



Fiber-optic sensors and fibers

Fits flexibly into the narrowest corners

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Systems



Proximity system



Through-beam system

Design



Threaded sleeve



Flat design



Smooth sleeve



Flexible fibers



90° deflection



Long end sleeve

Fields of application



Area detection



LCDs/transparent objects/semiconductors



Heat-resistant



Robotics



Oil/chemical resistant



Retro-reflective



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 6

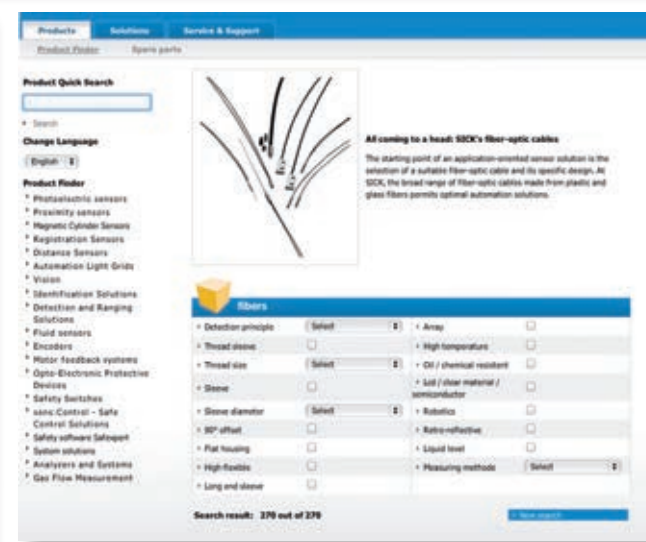
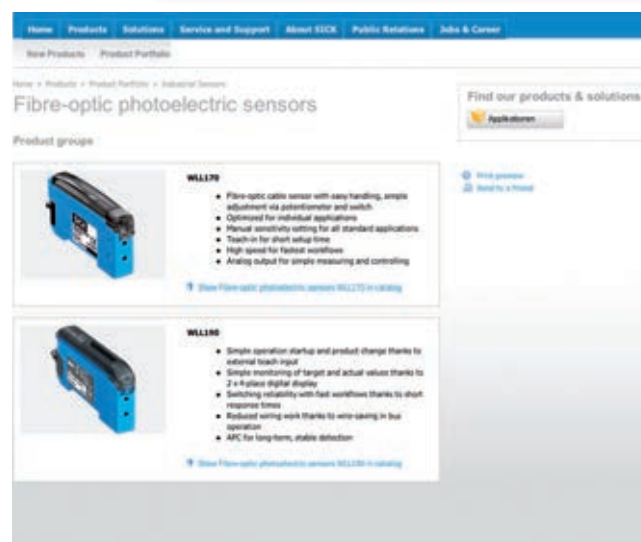
2. Fiber categories

Select the fibers that are suitable for your application. Page 16

3. Fiber-optic sensors

Select an amplifier. Page 86

www.sick.com/fiber



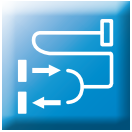
Additional product information

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.

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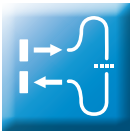
B

Systems



Proximity system

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



Through-beam system

- Sender and receiver fibers are mounted separately
- Detection of object by moving the optical axis between sender and receiver
- Very large sensing ranges
- For accurate positioning
- Stable measuring position
- Optically opaque objects 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
- 90 degree sensing tips for detection of objects in tight areas



Flat design

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



Flexible fibers

- Easy installation around small corners
- 1 mm bend radius



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



LCDs/transparent objects/
semiconductors

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



Robotics

- Ideal for repeated bending
- Presence detection in the gripper



Retro-reflective

- Detection of transparent objects
- Integrated polarizing filter for safe detection of shiny/reflective objects



Fiber-optic proximity systems

B

Model name	Design						Application						Page
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Fiber-optic through-beam systems

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B

Fibers – fit flexibly into the narrowest corners

C









It's the tip that makes the difference








The starting point for finding the ideal sensor solution for your application is choosing the right fiber and specific design. The wide variety of plastic or glass fibers from SICK provide optimum automation solutions. This is particularly true when it comes to solutions that require flexible installation, the ability to operate in high temperatures, or that require a high degree of durability. While plastic fibers are characterized, among other things, by the smallest of bend radii and maximum flexibility, and the ability to be shortened, glass fibers are more chemically resistant and suitable for a higher temperature range. The wide variety of end sleeve options or individual special sleeves can handle any installation requirement. Depending on the application, the protective cladding of the fibers can be made from plastic, metal, or PTFE for exposure to aggressive chemicals.

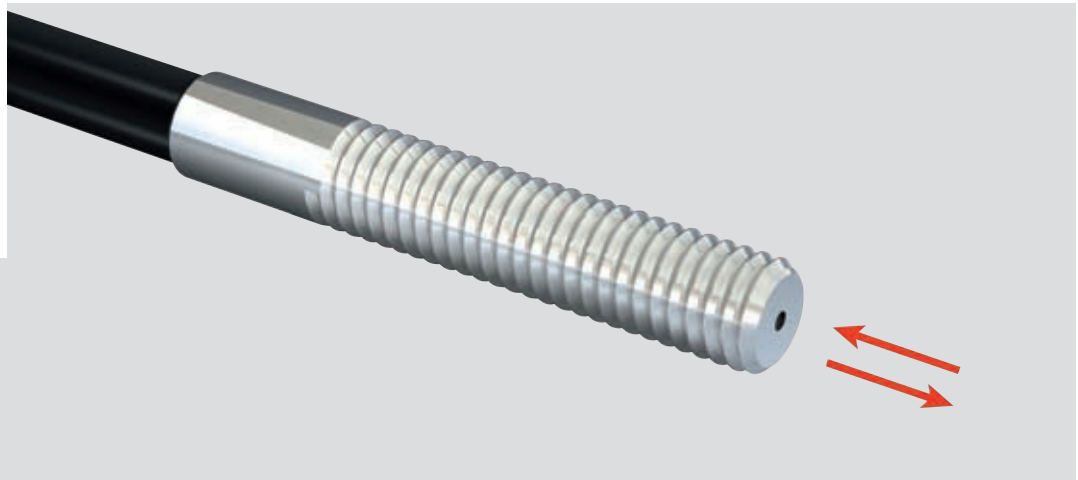


Design

Application

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C



Axial outlet



Fibers with hexagon head for space-saving installation







Threaded sleeves

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.



Fiber-optic proximity systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DB01  	25 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	90 ¹⁾	160 ⁶⁾	5308074
					280 ²⁾	62 ⁷⁾	
					500 ³⁾	37 ⁸⁾	
					900 ⁴⁾		
					1350 ⁵⁾		
LL3-DB01-3  	25 mm	Ø 0.015 mm	-40 °C - +70 °C	3 m 	90 ¹⁾	160 ⁶⁾	5322552
					280 ²⁾	62 ⁷⁾	
					500 ³⁾	37 ⁸⁾	
					900 ⁴⁾		
					1350 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DB01-10 	25 mm	Ø 0.015 mm	-40 °C - +70 °C	10 m 	50 ¹⁾ 140 ²⁾ 250 ³⁾ 500 ⁴⁾ 750 ⁵⁾	90 ⁶⁾ 27 ⁷⁾ 32 ⁸⁾	5308075
LL3-DB01-30 	25 mm	Ø 0.015 mm	-40 °C - +70 °C	30 m 	35 ¹⁾ 98 ²⁾ 175 ³⁾ 350 ⁴⁾ 525 ⁵⁾	63 ⁶⁾ 18 ⁷⁾ 25 ⁸⁾	5324662
LL3-DB03 	25 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	90 ¹⁾ 300 ²⁾ 500 ³⁾ 900 ⁴⁾ 1350 ⁵⁾	160 ⁶⁾ 62 ⁷⁾ 37 ⁸⁾	5313021
LL3-DB04 	25 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	90 ¹⁾ 280 ²⁾ 500 ³⁾ 900 ⁴⁾ 1350 ⁵⁾	90 ⁶⁾ 55 ⁷⁾ 50 ⁸⁾	5325990
LL3-DB07 	25 mm	Ø 0.02 mm	-40 °C - +60 °C	2 m 	27 ¹⁾ 88 ²⁾ 165 ³⁾ 330 ⁴⁾ 350 ⁵⁾	65 ⁶⁾ 30 ⁷⁾ 20 ⁸⁾	5325988
LL3-DH01  	35 mm	Ø 0.015 mm	-40 °C - +180 °C	2 m 	120 ¹⁾ 350 ²⁾ 600 ³⁾ 980 ⁴⁾ 1500 ⁵⁾	220 ⁶⁾ 95 ⁷⁾ 45 ⁸⁾	5308091
LL3-DH01-03  	35 mm	Ø 0.015 mm	-40 °C - +180 °C	3 m 	100 ¹⁾ 300 ²⁾ 500 ³⁾ 850 ⁴⁾ 1400 ⁵⁾	150 ⁶⁾ 85 ⁷⁾ 40 ⁸⁾	5321260
LL3-DH02  	25 mm	Ø 0.015 mm	-40 °C - +100 °C	2 m 	70 ¹⁾ 230 ²⁾ 350 ³⁾ 600 ⁴⁾ 1000 ⁵⁾	125 ⁶⁾ 45 ⁷⁾ 8 ⁸⁾	5308092
LL3-DJ01 	10 mm	Ø 0.02 mm	-40 °C - +60 °C	1 m	14 ¹⁾ 49 ²⁾ 99 ³⁾ 190 ⁴⁾ 210 ⁵⁾	60 ⁶⁾ 27 ⁷⁾ 17 ⁸⁾	5325989

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

C

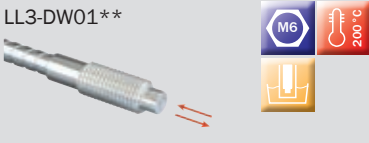
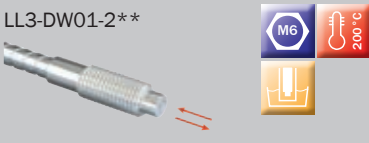
Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DJ02 	10 mm	∅ 0.02 mm	-40 °C – +70 °C	1 m	38 ¹⁾ 120 ²⁾ 230 ³⁾ 460 ⁴⁾ 490 ⁵⁾	110 ⁶⁾ 50 ⁷⁾ 30 ⁸⁾	5325992
LL3-DK06 	25 mm	∅ 0.015 mm	-40 °C – +70 °C	2 m 	100 ¹⁾ 300 ²⁾ 500 ³⁾ 900 ⁴⁾ 1400 ⁵⁾	165 ⁶⁾ 65 ⁷⁾ 37 ⁸⁾	5313019
LL3-DK21  Suitable for tip adapters	15 mm	∅ 0.015 mm	-40 °C – +70 °C	0.5 m	14 ¹⁾ 45 ²⁾ 75 ³⁾ 135 ⁴⁾ 200 ⁵⁾	17 ⁶⁾ 7 ⁷⁾ 3 ⁸⁾	5313023
LL3-DK66  	2 mm	∅ 0.015 mm	-40 °C – +70 °C	2 m 	90 ¹⁾ 300 ²⁾ 500 ³⁾ 900 ⁴⁾ 1400 ⁵⁾	115 ⁶⁾ 47 ⁷⁾ 27 ⁸⁾	5313024
LL3-DK67  	2 mm	∅ 0.015 mm	-40 °C – +70 °C	2 m 	90 ¹⁾ 300 ²⁾ 500 ³⁾ 900 ⁴⁾ 1400 ⁵⁾	115 ⁶⁾ 47 ⁷⁾ 27 ⁸⁾	5313025
LL3-DM01 	25 mm	∅ 0.015 mm	-40 °C – +70 °C	2 m 	75 ¹⁾ 255 ²⁾ 420 ³⁾ 800 ⁴⁾ 1300 ⁵⁾	165 ⁶⁾ 65 ⁷⁾ 37 ⁸⁾	5308071
LL3-DM02  Suitable for tip adapters	15 mm	∅ 0.015 mm	-40 °C – +70 °C	2 m 	40 ¹⁾ 130 ²⁾ 200 ³⁾ 350 ⁴⁾ 600 ⁵⁾	72 ⁶⁾ 22 ⁷⁾ 11 ⁸⁾	5308077
LL3-DR01   	4 mm	∅ 0.015 mm	-40 °C – +70 °C	2 m 	90 ¹⁾ 280 ²⁾ 450 ³⁾ 880 ⁴⁾ 1350 ⁵⁾	135 ⁶⁾ 50 ⁷⁾ 20 ⁸⁾	5308078
LL3-DR02   	4 mm	∅ 0.015 mm	-40 °C – +70 °C	1 m 	18 ¹⁾ 50 ²⁾ 90 ³⁾ 200 ⁴⁾ 370 ⁵⁾	22 ⁶⁾ 9 ⁷⁾ 3 ⁸⁾	5308079

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DR06    	4 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	18 ¹⁾ 60 ²⁾ 100 ³⁾ 220 ⁴⁾ 360 ⁵⁾	37 ⁶⁾ 11 ⁷⁾ 5 ⁸⁾	5308082
LL3-DR08   	4 mm	Ø 0.02 mm	-40 °C - +70 °C	2 m 	8 ¹⁾ 25 ²⁾ 46 ³⁾ 90 ⁴⁾ 98 ⁵⁾	22 ⁶⁾ 9 ⁷⁾ 6 ⁸⁾	5326037
LL3-DS06  	15 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	18 ¹⁾ 55 ²⁾ 95 ³⁾ 190 ⁴⁾ 360 ⁵⁾	47 ⁶⁾ 17 ⁷⁾ 7 ⁸⁾	5308073
LL3-DT01   Suitable for tip adapters	15 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	40 ¹⁾ 130 ²⁾ 200 ³⁾ 350 ⁴⁾ 600 ⁵⁾	75 ⁶⁾ 22 ⁷⁾ 11 ⁸⁾	5308076
LL3-DT01-05   Suitable for tip adapters	15 mm	Ø 0.015 mm	-40 °C - +70 °C	5 m 	30 ¹⁾ 100 ²⁾ 150 ³⁾ 300 ⁴⁾ 500 ⁵⁾	45 ⁶⁾ 18 ⁷⁾ 9 ⁸⁾	5309087
LL3-DV05  	25 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	25 ¹⁾ 110 ²⁾ 185 ³⁾ 400 ⁴⁾ 650 ⁵⁾	47 ⁶⁾ 17 ⁷⁾ 17 ⁸⁾	5322549
LL3-DV06   105 °C	25 mm	Ø 0.015 mm	-40 °C - +105 °C	2 m 	30 ¹⁾ 130 ²⁾ 210 ³⁾ 450 ⁴⁾ 800 ⁵⁾	47 ⁶⁾ 12 ⁷⁾ 12 ⁸⁾	5322550
LL3-DV07   Green light	2 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	20 ¹⁾ 110 ²⁾ 180 ³⁾ 400 ⁴⁾ 650 ⁵⁾	16 ⁶⁾ 12 ⁷⁾ 12 ⁸⁾	5322551

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.



Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DW01** 	25 mm	Ø 0.02 mm	-40 °C – +200 °C	1 m	20 ¹⁾	–	5315234
					50 ²⁾	–	
					95 ³⁾	–	
					150 ⁴⁾	–	
					400 ⁵⁾	–	
LL3-DW01-2** 	25 mm	Ø 0.02 mm	-40 °C – +200 °C	2 m	20 ¹⁾	–	5324789
					50 ²⁾	–	
					95 ³⁾	–	
					150 ⁴⁾	–	
					400 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

* With optimal measuring distance and settings. ** Humidity/level detection only in conjunction with WLL180T-P474 IR version.

Mounting material included.

C



Fiber-optic through-beam systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TB01  Suitable for tip adapters	30 mm	Ø 0.5 mm	-40 °C - +70 °C	2 m 	300 ¹⁾ 950 ²⁾ 1700 ³⁾ 3500 ⁴⁾ 4000 ⁵⁾	720 ⁶⁾ 315 ⁷⁾ 280 ⁸⁾	5308050
LL3-TB01-10  Suitable for tip adapters	30 mm	Ø 0.5 mm	-40 °C - +70 °C	10 m 	230 ¹⁾ 650 ²⁾ 1200 ³⁾ 2450 ⁴⁾ 4000 ⁵⁾	420 ⁶⁾ 165 ⁷⁾ 230 ⁸⁾	5308051
LL3-TB01-30  Suitable for tip adapters	30 mm	Ø 0.5 mm	-40 °C - +70 °C	30 m 	160 ¹⁾ 450 ²⁾ 840 ³⁾ 1700 ⁴⁾ 2800 ⁵⁾	290 ⁶⁾ 110 ⁷⁾ 180 ⁸⁾	5315499
LL3-TB02  Suitable for tip adapters	25 mm	Ø 0.2 mm	-40 °C - +70 °C	2 m 	225 ¹⁾ 650 ²⁾ 1200 ³⁾ 2500 ⁴⁾ 4000 ⁵⁾	470 ⁶⁾ 165 ⁷⁾ 135 ⁸⁾	5308048
LL3-TB08  Suitable for tip adapters	25 mm	Ø 0.4 mm	-40 °C - +70 °C	10 m 	6600 ¹⁾ 19500 ²⁾ 19500 ³⁾ 19500 ⁴⁾ 19500 ⁵⁾	19500 ⁶⁾ 7500 ⁷⁾ 6000 ⁸⁾	5325917
LL3-TH01  Suitable for tip adapters	25 mm	Ø 0.2 mm	-40 °C - +100 °C	2 m 	55 ¹⁾ 180 ²⁾ 320 ³⁾ 680 ⁴⁾ 1000 ⁵⁾	305 ⁶⁾ 125 ⁷⁾ 50 ⁸⁾	5308064
LL3-TH02  Suitable for tip adapters	35 mm	Ø 0.5 mm	-40 °C - +180 °C	2 m 	230 ¹⁾ 700 ²⁾ 1300 ³⁾ 2700 ⁴⁾ 4000 ⁵⁾	620 ⁶⁾ 255 ⁷⁾ 125 ⁸⁾	5308065
LL3-TJ01  Suitable for tip adapters	10 mm	Ø 0.05 mm	-40 °C - +60 °C	1 m	145 ¹⁾ 460 ²⁾ 830 ³⁾ 1600 ⁴⁾ 1770 ⁵⁾	40 ⁶⁾ 120 ⁷⁾ 150 ⁸⁾	5325915

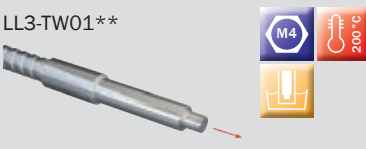
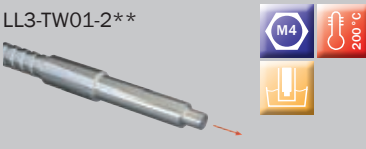
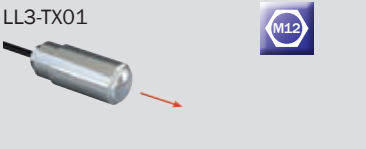
¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.



C

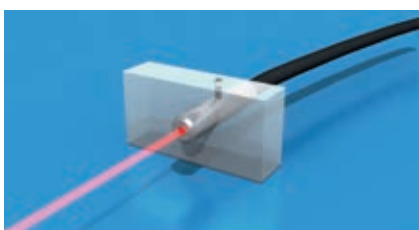
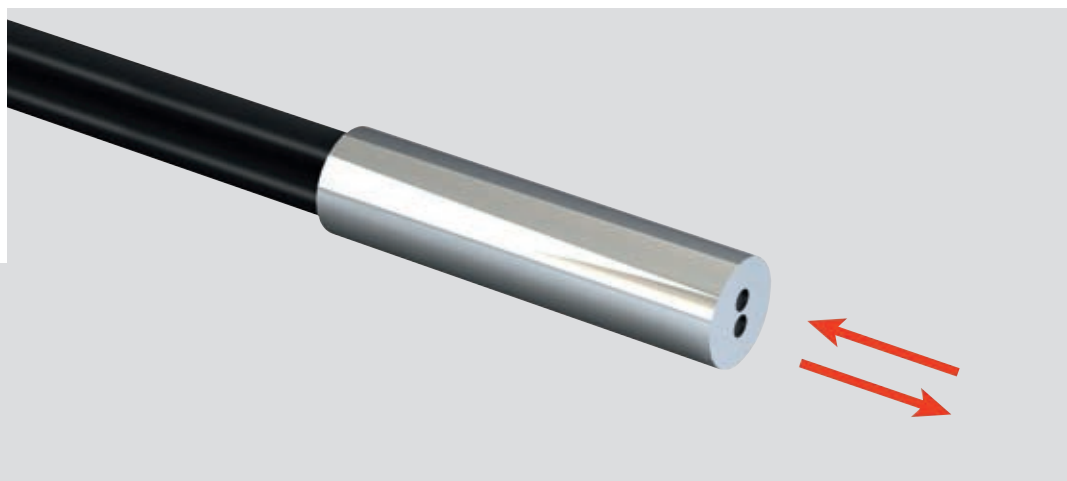
Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TK77  Suitable for tip adapters	2 mm	Ø 0.2 mm	-40 °C – +70 °C	2 m	220 ¹⁾ 650 ²⁾ 1200 ³⁾ 2750 ⁴⁾ 4000 ⁵⁾	370 ⁶⁾ 125 ⁷⁾ 120 ⁸⁾	5313035
LL3-TM01 	25 mm	Ø 0.2 mm	-40 °C – +70 °C	2 m	220 ¹⁾ 680 ²⁾ 1200 ³⁾ 2500 ⁴⁾ 4000 ⁵⁾	470 ⁶⁾ 165 ⁷⁾ 135 ⁸⁾	5308068
LL3-TM02 	15 mm	Ø 0.1 mm	-40 °C – +70 °C	2 m	55 ¹⁾ 175 ²⁾ 300 ³⁾ 700 ⁴⁾ 1100 ⁵⁾	125 ⁶⁾ 45 ⁷⁾ 30 ⁸⁾	5308069
LL3-TR01  Suitable for tip adapters	4 mm	Ø 0.3 mm	-40 °C – +70 °C	2 m	200 ¹⁾ 600 ²⁾ 1000 ³⁾ 2400 ⁴⁾ 4000 ⁵⁾	340 ⁶⁾ 125 ⁷⁾ 125 ⁸⁾	5308052
LL3-TR01-05 	4 mm	Ø 0.3 mm	-40 °C – +70 °C	5 m	160 ¹⁾ 450 ²⁾ 800 ³⁾ 1900 ⁴⁾ 2800 ⁵⁾	120 ⁶⁾ 60 ⁷⁾ 60 ⁸⁾	5322198
LL3-TR02 	4 mm	Ø 0.1 mm	-40 °C – +70 °C	2 m	60 ¹⁾ 175 ²⁾ 330 ³⁾ 750 ⁴⁾ 1100 ⁵⁾	115 ⁶⁾ 38 ⁷⁾ 23 ⁸⁾	5308053
LL3-TV05 	25 mm	Ø 0.4 mm	-40 °C – +70 °C	2 m	350 ¹⁾ 750 ²⁾ 1800 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	400 ⁶⁾ 170 ⁷⁾ 150 ⁸⁾	5322546
LL3-TV06 	25 mm	Ø 0.4 mm	-40 °C – +105 °C	2 m	180 ¹⁾ 550 ²⁾ 900 ³⁾ 2100 ⁴⁾ 3500 ⁵⁾	350 ⁶⁾ 150 ⁷⁾ 150 ⁸⁾	5322547
LL3-TV07 	2 mm	Ø 0.4 mm	-40 °C – +70 °C	2 m	340 ¹⁾ 1000 ²⁾ 1800 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	290 ⁶⁾ 150 ⁷⁾ 150 ⁸⁾	5322548

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TW01** 	25 mm	∅ 0.4 mm	-40 °C - +200 °C	1 m	80 ¹⁾ 230 ²⁾ 350 ³⁾ 560 ⁴⁾ 980 ⁵⁾	- - - - -	5315233
LL3-TW01-2** 	25 mm	∅ 0.4 mm	-40 °C - +200 °C	2 m	80 ¹⁾ 230 ²⁾ 350 ³⁾ 560 ⁴⁾ 980 ⁵⁾	- - - - -	5321306
LL3-TX01 	25 mm	∅ 0.5 mm	-40 °C - +60 °C	20 m	1000 ¹⁾ 3700 ²⁾ 7000 ³⁾ 14000 ⁴⁾ 20000 ⁵⁾	1500 ⁶⁾ 600 ⁷⁾ 500 ⁸⁾	5324173

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
 * With optimal measuring distance and settings. ** Humidity/level detection only in conjunction with WLL180T-P474 IR version.
 Mounting material included.





Easy to mount with setscrew







C

Smooth sleeves

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



Fiber-optic proximity systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DB10  	25 mm	Ø 0.02 mm	-40 °C - +70 °C	2 m 	70 ¹⁾	170 ⁶⁾	5325999
					220 ²⁾	75 ⁷⁾	
					360 ³⁾	60 ⁸⁾	
					720 ⁴⁾		
					770 ⁵⁾		
LL3-DK04  	25 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	100 ¹⁾	165 ⁶⁾	5313020
					300 ²⁾	65 ⁷⁾	
					500 ³⁾	37 ⁸⁾	
					900 ⁴⁾		
					1400 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DK4Z 	2 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	65 ¹⁾ 200 ²⁾ 350 ³⁾ 650 ⁴⁾ 1000 ⁵⁾	115 ⁶⁾ 47 ⁷⁾ 27 ⁸⁾	5313026
LL3-DP01 	10 mm	Ø 0.02 mm	-40 °C - +60 °C	2 m	- 3 ²⁾ 14 ³⁾ 29 ⁴⁾ 31 ⁵⁾	3.5 ⁶⁾ - - -	5325998
LL3-DR03 	4 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	30 ¹⁾ 85 ²⁾ 140 ³⁾ 300 ⁴⁾ 600 ⁵⁾	37 ⁶⁾ 13 ⁷⁾ 8 ⁸⁾	5308080
LL3-DR04 	4 mm	Ø 0.015 mm	-40 °C - +70 °C	1 m	20 ¹⁾ 70 ²⁾ 110 ³⁾ 220 ⁴⁾ 360 ⁵⁾	25 ⁶⁾ 9 ⁷⁾ 3 ⁸⁾	5308081
LL3-DR05 	4 mm	Ø 0.015 mm	-40 °C - +70 °C	0.5 m	10 ¹⁾ 30 ²⁾ 60 ³⁾ 140 ⁴⁾ 225 ⁵⁾	12 ⁶⁾ 4 ⁷⁾ 2 ⁸⁾	5308087
LL3-DR11 	2 mm	Ø 0.02 mm	-40 °C - +60 °C	2 m 	22 ¹⁾ 74 ²⁾ 140 ³⁾ 280 ⁴⁾ 300 ⁵⁾	65 ⁶⁾ 30 ⁷⁾ 20 ⁸⁾	5326000
LL3-DR12 	1 mm	Ø 0.02 mm	-40 °C - +60 °C	2 m 	4 ¹⁾ 13 ²⁾ 27 ³⁾ 55 ⁴⁾ 59 ⁵⁾	11 ⁶⁾ 5 ⁷⁾ -	5326001
LL3-DT03 	15 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	18 ¹⁾ 55 ²⁾ 95 ³⁾ 190 ⁴⁾ 360 ⁵⁾	47 ⁶⁾ 17 ⁷⁾ 7 ⁸⁾	5308072

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.


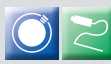




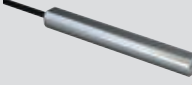









Fiber-optic through-beam systems

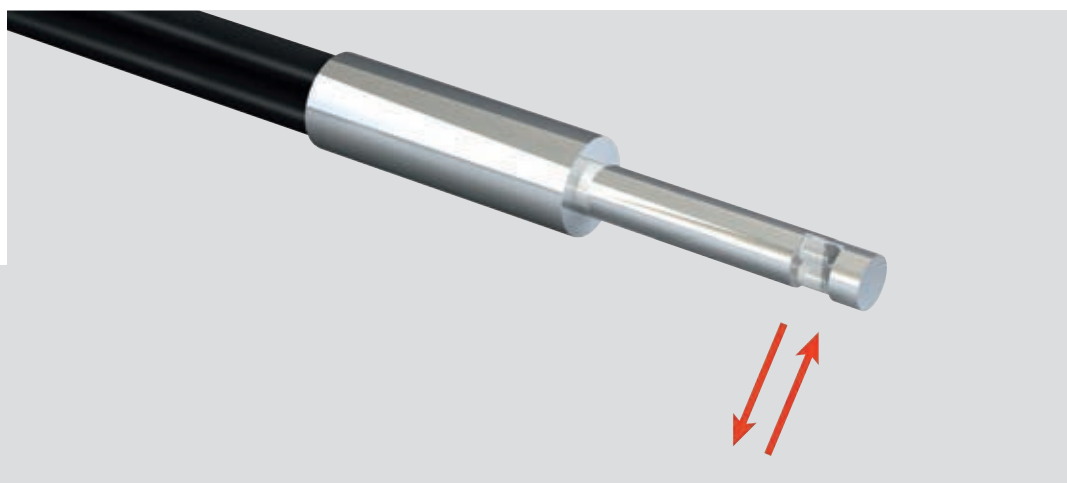
Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TB07 	25 mm	∅ 0.03 mm	-40 °C – +70 °C	2 m 	180 ¹⁾ 540 ²⁾ 890 ³⁾ 1700 ⁴⁾ 1900 ⁵⁾	400 ⁶⁾ 190 ⁷⁾ 200 ⁸⁾	5325919
LL3-TG05 	1 mm	∅ 0.02 mm	-40 °C – +60 °C	2 m 	13 ¹⁾ 50 ²⁾ 85 ³⁾ 170 ⁴⁾ 180 ⁵⁾	25 ⁶⁾ 12 ⁷⁾ 12 ⁸⁾	5325921
LL3-TH06 	10 mm	∅ 10 mm	-40 °C – +105 °C	1 m 	6 ¹⁾ 19 ²⁾ 38 ³⁾ 74 ⁴⁾ 130 ⁵⁾	18 ⁶⁾ 7 ⁷⁾ 11 ⁸⁾	5325926
LL3-TK05 	2 mm	∅ 0.2 mm	-40 °C – +70 °C	2 m 	220 ¹⁾ 650 ²⁾ 1200 ³⁾ 2750 ⁴⁾ 4000 ⁵⁾	370 ⁶⁾ 125 ⁷⁾ 120 ⁸⁾	5313034
LL3-TM03 	15 mm	∅ 0.1 mm	-40 °C – +70 °C	2 m 	55 ¹⁾ 175 ²⁾ 300 ³⁾ 700 ⁴⁾ 1100 ⁵⁾	125 ⁶⁾ 45 ⁷⁾ 30 ⁸⁾	5308070
LL3-TR03 	4 mm	∅ 0.1 mm	-40 °C – +70 °C	1 m 	60 ¹⁾ 175 ²⁾ 330 ³⁾ 750 ⁴⁾ 1100 ⁵⁾	115 ⁶⁾ 38 ⁷⁾ 23 ⁸⁾	5308054
LL3-TR03-2 	4 mm	∅ 0.1 mm	-40 °C – +70 °C	2 m 	60 ¹⁾ 175 ²⁾ 330 ³⁾ 750 ⁴⁾ 1100 ⁵⁾	115 ⁶⁾ 38 ⁷⁾ 23 ⁸⁾	5308055
LL3-TR04 	4 mm	∅ 0.02 mm	-40 °C – +60 °C	0.5 m	5 ¹⁾ 17 ²⁾ 28 ³⁾ 56 ⁴⁾ 60 ⁵⁾	12 ⁶⁾ 5 ⁷⁾ 5 ⁸⁾	5325918

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TR10  	1 mm	Ø 0.02 mm	-40 °C - +60 °C	2 m 	380 ¹⁾ 1220 ²⁾ 2000 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	800 ⁶⁾ 250 ⁷⁾ 250 ⁸⁾	5325920
LL3-TS07  	30 mm	Ø 0.5 mm	-40 °C - +70 °C	2 m 	275 ¹⁾ 1000 ²⁾ 1800 ³⁾ 3500 ⁴⁾ 4000 ⁵⁾	720 ⁶⁾ 315 ⁷⁾ 280 ⁸⁾	5308049
LL3-TS22V  	1 mm	Ø 0.05 mm	-40 °C - +70 °C	2 m 	380 ¹⁾ 1280 ²⁾ 2560 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	800 ⁶⁾ 800 ⁷⁾ 700 ⁸⁾	5325923
LL3-TV08  	25 mm	Ø 0.05 mm	-40 °C - +60 °C	2 m 	590 ¹⁾ 1790 ²⁾ 2400 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1100 ⁶⁾ 600 ⁷⁾ 500 ⁸⁾	5325922

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
 * With optimal measuring distance and settings. / Mounting material included.

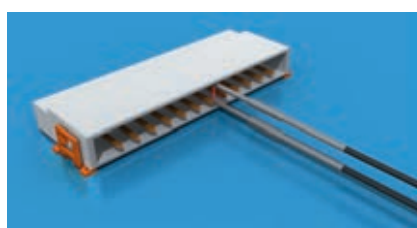




C



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.



Fiber-optic proximity systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DB09  	25 mm	Ø 0.02 mm	-40 °C - +70 °C	2 m 	47 ¹⁾	110 ⁶⁾	5325991
					165 ²⁾	55 ⁷⁾	
					285 ³⁾	30 ⁸⁾	
					575 ⁴⁾		
					610 ⁵⁾		
LL3-DK33   	25 mm	Ø 0.025 mm	-40 °C - +70 °C	2 m 	35 ¹⁾	95 ⁶⁾	5313031
					135 ²⁾	41 ⁷⁾	
					170 ³⁾	27 ⁸⁾	
					290 ⁴⁾		
					320 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DR12 	1 mm	Ø 0.02 mm	-40 °C - +60 °C	2 m 	4 ¹⁾ 13 ²⁾ 27 ³⁾ 55 ⁴⁾ 59 ⁵⁾	11 ⁶⁾ 5 ⁷⁾ - - -	5326001
LL3-DV01 	25 mm	Ø 0.025 mm	-40 °C - +70 °C	2 m 	40 ¹⁾ 135 ²⁾ 180 ³⁾ 270 ⁴⁾ 330 ⁵⁾	95 ⁶⁾ 41 ⁷⁾ 22 ⁸⁾ - -	5308088
LL3-DV02 	15 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	10 ¹⁾ 35 ²⁾ 70 ³⁾ 125 ⁴⁾ 290 ⁵⁾	16 ⁶⁾ 3 ⁷⁾ 3 ⁸⁾ - -	5308089
LL3-DV03 	25 mm	Ø 0.025 mm	-40 °C - +70 °C	2 m 	35 ¹⁾ 135 ²⁾ 170 ³⁾ 290 ⁴⁾ 320 ⁵⁾	95 ⁶⁾ 41 ⁷⁾ 22 ⁸⁾ - -	5308090
LL3-DV05 	25 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	25 ¹⁾ 110 ²⁾ 185 ³⁾ 400 ⁴⁾ 650 ⁵⁾	47 ⁶⁾ 17 ⁷⁾ 17 ⁸⁾ - -	5322549
LL3-DV06 	25 mm	Ø 0.015 mm	-40 °C - +105 °C	2 m 	30 ¹⁾ 130 ²⁾ 210 ³⁾ 450 ⁴⁾ 800 ⁵⁾	47 ⁶⁾ 12 ⁷⁾ 12 ⁸⁾ - -	5322550
LL3-DV07 	2 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	20 ¹⁾ 110 ²⁾ 180 ³⁾ 400 ⁴⁾ 650 ⁵⁾	16 ⁶⁾ 12 ⁷⁾ 12 ⁸⁾ - -	5322551

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.





Fiber-optic through-beam systems

C

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TB06 	25 mm	∅ 0.05 mm	-40 °C - +70 °C	2 m 	150 ¹⁾ 480 ²⁾ 770 ³⁾ 1500 ⁴⁾ 1600 ⁵⁾	400 ⁶⁾ 170 ⁷⁾ 150 ⁸⁾	5325916
LL3-TG02   	1 mm	∅ 0.06 mm	-40 °C - +55 °C	2 m 	580 ¹⁾ 1670 ²⁾ 2400 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1100 ⁶⁾ 450 ⁷⁾ 700 ⁸⁾	5325943
LL3-TG05   	1 mm	∅ 0.02 mm	-40 °C - +60 °C	2 m 	13 ¹⁾ 50 ²⁾ 85 ³⁾ 170 ⁴⁾ 180 ⁵⁾	25 ⁶⁾ 12 ⁷⁾ 12 ⁸⁾	5325921
LL3-TH06  	10 mm	∅ 10 mm	-40 °C - +105 °C	1 m 	6 ¹⁾ 19 ²⁾ 38 ³⁾ 74 ⁴⁾ 130 ⁵⁾	18 ⁶⁾ 7 ⁷⁾ 11 ⁸⁾	5325926
LL3-TH07  	50 mm	∅ 0.1 mm	-60 °C - +200 °C	2 m	18 ¹⁾ 30 ²⁾ 120 ³⁾ 220 ⁴⁾ 420 ⁵⁾	- 23 ⁶⁾ -	5325977
LL3-TH15  	25 mm	∅ 0.16 mm	-60 °C - +200 °C	2 m 	90 ¹⁾ 290 ²⁾ 480 ³⁾ 970 ⁴⁾ 1000 ⁵⁾	170 ⁶⁾ 75 ⁷⁾ 110 ⁸⁾	5325975
LL3-TH16  	25 mm	∅ 0.16 mm	-60 °C - +200 °C	2 m 	90 ¹⁾ 290 ²⁾ 480 ³⁾ 970 ⁴⁾ 1000 ⁵⁾	170 ⁶⁾ 75 ⁷⁾ 110 ⁸⁾	5325976
LL3-TK16  	25 mm	∅ 0.2 mm	-40 °C - +100 °C	2 m 	180 ¹⁾ 600 ²⁾ 1100 ³⁾ 2500 ⁴⁾ 3300 ⁵⁾	2050 ⁶⁾ 950 ⁷⁾ 850 ⁸⁾	5313038

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 ⁶⁾ Red light: 250 μs ⁷⁾ High speed: 50 μs ⁸⁾ Green light: 250 μs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TR08 	1 mm	Ø 0.06 mm	-40 °C - +60 °C	2 m 	160 ¹⁾ 480 ²⁾ 800 ³⁾ 1600 ⁴⁾ 1700 ⁵⁾	350 ⁶⁾ 170 ⁷⁾ 150 ⁸⁾	5325984
LL3-TR09 	1 mm	Ø 0.04 mm	-40 °C - +60 °C	2 m 	360 ¹⁾ 1200 ²⁾ 2200 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	900 ⁶⁾ 500 ⁷⁾ 450 ⁸⁾	5325985
LL3-TS08 	25 mm	Ø 0.2 mm	-40 °C - +70 °C	2 m 	170 ¹⁾ 500 ²⁾ 1000 ³⁾ 2300 ⁴⁾ 3000 ⁵⁾	355 ⁶⁾ 125 ⁷⁾ 115 ⁸⁾	5308061
LL3-TS12 	25 mm	Ø 0.5 mm	-40 °C - +70 °C	2 m 	170 ¹⁾ 550 ²⁾ 1000 ³⁾ 2300 ⁴⁾ 3000 ⁵⁾	1800 ⁶⁾ 840 ⁷⁾ 760 ⁸⁾	5308062
LL3-TS22 	25 mm	Ø 0.05 mm	-40 °C - +70 °C	2 m 	390 ¹⁾ 1300 ²⁾ 2600 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	850 ⁶⁾ - - -	5325944
LL3-TS22M 	10 mm	Ø 0.05 mm	-40 °C - +105 °C	2 m 	220 ¹⁾ 760 ²⁾ 1500 ³⁾ 2900 ⁴⁾ 4000 ⁵⁾	625 ⁶⁾ - - -	5325968
LL3-TS22V 	1 mm	Ø 0.05 mm	-40 °C - +70 °C	2 m 	380 ¹⁾ 1280 ²⁾ 2560 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	800 ⁶⁾ 800 ⁷⁾ 700 ⁸⁾	5325923
LL3-TV01 	25 mm	Ø 0.2 mm	-40 °C - +70 °C	2 m 	120 ¹⁾ 400 ²⁾ 800 ³⁾ 1800 ⁴⁾ 2750 ⁵⁾	325 ⁶⁾ 115 ⁷⁾ 87 ⁸⁾	5308058
LL3-TV02 	15 mm	Ø 0.1 mm	-40 °C - +70 °C	2 m 	30 ¹⁾ 130 ²⁾ 250 ³⁾ 550 ⁴⁾ 800 ⁵⁾	77 ⁶⁾ 27 ⁷⁾ 16 ⁸⁾	5308059



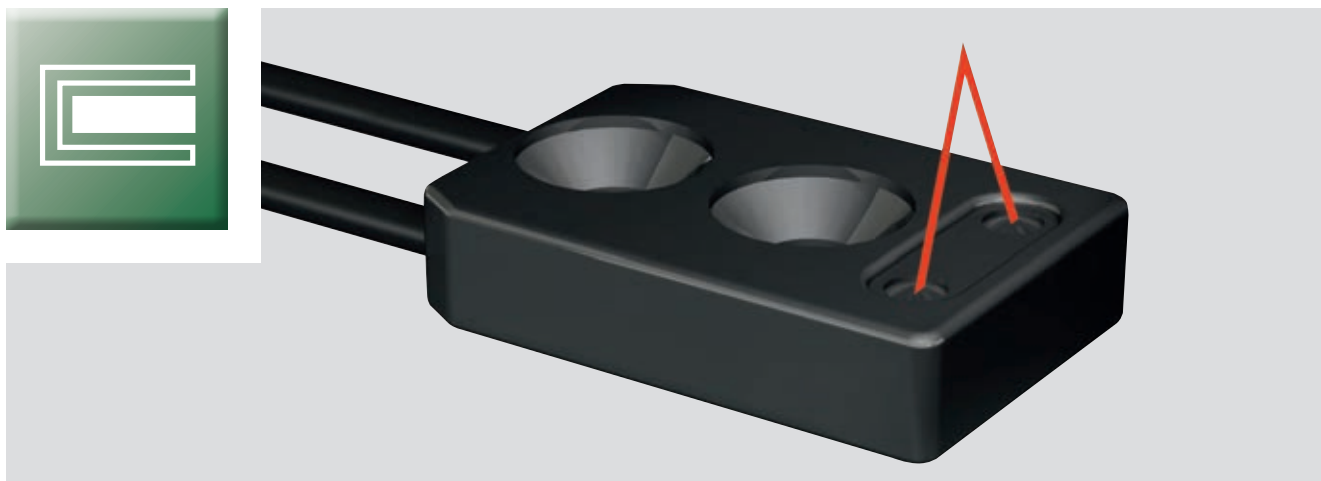
¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

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Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TV04 	15 mm	Ø 0.1 mm	-40 °C - +70 °C	2 m 	30 ¹⁾ 130 ²⁾ 250 ³⁾ 550 ⁴⁾ 800 ⁵⁾	77 ⁶⁾ 27 ⁷⁾ 16 ⁸⁾	5308060
LL3-TV05 	25 mm	Ø 0.4 mm	-40 °C - +70 °C	2 m 	350 ¹⁾ 750 ²⁾ 1800 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	400 ⁶⁾ 170 ⁷⁾ 150 ⁸⁾	5322546
LL3-TV06 	25 mm	Ø 0.4 mm	-40 °C - +105 °C	2 m 	180 ¹⁾ 550 ²⁾ 900 ³⁾ 2100 ⁴⁾ 3500 ⁵⁾	350 ⁶⁾ 150 ⁷⁾ 150 ⁸⁾	5322547
LL3-TV07 	2 mm	Ø 0.4 mm	-40 °C - +70 °C	2 m 	340 ¹⁾ 1000 ²⁾ 1800 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	290 ⁶⁾ 150 ⁷⁾ 150 ⁸⁾	5322548
LL3-TV08 	25 mm	Ø 0.05 mm	-40 °C - +60 °C	2 m 	590 ¹⁾ 1790 ²⁾ 2400 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1100 ⁶⁾ 600 ⁷⁾ 500 ⁸⁾	5325922
LL3-TY02 	60 mm	Ø 0.3 mm	-40 °C - +70 °C	2 m	300 ¹⁾ 1000 ²⁾ 1300 ³⁾ 3000 ⁴⁾ 4000 ⁵⁾	620 ⁶⁾ 225 ⁷⁾ 210 ⁸⁾	5308067
LL3-TY03 	20 mm	Ø 0.3 mm	-55 °C - +70 °C	2 m 	460 ¹⁾ 1400 ²⁾ 2500 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1000 ⁶⁾ 350 ⁷⁾ 450 ⁸⁾	5325982

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

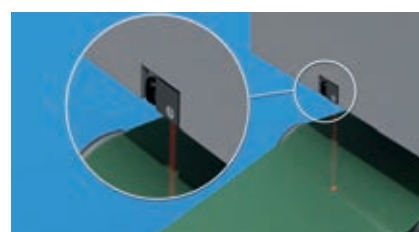
C



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







C

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.



