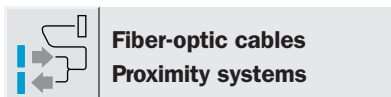
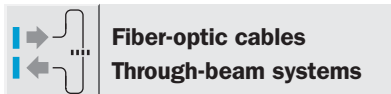
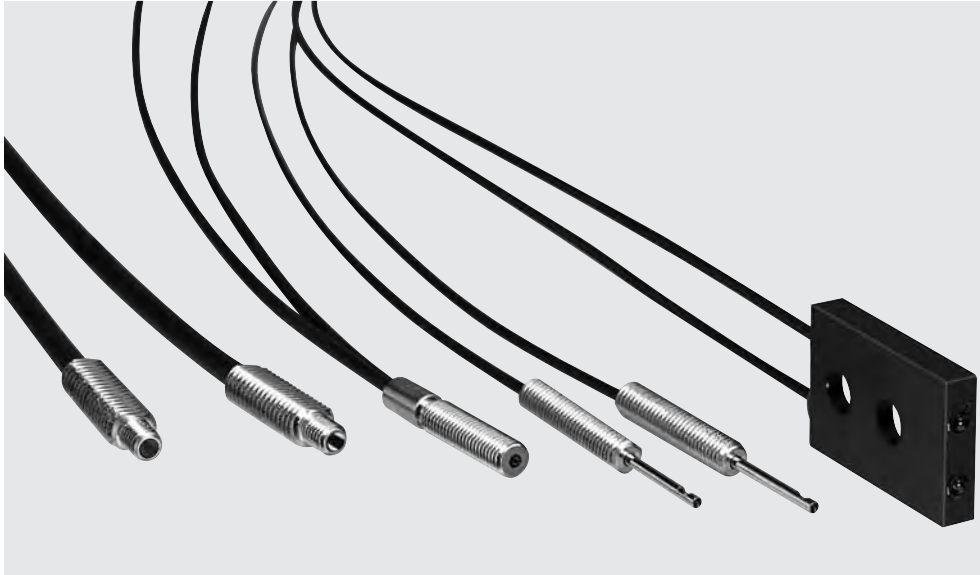


## LL3: fiber-optic cables – solving automation problems



Lack of installation space (even for miniature photoelectric switches) or exposure to chemicals or heat are frequent reasons for using the LL3 plastic fiber-optic cable. In combination with the WLL170(T) photoelectric switch series, the LL3s ensure 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 make it easy to connect and install.

In addition, there are a large number of 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. The LL3 fiber-optic cable and the SICK fiber-optic cable photoelectric switch are an unbeatable team for semiconductor and electronics assembly, packaging, handling and assembly systems, special engineering and fine mechanics applications.

### 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

## ■ WLL 160(T)



### WLL 160

with LL 3 fiber-optic cable, plastic

- manual sensitivity adjustment
- alarm output and test input
- timer 0 to 100 ms
- light/dark switching

### WLL 160T

with LL 3 fiber-optic cable, plastic

- teach-in sensitivity adjustment, via button on device or externally via control signal
- switching frequency 830/s or 1,600/s, switch-selectable
- timer

## ■ WLL 170(T)



### WLL 170

with LL 3 fiber-optic cable, plastic

- manual sensitivity adjustment
- red light LED sender
- large sensing ranges
- timer and L.ON-/D.ON selector

### WLL 170 high-speed

with LL 3 fiber-optic cable, plastic

- high-speed 10,000/s
- red light LED sender
- timer and L.ON-/D.ON selector

### WLL 170 analog

with LL 3 fiber-optic cable, plastic

- analog output voltage 1 to 5 V
- red light LED sender
- variable gain

### WLL 170T

with LL 3 fiber-optic cable, plastic

- teach-in sensitivity adjustment via button on device
- large sensing ranges
- red light LED sender
- optional: anti-interference

### WLL 170T mark sensor

with LL 3 fiber-optic cable, plastic

- teach-in sensitivity adjustment via button on device
- green light LED sender
- optional: anti-interference

## ■ WLL 170T-2



### WLL 170T-2

with LL 3 fiber-optic cable, plastic

- longer ranges
- fast response time of 50  $\mu$ s for fast processes
- external teach in put
- light/dark switching

