

# LL3: fibre-optic cables – solving automation problems



To this should be added the large number of different variants. Around 70 different versions of the LL3 offer optimum alternatives for virtually every application in the optical, mechanical and chemical fields. A number of different attachment lenses extend its field of possible applications even further. The fibre-optic cable of type LL3 and the fibre-optic cable photoelectric switch by SICK are an unbeatable team with a high degree of success in semiconductor and electronics assembly, packaging, handling and assembly systems, special engineering and fine mechanics.

	<b>Fibre optic cable Through-beam systems</b>
	<b>Fibre optic cable Proximity systems</b>

Lack of installation space (even for miniature photoelectric switches) or exposure to chemicals or heat are frequent reasons for using the plastic fibre-optic cable LL3. In combination with the photoelectric switch series WLL170(T), the LL3s assure reliable object detection even under difficult conditions.

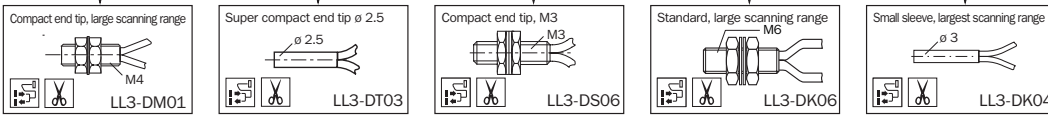
Its multiple flexibility is one of the main advantages of the LL3. It has small bending radii and can be easily shortened to the required length. A number of different end sleeves also mean that it is easy to connect and install.

LL3 options:

- Standard optical conductor
- Large range
- Attachment lenses
- Small end sleeves for confined spaces
- Highly flexible with small bending radii
- Integrated 90° deflection
- Temperature resistant up to 300 °C
- Teflon sheath for corrosive surroundings
- Coaxial design
- Flexible end sleeves
- 10 meters in length
- Optical-guide line
- Level switch ...

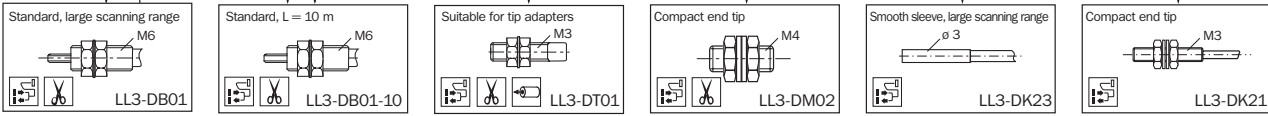
## Flowchart for selection of fibre-optic cable, proximity systems

### Standard, compact end tip, large scanning range

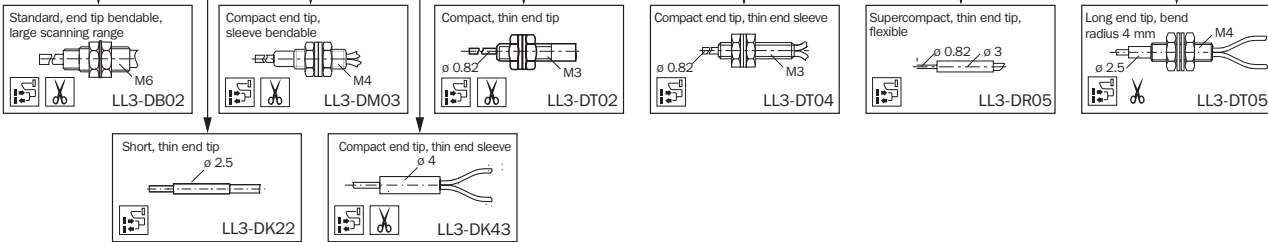


### Coaxial structure for exact switching

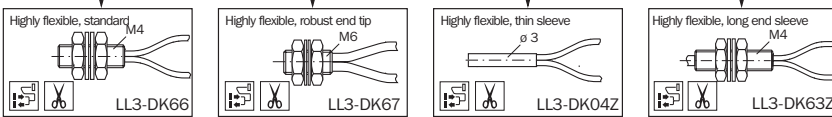
Length of fiber 10 m



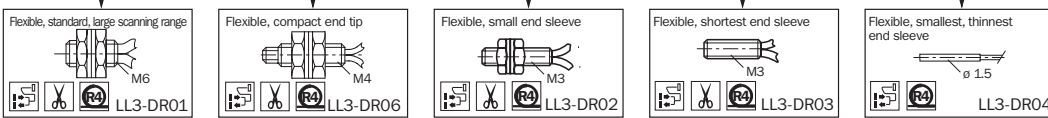
### Thin sleeves, long end tips, bendable: ideal for small inaccessible objects



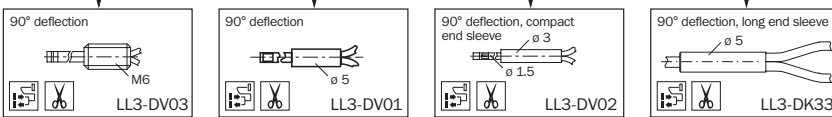
### Highly flexible, for moved mechanics, bend radius R2 (R = 2 mm)



### Flexible, bend radius R4 (R = 4mm)



### Integrated 90° deflection, smallest mounting depth

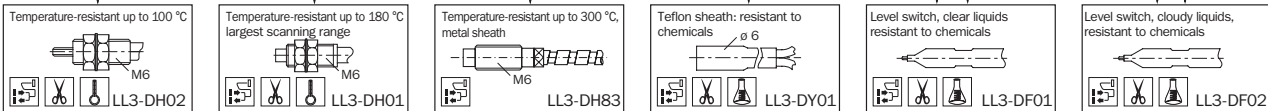


### Special applications:

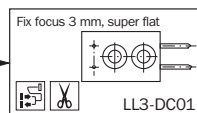
#### Level switch

#### Chemicals

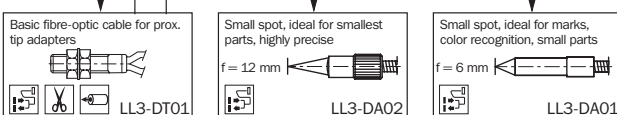
#### Temperature



#### Fix focus



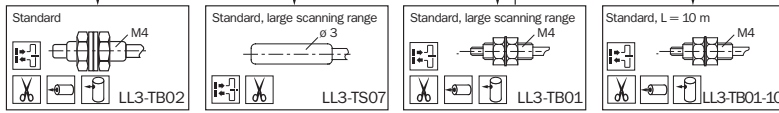
#### Accessories: Tip adapters with focussed optics



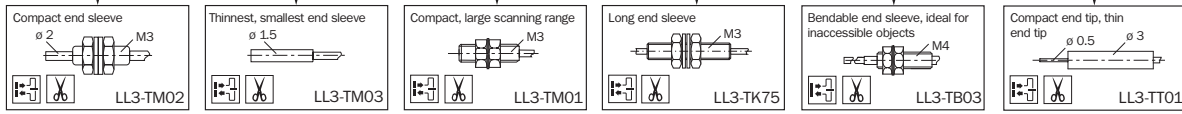
**Flowchart for selection of fibre-optic cable, through-beam systems**

Standard: compact end sleeve, large scanning ranges

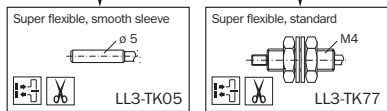
Length of fibre-optic cable 10 m



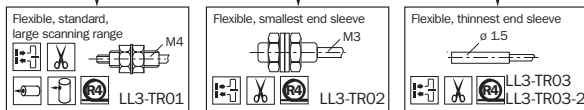
Thin end sleeves, long end sleeves, bendable



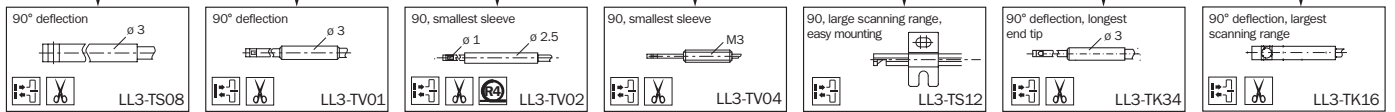
Super flexible, for moved mechanics, bend radius R2 (R = 2 mm)



Flexible fibre-cable, smallest bend radius R4 (R = 4mm)



Integrated 90° deflection, smallest mounting depth

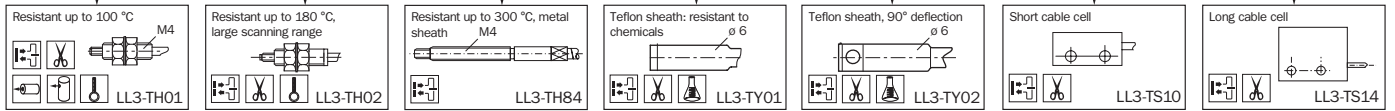


Special applications:

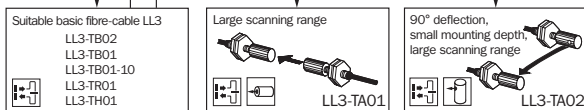
Fibre-optic cable cell

Chemicals

Temperature



Accessories: tip adapters, large scanning ranges (max. 3200 mm), 90° deflection



# LL3 Plastic fibre-optic cables Proximity systems



Type	Order no.	Object size Standard: white 90 %	Minimum <sup>1)</sup>	Suitable for scanning tip adapter <sup>2)</sup>	LL3 – Core structure C = Coaxial, S = Sender, R = Receiver	Can be shortened as re- quired <sup>3)</sup>	LL3- Length	LL3- Outside Ø	Bend radius R LL3
<b>Standard type</b>									
LL3-DM01	5308071	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	1.3 mm	R25
LL3-DT03	5308072	30 x 30 mm	Ø 0.015 mm	No	2 x : Ø 0.5 mm	Yes	2 m	1.0 mm	R15
LL3-DS06	5308073	30 x 30 mm	Ø 0.015 mm	No	2 x : Ø 0.5 mm	Yes	2 m	2.2 mm	R15
LL3-DK06	5313019	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	2.2 mm	R25
LL3-DK04	5313020	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	1.3 mm	R25
<b>Coaxial cable</b>									
LL3-DB01	5308074	100 x 100 mm	Ø 0.015 mm	No	C, S: Ø 1.0 mm, R: 16 x Ø 0.25 mm	Yes	2 m	2.2 mm	R25
LL3-DB01-10	5308075	100 x 100 mm	Ø 0.015 mm	No	C, S: Ø 1.0 mm, R: 16 x Ø 0.25 mm	Yes	10 m	2.2 mm	R25
LL3-DB03	5313021	100 x 100 mm	Ø 0.015 mm	No	C, S: Ø 1.0 mm, R: 16 x Ø 0.25 mm	Yes	2 m	2.2 mm	R25
LL3-DT01	5308076	30 x 30 mm	Ø 0.015 mm	Yes	C, S: Ø 0.5 mm, R: 9 x Ø 0.25 mm	Yes	2 m	1.3 mm	R15
LL3-DM02	5308077	30 x 30 mm	Ø 0.015 mm	No	C, S: Ø 0.5 mm; R: 9 x Ø 0.25 mm	Yes	2 m	1.3 mm	R15
LL3-DK23	5313022	30 x 30 mm	Ø 0.015 mm	No	C, S: Ø 1.0 mm, R: 16 x Ø 0.25 mm	No	0.5 m	2.6 mm	R25
LL3-DK21	5313023	30 x 30 mm	Ø 0.015 mm	No	C, S: Ø 0.25 mm, R: 10 x Ø 0.125 mm	No	2 m	1.6 mm	R15
<b>Super flexible, bend radius R = 2 mm</b>									
LL3-DK66	5313024	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	1.3 mm	R2
LL3-DK67	5313025	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	2.2 mm	R2
LL3-DK04Z	5313026	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	1.3 mm	R2
LL3-DK63Z	5313027	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	1.3 mm	R2
<b>Flexible, bend radius R = 4 mm</b>									
LL3-DR01	5308078	100 x 100 mm	Ø 0.015 mm	No	S: 16 x Ø 0.26 mm, R: 16 x Ø 0.26 mm	Yes	2 m	2.2 mm	R4
LL3-DR02	5308079	30 x 30 mm	Ø 0.015 mm	No	S: 2 x Ø 0.25 mm, R: 2 x Ø 0.25 mm	Yes	1 m	1.0 mm	R4
LL3-DR03	5308080	30 x 30 mm	Ø 0.015 mm	No	S: 4 x Ø 0.25 mm, R: 4 x Ø 0.25 mm	Yes	2 m	1.0 mm	R4
LL3-DR04	5308081	30 x 30 mm	Ø 0.015 mm	No	S: 2 x Ø 0.25 mm, R: 2 x Ø 0.25 mm	No	1 m	1.2 mm	R4
LL3-DR06	5308082	30 x 30 mm	Ø 0.015 mm	No	S: 4 x Ø 0.25 mm, R: 4 x Ø 0.25 mm	Yes	2 m	1.0 mm	R4
<b>Long end tips</b>									
LL3-DB02	5308083	100 x 100 mm	Ø 0.015 mm	No	C, S: Ø 1.0 mm, R: 16 x Ø 0.25 mm	Yes	2 m	2.2 mm	R25
LL3-DM03	5308084	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.5 mm	Yes	2 m	1.0 mm	R15
LL3-DT02	5308085	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.25 mm	Yes	2 m	1.0 mm	R4
LL3-DT04	5308086	30 x 30 mm	Ø 0.015 mm	No	C, S: Ø 0.25 mm, R: 9 x Ø 0.125 mm	No	0.5 m	1.2 mm	R4
LL3-DT05	5313028	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.5 mm	Yes	2 m	1.0 mm	R15
LL3-DR05	5308087	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.25 mm	No	0.5 m	2.2 mm	R4
LL3-DK22	5313029	30 x 30 mm	Ø 0.015 mm	No	C, S: Ø 0.5 mm, R: 9 x Ø 0.25 mm	No	0.5 m	2.1 mm	R15
LL3-DK43	5313030	30 x 30 mm	Ø 0.015 mm	No	2 x : Ø 0.5 mm	Yes	2 m	1.0 mm	R15
<b>Integrated 90° deflection</b>									
LL3-DV01	5308088	30 x 30 mm	Ø 0.025 mm	No	2 x Ø 1.0 mm	Yes	2 m	2.2 mm	R25
LL3-DV02	5308089	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.5 mm	Yes	2 m	1.0 mm	R15
LL3-DV03	5308090	30 x 30 mm	Ø 0.025 mm	No	2 x Ø 1.0 mm	Yes	2 m	2.2 mm	R25
LL3-DK33	5313031	30 x 30 mm	Ø 0.025 mm	No	2 x Ø 1.0 mm	Yes	2 m	2.2 mm	R25
<b>Level switch for liquids</b>									
LL3-DF01	5308094	clear liquid	–	No	2 x Ø 1.0 mm	Yes	2 m	6 mm	R60
LL3-DF02	5308095	cloudy liquid	–	No	2 x Ø 1.0 mm	Yes	2 m	6 mm	R60
<b>Temperature-resistant</b>									
LL3-DH01	5308091	100 x 100 mm	Ø 0.015 mm	No	2 x Ø 1.5 mm	Yes	2 m	2.2 mm	R35
LL3-DH02	5308092	100 x 100 mm	Ø 0.015 mm	No	2 x Ø 1.0 mm	Yes	2 m	2.2 mm	R25
LL3-DH83	5313032	100 x 100 mm	Ø 0.015 mm	No	Ø 1.6 (mixed 50 µm)	No	1 m	5 mm	R25
<b>Teflon sheath</b>									
LL3-DY01	5308093	100 x 100 mm	Ø 0.02 mm	No	2 x Ø 1.0 mm	Yes	2 m	6 mm	R60
<b>Fix focus</b>									
LL3-DC01	5313033	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.5 mm	Yes	2 m	1.0 mm	R15

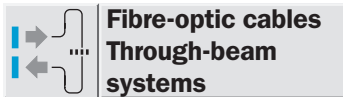
<sup>1)</sup> Minimum object diameter: scanning range reduction