Fiber-optic proximity systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DC03  	25 mm	Ø 0.3 mm	-40 °C - +60 °C	2 m 	12-60 ¹⁾	7-80 ⁶⁾	5326020
					10-75 ²⁾	10-60 ⁷⁾	
					5-85 ³⁾	10-60 ⁸⁾	
					3-150 ⁴⁾		
					2-280 ⁵⁾		
LL3-DC04  	4 mm	Ø 0.4 mm	0 °C - +70 °C	2 m 	4-18 ¹⁾	1-20 ⁶⁾	5326018
					0-31 ²⁾	1-20 ⁷⁾	
					0-34 ³⁾	4-15 ⁸⁾	
					0-38 ⁴⁾		
					0-38 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DC05 	25 mm	0.25 mm	0 °C - +70 °C	2 m 	9-18 ¹⁾	5-22 ⁶⁾	5326016
					7-29 ²⁾	5-22 ⁷⁾	
					5-35 ³⁾	6-25 ⁸⁾	
					4-40 ⁴⁾		
					3-43 ⁵⁾		
LL3-DC06 	4 mm	0.4 mm	0 °C - +70 °C	2 m 	4-15 ¹⁾	2-15 ⁶⁾	5326017
					2-22 ²⁾	2-15 ⁷⁾	
					0-23 ³⁾	3-10 ⁸⁾	
					0-25 ⁴⁾		
					0-25 ⁵⁾		
LL3-DC07 	10 mm	Ø 0.06 mm	-40 °C - +60 °C	2 m 	7-8 ¹⁾	5-10 ⁶⁾	5326019
					4-12 ²⁾	7-8 ⁷⁾	
					4-14 ³⁾	7-8 ⁸⁾	
					2-16 ⁴⁾		
					2-18 ⁵⁾		
LL3-DC08 	1 mm	Ø 0.3 mm	-20 °C - +60 °C	2 m 	1-2 ¹⁾	1-4.5 ⁶⁾	5326029
					1-4 ²⁾	1-2.5 ⁷⁾	
					1-6 ³⁾	1-2.5 ⁸⁾	
					0-9 ⁴⁾		
					0-10 ⁵⁾		
LL3-DC09 	10 mm	Ø 0.02 mm	-40 °C - +70 °C	2 m 	6-8 ¹⁾	5-8 ⁶⁾	5326028
					6-10 ²⁾	5-8 ⁷⁾	
					5-11 ³⁾	5-8 ⁸⁾	
					4-13 ⁴⁾		
					0-17 ⁵⁾		
LL3-DC38 	10 mm	Ø 0.02 mm	-40 °C - +50 °C	2 m 	6 ¹⁾	4-7 ⁶⁾	5322472
					6 ²⁾	4-7 ⁷⁾	
					6 ³⁾	4-6 ⁸⁾	
					1-10 ⁴⁾		
					0-15 ⁵⁾		
LL3-DC39 	10 mm	Ø 0.02 mm	-40 °C - +50 °C	2 m 	-	0-5 ⁶⁾	5322513
					0-4 ²⁾	0-4 ⁷⁾	
					0-4 ³⁾	0-4 ⁸⁾	
					0-4 ⁴⁾		
					0-4 ⁵⁾		
LL3-DC47 	1 mm	Ø 0.01 mm	-40 °C - +60 °C	2 m 	12 ¹⁾	30 ⁶⁾	5324268
					25 ²⁾	10 ⁷⁾	
					37 ³⁾	5 ⁸⁾	
					75 ⁴⁾		
					90 ⁵⁾		
LL3-DC57 	1 mm	Ø 0.01 mm	-40 °C - +60 °C	2 m 	35 ¹⁾	50 ⁶⁾	5324269
					45 ²⁾	35 ⁷⁾	
					55 ³⁾	10 ⁸⁾	
					250 ⁴⁾		
					330 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

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Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DE01 	1 mm	∅ 0.16 mm	-40 °C – +60 °C	1 m	11 ¹⁾	35 ⁶⁾	5325285
					38 ²⁾	6-8 ⁷⁾	
					78 ³⁾	–	
					150 ⁴⁾		
					160 ⁵⁾		
LL3-DE02 	1 mm	∅ 0.01 mm	-40 °C – +60 °C	1 m	13 ¹⁾	35 ⁶⁾	5324497
					48 ²⁾	15 ⁷⁾	
					86 ³⁾	12 ⁸⁾	
					170 ⁴⁾		
					180 ⁵⁾		
LL3-DE03 	1 mm	∅ 0.03 mm	-40 °C – +60 °C	2 m	45 ¹⁾	110 ⁶⁾	5325986
					130 ²⁾	43 ⁷⁾	
					250 ³⁾	31 ⁸⁾	
					510 ⁴⁾		
					550 ⁵⁾		
LL3-DE04 	1 mm	∅ 0.03 mm	-40 °C – +60 °C	2 m	50 ¹⁾	110 ⁶⁾	5325987
					130 ²⁾	50 ⁷⁾	
					250 ³⁾	35 ⁸⁾	
					500 ⁴⁾		
					540 ⁵⁾		
LL3-DH06 	25 mm	∅ 0.02 mm	-30 °C – +300 °C	2 m	3-5 ¹⁾	7 ⁶⁾	5326026
					0-10 ²⁾	0.3-10.5 ⁷⁾	
					0-19 ³⁾	1.2-9 ⁸⁾	
					0-37 ⁴⁾		
					0-43 ⁵⁾		
LL3-DH08 	25 mm	∅ 0.02 mm	-60 °C – +180 °C	2 m	2-5 ¹⁾	11 ⁶⁾	5326025
					0-11 ²⁾	0-15.5 ⁷⁾	
					0-22 ³⁾	0.5-9.3 ⁸⁾	
					0-30 ⁴⁾		
					0-38 ⁵⁾		
LL3-DH10 	25 mm	∅ 0.02 mm	-20 °C – +250 °C	2 m	4-11 ¹⁾	3.5-18 ⁶⁾	5326023
					3-18 ²⁾	4-18 ⁷⁾	
					3-21 ³⁾	4-15 ⁸⁾	
					2-24 ⁴⁾		
					2-26 ⁵⁾		
LL3-DH11 	25 mm	∅ 0.02 mm	-20 °C – +250 °C	2 m	8-19 ¹⁾	7.5-24 ⁶⁾	5326024
					6-29 ²⁾	7.5-24 ⁷⁾	
					4-34 ³⁾	9-24 ⁸⁾	
					3-39 ⁴⁾		
					2-42 ⁵⁾		
LL3-DR09 	1 mm	∅ 0.03 mm	-20 °C – +70 °C	2 m	110 ¹⁾	300 ⁶⁾	5325528
					345 ²⁾	120 ⁷⁾	
					560 ³⁾	80 ⁸⁾	
					1100 ⁴⁾		
					1190 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.







Fiber-optic through-beam systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TE01  	1 mm	Ø 0.08 mm	-40 °C - +60 °C	1 m 	120 ¹⁾ 350 ²⁾ 620 ³⁾ 1250 ⁴⁾ 1330 ⁵⁾	250 ⁶⁾ 120 ⁷⁾ 120 ⁸⁾	5325807
LL3-TE02  	1 mm	Ø 0.08 mm	-40 °C - +60 °C	1 m 	40 ¹⁾ 140 ²⁾ 220 ³⁾ 450 ⁴⁾ 480 ⁵⁾	130 ⁶⁾ 60 ⁷⁾ 50 ⁸⁾	5325910
LL3-TE03  	1 mm	Ø 0.08 mm	-40 °C - +60 °C	2 m 	190 ¹⁾ 580 ²⁾ 980 ³⁾ 1970 ⁴⁾ 2100 ⁵⁾	500 ⁶⁾ 250 ⁷⁾ 200 ⁸⁾	5325908
LL3-TE04  	1 mm	Ø 0.03 mm	-40 °C - +60 °C	2 m 	150 ¹⁾ 440 ²⁾ 700 ³⁾ 1400 ⁴⁾ 1490 ⁵⁾	320 ⁶⁾ 160 ⁷⁾ 120 ⁸⁾	5325911
LL3-TE05  	4 mm	Ø 0.03 mm	-40 °C - +60 °C	2 m 	150 ¹⁾ 460 ²⁾ 840 ³⁾ 1680 ⁴⁾ 1780 ⁵⁾	350 ⁶⁾ 140 ⁷⁾ 240 ⁸⁾	5325914
LL3-TR05  	4 mm	Ø 0.03 mm	-40 °C - +60 °C	2 m 	360 ¹⁾ 1300 ²⁾ 2300 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1200 ⁶⁾ 500 ⁷⁾ 750 ⁸⁾	5325808
LL3-TR06  	4 mm	Ø 0.03 mm	-40 °C - +60 °C	2 m 	560 ¹⁾ 1600 ²⁾ 2200 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1200 ⁶⁾ 500 ⁷⁾ 750 ⁸⁾	5325912
LL3-TR11  	1 mm	Ø 0.08 mm	-40 °C - +60 °C	2 m 	590 ¹⁾ 1500 ²⁾ 2200 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1800 ⁶⁾ - 750 ⁸⁾	5325906

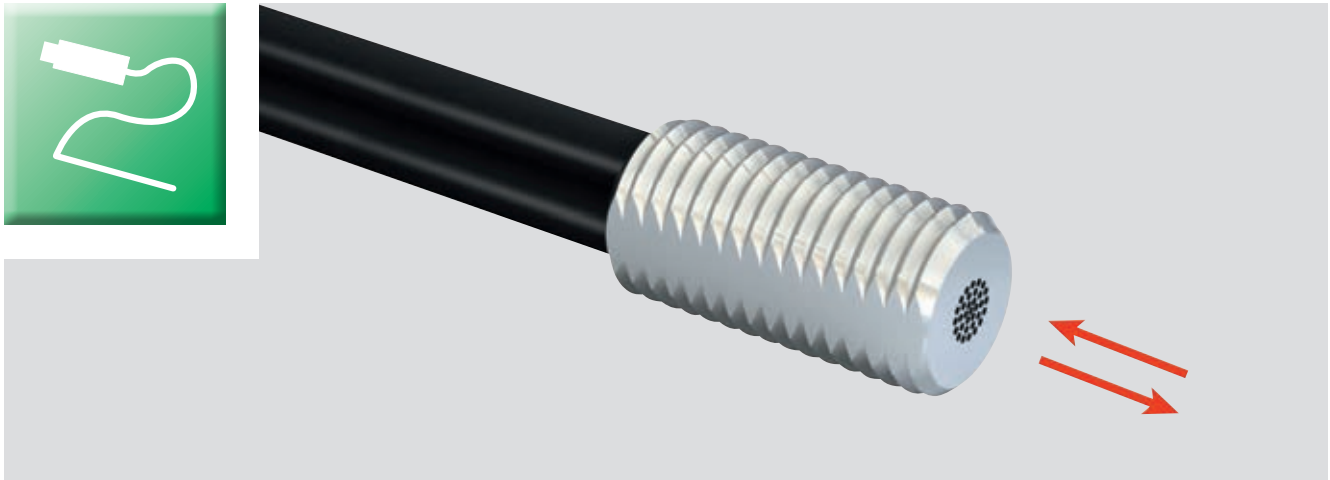
¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.



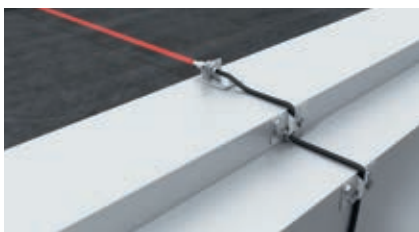
Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TR12 	1 mm	Ø 0.05 mm	-40 °C – +60 °C	2 m 	600 ¹⁾	1400 ⁶⁾	5325907
					1400 ²⁾	650 ⁷⁾	
					2300 ³⁾	600 ⁸⁾	
					4000 ⁴⁾		
					4000 ⁵⁾		
LL3-TR13 	1 mm	Ø 0.04 mm	-40 °C – +60 °C	2 m 	250 ¹⁾	600 ⁶⁾	5325909
					730 ²⁾	300 ⁷⁾	
					1280 ³⁾	400 ⁸⁾	
					2560 ⁴⁾		
					2730 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
 * With optimal measuring distance and settings. / Mounting material included.

C



C



Highly-flexible fibers






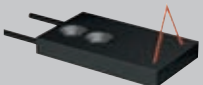


Standard fibers

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.



Fiber-optic proximity systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DC04  	4 mm	Ø 4 mm	0 °C - +70 °C	3 m 	4-18 ¹⁾	1-20 ⁶⁾	5326018
					0-31 ²⁾	1-20 ⁷⁾	
					0-34 ³⁾	4-15 ⁸⁾	
					0-38 ⁴⁾		
					0-38 ⁵⁾		
LL3-DC06  	4 mm	Ø 4 mm	0 °C - +70 °C	2 m 	4-15 ¹⁾	2-15 ⁶⁾	5326017
					2-22 ²⁾	2-15 ⁷⁾	
					0-23 ³⁾	3-10 ⁸⁾	
					0-25 ⁴⁾		
					0-25 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.



Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DC47 	1 mm	Ø 0.01 mm	-40 °C - +60 °C	2 m 	12 ¹⁾ 25 ²⁾ 37 ³⁾ 75 ⁴⁾ 90 ⁵⁾	30 ⁶⁾ 10 ⁷⁾ 5 ⁸⁾	5324268
LL3-DC57 	1 mm	Ø 0.01 mm	-40 °C - +60 °C	2 m 	35 ¹⁾ 45 ²⁾ 55 ³⁾ 250 ⁴⁾ 330 ⁵⁾	50 ⁶⁾ 35 ⁷⁾ 10 ⁸⁾	5324269
LL3-DE01 	1 mm	Ø 0.16 mm	-40 °C - +60 °C	1 m 	11 ¹⁾ 38 ²⁾ 78 ³⁾ 150 ⁴⁾ 160 ⁵⁾	35 ⁶⁾ 6-8 ⁷⁾ -	5325285
LL3-DE02 	1 mm	Ø 0.01 mm	-40 °C - +60 °C	1 m 	13 ¹⁾ 48 ²⁾ 86 ³⁾ 170 ⁴⁾ 180 ⁵⁾	35 ⁶⁾ 15 ⁷⁾ 12 ⁸⁾	5324497
LL3-DE03 	1 mm	Ø 0.03 mm	-40 °C - +60 °C	2 m 	45 ¹⁾ 130 ²⁾ 250 ³⁾ 510 ⁴⁾ 550 ⁵⁾	110 ⁶⁾ 43 ⁷⁾ 31 ⁸⁾	5325986
LL3-DE04 	1 mm	Ø 0.03 mm	-40 °C - +60 °C	2 m 	50 ¹⁾ 130 ²⁾ 250 ³⁾ 500 ⁴⁾ 540 ⁵⁾	110 ⁶⁾ 50 ⁷⁾ 35 ⁸⁾	5325987
LL3-DK4Z 	2 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	65 ¹⁾ 200 ²⁾ 350 ³⁾ 650 ⁴⁾ 1000 ⁵⁾	115 ⁶⁾ 47 ⁷⁾ 27 ⁸⁾	5313026
LL3-DK63Z 	2 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	90 ¹⁾ 300 ²⁾ 500 ³⁾ 900 ⁴⁾ 1400 ⁵⁾	115 ⁶⁾ 47 ⁷⁾ 27 ⁸⁾	5313027
LL3-DK66 	2 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	90 ¹⁾ 300 ²⁾ 500 ³⁾ 900 ⁴⁾ 1400 ⁵⁾	115 ⁶⁾ 47 ⁷⁾ 27 ⁸⁾	5313024

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

C

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DK67 	2 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	90 ¹⁾ 300 ²⁾ 500 ³⁾ 900 ⁴⁾ 1400 ⁵⁾	115 ⁶⁾ 47 ⁷⁾ 27 ⁸⁾	5313025
LL3-DR01 	4 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	90 ¹⁾ 280 ²⁾ 450 ³⁾ 880 ⁴⁾ 1350 ⁵⁾	135 ⁶⁾ 50 ⁷⁾ 20 ⁸⁾	5308078
LL3-DR02 	4 mm	Ø 0.015 mm	-40 °C - +70 °C	1 m 	18 ¹⁾ 50 ²⁾ 90 ³⁾ 200 ⁴⁾ 370 ⁵⁾	22 ⁶⁾ 9 ⁷⁾ 3 ⁸⁾	5308079
LL3-DR03 	4 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	30 ¹⁾ 85 ²⁾ 140 ³⁾ 300 ⁴⁾ 600 ⁵⁾	37 ⁶⁾ 13 ⁷⁾ 8 ⁸⁾	5308080
LL3-DR04 	4 mm	Ø 0.015 mm	-40 °C - +70 °C	1 m 	20 ¹⁾ 70 ²⁾ 110 ³⁾ 220 ⁴⁾ 360 ⁵⁾	25 ⁶⁾ 9 ⁷⁾ 3 ⁸⁾	5308081
LL3-DR06 	4 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	18 ¹⁾ 60 ²⁾ 100 ³⁾ 220 ⁴⁾ 360 ⁵⁾	37 ⁶⁾ 11 ⁷⁾ 5 ⁸⁾	5308082
LL3-DR09 	1 mm	Ø 0.03 mm	-20 °C - +70 °C	2 m 	110 ¹⁾ 345 ²⁾ 560 ³⁾ 1100 ⁴⁾ 1190 ⁵⁾	300 ⁶⁾ 120 ⁷⁾ 80 ⁸⁾	5325528
LL3-DR12 	1 mm	Ø 0.02 mm	-40 °C - +60 °C	2 m 	4 ¹⁾ 13 ²⁾ 27 ³⁾ 55 ⁴⁾ 59 ⁵⁾	11 ⁶⁾ 5 ⁷⁾ -	5326001
LL3-DT02 	4 mm	Ø 0.015 mm	-40 °C - +70 °C	0.5 m 	10 ¹⁾ 30 ²⁾ 60 ³⁾ 140 ⁴⁾ 225 ⁵⁾	9 ⁶⁾ 4 ⁷⁾ 2 ⁸⁾	5308085

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.





Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DT04 	4 mm	Ø 0.015 mm	-40 °C - +70 °C	0.5 m	13 ¹⁾	9 ⁶⁾	5308086
					45 ²⁾	4 ⁷⁾	
					80 ³⁾	2 ⁸⁾	
					140 ⁴⁾		
					280 ⁵⁾		
LL3-DV07 	2 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m	20 ¹⁾	16 ⁶⁾	5322551
					110 ²⁾	12 ⁷⁾	
					180 ³⁾	12 ⁸⁾	
					400 ⁴⁾		
					650 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

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Fiber-optic through-beam systems

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TE01 	1 mm	Ø 0.08 mm	-40 °C - +60 °C	1 m	120 ¹⁾	250 ⁶⁾	5325807
					350 ²⁾	120 ⁷⁾	
					620 ³⁾	120 ⁸⁾	
					1250 ⁴⁾		
					1330 ⁵⁾		
LL3-TE02 	1 mm	Ø 0.08 mm	-40 °C - +60 °C	1 m	40 ¹⁾	130 ⁶⁾	5325910
					140 ²⁾	60 ⁷⁾	
					220 ³⁾	50 ⁸⁾	
					450 ⁴⁾		
					480 ⁵⁾		
LL3-TE03 	1 mm	Ø 0.08 mm	-40 °C - +60 °C	2 m	190 ¹⁾	500 ⁶⁾	5325908
					580 ²⁾	250 ⁷⁾	
					980 ³⁾	200 ⁸⁾	
					1970 ⁴⁾		
					2100 ⁵⁾		
LL3-TE04 	1 mm	Ø 0.03 mm	-40 °C - +60 °C	2 m	150 ¹⁾	320 ⁶⁾	5325911
					440 ²⁾	160 ⁷⁾	
					700 ³⁾	120 ⁸⁾	
					1400 ⁴⁾		
					1490 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

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Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TE05 	4 mm	∅ 0.03 mm	-40 °C - +60 °C	2 m	150 ¹⁾ 460 ²⁾ 840 ³⁾ 1680 ⁴⁾ 1780 ⁵⁾	350 ⁶⁾ 140 ⁷⁾ 240 ⁸⁾	5325914
LL3-TG02 	1 mm	∅ 0.06 mm	-40 °C - +55 °C	2 m	580 ¹⁾ 1670 ²⁾ 2400 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1100 ⁶⁾ 450 ⁷⁾ 700 ⁸⁾	5325943
LL3-TG05 	1 mm	∅ 0.02 mm	-40 °C - +60 °C	2 m	13 ¹⁾ 50 ²⁾ 85 ³⁾ 170 ⁴⁾ 180 ⁵⁾	25 ⁶⁾ 12 ⁷⁾ 12 ⁸⁾	5325921
LL3-TK05 	2 mm	∅ 0.2 mm	-40 °C - +70 °C	2 m	220 ¹⁾ 650 ²⁾ 1200 ³⁾ 2750 ⁴⁾ 4000 ⁵⁾	370 ⁶⁾ 125 ⁷⁾ 120 ⁸⁾	5313034
LL3-TK77  <p>Suitable for tip adapters</p>	2 mm	∅ 0.2 mm	-40 °C - +70 °C	2 m	220 ¹⁾ 650 ²⁾ 1200 ³⁾ 2750 ⁴⁾ 4000 ⁵⁾	370 ⁶⁾ 125 ⁷⁾ 120 ⁸⁾	5313035
LL3-TR01  <p>Suitable for tip adapters</p>	4 mm	∅ 0.3 mm	-40 °C - +70 °C	2 m	200 ¹⁾ 600 ²⁾ 1000 ³⁾ 2400 ⁴⁾ 4000 ⁵⁾	340 ⁶⁾ 125 ⁷⁾ 125 ⁸⁾	5308052
LL3-TR01-05 	4 mm	∅ 0.3 mm	-40 °C - +70 °C	5 m	160 ¹⁾ 450 ²⁾ 800 ³⁾ 1900 ⁴⁾ 2800 ⁵⁾	120 ⁶⁾ 60 ⁷⁾ 60 ⁸⁾	5322198
LL3-TR02 	4 mm	∅ 0.1 mm	-40 °C - +70 °C	2 m	60 ¹⁾ 175 ²⁾ 330 ³⁾ 750 ⁴⁾ 1100 ⁵⁾	115 ⁶⁾ 38 ⁷⁾ 23 ⁸⁾	5308053
LL3-TR03 	4 mm	∅ 0.1 mm	-40 °C - +70 °C	1 m	60 ¹⁾ 175 ²⁾ 330 ³⁾ 750 ⁴⁾ 1100 ⁵⁾	115 ⁶⁾ 38 ⁷⁾ 23 ⁸⁾	5308054













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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TR03-2 	4 mm	Ø 0.1 mm	-40 °C - +70 °C	2 m 	60 ¹⁾ 175 ²⁾ 330 ³⁾ 750 ⁴⁾ 1100 ⁵⁾	115 ⁶⁾ 38 ⁷⁾ 23 ⁸⁾	5308055
LL3-TR04 	4 mm	Ø 0.02 mm	-40 °C - +60 °C	0.5 m	5 ¹⁾ 17 ²⁾ 28 ³⁾ 56 ⁴⁾ 60 ⁵⁾	12 ⁶⁾ 5 ⁷⁾ 5 ⁸⁾	5325918
LL3-TR05 	4 mm	Ø 0.03 mm	-40 °C - +60 °C	2 m 	360 ¹⁾ 1300 ²⁾ 2300 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1200 ⁶⁾ 500 ⁷⁾ 750 ⁸⁾	5325808
LL3-TR06 	4 mm	Ø 0.03 mm	-40 °C - +60 °C	2 m 	560 ¹⁾ 1600 ²⁾ 2200 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1200 ⁶⁾ 500 ⁷⁾ 750 ⁸⁾	5325912
LL3-TR08 	1 mm	Ø 0.06 mm	-40 °C - +60 °C	2 m 	160 ¹⁾ 480 ²⁾ 800 ³⁾ 1600 ⁴⁾ 1700 ⁵⁾	350 ⁶⁾ 170 ⁷⁾ 150 ⁸⁾	5325984
LL3-TR09 	1 mm	Ø 0.04 mm	-40 °C - +60 °C	2 m 	360 ¹⁾ 1200 ²⁾ 2200 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	900 ⁶⁾ 500 ⁷⁾ 450 ⁸⁾	5325985
LL3-TR10 	1 mm	Ø 0.02 mm	-40 °C - +60 °C	2 m 	380 ¹⁾ 1220 ²⁾ 2000 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	800 ⁶⁾ 250 ⁷⁾ 250 ⁸⁾	5325920
LL3-TR11 	1 mm	Ø 0.08 mm	-40 °C - +60 °C	2 m 	590 ¹⁾ 1500 ²⁾ 2200 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1800 ⁶⁾ - 750 ⁸⁾	5325906
LL3-TR12 	1 mm	Ø 0.05 mm	-40 °C - +60 °C	2 m 	600 ¹⁾ 1400 ²⁾ 2300 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1400 ⁶⁾ 650 ⁷⁾ 600 ⁸⁾	5325907

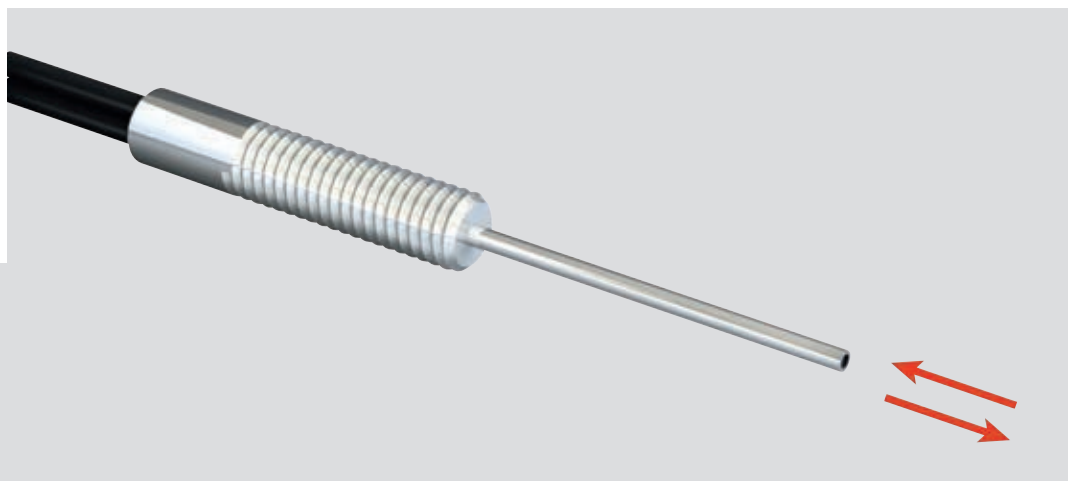


¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

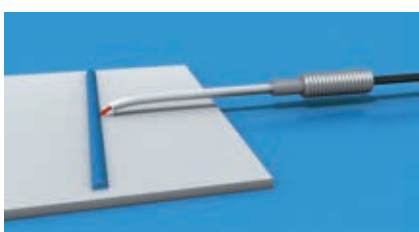


Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TR13  	1 mm	∅ 0.04 mm	-40 °C – +60 °C	2 m 	250 ¹⁾ 730 ²⁾ 1280 ³⁾ 2560 ⁴⁾ 2730 ⁵⁾	600 ⁶⁾ 300 ⁷⁾ 400 ⁸⁾	5325909
LL3-TS22V  	1 mm	∅ 0.05 mm	-40 °C – +70 °C	2 m 	380 ¹⁾ 1280 ²⁾ 2560 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	800 ⁶⁾ 800 ⁷⁾ 700 ⁸⁾	5325923
LL3-TV07  	2 mm	∅ 0.4 mm	-40 °C – +70 °C	2 m 	340 ¹⁾ 1000 ²⁾ 1800 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	290 ⁶⁾ 150 ⁷⁾ 150 ⁸⁾	5322548
LL3-TZ09  	1 mm	∅ 0.25 mm	-40 °C – +55 °C	2 m 	1300 ¹⁾ 2500 ²⁾ 3000 ³⁾ 3500 ⁴⁾ 4000 ⁵⁾	3700 ⁶⁾ 1200 ⁷⁾ 1000 ⁸⁾	5326598

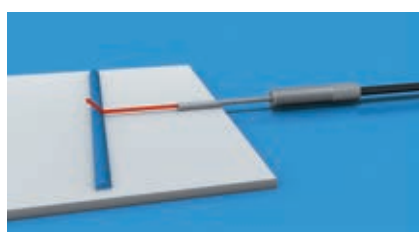
¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
 * With optimal measuring distance and settings. / Mounting material included.



C



Bendable end sleeves








Standard model with long end sleeves

Long end sleeves

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.



Fiber-optic proximity systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DB02  	25 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	100 ¹⁾	170 ⁶⁾	5308083
					350 ²⁾	67 ⁷⁾	
					580 ³⁾	42 ⁸⁾	
					850 ⁴⁾		
					1300 ⁵⁾		
LL3-DB05  	25 mm	Ø 0.02 mm	-40 °C - +60 °C	2 m	8 ¹⁾	22 ⁶⁾	5326002
					25 ²⁾	6 ⁷⁾	
					52 ³⁾	6 ⁸⁾	
					100 ⁴⁾		
					110 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DB06 	25 mm	Ø 0.02 mm	-40 °C - +70 °C	2 m 	60 ¹⁾ 210 ²⁾ 360 ³⁾ 700 ⁴⁾ 760 ⁵⁾	150 ⁶⁾ 60 ⁷⁾ 40 ⁸⁾	5326006
LL3-DB08 	25 mm	Ø 0.02 mm	-40 °C - +70 °C	2 m 	17 ¹⁾ 55 ²⁾ 107 ³⁾ 200 ⁴⁾ 220 ⁵⁾	45 ⁶⁾ 18 ⁷⁾ 13 ⁸⁾	5326004
LL3-DH04 	25 mm	Ø 0.02 mm	-30 °C - +350 °C	2 m	65 ¹⁾ 225 ²⁾ 500 ³⁾ 1000 ⁴⁾ 1060 ⁵⁾	350 ⁶⁾ 120 ⁷⁾ 90 ⁸⁾	5326022
LL3-DH05 	25 mm	Ø 0.02 mm	-30 °C - +350 °C	2 m	55 ¹⁾ 220 ²⁾ 580 ³⁾ 1170 ⁴⁾ 1240 ⁵⁾	220 ⁶⁾ 90 ⁷⁾ 70 ⁸⁾	5326021
LL3-DK33 	25 mm	Ø 0.025 mm	-40 °C - +70 °C	2 m 	35 ¹⁾ 135 ²⁾ 170 ³⁾ 290 ⁴⁾ 320 ⁵⁾	95 ⁶⁾ 41 ⁷⁾ 27 ⁸⁾	5313031
LL3-DK43 	15 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	10 ¹⁾ 28 ²⁾ 45 ³⁾ 93 ⁴⁾ 170 ⁵⁾	47 ⁶⁾ 17 ⁷⁾ 8 ⁸⁾	5313030
LL3-DK63Z 	2 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	90 ¹⁾ 300 ²⁾ 500 ³⁾ 900 ⁴⁾ 1400 ⁵⁾	115 ⁶⁾ 47 ⁷⁾ 27 ⁸⁾	5313027
LL3-DM03 	15 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	10 ¹⁾ 25 ²⁾ 45 ³⁾ 90 ⁴⁾ 170 ⁵⁾	50 ⁶⁾ 17 ⁷⁾ 8 ⁸⁾	5308084
LL3-DR07 	25 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m	5 ¹⁾ 15 ²⁾ 35 ³⁾ 65 ⁴⁾ 120 ⁵⁾	7 ⁶⁾ 3 ⁸⁾ -	5326007



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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

C

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DR10 	1 mm	Ø 0.02 mm	-40 °C – +60 °C	2 m 	12 ¹⁾	35 ⁶⁾	5326005
					40 ²⁾	15 ⁷⁾	
					77 ³⁾	9 ⁸⁾	
					150 ⁴⁾		
					160 ⁵⁾		
LL3-DT02 	4 mm	Ø 0.015 mm	-40 °C – +70 °C	2 m 	10 ¹⁾	9 ⁶⁾	5308085
					30 ²⁾	4 ⁷⁾	
					60 ³⁾	2 ⁸⁾	
					140 ⁴⁾		
					225 ⁵⁾		
LL3-DT04 	4 mm	Ø 0.015 mm	-40 °C – +70 °C	0.5 m	13 ¹⁾	9 ⁶⁾	5308086
					45 ²⁾	4 ⁷⁾	
					80 ³⁾	2 ⁸⁾	
					140 ⁴⁾		
					280 ⁵⁾		
LL3-DT05 	15 mm	Ø 0.015 mm	-40 °C – +70 °C	2 m 	10 ¹⁾	50 ⁶⁾	5313028
					28 ²⁾	17 ⁷⁾	
					45 ³⁾	8 ⁸⁾	
					95 ⁴⁾		
					170 ⁵⁾		
LL3-DV01 	25 mm	Ø 0.025 mm	-40 °C – +70 °C	2 m 	40 ¹⁾	95 ⁶⁾	5308088
					135 ²⁾	41 ⁷⁾	
					180 ³⁾	22 ⁸⁾	
					270 ⁴⁾		
					330 ⁵⁾		
LL3-DV02 	15 mm	Ø 0.015 mm	-40 °C – +70 °C	2 m 	10 ¹⁾	16 ⁶⁾	5308089
					35 ²⁾	3 ⁷⁾	
					70 ³⁾	3 ⁸⁾	
					125 ⁴⁾		
					290 ⁵⁾		
LL3-DV03 	25 mm	Ø 0.025 mm	-40 °C – +70 °C	2 m 	35 ¹⁾	95 ⁶⁾	5308090
					135 ²⁾	41 ⁷⁾	
					170 ³⁾	22 ⁸⁾	
					290 ⁴⁾		
					320 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

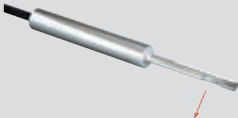









Fiber-optic through-beam systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TB03 	25 mm	∅ 0.2 mm	-40 °C - +70 °C	2 m 	240 ¹⁾ 700 ²⁾ 1400 ³⁾ 2500 ⁴⁾ 2900 ⁵⁾	470 ⁶⁾ 165 ⁷⁾ 132 ⁸⁾	5308056
LL3-TB05 	25 mm	∅ 0.03 mm	-40 °C - +70 °C	2 m 	50 ¹⁾ 140 ²⁾ 250 ³⁾ 500 ⁴⁾ 530 ⁵⁾	120 ⁶⁾ 60 ⁷⁾ 60 ⁸⁾	5325924
LL3-TK16 	25 mm	∅ 0.2 mm	-40 °C - +100 °C	2 m 	180 ¹⁾ 600 ²⁾ 1100 ³⁾ 2500 ⁴⁾ 3300 ⁵⁾	2050 ⁶⁾ 950 ⁷⁾ 850 ⁸⁾	5313038
LL3-TP01 	5 mm	∅ 0.02 mm	-40 °C - +70 °C	0.5 m	2 ¹⁾ 8 ²⁾ 14 ³⁾ 28 ⁴⁾ 30 ⁵⁾	5 ⁶⁾ 3 ⁷⁾ 3 ⁸⁾	5325925
LL3-TS08 	25 mm	∅ 0.2 mm	-40 °C - +70 °C	2 m 	170 ¹⁾ 500 ²⁾ 1000 ³⁾ 2300 ⁴⁾ 3000 ⁵⁾	355 ⁶⁾ 125 ⁷⁾ 115 ⁸⁾	5308061
LL3-TS12 	25 mm	∅ 0.5 mm	-40 °C - +70 °C	2 m 	170 ¹⁾ 550 ²⁾ 1000 ³⁾ 2300 ⁴⁾ 3000 ⁵⁾	1800 ⁶⁾ 840 ⁷⁾ 760 ⁸⁾	5308062
LL3-TT01 	15 mm	∅ 0.1 mm	-40 °C - +70 °C	2 m 	10 ¹⁾ 30 ²⁾ 60 ³⁾ 140 ⁴⁾ 200 ⁵⁾	32 ⁶⁾ 13 ⁷⁾ 5 ⁸⁾	5308057
LL3-TV01 	25 mm	∅ 0.2 mm	-40 °C - +70 °C	2 m 	120 ¹⁾ 400 ²⁾ 800 ³⁾ 1800 ⁴⁾ 2750 ⁵⁾	325 ⁶⁾ 115 ⁷⁾ 87 ⁸⁾	5308058

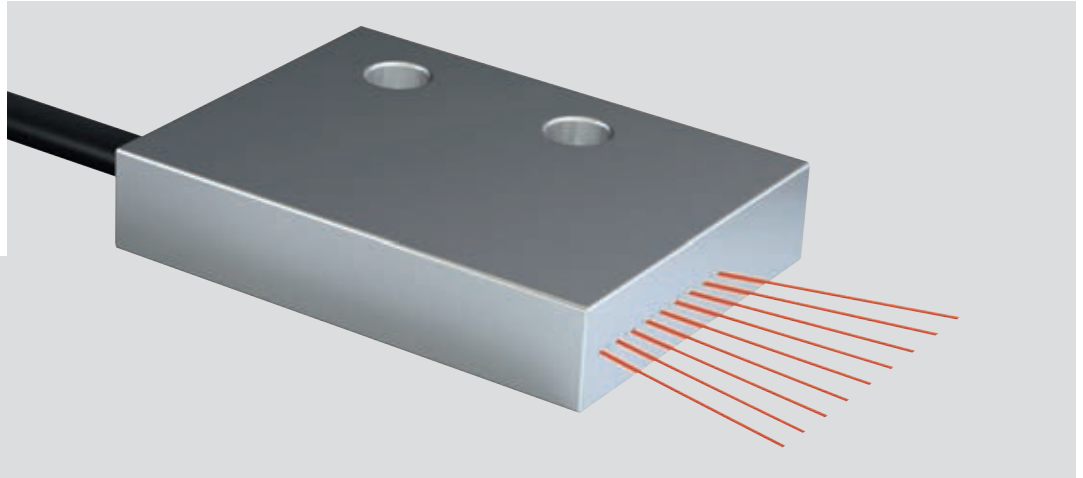
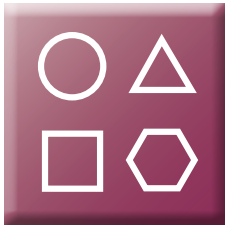
¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.



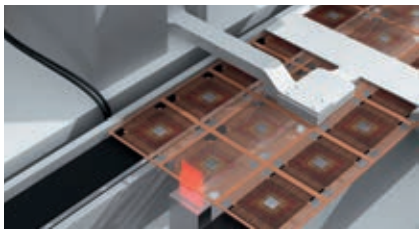
Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TV02   	15 mm	Ø 0.1 mm	-40 °C – +70 °C	2 m 	30 ¹⁾	77 ⁶⁾	5308059
					130 ²⁾	27 ⁷⁾	
					250 ³⁾	16 ⁸⁾	
					550 ⁴⁾		
					800 ⁵⁾		
LL3-TV04   	15 mm	Ø 0.1 mm	-40 °C – +70 °C	2 m 	30 ¹⁾	77 ⁶⁾	5308060
					130 ²⁾	27 ⁷⁾	
					250 ³⁾	16 ⁸⁾	
					550 ⁴⁾		
					800 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
 * With optimal measuring distance and settings. / Mounting material included.

C



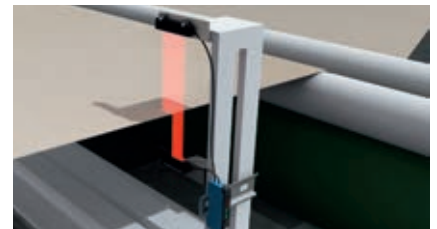
C



Detection of lead frames



Detection of free falling tablets



Monitoring of web edges



Counting pieces on a conveyor




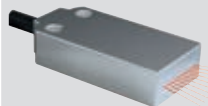

Front-edge detection for PCBs

Area detection

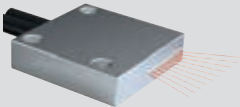

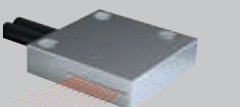

Area detection fibers are ideal for detecting objects at any point in the light array and for comparing height differences. Optional slotted diaphragms for limiting the detection area enable even very small objects to be detected.



Fiber-optic proximity systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL 180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DZ01  	25 mm	Ø 0.02 mm	-40 °C - +60 °C	2 m 	65 ¹⁾	-	5326013
					240 ²⁾	-	
					320 ³⁾	-	
					650 ⁴⁾	-	
					690 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

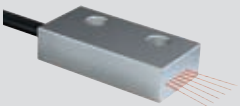

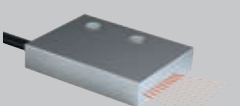







Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DZ02 	25 mm	Ø 0.02 mm	-40 °C - +70 °C	2 m 	57 ¹⁾	150 ⁶⁾	5326014
					190 ²⁾	70 ⁷⁾	
					310 ³⁾	50 ⁸⁾	
					630 ⁴⁾		
					670 ⁵⁾		
LL3-DZ03 	25 mm	Ø 0.02 mm	-40 °C - +70 °C	2 m 	50 ¹⁾	110 ⁶⁾	5326015
					160 ²⁾	55 ⁷⁾	
					280 ³⁾	35 ⁸⁾	
					450 ⁴⁾		
					590 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

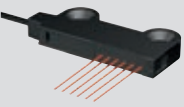

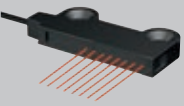

C



Fiber-optic through-beam systems

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TS10  Array width: 5.25 mm	25 mm	Ø 1 mm	-40 °C - +70 °C	2 m 	130 ¹⁾	335 ⁶⁾	5308063
					400 ²⁾	125 ⁷⁾	
					800 ³⁾	90 ⁸⁾	
					2000 ⁴⁾		
					3500 ⁵⁾		
LL3-TS14  Array width: 10.5 mm	25 mm	Ø 0.5 mm	-40 °C - +70 °C	2 m 	130 ¹⁾	335 ⁶⁾	5313039
					400 ²⁾	125 ⁷⁾	
					800 ³⁾	90 ⁸⁾	
					2000 ⁴⁾		
					3500 ⁵⁾		
LL3-TS40  Array width: 40 mm	2 mm	Ø 0.4 mm	-40 °C - +60 °C	2 m 	3000 ¹⁾	4000 ⁶⁾	5323971
					4000 ²⁾	1300 ⁷⁾	
					4000 ³⁾	1600 ⁸⁾	
					4000 ⁴⁾		
					4000 ⁵⁾		
LL3-TZ05  Array width: 5.25 mm	25 mm	Ø 0.45 mm	-40 °C - +70 °C	2 m 	150 ¹⁾	350 ⁶⁾	5325937
					450 ²⁾	150 ⁷⁾	
					740 ³⁾	250 ⁸⁾	
					1400 ⁴⁾		
					1500 ⁵⁾		
LL3-TZ06  Array width: 5.25 mm	25 mm	Ø 0.45 mm	-40 °C - +70 °C	2 m 	150 ¹⁾	350 ⁶⁾	5325938
					480 ²⁾	150 ⁷⁾	
					790 ³⁾	250 ⁸⁾	
					1500 ⁴⁾		
					1600 ⁵⁾		

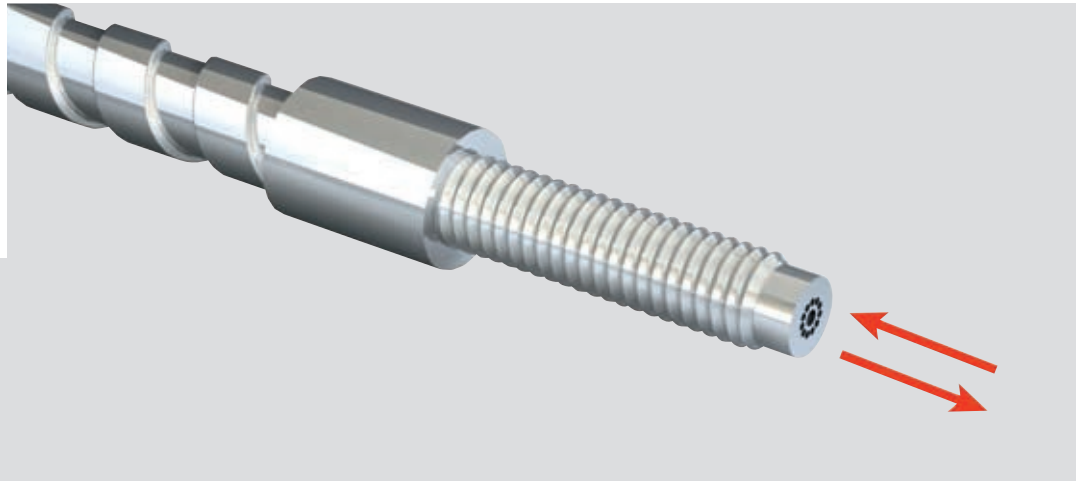
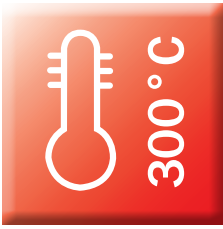
¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TZ09  Array width: 11 mm	1 mm	Ø 0.25 mm	-40 °C – +55 °C	2 m 	1300 ¹⁾	2000 ⁶⁾	5326598
					2500 ²⁾	800 ⁷⁾	
					3000 ³⁾	1000 ⁸⁾	
					3500 ⁴⁾		
					4000 ⁵⁾		
LL3-TZ10  Array width: 11 mm	10 mm	Ø 0.25 mm	-40 °C – +70 °C	2 m 	1700 ¹⁾	2800 ⁶⁾	5326599
					2500 ²⁾	800 ⁷⁾	
					3000 ³⁾	1200 ⁸⁾	
					3500 ⁴⁾		
					4000 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
 * With optimal measuring distance and settings. / Mounting material included.

