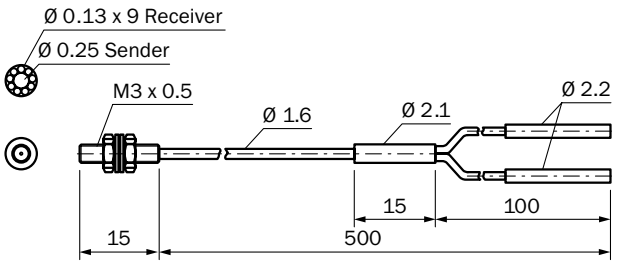
LL3-DK04



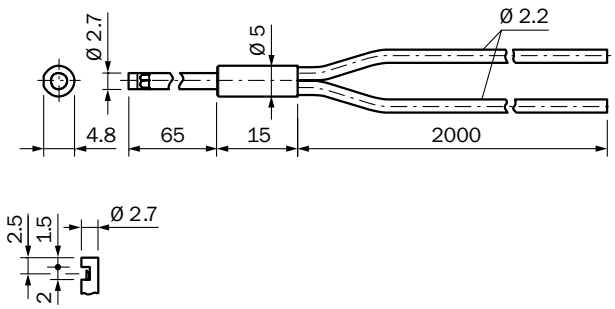
LL3-DK06



LL3-DK21



LL3-DK33



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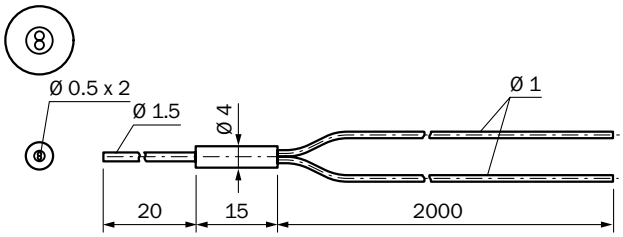
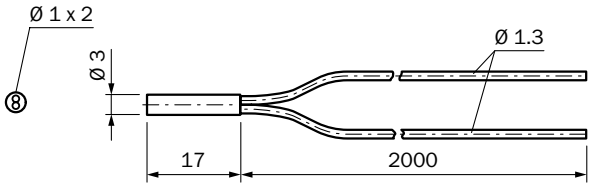
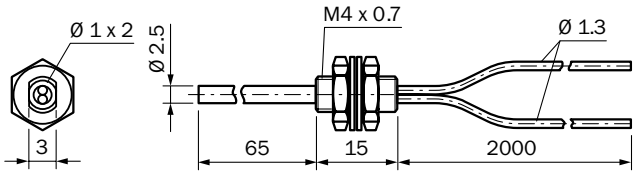
LL3-DK43



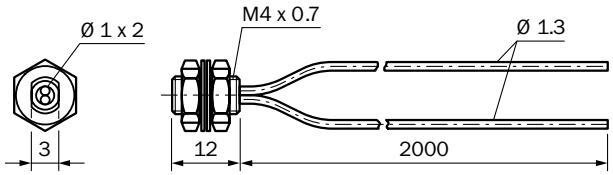
LL3-DK4Z



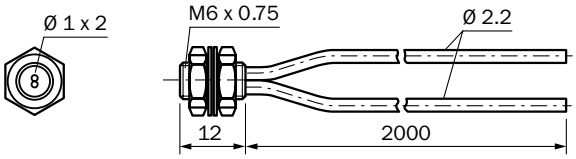
LL3-DK63Z



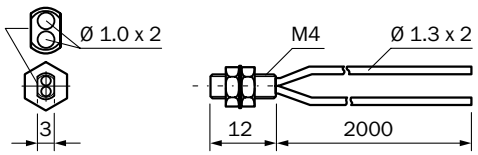
LL3-DK66



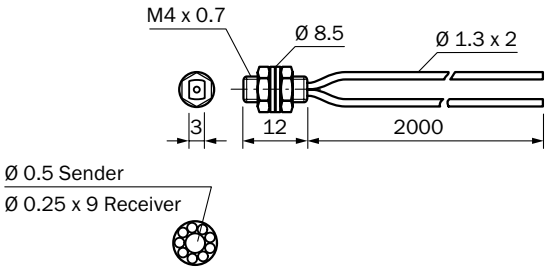
LL3-DK67



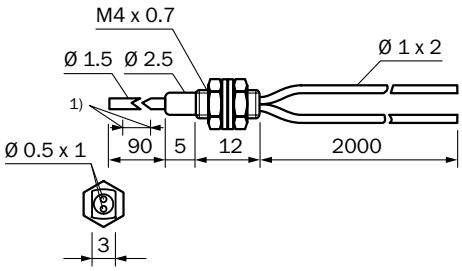
LL3-DM01



LL3-DM02



LL3-DM03



1) Flexible end tip, do not bend in this area (10 mm), bend radius R10 mm

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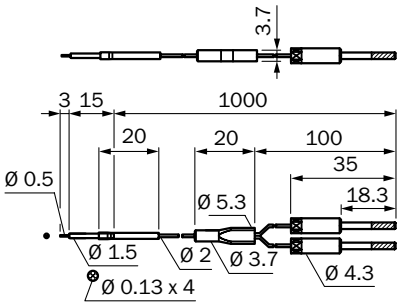
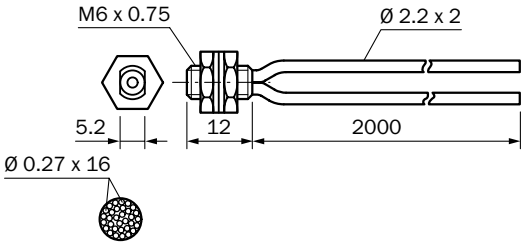
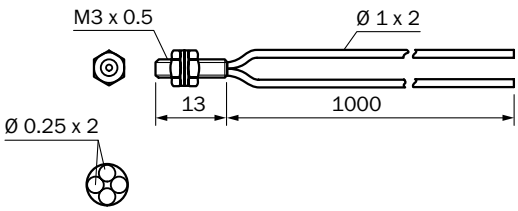
LL3-DP01



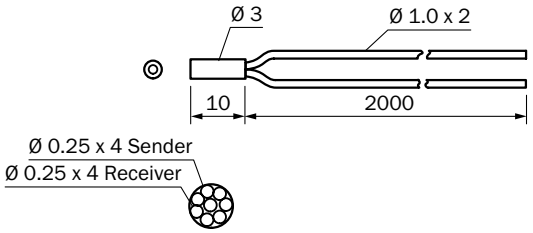
LL3-DR01



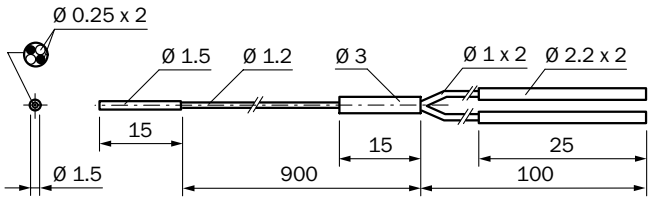
LL3-DR02



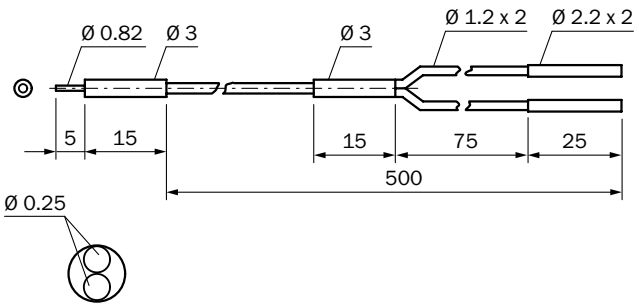
LL3-DR03



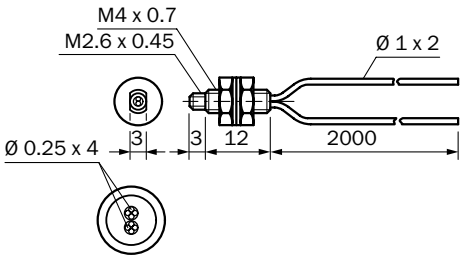
LL3-DR04



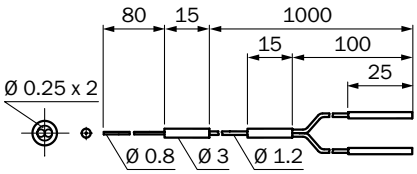
LL3-DR05



LL3-DR06



LL3-DR07



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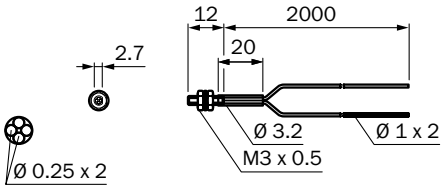
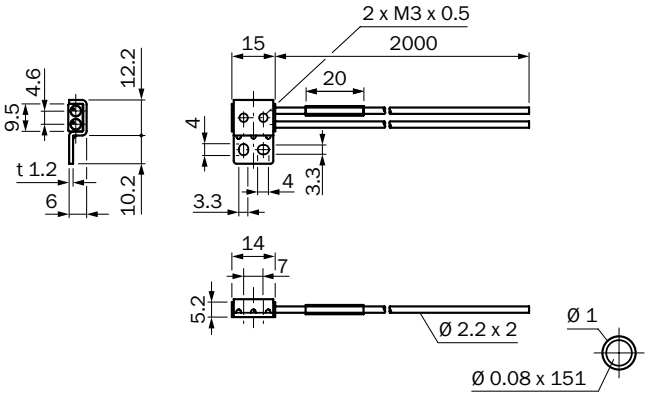
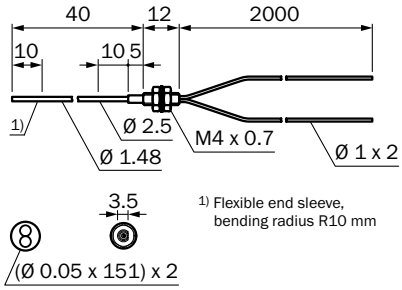
LL3-DR08