<sup>2)</sup> See also LL3-Accessories: tip adapters

<sup>3)</sup> Cutter FC for fibre-optic cables included with delivery

Dimensioning Mounting sleeve	End tip	Fibre material		End tip <sup>4)</sup>	Operating temperature	General description
		Core	Sheath			
M4	–	PMMA	PE	1.4305	–40 ... +70 °C	M4, core: 2 x Ø 1.0 mm
Ø 2.5 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	2.5 mm cylindric, core: 2 x Ø 0.5 mm
M3	–	PMMA	PE	1.4305	–40 ... +70 °C	M3, core: 2 x Ø 0.5 mm
M6	–	PMMA	PE	1.4306	–40 ... +70 °C	M6, core: 2 x Ø 1.0 mm
Ø 3 mm	–	PMMA	PE	1.4306	–40 ... +70 °C	Ø 3, core: 2 x Ø 1.0 mm
M6	–	PMMA	PE	1.4305	–40 ... +70 °C	M6, core: S = Ø 1.0 mm/R = 16 x Ø 0.25 mm; fibre length 2 m
M6	–	PMMA	PE	1.4305	–40 ... +70 °C	M6, core: S = Ø 1.0 mm/R = 16 x Ø 0.25 mm; fibre length 10 m
M6	–	PMMA	PE	1.4305	–40 ... +70 °C	M6, core: S = Ø 1.0 mm/R = 16 x Ø 0.25 mm
M3	–	PMMA	PE	1.4305	–40 ... +70 °C	M3, core: S = Ø 0.5 mm/R = 9 x Ø 0.25 mm
M4	–	PMMA	PE	1.4305	–40 ... +70 °C	M4, core: S = Ø 0.5 mm/R = 9 x Ø 0.25 mm
Ø 3 mm	–	PMMA	PE	1.4306	–40 ... +70 °C	Ø 3 mm, core: S = Ø 1.0 mm/R = 16 x Ø 0.25 mm
M3	–	PMMA	PE	1.4306	–40 ... +70 °C	M3, core: S = Ø 0.25 mm/R = 10 x Ø 0.125 mm
M4	–	PMMA	PE	1.4305	–40 ... +70 °C	M4, core: 2 x Ø 1.0 mm; R = 2
M6	–	PMMA	PE	1.4305	–40 ... +70 °C	M6, core: 2 x Ø 1.0 mm; R = 2
Ø 3 mm	–	PMMA	PE	1.4306	–40 ... +70 °C	Ø 3 mm, core: 2 x Ø 1.0 mm; R = 2
M4	Ø 2.5 mm	PMMA	PE	1.4306	–40 ... +70 °C	M4, Ø 2.5 end tip (bendable R = 10); core 2 x Ø 1.0 mm
M6	–	PMMA	PE	CuZn	–40 ... +70 °C	M6; core: S = 16 x Ø 0.26 mm/R = 16 x Ø 0.26 mm, mixed; R = 4
M3	–	PMMA	PE	1.4305	–40 ... +70 °C	M3; core: S = 2 x Ø 0.25 mm/R = 2 x Ø 0.25 mm, mixed; R = 4
Ø 3 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 3 cylindric, core: S = 4 x Ø 0.25 mm/R = 4 x Ø 0.25 mm mixed; R = 4
Ø 1.5 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 1.5 cylindric, core: S = 2 x Ø 0.25 mm/R = 2 x Ø 0.25 mm mixed; R = 4
M4	–	PMMA	PE	1.4305	–40 ... +70 °C	M4; core: S = 4 x Ø 0.25 mm/R = 4 x Ø 0.25 mm splitted; R = 4
M6	Ø 2.5 mm	PMMA	PE	1.4305	–40 ... +70 °C	M6, Ø 2.5 end tip, bendable; coaxial: S = Ø 1.0 mm/R = 16 x Ø 0.25 mm
M4	–	PMMA	PE	1.4305	–40 ... +70 °C	M4, Ø 1.5 end tip, bendable; core: 2 x Ø 0.5 mm
M3	–	PMMA	PE	1.4305	–40 ... +70 °C	M3, Ø 0.82 end tip; core: 2 x Ø 0.25 mm; R = 4
M3	–	PMMA	PE	1.4305	–40 ... +70 °C	M3, Ø 0.82 end tip; coax: 1 x Ø 0.25 mm/9 x Ø 0.125 mm; fibre length 0.5 m; R = 4
M4	–	PMMA	PE	1.4305	–40 ... +70 °C	M4, Ø 1.5 end tip, not bendable; core: 2 x Ø 0.5 mm;
Ø 3 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 3 cylindric, Ø 0.82 end tip; core: 2 x Ø 0.25 mm; fibre length 0.5 m; R = 4
Ø 2.5 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 2.5 mm cylindric, Ø 1.5 mm end tip; core: S = Ø 0.5 mm/R = 9 x Ø 0.25 mm;
Ø 4.0 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 4 mm, Ø 1.5 end tip, core: 2 x Ø 0.5 mm
Ø 5 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 5 mm cylindric, side view, Ø 2.7 mm short sleeve; core: 2 x Ø 1.0 mm
Ø 3 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 3 mm cylindric, side view, Ø 1.5 mm end tip; core: 2 x Ø 0.5 mm
M6	–	PMMA	PE	1.4305	–40 ... +70 °C	M6, side view, Ø 2.5 mm end tip; core: 2 x Ø 1.0 mm
Ø 5 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 5 mm cylindric, side view, Ø 2.7 mm lange sleeve; core: 2 x Ø 1.0 mm
Ø 6 mm	–	PTEE (Teflon sheath)			–40 ... +70 °C	Ø 6 mm cylindric, Teflon jacket; for clear liquid detection
Ø 6 mm	–	PTEE (Teflon sheath)			–40 ... +70 °C	Ø 6 mm cylindric, Teflon jacket; for cloudy liquid detection
M6	–	Si	FEP	1.4305	–40 ... +180 °C	Heat resist to 180 °C; M6; core: 2 x Ø 1.5 mm
M6	–	PC	PVC	1.4305	–40 ... +100 °C	Heat resist to 105 °C; M6; core: 2 x Ø 1.0 mm
M6	–	Glas	1.4305	1.4305	–40 ... +300 °C	Heat resist to 300 °C; M6; core: Ø 1.6 (mixed 50 µ)
Ø 6 mm	–	PTEE (Teflon sheath)			–40 ... +100 °C	Ø 6 mm cylindric, Teflon sheath
19 x 12 x 3	–	PMMA	PE	Al	–40 ... +70 °C	Fix focussed 3mm

<sup>4)</sup> 1.4305 (German materials no.) stainless steel, resistant to rusting and acids



# LL3 Plastic fibre-optic cables Through-beam systems

Type	Order no.	Object size Standard	Minimum <sup>1)</sup>	Suitable for scanning tip adapter <sup>2)</sup>	LL3 – Core structure	Can be shortened as re- quired <sup>3)</sup>	LL3- Length	LL3-Out- side Ø	Bend radius R LL3	Sleeve
<b>Standard type</b>										
LL3-TS07	5308049	Ø 1.5 mm	Ø 0.5 mm	No	Ø 1.5 mm	Yes	2 m	2.2 mm	R30	–
LL3-TB01	5308050	Ø 1.5 mm	Ø 0.5 mm	Yes	Ø 1.5 mm	Yes	2 m	2.2 mm	R30	–
LL3-TB01-10	5308051	Ø 1.5 mm	Ø 0.5 mm	Yes	Ø 1.5 mm	Yes	10 m	2.2 mm	R30	–
LL3-TB02	5308048	Ø 1 mm	Ø 0.2 mm	Yes	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	–
<b>Super flexible, bend radius R = 2 mm</b>										
LL3-TK05	5313034	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm (multi-core)	Yes	2 m	2.2 mm	R2	–
LL3-TK77	5313035	Ø 1 mm	Ø 0.2 mm	Yes	Ø 1.0 mm (multi-core)	Yes	2 m	2.2 mm	R2	–
<b>Flexible, bend radius R = 4 mm</b>										
LL3-TR01	5308052	Ø 1 mm	Ø 0.3 mm	Yes	Ø 0.265 mm x 16	Yes	2 m	2.2 mm	R4	–
LL3-TR02	5308053	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.25 mm x 4	Yes	2 m	1.0 mm	R4	–
LL3-TR03	5308054	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.25 mm x 4	Yes	1 m	1.0 mm	R4	–
LL3-TR03-02	5308055	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.25 mm x 4	Yes	2 m	1.0 mm	R4	–
<b>Long end tips</b>										
LL3-TB03	5308056	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	10
LL3-TT01	5308057	Ø 0.25 mm	Ø 0.1 mm	No	Ø 0.25 mm	Yes	2 m	1.0 mm	R15	–
LL3-TK75	5313036	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.5 mm	Yes	2 m	1.0 mm	R15	–
<b>Integrated 90° deflection</b>										
LL3-TV01	5308058	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	–
LL3-TV02	5308059	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.5 mm	Yes	2 m	1.0 mm	R15	–
LL3-TV04	5308060	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.5 mm	Yes	2 m	1.0 mm	R15	–
LL3-TS08	5308061	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	–
LL3-TS12	5308062	Ø 1.7 mm	Ø 0.5 mm	No	Ø 0.75 mm	Yes	2 m	2.2 mm	R25	–
LL3-TK34	5313037	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	–
LL3-TK16	5313038	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	–
<b>Fibre-optic cable cell</b>										
LL3-TS10	5308063	Ø 2 mm	Ø 1 mm	No	Ø 0.25 mm x 16	Yes	2 m	2.2 mm	R25	–
LL3-TS14	5313039	Ø 1.5 mm	Ø 0.5 mm	No	Ø 0.25 mm x 16	Yes	2 m	2.2 mm	R25	–
<b>Temperature-resistant</b>										
LL3-TH01	5308064	Ø 1 mm	Ø 0.2 mm	Yes	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	–
LL3-TH02	5308065	Ø 1.5 mm	Ø 0.5 mm	No	Ø 1.5 mm	Yes	2 m	2.2 mm	R35	–
LL3-TH84	5313040	Ø 1 mm	Ø 0.2 mm	No	Ø 1.1 mm (multi-core Ø 50 µm)	No	1 m	2.2 mm	R25	–
<b>Teflon sheath</b>										
LL3-TY01	5308066	Ø 4 mm	Ø 0.3 mm	No	Ø 1.0 mm	Yes	2 m	6 mm	R60	–
LL3-TY02	5308067	Ø 4 mm	Ø 0.3 mm	No	Ø 1.0 mm	Yes	2 m	6 mm	R60	–
<b>Smallest end sleeves</b>										
LL3-TM01	5308068	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm	Yes	2 m	1.3 mm	R25	–
LL3-TM02	5308069	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.5 mm	Yes	2 m	1.0 mm	R15	–
LL3-TM03	5308070	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.5 mm	Yes	2 m	1.0 mm	R15	–

<sup>1)</sup> Minimum object diameter: scanning range reduction

<sup>2)</sup> See also LL3-Accessories: tip adapters

<sup>3)</sup> Cutter FC for fibre-optic cables included with delivery

Dimensioning Mounting sleeve	End tip	Fibre material		End tip <sup>4)</sup>	Operating temperature	General description
		Core	Sheath			
Ø 3 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 3 mm cylindric
M4	–	PMMA	PE	1.4305	–40 ... +70 °C	M4, long range, fibre length 2 m
M4	–	PMMA	PE	1.4305	–40 ... +70 °C	M4, long range, fibre length 10 m
M4	–	PMMA	PE	CuZn	–40 ... +70 °C	M4, standard
Ø 3 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 3 mm cylindric, multicore, tubular
M4	–	PMMA	PE	CuZn	–40 ... +70 °C	M4 cylindric, multicore, tubular
M4	–	PMMA	PE	CuZn	–40 ... +70 °C	flexible, R4 mm, M4
M3	–	PMMA	PE	1.4305	–40 ... +70 °C	flexible, R4 mm, M3
Ø 1.5 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	flexible, R4 mm, Ø 1.5 mm cylindric, fibre length 1 m
1.5 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	flexible, R4 mm, Ø 1.5 mm cylindric, fibre length 2 m
M4	Ø 1.5 mm	PMMA	PE	1.4305	–40 ... +70 °C	M4, Ø 1.5 mm end tip bendable
Ø 3 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 3 mm cylindric, Ø 0.5 mm end tip
M3	–	PMMA	PE	1.4305	–40 ... +70 °C	M3, Ø 1.0 mm end tip
Ø 3 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	3 mm cylindric, side view 90°, Ø 2.0 mm end tip
Ø 2.5 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 2.5 mm cylindric, side view 90°, Ø 1.0 mm end tip
M3	–	PMMA	PE	1.4305	–40 ... +70 °C	M3, side view 90°, Ø 1.0 mm end tip
Ø 3 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 3 mm cylindric, side view 90°, Ø 2.0 mm end tip
Ø 4 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 4 mm cylindric, side view 90°, special mounting
Ø 3 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	Ø 3 mm cylindric, side view 90°, Ø 1.5 mm end tip
Ø 4 mm	–	PMMA	PE	1.4305	–40 ... +100 °C	Ø 4 mm cylindric, side view 90°, short end tip, heat resist to 100 °C
10 x 20 x 5	–	PMMA	PE	CuZn	–40 ... +70 °C	Fibre-optic cable cell 5.25 mm
19 x 25 x 5	–	PMMA	PE	CuZn	–40 ... +70 °C	Fibre-optic cable cell 10.5 mm
M4	–	PC	PE	CuZn	–40 ... +100 °C	Heat resist to 100°, M4-sleeve
M4	–	Si	FEP	1.4305	–40 ... +180 °C	Heat resist to 180°, M4-sleeve
M4	–	Glas	1.4305	1.4305	–40 ... +300 °C	Heat resist to 300°, M4-sleeve, glass/metal
Ø 6 mm	–	PTEE (Teflon sheath)			–40 ... +70 °C	Ø 6 mm cylindric, Teflon sheath
Ø 6 mm	–	PTEE (Teflon sheath)			–40 ... +70 °C	Ø 6 mm cylindric, side view 90°, Teflon sheath
M3	–	PMMA	PE	1.4305	–40 ... +70 °C	M3, Ø LL-core: 1 mm
M3	–	PMMA	PE	1.4305	–40 ... +70 °C	M3, Ø LL-core: 0.5 mm
Ø 1.5 mm	–	PMMA	PE	1.4305	–40 ... +70 °C	1.5 mm cylindric, Ø LL-core: 0.5 mm

<sup>4)</sup> 1.4305 (German materials no.) stainless steel, resistant to rusting and acids

**Accessories**  
**LL3 Fibre-optic cables**

# LL3 Plastic fibre-optic cables

## Accessories – Tip adapters

Type LL3 proximity, lenses with focussed optic	Order no.	Object size (White 90 %)		Dimensioning		Lens material		Operating temperature	Remark
		Standard	Minimum	Thread	Outside Ø	Lens	Housing		
<b>Focus 6 mm, spot size Ø 0.25 mm</b>									
LL3-DA01	5308127			M3	Ø 5.0 mm			-40 ... +70 °C	<ul style="list-style-type: none"> <li>■ For detection of very small parts,</li> <li>■ focused , very small light spot diameter,</li> <li>■ high sensitivity (6 % remission),</li> <li>■ for suppressing interference – causing backgrounds</li> </ul>
Combined with standard fibre LL3									
LL3-DT01	5308076	Ø 0.25 mm	Ø 0.1 mm			Glass	Al	-40 ... +70 °C	
<b>Focus 12 mm, spot size Ø 3.0 mm</b>									
LL3-DA02	5308130			M3	Ø 5.0 mm			-40 ... +70 °C	<ul style="list-style-type: none"> <li>■ Suitable as a mark sensor for color marks,</li> <li>■ focused , very small light spot diameter,</li> <li>■ high sensitivity (6 % remission),</li> <li>■ for suppressing interference – causing backgrounds</li> </ul>
Combined with standard fibre LL3									
LL3-DT01	5308076	Ø 3.0 mm	Ø 0.1 mm			Glass	Al	-40 ... +70 °C	

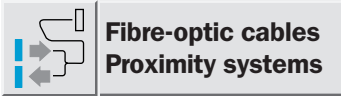
Type LL3 through-beam, lenses for extended scanning ranges	Order no.	Object size		Dimensioning		Lens material		Operating temperature	Remark
		Standard	Minimum	Thread	Outside Ø	Lens	Housing		
<b>Axial optic, largest scanning ranges</b>									
LL3-TA01	5308128			M2.6	Ø 5.0 mm	Glass	CuZn	-40 ... +300 °C	<ul style="list-style-type: none"> <li>■ For through-beam systems,</li> <li>■ for increased scanning ranges (up to factor 10 x),</li> <li>■ light spot diameter: approx. 170 mm at 1000 mm</li> <li>■ aperture: approx. 15°</li> </ul>
Combined with standard fibres LL3									
LL3-TB01	5308050	–	Ø 3 mm <sup>1)</sup> /4 mm <sup>2)</sup>					-40 ... +70 °C	
LL3-TB01-10	5308051	–	Ø 3 mm <sup>1)</sup> /4 mm <sup>2)</sup>					-40 ... +70 °C	
LL3-TB02	5308048	–	Ø 3 mm <sup>1)</sup> /4 mm <sup>2)</sup>					-40 ... +70 °C	
Combined with super flexible fibres									
LL3-TK77	5313035	–	Ø 3 mm <sup>1)</sup> /4 mm <sup>2)</sup>					-40 ... +70 °C	
Combined with flexible fibres									
LL3-TR01	5308052	–	Ø 3 mm <sup>1)</sup> /4 mm <sup>2)</sup>					-40 ... +70 °C	
Combined with heat resisting fibres (100 °C)									
LL3-TH01	5308064	–	Ø 3 mm <sup>1)</sup> /4 mm <sup>2)</sup>					-40 ... +100 °C	
<b>Integrated 90° deflection, large scanning ranges</b>									
LL3-TA02	5308129			M2.6	Ø 5.0 mm	Glas	CuZn	-40 ... +300 °C	<ul style="list-style-type: none"> <li>■ For through-beam systems,</li> <li>■ integrated 90° deflection,</li> <li>■ for increased scanning ranges,</li> <li>■ light spot diameter: x-axis approx. 110 mm, y-axis ca. 170 mm (for 200 mm in each case),</li> <li>■ aperture: x-axis approx. 30°, y-axis approx. 40°</li> </ul>
Combined with standard fibres LL3									
LL3-TB01	5308050	–	Ø 3 mm					-40 ... +70 °C	
LL3-TB01-10	5308051	–	Ø 3 mm					-40 ... +70 °C	
LL3-TB02	5308048	–	Ø 3 mm					-40 ... +70 °C	
Combined with super flexible fibres									
LL3-TK77	5313035	–	Ø 3 mm					-40 ... +70 °C	
Combined with flexible fibres									
LL3-TR01	5308052	–	Ø 3 mm					-40 ... +70 °C	
Combined with heat resisting fibres (100 °C)									
LL3-TH01	5308064	–	Ø 3 mm					-40 ... +100 °C	