## ■ WLL 190T



### WLL 190T

with LL 3 fiber-optic cable, plastic

- manual sensitivity adjustment
- alarm output and test input
- timer 0 to 100 ms
- light/dark switching

### WLL 190T

with LL 3 fiber-optic cable, plastic

- teach-in sensitivity adjustment, via button on device or externally via control signal
- switching frequency 830/s or 1,600/s, switch-selectable
- timer

## ■ WLL 190T-2



### WLL 190T-2

with LL 3 fiber-optic cable, plastic

- 2 x 4 digit display to monitor nominal and actual value
- fast response time of 60  $\mu$ s
- automatic adjustment of switching threshold for transparent objects
- 2 outputs (switching outputs or alarm output)/analog output/external teach-in input
- saturation prevention by attenuation function

## ■ WLL 12



with LL 3, LT, LM fiber-optic cable

- red, infrared or green light LED sender
- complementary switching outputs, selectable via control cable
- switching frequency: 1,300/s

## ■ WLL 1000/WLL 2000



with LBS, LIS fiber-optic cable

- direct voltage supply
- cable chamber or M12 plug
- test input
- universal voltage supply, relay switching output

## ■ WLL 260



WLL 260 DC

with LBS, LIS fiber-optic cable

- direct voltage supply
- terminal chamber or M12 plug
- test input

WLL 260 UC

with LBS, LIS fiber-optic cable

- universal voltage supply, relay switching output
- terminal chamber

## ■ LUT



LUT 3-820

with LLX 3 fiber-optic cable

- UV light source
- supplementary optical filter

LUT 1-4

with LLUV 5 fiber-optic cable

- UV light source with high-pressure mercury-vapor burner
- supplementary optical filter

## ■ CSL



with LBS, LSS, LIS fiber-optic cable

- teach-in
- adjustable color selectivity

## ■ VLL 18



with LL 3 fiber-optic cable

- adjustable sensitivity: per teach-in
- simplest handling

## ■ KTL 5G-2



with LBS, LIS, LSS fiber-optic cable

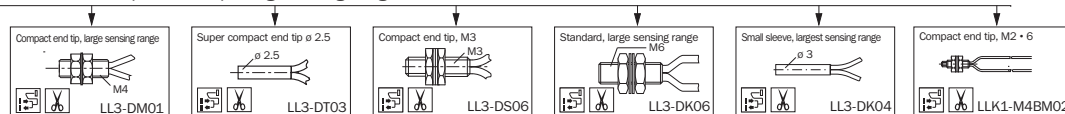
- green light LED sender
- switching frequency 10,000/s

7028071 - © 2008 SICK, Inc.

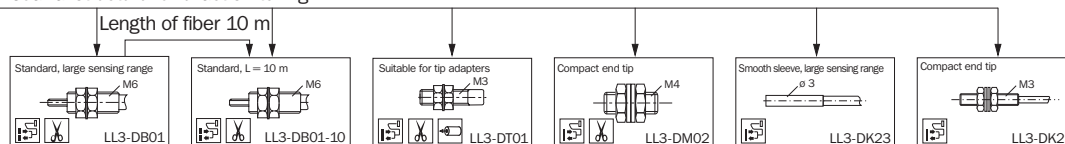
# Fiber-Optic Cables

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

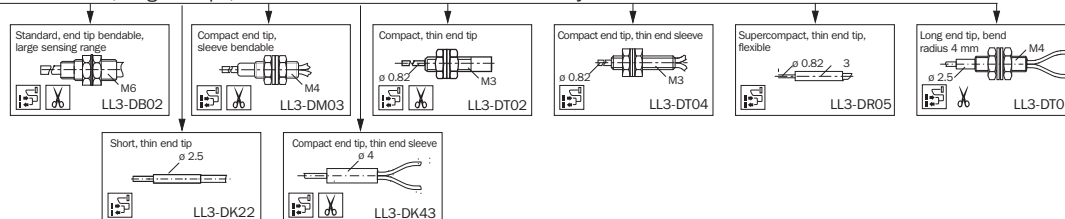
### Standard, compact end tip, long sensing range