LL3-DR09

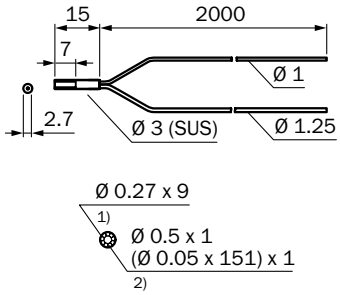


LL3-DR10



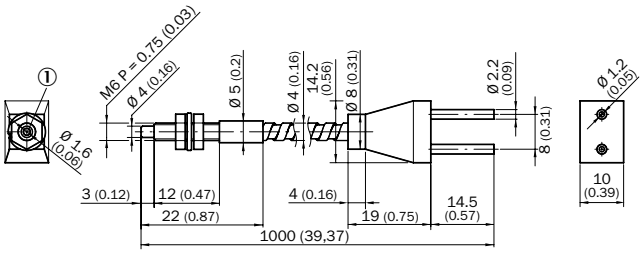
1) Flexible end sleeve, bending radius R10 mm

LL3-DR11

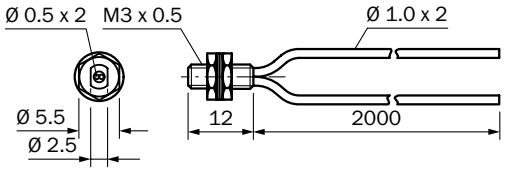


1) Receiver
2) Sender

LL3-DR12



LL3-DS06



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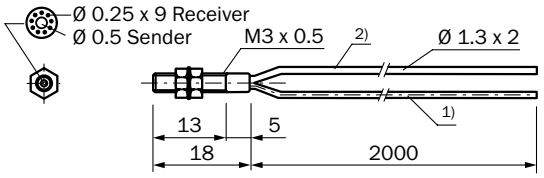
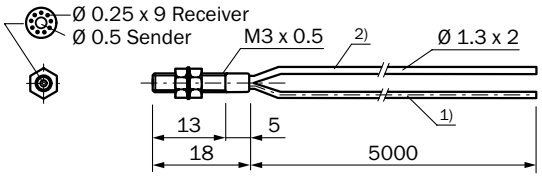
Subject to change without notice

LL3-DT01



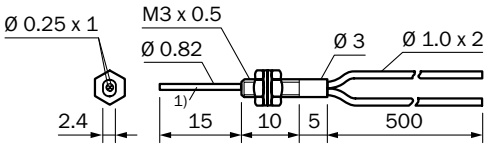
1) Sender
2) Receiver

LL3-DT01-05



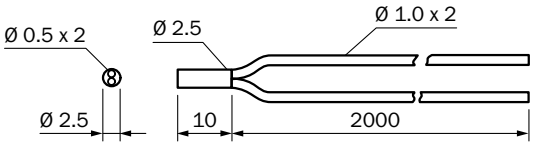
1) Sender
2) Receiver

LL3-DT02

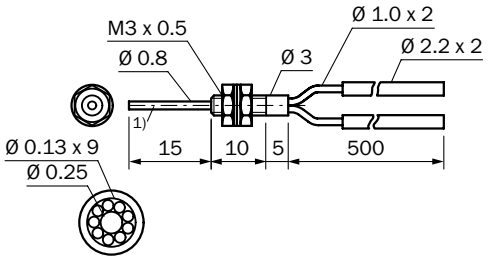


1) End tip cannot be bent

LL3-DT03

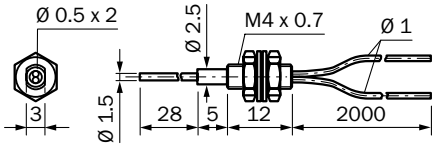


LL3-DT04



1) End tip cannot be bent

LL3-DT05



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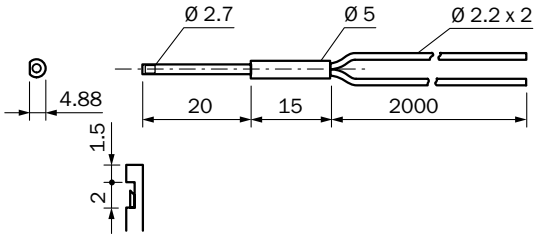
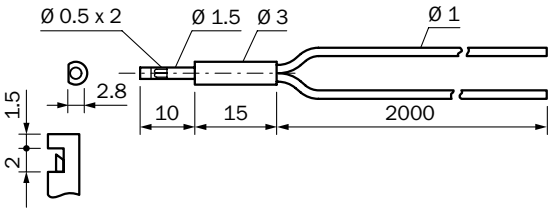
LL3-DV01



LL3-DV02



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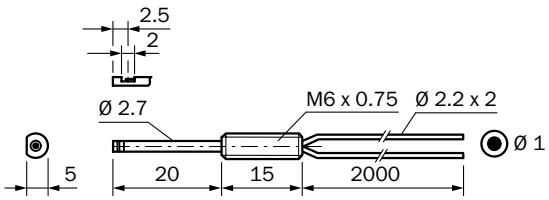
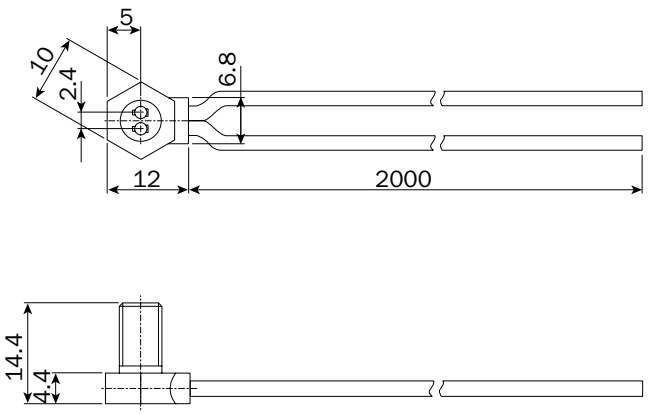
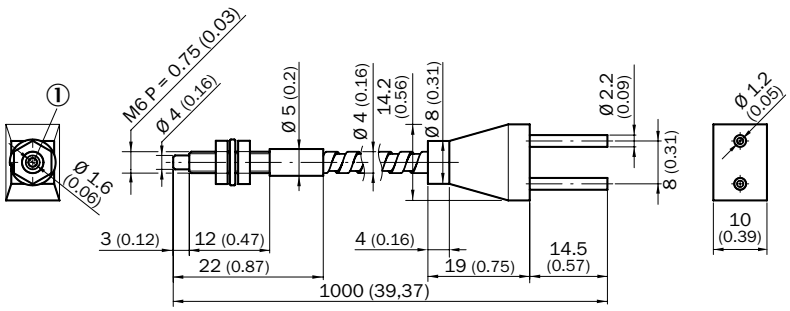


LL3-DV05, LL3-DV06, LL3-DV07



LL3-DW01



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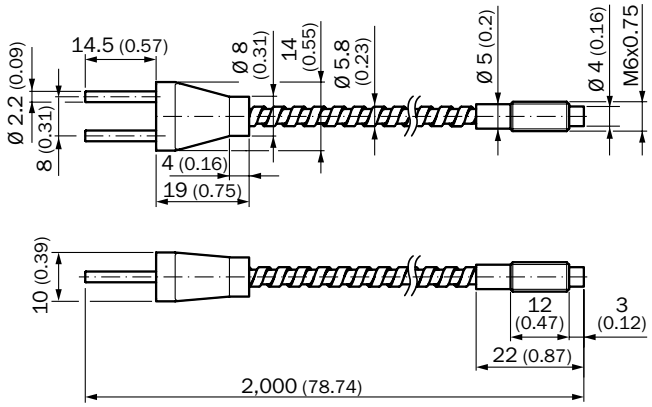
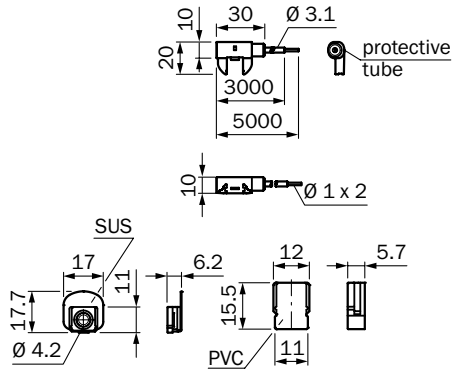
LL3-DW01-2



LL3-DW02



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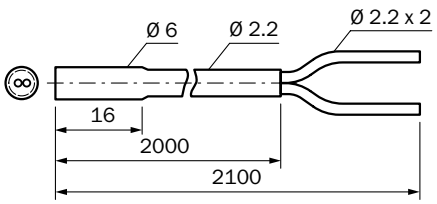
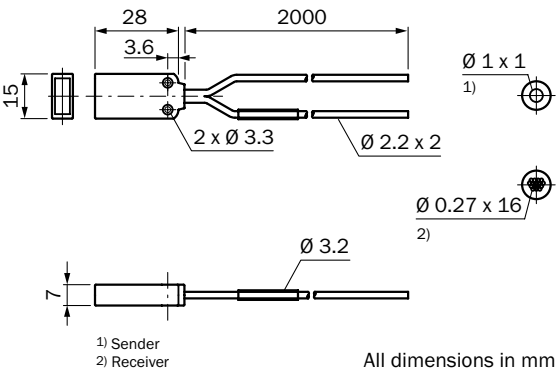


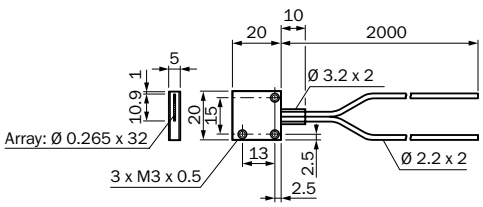
LL3-DZ01



1) Sender
2) Receiver

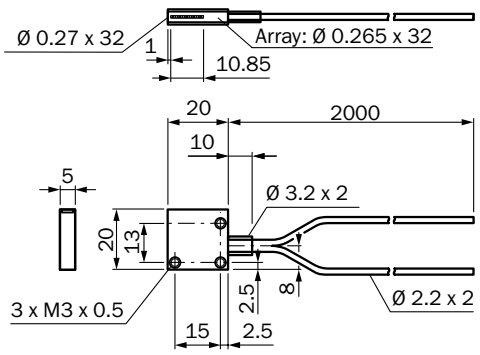
All dimensions in mm

LL3-DZ02



All dimensions in mm

LL3-DZ03



All dimensions in mm

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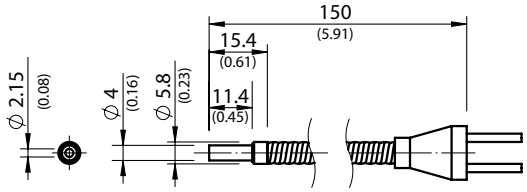
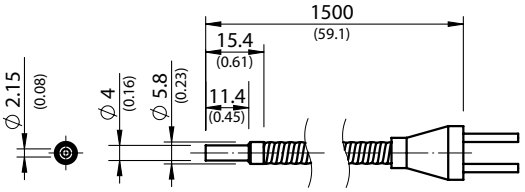
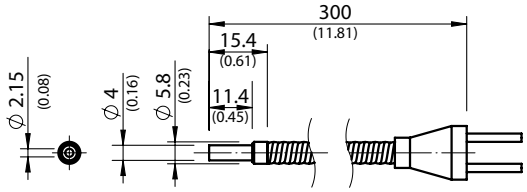
LL3-LM31150