1) For devices WLL190T

2) For devices WLL170, WLL160 and VLL 18T



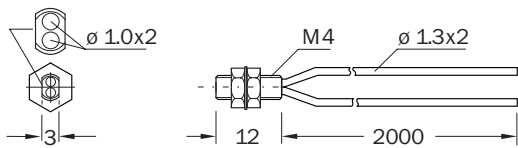
Dimensional drawings and order information



Dimensional drawings for LL3 fibre-optic cables, proximity systems

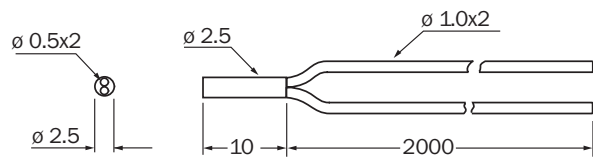
Standard type

Type	Order no.
LL3-DM01	5308071



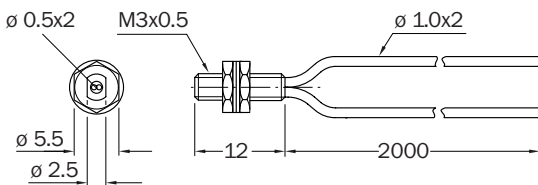
Standard type

Type	Order no.
LL3-DT03	5308072



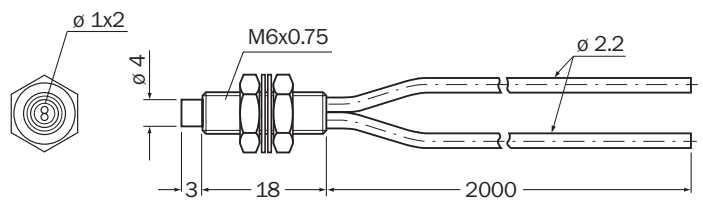
Standard type

Type	Order no.
LL3-DS06	5308073



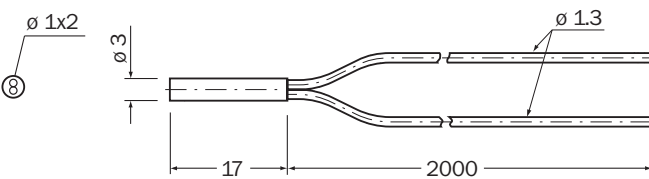
Standard type

Type	Order no.
LL3-DK06	5313019



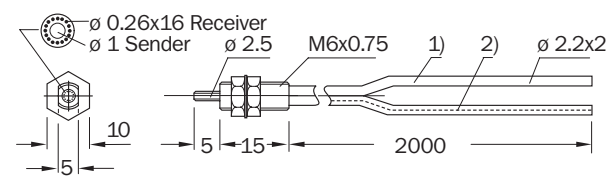
Standard type

Type	Order no.
LL3-DK04	5313020



Coaxial cable

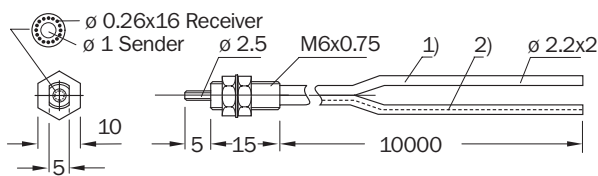
Type	Order no.
LL3-DB01	5308074



- 1) Sender
- 2) Receiver

Coaxial cable

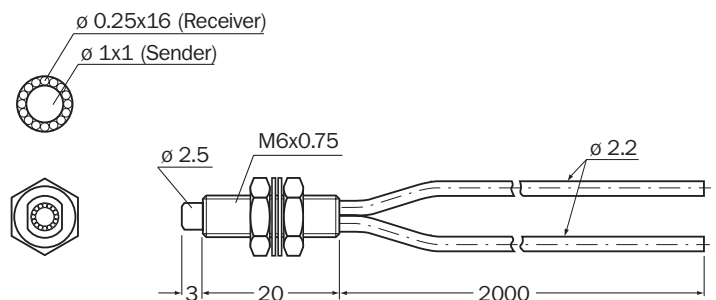
Type	Order no.
LL3-DB01-10	5308075



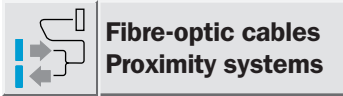
- 1) Sender
- 2) Receiver

Coaxial cable

Type	Order no.
LL3-DB03	5313021



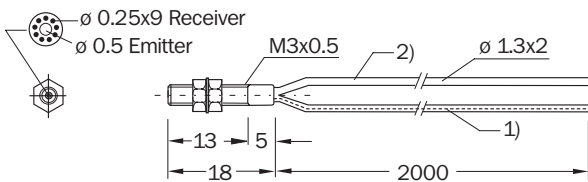
## Dimensional drawings and order information



### Dimensional drawings for LL3 fibre-optic cables, proximity systems

#### Coaxial cable

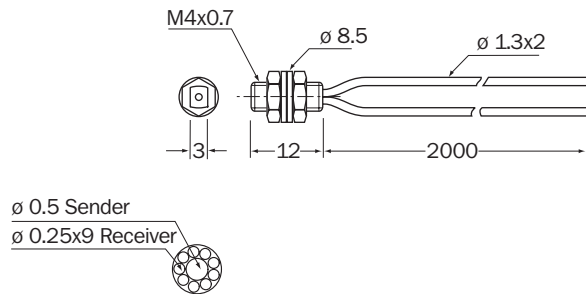
Type	Order no.
LL3-DT01	5308076



- 1) Sender
- 2) Receiver

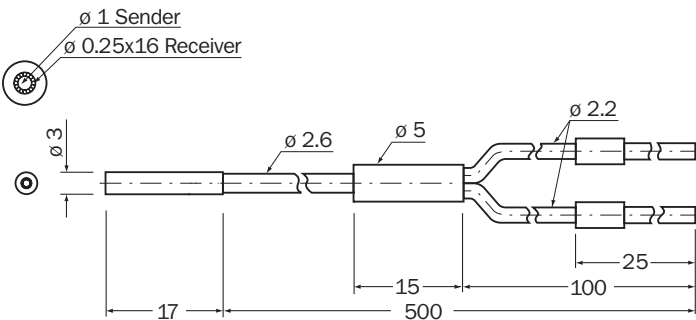
#### Coaxial cable

Type	Order no.
LL3-DM02	5308077



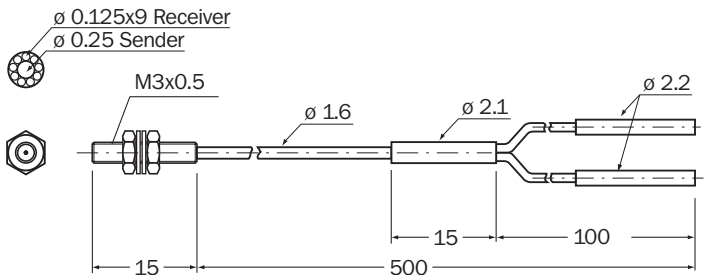
#### Coaxial cable

Type	Order no.
LL3-DK23	5313022



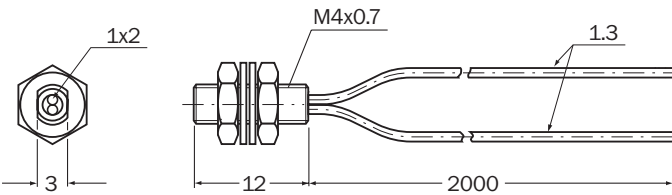
#### Coaxial cable

Type	Order no.
LL3-DK21	5313023



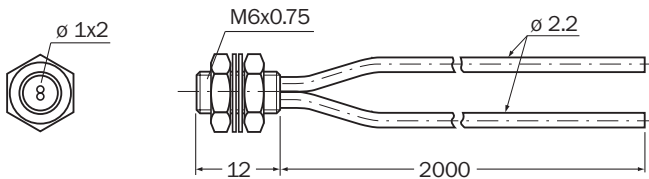
#### Super flexible, bend radius R = 2 mm

Type	Order no.
LL3-DK66	5313024



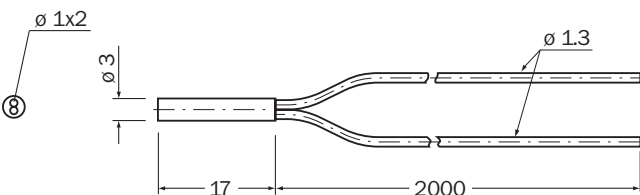
#### Super flexible, bend radius R = 2 mm

Type	Order no.
LL3-DK67	5313025



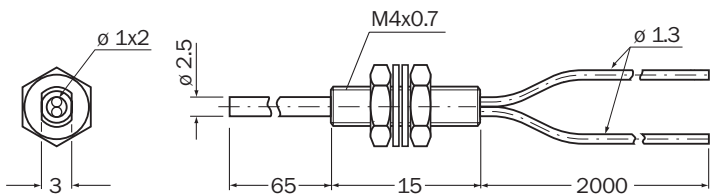
#### Super flexible, bend radius R = 2 mm

Type	Order no.
LL3-DK04Z	5313026



#### Super flexible, bend radius R = 2 mm

Type	Order no.
LL3-DK63Z	5313027



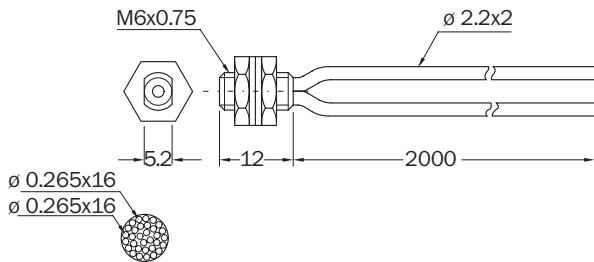
Dimensional drawings and order information



Dimensional drawings for LL3 fibre-optic cables, proximity systems

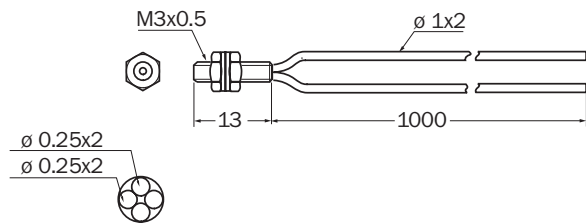
Flexible, bend radius R = 4 mm

Type	Order no.
LL3-DR01	5308078



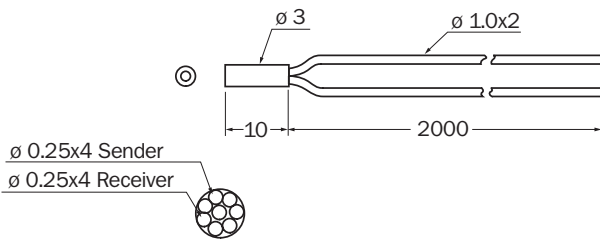
Flexible, bend radius R = 4 mm

Type	Order no.
LL3-DR02	5308079



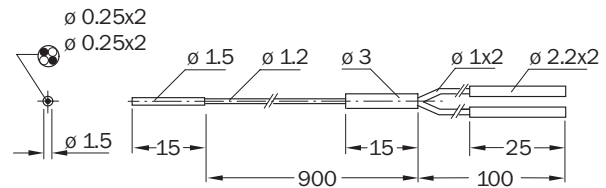
Flexible, bend radius R = 4 mm

Type	Order no.
LL3-DR03	5308080



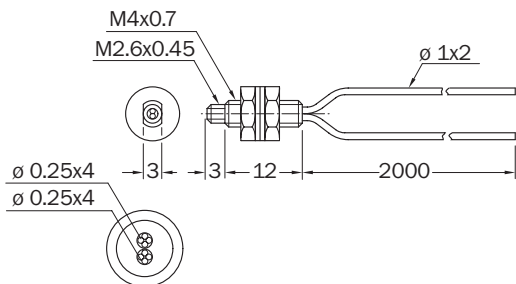
Flexible, bend radius R = 4 mm

Type	Order no.
LL3-DR04	5308081



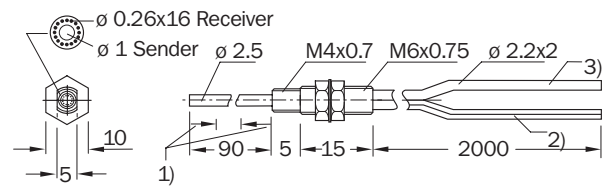
Flexible, bend radius R = 4 mm

Type	Order no.
LL3-DR06	5308082



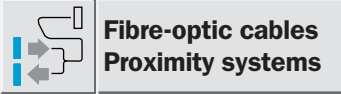
Long end tips

Type	Order no.
LL3-DB02	5308083



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

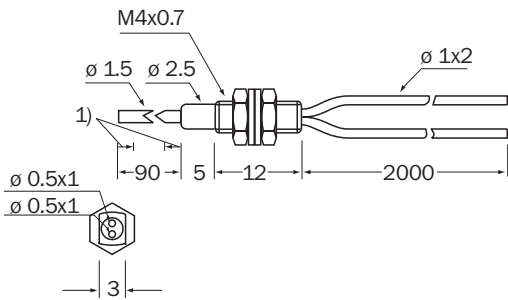
## Dimensional drawings and order information



## Dimensional drawings for LL3 fibre-optic cables, proximity systems

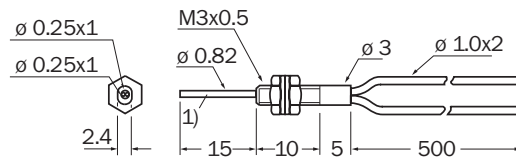
### Long end tips

Type	Order no.
LL3-DM03	5308084



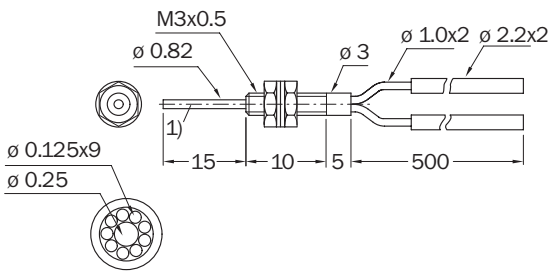
### Long end tips

Type	Order no.
LL3-DT02	5308085



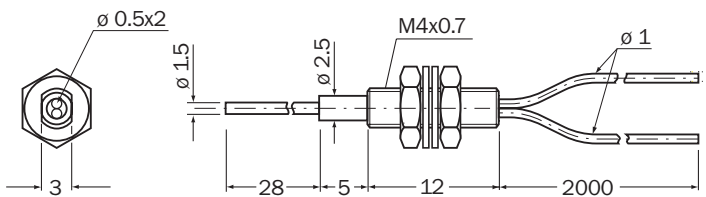
### Long end tips

Type	Order no.
LL3-DT04	5308086



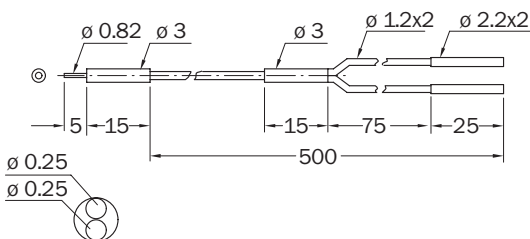
### Long end tips

Type	Order no.
LL3-DT05	5313028



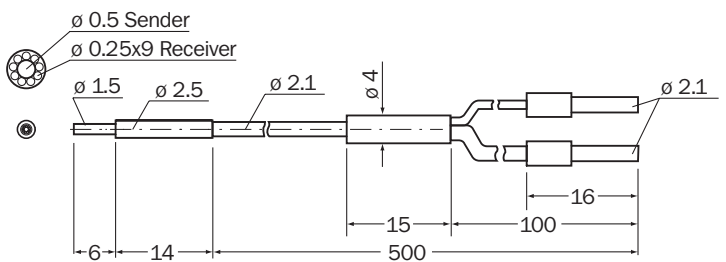
### Long end tips

Type	Order no.
LL3-DR05	5308087



### Long end tips

Type	Order no.
LL3-DK22	5313029



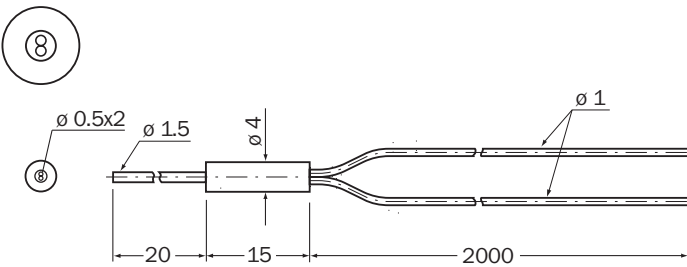
Dimensional drawings and order information