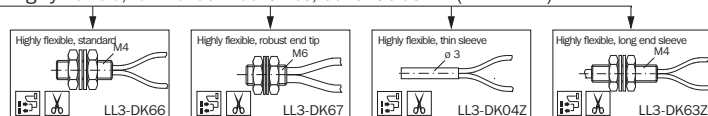
### Coaxial structure for exact switching



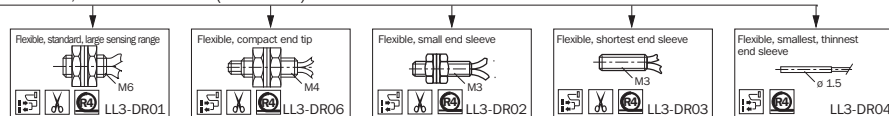
### Thin sleeves, long end tips, bendable: ideal for small inaccessible objects



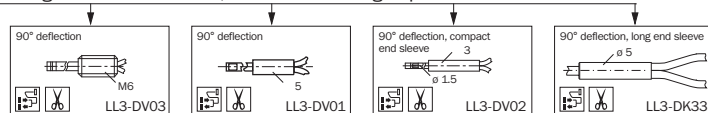
### Highly flexible, for moved mechanics, bend radius R2 (R = 2 mm)



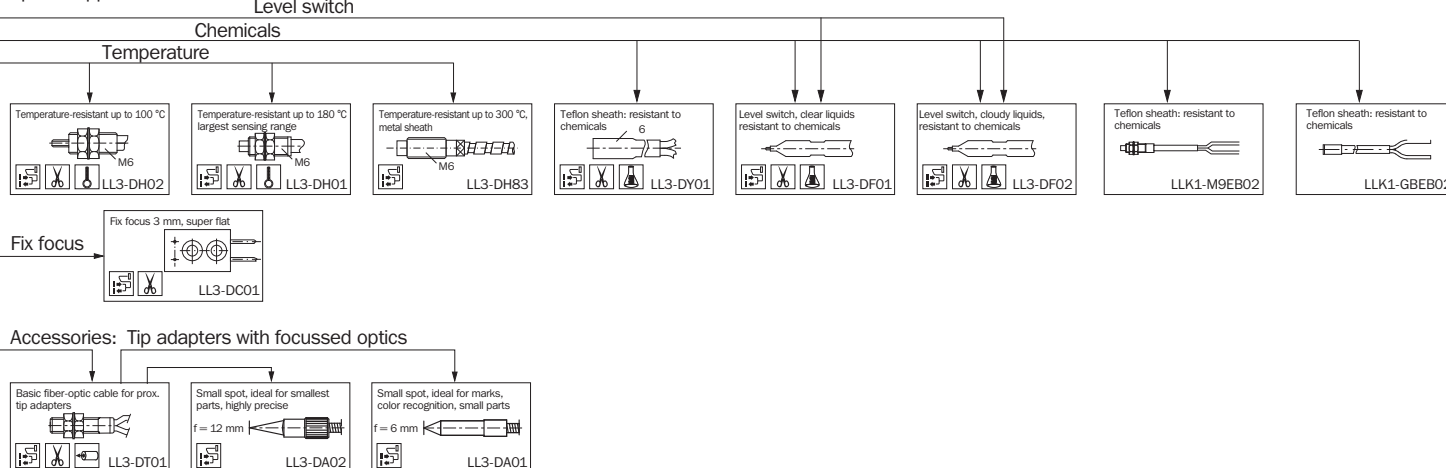
### Flexible, bend radius R4 (R = 4 mm)