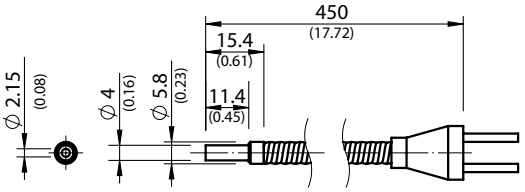
LL3-LM311500



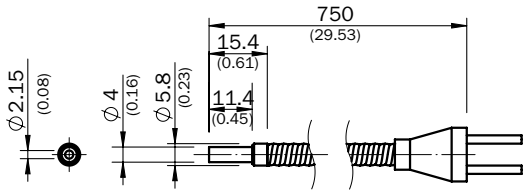
LL3-LM31300



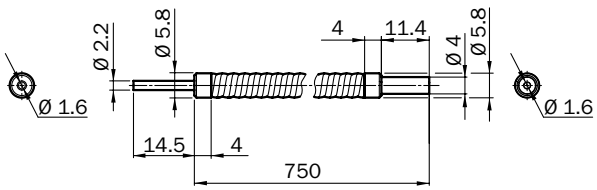
LL3-LM31450



LL3-LM31750



LL3-LM32750



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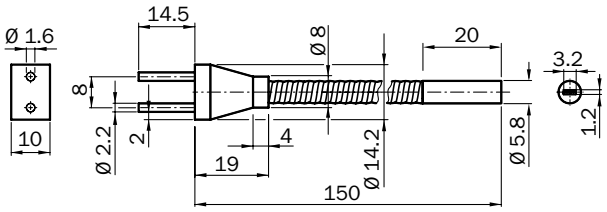
LL3-LM35150



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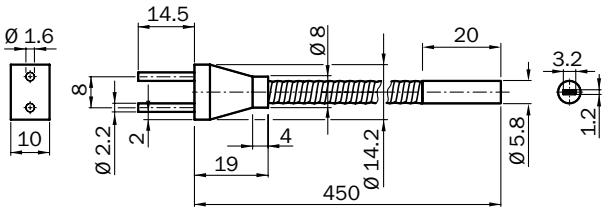

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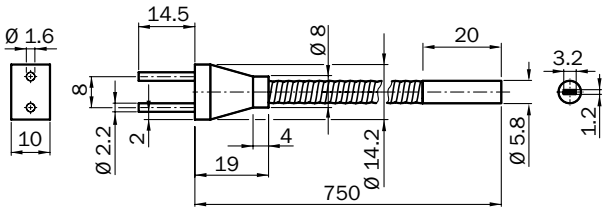
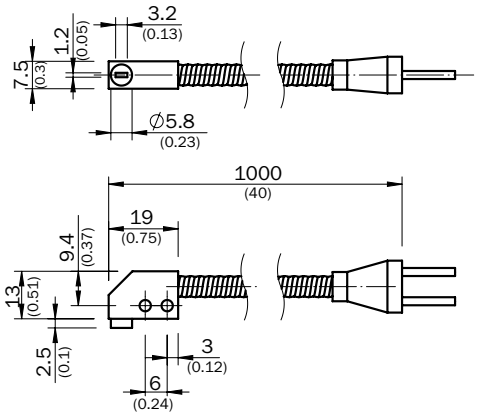


LL3-LM361000



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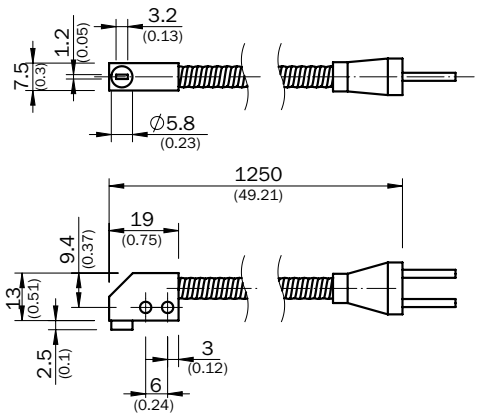

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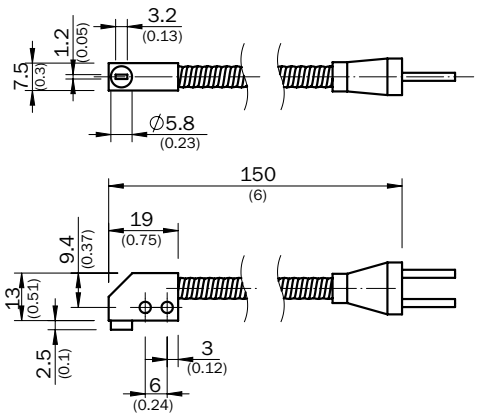

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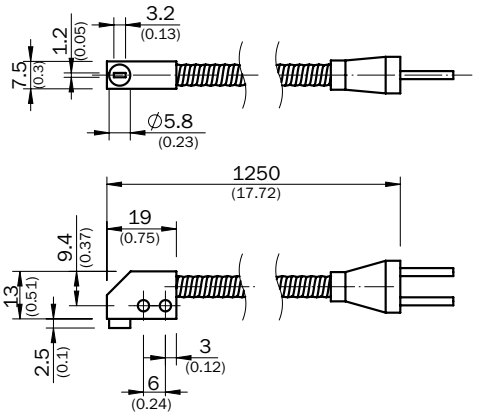

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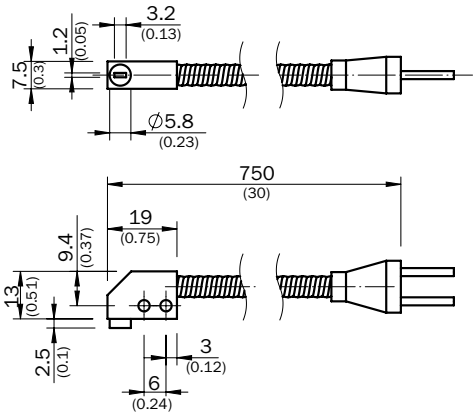

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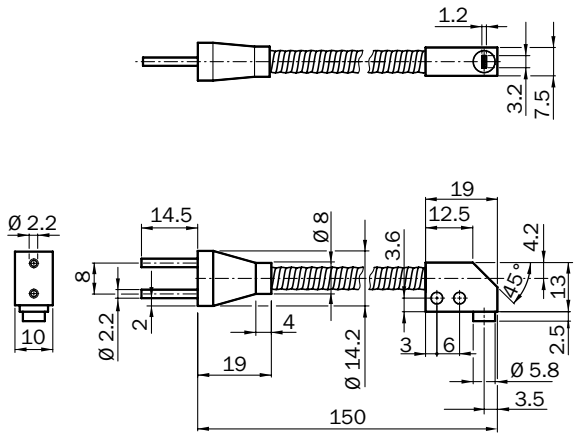

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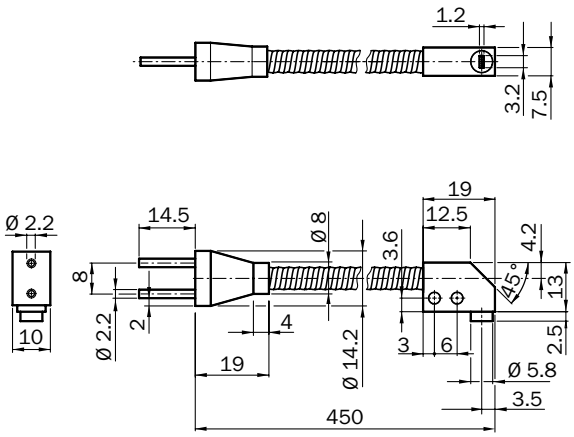

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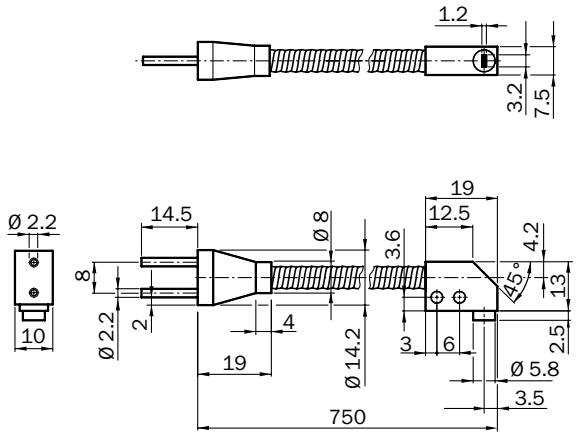
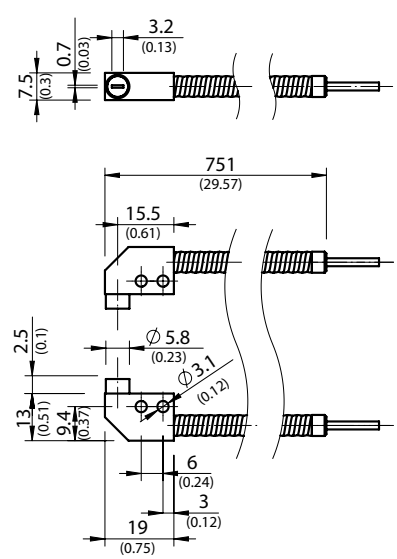


LL3-LM38750



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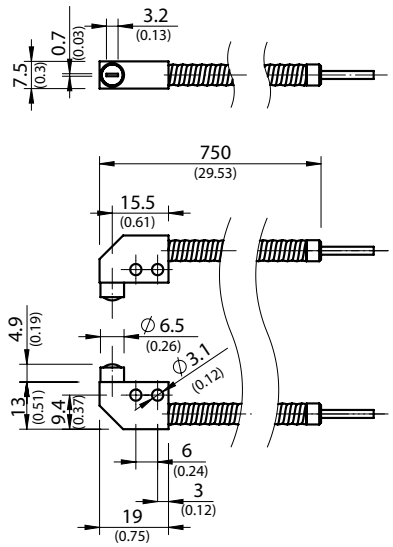
LL3-LM38751