Dimensional drawings for LL3 fibre-optic cables, proximity systems

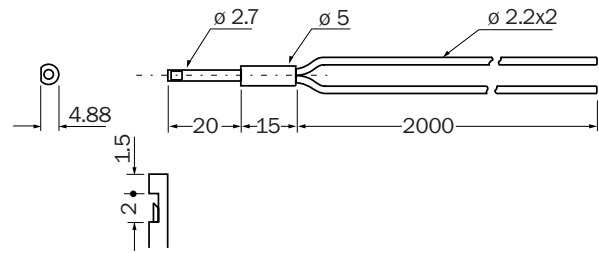
Long end tips

Type	Order no.
LL3-DK43	5313030



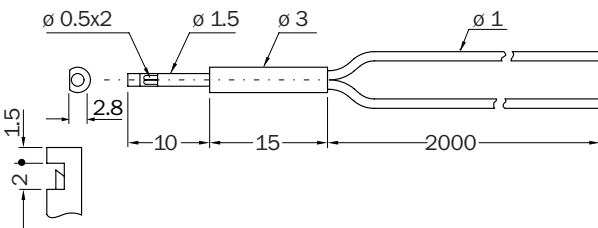
Integrated 90° deflection

Type	Order no.
LL3-DV01	5308088



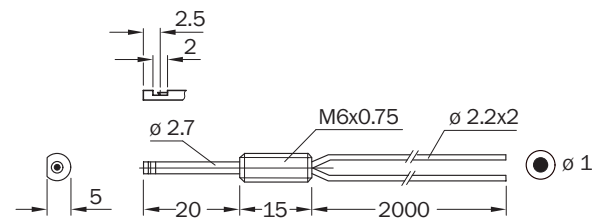
Integrated 90° deflection

Type	Order no.
LL3-DV02	5308089



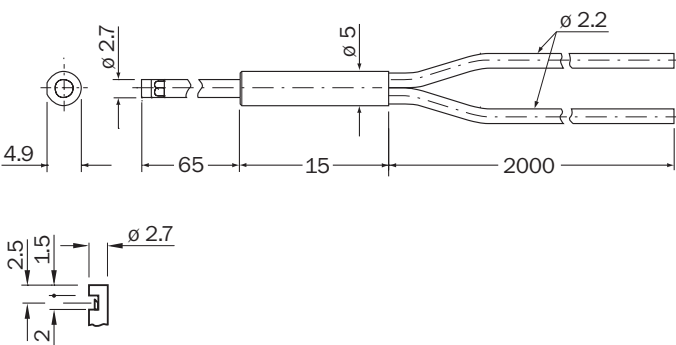
Integrated 90° deflection

Type	Order no.
LL3-DV03	5308090



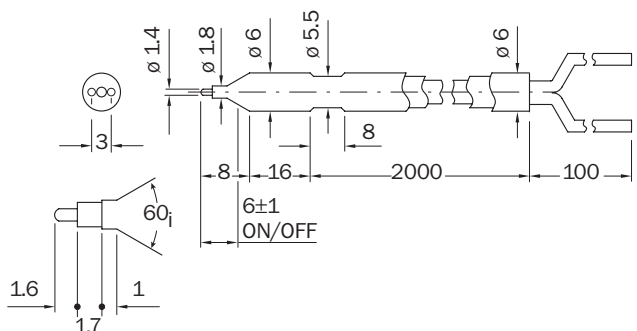
Integrated 90° deflection

Type	Order no.
LL3-DK33	5313031



Level switch for liquids

Type	Order no.
LL3-DF01	5308094 <sup>1)</sup>
LL3-DF02	5308095 <sup>2)</sup>



<sup>1)</sup> For transparent liquids  
<sup>2)</sup> For cloudy liquids

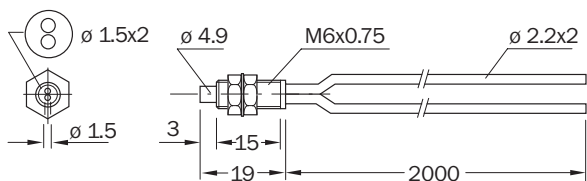
## Dimensional drawings and order information



## Dimensional drawings for LL3 fibre-optic cables, proximity systems

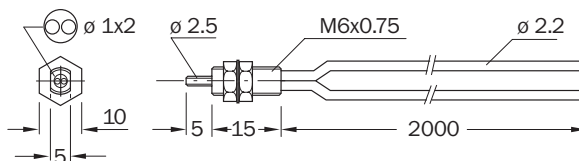
### Temperature-resistant

Type	Order no.
LL3-DH01	5308091



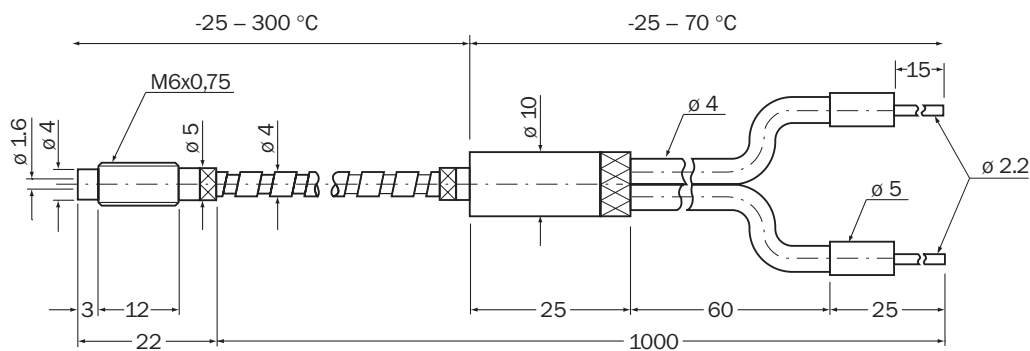
### Temperature-resistant

Type	Order no.
LL3-DH02	5308092



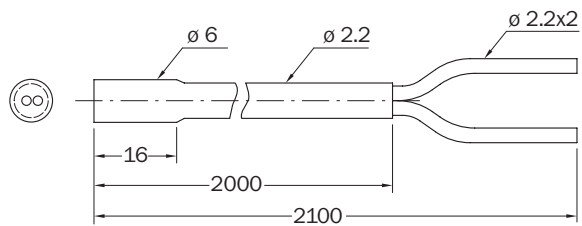
### Temperature-resistant

Type	Order no.
LL3-DH83	5313032



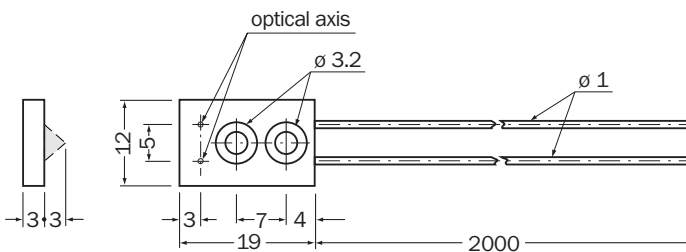
### Teflon sheath

Type	Order no.
LL3-DY01	5308093



### Fix focus

Type	Order no.
LL3-DC01	5313033



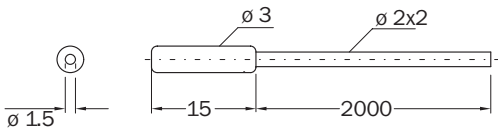
Dimensional drawings and order information

**Fibre-optic cables**  
**Through-beam systems**

Dimensional drawings for LL3 fibre-optic cables, through-beam systems

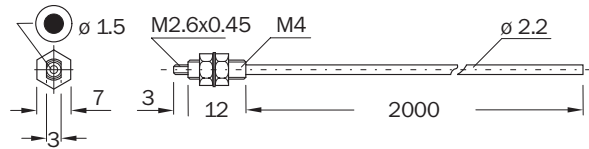
Standard type

Type	Order no.
LL3-TS07	5308049



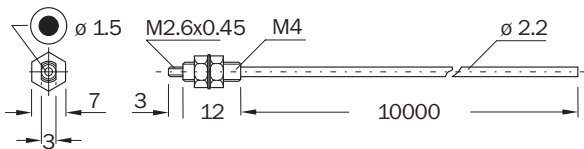
Standard type

Type	Order no.
LL3-TB01	5308050



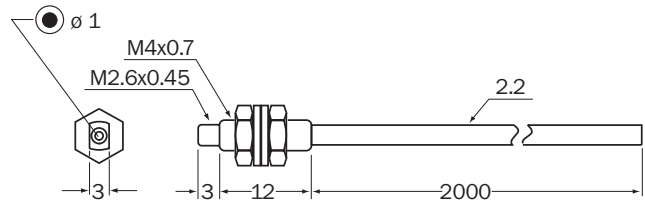
Standard type

Type	Order no.
LL3-TB01-10	5308051



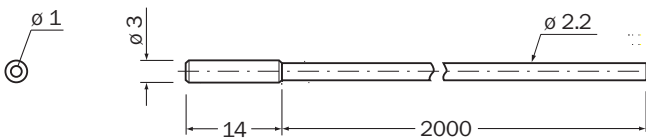
Standard type

Type	Order no.
LL3-TB02	5308048



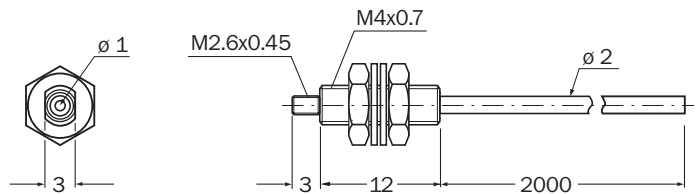
Super flexible, bend radius R = 2 mm

Type	Order no.
LL3-TK05	5313034



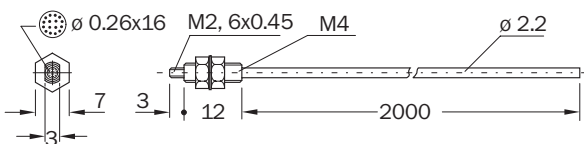
Super flexible, bend radius R = 2 mm

Type	Order no.
LL3-TK77	5313035



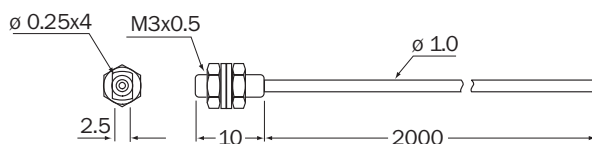
Flexible, bend radius R = 4 mm

Type	Order no.
LL3-TR01	5308052

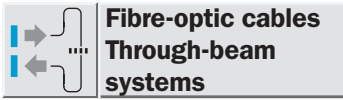


Flexible, bend radius R = 4 mm

Type	Order no.
LL3-TR02	5308053



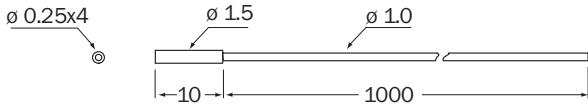
## Dimensional drawings and order information



## Dimensional drawings for LL3 fibre-optic cables, through-beam systems

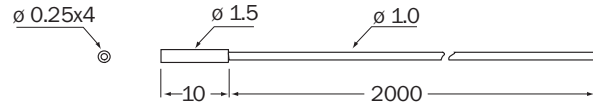
### Flexible, bend radius R = 4 mm

Type	Order no.
LL3-TR03	5308054



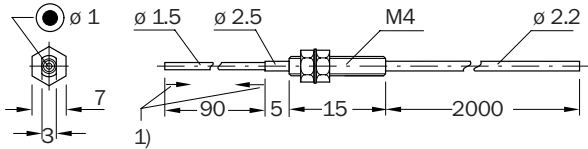
### Flexible, bend radius R = 4 mm

Type	Order no.
LL3-TR03-02	5308055



### Long end tips

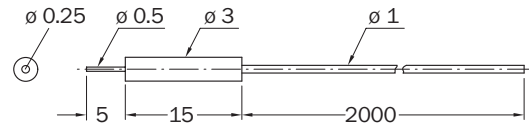
Type	Order no.
LL3-TB03	5308056



1) Flexible end tip, do not bend in this region (10 mm), bend radius R 10

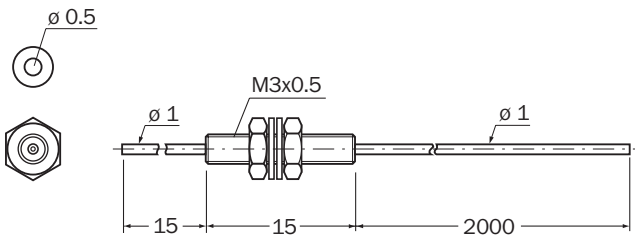
### Long end tips

Type	Order no.
LL3-TT01	5308057



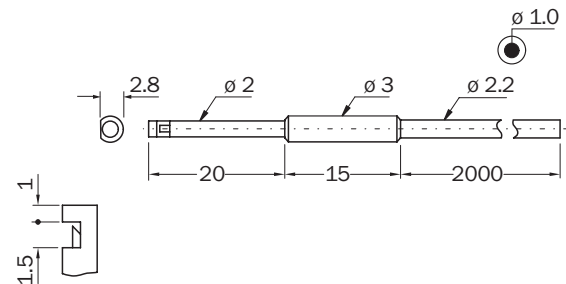
### Long end tips

Type	Order no.
LL3-TK75	5313036



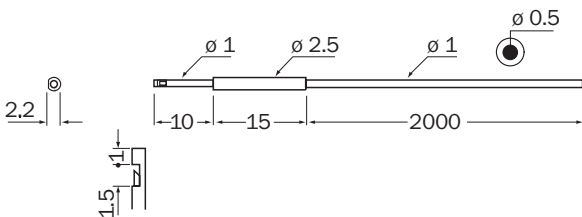
### Integrated 90° deflection

Type	Order no.
LL3-TV01	5308058



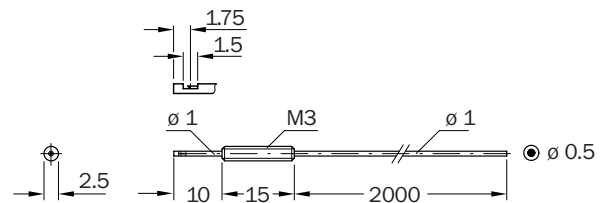
### Integrated 90° deflection

Type	Order no.
LL3-TV02	5308059



### Integrated 90° deflection

Type	Order no.
LL3-TV04	5308060





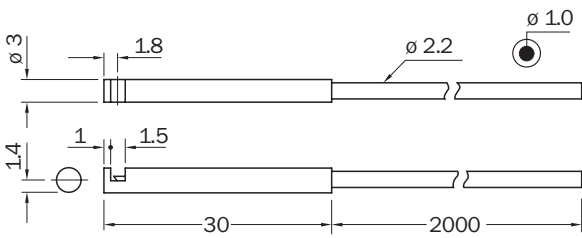
Dimensional drawings and order information