### Integrated 90° deflection, smallest mounting depth

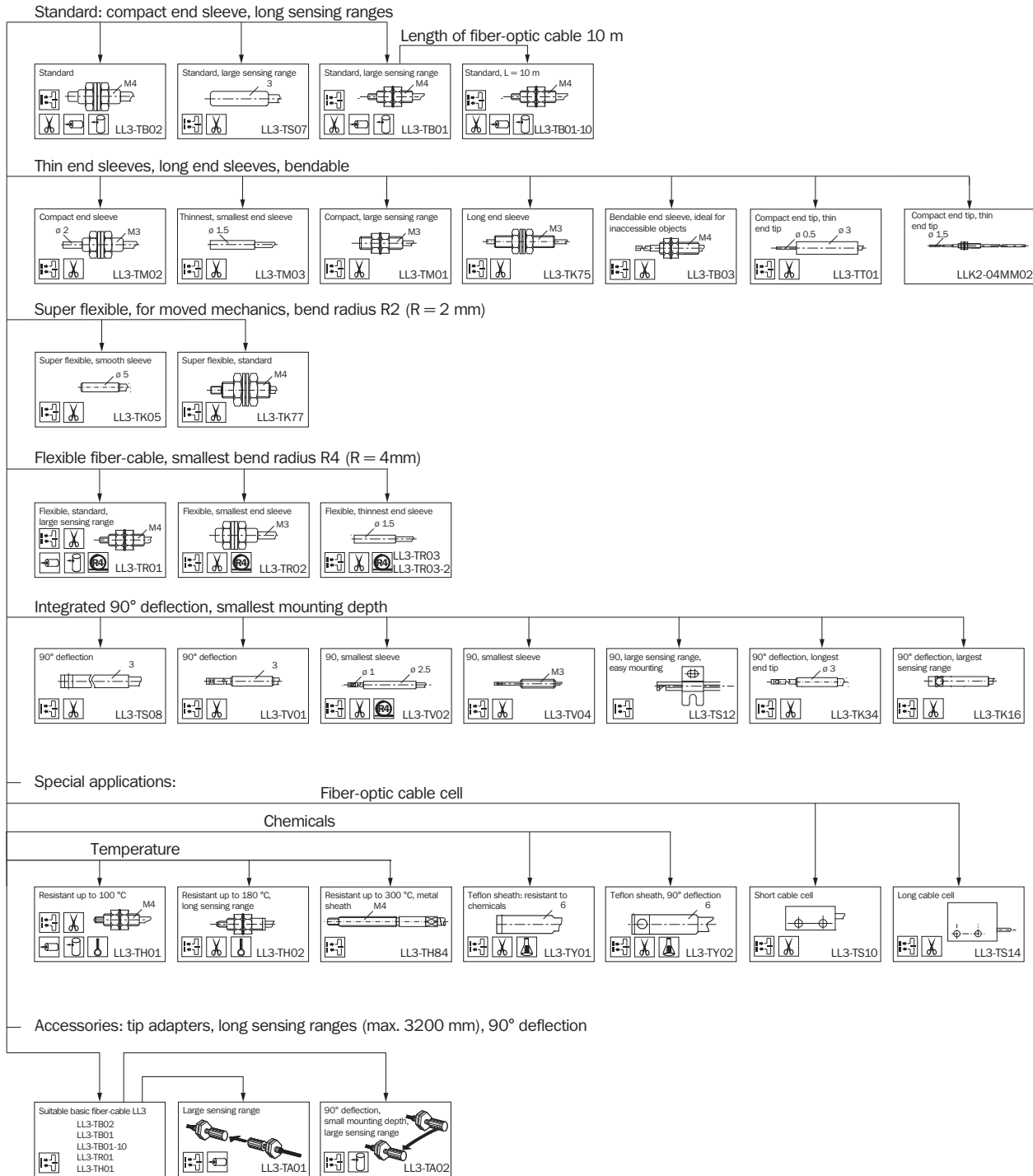


### Special applications:



# Fiber-Optic Cables

## Flowchart for selection of fiber-optic cable, through-beam systems





# LL3 plastic fiber-optic cables

## Proximity systems

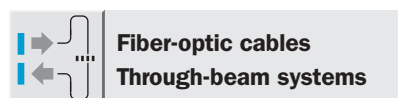
| Type                                        | Part no.  | Object size<br>Standard:<br>white 90% | Minimum <sup>1)</sup> | Suitable for<br>sensing tip<br>adapter <sup>2)</sup> | LL3 = Core structure<br>C = Coaxial, S = Sender<br>R = Receiver | Can be<br>shorten-<br>ed as<br>required <sup>3)</sup> | LL3-<br>Length | LL3-<br>Outside Ø | Bend radius<br>R LL3 |
|---------------------------------------------|-----------|---------------------------------------|-----------------------|------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------|----------------|-------------------|----------------------|
| <b>Standard type</b>                        |           |                                       |                       |                                                      |                                                                 |                                                       |                |                   |                      |
| LL3-DM01                                    | 5 308 071 | 100 x 100 mm                          | Ø 0.015 mm            | No                                                   | 2 x : Ø 1.0 mm                                                  | Yes                                                   | 2 m            | 1.3 mm            | R25                  |
| LL3-DT03                                    | 5 308 072 | 30 x 30 mm                            | Ø 0.015 mm            | No                                                   | 2 x : Ø 0.5 mm                                                  | Yes                                                   | 2 m            | 1.0 mm            | R15                  |
| LL3-DS06                                    | 5 308 073 | 30 x 30 mm                            | Ø 0.015 mm            | No                                                   | 2 x : Ø 0.5 mm                                                  | Yes                                                   | 2 m            | 2.2 mm            | R15                  |
| LL3-DK06                                    | 5 313 019 | 100 x 100 mm                          | Ø 0.015 mm            | No                                                   | 2 x : Ø 1.0 mm                                                  | Yes                                                   | 2 m            | 2.2 mm            | R25                  |
| LL3-DK04                                    | 5 313 020 | 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                                    | 5 308 074 | 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                                 | 5 308 075 | 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                                    | 5 313 021 | 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                                    | 5 308 076 | 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                                    | 5 308 077 | 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                                    | 5 313 022 | 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                                    | 5 313 023 | 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                                    | 5 313 024 | 100 x 100 mm                          | Ø 0.015 mm            | No                                                   | 2 x : Ø 1.0 mm                                                  | Yes                                                   | 2 m            | 1.3 mm            | R2                   |
| LL3-DK67                                    | 5 313 025 | 100 x 100 mm                          | Ø 0.015 mm            | No                                                   | 2 x : Ø 1.0 mm                                                  | Yes                                                   | 2 m            | 2.2 mm            | R2                   |
| LL3-DK04Z                                   | 5 313 026 | 100 x 100 mm                          | Ø 0.015 mm            | No                                                   | 2 x : Ø 1.0 mm                                                  | Yes                                                   | 2 m            | 1.3 mm            | R2                   |
| LL3-DK63Z                                   | 5 313 027 | 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                                    | 5 308 078 | 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                                    | 5 308 079 | 30 x 30 mm                            | Ø 0.015 mm            | No                                                   | S: 2 x Ø 0.25 mm, R: 16 x Ø 0.25 mm                             | Yes                                                   | 1 m            | 1.0 mm            | R4                   |
| LL3-DR03                                    | 5 308 080 | 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                                    | 5 308 081 | 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                                    | 5 308 082 | 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                                    | 5 308 083 | 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                                    | 5 308 084 | 30 x 30 mm                            | Ø 0.015 mm            | No                                                   | 2 x Ø 0.5 mm                                                    | Yes                                                   | 2 m            | 1.0 mm            | R15                  |