C





C





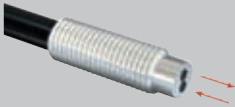

Detection in an oven

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.



Fiber-optic proximity systems

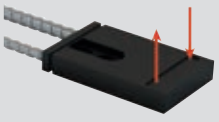








Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DH01 	35 mm	Ø 0.015 mm	-40 °C - +180 °C	2 m 	120 ¹⁾	220 ⁶⁾	5308091
					350 ²⁾	95 ⁷⁾	
					600 ³⁾	45 ⁸⁾	
					980 ⁴⁾		
					1500 ⁵⁾		
LL3-DH01-03 	35 mm	Ø 0.015 mm	-40 °C - +180 °C	3 m 	100 ¹⁾	150 ⁶⁾	5321260
					300 ²⁾	85 ⁷⁾	
					500 ³⁾	40 ⁸⁾	
					850 ⁴⁾		
					1400 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DH02 	25 mm	Ø 0.015 mm	-40 °C - +100 °C	2 m 	70 ¹⁾ 230 ²⁾ 350 ³⁾ 600 ⁴⁾ 1000 ⁵⁾	125 ⁶⁾ 45 ⁷⁾ 8 ⁸⁾	5308092
LL3-DH03 	25 mm	Ø 0.02 mm	-30 °C - +350 °C	2 m	55 ¹⁾ 220 ²⁾ 490 ³⁾ 990 ⁴⁾ 1050 ⁵⁾	170 ⁶⁾ 80 ⁷⁾ 50 ⁸⁾	5324787
LL3-DH04 	25 mm	Ø 0.02 mm	-30 °C - +350 °C	2 m	65 ¹⁾ 225 ²⁾ 500 ³⁾ 1000 ⁴⁾ 1060 ⁵⁾	350 ⁶⁾ 120 ⁷⁾ 90 ⁸⁾	5326022
LL3-DH05 	25 mm	Ø 0.02 mm	-30 °C - +350 °C	2 m	55 ¹⁾ 220 ²⁾ 580 ³⁾ 1170 ⁴⁾ 1240 ⁵⁾	220 ⁶⁾ 90 ⁷⁾ 70 ⁸⁾	5326021
LL3-DH06 	25 mm	Ø 0.02 mm	-30 °C - +300 °C	2 m	3-5 ¹⁾ 0-10 ²⁾ 0-19 ³⁾ 0-37 ⁴⁾ 0-43 ⁵⁾	7 ⁶⁾ 0.3-10.5 ⁷⁾ 1.2-9 ⁸⁾	5326026
LL3-DH07 	25 mm	Ø 0.02 mm	-60 °C - +200 °C	2 m	65 ¹⁾ 260 ²⁾ 670 ³⁾ 1340 ⁴⁾ 1430 ⁵⁾	220 ⁶⁾ 100 ⁷⁾ 70 ⁸⁾	5326031
LL3-DH08 	25 mm	Ø 0.02 mm	-60 °C - +180 °C	2 m 	2-5 ¹⁾ 0-11 ²⁾ 0-22 ³⁾ 0-30 ⁴⁾ 0-38 ⁵⁾	11 ⁶⁾ 0-15.5 ⁷⁾ 0.5-9.3 ⁸⁾	5326025
LL3-DH09 	25 mm	Ø 0.02 mm	-60 °C - +130 °C	2 m 	70 ¹⁾ 230 ²⁾ 370 ³⁾ 750 ⁴⁾ 800 ⁵⁾	220 ⁶⁾ 90 ⁷⁾ 70 ⁸⁾	5326030
LL3-DH10 	25 mm	Ø 0.02 mm	-20 °C - +250 °C	3 m	4-11 ¹⁾ 3-18 ²⁾ 3-21 ³⁾ 2-24 ⁴⁾ 2-26 ⁵⁾	3.5-18 ⁶⁾ 4-18 ⁷⁾ 4-15 ⁸⁾	5326023



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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-DH11  	25 mm	Ø 0.02 mm	-20 °C – +250 °C	2 m	8-19 ¹⁾	7.5-24 ⁶⁾	5326024
					6-29 ²⁾	7.5-24 ⁷⁾	
					4-34 ³⁾	9-24 ⁸⁾	
					3-39 ⁴⁾		
					2-42 ⁵⁾		
LL3-DV06  	25 mm	Ø 0.015 mm	-40 °C – +105 °C	2 m 	30 ¹⁾	47 ⁶⁾	5322550
					130 ²⁾	12 ⁷⁾	
					210 ³⁾	12 ⁸⁾	
					450 ⁴⁾		
					800 ⁵⁾		
LL3-DW01**  	25 mm	Ø 0.02 mm	-40 °C – +200 °C	1 m	20 ¹⁾	–	5315234
					50 ²⁾	–	
					95 ³⁾	–	
					150 ⁴⁾		
					400 ⁵⁾		
LL3-DW01-2**  	25 mm	Ø 0.02 mm	-40 °C – +200 °C	2 m	20 ¹⁾	–	5324789
					50 ²⁾	–	
					95 ³⁾	–	
					150 ⁴⁾		
					400 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
 * With optimal measuring distance and settings. ** Humidity/level detection only in conjunction with WLL180T-P474 IR version.
 Mounting material included.

C



Fiber-optic through-beam systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TH01    Suitable for tip adapters	25 mm	Ø 0.2 mm	-40 °C - +100 °C	2 m 	55 ¹⁾ 180 ²⁾ 320 ³⁾ 680 ⁴⁾ 1000 ⁵⁾	305 ⁶⁾ 125 ⁷⁾ 50 ⁸⁾	5308064
LL3-TH02   	35 mm	Ø 0.5 mm	-40 °C - +180 °C	2 m 	230 ¹⁾ 700 ²⁾ 1300 ³⁾ 2700 ⁴⁾ 4000 ⁵⁾	620 ⁶⁾ 255 ⁷⁾ 125 ⁸⁾	5308065
LL3-TH07   	50 mm	Ø 0.1 mm	-60 °C - +200 °C	2 m	18 ¹⁾ 30 ²⁾ 120 ³⁾ 220 ⁴⁾ 420 ⁵⁾	23 ⁷⁾ - - - -	5325977
LL3-TH08  	25 mm	Ø 0.04 mm	-30 °C - +350 °C	2 m	150 ¹⁾ 480 ²⁾ 790 ³⁾ 1500 ⁴⁾ 1600 ⁵⁾	350 ⁶⁾ 140 ⁷⁾ 240 ⁸⁾	5325978
LL3-TH09  	25 mm	Ø 0.04 mm	-30 °C - +350 °C	2 m	140 ¹⁾ 460 ²⁾ 700 ³⁾ 1400 ⁴⁾ 1500 ⁵⁾	350 ⁶⁾ 140 ⁷⁾ 240 ⁸⁾	5325979
LL3-TH10  	10 mm	Ø 0.02 mm	-60 °C - +200 °C	2 m	50 ¹⁾ 180 ²⁾ 300 ³⁾ 600 ⁴⁾ 640 ⁵⁾	130 ⁶⁾ 50 ⁷⁾ 80 ⁸⁾	5325970
LL3-TH11  	25 mm	Ø 0.04 mm	-60 °C - +200 °C	1 m	130 ¹⁾ 400 ²⁾ 700 ³⁾ 1400 ⁴⁾ 1500 ⁵⁾	320 ⁶⁾ 130 ⁷⁾ 200 ⁸⁾	5325971
LL3-TH12  	25 mm	Ø 0.12 mm	-60 °C - +200 °C	2 m 	100 ¹⁾ 330 ²⁾ 570 ³⁾ 1100 ⁴⁾ 1200 ⁵⁾	250 ⁶⁾ 100 ⁷⁾ 170 ⁸⁾	5325972

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

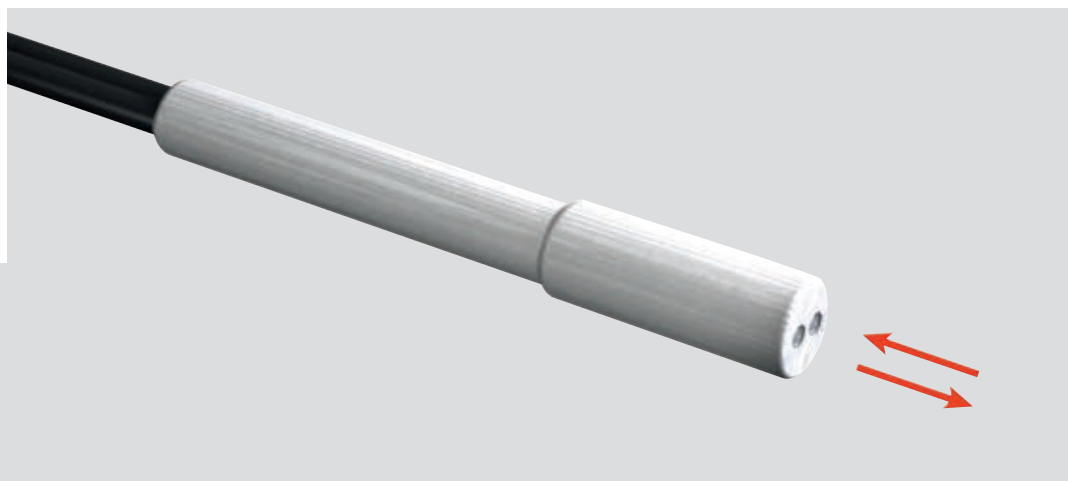


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Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TH13 	25 mm	Ø 0.12 mm	-60 °C – +200 °C	2 m 	100 ¹⁾	250 ⁶⁾	5325973
330 ²⁾					100 ⁷⁾		
570 ³⁾					170 ⁸⁾		
1100 ⁴⁾							
1200 ⁵⁾							
LL3-TH14 	25 mm	Ø 0.12 mm	-60 °C – +200 °C	2 m 	100 ¹⁾	250 ⁶⁾	5325974
330 ²⁾					100 ⁷⁾		
570 ³⁾					170 ⁸⁾		
1100 ⁴⁾							
1200 ⁵⁾							
LL3-TH15  	25 mm	Ø 0.16 mm	-60 °C – +200 °C	2 m 	90 ¹⁾	170 ⁶⁾	5325975
290 ²⁾					75 ⁷⁾		
480 ³⁾					110 ⁸⁾		
970 ⁴⁾							
1000 ⁵⁾							
LL3-TH16  	25 mm	Ø 0.16 mm	-60 °C – +200 °C	2 m 	90 ¹⁾	170 ⁶⁾	5325976
290 ²⁾					75 ⁷⁾		
480 ³⁾					110 ⁸⁾		
970 ⁴⁾							
1000 ⁵⁾							
LL3-TH17 	25 mm	Ø 0.06 mm	-60 °C – +130 °C	2 m 	230 ¹⁾	600 ⁶⁾	5325967
690 ²⁾					250 ⁷⁾		
1100 ³⁾					400 ⁸⁾		
2300 ⁴⁾							
2400 ⁵⁾							
LL3-TS22M  	10 mm	Ø 0.05 mm	-40 °C – +105 °C	2 m 	220 ¹⁾	625 ⁶⁾	5325968
760 ²⁾					–		
1500 ³⁾					–		
2900 ⁴⁾							
4000 ⁵⁾							
LL3-TV06   	25 mm	Ø 0.4 mm	-40 °C – +105 °C	2 m 	180 ¹⁾	350 ⁶⁾	5322547
550 ²⁾					150 ⁷⁾		
900 ³⁾					150 ⁸⁾		
2100 ⁴⁾							
3500 ⁵⁾							
LL3-TW01   	25 mm	Ø 0.4 mm	-40 °C – +200 °C	1 m	80 ¹⁾	–	5315233
230 ²⁾					–		
350 ³⁾					–		
560 ⁴⁾							
980 ⁵⁾							
LL3-TW01-2   	25 mm	Ø 0.4 mm	-40 °C – +200 °C	2 m	80 ¹⁾	–	5321306
230 ²⁾					–		
350 ³⁾					–		
560 ⁴⁾							
980 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

C



C



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.











Fiber-optic proximity systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DY01  	60 mm	Ø 0.02 mm	-40 °C - +100 °C	2 m	100 ¹⁾	50 ⁶⁾	5308093
					180 ²⁾	27 ⁷⁾	
					200 ³⁾	12 ⁸⁾	
					150 ⁴⁾		
					280 ⁵⁾		

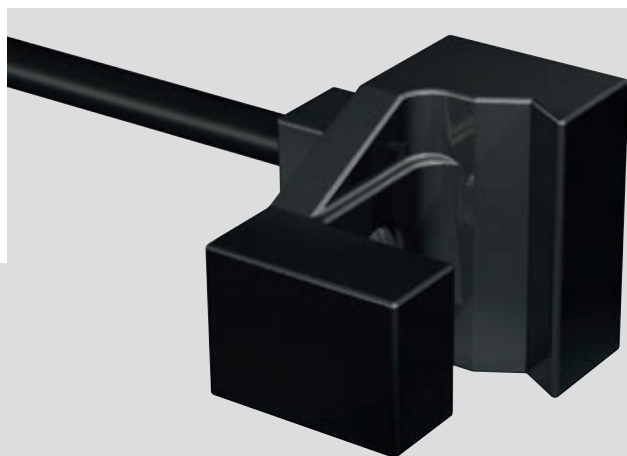
¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.



Fiber-optic through-beam systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TY01 	60 mm	Ø 0.3 mm	-40 °C - +70 °C	2 m	400 ¹⁾ 1200 ²⁾ 2100 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	2000 ⁶⁾ 415 ⁷⁾ 390 ⁸⁾	5308066
LL3-TY02 	60 mm	Ø 0.3 mm	-40 °C - +70 °C	2 m	300 ¹⁾ 1000 ²⁾ 1300 ³⁾ 3000 ⁴⁾ 4000 ⁵⁾	620 ⁶⁾ 225 ⁷⁾ 210 ⁸⁾	5308067
LL3-TY03 	20 mm	Ø 0.3 mm	-55 °C - +70 °C	2 m 	460 ¹⁾ 1400 ²⁾ 2500 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1000 ⁶⁾ 350 ⁷⁾ 450 ⁸⁾	5325982
LL3-TY04 	30 mm	Ø 0.3 mm	-40 °C - +115 °C	2 m 	740 ¹⁾ 2400 ²⁾ 3000 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	2200 ⁶⁾ 800 ⁷⁾ 1300 ⁸⁾	5325981
LL3-TY05 	25 mm	Ø 4 mm	0 °C - +60 °C	2 m 	850 ¹⁾ 2700 ²⁾ 3000 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	2200 ⁶⁾ 800 ⁷⁾ 1300 ⁸⁾	5325980

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.



C



Level detection through immersion using LL3-DF02



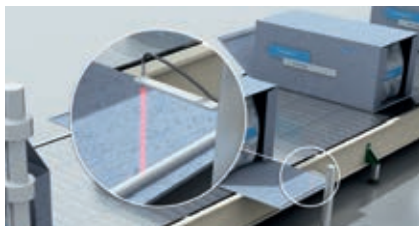
Leak detection (LL3-DW02)



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

Detection of liquids

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.



Fiber-optic proximity systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DF02-S01 	30 mm	-	-40 °C - +105 °C	2 m 	-	-	5321924
					-	-	
					-	-	
					-	-	
					-	-	

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DF04  	10 mm	-	-40 °C - +100 °C	2 m 	- - - - -	- - - -	5326035
LL3-DF05  	10 mm	-	-40 °C - +100 °C	2 m 	- - - - -	- - - -	5326034
LL3-DF07  	10 mm	-	-40 °C - +70 °C	2 m 	- - - - -	- - - -	5326033
LL3-DW01**    	25 mm	Ø 0.02 mm	-40 °C - +200 °C	1 m	 20 ¹⁾  50 ²⁾  95 ³⁾  150 ⁴⁾  400 ⁵⁾	- - - -	5315234
LL3-DW01-2**    	25 mm	Ø 0.02 mm	-40 °C - +200 °C	2 m	 20 ¹⁾  50 ²⁾  95 ³⁾  150 ⁴⁾  400 ⁵⁾	- - - -	5324789
LL3-DW02  	20 mm	Ø 4 mm	-20 °C - +50 °C	2 m 	- - - - -	- - - -	5325608


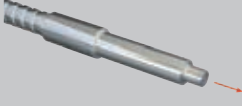



¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
 * With optimal measuring distance and settings. ** Humidity/level detection only in conjunction with WLL180T-P474 IR version.
 Mounting material included.

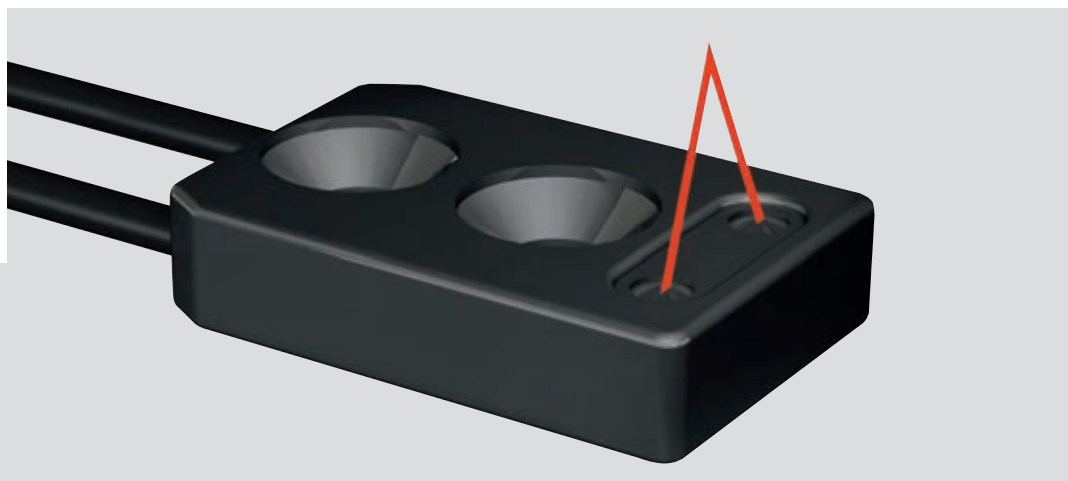


Fiber-optic through-beam systems

C

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TF01 	20 mm	Ø 4 mm	-20 °C – +60 °C	2 m	– – – – –	– – – – –	5324242
LL3-TW01** 	25 mm	Ø 0.4 mm	-40 °C – +200 °C	1 m	80 ¹⁾ 230 ²⁾ 350 ³⁾ 560 ⁴⁾ 980 ⁵⁾	– – – – –	5315233
LL3-TW01-2** 	25 mm	Ø 0.4 mm	-40 °C – +200 °C	2 m	80 ¹⁾ 230 ²⁾ 350 ³⁾ 560 ⁴⁾ 980 ⁵⁾	– – – – –	5321306

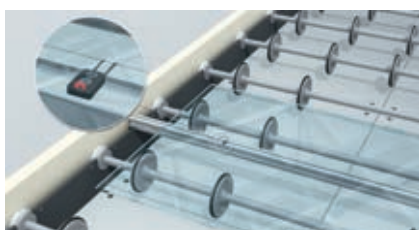
¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
 * With optimal measuring distance and settings. ** Humidity/level detection only in conjunction with WLL180T-P474 IR version.
 Mounting material included.



C



Indexing with wafers



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



Notch detection



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



Safe detection of substrates, even in a slanted position





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

LCDs/transparent objects/semiconductors

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



Fiber-optic proximity systems




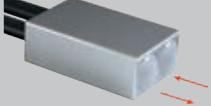
Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DC03 	25 mm	Ø 0.3 mm	-40 °C - +60 °C	2 m 	12-60 ¹⁾	7-80 ⁶⁾	5326020
					10-75 ²⁾	10-60 ⁷⁾	
					5-85 ³⁾	10-60 ⁸⁾	
					3-150 ⁴⁾		
					2-280 ⁵⁾		

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DC04 	4 mm	Ø 4 mm	0 °C - +70 °C	2 m 	4-18 ¹⁾	1-20 ⁶⁾	5326018
					0-31 ²⁾	1-20 ⁷⁾	
					0-34 ³⁾	4-15 ⁸⁾	
					0-38 ⁴⁾		
					0-38 ⁵⁾		
LL3-DC05 	25 mm	Ø 25 mm	0 °C - +70 °C	2 m 	9-18 ¹⁾	5-22 ⁶⁾	5326016
					7-29 ²⁾	5-22 ⁷⁾	
					5-35 ³⁾	6-25 ⁸⁾	
					4-40 ⁴⁾		
					3-43 ⁵⁾		
LL3-DC06 	4 mm	Ø 4 mm	0 °C - +70 °C	2 m 	4-15 ¹⁾	2-15 ⁶⁾	5326017
					2-22 ²⁾	2-15 ⁷⁾	
					0-23 ³⁾	3-10 ⁸⁾	
					0-25 ⁴⁾		
					0-25 ⁵⁾		
LL3-DC07 	10 mm	Ø 0.06 mm	-40 °C - +60 °C	2 m 	7-8 ¹⁾	5-10 ⁶⁾	5326019
					4-12 ²⁾	7-8 ⁷⁾	
					4-14 ³⁾	7-8 ⁸⁾	
					2-16 ⁴⁾		
					2-18 ⁵⁾		
LL3-DC08 	1 mm	Ø 0.3 mm	-20 °C - +60 °C	2 m 	1-2 ¹⁾	1-4.5 ⁶⁾	5326029
					1-4 ²⁾	1-2.5 ⁷⁾	
					1-6 ³⁾	1-2.5 ⁸⁾	
					0-9 ⁴⁾		
					0-10 ⁵⁾		
LL3-DC09 	10 mm	Ø 0.02 mm	-40 °C - +70 °C	2 m 	6-8 ¹⁾	5-8 ⁶⁾	5326028
					6-10 ²⁾	5-8 ⁷⁾	
					5-11 ³⁾	5-8 ⁸⁾	
					4-13 ⁴⁾		
					0-17 ⁵⁾		
LL3-DC38 	10 mm	Ø 0.02 mm	-40 °C - +50 °C	2 m 	6 ¹⁾	4-7 ⁶⁾	5322472
					6 ²⁾	4-7 ⁷⁾	
					6 ³⁾	4-6 ⁸⁾	
					1-10 ⁴⁾		
					0-15 ⁵⁾		
LL3-DC39 	10 mm	Ø 0.02 mm	-40 °C - +50 °C	2 m 	-	0-5 ⁶⁾	5322513
					0-4 ²⁾	0-4 ⁷⁾	
					0-4 ³⁾	0-4 ⁸⁾	
					0-4 ⁴⁾		
					0-4 ⁵⁾		
LL3-DH06 	25 mm	Ø 0.02 mm	-30 °C - +300 °C	2 m	3-5 ¹⁾	7 ⁶⁾	5326026
					0-10 ²⁾	0.3-10.5 ⁷⁾	
					0-19 ³⁾	1.2-9 ⁸⁾	
					0-37 ⁴⁾		
					0-43 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

C

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing distance (mm)	WLL170-2 Sensing distance (mm)	Part no.
LL3-DH08 	25 mm	Ø 0.02 mm	-60 °C – +180 °C	2 m	2-5 ¹⁾	11 ⁶⁾	5326025
					0-11 ²⁾	0-15.5 ⁷⁾	
					0-22 ³⁾	0.5-9.3 ⁸⁾	
					0-30 ⁴⁾		
					0-38 ⁵⁾		
LL3-DH10 	25 mm	Ø 0.02 mm	-20 °C – +250 °C	2 m	4-11 ¹⁾	3.5-18 ⁶⁾	5326023
					3-18 ²⁾	4-18 ⁷⁾	
					3-21 ³⁾	4-15 ⁸⁾	
					2-24 ⁴⁾		
					2-26 ⁵⁾		
LL3-DH11 	25 mm	Ø 0.02 mm	-20 °C – +250 °C	2 m	8-19 ¹⁾	7.5-24 ⁶⁾	5326024
					6-29 ²⁾	7.5-24 ⁷⁾	
					4-34 ³⁾	9-24 ⁸⁾	
					3-39 ⁴⁾		
					2-42 ⁵⁾		
LL3-DR09 	1 mm	Ø 0.03 mm	-20 °C – +70 °C	2 m	110 ¹⁾	300 ⁶⁾	5325528
					345 ²⁾	120 ⁷⁾	
					560 ³⁾	80 ⁸⁾	
					1100 ⁴⁾		
					1190 ⁵⁾		

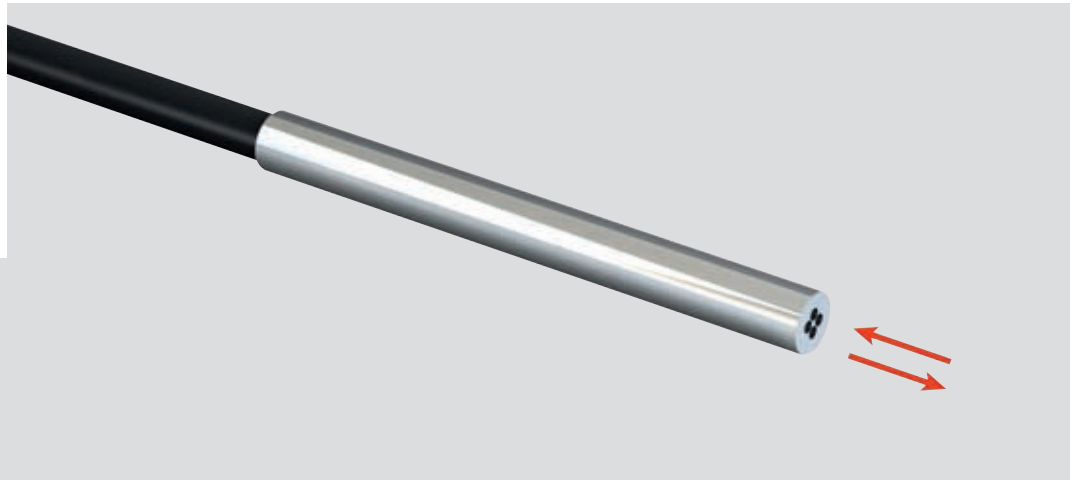
¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
 * With optimal measuring distance and settings. / Mounting material included.



Fiber-optic through-beam systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TG01 	25 mm	Ø 0.06 mm	-40 °C - +70 °C	2 m 	880 ¹⁾ 2300 ²⁾ 3500 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	2500 ⁶⁾ 1300 ⁷⁾ 1600 ⁸⁾	5325940
LL3-TG02 	1 mm	Ø 0.06 mm	-40 °C - +55 °C	2 m 	580 ¹⁾ 1670 ²⁾ 2400 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1100 ⁶⁾ 450 ⁷⁾ 700 ⁸⁾	5325943
LL3-TG03 	25 mm	Ø 0.06 mm	-40 °C - +60 °C	2 m 	570 ¹⁾ 1980 ²⁾ 2400 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1000 ⁶⁾ 450 ⁷⁾ 700 ⁸⁾	5325942
LL3-TG04 	10 mm	Ø 0.02 mm	-40 °C - +60 °C	2 m 	100 ¹⁾ 290 ²⁾ 500 ³⁾ 1000 ⁴⁾ 1100 ⁵⁾	250 ⁶⁾ 120 ⁷⁾ 120 ⁸⁾	5324499
LL3-TR08 	1 mm	Ø 0.06 mm	-40 °C - +60 °C	2 m 	160 ¹⁾ 480 ²⁾ 800 ³⁾ 1600 ⁴⁾ 1700 ⁵⁾	350 ⁶⁾ 170 ⁷⁾ 150 ⁸⁾	5325984
LL3-TR09 	1 mm	Ø 0.04 mm	-40 °C - +60 °C	2 m 	360 ¹⁾ 1200 ²⁾ 2200 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	900 ⁶⁾ 500 ⁷⁾ 450 ⁸⁾	5325985
LL3-TS22 	25 mm	Ø 0.05 mm	-40 °C - +70 °C	2 m 	390 ¹⁾ 1300 ²⁾ 2600 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	850 ⁶⁾ - -	5325944

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.



Detecting parts in the grabber




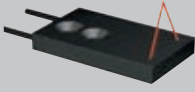


C

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%.



Fiber-optic proximity systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL 180T Sensing distance (mm)	WLL 170(T)-2 Sensing distance (mm)	Part no.
LL3-DC04  	4 mm	Ø 4 mm	0 °C - +70 °C	2 m 	4-18 ¹⁾	1-20 ⁶⁾	5326018
					0-31 ²⁾	1-20 ⁷⁾	
					0-34 ³⁾	4-15 ⁸⁾	
					0-38 ⁴⁾		
					0-38 ⁵⁾		
LL3-DC06  	4 mm	Ø 4 mm	0 °C - +70 °C	2 m 	4-15 ¹⁾	2-15 ⁶⁾	5326017
					2-22 ²⁾	2-15 ⁷⁾	
					0-23 ³⁾	3-10 ⁸⁾	
					0-25 ⁴⁾		
					0-25 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size *	Temperature	Fiber length	WLL 180T Sensing distance (mm)	WLL 170(T)-2 Sensing distance (mm)	Part no.
   	4 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	90 ¹⁾ 280 ²⁾ 450 ³⁾ 880 ⁴⁾ 1350 ⁵⁾	135 ⁶⁾ 50 ⁷⁾ 20 ⁸⁾	5308078
   	4 mm	Ø 0.015 mm	-40 °C - +70 °C	1 m 	18 ¹⁾ 50 ²⁾ 90 ³⁾ 200 ⁴⁾ 370 ⁵⁾	22 ⁶⁾ 9 ⁷⁾ 3 ⁸⁾	5308079
   	4 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	30 ¹⁾ 85 ²⁾ 140 ³⁾ 300 ⁴⁾ 600 ⁵⁾	37 ⁶⁾ 13 ⁷⁾ 8 ⁸⁾	5308080
   	4 mm	Ø 0.015 mm	-40 °C - +70 °C	1 m 	20 ¹⁾ 70 ²⁾ 110 ³⁾ 220 ⁴⁾ 360 ⁵⁾	25 ⁶⁾ 9 ⁷⁾ 3 ⁸⁾	5308081
  	4 mm	Ø 0.015 mm	-40 °C - +70 °C	0.5 m 	10 ¹⁾ 30 ²⁾ 60 ³⁾ 140 ⁴⁾ 225 ⁵⁾	12 ⁶⁾ 4 ⁷⁾ 2 ⁸⁾	5308087
   	4 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	18 ¹⁾ 60 ²⁾ 100 ³⁾ 220 ⁴⁾ 360 ⁵⁾	37 ⁶⁾ 11 ⁷⁾ 5 ⁸⁾	5308082
  	4 mm	Ø 0.02 mm	-40 °C - +70 °C	2 m 	8 ¹⁾ 25 ²⁾ 46 ³⁾ 90 ⁴⁾ 98 ⁵⁾	22 ⁶⁾ 9 ⁷⁾ 6 ⁸⁾	5326037
   	4 mm	Ø 0.015 mm	-40 °C - +70 °C	2 m 	10 ¹⁾ 30 ²⁾ 60 ³⁾ 140 ⁴⁾ 225 ⁵⁾	9 ⁶⁾ 4 ⁷⁾ 2 ⁸⁾	5308085
   	4 mm	Ø 0.015 mm	-40 °C - +70 °C	0.5 m 	13 ¹⁾ 45 ²⁾ 80 ³⁾ 140 ⁴⁾ 280 ⁵⁾	9 ⁶⁾ 4 ⁷⁾ 2 ⁸⁾	5308086

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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.



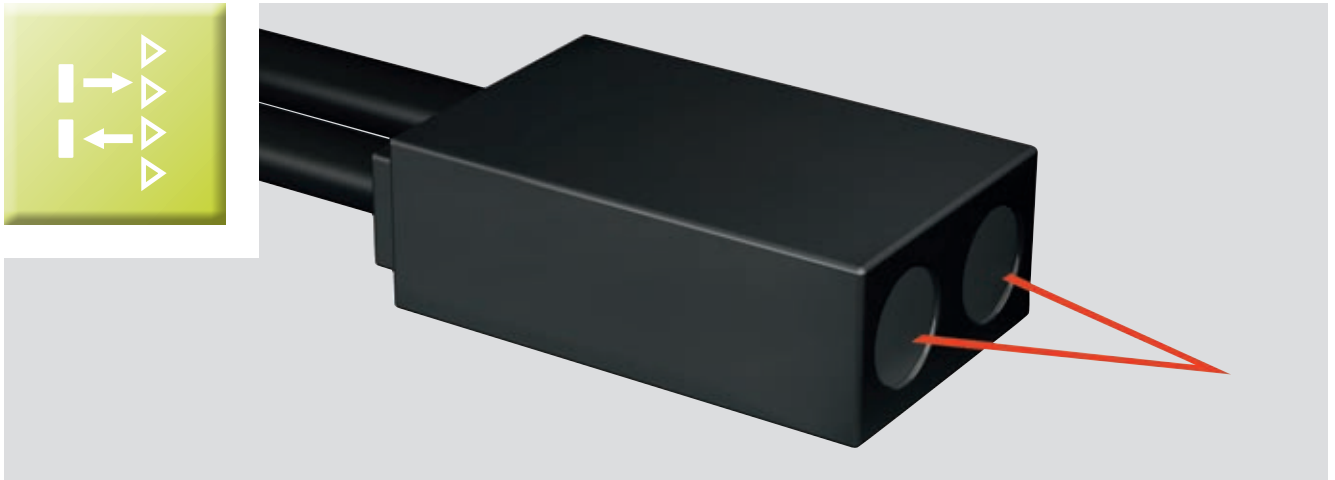


Fiber-optic through-beam systems

C

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-TR01     <p>Suitable for tip adapters</p>	4 mm	Ø 0.3 mm	-40 °C – +70 °C	2 m 	200 ¹⁾ 600 ²⁾ 1000 ³⁾ 2400 ⁴⁾ 4000 ⁵⁾	340 ⁶⁾ 125 ⁷⁾ 125 ⁸⁾	5308052
LL3-TR01-05    	4 mm	Ø 0.3 mm	-40 °C – +70 °C	5 m 	160 ¹⁾ 450 ²⁾ 800 ³⁾ 1900 ⁴⁾ 2800 ⁵⁾	120 ⁶⁾ 60 ⁷⁾ 60 ⁸⁾	5322198
LL3-TR02    	4 mm	Ø 0.1 mm	-40 °C – +70 °C	2 m 	60 ¹⁾ 175 ²⁾ 330 ³⁾ 750 ⁴⁾ 1100 ⁵⁾	115 ⁶⁾ 38 ⁷⁾ 23 ⁸⁾	5308053
LL3-TR03    	4 mm	Ø 0.1 mm	-40 °C – +70 °C	1 m 	60 ¹⁾ 175 ²⁾ 330 ³⁾ 750 ⁴⁾ 1100 ⁵⁾	115 ⁶⁾ 38 ⁷⁾ 23 ⁸⁾	5308054
LL3-TR03-2    	4 mm	Ø 0.1 mm	-40 °C – +70 °C	2 m 	60 ¹⁾ 175 ²⁾ 330 ³⁾ 750 ⁴⁾ 1100 ⁵⁾	115 ⁶⁾ 38 ⁷⁾ 23 ⁸⁾	5308055
LL3-TR04    	4 mm	Ø 0.02 mm	-40 °C – +60 °C	0.5 m	5 ¹⁾ 17 ²⁾ 28 ³⁾ 56 ⁴⁾ 60 ⁵⁾	12 ⁶⁾ 5 ⁷⁾ 5 ⁸⁾	5325918
LL3-TR05    	4 mm	Ø 0.03 mm	-40 °C – +60 °C	2 m 	360 ¹⁾ 1300 ²⁾ 2300 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1200 ⁶⁾ 500 ⁷⁾ 750 ⁸⁾	5325808
LL3-TR06    	4 mm	Ø 0.03 mm	-40 °C – +60 °C	2 m 	560 ¹⁾ 1600 ²⁾ 2200 ³⁾ 4000 ⁴⁾ 4000 ⁵⁾	1200 ⁶⁾ 500 ⁷⁾ 750 ⁸⁾	5325912

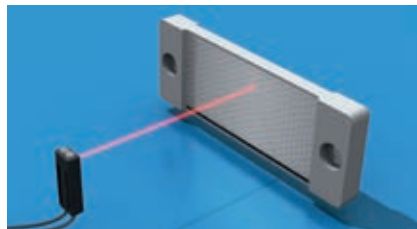
¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.



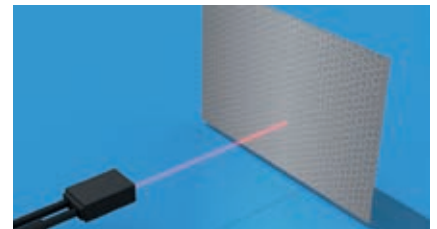
C



LL3-RB01



LL3-RB02







LL3-RR01

Retro-reflective





Retro-reflective fibers are ideal for detecting transparent objects. The polarizing filter integrated in the LL3-RR01 can even handle shiny surfaces.



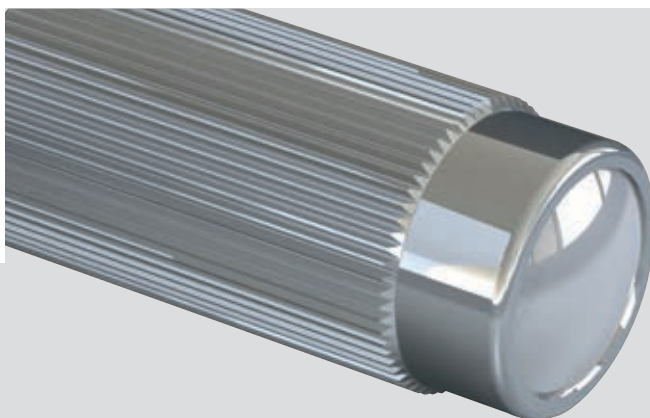
Fiber-optic proximity systems

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-RB01 	10 mm	Ø 0.06 mm	-40 °C - +60 °C	2 m 	105 ¹⁾	220 ⁶⁾	5326010
					190 ²⁾	80 ⁷⁾	
					230 ³⁾	65 ⁸⁾	
					460 ⁴⁾		
					490 ⁵⁾		
LL3-RB02 	10 mm	Ø 0.06 mm	-40 °C - +60 °C	2 m 	100 ¹⁾	220 ⁶⁾	5326011
					170 ²⁾	80 ⁷⁾	
					210 ³⁾	65 ⁸⁾	
					430 ⁴⁾		
					460 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 ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.

Model name	Minimum bend radius	Minimum object size*	Temperature	Fiber length	WLL180T Sensing range (mm)	WLL170-2 Sensing range (mm)	Part no.
LL3-RG01 	10 mm	Ø 0.12 mm	-40 °C - +60 °C	2 m 	80 ¹⁾	-	5326012
					200 ²⁾	-	
					310 ³⁾	-	
					620 ⁴⁾	-	
					660 ⁵⁾	-	
LL3-RR01 	1 mm	Ø 0.3 mm	-25 °C - +55 °C	2 m 	290 ¹⁾	650 ⁶⁾	5326008
					580 ²⁾	250 ⁷⁾	
					720 ³⁾	180 ⁸⁾	
					1450 ⁴⁾		
					1550 ⁵⁾		



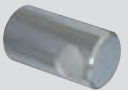

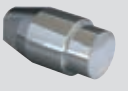
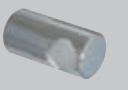
¹⁾ Operating mode: 16 µs ²⁾ Operating mode: 70 µs ³⁾ Operating mode: 250 µs ⁴⁾ Operating mode: 2 ms ⁵⁾ Operating mode: 8 ms ⁶⁾ Red light: 250 µs ⁷⁾ High speed: 50 µs ⁸⁾ Green light: 250 µs
* With optimal measuring distance and settings. / Mounting material included.



D



Suitable for
WLL170-2 amplifiers

	Model name	Temperature	Part no.	LL model name/sensing range (mm)				
				LL3-TB01	LL3-TB01-10	LL3-TB01-30	LL3-TB02	LL3-TB06
For long distances	 LL3-TA01	-40 °C - +100 °C	5308128	3000 ¹⁾	1800 ¹⁾	1000 ¹⁾	3500 ¹⁾	3500 ¹⁾
				1200 ²⁾	700 ²⁾	400 ²⁾	1400 ²⁾	1400 ²⁾
				1100 ³⁾	600 ³⁾	200 ³⁾	1200 ³⁾	1200 ³⁾
	 LL3-TA01S	-40 °C - +100 °C	5326461	3000 ¹⁾	1800 ¹⁾	1000 ¹⁾	3500 ¹⁾	3500 ¹⁾
				1200 ²⁾	700 ²⁾	400 ²⁾	1400 ²⁾	1400 ²⁾
				800 ³⁾	500 ³⁾	200 ³⁾	1000 ³⁾	1000 ³⁾
	 LL3-TA02	-40 °C - +70 °C	5308129	600 ¹⁾	360 ¹⁾	200 ¹⁾	600 ¹⁾	-
				230 ²⁾	130 ²⁾	80 ²⁾	230 ²⁾	-
				100 ³⁾	-	-	100 ³⁾	-
	 LL3-TA03	-40 °C - +350 °C	5326462	3500 ¹⁾	2100 ¹⁾	1200 ¹⁾	3500 ¹⁾	3500 ¹⁾
				1400 ²⁾	850 ²⁾	500 ²⁾	1400 ²⁾	1400 ²⁾
				1000 ³⁾	600 ³⁾	200 ³⁾	1000 ³⁾	1000 ³⁾
	 LL3-TA04	-60 °C - +350 °C	5326463	3500 ¹⁾	2100 ¹⁾	1200 ¹⁾	3500 ¹⁾	3500 ¹⁾
				1400 ²⁾	850 ²⁾	500 ²⁾	1400 ²⁾	1400 ²⁾
				1000 ³⁾	600 ³⁾	200 ³⁾	1000 ³⁾	1000 ³⁾
	 LL3-TA05	-60 °C - +300 °C	5326464	500 ¹⁾	300 ¹⁾	180 ¹⁾	500 ¹⁾	-
				200 ²⁾	100 ²⁾	70 ²⁾	200 ²⁾	-
				-	-	-	80 ³⁾	-

¹⁾ Red light: 250 μs ²⁾ High speed: 50 μs ³⁾ Green light: 250 μs
Mounting material included.

Tip adapters for through-beam systems

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. The LL3-TA02 and LL3-TA05 models enable an additional 90° deflection.