**Fibre-optic cables**  
**Through-beam systems**

Dimensional drawings for LL3 fibre-optic cables, through-beam systems

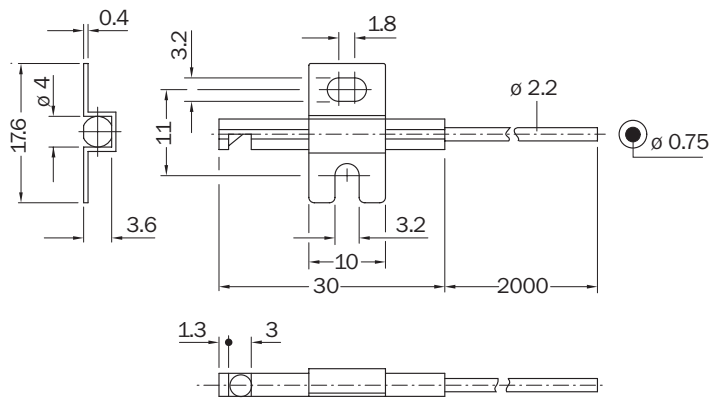
Integrated 90° deflection

Type	Order no.
LL3-TS08	5308061



Integrated 90° deflection

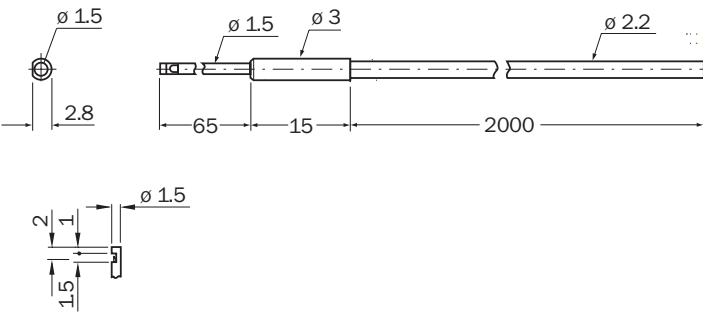
Type	Order no. *)
LL3-TS12	5308062



\*) Mounting bracket included with delivery

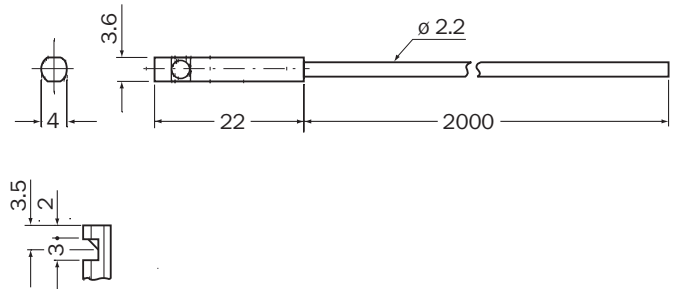
Integrated 90° deflection

Type	Order no.
LL3-TK34	5313037



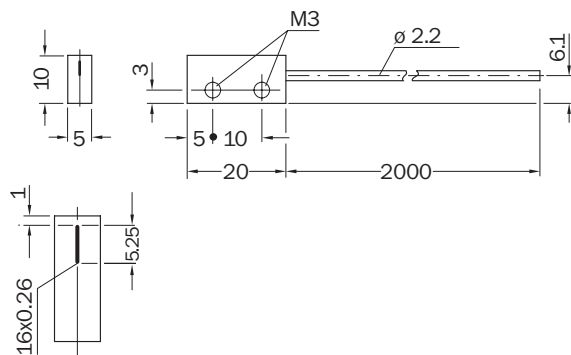
Integrated 90° deflection

Type	Order no.
LL3-TK16	5313038



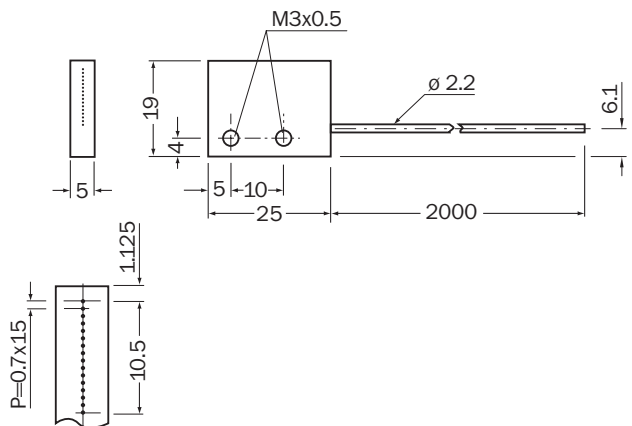
Fibre-optic cable cell

Type	Order no.
LL3-TS10	5308063

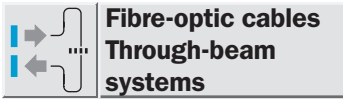


Fibre-optic cable cell

Type	Order no.
LL3-TS14	5313039



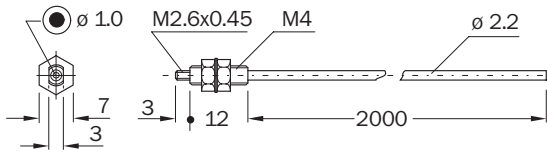
## Dimensional drawings and order information



## Dimensional drawings for LL3 fibre-optic cables, through-beam systems

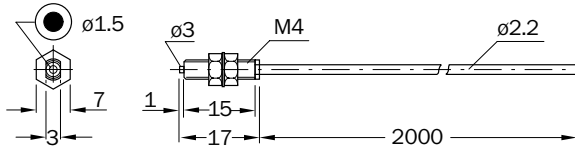
### Temperature-resistant

Type	Order no.
LL3-TH01	5308064



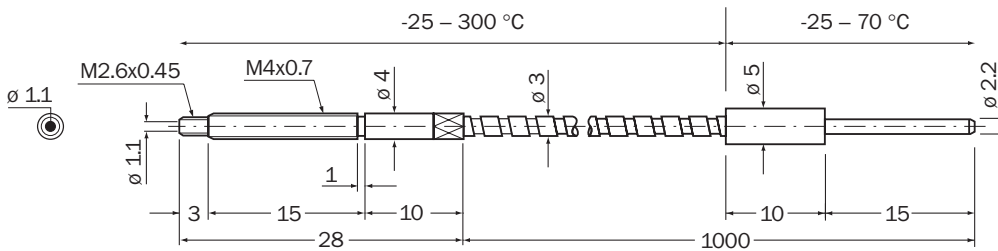
### Temperature-resistant

Type	Order no.
LL3-TH02	5308065



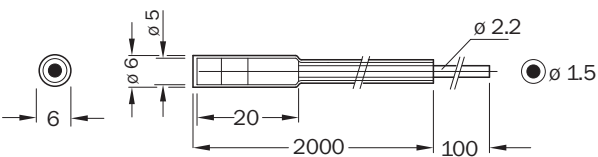
### Temperature-resistant

Type	Order no.
LL3-TH84	5313040



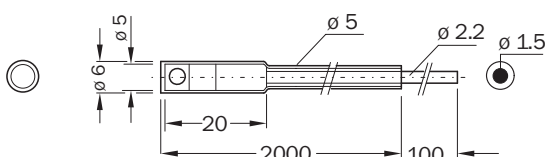
### Teflon sheath

Type	Order no.
LL3-TY01	5308066



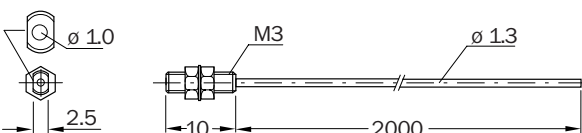
### Teflon sheath

Type	Order no.
LL3-TY02	5308067



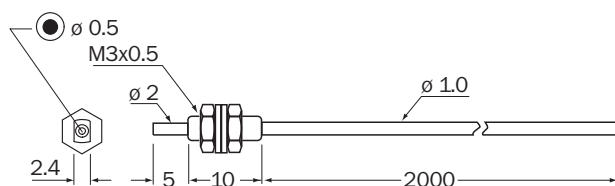
### Smallest end sleeves

Type	Order no.
LL3-TM01	5308068



### Smallest end sleeves

Type	Order no.
LL3-TM02	5308069



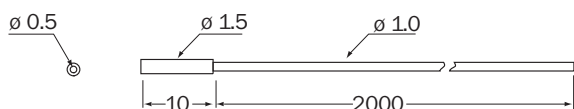
Dimensional drawings and order information

**Fibre-optic cables**  
**Through-beam systems**

Dimensional drawings for LL3 fibre-optic cables, through-beam systems

Smallest end sleeves

Type	Order no.
LL3-TM03	5308070

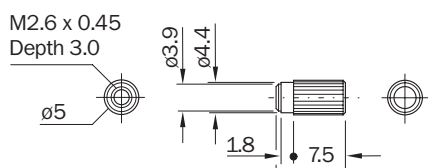


**Accessories**  
**LL3 Fibre-optic cables**

Dimensional drawings for tip adapters LL3 fibre-optic cables

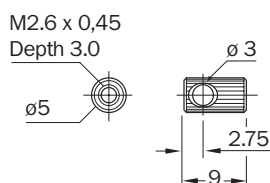
Order information

Type	Order no.
LL3-TA01	5308128



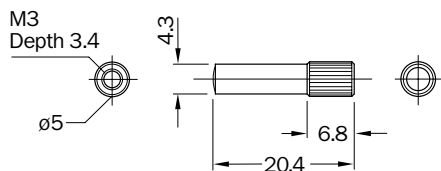
Order information

Type	Order no.
LL3-TA02	5308129



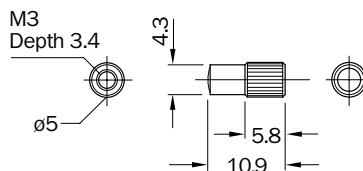
Order information

Type	Order no.
LL3-DA01	5308127



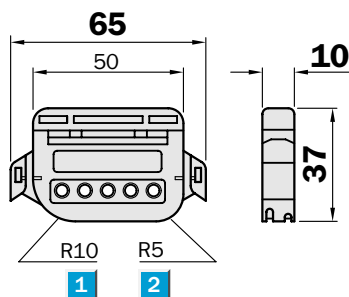
Order information

Type	Order no.
LL3-DA02	5308130



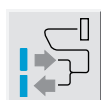
Cutter for fibre-optic cables <sup>1)</sup>

Type	Order no.
FC	5304141



- 1 Templing for bend radius  
R 10 mm, for end tips  
Ø 1.5 mm and Ø 2.5 mm
- 2 Bend radius R 5 mm

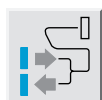
<sup>1)</sup> Supplied with fibre-optic cable for cutting to length



# LL 3 Plastic fibre-optic cables, scanning ranges combined with serie WLL 190T

Type	Order no.	WLL 190T – LED red High-Speed 1.25 kHz Operating range [mm]	Standard Operating range [mm]	Large scanning range Operating range [mm]	WLL 190T – LED green (registration mark sensor) High-Speed 1.25 kHz Operating range [mm]	Standard Operating range [mm]	Large scanning range Operating range [mm]
<b>Standard type</b>							
LL3-DM01	5 308 071	80	150	250	20	30	40
LL3-DT03	5 308 072	25	45	80	15	25	40
LL3-DS06	5 308 073	25	45	80	15	25	40
LL3-DK06	5 313 019	100	200	300	30	45	60
LL3-DK04	5 313 020	100	200	300	30	45	60
<b>Coaxial cable</b>							
LL3-DB01	5 308 074	100	200	300	20	35	45
LL3-DB01-10	5 308 075	100	200	300	20	35	45
LL3-DB03	5 313 021	70	100	200	15	30	40
LL3-DT01	5 308 076	70	130	250	20	30	40
LL3-DM02	5 308 077	70	130	250	20	30	40
LL3-DK23	5 313 022	100	200	300	20	35	45
LL3-DK21	5 313 023	15	30	50	8	15	25
<b>Super flexible, bend radius R = 2 mm</b>							
LL3-DK66	5 313 024	80	150	250	25	40	50
LL3-DK67	5 313 025	80	150	250	25	40	50
LL3-DK04Z	5 313 026	80	150	250	25	40	50
LL3-DK63Z	5 313 027	80	150	250	25	40	50
<b>Flexible, bend radius R = 4 mm</b>							
LL3-DR01	5 308 078	80	150	250	25	35	50
LL3-DR02	5 308 079	15	25	50	8	15	25
LL3-DR03	5 308 080	30	50	100	15	30	50
LL3-DR04	5 308 081	15	25	50	8	15	25
LL3-DR06	5 308 082	30	50	100	15	30	30
<b>Long end tips</b>							
LL3-DB02	5 308 083	100	200	300	20	35	45
LL3-DM03	5 308 084	25	40	80	15	25	40
LL3-DT02	5 308 085	5	10	20	3	6	10
LL3-DT04	5 308 086	10	18	35	5	10	20
LL3-DT05	5 313 028	25	40	80	15	30	40
LL3-DR05	5 308 087	5	10	20	3	6	10
LL3-DK22	5 313 029	70	130	250	20	30	50
LL3-DK43	5 313 030	25	40	80	15	30	45
<b>Integrated 90° deflection</b>							
LL3-DV01	5 308 088	50	80	150	20	30	45
LL3-DV02	5 308 089	20	35	60	10	20	35
LL3-DV03	5 308 090	50	80	150	20	45	45
LL3-DK33	5 313 031	50	80	150	20	45	45
<b>Level switch for liquids</b>							
LL3-DF01	5 308 094	–	–	–	–	–	–
LL3-DF02	5 308 095	–	–	–	–	–	–
<b>Temperature-resistant</b>							
LL3-DH01	5 308 091	130	200	300	30	50	70
LL3-DH02	5 308 092	50	100	180	30	50	70
LL3-DH83	5 313 032	100	150	200	20	40	60
<b>Teflon sheath</b>							
LL3-DY01	5 308 093	50	80	100	20	30	40
<b>Fix focus</b>							
LL3-DC01	5 313 033	3	3	3	3	3	3

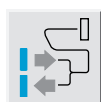
Characteristic curves and diagrams: see Internet "www.sick.com"



## LL 3 Plastic fibre-optic cables, scanning ranges combined with serie WLL 170

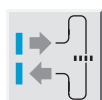
Type	Order no.	WLL 170-2, manual sensitivity	WLL 170-2, registration mark sensor, LED green	WLL 170T, sensitivity adjustment via teach-in	WLL 170T, registration mark sensor, LED green	WLL 170A, Analogue output 1 ... 5 V			WLL 170-2, High speed 10,000 Hz	
		Operating range [mm]	Operating range [mm]	Operating range [mm]	Operating range [mm]	5 V	3 V	1 V	Operating range [mm]	
<b>Standard type</b>										
LL3-DM01	5 308 071	160	45	100	25	30	45	170	60	
LL3-DT03	5 308 072	45	5	25	4	11	15	60	15	
LL3-DS06	5 308 073	45	5	25	4	11	15	60	15	
LL3-DK06	5 313 019	160	45	100	25	30	45	170	60	
LL3-DK04	5 313 020	160	45	100	25	30	45	170	60	
<b>Coaxial cable</b>										
LL3-DB01	5 308 074	150	45	100	25	28	40	170	65	
LL3-DB01-10	5 308 075	80	45	50	20	15	20	90	25	
LL3-DB03	5 313 021	150	35	100	25	28	40	170	65	
LL3-DT01	5 308 076	70	10	35	7	15	20	90	20	
LL3-DM02	5 308 077	70	10	35	7	15	20	90	20	
LL3-DK23	5 313 022	150	45	100	25	28	40	170	65	
LL3-DK21	5 313 023	20	4	14	not possible	not possible	not possible	not possible	5	
<b>Super flexible, bend radius R = 2 mm</b>										
LL3-DK66	5 313 024	110	25	80	20	25	35	140	45	
LL3-DK67	5 313 025	110	25	80	20	25	35	140	45	
LL3-DK04Z	5 313 026	110	25	80	20	25	35	140	45	
LL3-DK63Z	5 313 027	110	25	80	20	25	35	140	45	
<b>Flexible, bend radius R = 4 mm</b>										
LL3-DR01	5 308 078	130	15	85	20	25	35	140	45	
LL3-DR02	5 308 079	20	2	14	not possible	not possible	not possible	not possible	8	
LL3-DR03	5 308 080	35	5	25	3	7	10	43	10	
LL3-DR04	5 308 081	20	2	14	not possible	not possible	not possible	not possible	8	
LL3-DR06	5 308 082	35	5	25	3	7	10	43	10	
<b>Long end tips</b>										
LL3-DB02	5 308 083	150	45	100	25	30	40	160	65	
LL3-DM03	5 308 084	45	5	25	4	11	15	60	15	
LL3-DT02	5 308 085	10	2	6	not possible	not possible	not possible	not possible	3	
LL3-DT04	5 308 086	15	2	13	not possible	not possible	not possible	not possible	8	
LL3-DT05	5 313 028	45	5	25	4	11	15	60	15	
LL3-DR05	5 308 087	10	2	8	not possible	not possible	not possible	not possible	3	
LL3-DK22	5 313 029	70	10	35	7	15	20	90	20	
LL3-DK43	5 313 030	45	5	25	4	7	10	43	15	
<b>Integrated 90° deflection</b>										
LL3-DV01	5 308 088	90	25	50	10	17	24	170	40	
LL3-DV02	5 308 089	15	3	12	not possible	not possible	not possible	not possible	5	
LL3-DV03	5 308 090	90	25	50	10	17	24	170	40	
LL3-DK33	5 313 031	90	25	50	10	17	24	170	40	
<b>Level switch for liquids</b>										
LL3-DF01	5 308 094	–	–	–	not possible	not possible	not possible	not possible	–	
LL3-DF02	5 308 095	–	–	–	not possible	not possible	not possible	not possible	–	
<b>Temperature-resistant</b>										
LL3-DH01	5 308 091	210	40	135	25	45	65	200	90	
LL3-DH02	5 308 092	110	7	75	5	22	30	125	40	
LL3-DH83	5 313 032	140	25	125	25	40	60	180	55	
<b>Teflon sheath</b>										
LL3-DY01	5 308 093	45	10	60	not possible	not possible	not possible	not possible	5	
<b>Fix focus</b>										
LL3-DC01	5 313 033	3	1,5	3	3	3	3	4	3	