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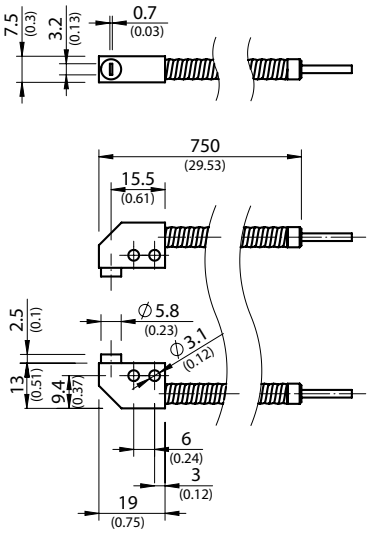
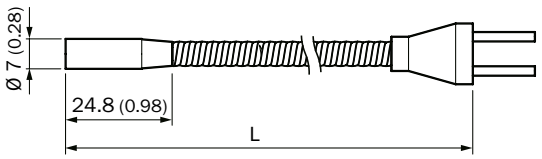
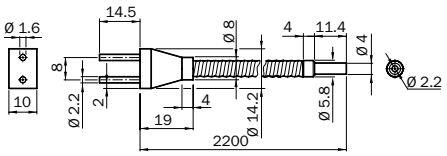


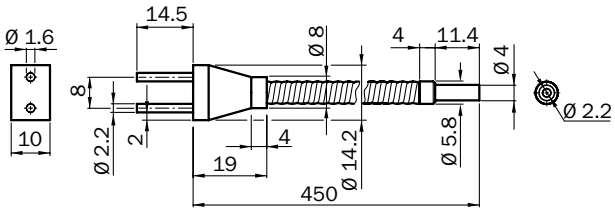
LL3-LM401000



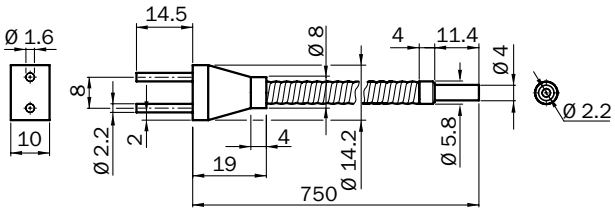
LL3-LT312200



LL3-LT31450



LL3-LT31750



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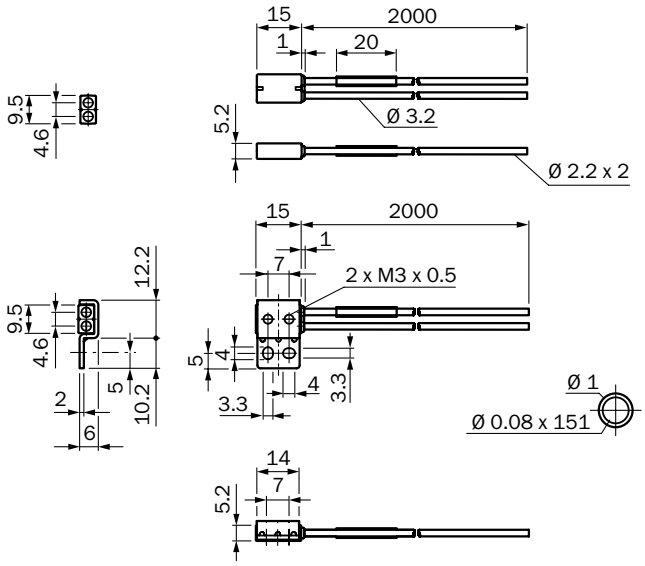
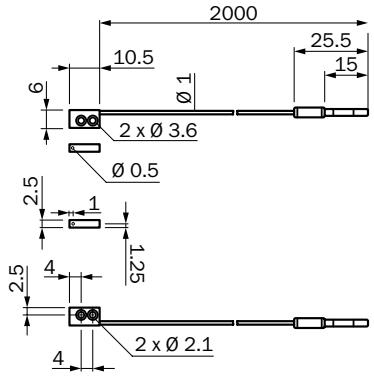
LL3-RR01


15
2000
1
20
Ø 3.2
5.2
Ø 2.2 x 2
9.5
4.6
15
2000
1
7
2 x M3 x 0.5
12.2
9.5
4.6
5
4
2
5
10.2
6
3.3
4
3.3
Ø 1
Ø 0.08 x 151
14
7
5.2

Fiber-optic through-beam systems

LL3-DC57



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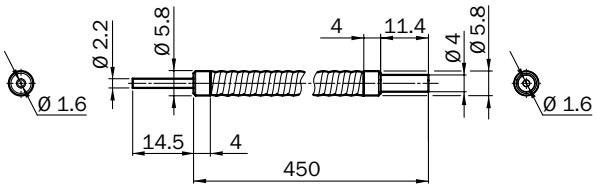
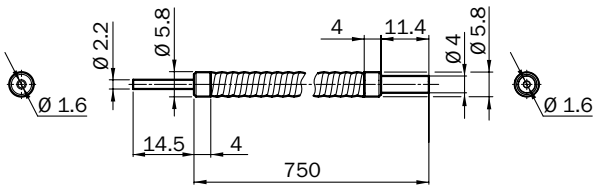
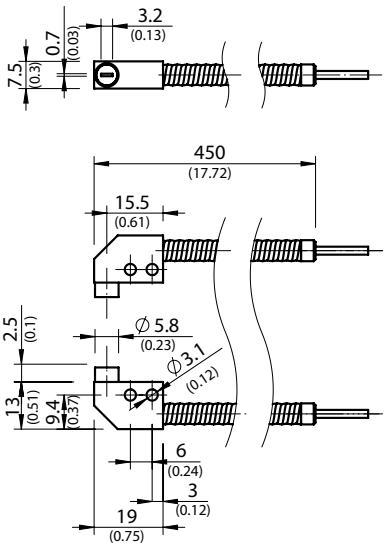


LL3-LM32750



LL3-LM38150



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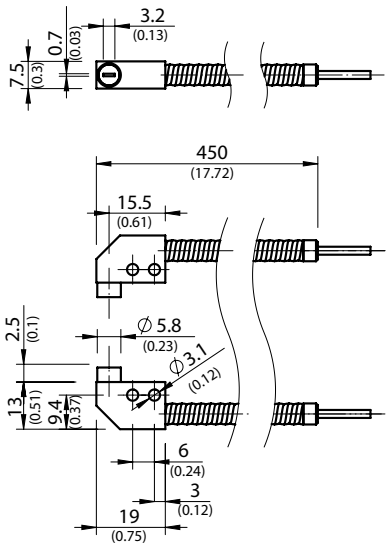
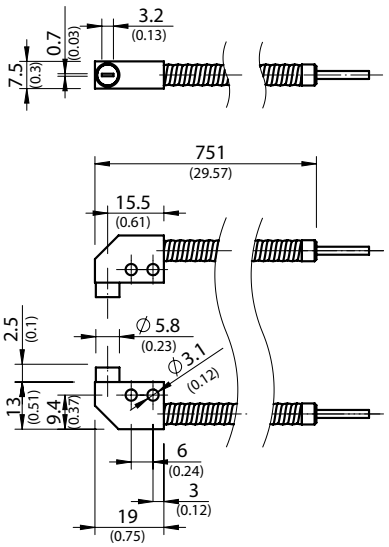
LL3-LM38450



LL3-LM38750



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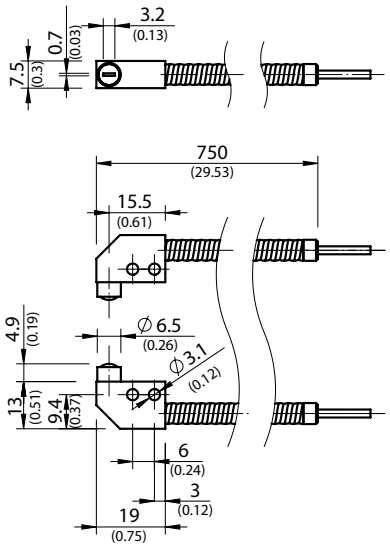

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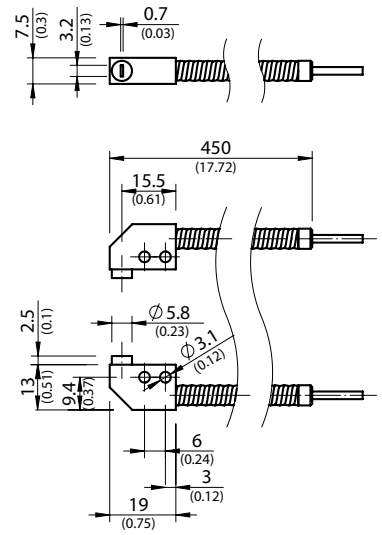

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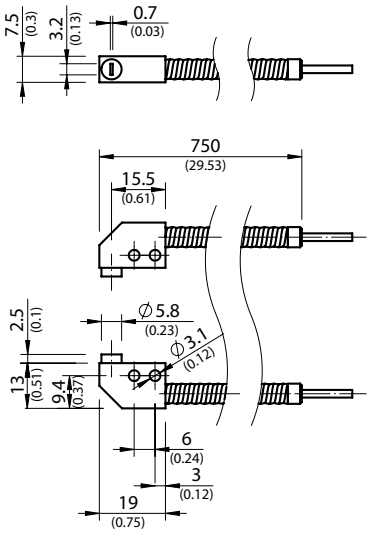
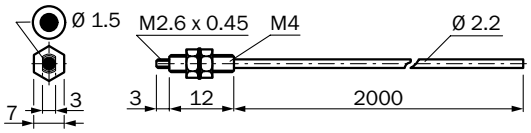
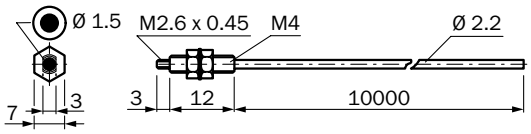