D

LL model name/sensing range (mm)						
LL3-TH01	LL3-TH08	LL3-TH10	LL3-TH11	LL3-TJ01	LL3-TK77	LL3-TR01
■ 3500 ¹⁾	-	-	-	■ 1500 ¹⁾	■ 3500 ¹⁾	■ 3000 ¹⁾
■ 1400 ²⁾	-	-	-	■ 600 ²⁾	■ 1400 ²⁾	■ 1200 ²⁾
■ 1200 ³⁾	-	-	-	■ 400 ³⁾	■ 1200 ³⁾	■ 1000 ³⁾
■ 3500 ¹⁾	-	-	-	■ 1500 ¹⁾	■ 3500 ¹⁾	■ 3000 ¹⁾
■ 1400 ²⁾	-	-	-	■ 600 ²⁾	■ 1400 ²⁾	■ 1200 ²⁾
■ 1000 ³⁾	-	-	-	■ 400 ³⁾	■ 1100 ³⁾	■ 1100 ³⁾
-	-	-	-	■ 500 ¹⁾	■ 600 ¹⁾	■ 500 ¹⁾
-	-	-	-	■ 200 ²⁾	■ 230 ²⁾	■ 200 ²⁾
-	-	-	-	-	-	-
■ 3500 ¹⁾	■ 2100 ¹⁾	■ 1500 ¹⁾	■ 1500 ¹⁾	■ 1500 ¹⁾	■ 3500 ¹⁾	■ 2500 ¹⁾
■ 1400 ²⁾	■ 850 ²⁾	■ 600 ²⁾	■ 600 ²⁾	■ 600 ²⁾	■ 1400 ²⁾	■ 1000 ²⁾
■ 1000 ³⁾	■ 500 ³⁾	■ 300 ³⁾	■ 300 ³⁾	■ 300 ³⁾	■ 1000 ³⁾	■ 700 ³⁾
■ 3500 ¹⁾	■ 3500 ¹⁾	■ 1500 ¹⁾	■ 1500 ¹⁾	■ 1500 ¹⁾	■ 3500 ¹⁾	■ 3500 ¹⁾
■ 1400 ²⁾	■ 1400 ²⁾	■ 600 ²⁾	■ 600 ²⁾	■ 600 ²⁾	■ 1400 ²⁾	■ 1400 ²⁾
■ 1000 ³⁾	■ 1000 ³⁾	■ 300 ³⁾	■ 250 ³⁾	■ 250 ³⁾	■ 1000 ³⁾	■ 1100 ³⁾
■ 400 ¹⁾	■ 350 ¹⁾	■ 300 ¹⁾	■ 350 ¹⁾	■ 400 ¹⁾	■ 400 ¹⁾	■ 350 ¹⁾
■ 150 ²⁾	■ 140 ²⁾	■ 120 ²⁾	■ 140 ²⁾	■ 160 ²⁾	■ 160 ²⁾	■ 140 ²⁾
-	-	-	-	-	-	-

¹⁾ Red light: 250 μs ²⁾ High speed: 50 μs ³⁾ Green light: 250 μs
Mounting material included.



Suitable for
WLL180T amplifiers

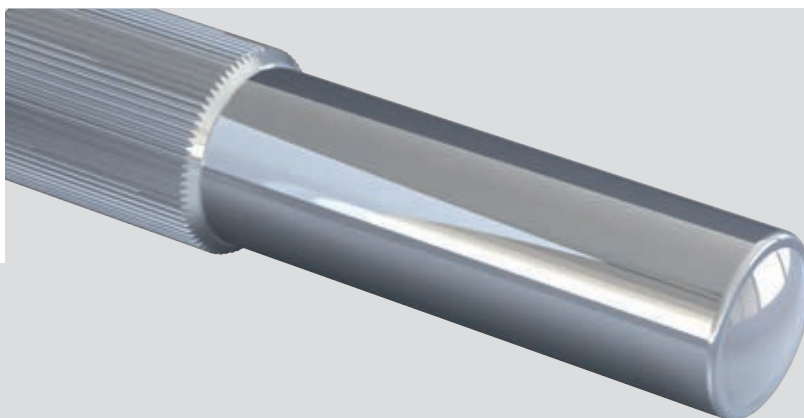
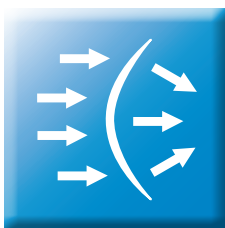
	Model name	Temperature	Part no.	LL model name/sensing range (mm)				
				LL3-TB01	LL3-TB01-10	LL3-TB01-30	LL3-TB02	LL3-TB06
For long distances	 LL3-TA01	-40 °C - +100 °C	5308128	■ 800 ¹⁾	■ 720 ¹⁾	■ 570 ¹⁾	■ 1800 ¹⁾	■ 1500 ¹⁾
				■ 2500 ²⁾	■ 2250 ²⁾	■ 1800 ²⁾	■ 4000 ²⁾	■ 4000 ²⁾
				■ 4000 ³⁾	■ 3600 ³⁾	■ 2880 ³⁾	■ 4000 ³⁾	■ 4000 ³⁾
				■ 4000 ⁴⁾	■ 3600 ⁴⁾	■ 2880 ⁴⁾	■ 4000 ⁴⁾	■ 4000 ⁴⁾
				■ 4000 ⁵⁾	■ 3600 ⁵⁾	■ 2880 ⁵⁾	■ 4000 ⁵⁾	■ 4000 ⁵⁾
	 LL3-TA01S	-40 °C - +100 °C	5326461	■ 800 ¹⁾	■ 720 ¹⁾	■ 570 ¹⁾	■ 1800 ¹⁾	■ 1500 ¹⁾
				■ 2500 ²⁾	■ 2250 ²⁾	■ 1800 ²⁾	■ 4000 ²⁾	■ 4000 ²⁾
				■ 4000 ³⁾	■ 3600 ³⁾	■ 2880 ³⁾	■ 4000 ³⁾	■ 4000 ³⁾
				■ 4000 ⁴⁾	■ 3600 ⁴⁾	■ 2880 ⁴⁾	■ 4000 ⁴⁾	■ 4000 ⁴⁾
				■ 4000 ⁵⁾	■ 3600 ⁵⁾	■ 2880 ⁵⁾	■ 4000 ⁵⁾	■ 4000 ⁵⁾
	 LL3-TA02	-40 °C - +70 °C	5308129	■ 200 ¹⁾	■ 180 ¹⁾	■ 150 ¹⁾	■ 300 ¹⁾	-
				■ 650 ²⁾	■ 585 ²⁾	■ 460 ²⁾	■ 1000 ²⁾	-
				■ 1200 ³⁾	■ 1080 ³⁾	■ 860 ³⁾	■ 1800 ³⁾	-
				■ 2500 ⁴⁾	■ 2250 ⁴⁾	■ 1800 ⁴⁾	■ 3500 ⁴⁾	-
				■ 3600 ⁵⁾	■ 3240 ⁵⁾	■ 2600 ⁵⁾	■ 4000 ⁵⁾	-
	 LL3-TA03	-40 °C - +350 °C	5326462	■ 360 ¹⁾	■ 324 ¹⁾	■ 260 ¹⁾	■ 1200 ¹⁾	■ 1200 ¹⁾
				■ 2000 ²⁾	■ 1800 ²⁾	■ 1440 ²⁾	■ 4000 ²⁾	■ 4000 ²⁾
				■ 4000 ³⁾	■ 3600 ³⁾	■ 2880 ³⁾	■ 4000 ³⁾	■ 4000 ³⁾
				■ 4000 ⁴⁾	■ 3600 ⁴⁾	■ 2880 ⁴⁾	■ 4000 ⁴⁾	■ 4000 ⁴⁾
				■ 4000 ⁵⁾	■ 3600 ⁵⁾	■ 2880 ⁵⁾	■ 4000 ⁵⁾	■ 4000 ⁵⁾
	 LL3-TA04	-60 °C - +350 °C	5326463	■ 4000 ¹⁾	■ 3600 ¹⁾	■ 2880 ¹⁾	■ 4000 ¹⁾	■ 4000 ¹⁾
				■ 4000 ²⁾	■ 3600 ²⁾	■ 2880 ²⁾	■ 4000 ²⁾	■ 4000 ²⁾
				■ 4000 ³⁾	■ 3600 ³⁾	■ 2880 ³⁾	■ 4000 ³⁾	■ 4000 ³⁾
				■ 4000 ⁴⁾	■ 3600 ⁴⁾	■ 2880 ⁴⁾	■ 4000 ⁴⁾	■ 4000 ⁴⁾
■ 4000 ⁵⁾				■ 3600 ⁵⁾	■ 2880 ⁵⁾	■ 4000 ⁵⁾	■ 4000 ⁵⁾	
 LL3-TA05	-60 °C - +300 °C	5326464	■ 250 ¹⁾	■ 225 ¹⁾	■ 180 ¹⁾	■ 250 ¹⁾	-	
			■ 800 ²⁾	■ 720 ²⁾	■ 570 ²⁾	■ 800 ²⁾	-	
			■ 1200 ³⁾	■ 1080 ³⁾	■ 860 ³⁾	■ 1200 ³⁾	-	
			■ 2400 ⁴⁾	■ 2160 ⁴⁾	■ 1700 ⁴⁾	■ 2400 ⁴⁾	-	
			■ 4000 ⁵⁾	■ 3600 ⁵⁾	■ 2880 ⁵⁾	■ 4000 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.

LL model name/sensing range (mm)						
LL3-TH01	LL3-TH08	LL3-TH10	LL3-TH11	LL3-TJ01	LL3-TK77	LL3-TR01
■ 500 ¹⁾	-	-	-	■ 750 ¹⁾	■ 2000 ¹⁾	■ 1800 ¹⁾
■ 1400 ²⁾	-	-	-	■ 2000 ²⁾	■ 4000 ²⁾	■ 4000 ²⁾
■ 2500 ³⁾	-	-	-	■ 2000 ³⁾	■ 4000 ³⁾	■ 4000 ³⁾
■ 4000 ⁴⁾	-	-	-	■ 2000 ⁴⁾	■ 4000 ⁴⁾	■ 4000 ⁴⁾
■ 4000 ⁵⁾	-	-	-	■ 2000 ⁵⁾	■ 4000 ⁵⁾	■ 4000 ⁵⁾
■ 500 ¹⁾	-	-	-	■ 650 ¹⁾	■ 2000 ¹⁾	■ 1800 ¹⁾
■ 1400 ²⁾	-	-	-	■ 2000 ²⁾	■ 4000 ²⁾	■ 4000 ²⁾
■ 2500 ³⁾	-	-	-	■ 2000 ³⁾	■ 4000 ³⁾	■ 4000 ³⁾
■ 4000 ⁴⁾	-	-	-	■ 2000 ⁴⁾	■ 4000 ⁴⁾	■ 4000 ⁴⁾
■ 4000 ⁵⁾	-	-	-	■ 2000 ⁵⁾	■ 4000 ⁵⁾	■ 4000 ⁵⁾
-	-	-	-	■ 200 ¹⁾	■ 300 ¹⁾	■ 200 ¹⁾
-	-	-	-	■ 600 ²⁾	■ 950 ²⁾	■ 900 ²⁾
-	-	-	-	■ 950 ³⁾	■ 1800 ³⁾	■ 1500 ³⁾
-	-	-	-	■ 1900 ⁴⁾	■ 3500 ⁴⁾	■ 3300 ⁴⁾
-	-	-	-	■ 4000 ⁵⁾	■ 4000 ⁵⁾	■ 4000 ⁵⁾
■ 1200 ¹⁾	■ 800 ¹⁾	■ 750 ¹⁾	■ 1000 ¹⁾	■ 600 ¹⁾	■ 600 ¹⁾	■ 800 ¹⁾
■ 2000 ²⁾	■ 2000 ²⁾	■ 2000 ²⁾	■ 2000 ²⁾	■ 2000 ²⁾	■ 2000 ²⁾	■ 2000 ²⁾
■ 4000 ³⁾	■ 4000 ³⁾	■ 2000 ³⁾	■ 2000 ³⁾	■ 2000 ³⁾	■ 4000 ³⁾	■ 4000 ³⁾
■ 4000 ⁴⁾	■ 4000 ⁴⁾	■ 2000 ⁴⁾	■ 2000 ⁴⁾	■ 2000 ⁴⁾	■ 4000 ⁴⁾	■ 4000 ⁴⁾
■ 4000 ⁵⁾	■ 4000 ⁵⁾	■ 2000 ⁵⁾	■ 2000 ⁵⁾	■ 2000 ⁵⁾	■ 4000 ⁵⁾	■ 4000 ⁵⁾
■ 4000 ¹⁾	■ 4000 ¹⁾	■ 2000 ¹⁾	■ 2000 ¹⁾	■ 2000 ¹⁾	■ 4000 ¹⁾	■ 4000 ¹⁾
■ 4000 ²⁾	■ 4000 ²⁾	■ 2000 ²⁾	■ 2000 ²⁾	■ 2000 ²⁾	■ 4000 ²⁾	■ 4000 ²⁾
■ 4000 ³⁾	■ 4000 ³⁾	■ 2000 ³⁾	■ 2000 ³⁾	■ 2000 ³⁾	■ 4000 ³⁾	■ 4000 ³⁾
■ 4000 ⁴⁾	■ 4000 ⁴⁾	■ 2000 ⁴⁾	■ 2000 ⁴⁾	■ 2000 ⁴⁾	■ 4000 ⁴⁾	■ 4000 ⁴⁾
■ 4000 ⁵⁾	■ 4000 ⁵⁾	■ 2000 ⁵⁾	■ 2000 ⁵⁾	■ 2000 ⁵⁾	■ 4000 ⁵⁾	■ 4000 ⁵⁾
■ 160 ¹⁾	■ 170 ¹⁾	■ 100 ¹⁾	■ 150 ¹⁾	■ 200 ¹⁾	■ 200 ¹⁾	■ 160 ¹⁾
■ 450 ²⁾	■ 550 ²⁾	■ 300 ²⁾	■ 400 ²⁾	■ 600 ²⁾	■ 600 ²⁾	■ 550 ²⁾
■ 800 ³⁾	■ 800 ³⁾	■ 600 ³⁾	■ 700 ³⁾	■ 950 ³⁾	■ 950 ³⁾	■ 850 ³⁾
■ 1500 ⁴⁾	■ 1600 ⁴⁾	■ 1100 ⁴⁾	■ 1400 ⁴⁾	■ 1900 ⁴⁾	■ 1900 ⁴⁾	■ 1700 ⁴⁾
■ 4000 ⁵⁾	■ 4000 ⁵⁾	■ 2000 ⁵⁾	■ 4000 ⁵⁾	■ 4000 ⁵⁾	■ 4000 ⁵⁾	■ 4000 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.


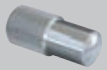

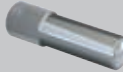

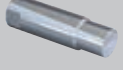





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Suitable for proximity systems

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

Tip adapters for proximity systems

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

SICK SIC

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Fits 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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Fiber-optic sensors and fibers

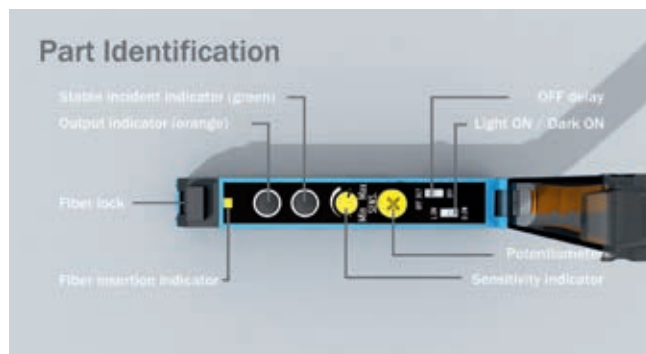
<p>Product family overview</p>	<p>88</p>
<p> WLL170-2 Versatility for standard applications</p>	<p>90</p>
<p> WLL180T A global leader when it comes to sensing range and performance</p>	<p>96</p>

Product family overview

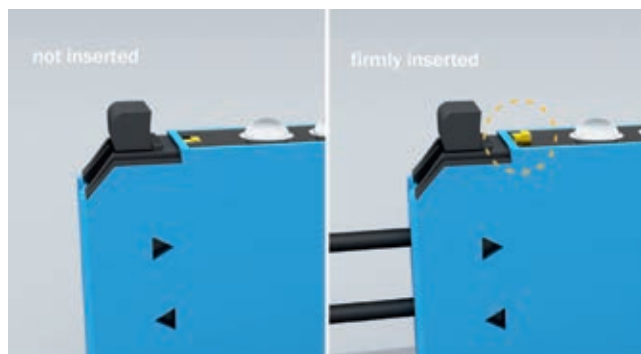
		
	WLL170-2	WLL180T
	Versatility for standard applications	A global leader when it comes to sensing range and performance
Technical data overview		
Housing material	Plastic	Plastic
Type of light	Visible red/green light	Visible red light/infrared
Enclosure rating	IP 66	IP 50
Adjustment	Potentiometer, 10 revolutions, teach-in button, cable	Teach-in button, cable, increment button +/- manual
Response time	≤ 0.25 ms, ≤ 50 μs	≤ 2 ms, ≤ 8 ms, ≤ 16 μs, ≤ 70 μs, ≤ 250 μs
Sensing range button	160 mm	1400 mm
Sensing range, through-beam	700 mm	20 m
Output signal switching device	Light/dark-switching	Light/dark-switching
Indicator	LED	Display
At a glance		
		
	<ul style="list-style-type: none"> • Rapid response time (50 μs) • Switching threshold adjustment via potentiometer, or teach-in via button or cable • 4 different teach-in modes • Simple installation • Red or green LED emitter 	<ul style="list-style-type: none"> • Selectable response time up to 16 μs • Sensing range up to 20 m, sensing distance up to 1400 mm • Bus-compatible with anti-interference • 2 x 4-digit digital display • Adjustable hysteresis • Rotatable display • High-resolution signal processing • Programmable time delays
Detailed information	→ 90-95	→ 96-100

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The versatile WLL170-2



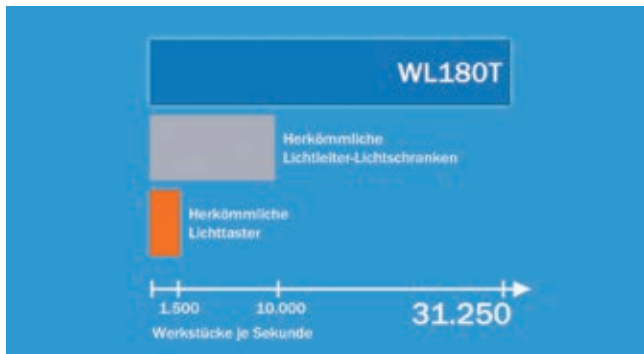
Easy to operate fiber-optic sensor. Simple adjustment via potentiometer or teach-in button.



The devices are optimized for the individual applications:

- Standard applications
- High speed applications (50 μs)
- Easy contrast detection with green LED emitter

The high-performance WLL180T



The world's fastest fiber-optic sensor in its class with a 16 μ s response time. It reliably detects up to 31,250 workpieces per second.



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.



- Easy reading guaranteed: The 7-segment display can be turned upside down in difficult installation conditions
- Up to 16 devices can be synchronized in bus mode. This prevents mutual interference (anti-interference) in the case of closely mounted fiber-optic heads.



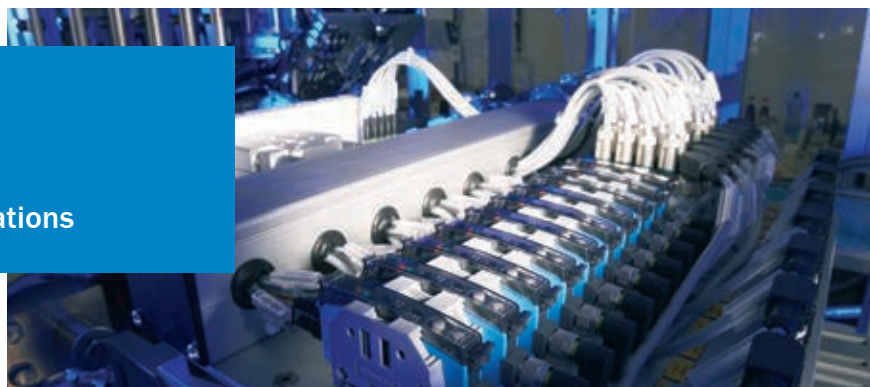
The copy function simplifies commissioning. All settings are copied to the other bus devices at the touch of a button.



The plug/socket design means installation on a mounting rail is extremely easy

- All connected WLL180T sensors can be individually set 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.
- 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 enables flexible settings for detection of complex objects.
- Anti-blooming function to prevent overload.

Versatility for standard applications



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Product description

This fiber-optic sensor with its simple operating system is ideal for standard applications as well as when rapid response times are crucial. WLL170(T) variants which are optimized for diverse specific applications, such as detection of the smallest of objects, color marks or transparent objects, are available: The WLL170T-2 with teach-in featuring automatic switching threshold adjustment via button or cable, or the WLL170-2 with manual switching threshold

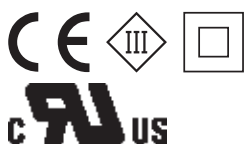
adjustment via potentiometer. Both models are available in a high-speed version with a switching frequency of 10 kHz for extremely fast response times. For optimum detection of color contrasts, you can choose between devices with a red or green LED emitter. Detection tasks are handled securely and reliably using the LL3 series of fibers.

At a glance

- Rapid response time (50 µs)
- Switching threshold adjustment via potentiometer, or teach-in via button or cable
- 4 different teach-in modes
- Simple installation
- Red or green LED emitter

Your Benefits

- Reliable, rapid process detection
- Low installation costs due to short commissioning time
- The optimum setting for every application thanks to a variety of teach-in modes
- Emitted light ideal for color or contrast detection
- Easy to operate fiber-optic sensor thanks to setting via potentiometer and switch



Additional information

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Adjustments 94

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Connection type and diagram 95

Recommended accessories 104

Detailed technical data

	WLL170-2	WLL170T-2
Sensor type	Fiber-optic sensor	
Dimensions (W x H x D)	10.5 mm x 35.5 mm x 83.7 mm	
Max. sensing range	0 m ... 4 m, through-beam system ¹⁾	0 m ... 3.50 m, through-beam system ¹⁾
Sensing range	0 m ... 0.16 m, proximity system ²⁾ 0 m ... 0.70 m, through-beam system ³⁾ (depends on type)	0 m ... 0.16 m, proximity system ²⁾ 0 m ... 0.70 m, through-beam system ³⁾
Housing design (light emission)	Cuboid	
Light sender ⁴⁾	LED	
Type of light	Visible red/green light (depends on type)	
Wavelength	Visible red light Green light	660 nm 660 nm
Sensitivity control	Potentiometer, 10 rotations ⁵⁾	Teach-in button/teach-in button, Cable (depends on type)
Adjustment of operating distance	-	Teach-in button/teach-in button, Cable (depends on type)
Teach-in	-	Yes
Time type	Off delay	
Delay time	Can be selected via sliding switch: ≤ 40 ms	
Display	LED	

¹⁾ LL3-TB02 and tip adapter LL3-TA01.

²⁾ Object with 90% remission (based on DIN 5033 white standard), sensing distance depends on fibers.

³⁾ LL3-TB01.

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

⁵⁾ Scale: 270°.

Mechanics/electronics

	WLL170-2	WLL170T-2
Supply voltage ¹⁾	10 V DC ... 30 V DC	
Residual ripple ²⁾	10 %	
Power consumption ³⁾	≤ 30 mA	
Output signal switching device	PNP, light/dark-switching, can be selected via light/dark switch, open collector NPN, light/dark-switching, can be selected via light/dark switch, open collector (depends on type)	
Output current I _{max.}	≤ 100 mA	
Response time	2,000 Hz 10,000 Hz	≤ 0.25 ms ⁴⁾ ≤ 50 μs ⁴⁾
Switching frequency	≤ 0.25 ms < 50 μs	2,000 Hz ⁵⁾ 10,000 Hz ⁵⁾
Aperture angle ⁶⁾	Approx. 65°	
Connection type	Cable, 3-wire, 2 m, PVC, 0.2 mm ² , 3.8 mm ⁷⁾ Plug M8, 3-pin Plug M8, 4-pin (depends on type)	Cable, 4-wire, 2 m, PVC, 0.2 mm ² ⁷⁾ Cable, 4-wire, 5 m, PVC, 0.2 mm ² ⁷⁾ Plug M8, 3-pin Plug M8, 4-pin (depends on type)
Circuit protection	A ⁸⁾ , B ⁹⁾ , C ¹⁰⁾ , D ¹¹⁾	
Protection class	III	
Housing material	ABS/PC	ABS



	WLL170-2	WLL170T-2
Enclosure rating ¹²⁾	IP 66	
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⁾ With light/dark ratio 1:1.

⁶⁾ See LL3 fiber data.

⁷⁾ Do not bend below 0 °C.

⁸⁾ A = U_v connections reverse polarity protected.

⁹⁾ B = Inputs and output reverse polarity protected.

¹⁰⁾ C = Suppression of interfering pulses.

¹¹⁾ D = Outputs overcurrent and short-circuit protected.

¹²⁾ With correctly attached LL3 fibers and closed protection hood.

Ordering information

WLL170-2

- **Adjustment:** Potentiometer, 10 revolutions (scale: 270°)

Type of light	Response time	Max. sensing range ¹⁾	Switching type	Connection	Model name	Part no.
Visible red light	≤ 0.25 ms	0 mm ... 4,000 mm, through-beam system	PNP	Cable, 3-wire, 2 m	WLL170-2P132	6029511
				Plug M8, 3-pin	WLL170-2P330	6029513
				Plug M8, 4-pin	WLL170-2P430	6029514
			NPN	Cable, 3-wire, 2 m	WLL170-2N132	6029515
				Plug M8, 3-pin	WLL170-2N330	6029517
				Plug M8, 4-pin	WLL170-2N430	6029518
	< 50 μs	0 mm ... 1,600 mm, through-beam system	PNP	Cable, 3-wire, 2 m	WLL170-2P162	6029527
				Plug M8, 3-pin	WLL170-2P360	6029529
				Plug M8, 4-pin	WLL170-2P460	6029530
			NPN	Cable, 3-wire, 2 m	WLL170-2N162	6029531
				Plug M8, 3-pin	WLL170-2N360	6029533
				Plug M8, 4-pin	WLL170-2N460	6029534
Green light	≤ 0.25 ms	0 mm ... 1,700 mm, through-beam system	PNP	Cable, 3-wire, 2 m	WLL170-2P192	6029519
				Plug M8, 3-pin	WLL170-2P390	6029521
				Plug M8, 4-pin	WLL170-2P490	6029522
			NPN	Cable, 3-wire, 2 m	WLL170-2N192	6029523
				Plug M8, 3-pin	WLL170-2N390	6029525
				Plug M8, 4-pin	WLL170-2N490	6029526

¹⁾ LL3-TB02 and tip adapter LL3-TA01.

WLL170T-2

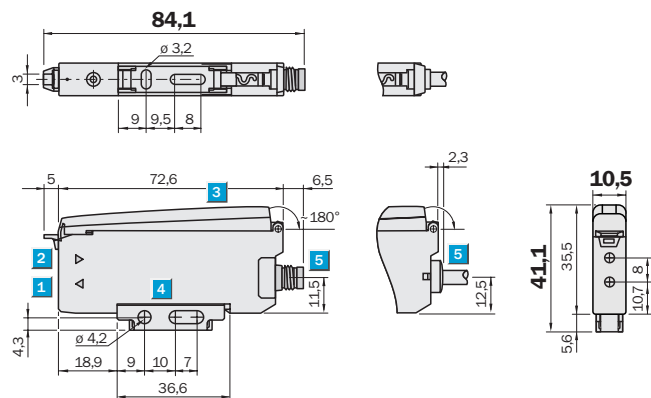
Type of light	Response time	Max. sensing range ¹⁾	Adjustment	Switching type	Connection	Model name	Part no.
Visible red light	≤ 0.25 ms	0 mm ... 3,500 mm, through-beam system	Teach-in button	PNP	Plug M8, 3-pin	WLL170T-2P330	6033949
				NPN	Plug M8, 3-pin	WLL170T-2N330	6033952
			Teach-in button, cable	PNP	Cable, 4-wire, 2 m	WLL170T-2P132	6033948
					Cable, 4-wire, 5 m	WLL170T-2P135	6036328
					Plug M8, 4-pin	WLL170T-2P430	6033950
	< 50 µs	0 mm ... 1,500 mm, through-beam system	Teach-in button	PNP	Cable, 4-wire, 2 m	WLL170T-2N132	6033951
				NPN	Plug M8, 4-pin	WLL170T-2N430	6033953
			Teach-in button, cable	PNP	Plug M8, 3-pin	WLL170T-2P360	6033964
				NPN	Plug M8, 3-pin	WLL170T-2N360	6033961
				PNP	Cable, 4-wire, 2 m	WLL170T-2P162	6033963
Green light	≤ 0.25 ms	0 mm ... 1,600 mm, through-beam system	Teach-in button	PNP	Plug M8, 3-pin	WLL170T-2P390	6033955
				NPN	Plug M8, 3-pin	WLL170T-2N390	6033958
			Teach-in button, cable	PNP	Cable, 4-wire, 2 m	WLL170T-2P192	6033954
					Plug M8, 4-pin	WLL170T-2P490	6033956
				NPN	Cable, 4-wire, 2 m	WLL170T-2N192	6033957
				Plug M8, 4-pin	WLL170T-2N490	6033959	

¹⁾ LL3-TB02 and tip adapter LL3-TA01.



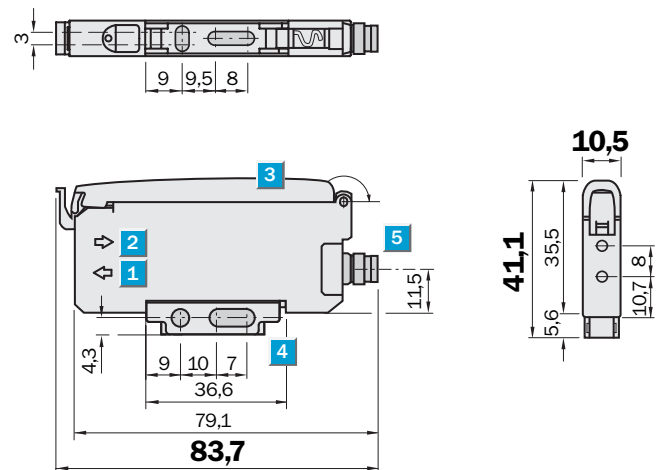
Dimensional drawings

WLL170-2



- ① LED emitter, installation of LL3 fibers (emitter fiber)
- ② Receiver, installation of LL3 fibers (receiver fiber)
- ③ Hinged protection hood
- ④ Mounting bracket, included
- ⑤ Connection

WLL170T-2



- ① LED emitter, installation of LL3 fibers (emitter fiber)
- ② Receiver, installation of LL3 fibers (receiver fiber)
- ③ Hinged protection hood
- ④ Mounting bracket, included
- ⑤ Connection

Dimensions in mm

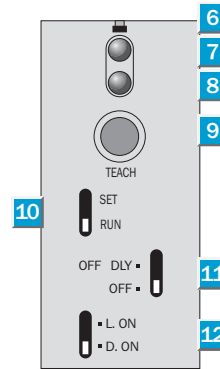
Adjustments

WLL170-2



- ⑥ Indicating pin correctly inserted LL3 fiber
- ⑦ LED indicator orange: Lights up when output signal switching device is active
- ⑧ Receive indicator green: Lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
- ⑨ Sensitivity scale 270°
- ⑩ Sensitivity control (10 revolutions)
- ⑪ OFF delay selector switch: "OFF DLY" (on)/"OFF" (off), 40 ms fixed
- ⑫ Selector switch: "L.ON" (light-switching/"D.ON" (dark-switching)

WLL170T-2



- ⑥ Indicating pin correctly inserted LL3 fiber
- ⑦ LED indicator orange: Lights up when output signal switching device is active
- ⑧ Receive indicator green: Lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
- ⑨ Teach-in button
- ⑩ Operating mode selector switch: "SET" (teach-in mode)/"RUN" (sensor mode)
- ⑪ OFF delay selector switch: "OFF DLY" (on)/"OFF" (off), 40 ms fixed
- ⑫ Selector switch: "L.ON" (light-switching/"D.ON" (dark-switching)

E

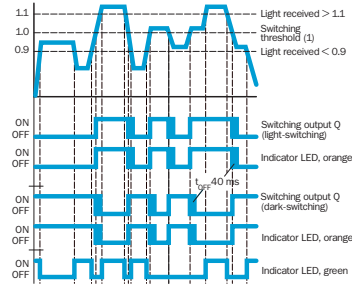
Function diagram

WLL170-2

■ WLL 170-2

Orange LED display: lights up if switching output Q is active. Dependent on setting of light/dark selector switch.

Green LED display: lights up if light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).



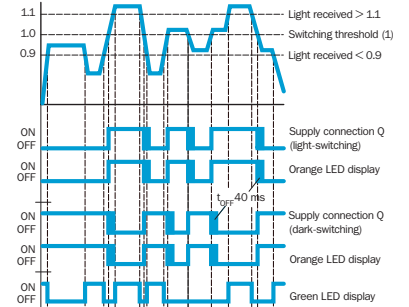
WLL170T-2

■ WLL170T-2 in sensor mode

Operating mode selector switch in RUN mode (after setting the switching threshold by means of Teach-in).

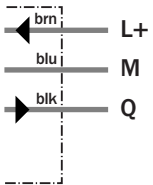
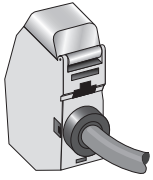
Orange LED display: lights up if supply connection Q is active. Dependent on setting of light/dark-selector switch.

Green LED display: lights up if light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).

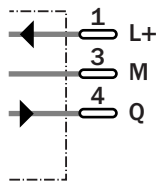
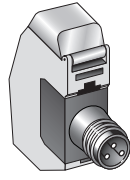


Connection type and diagram

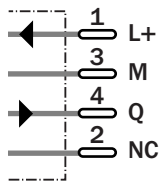
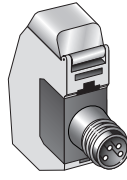
WLL170-2
cable, 3-wire



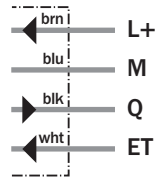
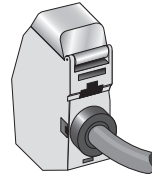
WLL170-2, WLL170T-2
plug M8, 3-pin



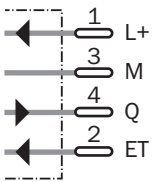
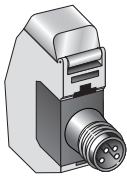
WLL170-2
plug M8, 4-pin



WLL170T-2
cable, 4-wire



WLL170T-2
plug M8, 4-pin



A global leader when it comes to sensing range and performance



E

Product description

The WLL180T provides the world's fastest response time - only 16 μ s. 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 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 μ s
- Sensing range up to 20 m, sensing distance up to 1.40 m
- Bus-compatible with anti-interference
- 2 x 4-digit digital display
- Adjustable hysteresis
- Rotatable display
- High-resolution signal processing
- Programmable time delays

Your Benefits

- Reliable, rapid process detection
- Workpieces are detected reliably even under the most difficult ambient conditions, such as dust, spray or mist
- Thanks to bus communication, closely mounted fiber-optic heads do not influence each other
- 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
- Tiny objects can be detected due to the high-resolution signal processing
- Time delays can be adjusted individually to suit the application



Additional information

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Adjustments 100

Connection type and diagram 100

Recommended accessories 104

Detailed technical data

	Visible red light	Infrared light ⁵⁾
Sensor type	Fiber-optic sensor	
Device type	Stand-alone Base unit ¹⁾ Expansion unit (depends on type)	Stand-alone
Dimensions (W x H x D)	10.5 mm x 34.6 mm x 71.9 mm	
Max. sensing range	0 m ... 20 m, through-beam system ²⁾	0 m ... 1 m, through-beam system ²⁾
Sensing range	0 m ... 1.40 m, proximity system ³⁾ 0 m ... 20 m, through-beam system ²⁾	0 m ... 0.40 m, proximity system ³⁾ 0 m ... 0.85 m, through-beam system ²⁾
Housing design (light emission)	Cuboid	
Light sender ⁴⁾	LED	
Type of light	Visible red light	Infrared light
Wavelength	650 nm	1,450 nm
Sensitivity control	Teach-in button, cable, increment button +/- manual	
Adjustment of operating distance	Teach-in button, cable, increment button +/- manual	
Teach-in	Menu-controlled	
Time type	Without time delay, off delay, on delay, on and off delay, one-shot	
Delay time	Programmable: 0 ms ... 9,999 ms	
Indicator	Display	

¹⁾ Up to 15 expansion units can be connected.

²⁾ Sensing range at response time 8 ms. Sensing range reduction with shorter response time (see tables LL3/WLL180T)

³⁾ Object with 90 % remission (based on standard white to DIN 5033). Sensing distance with 8 ms response time. Sensing distance reduction with shorter response time (see tables LL3/WLL180T).

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

⁵⁾ Only in conjunction with LL3-TW01/LL3-DW01.

Mechanics/electronics

	Visible red light	Infrared light
Supply voltage ¹⁾	12 V DC ... 24 V DC	
Residual ripple ²⁾	≤ 10%	
Power consumption ³⁾	≤ 50 mA	
Output signal switching device	PNP, light/dark-switching, can be selected manually, open collector NPN, light/dark-switching, can be selected manually, open collector (depends on type)	
Output current I _{max.}	≤ 100 mA	
Response time ⁴⁾	≤ 16 μs, ≤ 70 μs, ≤ 250 μs, ≤ 2 ms, ≤ 8 ms	
Switching frequency	31.2 kHz, 7.1 kHz, 2 kHz, 250 Hz, 62.5 Hz	
Aperture angle ⁵⁾	Approx. 65°	
Connection type ⁶⁾	Cable, 4-wire, 2 m, PVC, 0.2 mm ² Cable, 2-wire, 2 m, PVC, 0.2 mm ² Plug M8, 4-pin Plug M8, 3-pin (depends on type)	Plug M8, 4-pin
Circuit protection	A ⁷⁾ , B ⁸⁾ , C ⁹⁾ , D ¹⁰⁾	
Protection class	III	
Housing material	ABS/PC	



	Visible red light	Infrared light
Enclosure rating ¹¹⁾	IP 50	
Ambient temperature, operation ¹²⁾	-25 °C ... +55 °C -25 °C ... +55 °C (depends on type)	-25 °C ... +55 °C
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⁾ See LL3 fiber data.

⁶⁾ Do not bend below 0 °C.

⁷⁾ A = U_v connections reverse polarity protected.

⁸⁾ B = Inputs and output reverse polarity protected.

⁹⁾ C = Suppression of interfering pulses.

¹⁰⁾ D = Outputs overcurrent and short-circuit protected.

¹¹⁾ With correctly attached LL3 fibers and closed protection hood.

¹²⁾ Operating temperature fluctuates according to 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

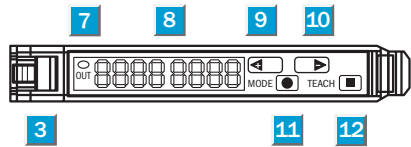
Visible red light

- **Type of light:** Visible red light
- **Adjustment:** Teach-in button, cable, increment button +/- manual
- **Max. sensing range:** 0 m to 20 m, through-beam system (sensing range at response time 8 ms. Sensing range reduction with shorter response time [see tables LL3/WLL180T].)

Device type	Output signal switching device	Connection	Model name	Part no.
Stand-alone	PNP	Cable, 4-wire, 2 m	WLL180T-P432	6039093
		Plug M8, 4-pin	WLL180T-P434	6039095
	NPN	Cable, 4-wire, 2 m	WLL180T-N432	6039094
		Plug M8, 4-pin	WLL180T-N434	6039096
Base unit ¹⁾	PNP	Cable, 4-wire, 2 m	WLL180T-M432	6039097
		Plug M8, 3-pin	WLL180T-M333	6042428
		Plug M8, 4-pin	WLL180T-M434	6039101
	NPN	Cable, 4-wire, 2 m	WLL180T-L432	6039099
		Plug M8, 4-pin	WLL180T-L434	6039103
		Plug M8, 4-pin	WLL180T-L434	6039103
Expansion unit	PNP	Cable, 2-wire, 2 m	WLL180T-F232	6039098
		Plug M8, 3-pin	WLL180T-F333	6042429
		Plug M8, 4-pin	WLL180T-F434	6039102
	NPN	Cable, 2-wire, 2 m	WLL180T-E232	6039100
		Plug M8, 4-pin	WLL180T-E434	6039104
		Plug M8, 4-pin	WLL180T-E434	6039104

¹⁾Up to 15 expansion units can be connected.

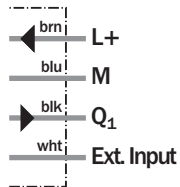
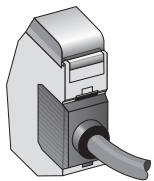
Adjustments



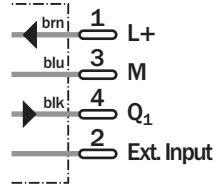
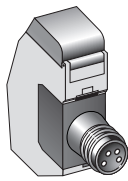
- ③ Fiber-optic locking mechanism
- ⑦ LED indicator orange: Lights up when output signal switching device is active
- ⑧ Numeric display 2 x 4-digit; green: switching threshold, operating mode; red: actual value, teach-in button and function parameter
- ⑨ Step button > (manual switching threshold: higher/next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

Connection type and diagram

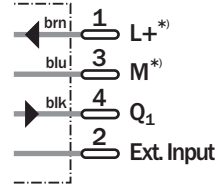
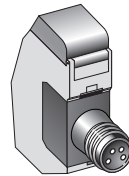
Stand-alone cable, 4-wire, 2 m



Stand-alone plug M8, 4-pin

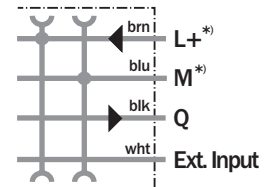
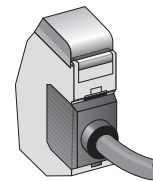


**Base/expansion unit plug M8, 3-pin
plug M8, 4-pin**



*) Only base unit

Expansion unit cable, 2-wire, 2 m



*) Only base unit

E



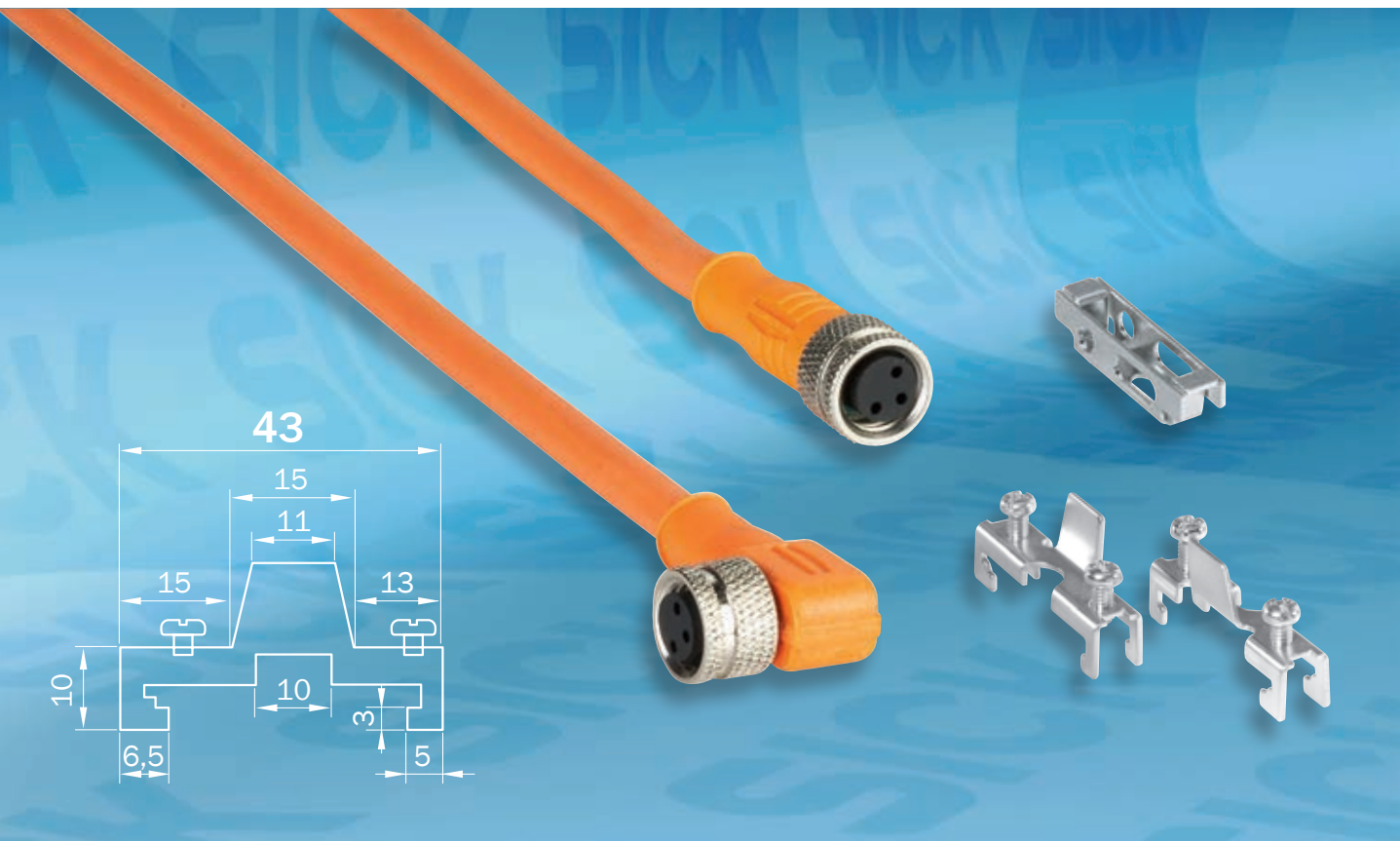
F

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.