Characteristic curves and diagrams: see Internet "www.sick.com"



# LL 3 Plastic fibre-optic cables, scanning ranges combined with series WLL 160 and VLL 18T

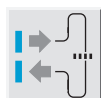
Type	Order no.	WLL 160, manual sensitivity Operating range [mm]	WLL 160T, Large scanning range Operating range [mm]	High-Speed 1,666 kHz Operating range [mm]	VLL 18T, Teach-in, LED red Operating range [mm]
<b>Standard type</b>					
LL3-DM01	5 308 071	70	70	50	50
LL3-DT03	5 308 072	20	20	14	15
LL3-DS06	5 308 073	20	20	14	15
LL3-DK06	5 313 019	70	70	50	50
LL3-DK04	5 313 020	70	70	50	50
<b>Coaxial cable</b>					
LL3-DB01	5 308 074	70	70	50	50
LL3-DB01-10	5 308 075	40	40	30	25
LL3-DB03	5 313 021	70	70	50	50
LL3-DT01	5 308 076	25	25	18	20
LL3-DM02	5 308 077	25	25	18	20
LL3-DK23	5 313 022	70	70	50	50
LL3-DK21	5 313 023	8	8	5	not possible
<b>Super flexible, bend radius R = 2 mm</b>					
LL3-DK66	5 313 024	65	65	45	45
LL3-DK67	5 313 025	65	65	45	45
LL3-DK04Z	5 313 026	65	65	45	45
LL3-DK63Z	5 313 027	65	65	45	45
<b>Flexible, bend radius R = 4 mm</b>					
LL3-DR01	5 308 078	70	70	50	45
LL3-DR02	5 308 079	9	9	6	not possible
LL3-DR03	5 308 080	20	20	14	13
LL3-DR04	5 308 081	9	9	6	not possible
LL3-DR06	5 308 082	20	20	14	13
<b>Long end tips</b>					
LL3-DB02	5 308 083	70	70	50	50
LL3-DM03	5 308 084	20	20	14	15
LL3-DT02	5 308 085	5	5	3	not possible
LL3-DT04	5 308 086	9	9	5	not possible
LL3-DT05	5 313 028	20	20	14	15
LL3-DR05	5 308 087	5	5	3	not possible
LL3-DK22	5 313 029	30	30	25	not possible
LL3-DK43	5 313 030	20	20	14	15
<b>Integrated 90° deflection</b>					
LL3-DV01	5 308 088	40	40	30	25
LL3-DV02	5 308 089	9	9	5	not possible
LL3-DV03	5 308 090	40	40	30	25
LL3-DK33	5 313 031	40	40	30	25
<b>Level switch for liquids</b>					
LL3-DF01	5 308 094	clear liquid	clear liquid	not possible	not possible
LL3-DF02	5 308 095	cloudy liquid	cloudy liquid	not possible	not possible
<b>Temperature-resistant</b>					
LL3-DH01	5 308 091	100	100	70	65
LL3-DH02	5 308 092	55	55	50	35
LL3-DH83	5 313 032	100	100	70	65
<b>Teflon sheath</b>					
LL3-DY01	5 308 093	not possible	45	not possible	30
<b>Fix focus</b>					
LL3-DC01	5 313 033	3	3	3	not possible



## LL 3 Plastic fibre-optic cables, scanning ranges combined with serie WLL 190T

Type	Order no.	WLL 190T – LED red High-Speed 1.25 kHz Operating range [mm]	Standard Operating range [mm]	Large scanning range Operating range [mm]	WLL 190T – LED green (registration mark sensor) High-Speed 1.25 kHz Operating range [mm]	Standard Operating range [mm]	Large scanning range Operating range [mm]
<b>Standard type</b>							
LL3-TS07	5 308 049	450	800	1300	100	200	300
LL3-TB01	5 308 050	450	800	1300	100	200	300
LL3-TB01-10	5 308 051	350	450	900	100	150	250
LL3-TB02	5 308 048	250	450	800	80	150	200
<b>Super flexible, bend radius R = 2 mm</b>							
LL3-TK05	5 313 034	300	550	1000	80	150	600
LL3-TK77	5 313 035	300	550	1000	80	150	600
<b>Flexible, bend radius R = 4 mm</b>							
LL3-TR01	5 308 052	250	400	650	80	150	200
LL3-TR02	5 308 053	90	180	300	50	100	150
LL3-TR03	5 308 054	90	180	300	50	100	150
LL3-TR03-02	5 308 055	90	180	300	50	100	150
<b>Long end tips</b>							
LL3-TB03	5 308 056	250	500	800	80	150	250
LL3-TT01	5 308 057	20	40	55	10	20	30
LL3-TK75	5 313 036	35	60	90	20	30	40
<b>Integrated 90° deflection</b>							
LL3-TV01	5 308 058	250	450	700	80	150	250
LL3-TV02	5 308 059	50	90	150	30	50	70
LL3-TV04	5 308 060	50	90	150	30	50	70
LL3-TS08	5 308 061	250	400	650	80	150	250
LL3-TS12	5 308 062	2000	3500	3000	800	1000	1500
LL3-TK34	5 313 037	250	450	700	80	150	200
LL3-TK16	5 313 038	2500	3000	3000	1000	1500	2000
<b>Fibre-optic cable cell</b>							
LL3-TS10	5 308 063	300	500	800	80	150	300
LL3-TS14	5 313 039	300	500	800	80	150	300
<b>Temperature-resistant</b>							
LL3-TH01	5 308 064	250	400	700	80	150	250
LL3-TH02	5 308 065	350	600	1000	100	200	300
LL3-TH84	5 313 040	250	350	600	80	100	200
<b>Teflon sheath</b>							
LL3-TY01	5 308 066	1500	2500	3000	500	1000	1700
LL3-TY02	5 308 067	500	800	1000	150	250	350
<b>Smallest end sleeves</b>							
LL3-TM01	5 308 068	250	450	800	80	150	300
LL3-TM02	5 308 069	100	200	300	40	100	150
LL3-TM03	5 308 070	100	200	300	40	100	150

Characteristic curves and diagrams: see Internet "www.sick.com"

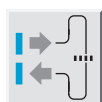


# LL 3 Plastic fibre-optic cables, scanning ranges combined with serie WLL 170

Type	Order no.	WLL 170-2, manual sensitivity	WLL 170-2, registration mark sensor, LED green	WLL 170T, sensitivity adjustment via teach-in	WLL 170T, registration mark sensor, LED green	WLL 170A, Analogue output 1 ... 5 V			WLL 170-2, High speed 10,000 Hz	
		Operating range [mm]	Operating range [mm]	Operating range [mm]	Operating range [mm]	5 V	3 V	1 V	Operating range [mm]	
<b>Standard type</b>										
LL3-TS07	5 308 049	700	350	580	140	160	230	1000	350	
LL3-TB01	5 308 050	700	350	580	140	160	230	1000	350	
LL3-TB01-10	5 308 051	400	260	300	120	80	110	500	160	
LL3-TB02	5 308 048	450	130	350	75	95	135	590	160	
<b>Super flexible, bend radius R = 2 mm</b>										
LL3-TK05	5 313 034	360	110	350	75	95	135	590	120	
LL3-TK77	5 313 035	360	110	350	75	95	135	590	120	
<b>Flexible, bend radius R = 4 mm</b>										
LL3-TR01	5 308 052	330	120	270	60	80	110	500	120	
LL3-TR02	5 308 053	110	20	80	15	25	35	150	35	
LL3-TR03	5 308 054	110	20	80	15	25	35	150	35	
LL3-TR03-02	5 308 055	110	20	80	15	25	35	150	35	
<b>Long end tips</b>										
LL3-TB03	5 308 056	450	130	330	75	90	125	540	160	
LL3-TT01	5 308 057	30	4	23	not possible	6	8	35	12	
LL3-TK75	5 313 036	120	25	100	15	27	38	160	40	
<b>Integrated 90° deflection</b>										
LL3-TV01	5 308 058	320	85	230	55	80	110	450	110	
LL3-TV02	5 308 059	75	15	60	15	23	33	140	25	
LL3-TV04	5 308 060	75	15	60	15	23	33	140	25	
LL3-TS08	5 308 061	350	110	250	55	80	110	450	120	
LL3-TS12	5 308 062	1700	750	1000	450	550	800	2500	830	
LL3-TK34	5 313 037	320	85	230	55	80	110	450	110	
LL3-TK16	5 313 038	2000	800	1300	550	600	900	3000	900	
<b>Fibre-optic cable cell</b>										
LL3-TS10	5 308 063	330	85	330	60	85	120	530	120	
LL3-TS14	5 313 039	330	85	330	60	85	120	530	120	
<b>Temperature-resistant</b>										
LL3-TH01	5 308 064	300	45	250	60	70	95	430	120	
LL3-TH02	5 308 065	600	120	500	85	130	180	770	250	
LL3-TH84	5 313 040	350	130	240	50	65	90	380	150	
<b>Teflon sheath</b>										
LL3-TY01	5 308 066	2000	380	1800	200	not possible	not possible	not possible	400	
LL3-TY02	5 308 067	550	210	380	50	not possible	not possible	not possible	220	
<b>Smallest end sleeves</b>										
LL3-TM01	5 308 068	450	130	350	75	95	135	590	160	
LL3-TM02	5 308 069	120	25	100	15	27	38	160	40	
LL3-TM03	5 308 070	120	25	100	15	27	38	160	40	

Characteristic curves and diagrams: see Internet "www.sick.com"





## LL 3 Plastic fibre-optic cables, scanning ranges combined with series WLL 160 and VLL 18T

Type	Order no.	WLL 160, manual sensitivity Operating range [mm]	WLL 160T, Large scanning range Operating range [mm]	High-Speed 1,660 kHz Operating range [mm]	VLL 18T, Teach-in, LED red Operating range [mm]
<b>Standard type</b>					
LL3-TS07	5 308 049	500	500	360	200
LL3-TB01	5 308 050	400	400	280	200
LL3-TB01-10	5 308 051	250	250	190	110
LL3-TB02	5 308 048	200	200	150	120
<b>Super flexible, bend radius R = 2 mm</b>					
LL3-TK05	5 313 034	200	200	150	120
LL3-TK77	5 313 035	200	200	150	120
<b>Flexible, bend radius R = 4 mm</b>					
LL3-TR01	5 308 052	180	180	130	100
LL3-TR02	5 308 053	50	50	40	not possible
LL3-TR03	5 308 054	50	50	40	not possible
LL3-TR03-02	5 308 055	50	50	40	not possible
<b>Long end tips</b>					
LL3-TB03	5 308 056	200	200	150	120
LL3-TT01	5 308 057	18	18	10	not possible
LL3-TK75	5 313 036	70	70	50	not possible
<b>Integrated 90° deflection</b>					
LL3-TV01	5 308 058	150	150	130	70
LL3-TV02	5 308 059	40	40	30	not possible
LL3-TV04	5 308 060	40	40	30	not possible
LL3-TS08	5 308 061	200	200	150	80
LL3-TS12	5 308 062	700	700	400	350
LL3-TK34	5 313 037	150	150	130	70
LL3-TK16	5 313 038	800	800	500	450
<b>Fibre-optic cable cell</b>					
LL3-TS10	5 308 063	260	260	190	100
LL3-TS14	5 313 039	260	260	190	100
<b>Temperature-resistant</b>					
LL3-TH01	5 308 064	180	180	130	80
LL3-TH02	5 308 065	350	350	240	170
LL3-TH84	5 313 040	170	170	140	70
<b>Teflon sheath</b>					
LL3-TY01	5 308 066	1000	1000	700	350
LL3-TY02	5 308 067	250	250	180	120
<b>Smallest end sleeves</b>					
LL3-TM01	5 308 068	200	200	150	not possible
LL3-TM02	5 308 069	70	70	50	not possible
LL3-TM03	5 308 070	70	70	50	not possible

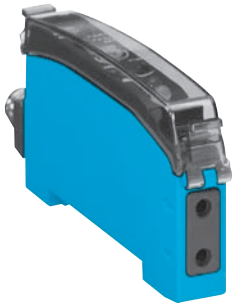


# Tip adapters for LL 3 plastic fibre-optic cables, scanning ranges combined with serie WLL 190T

Type LL3 proximity, lenses with focussed optic	Order no.	WLL 190T – LED red High-Speed, 1.25 kHz Operating range [mm]	Standard Operating range [mm]	Large scanning range Operating range [mm]	WLL 190T – LED green (registration mark sensor) High-Speed, 1.25 kHz Operating range [mm]	Standard Operating range [mm]	Large scanning range Operating range [mm]
<b>Focus 6 mm, spot size Ø 0.25 mm</b>							
LL3-DA01	5 308 127						
Combined with standard fibre LL 3							
LL3-DT01	5 308 076	6 ± 1	6 ± 1	6 ± 1	6 ± 1	6 ± 1	6 ± 1
<b>Focus 12 mm, spot size Ø 3.0 mm</b>							
LL3-DA02	5 308 130						
Combined with standard fibre LL 3							
LL3-DT01	5 308 076	12 ± 3	12 ± 3	12 ± 3	12 ± 3	12 ± 3	12 ± 3

Type LL3 through-beam, lenses for extended scanning ranges	Order no.	WLL 190T – LED red High-Speed, 1.25 kHz Operating range [mm]	Standard Operating range [mm]	Large scanning range Operating range [mm]	WLL 190T – LED green (Marksensor) High-Speed, 1.25 kHz Operating range [mm]	Standard Operating range [mm]	Large scanning range Operating range [mm]
<b>axial optic, largest scanning ranges</b>							
LL3-TA01	5 308 128						
Combined with standard fibres LL 3							
LL3-TB01	5 308 050	2000	4000	4000	1000	2000	3000
LL3-TB01-10	5 308 051	1300	2500	5500	700	1500	3000
LL3-TB02	5 308 048	3500	4000	4000	1500	2500	3000
Combined with super flexible fibres							
LL3-TK77	5 313 035	3500	4000	4000	1500	2500	3000
Combined with flexible fibres							
LL3-TR01	5 308 052	3500	4000	4000	1500	2500	3000
Combined with heat resisting fibres (100 °C)							
LL3-TH01	5 308 064	3000	4000	4000	1500	2500	3000
<b>Integrated 90° deflection, large scanning ranges</b>							
LL3-TA02	5 308 129						
Combined with standard fibres LL 3							
LL3-TB01	5 308 050	400	700	1300	200	400	700
LL3-TB01-10	5 308 051	300	500	1000	150	300	500
LL3-TB02	5 308 048	500	1000	1500	300	600	800
Combined with super flexible fibres							
LL3-TK77	5 313 035	500	700	1300	300	400	700
Combined with flexible fibres							
LL3-TR01	5 308 052	450	600	800	250	350	450
Combined with heat resisting fibres (100 °C)							
LL3-TH01	5 308 064	550	800	1000	300	450	600

Characteristic curves and diagrams: see Internet "www.sick.com"



# Tip adapters for LL 3 plastic fibre-optic cables, scanning ranges combined with the WLL 170 series

Type LL 3 proximity, lenses with focussed optic	Order no.	WLL 170-2, manual sensitivity	WLL 170-2, registration mark sensor, LED green	WLL 170T, sensitivity adjustment via teach-in	WLL 170T, registration mark sensor, LED green	WLL 170A, Analogue output			WLL 170-2, High speed 10,000 Hz	
		Operating range [mm]	Operating range [mm]	Operating range [mm]	Operating range [mm]	5 V	3 V	1 V	Operating range [mm]	
<b>Focus 6 mm, spot size Ø 0.25 mm</b>										
LL3-DA01	5 308 127									
Combined with standard fibre LL 3										
LL3-DT01	5 308 076	6 ± 1	6 ± 1	6 ± 1	6 ± 1	-	-	-	6 ± 1	
<b>Focus 12 mm, spot size Ø 3.0 mm</b>										
LL3-DA02	5 308 130									
Combined with standard fibre LL 3										
LL3-DT01	5 308 076	12 ± 3	12 ± 3	12 ± 3	12 ± 3	-	-	-	12 ± 3	