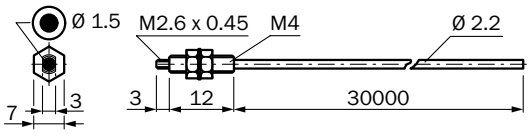
LL3-TB01



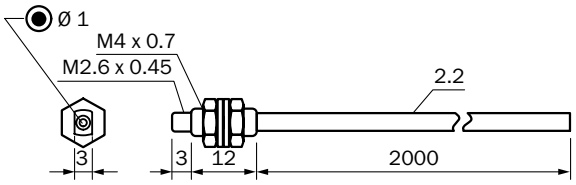
LL3-TB01-10



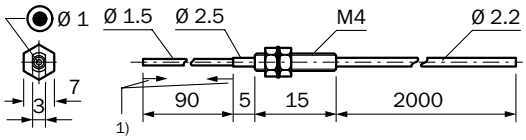
LL3-TB01-30



LL3-TB02

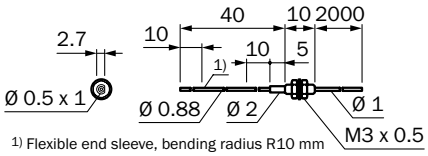


LL3-TB03



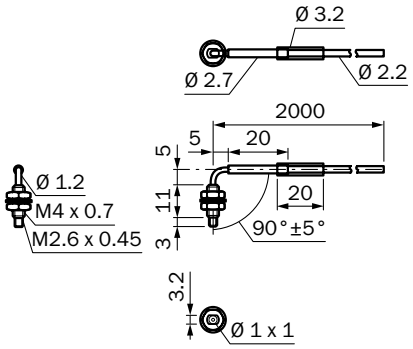
1) Flexible end tip, do not bend in this area (10 mm), bend radius R10 mm

LL3-TB05

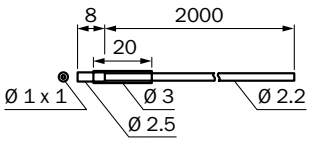


1) Flexible end sleeve, bending radius R10 mm

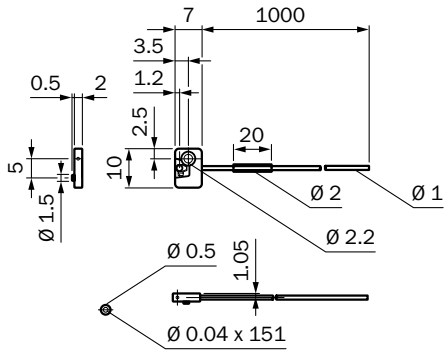
LL3-TB06



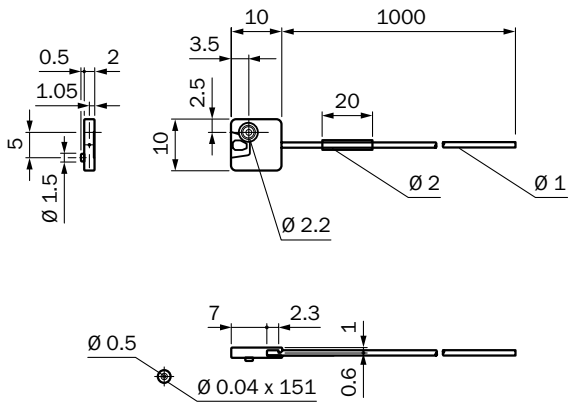
LL3-TB07



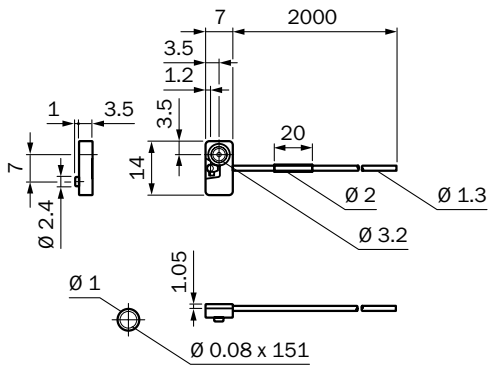
LL3-TE01



LL3-TE02



LL3-TE03



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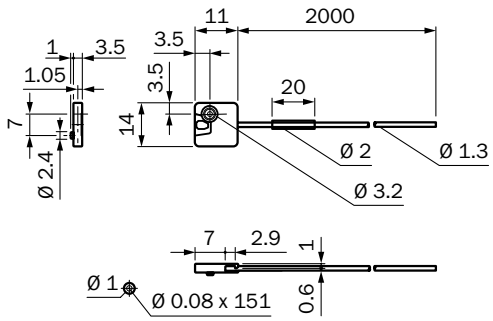
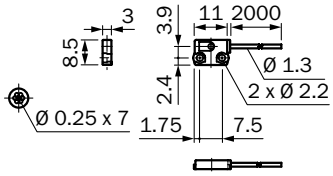
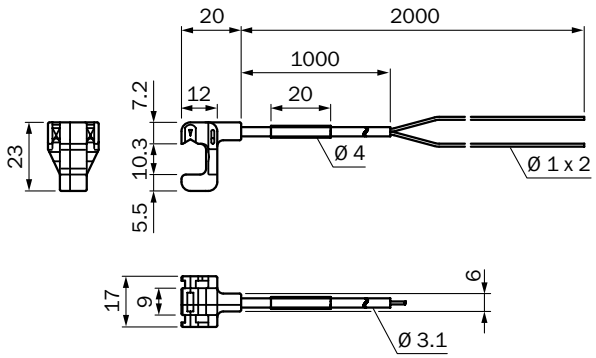
LL3-TE04



LL3-TE05



LL3-TF01



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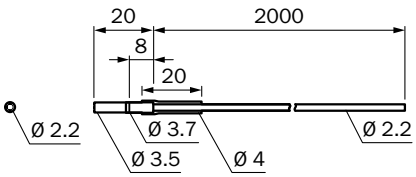

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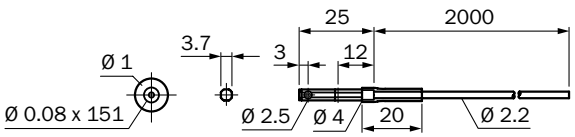

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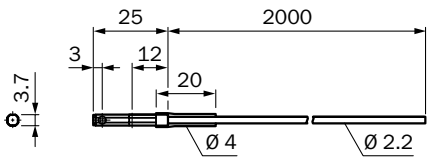

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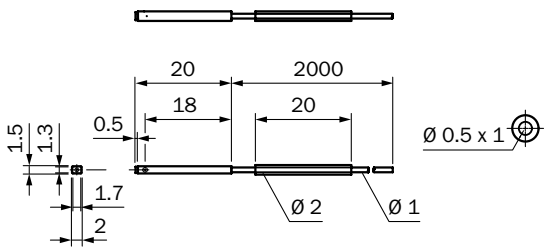

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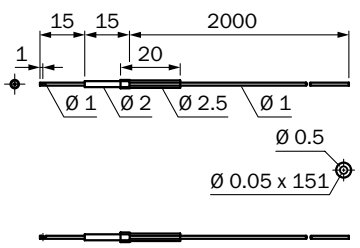

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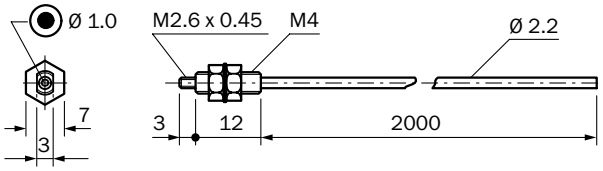

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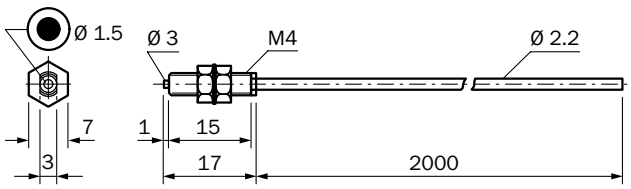

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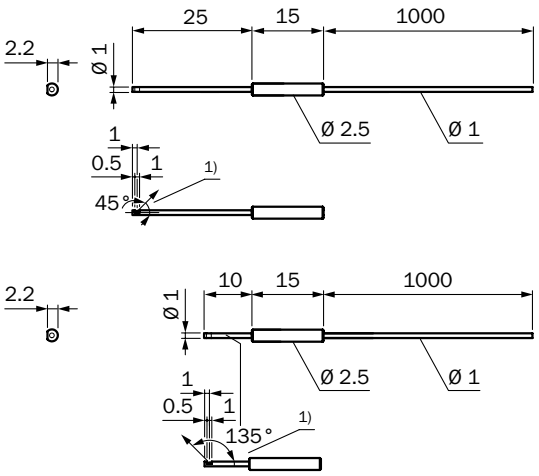
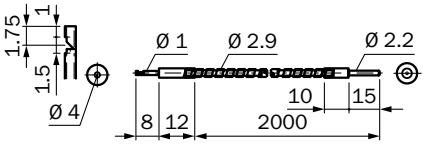


1) angle of beam

LL3-TH07



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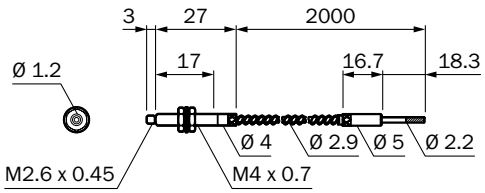

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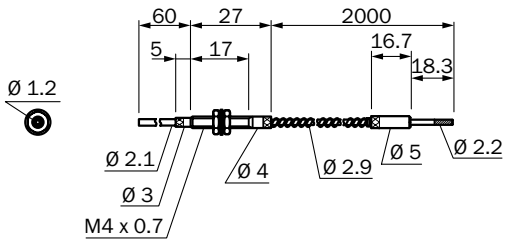

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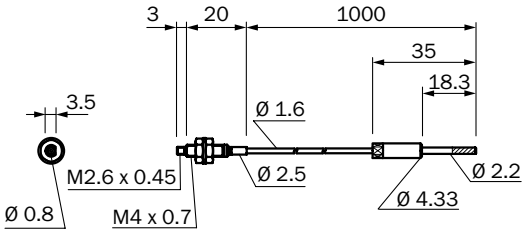

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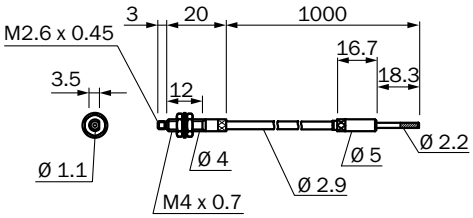