| LL3-DT02                                    | 5 308 085 | 30 x 30 mm                            | Ø 0.015 mm            | No                                                   | 2 x Ø 0.25 mm                                                   | Yes                                                   | 2 m            | 1.0 mm            | R4                   |
| LL3-DT04                                    | 5 308 086 | 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                                    | 5 313 028 | 30 x 30 mm                            | Ø 0.015 mm            | No                                                   | 2 x Ø 0.5 mm                                                    | Yes                                                   | 2 m            | 1.0 mm            | R15                  |
| LL3-DR05                                    | 5 308 087 | 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                                    | 5 313 029 | 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                                    | 5 313 030 | 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                                    | 5 308 088 | 30 x 30 mm                            | Ø 0.025 mm            | No                                                   | 2 x Ø 1.0 mm                                                    | Yes                                                   | 2 m            | 2.2 mm            | R25                  |
| LL3-DV02                                    | 5 308 089 | 30 x 30 mm                            | Ø 0.015 mm            | No                                                   | 2 x Ø 0.5 mm                                                    | Yes                                                   | 2 m            | 1.0 mm            | R15                  |
| LL3-DV03                                    | 5 308 090 | 30 x 30 mm                            | Ø 0.025 mm            | No                                                   | 2 x Ø 1.0 mm                                                    | Yes                                                   | 2 m            | 2.2 mm            | R25                  |
| LL3-DK33                                    | 5 313 031 | 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                                    | 5 308 094 | clear liquid                          | –                     | No                                                   | 2 x Ø 1.0 mm                                                    | Yes                                                   | 2 m            | 6 mm              | R60                  |
| LL3-DF02                                    | 5 308 095 | cloudy liquid                         | –                     | No                                                   | 2 x Ø 1.0 mm                                                    | Yes                                                   | 2 m            | 6 mm              | R60                  |
|                                             |           |                                       |                       |                                                      |                                                                 |                                                       |                |                   |                      |
| <b>Temperature-resistant</b>                |           |                                       |                       |                                                      |                                                                 |                                                       |                |                   |                      |
| LL3-DH01                                    | 5 308 091 | 100 x 100 mm                          | Ø 0.015 mm            | No                                                   | 2 x Ø 1.5 mm                                                    | Yes                                                   | 2 m            | 2.2 mm            | R35                  |
| LL3-DH02                                    | 5 308 092 | 100 x 100 mm                          | Ø 0.015 mm            | No                                                   | 2 x Ø 1.0 mm                                                    | Yes                                                   | 2 m            | 2.2 mm            | R25                  |
| LL3-DH83                                    | 5 313 032 | 100 x 100 mm                          | Ø 0.015 mm            | No                                                   | Ø 1.6 mm (mixed 50 µm)                                          | No                                                    | 1 m            | 5 mm              | R25                  |
|                                             |           |                                       |                       |                                                      |                                                                 |                                                       |                |                   |                      |
| <b>Teflon sheath</b>                        |           |                                       |                       |                                                      |                                                                 |                                                       |                |                   |                      |
| LL3-DY01                                    | 5 308 093 | 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                                    | 5 313 033 | 30 x 30 mm                            | Ø 0.015 mm            | No                                                   | 2 x Ø 0.5 mm                                                    | Yes                                                   | 2 m            | 1.0 mm            | R15                  |