Type LL 3 through-beam, lenses for extended scanning ranges	Order no.	WLL 170-2, manual sensitivity	WLL 170-2, registration mark sensor, LED green	WLL 170T, sensitivity adjustment via teach-in	WLL 170T, registration mark sensor, LED green	WLL 170A, Analogue output			WLL 170-2, High speed 10,000 Hz	
		Operating range [mm]	Operating range [mm]	Operating range [mm]	Operating range [mm]	5 V	3 V	1 V	Operating range [mm]	
<b>Axial optic, largest scanning ranges</b>										
LL3-TA01	5 308 128									
Combined with standard fibre LL3										
LL3-TB01	5 308 050	3000	1200	2500	600	650	950	4000	1200	
LL3-TB01-10	5 308 051	1900	1100	1200	500	350	480	2200	800	
LL3-TB02	5 308 048	4000	1700	3200	650	900	1300	5500	1600	
Combined with super flexible fibres										
LL3-TK77	5 313 035	4000	1500	3200	650	900	1300	5500	1400	
Combined with flexible fibres										
LL3-TR01	5 308 052	3000	1100	2500	550	640	880	4000	1500	
Combined with heat resisting fibres (100 °C)										
LL3-TH01	5 308 064	4000	800	2500	300	700	950	4300	1500	
<b>Integrated 90° deflection, large scanning ranges</b>										
LL3-TA02	5 308 129									
Combined with standard fibre LL 3										
LL3-TB01	5 308 050	600	200	550	200	180	260	1100	200	
LL3-TB01-10	5 308 051	450	250	300	150	80	110	500	180	
LL3-TB02	5 308 048	600	250	500	130	170	250	1100	250	
Combined with super flexible fibres										
LL3-TK77	5 313 035	600	200	500	130	170	250	1100	200	
Combined with flexible fibres										
LL3-TR01	5 308 052	500	150	320	80	110	150	690	200	
Combined with heat resisting fibres (100 °C)										
LL3-TH01	5 308 064	500	90	320	55	100	150	670	200	

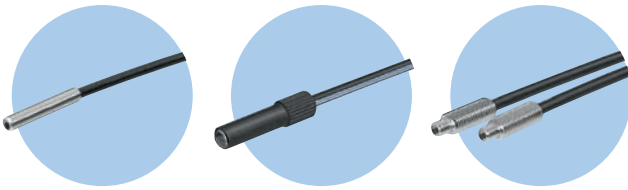
Characteristic curves and diagrams: see Internet "www.sick.com"



# Tip adapters for LL 3 Plastic fibre-optic cables, scanning ranges combined with series WLL 160 and VLL 18T

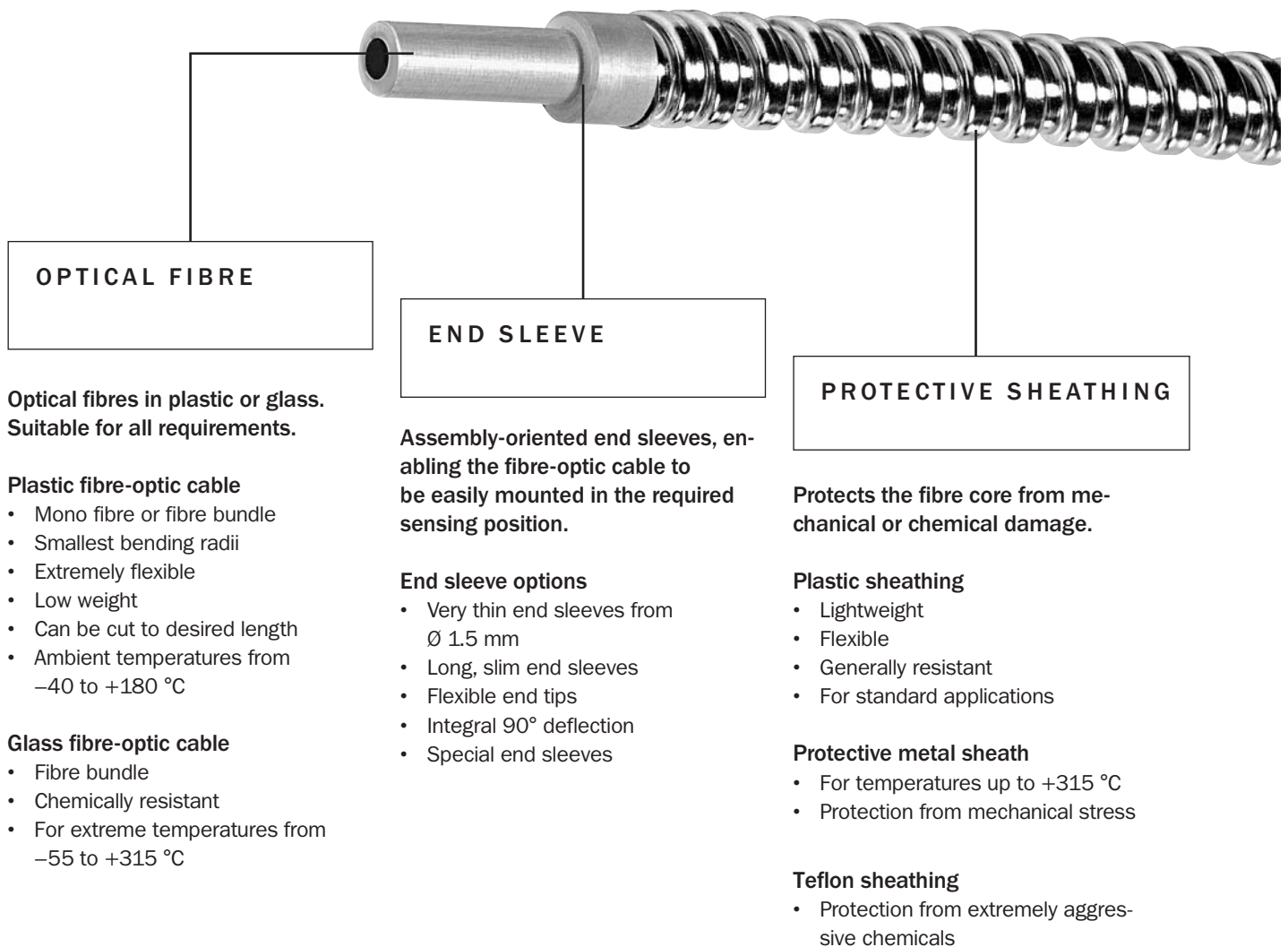
Type LL3 proximity, lenses with focussed optic	Order no.	WLL 160, manual sensitivity Operating range [mm]	WLL 160T, Large scanning range Operating range [mm]	High-Speed 1,666 kHz Operating range [mm]	VLL 18T, Teach-in, LED red Operating range [mm]
<b>Focus 6 mm, spot size Ø 0.25 mm</b>					
LL3-DA01	5 308 127				
Combined with standard fibre LL 3					
LL3-DT01	5 308 076	6 ± 1	6 ± 1	not possible	not possible
<b>Focus 12 mm, spot size Ø 3.0 mm</b>					
LL3-DA02	5 308 130				
Combined with standard fibre LL 3					
LL3-DT01	5 308 076	12 ± 3	12 ± 3	not possible	not possible

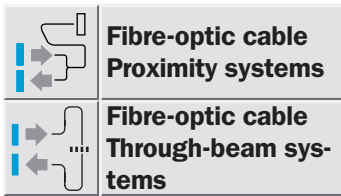
Type LL3 through-beam, lenses for extended scanning ranges	Order no.	WLL 160, manual sensitivity Operating range [mm]	WLL 160T, Large scanning range Operating range [mm]	High-Speed 1,666 kHz Operating range [mm]	VLL 18T, Teach-in, LED red Operating range [mm]
<b>axial optic, largest scanning ranges</b>					
LL3-TA01	5 308 128				
Combined with standard fibres LL 3					
LL3-TB01	5 308 050	1500	1500	1050	850
LL3-TB01-10	5 308 051	900	900	660	450
LL3-TB02	5 308 048	2000	2000	1500	1100
Combined with super flexible fibres					
LL3-TK77	5 313 035	2000	2000	1500	1100
Combined with flexible fibres					
LL3-TR01	5 308 052	1200	1200	850	850
Combined with heat resisting fibres (100 °C)					
LL3-TH01	5 308 064	1500	1500	1050	850
<b>Integrated 90° deflection, large scanning ranges</b>					
LL3-TA02	5 308 129				
Combined with standard fibres LL 3					
LL3-TB01	5 308 050	400	400	270	200
LL3-TB01-10	5 308 051	250	250	180	100
LL3-TB02	5 308 048	350	350	250	170
Combined with super flexible fibres					
LL3-TK77	5 313 035	350	350	250	170
Combined with flexible fibres					
LL3-TR01	5 308 052	250	250	180	110
Combined with heat resisting fibres (100 °C)					
LL3-TH01	5 308 064	250	350	180	110



## Fibre-optic cables – solving automation problems.

Fibre-optic cables provide “slimline” and flexible connection between the sensor and the sensing target. They are key to sensing solutions and often the only way to detect inaccessible objects, details, and printed marks.





**Features**

- Glass-fibre cable with stainless steel sheath
- Sender and receiver fibres are randomly mixed (proximity systems)
- Operating temperature - 58... + 315 °C
- Length of fibre-optic cable 900 mm
- Bend radius 19 mm

**Selection table: sensors, fibre-optic cables, range/scanning distances**

Proximity systems					
LBS Fibre-optic cables			Scanning distance in mm <sup>1)</sup> when combined with sensor		
Description	Type	Order no.	WLL 260	KTL 5-2	CSL 1
End sleeve $\phi$ 7.4 mm, FOC $\phi$ 3.2 mm	LBSA 32 900	7 020 040	50	9	9
End sleeve $\phi$ 6.4 mm, FOC $\phi$ 2.3 mm	LBSAA 23 900	7 020 103	30	9	9
Mounting 5/16" x 24, FOC $\phi$ 3.2 mm	LBSAT 32 900	7 020 036	50	9	9
End sleeve $\phi$ 7.4 mm, FOC $\phi$ 3.2 mm	LBSF 32 900	7 020 038	50	9	9
End sleeve $\phi$ 8 mm, FOC $\phi$ 1.2 mm	LBSM 12 900	7 020 054	6	9	9
End sleeve $\phi$ 7.9 mm, FOC $\phi$ 1.6 mm	LBSP 16 900	7 020 044	6	9	9
Fibre-optic cable cell 0.5 mm x 3.8 mm	LBSR 16 900	7 020 050	15	9	9
Fibre-optic cable cell 0.8 mm x 9.7 mm	LBSR 32 900	7 020 042	50	9	9
Fibre-optic cable cell 0.2 mm x 38.1 mm	LBSR 40 900	7 020 052	90	9	9
Mounting 5/16" x 24, FOC $\phi$ 3.2 mm	LBST 32 900	7 020 046	50	9	9
Mounting 5/16" x 24, FOC $\phi$ 3.2 mm	LBSTA 32 900	7 020 048	50	9	9
Optical head with fibre-optic cables	OCSL	1 016 296	–	9	9

Through-beam systems					
LIS Fibre-optic cables			Scanning range in mm <sup>1)</sup> when combined with sensor		
Description	Type	Part No. <sup>2)</sup>	WLL 260	KTL 5-2	CSL 1
End sleeve $\phi$ 7.4 mm, FOC $\phi$ 3.2 mm	LISA 32 900	7 020 039	700	20	20
End sleeve $\phi$ 6.4 mm, FOC $\phi$ 2.3 mm	LISAA 23 900	7 020 102	240	20	20
Mounting 5/16" x 24, FOC $\phi$ 3.2 mm	LISAT 32 900	7 020 035	700	20	20
End sleeve $\phi$ 7.4 mm, FOC $\phi$ 3.2 mm	LISF 32 900	7 020 037	700	20	20
End sleeve $\phi$ 8 mm, FOC $\phi$ 1.2 mm	LISM 12 900	7 020 053	90	20	20
End sleeve $\phi$ 7.9 mm, FOC $\phi$ 1.6 mm	LISP 16 900	7 020 043	100	20	20
Fibre-optic cable cell 0.5 mm x 3.8 mm	LISR 16 900	7 020 049	220	20	20
Fibre-optic cable cell 0.8 mm x 9.7 mm	LISR 32 900	7 020 041	700	20	20
Fibre-optic cable cell 0.2 mm x 38.1 mm	LISR 40 900	7 020 051	600	20	20
Mounting 5/16" x 24, FOC $\phi$ 3.2 mm	LIST 32 900	7 020 045	700	20	20
Mounting 5/16" x 24, FOC $\phi$ 3.2 mm	LISTA 32 900	7 020 047	700	20	20

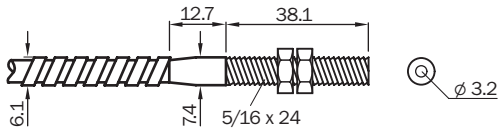
<sup>1)</sup> Operating range or scanning distance  
Scanned material 90 % remission  
(DIN 5033)  
Size of scanned material = diameter of  
light spot (aperture approx. 60°)

<sup>2)</sup> The order number includes one fibre-  
optic cable. Two fibre-optic cables are  
needed for a through-beam system.

Dimensional drawings and order information

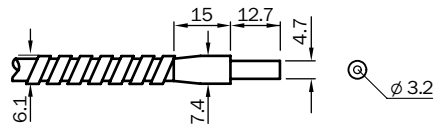
LIS/LBS 32 900 Fibre-optic cables

System	Type	Order no.
Through-beam	LIST 32 900	7 020 045
Proximity system	LBST 32 900	7 020 046



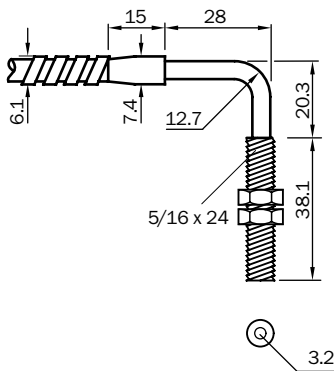
LIS/LBS 32 900 Fibre-optic cables

System	Type	Order no.
Through-beam	LISF 32 900	7 020 037
Proximity system	LBSF 32 900	7 020 038



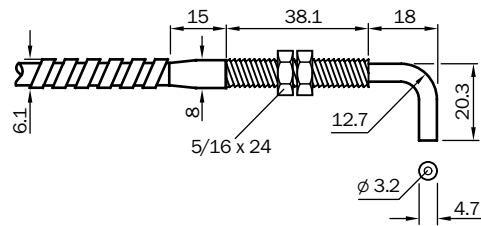
LIS/LBS 32 900 Fibre-optic cables

System	Type	Order no.
Through-beam	LISAT 32 900	7 020 035
Proximity system	LBSAT 32 900	7 020 036



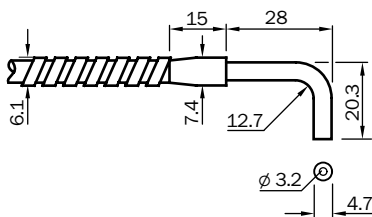
LIS/LBS 32 900 Fibre-optic cables

System	Type	Order no.
Through-beam	LISTA 32 900	7 020 047
Proximity system	LBSTA 32 900	7 020 048



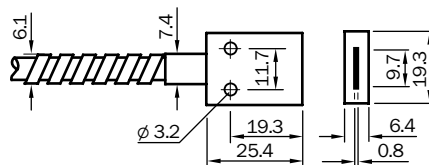
LIS/LBS 32 900 Fibre-optic cables

System	Type	Order no.
Through-beam	LISA 32 900	7 020 039
Proximity system	LBSA 32 900	7 020 040



LIS/LBS 32 900 Fibre-optic cables

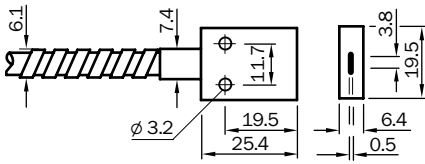
System	Type	Order no.
Through-beam	LISR 32 900	7 020 041
Proximity system	LBSR 32 900	7 020 042



## Dimensional drawings and order information

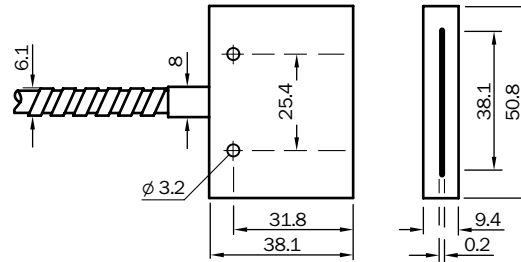
### LIS/LBS 16 900 Fibre-optic cables

System	Type	Order no.
Through-beam	LISR 16 900	7 020 049
Proximity system	LBSR 16 900	7 020 050



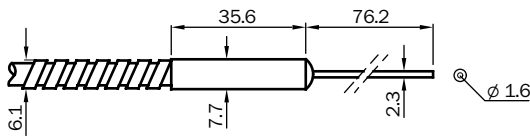
### LIS/LBS 40 900 Fibre-optic cables

System	Type	Order no.
Through-beam	LISR 40 900	7 020 051
Proximity system	LBSR 40 900	7 020 052



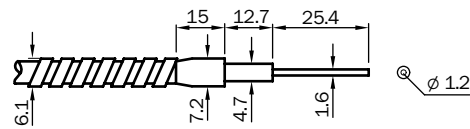
### LIS/LBS 16 900 Fibre-optic cables

System	Type	Order no.
Through-beam	LISP 16 900	7 020 043
Proximity system	LBSP 16 900	7 020 044



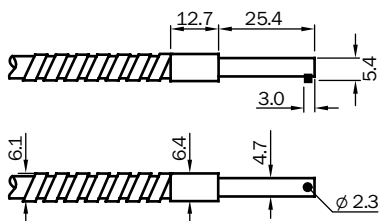
### LIS/LBS 12 900 Fibre-optic cables

System	Type	Order no.
Through-beam	LISM 12 900	7 020 053
Proximity system	LBSM 12 900	7 020 054



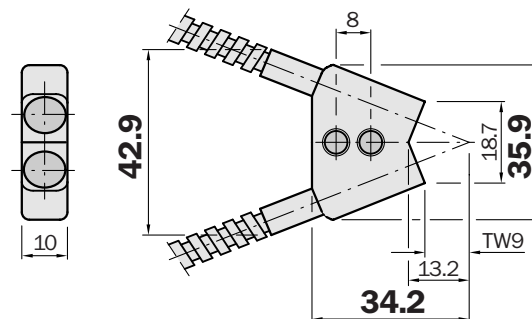
### LIS/LBS 23 900 Fibre-optic cables

System	Type	Order no.
Through-beam	LISAA 23 900	7 020 102
Proximity system	LBSAA 23 900	7 020 103



### OCSL Fibre-optic cables

System	Type	Order no.
Proximity system	OCSL	1 016 296

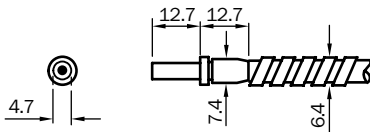




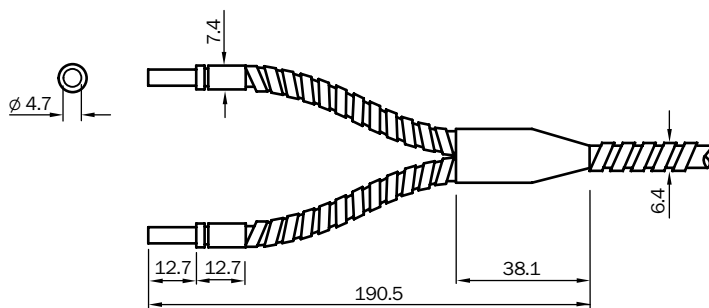
## Dimensional drawings and order information

## Adaptation of fibre-optic cables

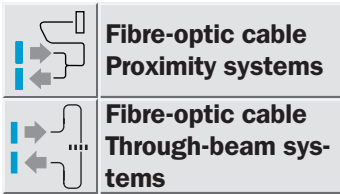
## Through-beam systems



## Proximity systems



Mounting materials (cap nut, clamp ring, O-ring seal and mounting instructions) are included with fibre-optic cables.