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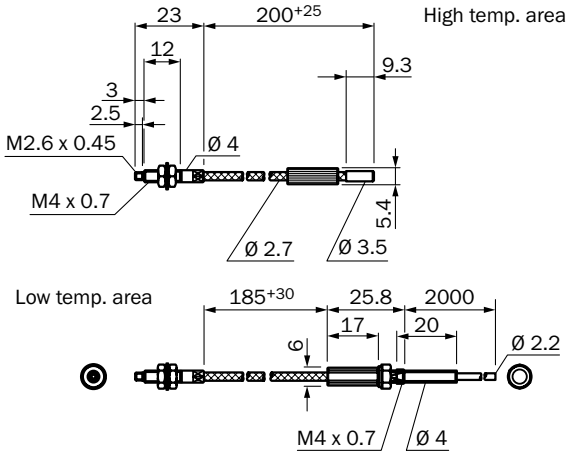

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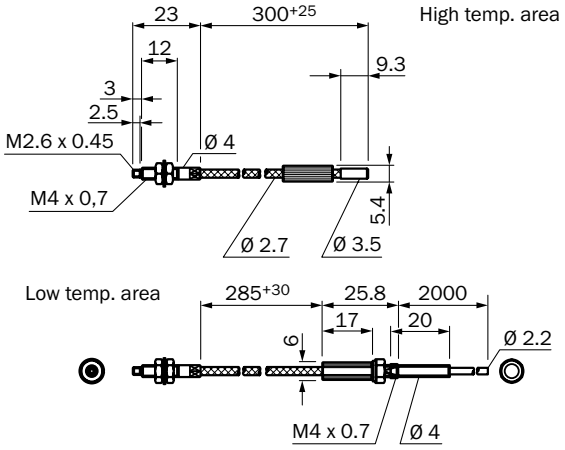

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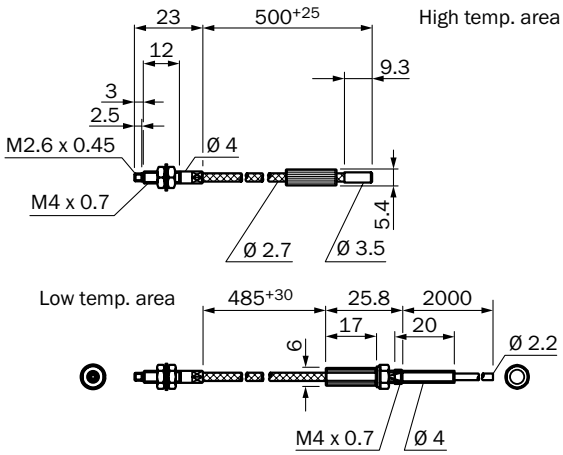
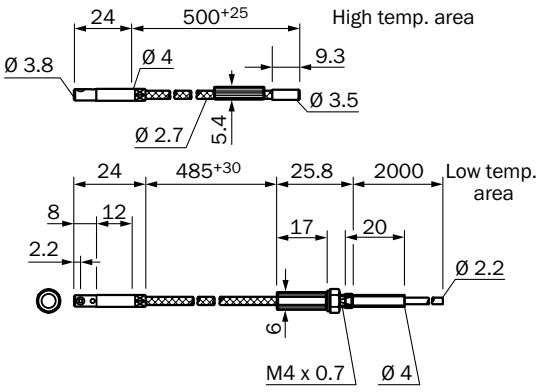


LL3-TH15



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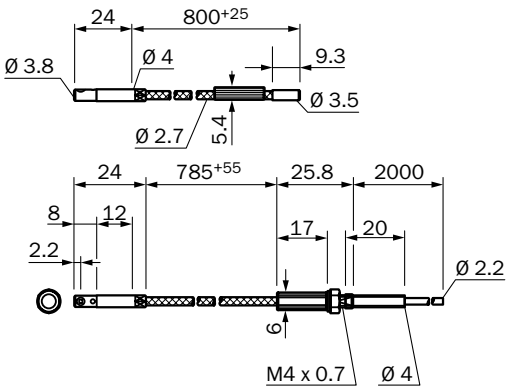
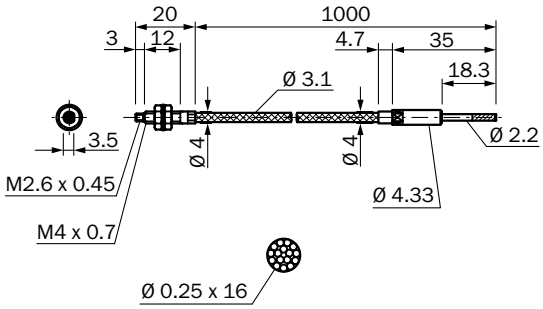
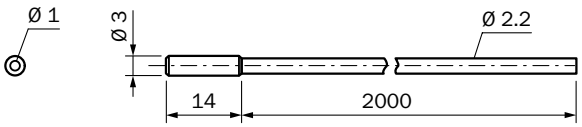


LL3-TJ01



LL3-TK05



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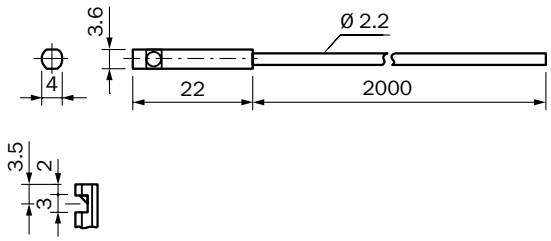

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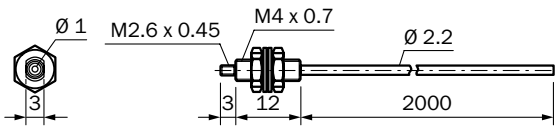

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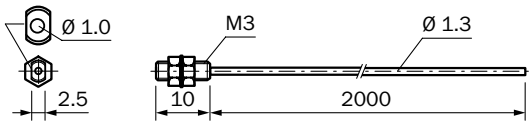

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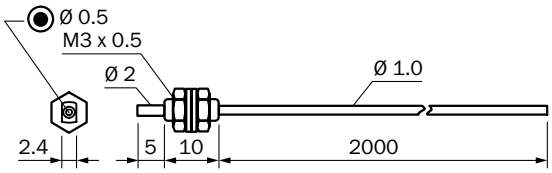

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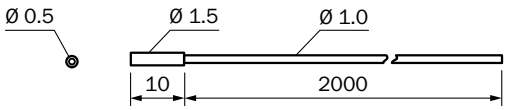

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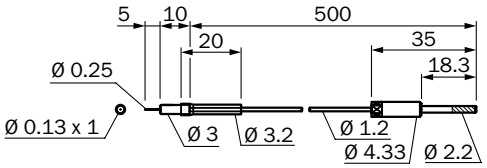
Subject to change without notice

LL3-TP01



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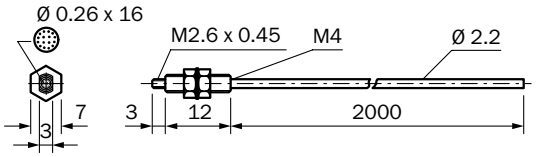

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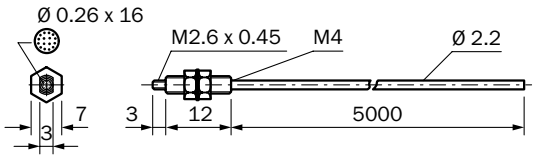

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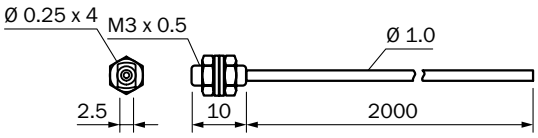

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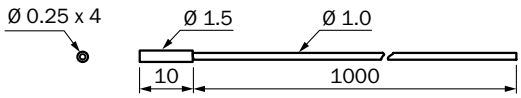

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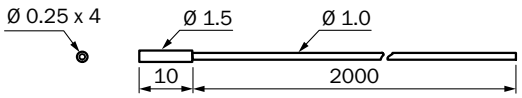

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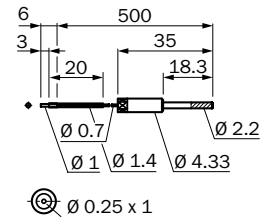

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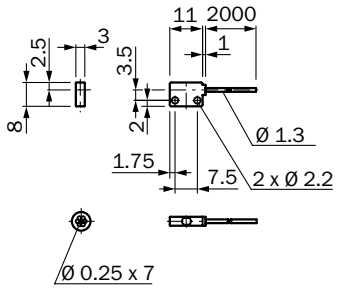

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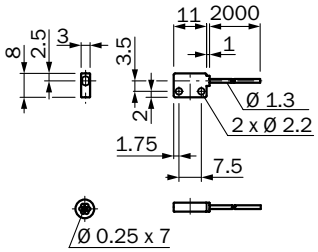

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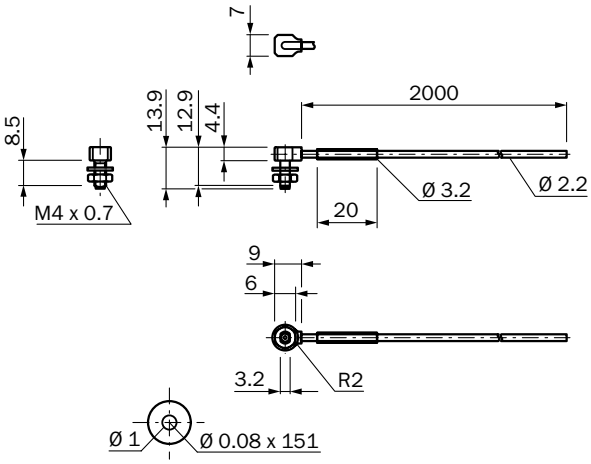

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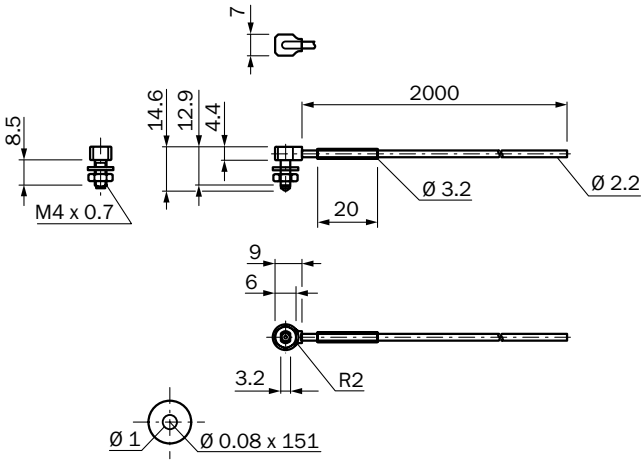