1) Minimum object diameter: sensing range reduction 2) See also LL3-Accessories: tip adapter 3) Cutter FC for fiber-optic cables included with delivery

| Dimensioning<br>mounting<br>sleeve | End tip  | Fiber material       |        |                       | Operating<br>temperature | General description                                                               |
|------------------------------------|----------|----------------------|--------|-----------------------|--------------------------|-----------------------------------------------------------------------------------|
|                                    |          | Core                 | Sheath | End tip <sup>4)</sup> |                          |                                                                                   |
| 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; fiber 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; fiber 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 0.25 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 split; R = 4                        |
|                                    |          |                      |        |                       |                          |                                                                                   |
| M6                                 | Ø 2.5 mm | PMMA                 | PE     | 1.4305                | -40...70° C              | M6, Ø 0.25 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; fiber 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; fiber 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 = 4 x 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 long 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 resistant to 180° C; M6; core 2 x Ø 1.5 mm                                   |
| M6                                 | –        | PC                   | PVC    | 1.4305                | -40...100° C             | Heat resistant to 105° C; M6; core 2 x Ø 1.0 mm                                   |
| M6                                 | –        | Glass                |        | 1.4305                | -40...300° C             | Heat resistant to 300° C; M6; core Ø 1.6 mm (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              | Fixed focus 3 mm                                                                  |