F

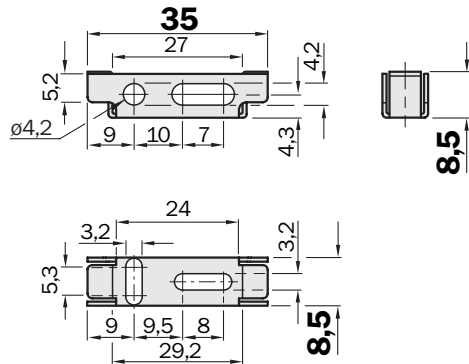
Appendix

Mounting systems/connectors	104
Fibers dimensional drawings	106
Index by part no.	138
Index by model name	140

Mounting brackets/plates

Figure	Mounting system type	Material	Model name	Part no.
	Mounting bracket	Steel, zinc-coated	BEF-WLL170	5306574

BEF-WLL170

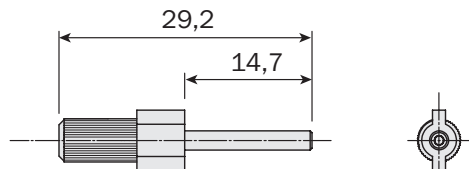


Adapter sleeves for fibers

Figure	Description	Model name	Part no.
-	Adapter sleeve for LL3 fibers, Ø 1,0 mm*	BF-WLL160-10	5305479
-	Adapter sleeve for LL3 fibers, Ø 1,3 mm*	BF-WLL160-13	5306094


* Included with LL3.

BF-WLL160-1x

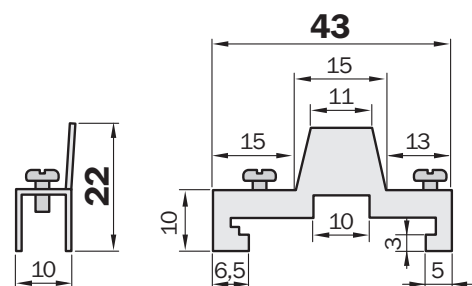


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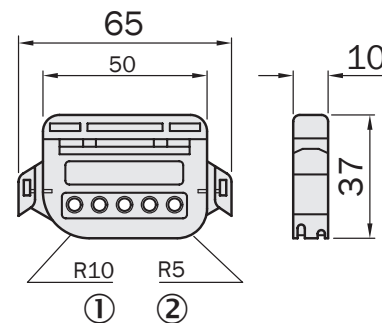
Other mounting accessories

Figure	Description	Model name	Part no.
	End cap for block installation on DIN-rail mounting 1	BF-EB01-W190	5313011
	Fiber-optic cutter	FC	5304141


BF-EB01-W190



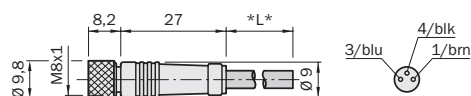
FC



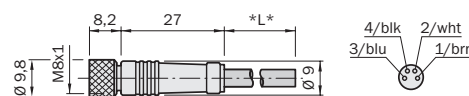
Plug connectors and cables

Figure	Plug type	Enclosure rating	Cable outlet	Connection	Sheath material	Length of cable	Model name	Part no.
	Cable socket	IP 67	Straight	Plug M8, 3-pin	PVC	2 m	DOL-0803-G02M	6010785
						5 m	DOL-0803-G05M	6022009
						10 m	DOL-0803-G10M	6022011
				Plug M8, 4-pin	PVC	2 m	DOL-0804-G02M	6009870
						5 m	DOL-0804-G05M	6009872
						10 m	DOL-0804-G10M	6010754
			Angled	Plug M8, 3-pin	PVC	2 m	DOL-0803-W02M	6008489
						5 m	DOL-0803-W05M	6022010
						10 m	DOL-0803-W10M	6022012
				Plug M8, 4-pin	PVC	2 m	DOL-0804-W02M	6009871
						5 m	DOL-0804-W05M	6009873
						10 m	DOL-0804-W10M	6010755

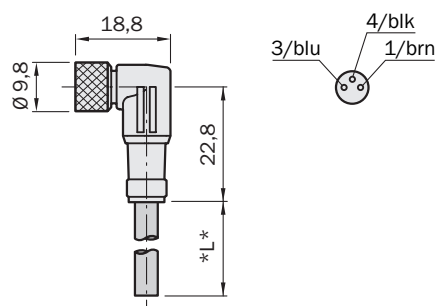
DOL-0803-GxxM



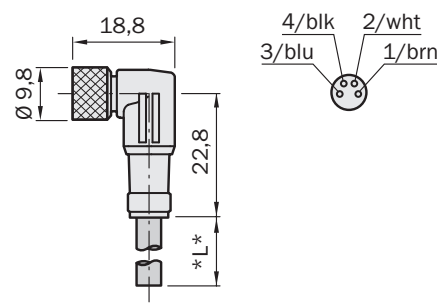
DOL-0804-GxxM



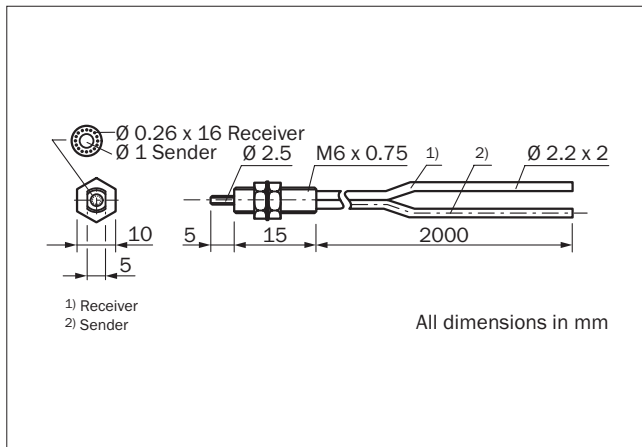
DOL-0803-WxxM



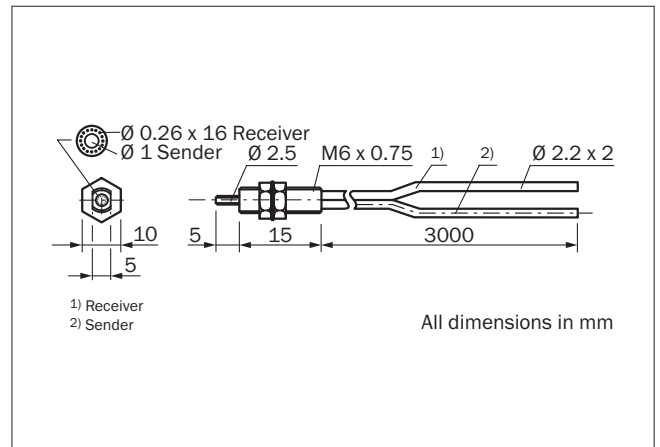
DOL-0804-WxxM



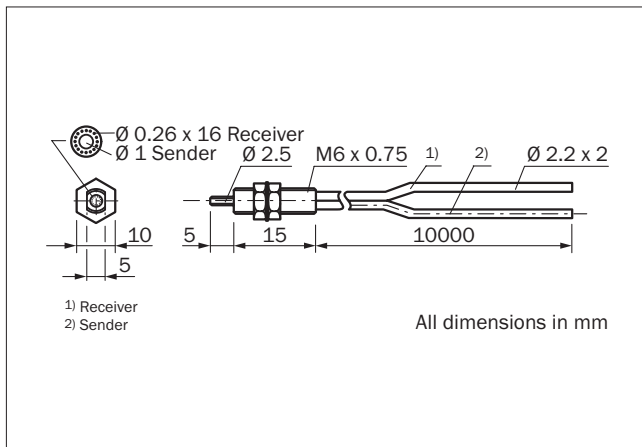
LL3-DB01



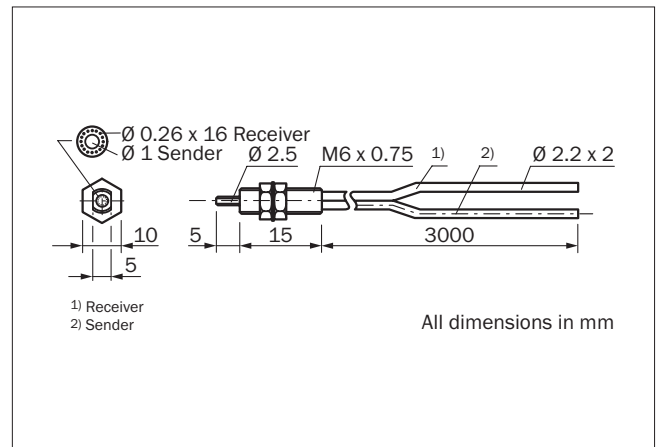
LL3-DB01-3



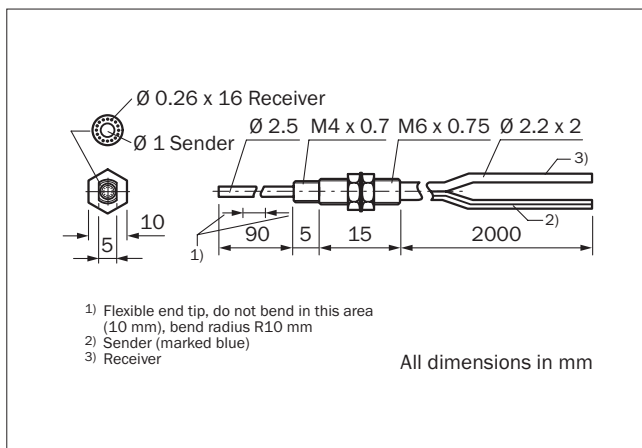
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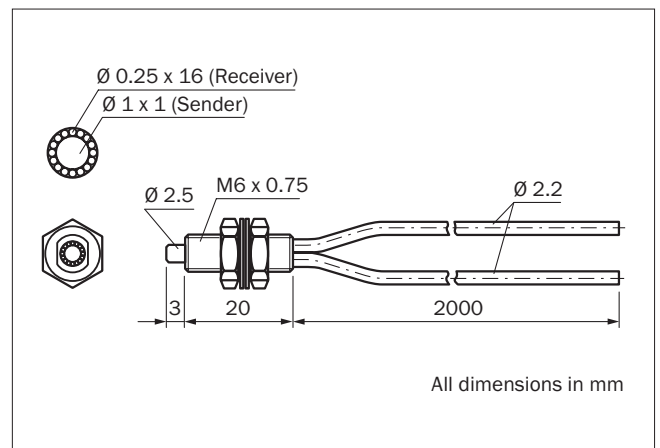
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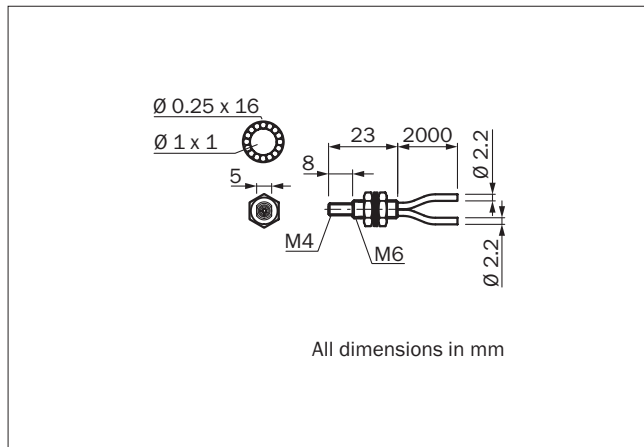
LL3-DB02



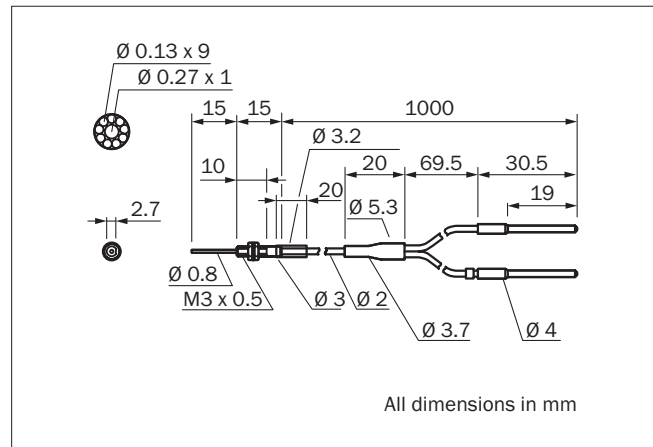
LL3-DB03



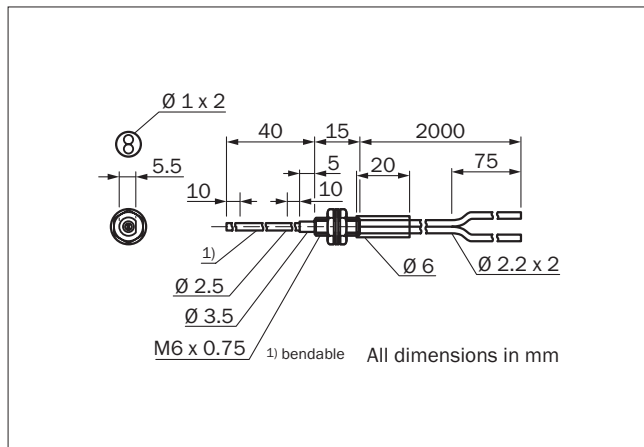
LL3-DB04



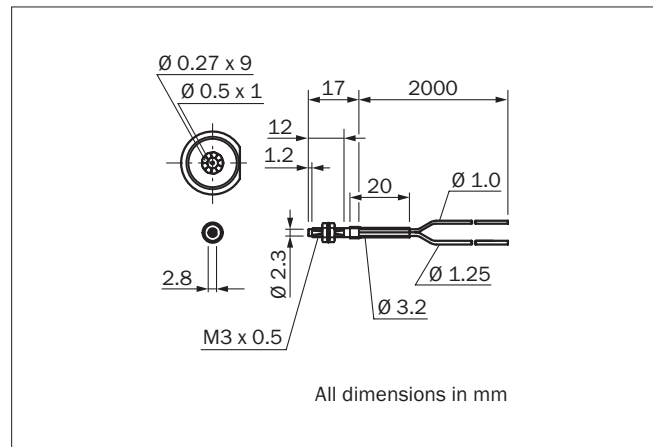
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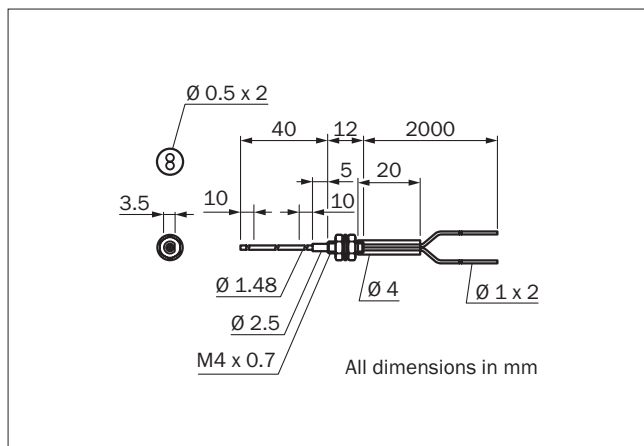
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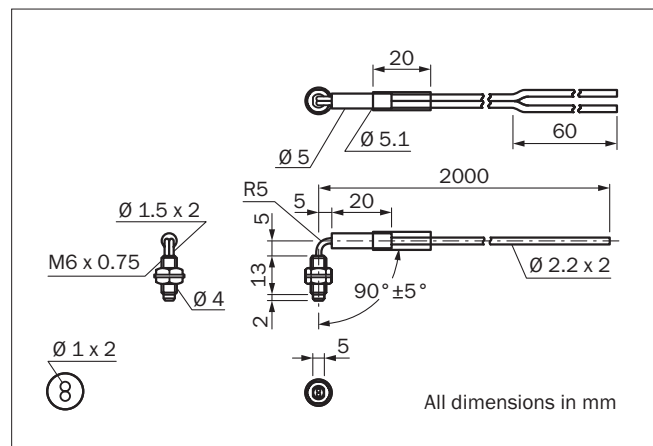
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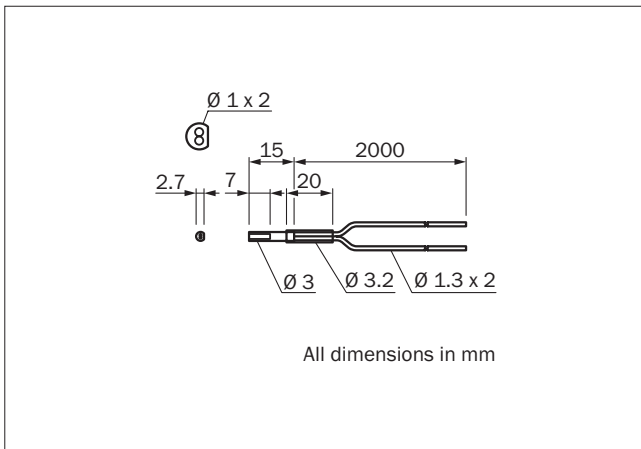
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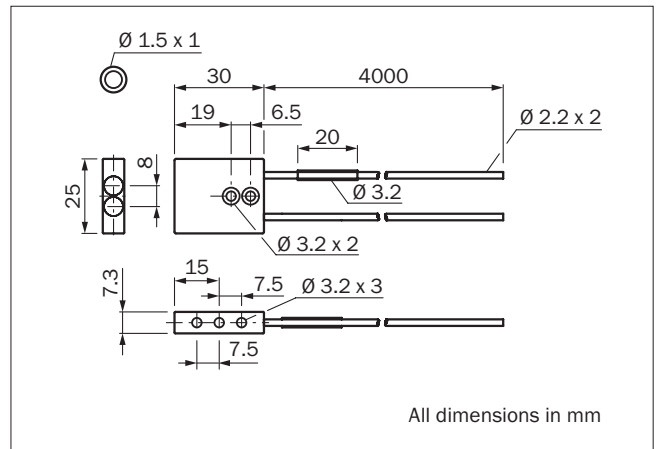
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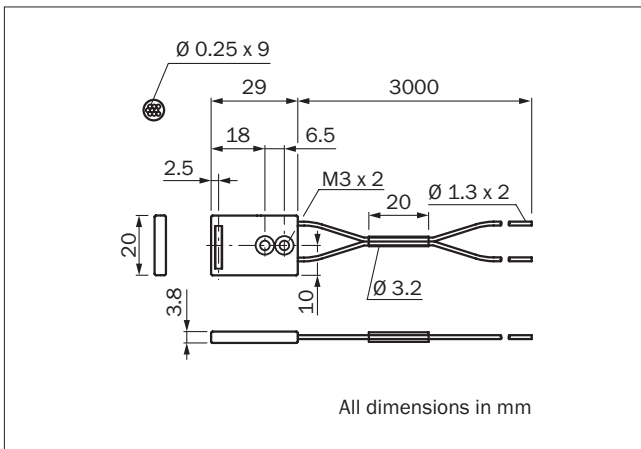
LL3-DB10



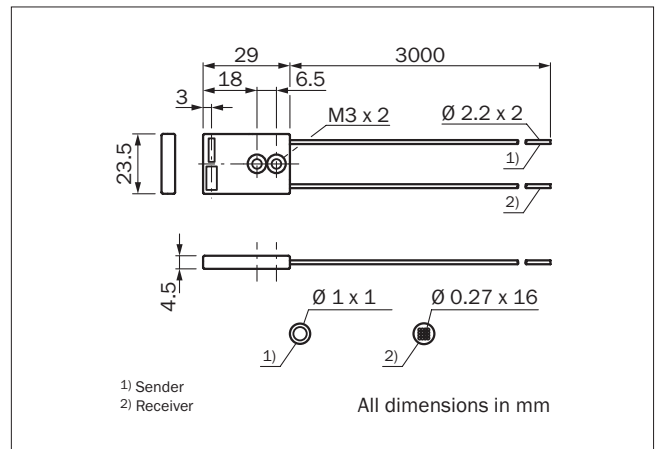
LL3-DC03



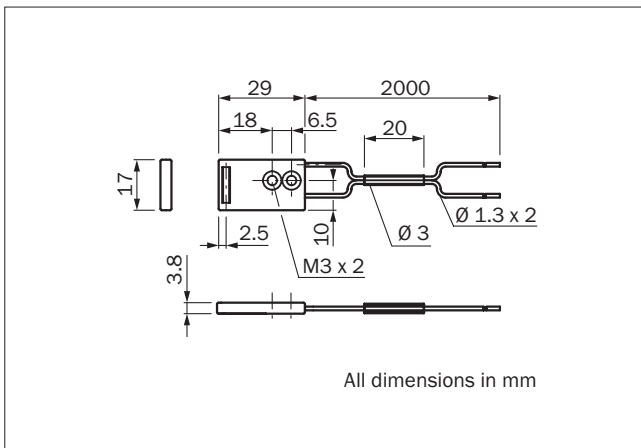
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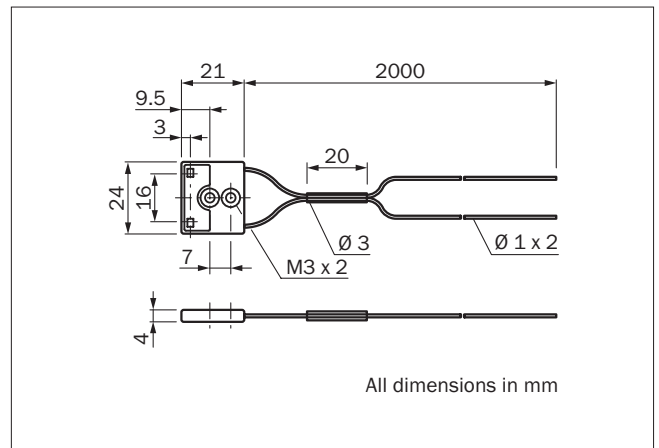
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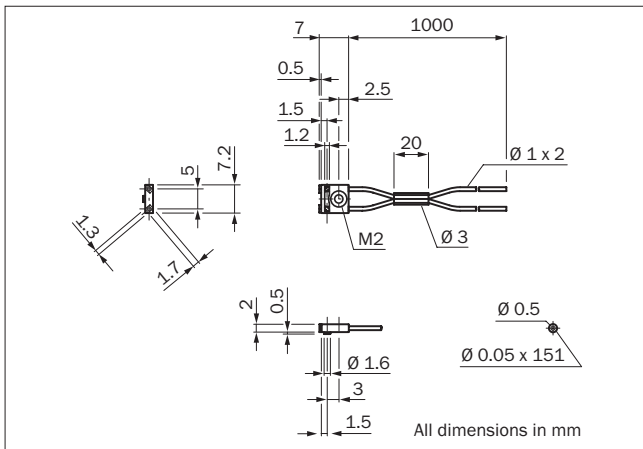
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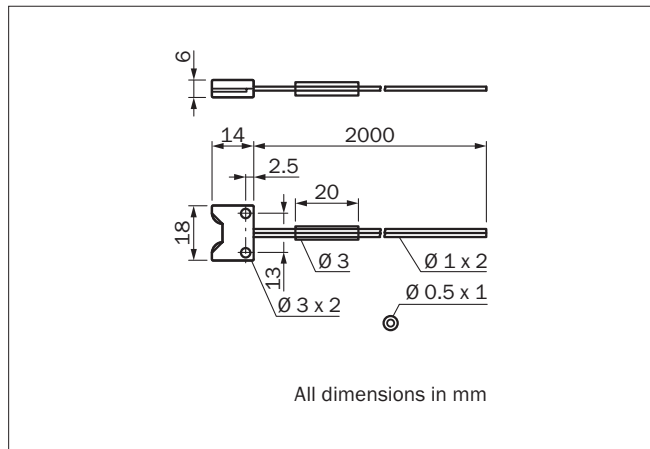
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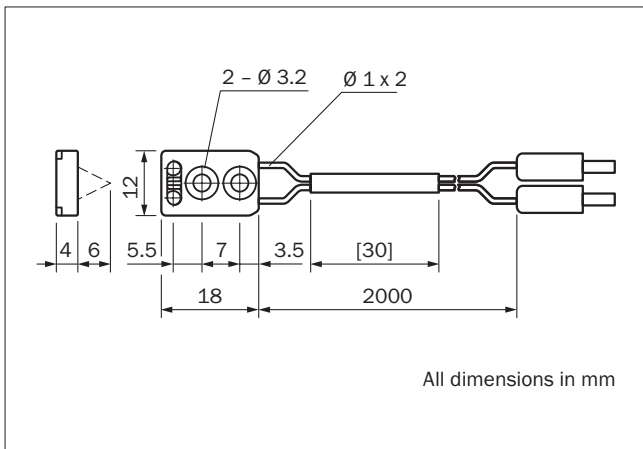
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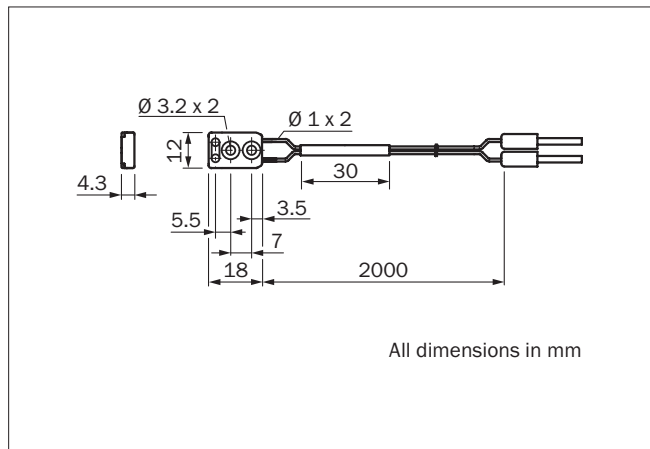
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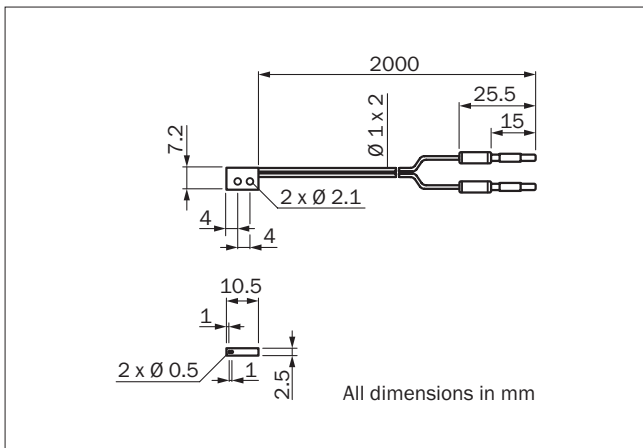
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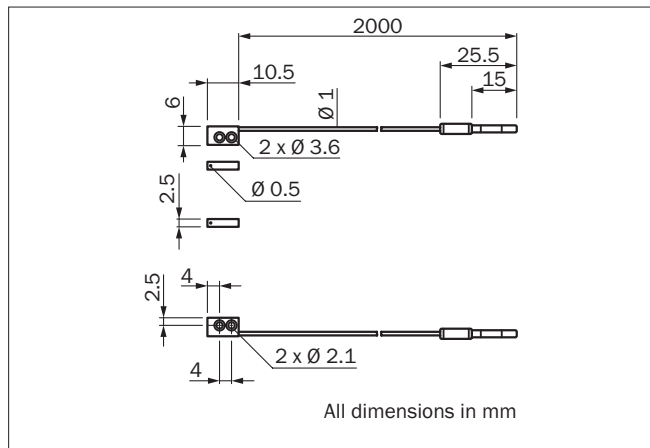
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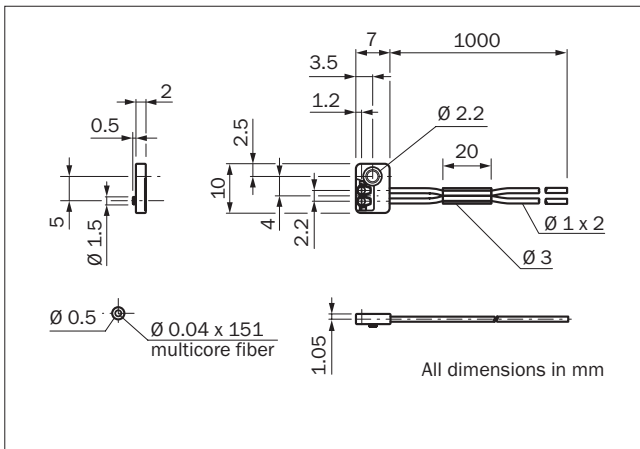
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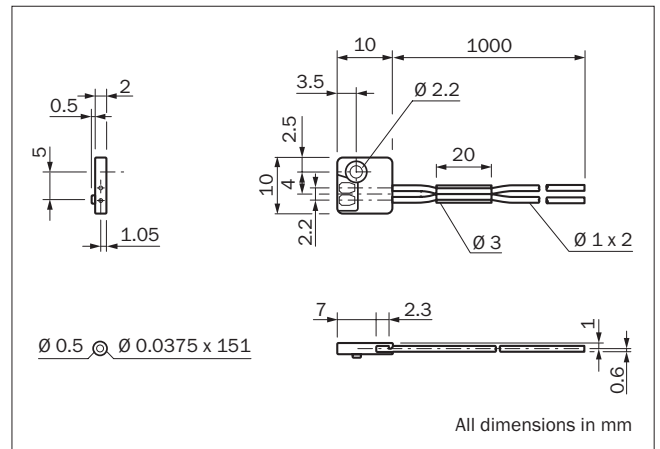
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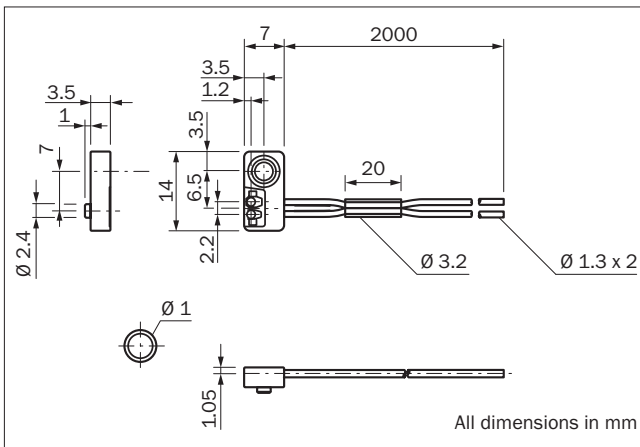
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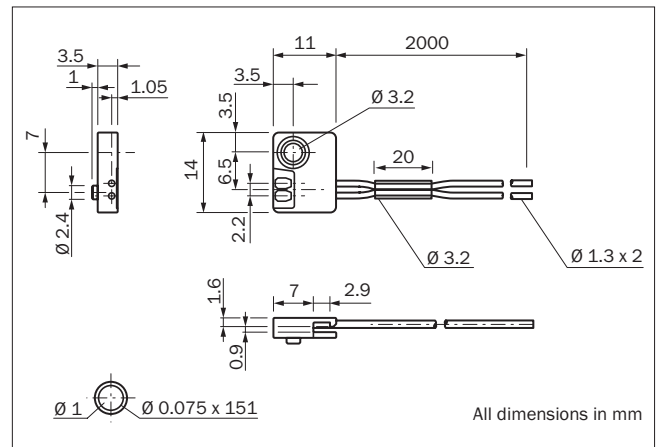
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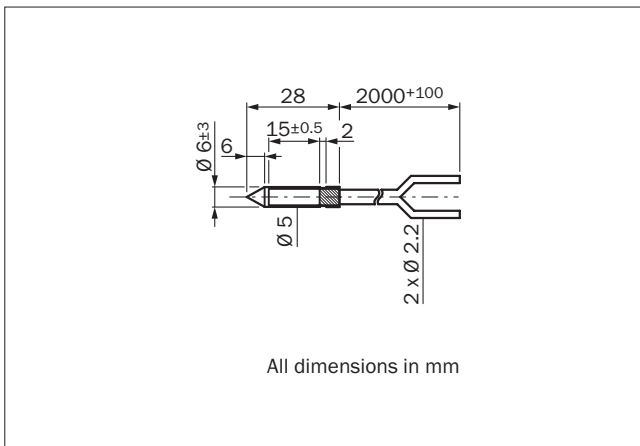
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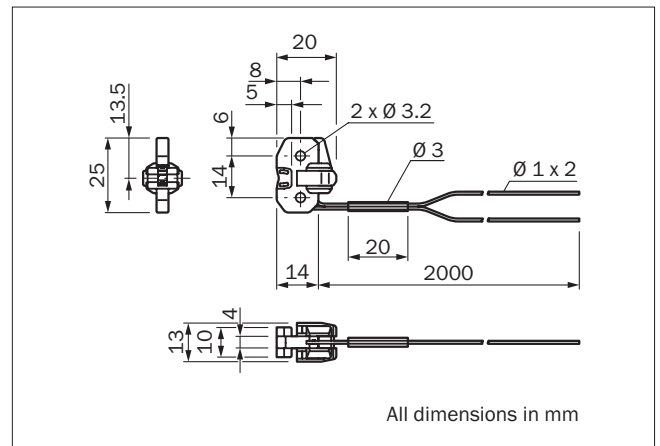
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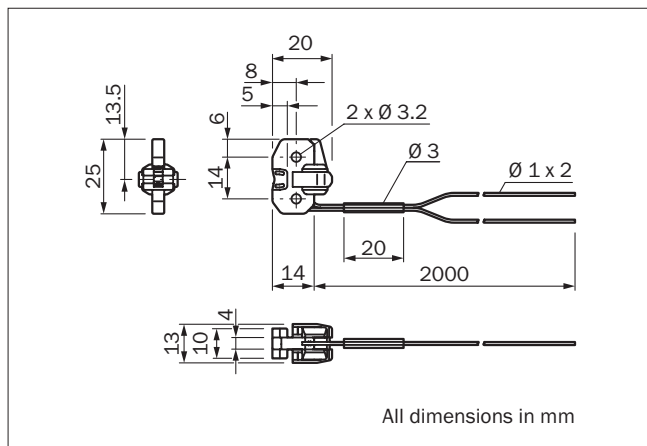


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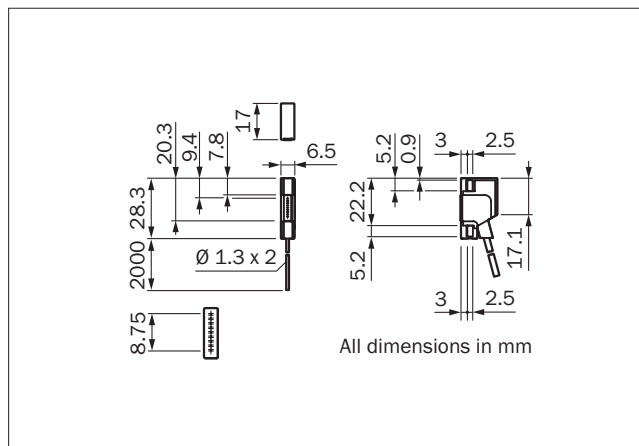


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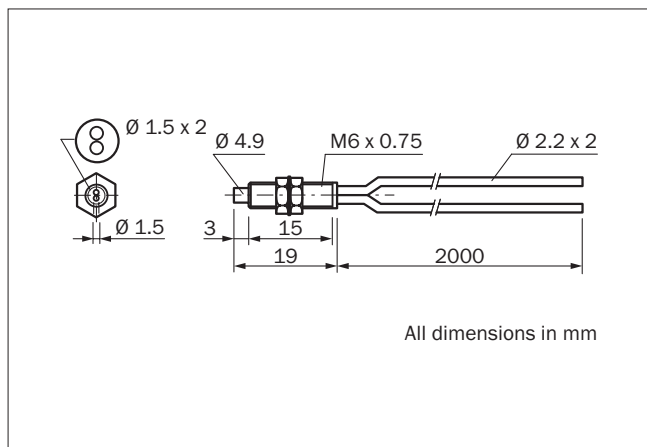
LL3-DF05