**Features**

- Robust glass fibre-optic cable within a helical metal spring
- Operating temperature for chrome-plated helical metal spring – 25... + 250 °C  
Operating temperature for helical metal spring with PVC sheath – 10... + 60 °C
- Minimum bend radius 20 mm

**Selection table: sensors, fibre-optic cables, scanning distance/range**

**Fibre-optic cables, proximity systems**

Description	Type	Order no.	Scanning distance in mm with photoelectric switches								
			WLL 12-B 5181			WLL 12-B 5281			WLL 12-B 5381		
			1	2	4	1	2	4	1	2	3
			Red light			Infrared light			Green light		
150 mm	LM 31-150	2 015 225	50	12	280	60	20	280	5	2	60
450 mm	LM 31-450	2 015 223	50	12	280	60	20	280	5	2	60
750 mm	LM 31-750	2 015 224	50	12	280	60	20	280	5	2	60
1500 mm	LM 31-1500	2 017 381	50	12	280	60	20	280	5	2	60
150 mm, with rectangular light outlet	LM 35-150	2 015 226	50	12	280	60	20	280	5	2	60
450 mm, with rectangular light outlet	LM 35-450	2 015 230	50	12	280	60	20	280	5	2	60
750 mm, with rectangular light outlet	LM 35-750	2 015 231	50	12	280	60	20	280	5	2	60
150 mm, with 90° offset head with rectangular light outlet	LM 36-150	2 015 232	50	12	280	60	20	280	5	2	60
450 mm, with 90° offset head with rectangular light outlet	LM 36-450	2 015 233	50	12	280	60	20	280	5	2	60
750 mm, with 90° offset head with rectangular light outlet	LM 36-750	2 015 234	50	12	280	60	20	280	5	2	60
1000 mm, with 90° offset head with rectangular light outlet	LM 36-1000	2 016 772	50	12	280	60	20	280	5	2	60
1250 mm, with 90° offset head with rectangular light outlet	LM 36-1250	2 016 792	50	12	280	60	20	280	5	2	60
150 mm, as LM 36, but with light outlet turned 90°	LM 37-150	2 015 235	50	12	280	60	20	280	5	2	60
450 mm, as LM 36, but with light outlet turned 90°	LM 37-450	2 015 236	50	12	280	60	20	280	5	2	60
750 mm, as LM 36, but with light outlet turned 90°	LM 37-750	2 015 237	50	12	280	60	20	280	5	2	60
450 mm, up to 250 °C	LT 31-450	2 015 227	50	12	280	60	20	280	5	2	60
750 mm, up to 250 °C	LT 31-750	2 015 228	50	12	280	60	20	280	5	2	60
2200 mm, up to 250 °C	LT 31-2200	2 017 871	50	12	280	60	20	280	5	2	60

**Fibre-optic cables, through-beam systems**

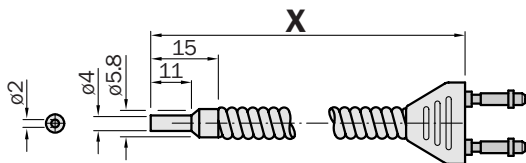
Description	Type	Order no.	Scanning range in mm with photoelectric switches								
			WLL 12-B 5181			WLL 12-B 5281			WLL 12-B 5381		
			Red light			Infrared light			Green light		
450 mm	LM 32-450	2 014 850	200			300			20		
750 mm	LM 32-750	2 015 038	200			300			20		
150 mm, with 90° offset head	LM 38-150	2 016 788	200			300			20		
450 mm, with 90° offset head	LM 38-450	2 015 049	200			300			20		
750 mm, with 90° offset head	LM 38-750	2 015 050	200			300			20		
750 mm, with 90° offset head and tip adapter	LM 38-751	2 015 970	330			550			32		
450 mm, as LM 38, but with light outlet turned 90°	LM 39-450	2 015 047	200			300			20		
750 mm, as LM 38, but with light outlet turned 90°	LM 39-750	2 015 048	200			300			20		
450 mm, up to 250 °C	LT 32-450	2 015 072	200			300			20		
750 mm, up to 250 °C	LT 32-750	2 015 073	200			300			20		

- 1 With reference to standard white, 90 % remission
- 2 With reference to standard grey, 18 % remission
- 3 With reference to standard black, 6 % remission
- 4 On "Diamond Grade" reflective tape

Dimensional drawings and order information

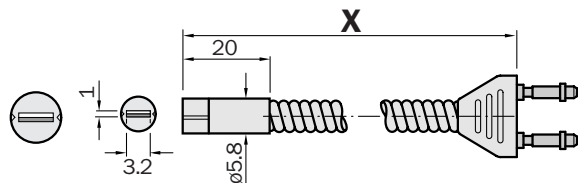
**LM 31 Fibre-optic cables, helical metal spring with PVC sheath**

Type	Order no.	Length X
LM 31-150	2 015 225	150 mm
LM 31-450	2 015 223	450 mm
LM 31-750	2 015 224	750 mm
LM 31-1500	2 017 381	1500 mm



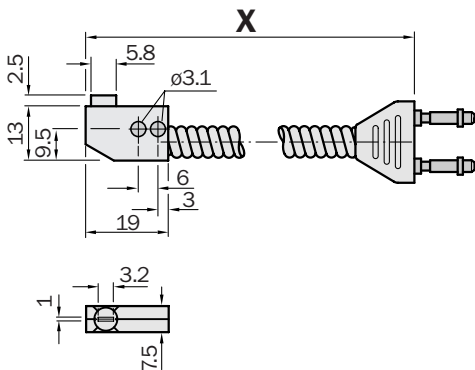
**LM 35 Fibre-optic cables, helical metal spring with PVC sheath**

Type	Order no.	Length X
LM 35-150	2 015 226	150 mm
LM 35-450	2 015 230	450 mm
LM 35-750	2 015 231	750 mm



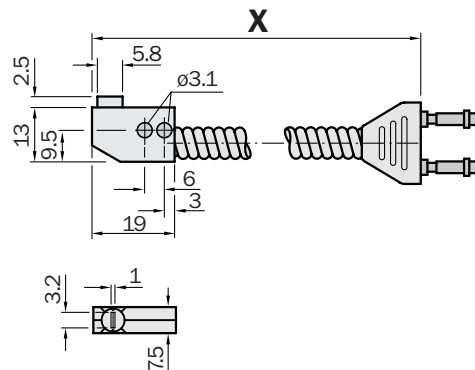
**LM 36 Fibre-optic cables, helical metal spring with PVC sheath**

Type	Order no.	Length X
LM 36-150	2 015 232	150 mm
LM 36-450	2 015 233	450 mm
LM 36-750	2 015 234	750 mm
LM 36-1000	2 016 772	1000 mm
LM 36-1250	2 016 792	1250 mm



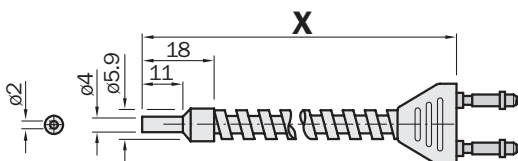
**LM 37 Fibre-optic cables, helical metal spring with PVC sheath**

Type	Order no.	Length X
LM 37-150	2 015 235	150 mm
LM 37-450	2 015 236	450 mm
LM 37-750	2 015 237	750 mm



**LT 31 Fibre-optic cables, helical metal spring, chrome-plated**

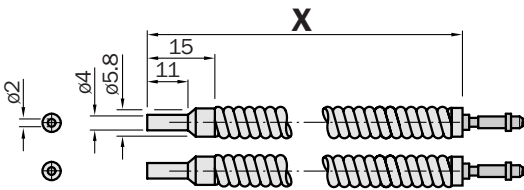
Type	Order no.	Length X
LT 31-450	2 015 227	450 mm
LT 31-750	2 015 228	750 mm
LT 31-2200	2 017 871	2200 mm



Dimensional drawings and order information

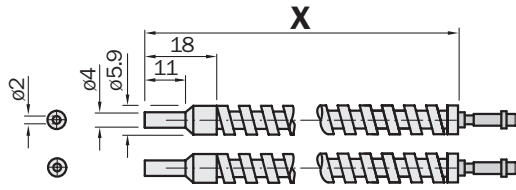
LM 32 Fibre-optic cables, helical metal spring with PVC sheath

Type	Order no.	Length X
LM 32-450	2 014 850	450 mm
LM 32-750	2 015 038	750 mm



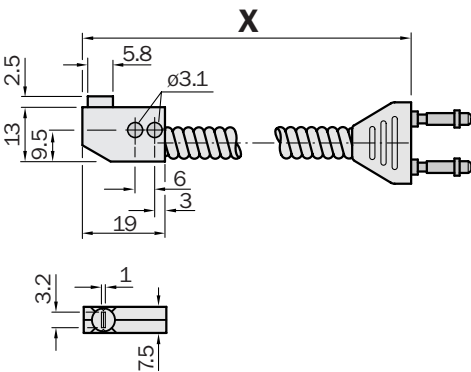
LT 32 Fibre-optic cables, helical metal spring, chrome-plated

Type	Order no.	Length X
LT 32-450	2 015 072	450 mm
LT 32-750	2 015 073	750 mm



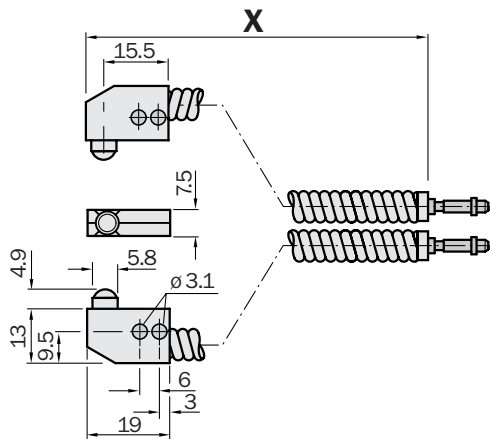
LM 38 Fibre-optic cables, helical metal spring with PVC sheath

Type	Order no.	Length X
LM 38-150	2 015 788	150 mm
LM 38-450	2 015 049	450 mm
LM 38-750	2 015 050	750 mm



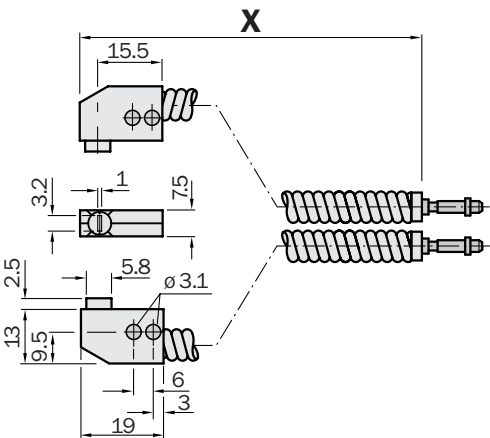
LM 38 Fibre-optic cables, with tip adapter, helical metal spring with PVC sheath

Type	Order no.	Length X
LM 38-751	2 015 970	750 mm



LM 39 Fibre-optic cables, helical metal spring with PVC sheath

Type	Order no.	Length X
LM 39-450	2 015 047	450 mm
LM 39-750	2 015 048	750 mm



**Fibre-optic cable Proximity systems**

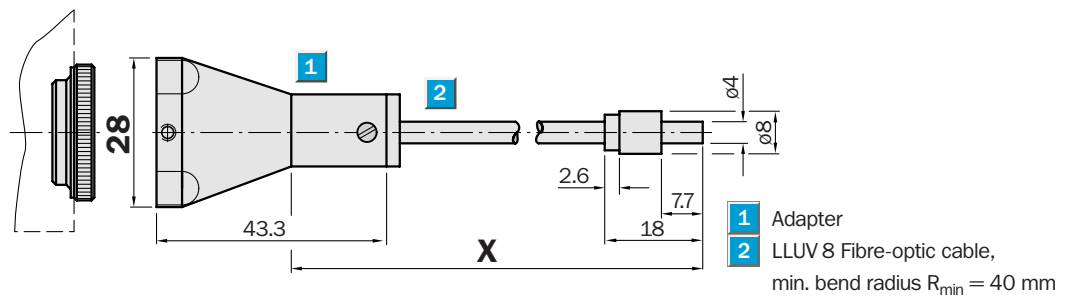
**Fibre-optic cables for LUT Luminescence scanner**

- UV fibre-optic cables
- Operating temperature – 5... + 35 °C.  
Unable to withstand mechanical loading outside this range.  
Must not be bent below 0 °C.

**Dimensional drawings and order information**

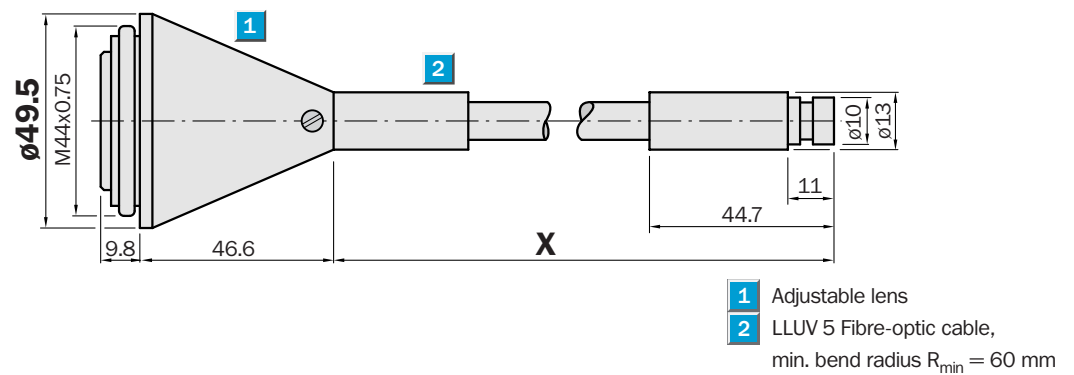
**LLUV 8 Fibre-optic cables for LUT 3-820, LUT 3-920 Luniscence scanner**

Type	Order no.	Length X
LLUV 8-500	2 017 098	500 mm
LLUV 8-1000	2 017 099	1000 mm



**LLUV 5 Fibre-optic cable for LUT 1-4 Luminescence scanner**

Type	Order no.	Length X
<b>with adjustable lens</b>		
LLUV 5-500-A	1 005 621	500 mm
LLUV 5-1000-A	1 005 622	1000 mm
LLUV 5-1500-A	1 005 623	1500 mm
<b>without adjustable lens</b>		
LLUV 5-500	2 008 435	500 mm
LLUV 5-1000	2 008 436	1000 mm
LLUV 5-1500	2 008 437	1500 mm



**Tip adapter for LLUV 5 fibre-optic cables**

Type	Order no.
OBJ-144	2 010 947