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





Fiber-optic cables  
Through-beam systems

## LL3 plastic fiber-optic cables Through-beam systems

| Type                                        | Part no. <sup>5)</sup> | Object size:<br>Standard | Minimum <sup>1)</sup> | Suitable for<br>sensing tip<br>adapter <sup>2)</sup> | LL3 = Core structure          | Can be<br>shorten-<br>ed as<br>required <sup>3)</sup> | LL3-<br>Length | LL3-<br>Outside Ø | Bend radius R |        |
|---------------------------------------------|------------------------|--------------------------|-----------------------|------------------------------------------------------|-------------------------------|-------------------------------------------------------|----------------|-------------------|---------------|--------|
|                                             |                        |                          |                       |                                                      |                               |                                                       |                |                   | LL3           | Sleeve |
| <b>Standard type</b>                        |                        |                          |                       |                                                      |                               |                                                       |                |                   |               |        |
| LL3-TS07                                    | 5 308 049              | Ø 1.5 mm                 | Ø 0.5 mm              | No                                                   | Ø 1.5 mm                      | Yes                                                   | 2 m            | 2.2 mm            | R30           | –      |
| LL3-TB01                                    | 5 308 050              | Ø 1.5 mm                 | Ø 0.5 mm              | Yes                                                  | Ø 1.5 mm                      | Yes                                                   | 2 m            | 2.2 mm            | R30           | –      |
| LL3-TB01-10                                 | 5 308 051              | Ø 1.5 mm                 | Ø 0.5 mm              | Yes                                                  | Ø 1.5 mm                      | Yes                                                   | 10 m           | 2.2 mm            | R30           | –      |
| LL3-TB02                                    | 5 308 048              | 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                                    | 5 313 034              | Ø 1 mm                   | Ø 0.2 mm              | No                                                   | Ø 1.0 mm (multi-core)         | Yes                                                   | 2 m            | 2.2 mm            | R2            | –      |
| LL3-TK77                                    | 5 313 035              | 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</b>          |                        |                          |                       |                                                      |                               |                                                       |                |                   |               |        |
| LL3-TR01                                    | 5 308 052              | Ø 1 mm                   | Ø 0.3 mm              | Yes                                                  | Ø 0.265 mm x 16               | Yes                                                   | 2 m            | 2.2 mm            | R4            | –      |
| LL3-TR02                                    | 5 308 053              | Ø 0.5 mm                 | Ø 0.1 mm              | No                                                   | Ø 0.25 mm x 4                 | Yes                                                   | 2 m            | 1.0 mm            | R4            | –      |
| LL3-TR03                                    | 5 308 054              | 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                                 | 5 308 055              | 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                                    | 5 308 056              | Ø 1 mm                   | Ø 0.2 mm              | No                                                   | Ø 1.0 mm                      | Yes                                                   | 2 m            | 2.2 mm            | R25           | 10     |
| LL3-TT01                                    | 5 308 057              | Ø 0.25 mm                | Ø 0.1 mm              | No                                                   | Ø 0.25 mm                     | Yes                                                   | 2 m            | 1.0 mm            | R15           | –      |
| LL3-TK75                                    | 5 313 036              | 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                                    | 5 308 058              | Ø 1 mm                   | Ø 0.2 mm              | No                                                   | Ø 1.0 mm                      | Yes                                                   | 2 m            | 2.2 mm            | R25           | –      |
| LL3-TV02                                    | 5 308 059              | Ø 0.5 mm                 | Ø 0.1 mm              | No                                                   | Ø 0.5 mm                      | Yes                                                   | 2 m            | 1.0 mm            | R15           | –      |
| LL3-TV04                                    | 5 308 060              | Ø 0.5 mm                 | Ø 0.1 mm              | No                                                   | Ø 0.5 mm                      | Yes                                                   | 2 m            | 1.0 mm            | R15           | –      |
| LL3-TS08                                    | 5 308 061              | Ø 1 mm                   | Ø 0.2 mm              | No                                                   | Ø 1.0 mm                      | Yes                                                   | 2 m            | 2.2 mm            | R25           | –      |
| LL3-TS12                                    | 5 308 062              | Ø 1.7 mm                 | Ø 0.5 mm              | No                                                   | Ø 0.75 mm                     | Yes                                                   | 2 m            | 2.2 mm            | R25           | –      |
| LL3-TK34                                    | 5 313 037              | Ø 1 mm                   | Ø 0.2 mm              | No                                                   | Ø 1.0 mm                      | Yes                                                   | 2 m            | 2.2 mm            | R25           | –      |
| LL3-TK16                                    | 5 313 038              | Ø 1 mm                   | Ø 0.2 mm              | No                                                   | Ø 1.0 mm                      | Yes                                                   | 2 m            | 2.2 mm            | R25           | –      |
|                                             |                        |                          |                       |                                                      |                               |                                                       |                |                   |               |        |
| <b>Fiber-optic cable cell</b>               |                        |                          |                       |                                                      |                               |                                                       |                |                   |               |        |
| LL3-TS10                                    | 5 308 063              | Ø 2 mm                   | Ø 1 mm                | No                                                   | Ø 0.25 mm x 16                | Yes                                                   | 2 m            | 2.2 mm            | R25           | –      |
| LL3-TS14                                    | 5 313 039              | 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                                    | 5 308 064              | Ø 1 mm                   | Ø 0.2 mm              | Yes                                                  | Ø 0.1 mm                      | Yes                                                   | 2 m            | 2.2 mm            | R25           | –      |
| LL3-TH02                                    | 5 308 065              | Ø 1.5 mm                 | Ø 0.5 mm              | No                                                   | Ø 1.5 mm                      | Yes                                                   | 2 m            | 2.2 mm            | R35           | –      |
| LL3-TH84                                    | 5 313 040              | 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                                    | 5 308 066              | Ø 4 mm                   | Ø 0.3 mm              | No                                                   | Ø 1.0 mm                      | Yes                                                   | 2 m            | 6 mm              | R60           | –      |
| LL3-TY02                                    | 5 308 067              | 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                                    | 5 308 068              | Ø 1 mm                   | Ø 0.2 mm              | No                                                   | Ø 1.0 mm                      | Yes                                                   | 2 m            | 1.3 mm            | R25           | –      |
| LL3-TM02                                    | 5 308 069              | Ø 0.5 mm                 | Ø 0.1 mm              | No                                                   | Ø 0.5 mm                      | Yes                                                   | 2 m            | 1.0 mm            | R15           | –      |
| LL3-TM03                                    | 5 308 070              | Ø 0.5 mm                 | Ø 0.1 mm              | No                                                   | Ø 0.5 mm                      | Yes                                                   | 2 m            | 1.0 mm            | R15           | –      |