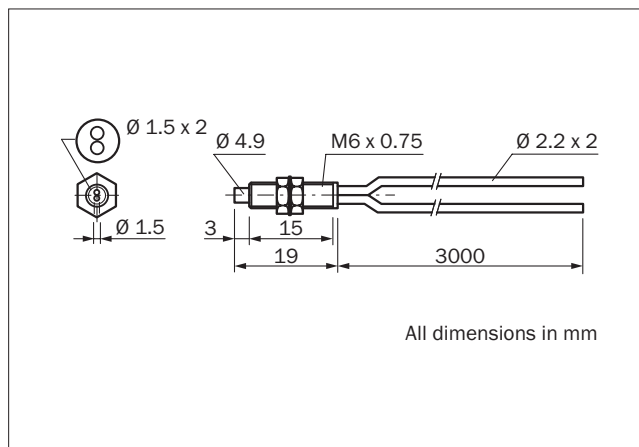
LL3-DF07



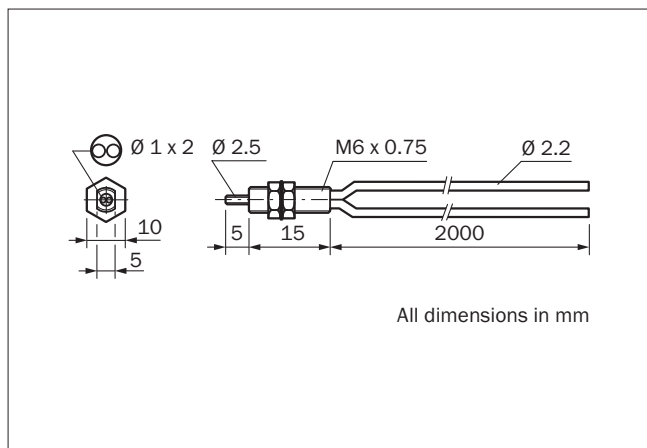
LL3-DH01



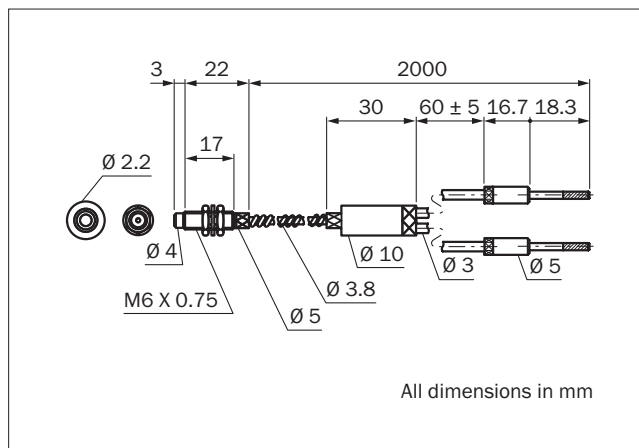
LL3-DH01-03



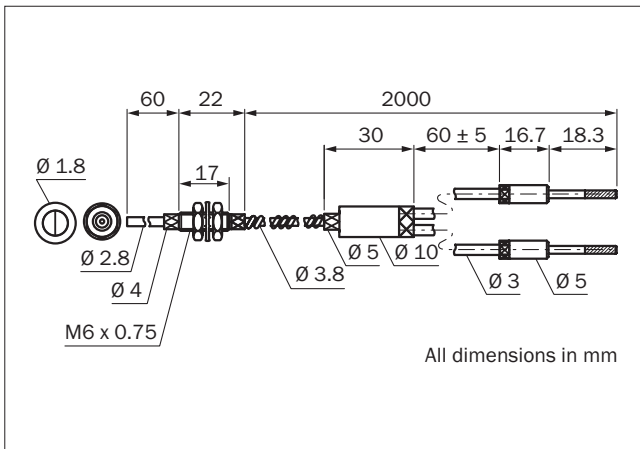
LL3-DH02



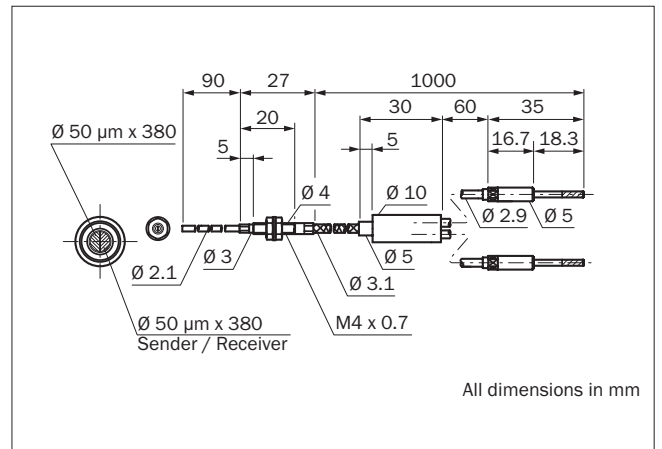
LL3-DH03



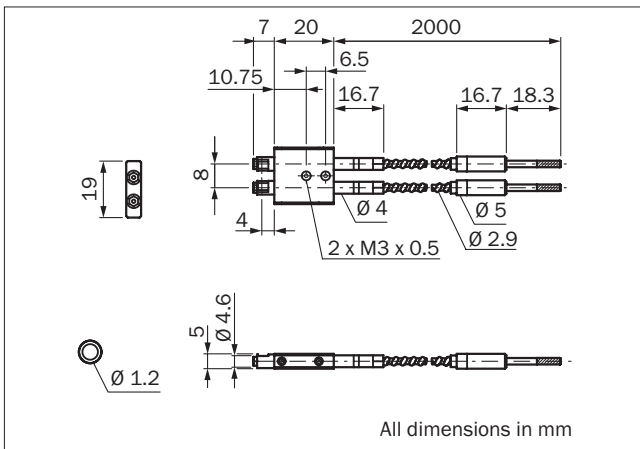
LL3-DH04



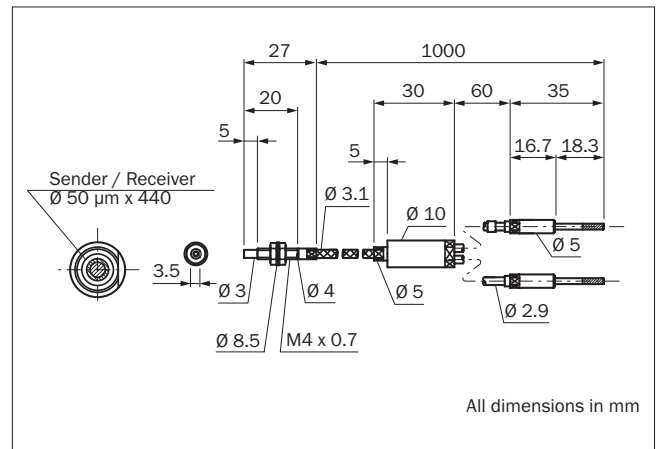
LL3-DH05



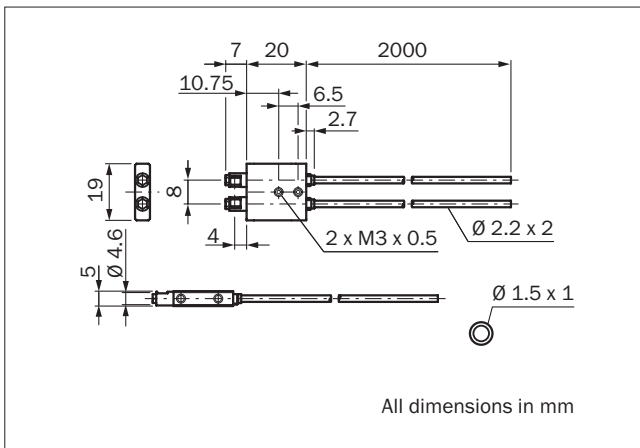
LL3-DH06



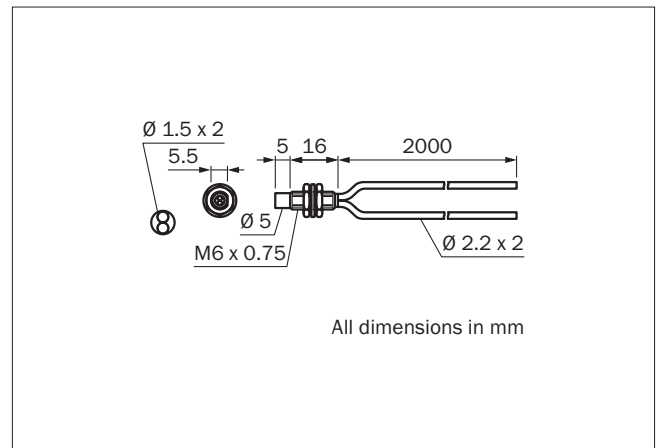
LL3-DH07



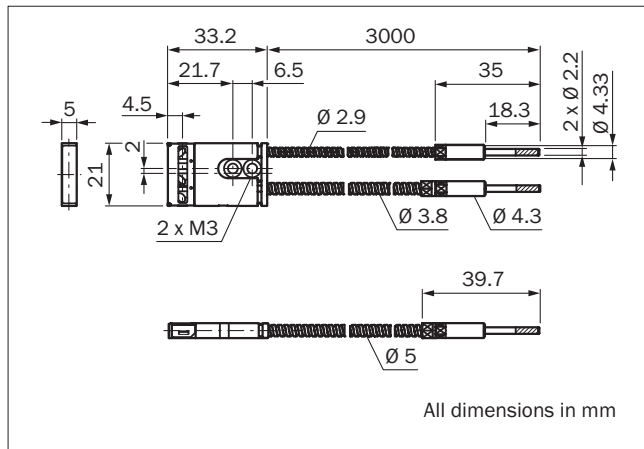
LL3-DH08



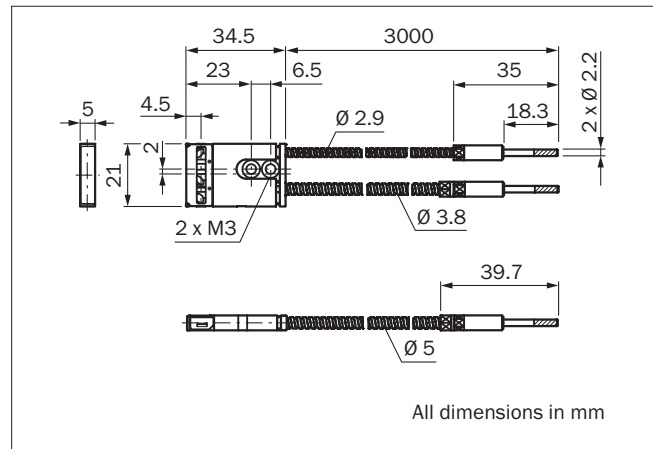
LL3-DH09



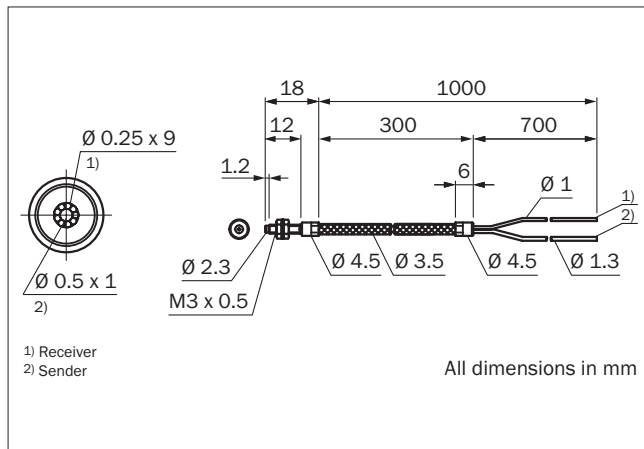
LL3-DH10



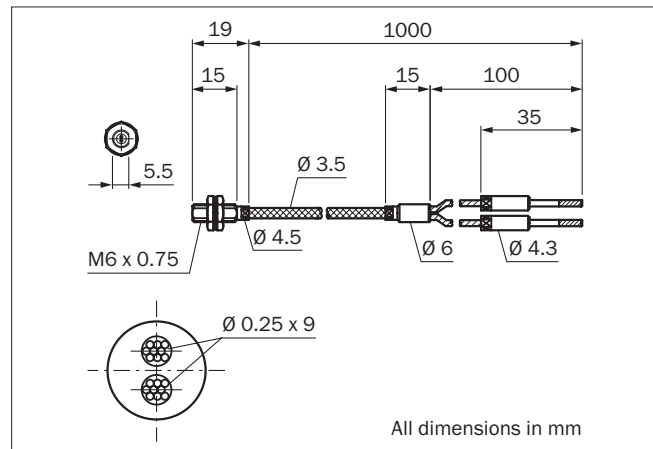
LL3-DH11



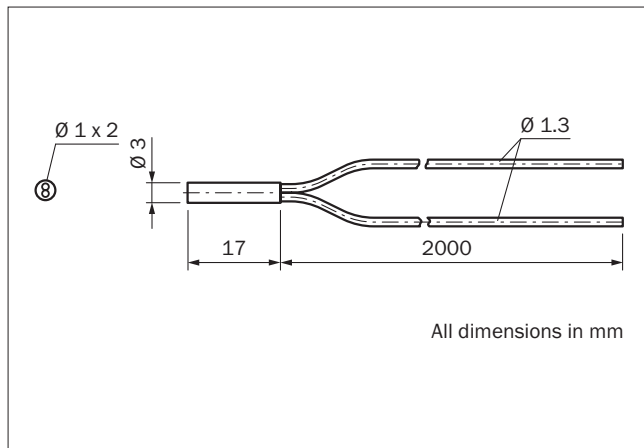
LL3-DJ01



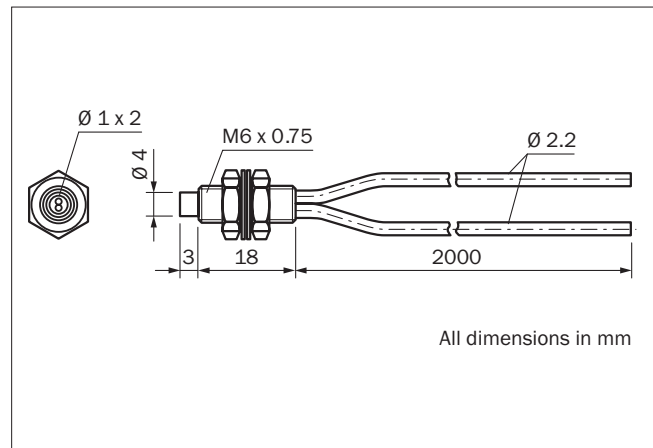
LL3-DJ02



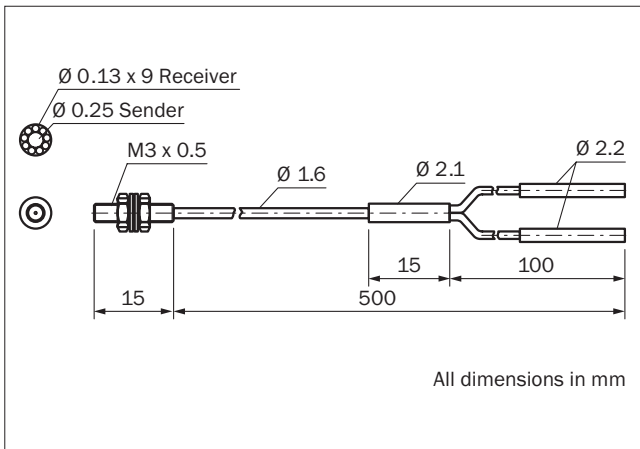
LL3-DK04



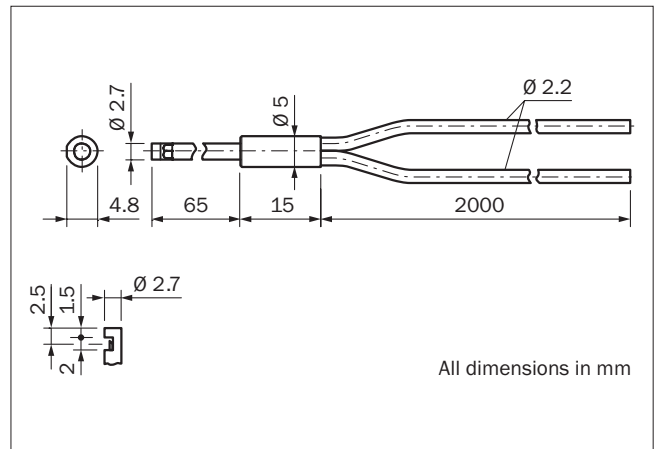
LL3-DK06



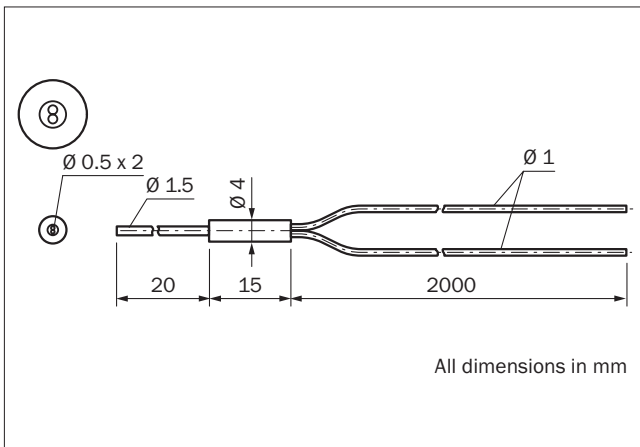
LL3-DK21



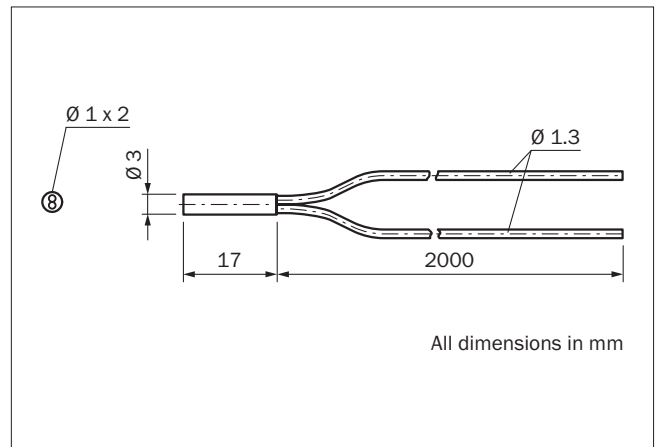
LL3-DK33



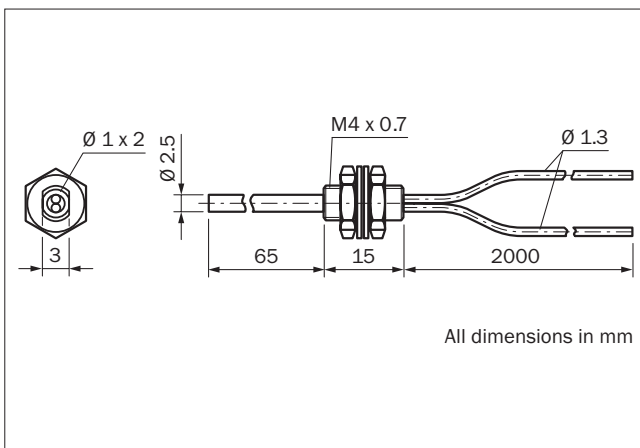
LL3-DK43



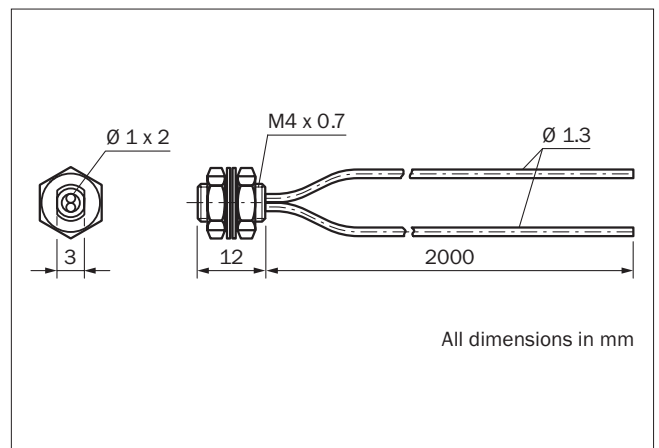
LL3-DK04Z



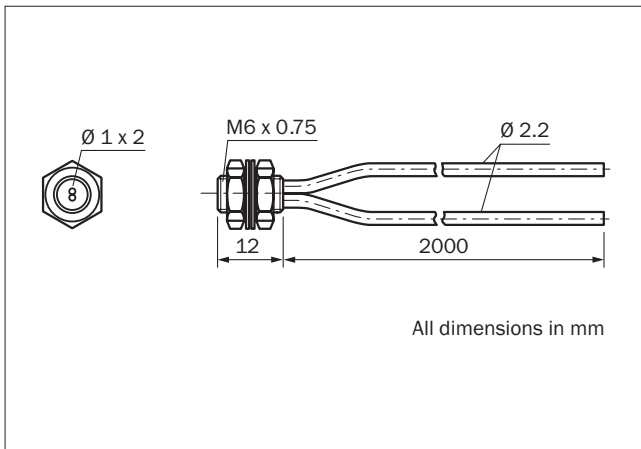
LL3-DK63Z



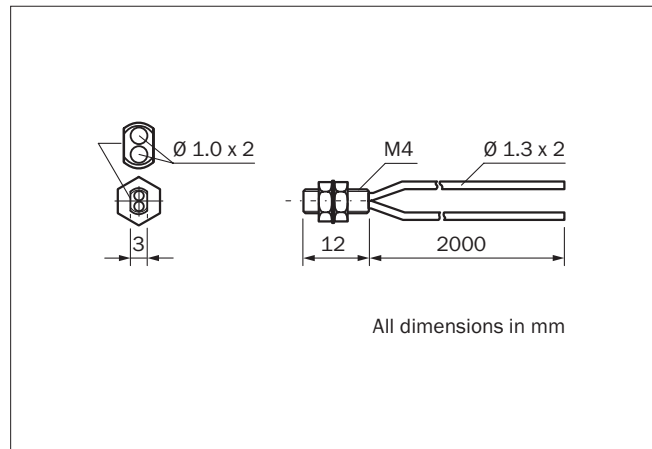
LL3-DK66



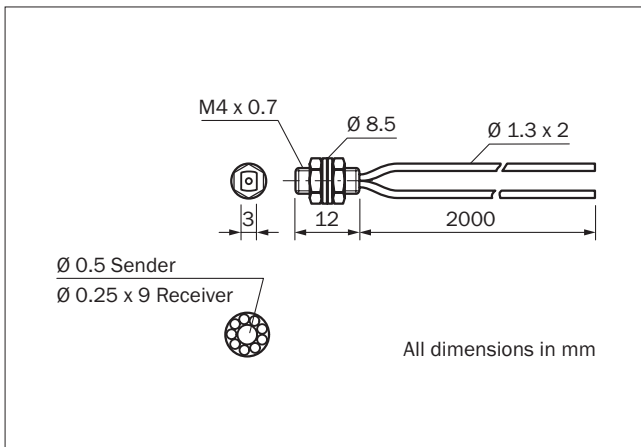
LL3-DK67



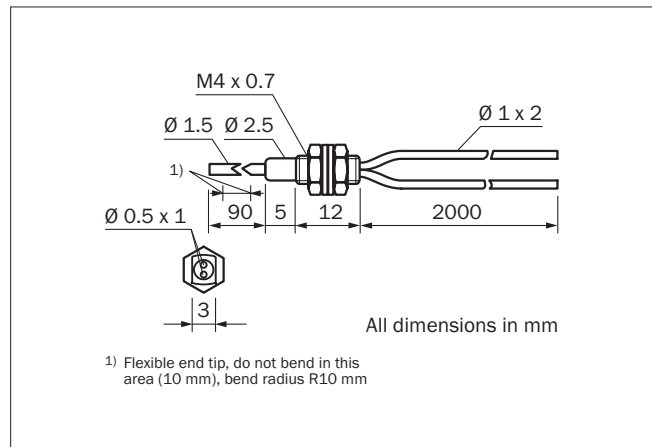
LL3-DM01



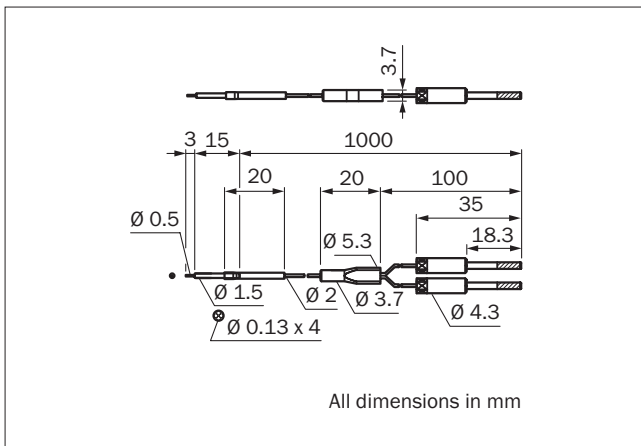
LL3-DM02



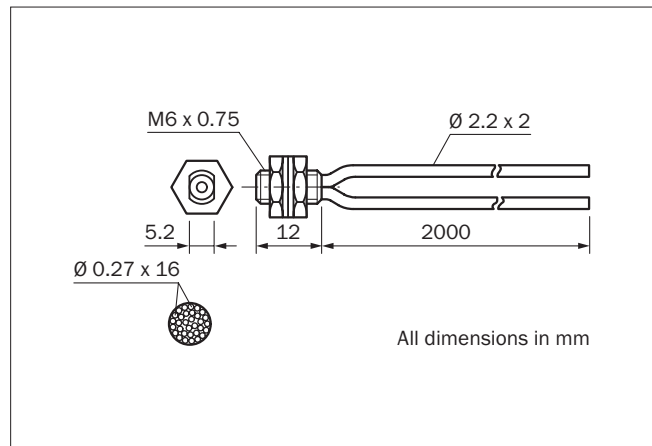
LL3-DM03



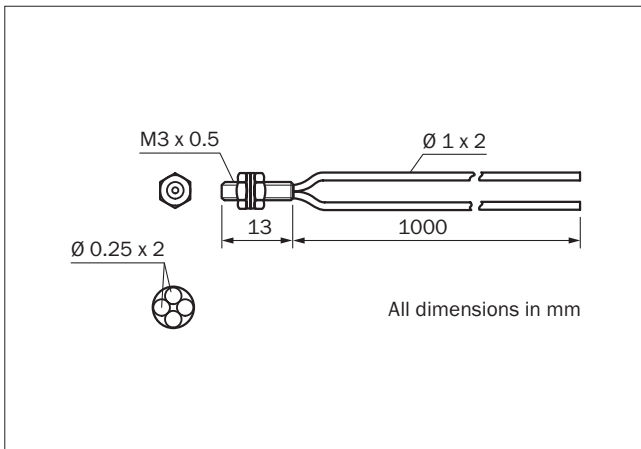
LL3-DP01



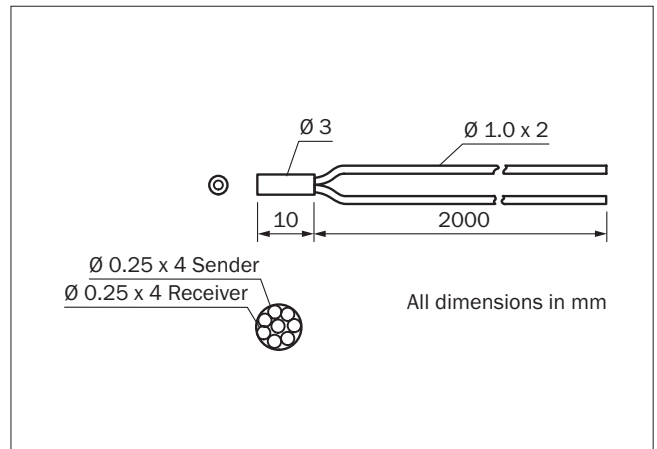
LL3-DR01



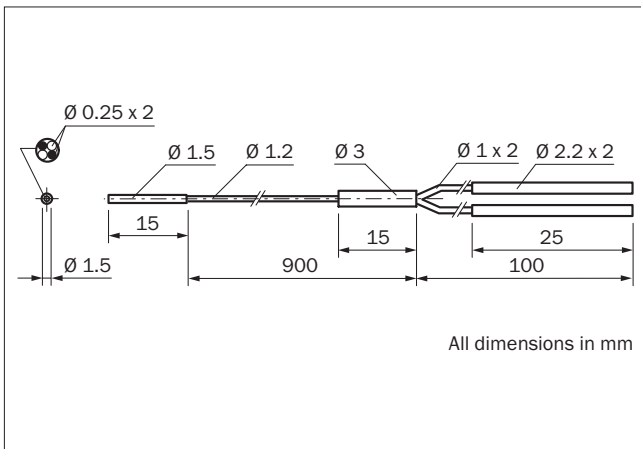
LL3-DR02



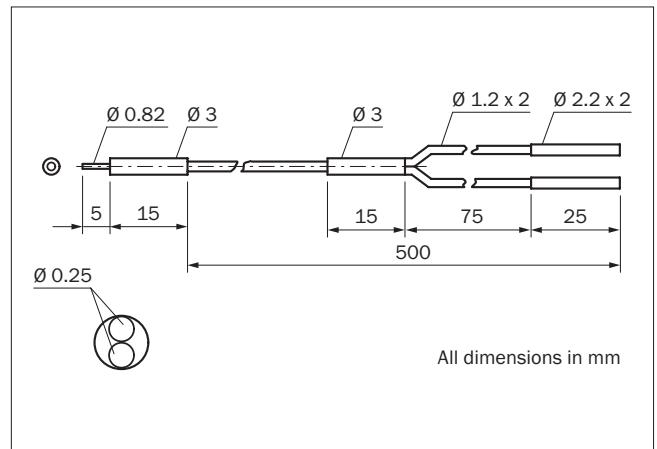
LL3-DR03



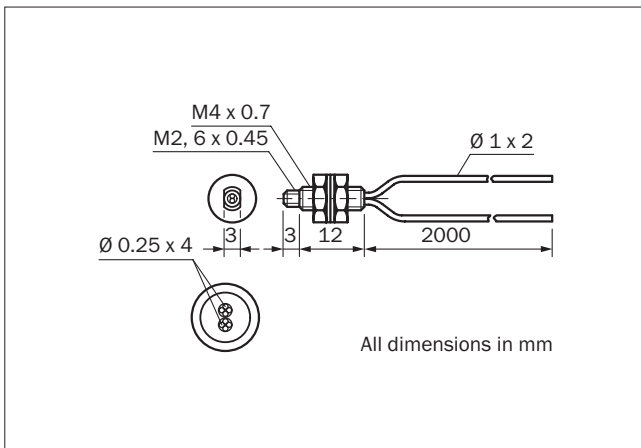
LL3-DR04



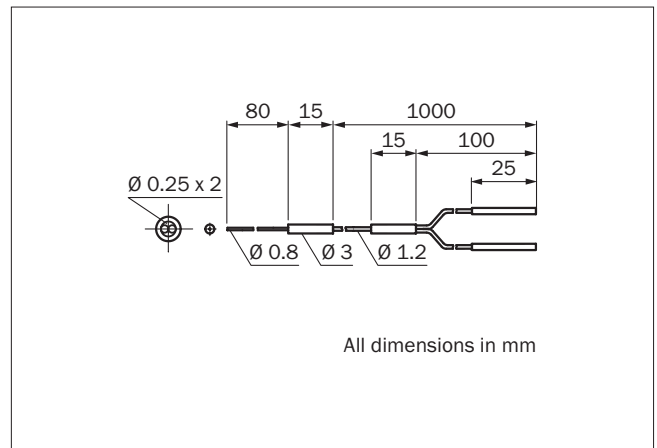
LL3-DR05



LL3-DR06

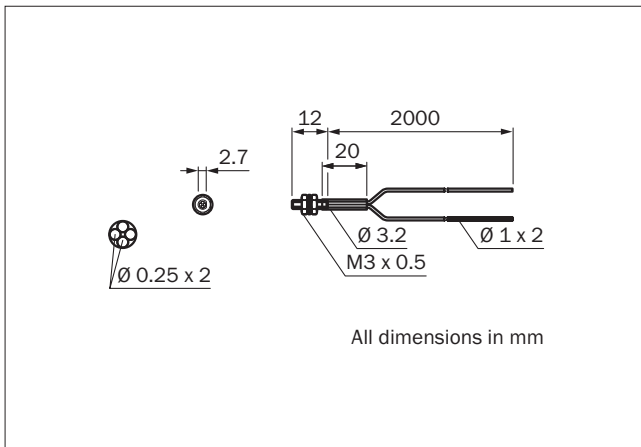


LL3-DR07

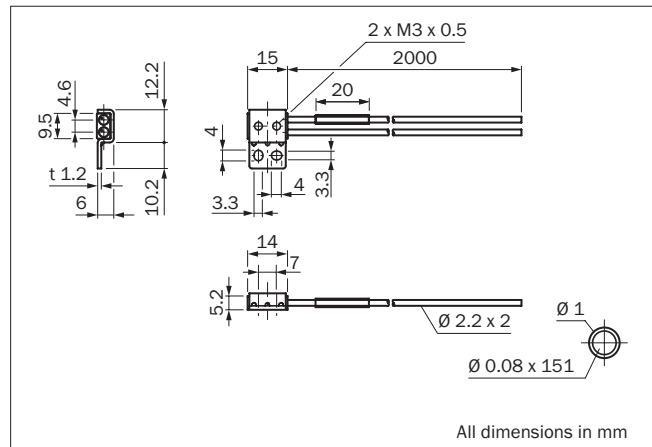


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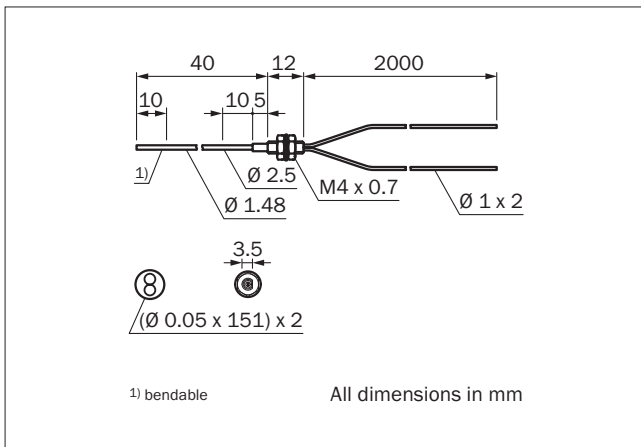
LL3-DR08