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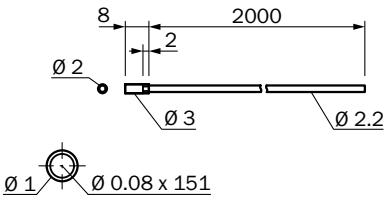

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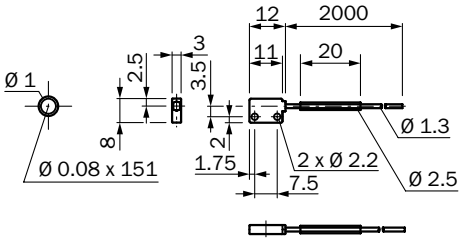

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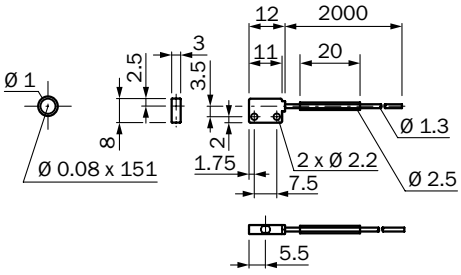

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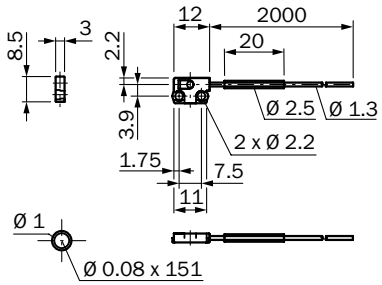
LL3-TR13



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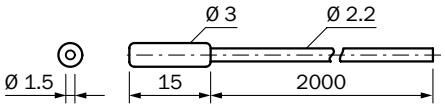

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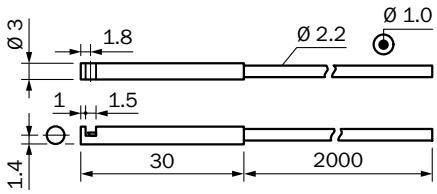

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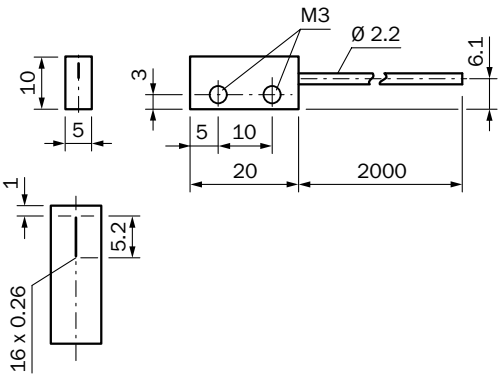

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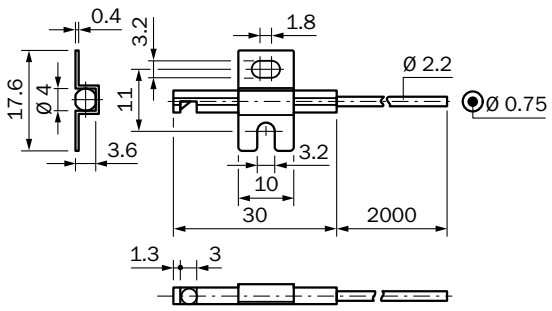

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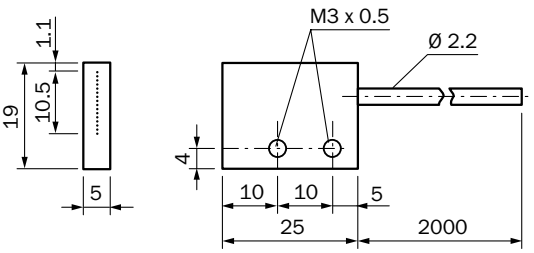

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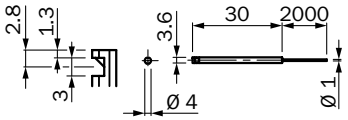

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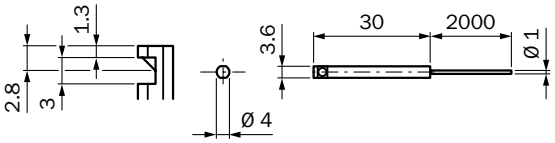

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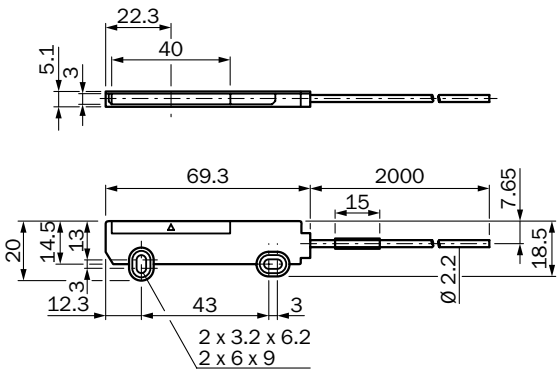

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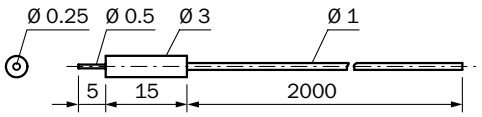

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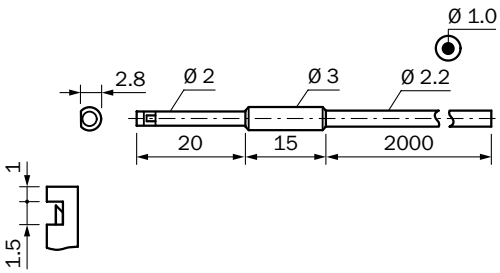

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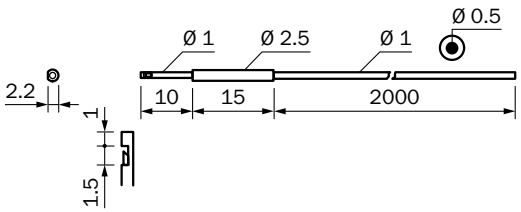

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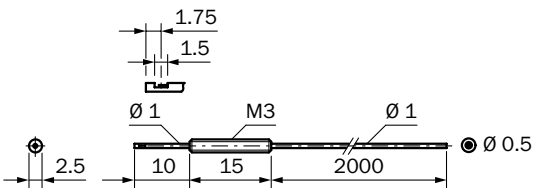
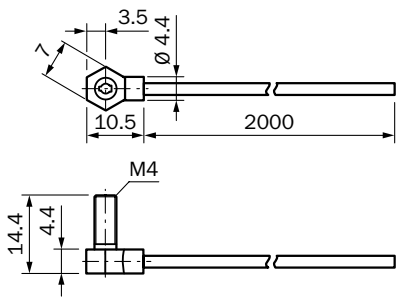


LL3-TV05, LL3-TV06, LL3-TV07



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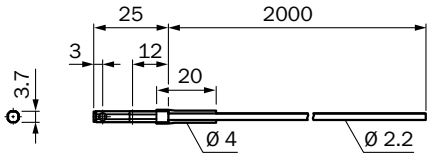
LL3-TV08



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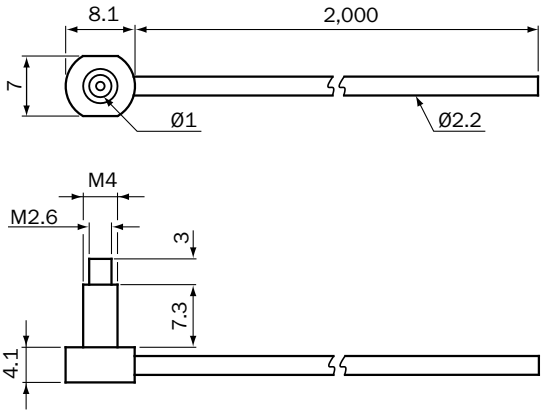
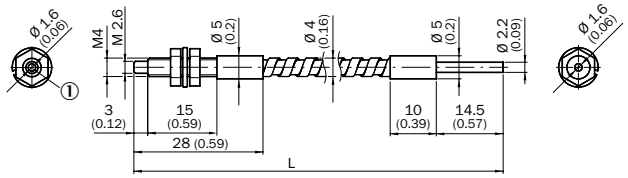


LL3-TW01



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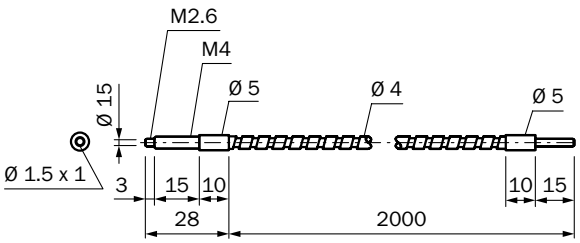

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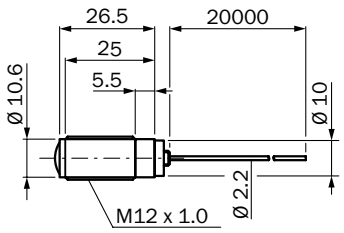
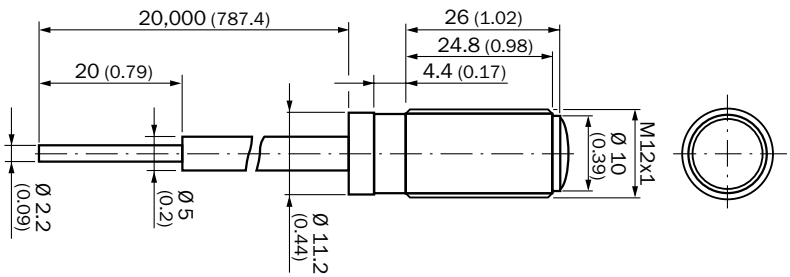


All dimensions in mm

LL3-TX02



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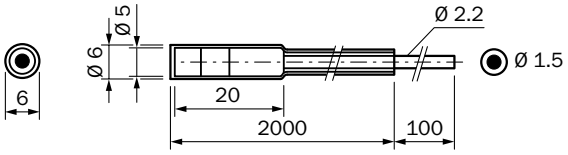
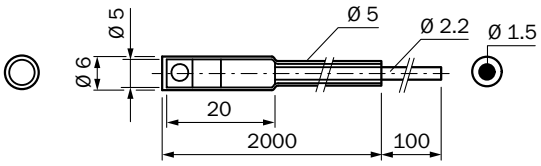
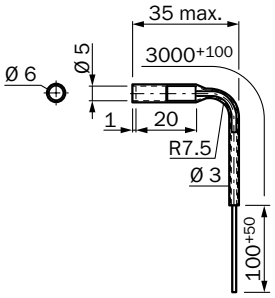
LL3-TY01