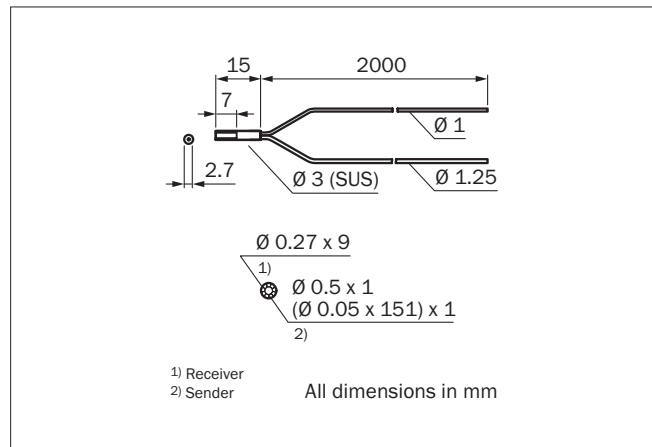
LL3-DR09



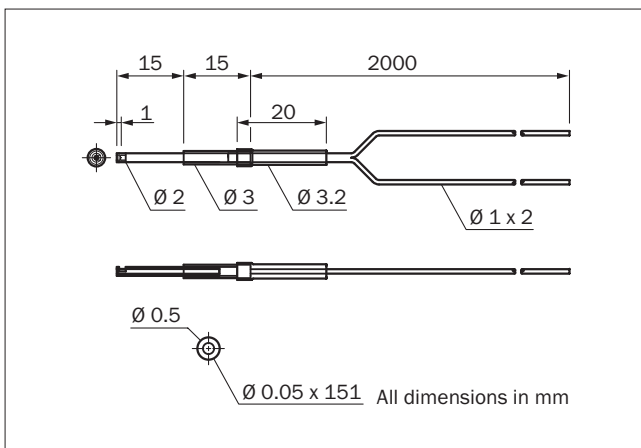
LL3-DR10



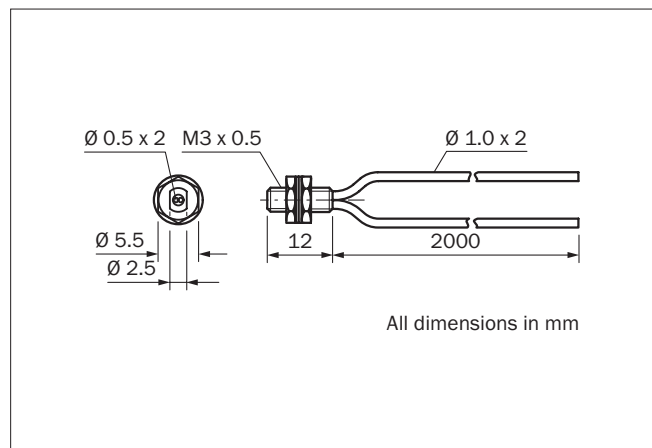
LL3-DR11



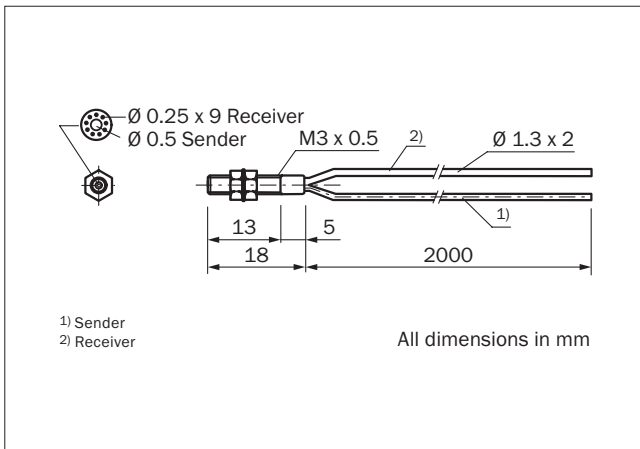
LL3-DR12



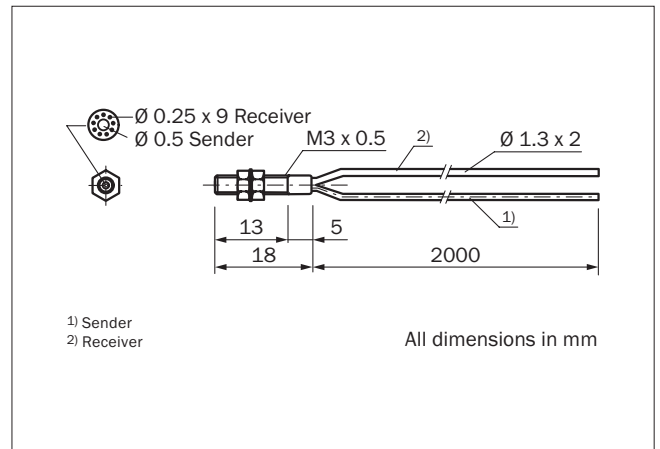
LL3-DS06



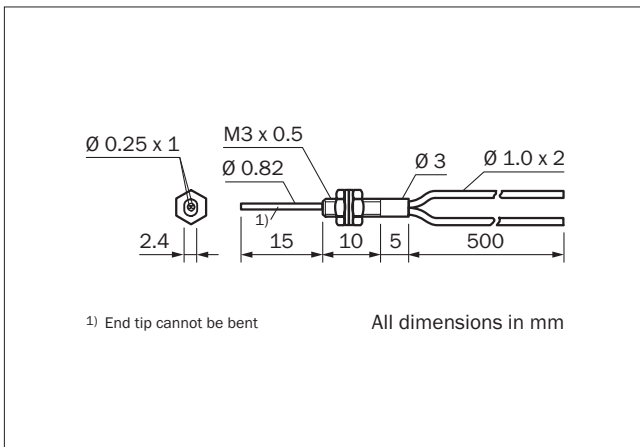
LL3-DT01



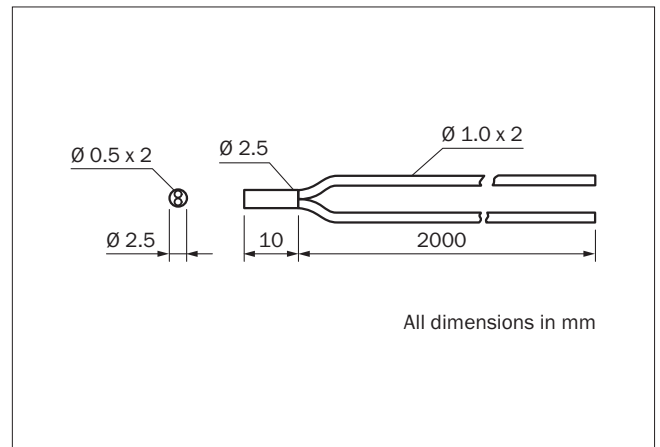
LL3-DT01-05



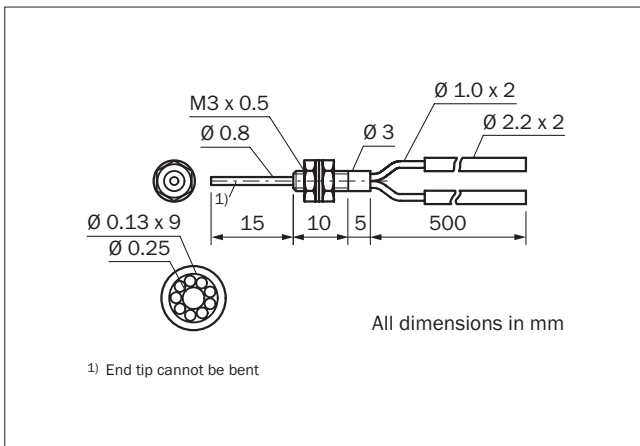
LL3-DT02



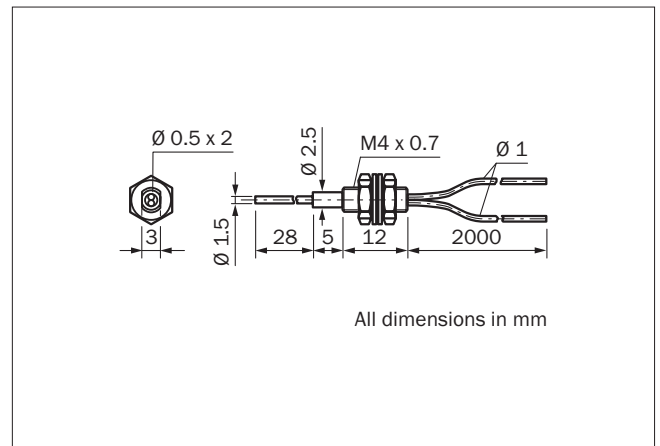
LL3-DT03



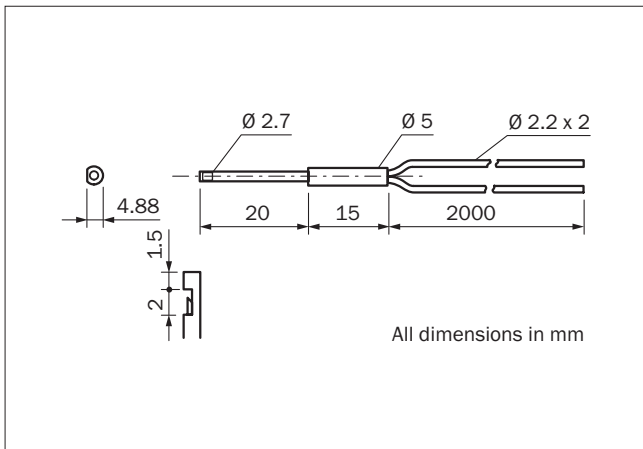
LL3-DT04



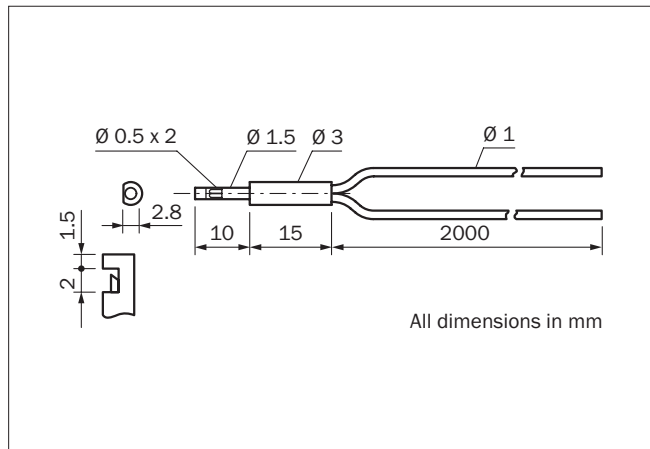
LL3-DT05



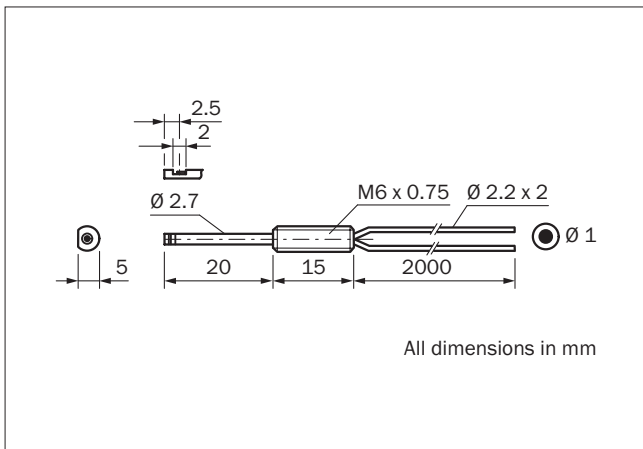
LL3-DV01



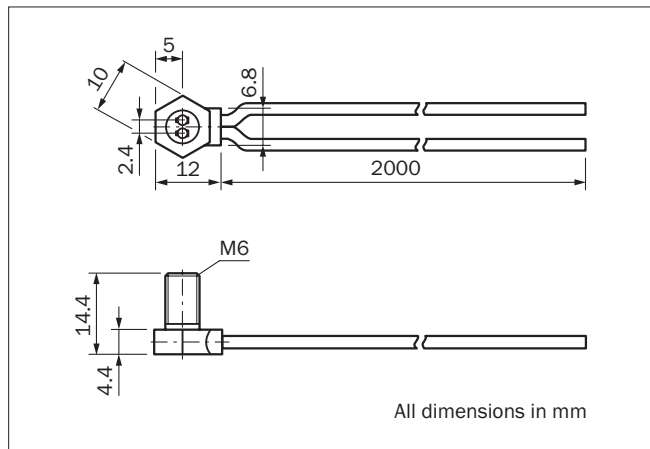
LL3-DV02



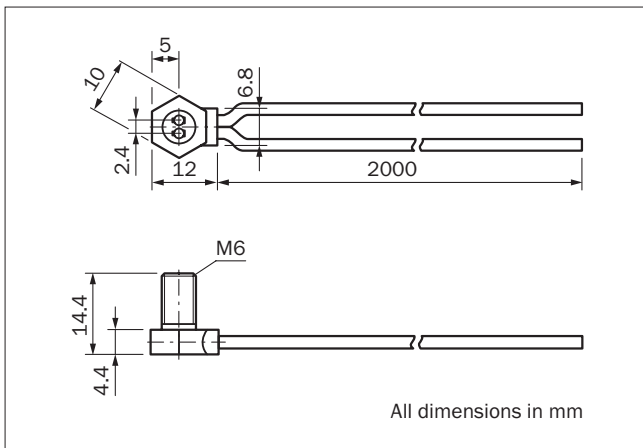
LL3-DV03



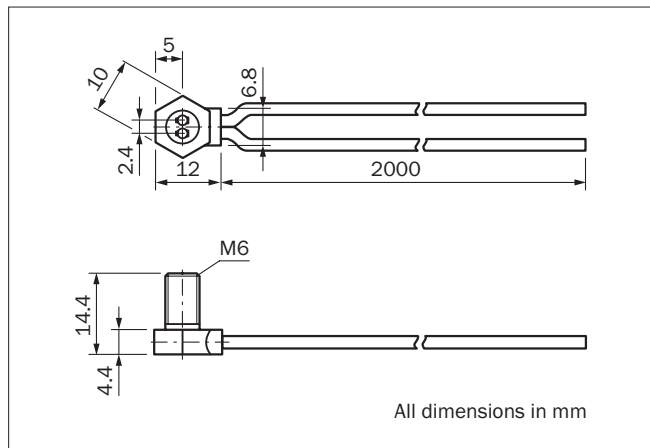
LL3-DV05



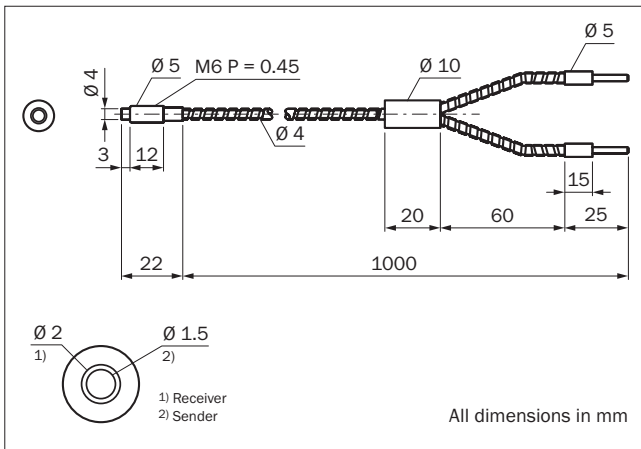
LL3-DV06



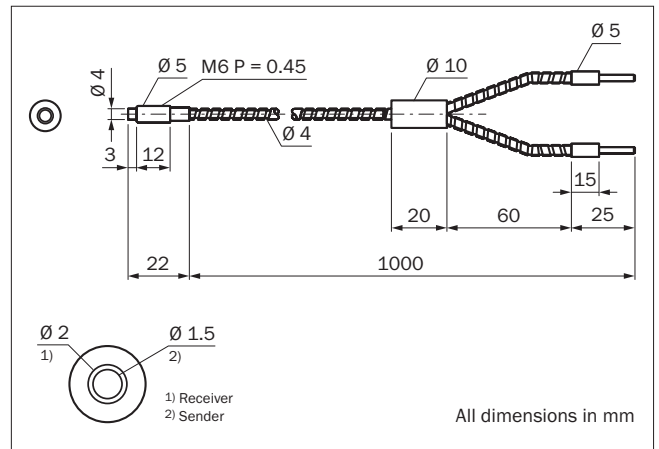
LL3-DV07



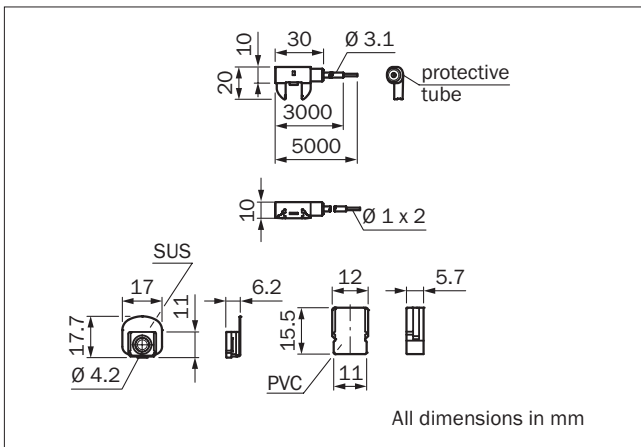
LL3-DW01



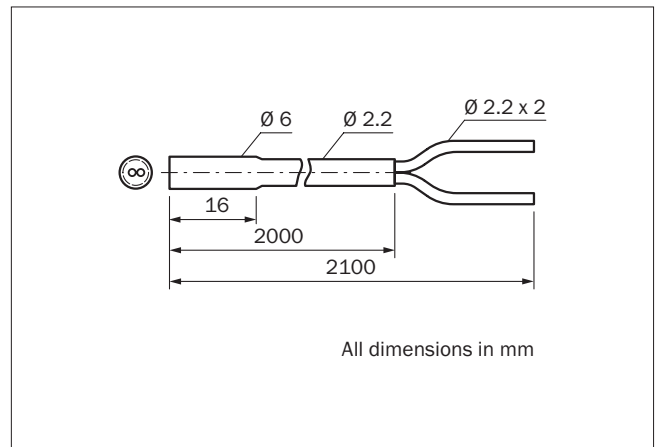
LL3-DW01-2



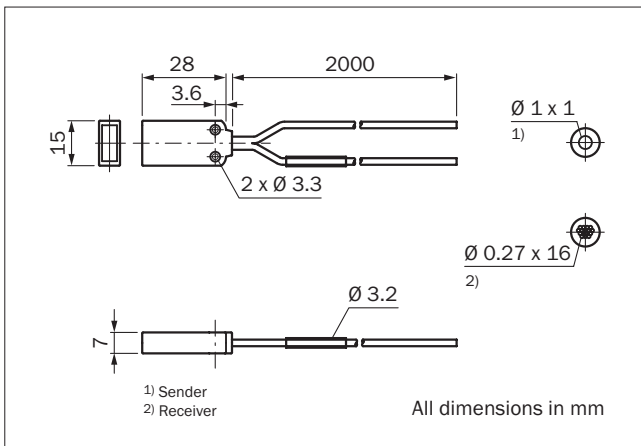
LL3-DW02



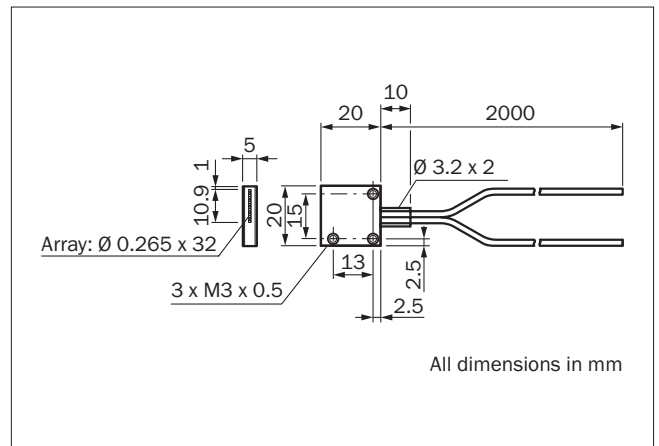
LL3-DY01



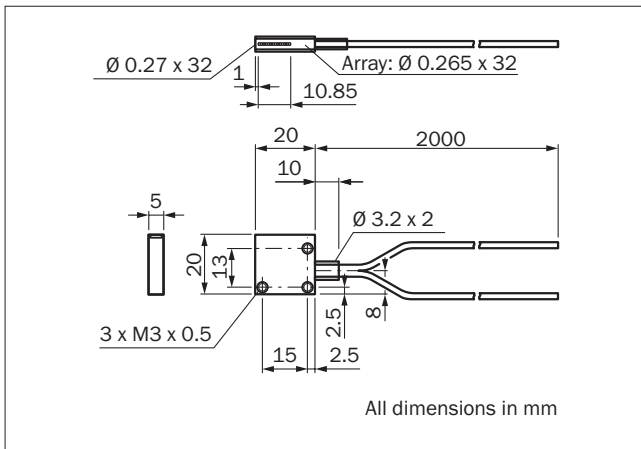
LL3-DZ01



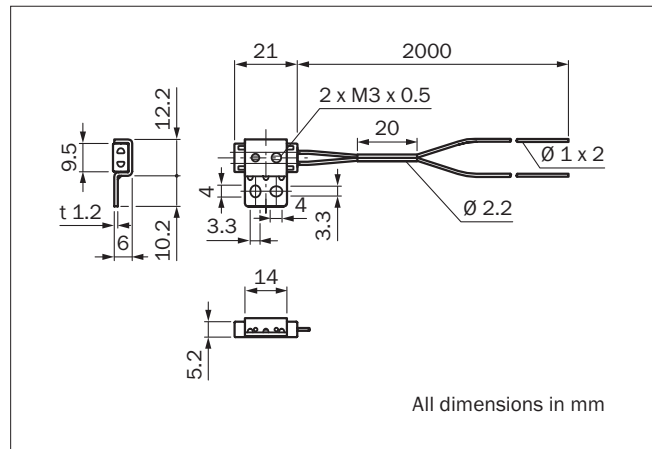
LL3-DZ02



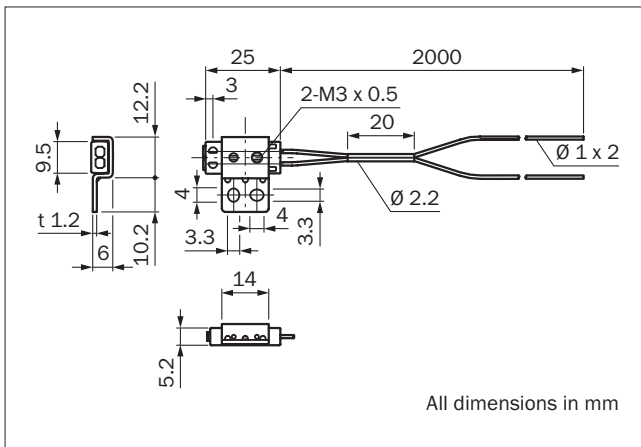
LL3-DZ03



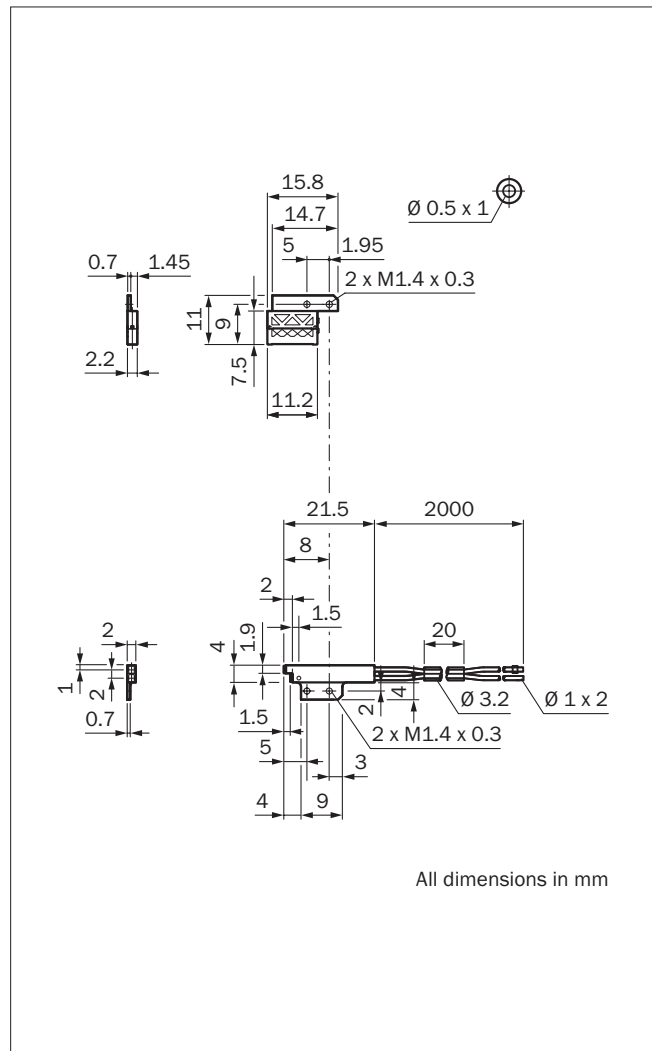
LL3-RB01



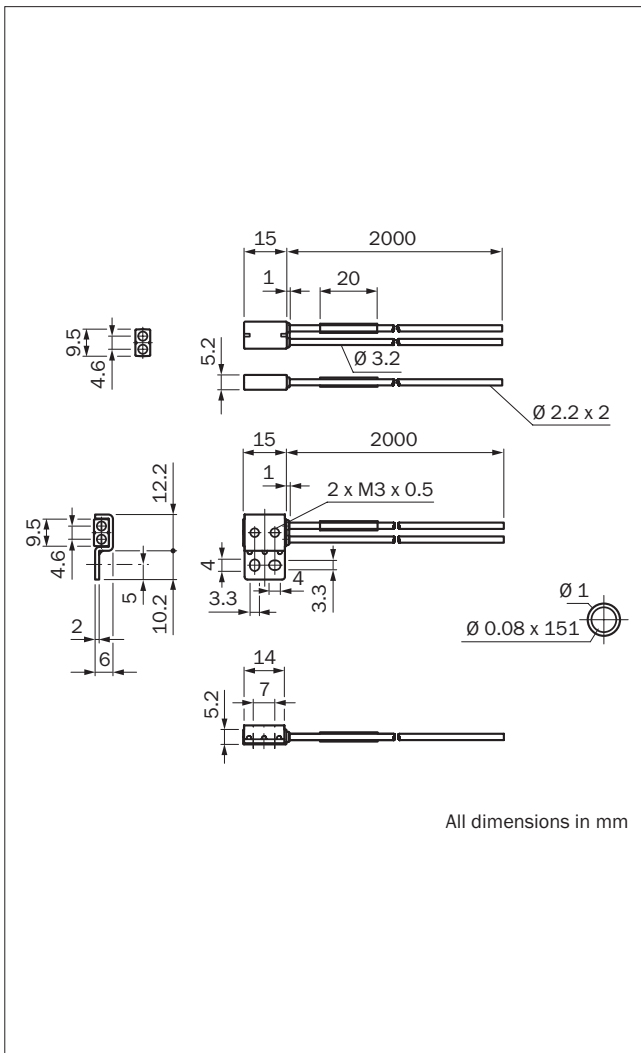
LL3-RB02



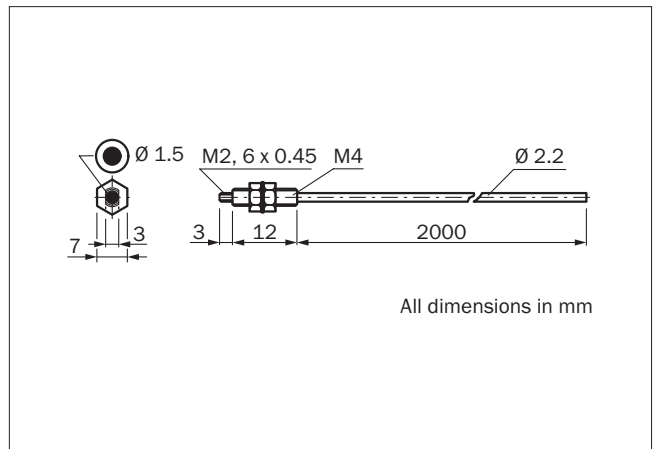
LL3-RG01



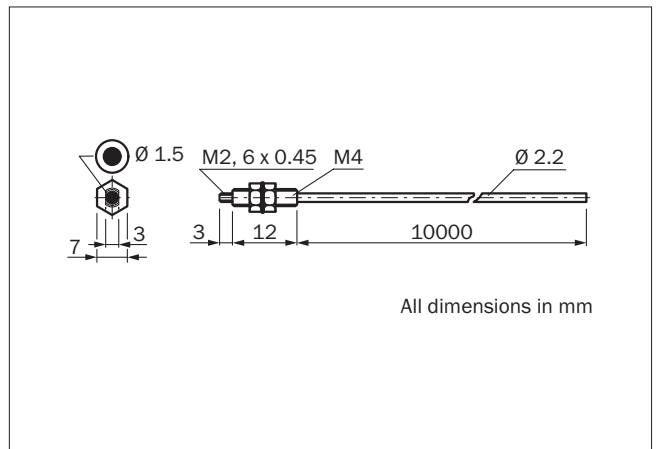
LL3-RR01



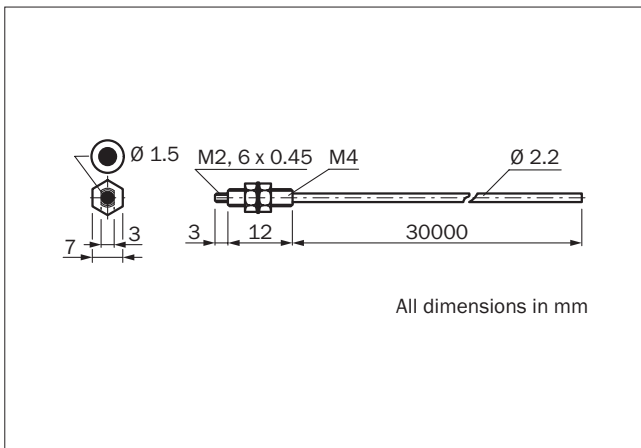
LL3-TB01



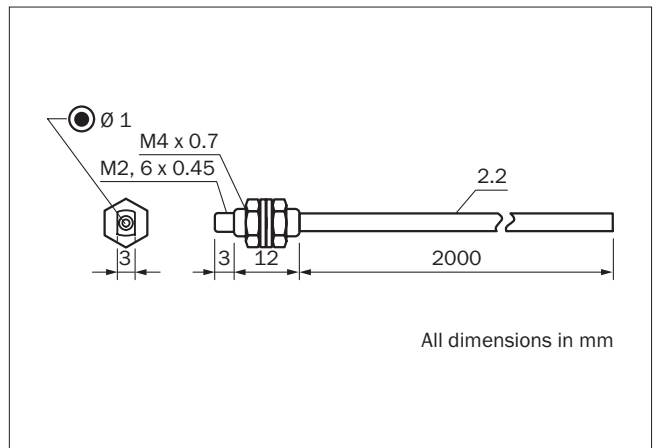
LL3-TB01-10



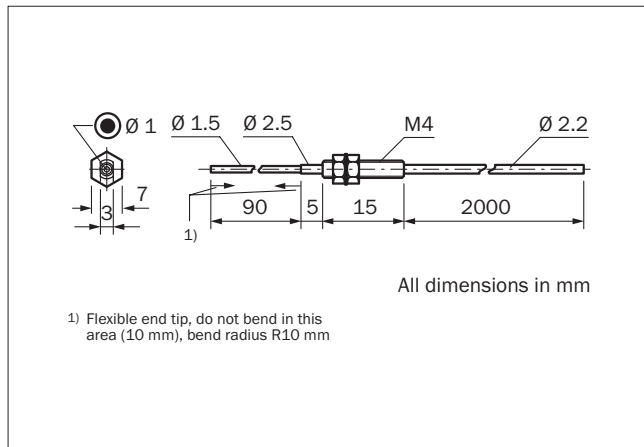
LL3-TB01-30



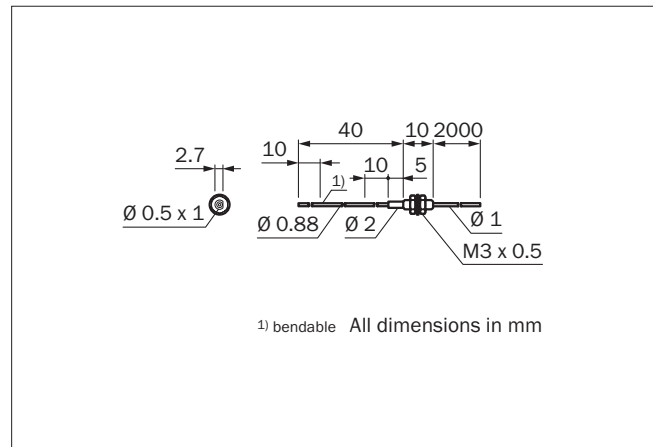
LL3-TB02



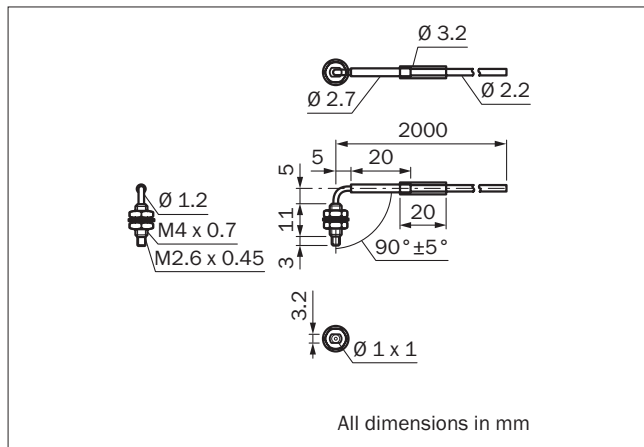
LL3-DB03



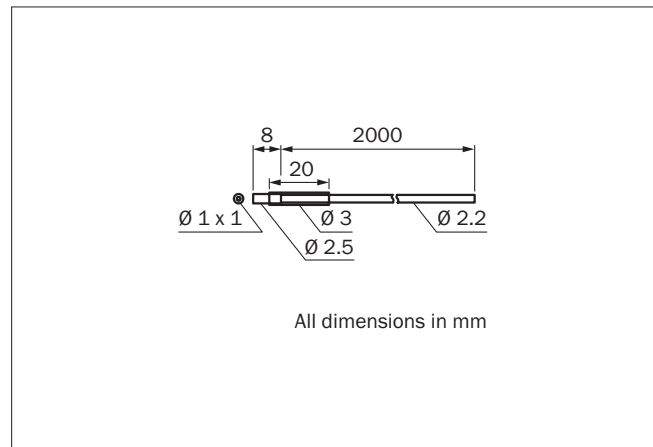
LL3-TB05



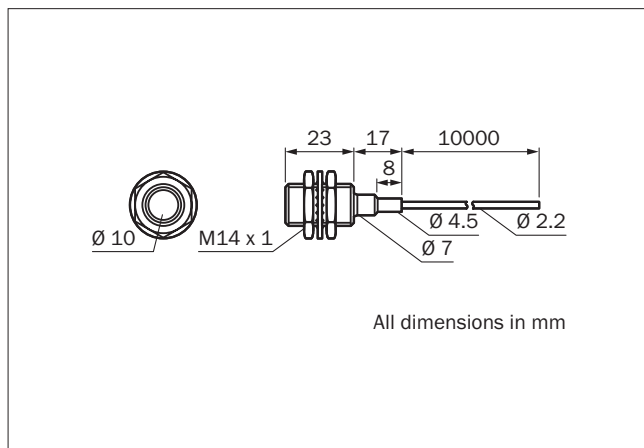
LL3-TB06



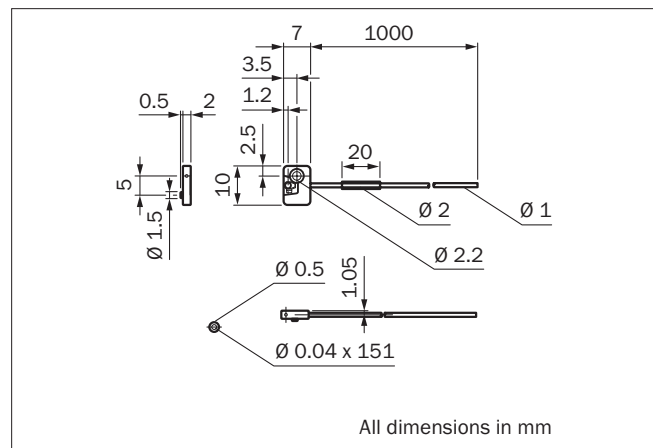
LL3-TB07



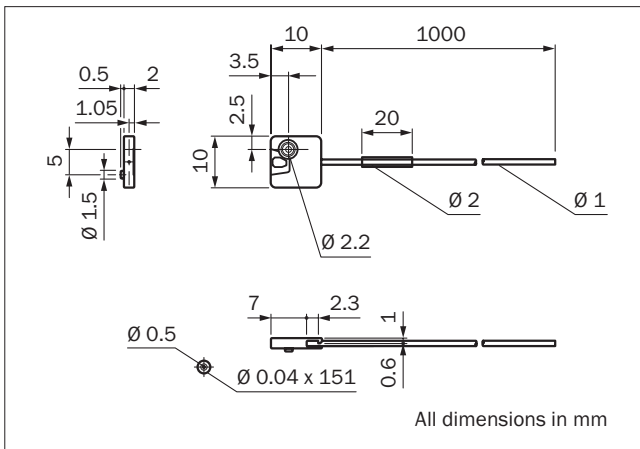
LL3-TB08



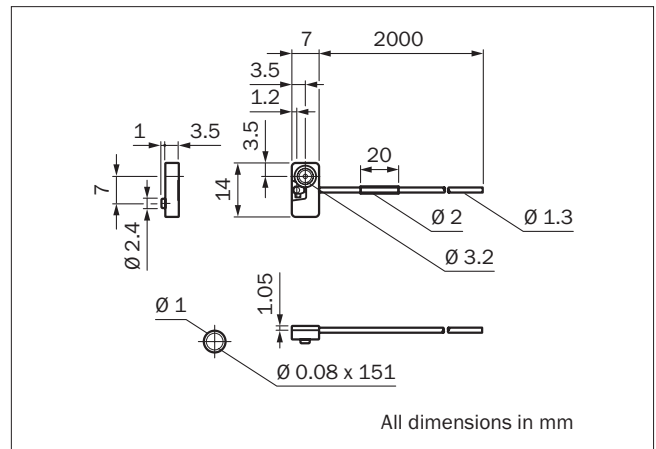
LL3-TE01



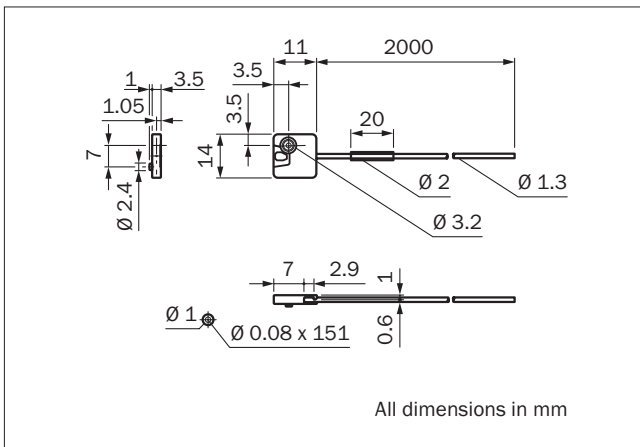
LL3-TE02



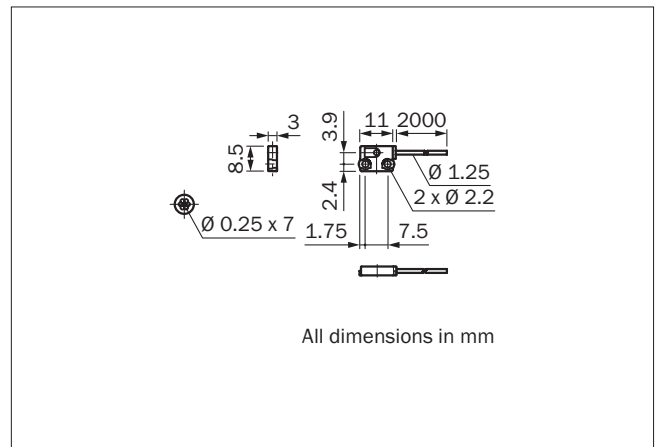
LL3-TE03



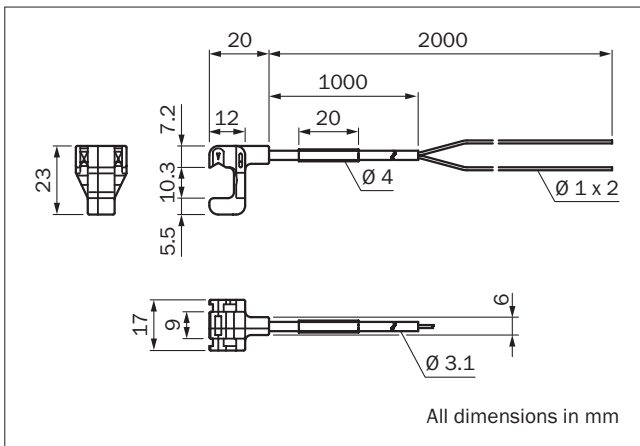
LL3-TE04



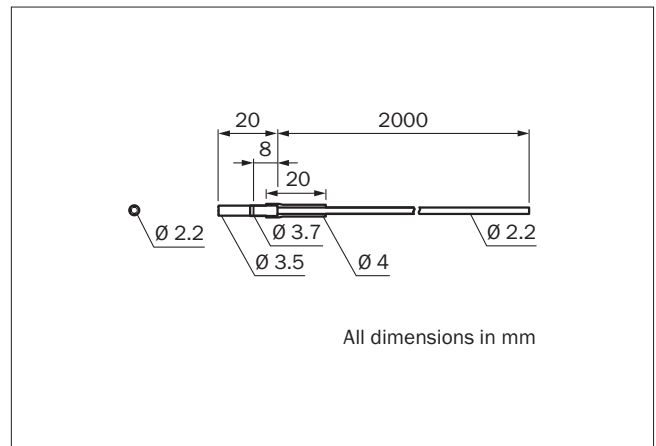
LL3-TE05



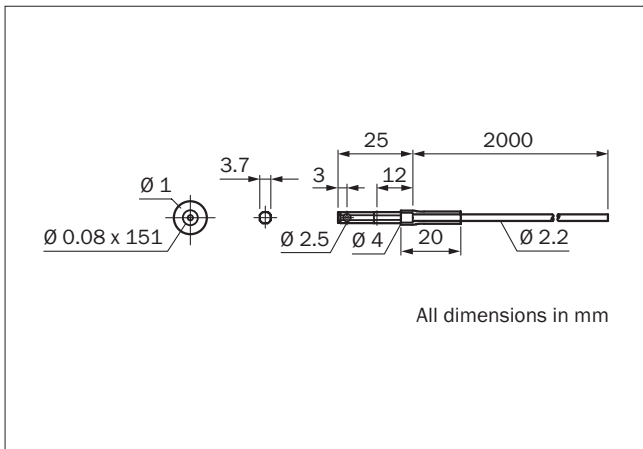
LL3-TF01



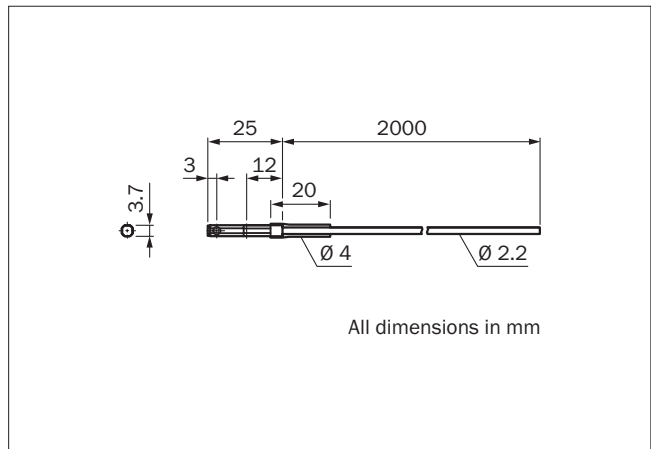
LL3-TG01



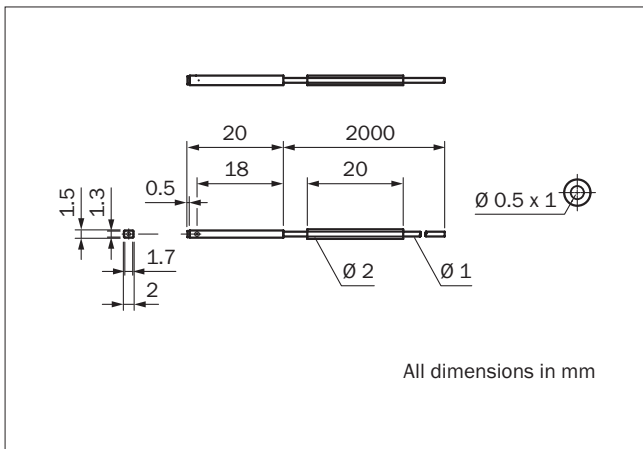
LL3-TG02



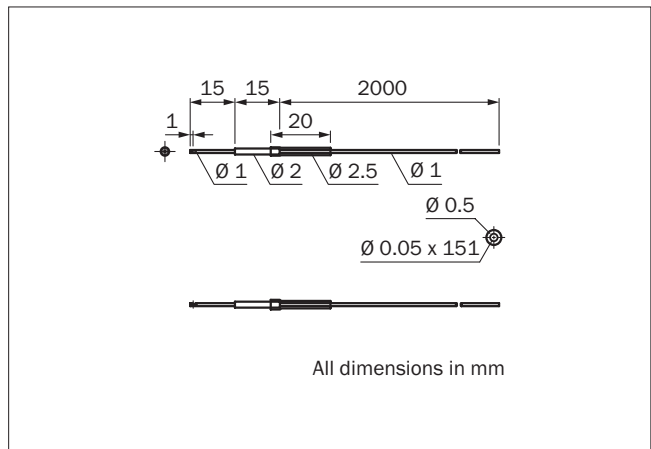
LL3-TG03



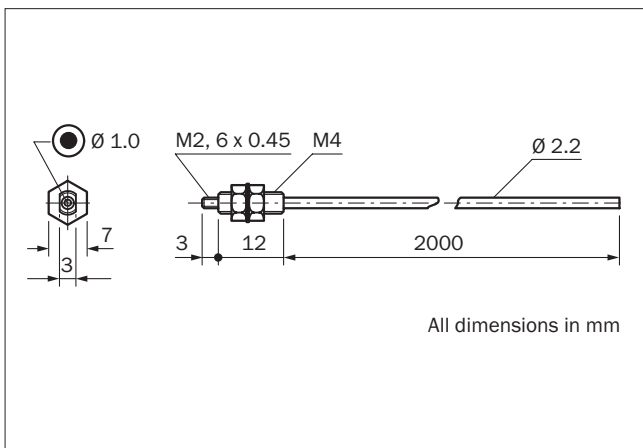
LL3-TG04



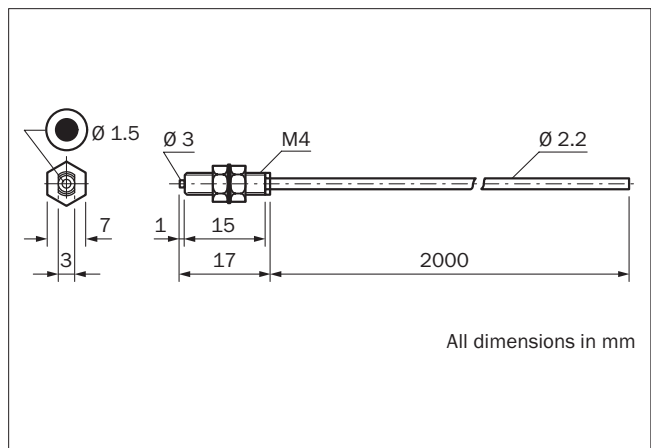
LL3-TG05



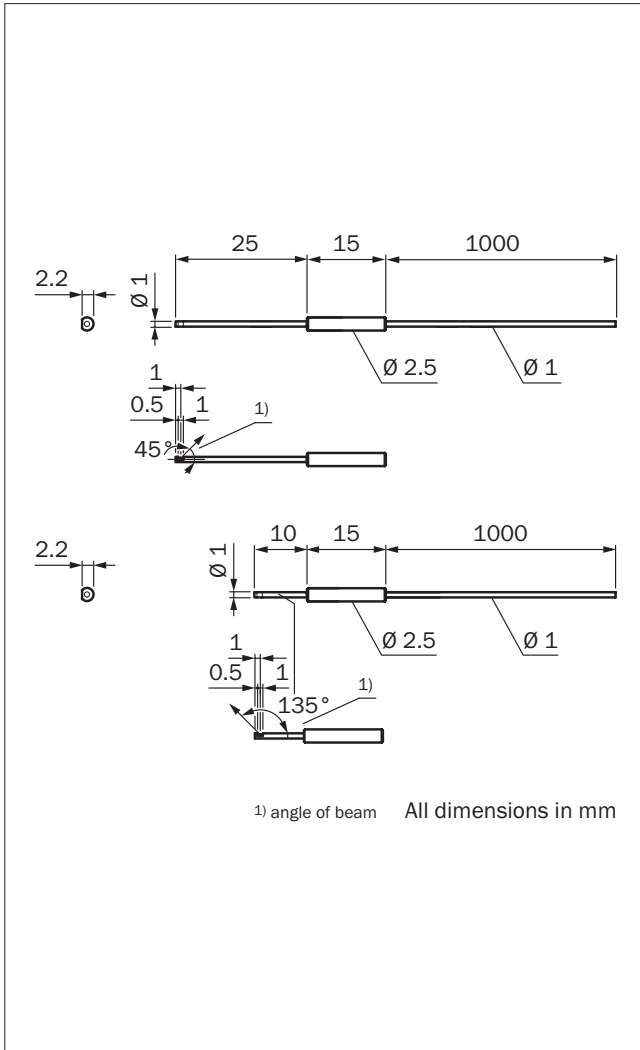
LL3-TH01



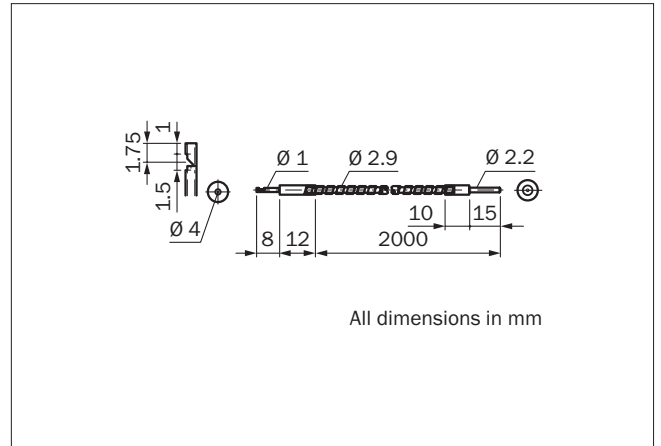
LL3-TH02



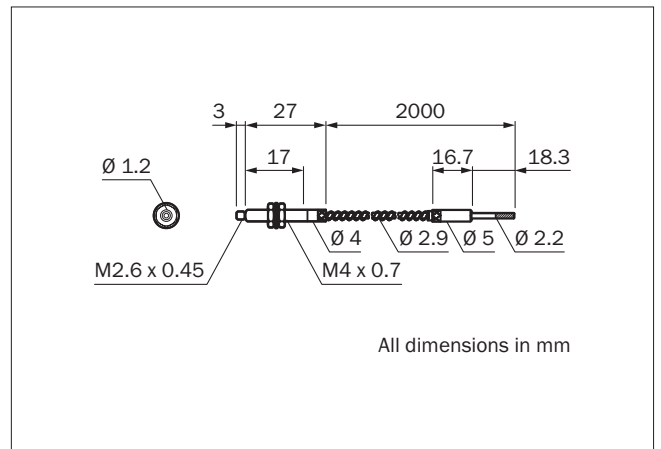
LL3-TH06



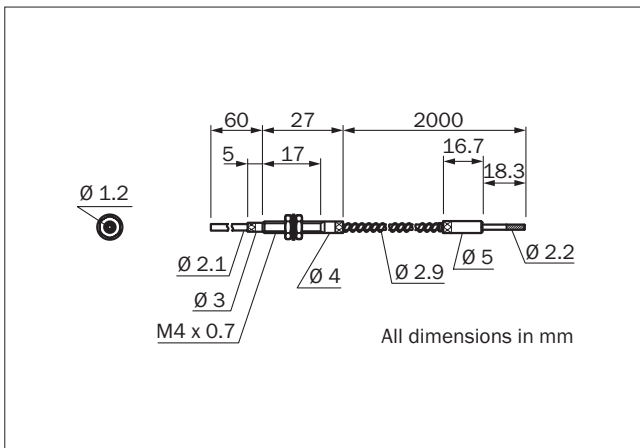
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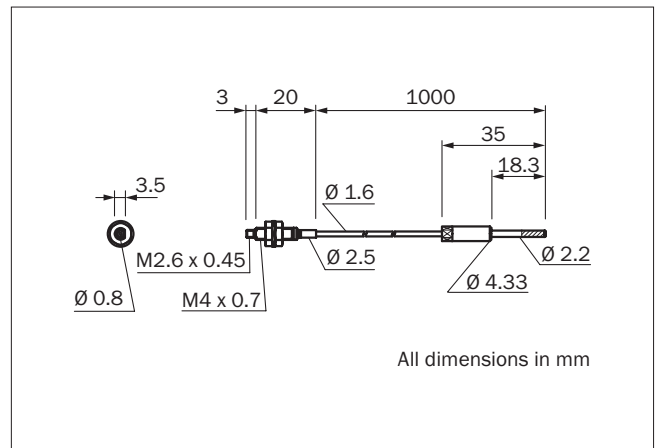
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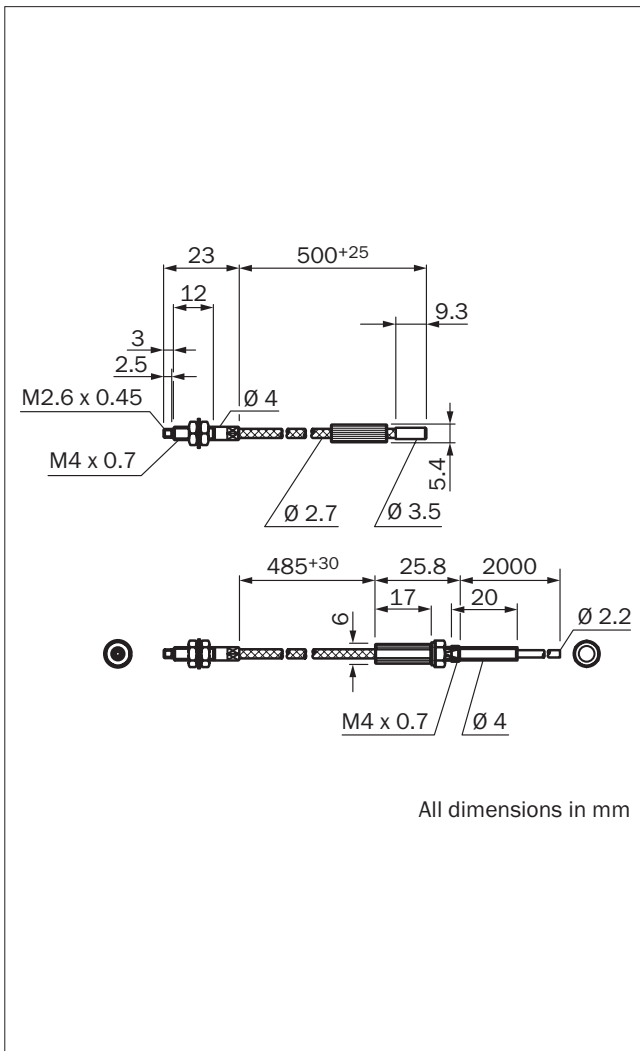
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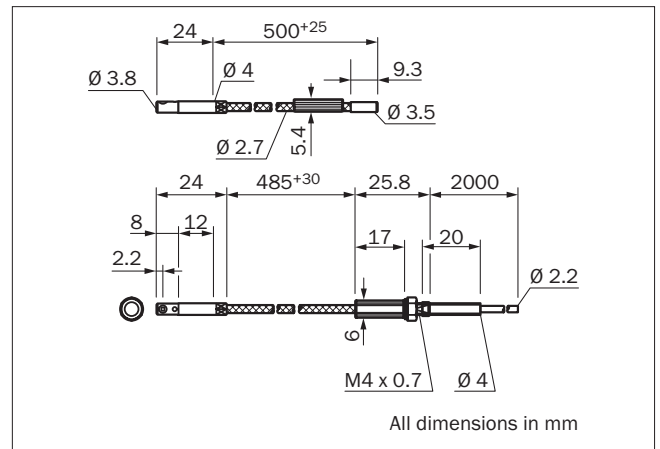
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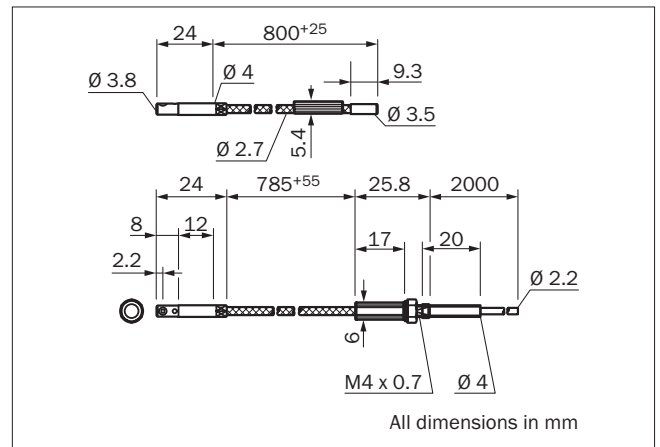
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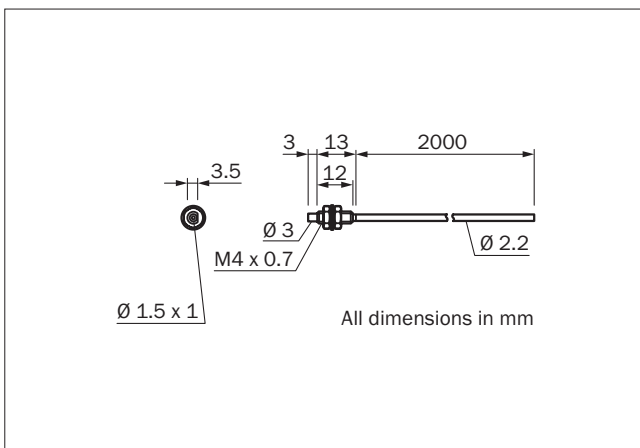
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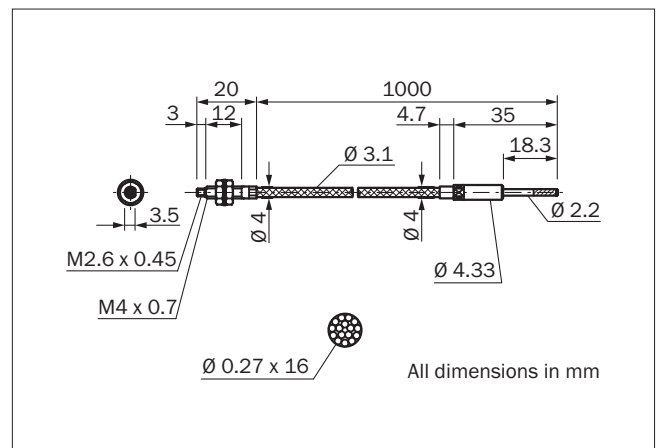
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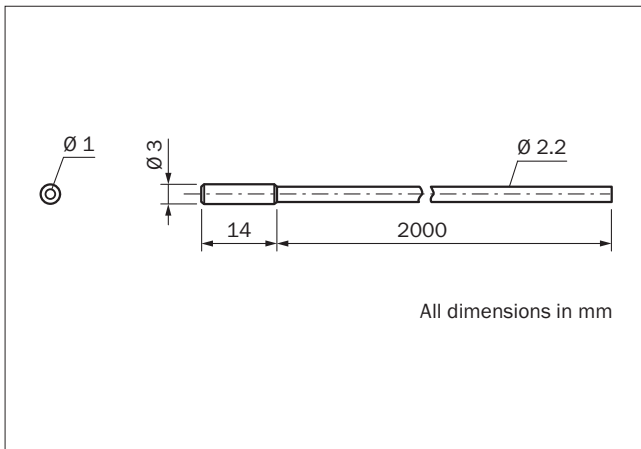
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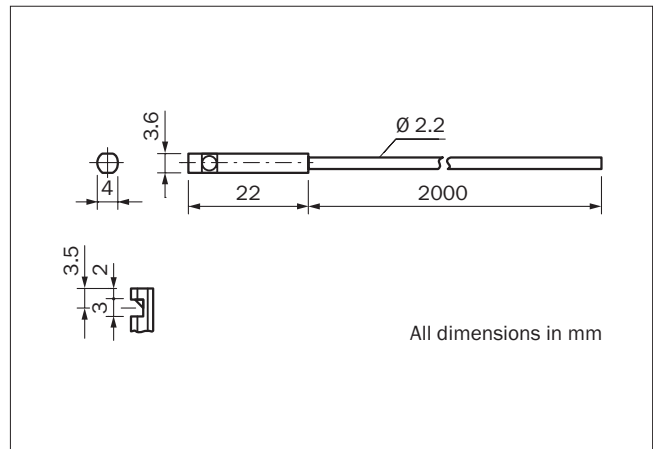
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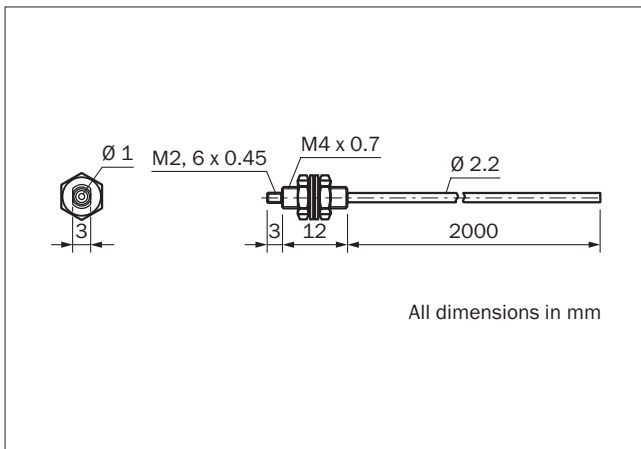
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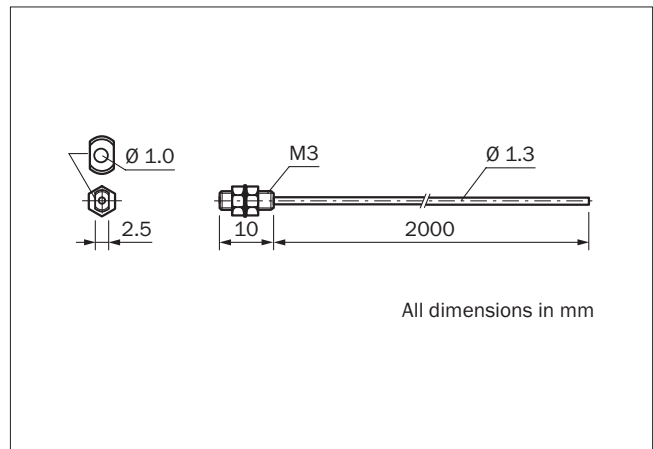
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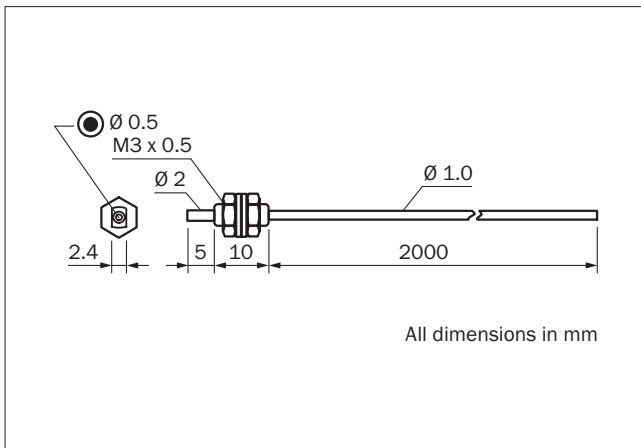
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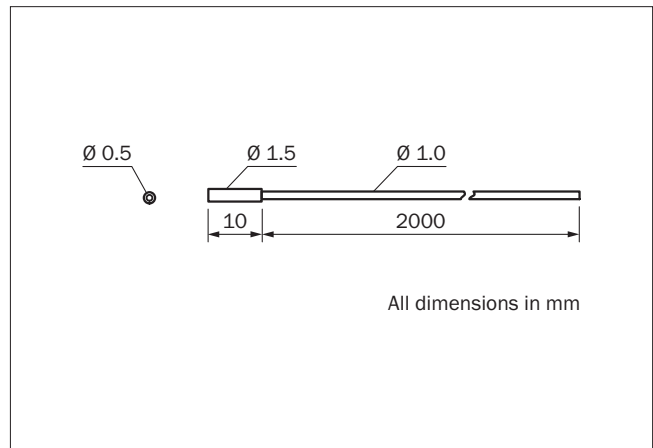
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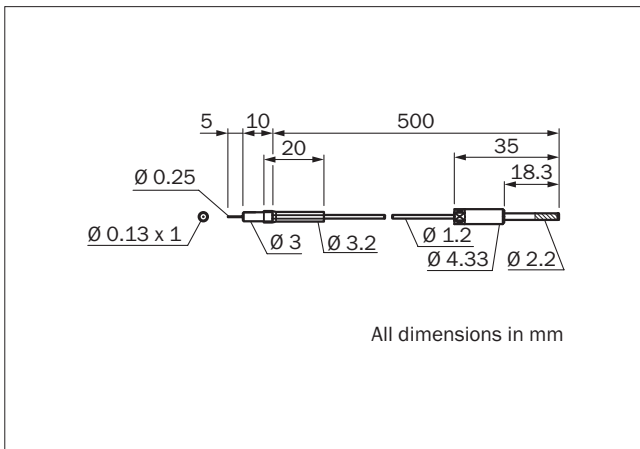
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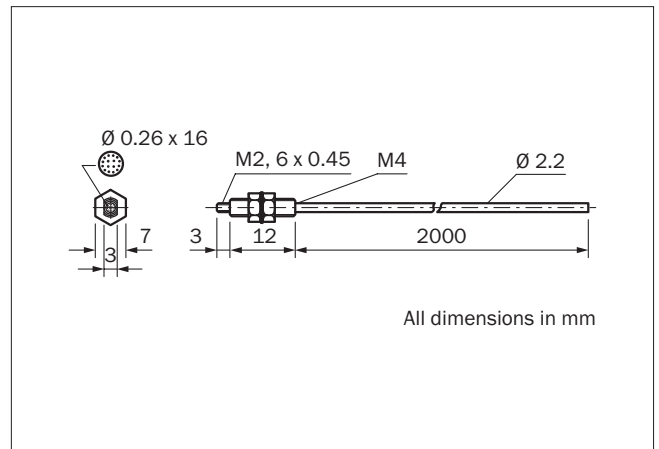
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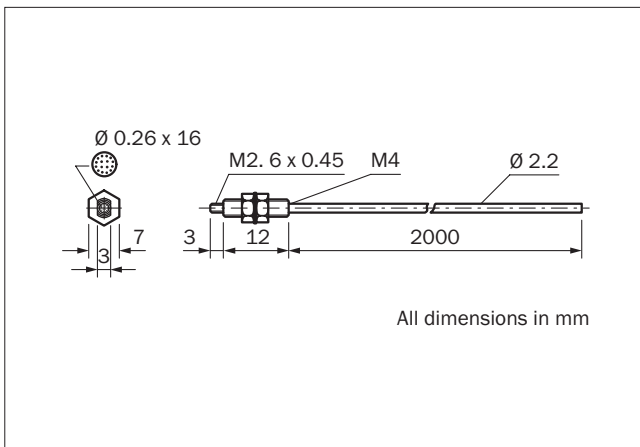
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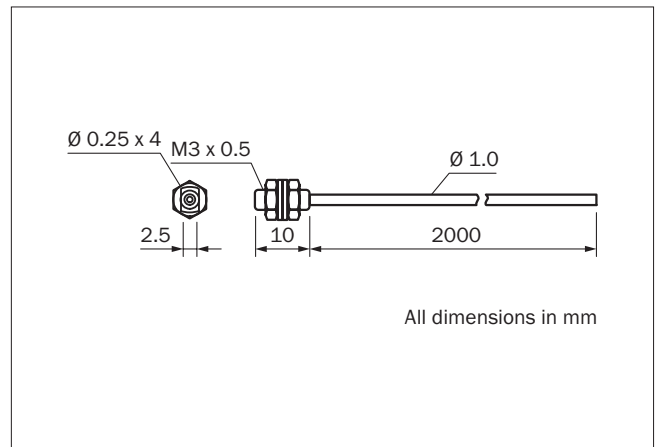
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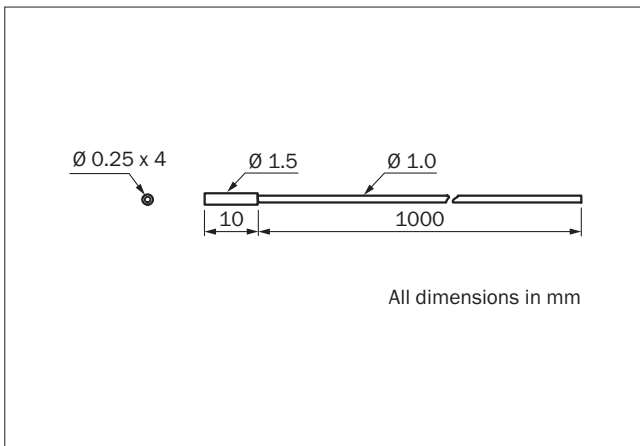
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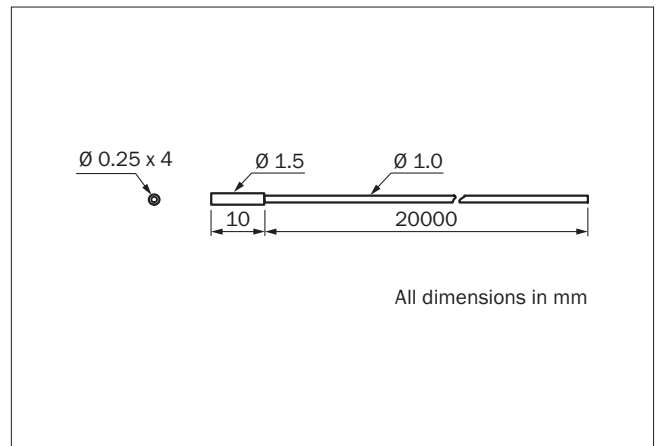
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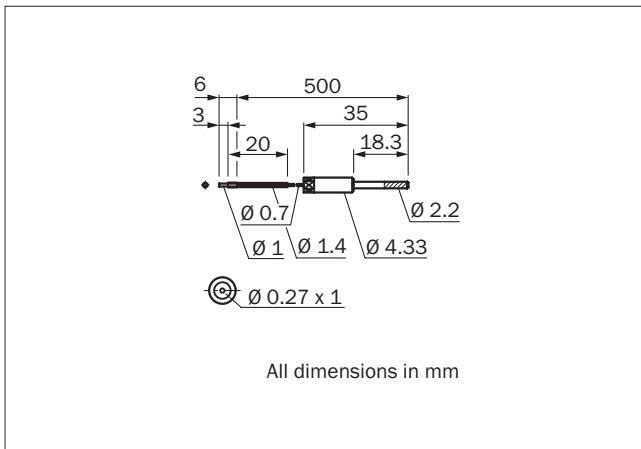
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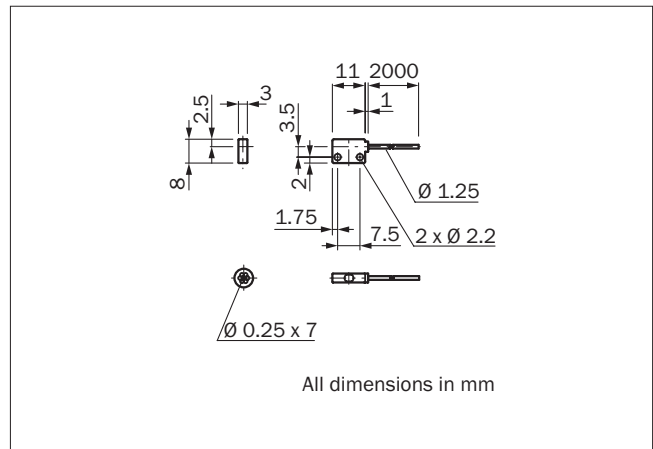
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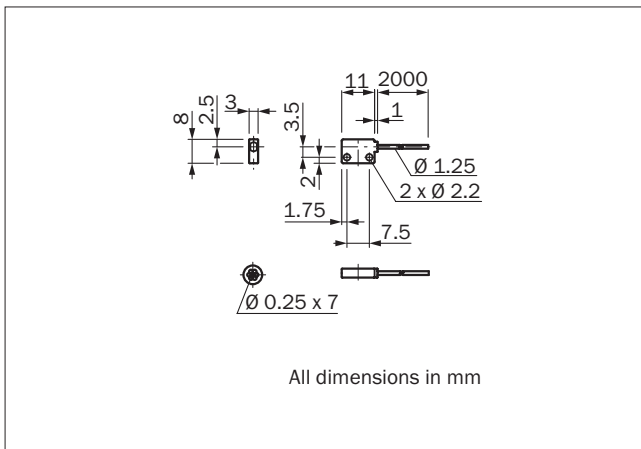
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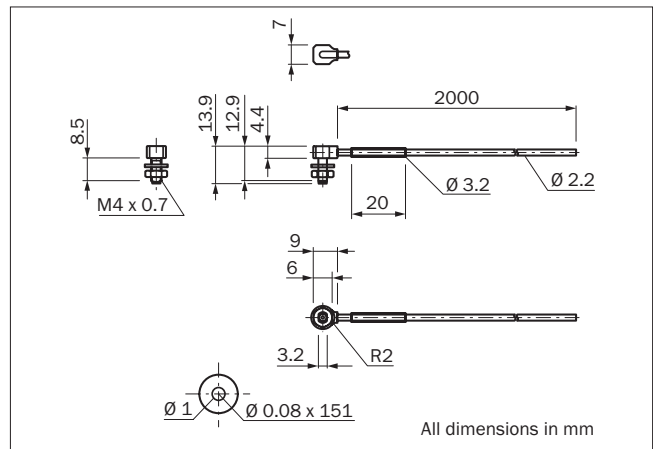
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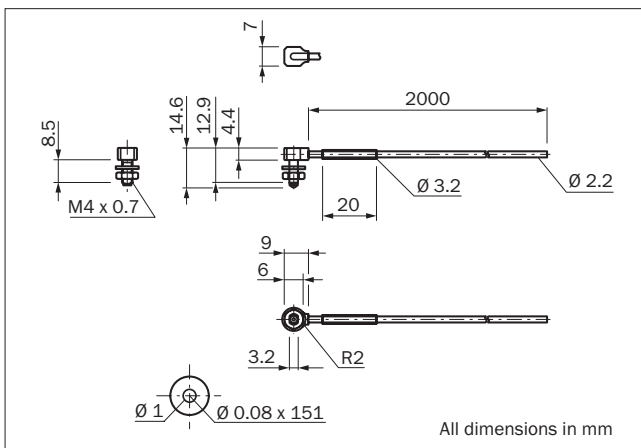
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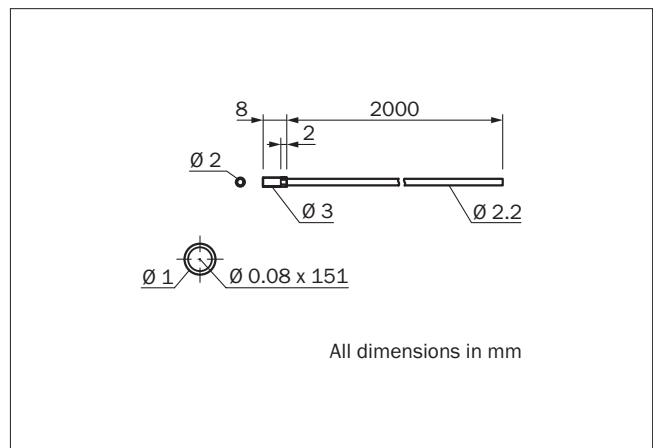
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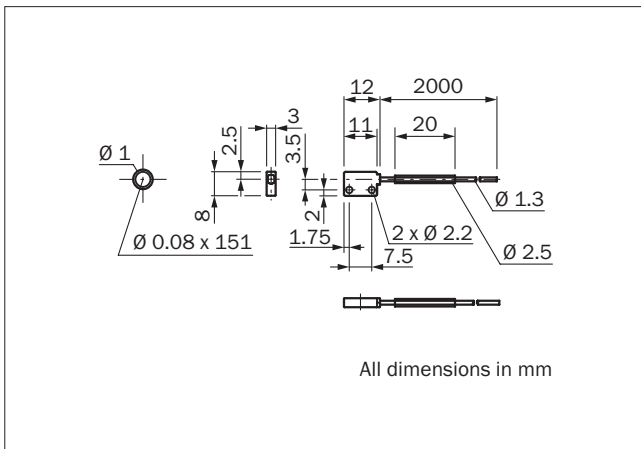
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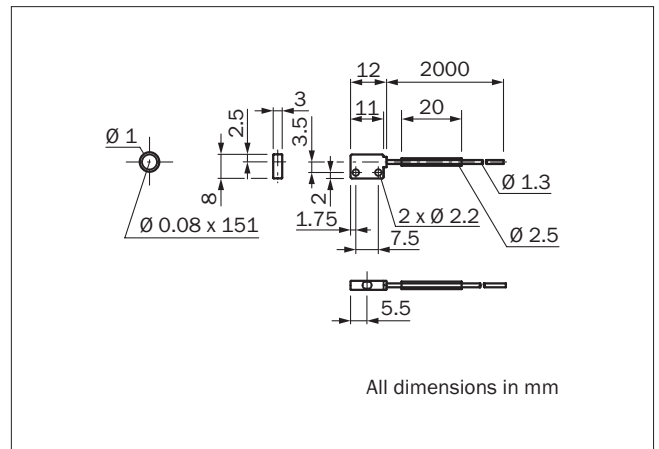
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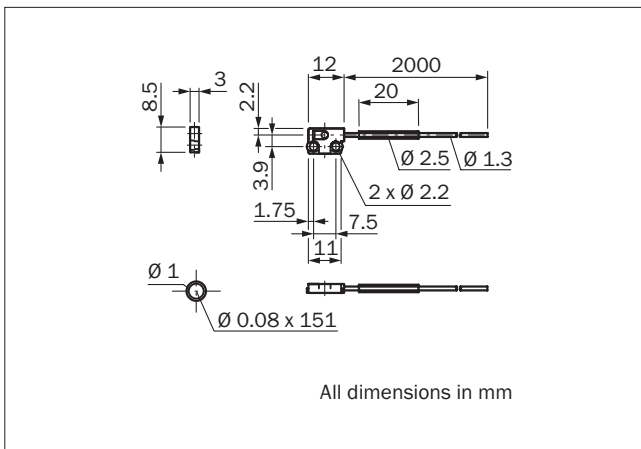
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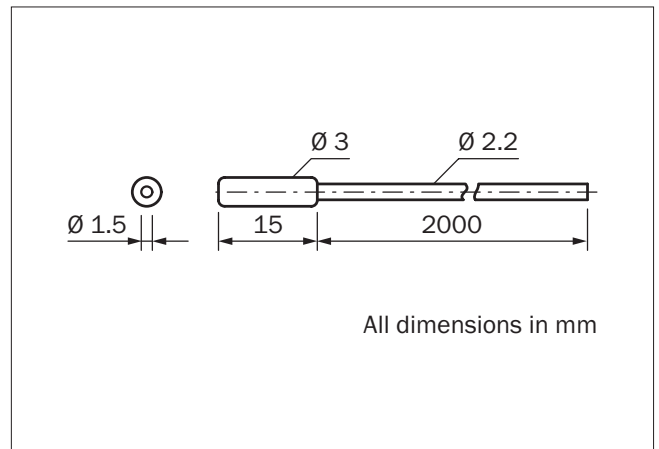
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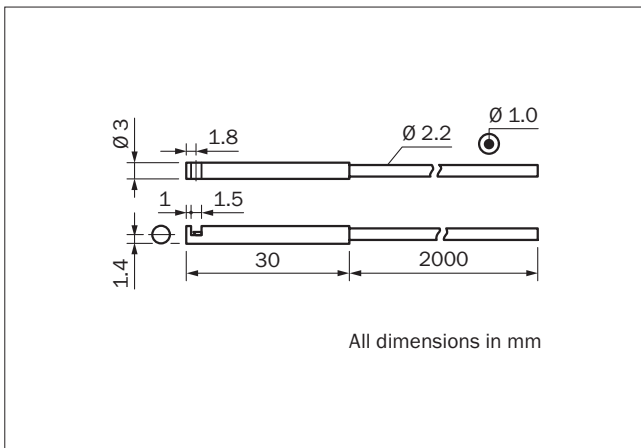
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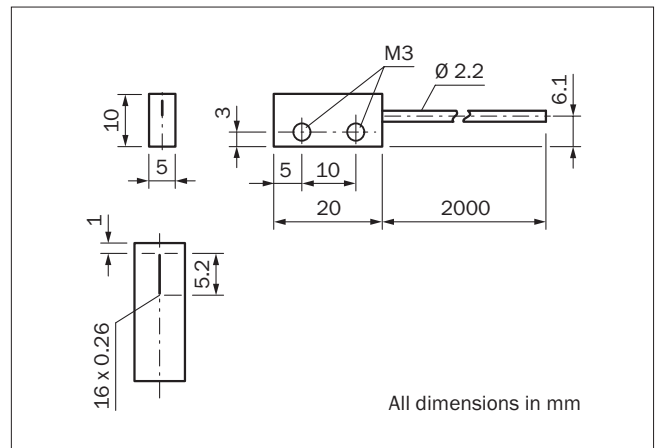
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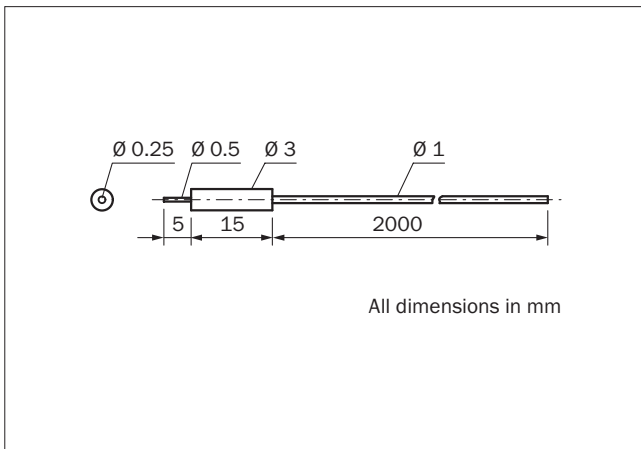
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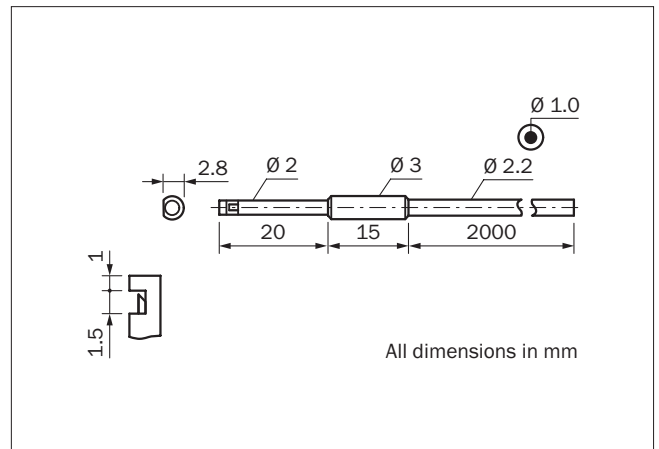
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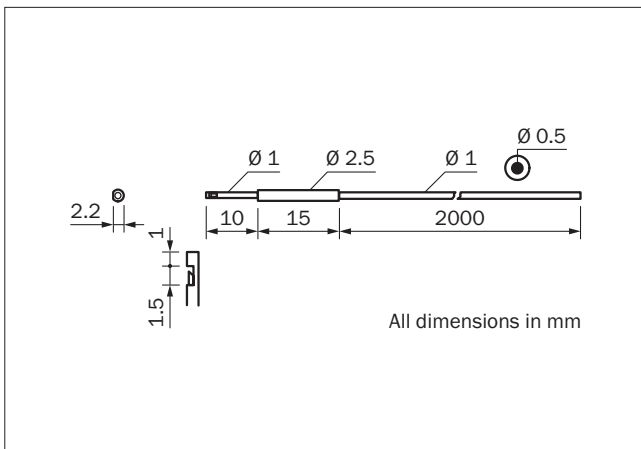
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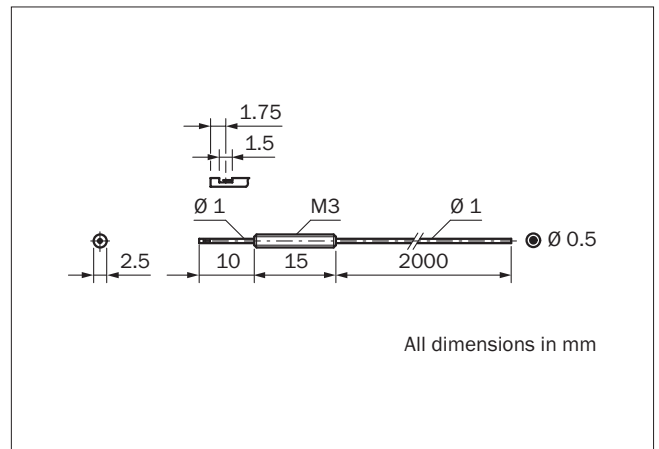
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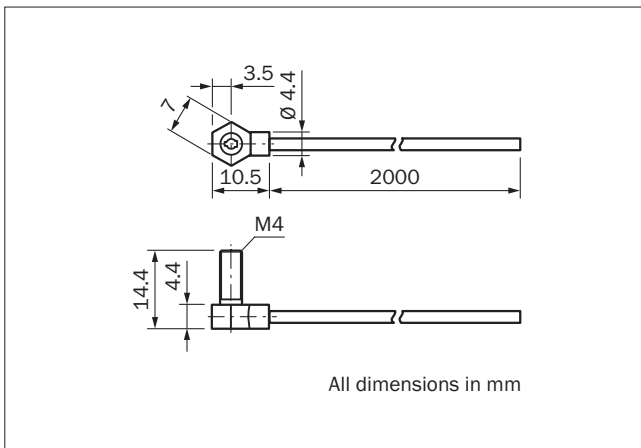
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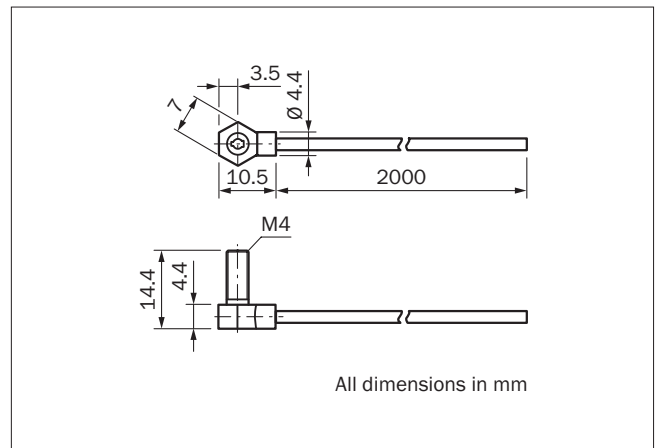
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LL3-TV05

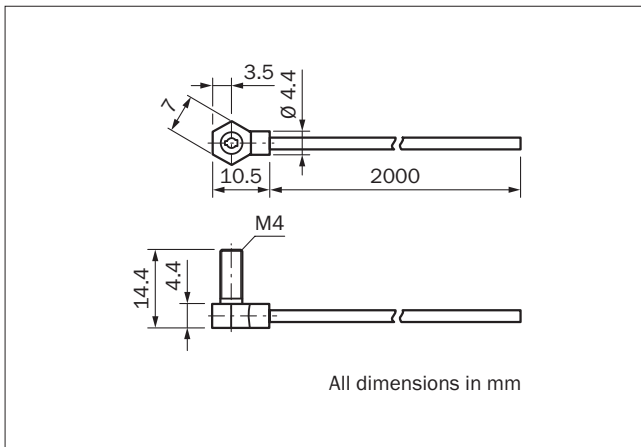


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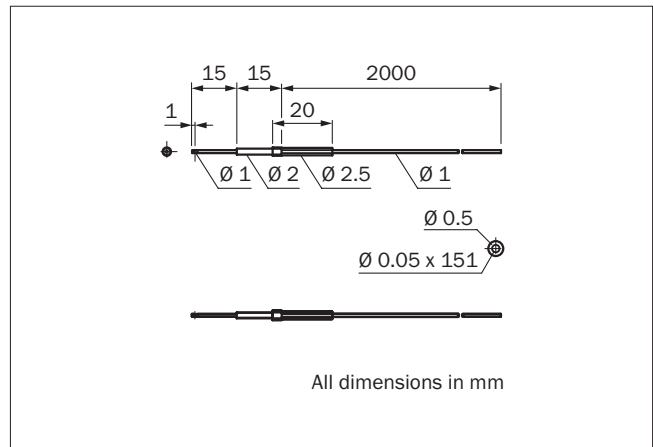


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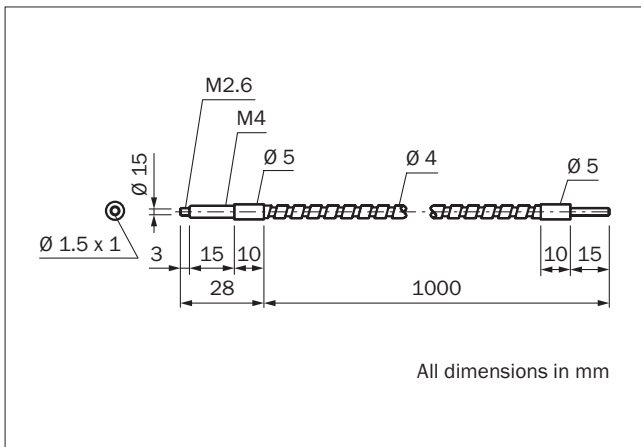
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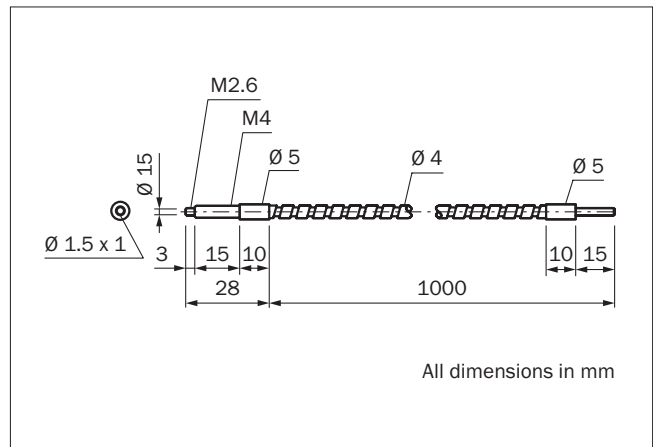
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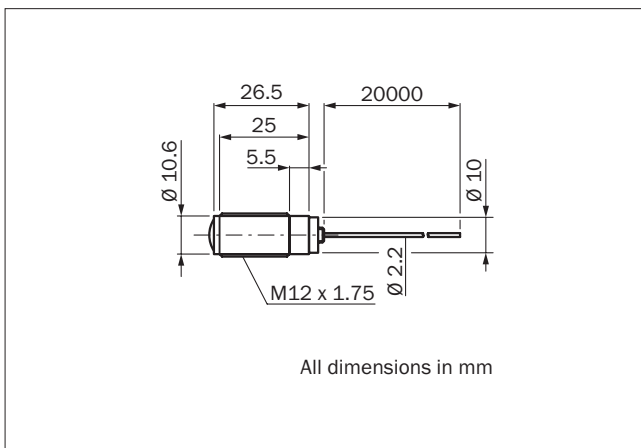
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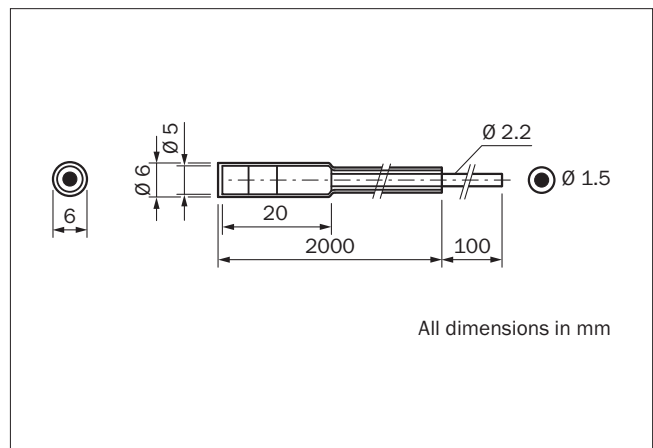
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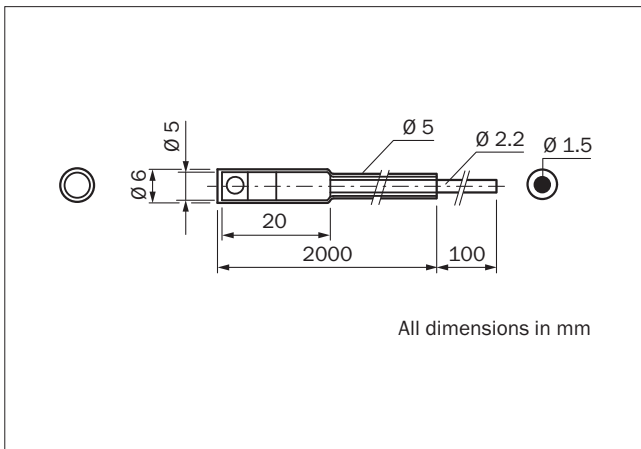
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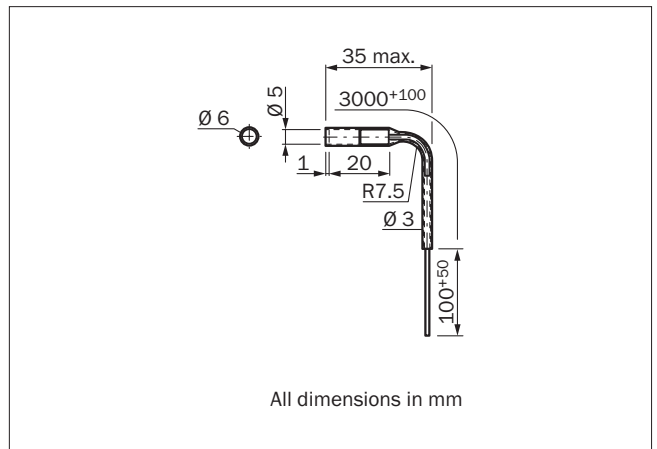
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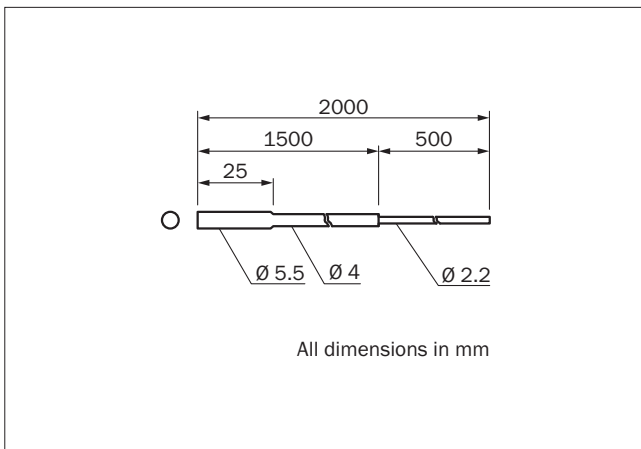
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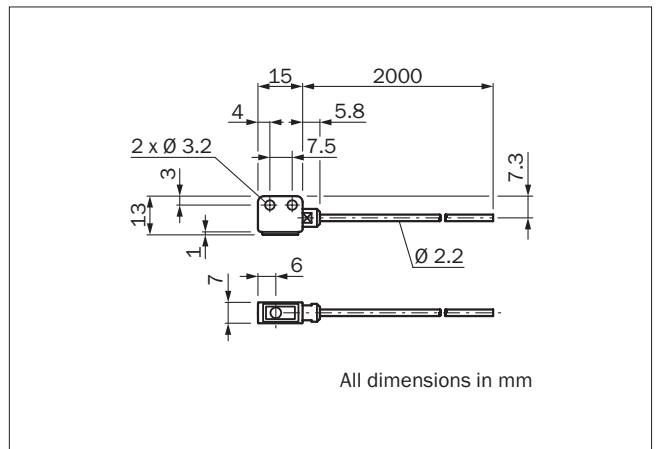
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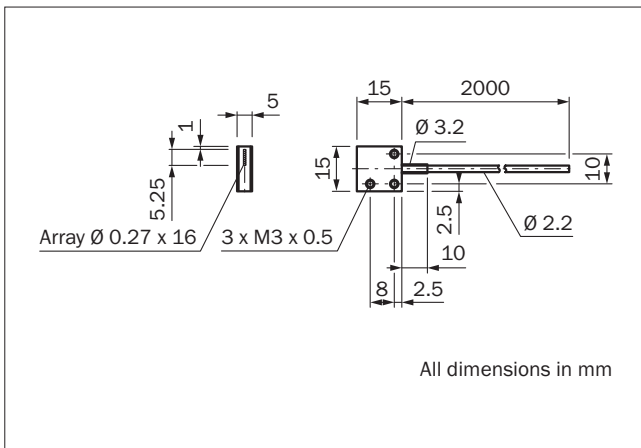
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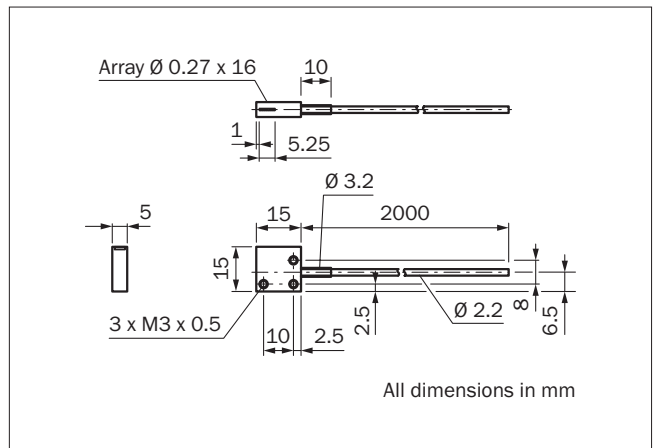
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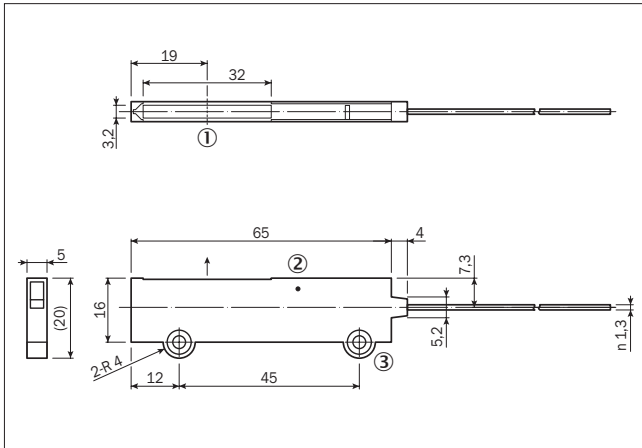
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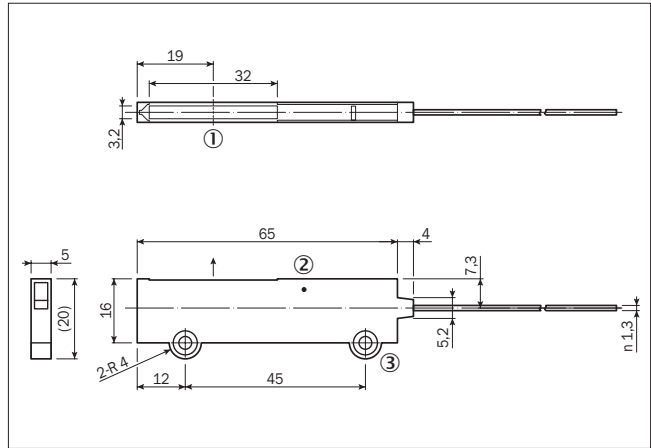
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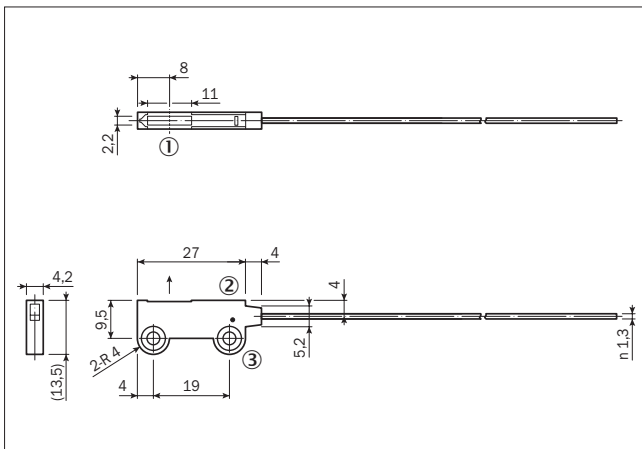
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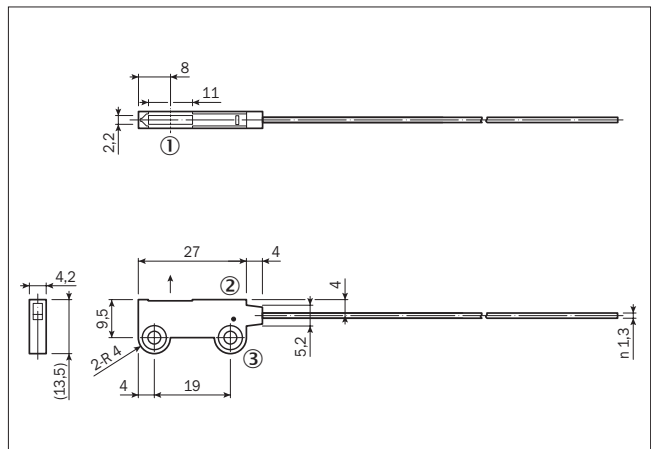
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LL3-TZ09



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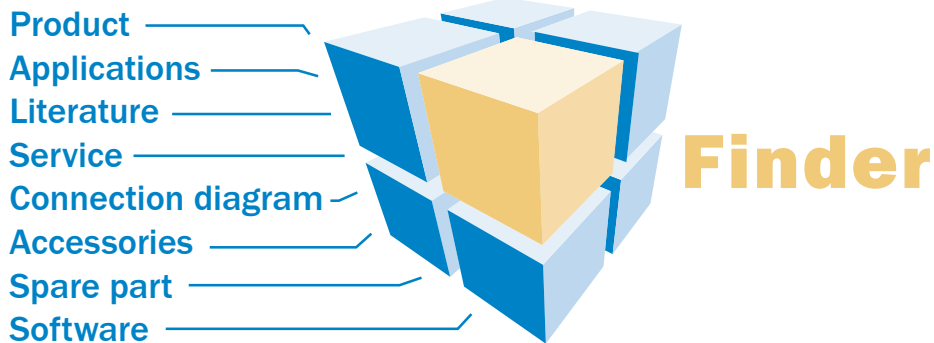
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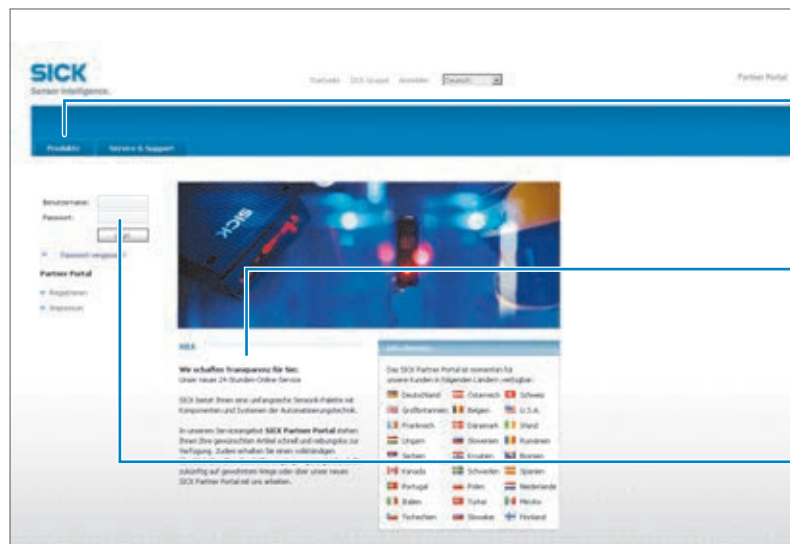
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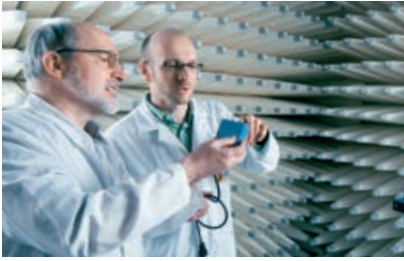
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