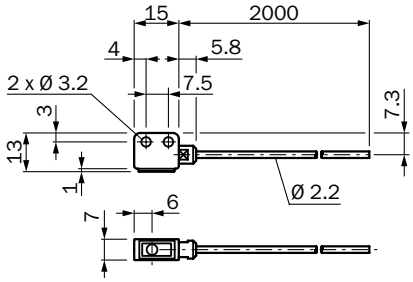
LL3-TY02



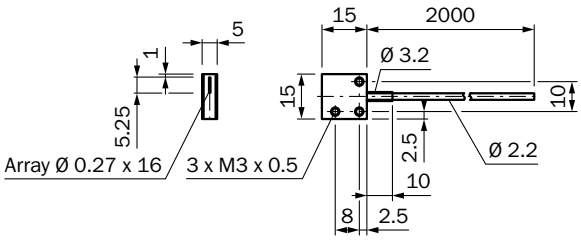
LL3-TY03



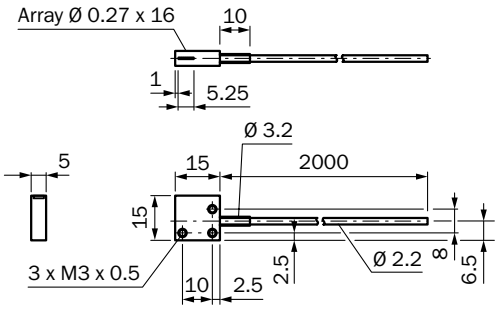
LL3-TY05



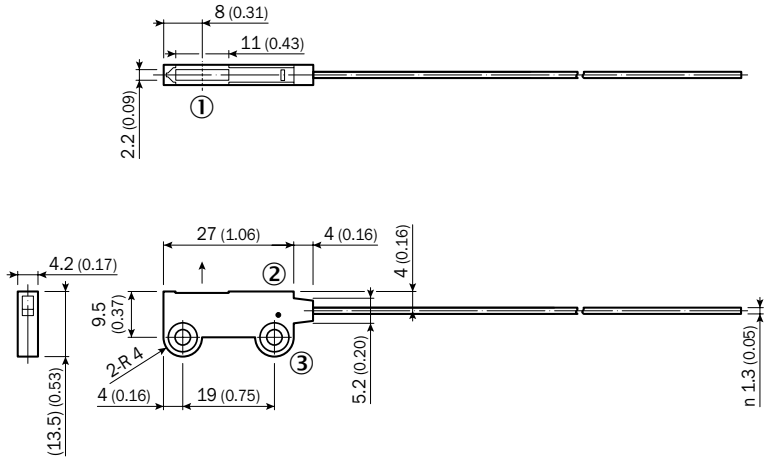
LL3-TZ05



LL3-TZ06



LL3-TZ09



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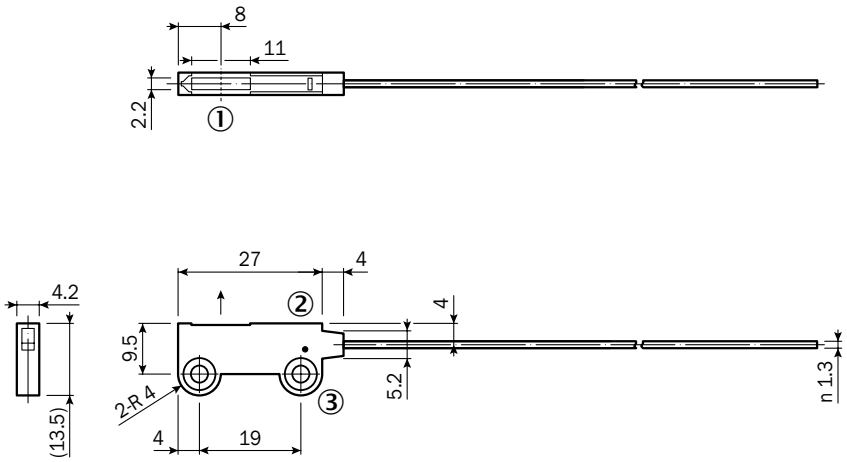
8014999/2019-05-24
Subject to change without notice

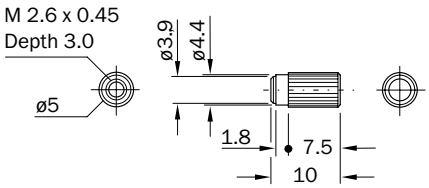
LL3-TZ10



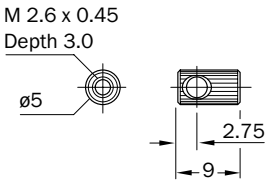
Dimensional drawings (dimensions in mm)

Tip adapters, through-beam system

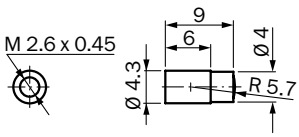
LL3-TA01, LL3-TA01S



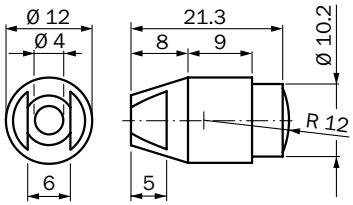
LL3-TA02



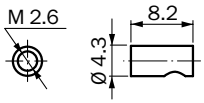
LL3-TA03



LL3-TA04



LL3-TA05



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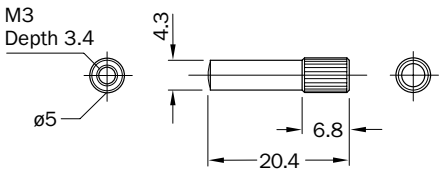
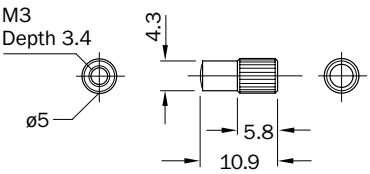
Tip adapters, proximity system

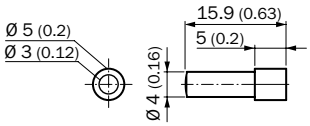
LL3-DA01



LL3-DA02



LL3-DA03



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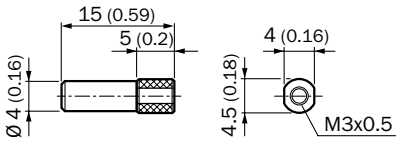

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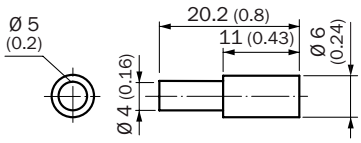
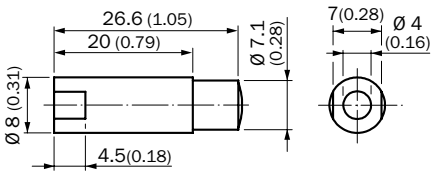
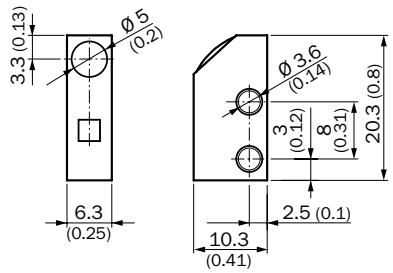


LL3-DA06



LL3-DA07



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BF-WLL160-13	5306094	→ E-106
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BL-TS40-40	5334439	→ E-107
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DOL-0803-G05MRN	6058505	→ E-108
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DOL-0803-W05MRN	6058508	→ E-108
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WLL180T-E333	6049838	→ D-100
WLL180T-E434	6039104	→ D-100
WLL180T-F232	6039098	→ D-100
WLL180T-F333	6042429	→ D-100
WLL180T-F434	6039102	→ D-100
WLL180T-L333	6049837	→ D-100
WLL180T-L432	6039099	→ D-100
WLL180T-L434	6039103	→ D-100
WLL180T-M333	6042428	→ D-100
WLL180T-M432	6039097	→ D-100
WLL180T-M434	6039101	→ D-100
WLL180T-N432	6039094	→ D-100
WLL180T-N434	6039096	→ D-100
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YF8U13-020UA1XLEAX	2094782	→ E-108
YF8U13-020VA1XLEAX	2095860	→ E-109
YF8U13-030UA1XLEAX	2094787	→ E-108
YF8U13-050UA1XLEAX	2094788	→ E-108
YF8U13-050VA1XLEAX	2095884	→ E-109
YF8U13-100UA1XLEAX	2094789	→ E-108
YF8U13-100VA1XLEAX	2095885	→ E-109
YF8U13-150VA1XLEAX	2095886	→ E-109
YF8U13-200UA1XLEAX	2094790	→ E-108
YF8U14-015VA3XLEAX	2095894	→ E-111
YF8U14-020UA3XLEAX	2094791	→ E-110
YF8U14-020VA3XLEAX	2095888	→ E-111
YF8U14-025VA3XLEAX	2095876	→ E-111
YF8U14-030VA3XLEAX	2095896	→ E-111
YF8U14-050UA3XLEAX	2094792	→ E-110
YF8U14-050VA3XLEAX	2095889	→ E-111
YF8U14-100UA3XLEAX	2094793	→ E-110
YF8U14-100VA3XLEAX	2095890	→ E-111
YF8U14-150UA3XLEAX	2095580	→ E-110
YF8U14-200UA3XLEAX	2095582	→ E-110
YF8UA4-050UB4XLEAX	2096200	→ E-110
YF8UA4-100UB4XLEAX	2096201	→ E-110
YG8U13-020UA1XLEAX	2094794	→ E-108
YG8U13-020VA1XLEAX	2096165	→ E-109
YG8U13-050UA1XLEAX	2095586	→ E-108
YG8U13-050VA1XLEAX	2096166	→ E-109
YG8U13-100UA1XLEAX	2095588	→ E-108
YG8U13-100VA1XLEAX	2096209	→ E-109
YG8U13-150VA1XLEAX	2096210	→ E-109
YG8U14-020UA3XLEAX	2095589	→ E-110
YG8U14-020VA3XLEAX	2095962	→ E-111
YG8U14-050UA3XLEAX	2095590	→ E-110
YG8U14-050VA3XLEAX	2095963	→ E-111
YG8U14-100UA3XLEAX	2095591	→ E-110
YG8U14-100VA3XLEAX	2095964	→ E-111

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