1) Minimum object diameter: sensing range reduction 2) See also LL3-Accessories: tip adapter 3) Cutter FC for fiber-optic cables included with delivery

5) The part number includes 2 fiber-optic cables, which are needed for a through-beam system.



| Dimensioning:   |          | Fiber material:      |        |                       | Operating temperature | General description                                                       |
|-----------------|----------|----------------------|--------|-----------------------|-----------------------|---------------------------------------------------------------------------|
| Mounting sleeve | End tip  | Core                 | Sheath | End tip <sup>4)</sup> |                       |                                                                           |
| 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, fiber length 2 m                                          |
| M4              | –        | PMMA                 | PE     | 1.4305                | -40...70° C           | M4, long range, fiber 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, multi-core, tubular                                     |
| M4              | –        | PMMA                 | PE     | CuZn                  | -40...70° C           | M4 cylindric, multi-core, 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, fiber length 1 m                     |
| 1.5 mm          | –        | PMMA                 | PE     | 1.4305                |                       | flexible, R4 mm, Ø 1.5 mm cylindric, fiber 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 1.5 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 resistant to 100 ° C |
|                 |          |                      |        |                       |                       |                                                                           |
| 10 x 20 x 5     | –        | PMMA                 | PE     | CuZn                  | -40...70° C           | Fiber-optic cable cell 5.25 mm                                            |
| 19 x 25 x 5     | –        | PMMA                 | PE     | CuZn                  | -40...70° C           | Fiber-optic cable cell 10.5 mm                                            |
|                 |          |                      |        |                       |                       |                                                                           |
| M4              | –        | PC                   | PE     | CuZn                  | -40...100° C          | Heat resistance to 100°, M4-sleeve                                        |
| M4              | –        | Si                   | FEP    | 1.4305                | -40...180° C          | Heat resistance to 180°, M4-sleeve                                        |
| M4              | –        | Glass                | 1.4305 | 1.4305                | -40...300° C          | Heat resistance 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                                       |

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

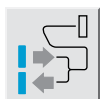
# LL 3 plastic fiber-optic cables

## Accessories – Tip adapters

| Type LL3<br>proximity, lenses<br>with focused optic | Part no. | Object size (White 90%)         |          | Dimensioning |           | Lens material |         | Operating<br>temperature | Remark                                                                                                                                                                                                                                               |
|-----------------------------------------------------|----------|---------------------------------|----------|--------------|-----------|---------------|---------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     |          | Standard                        | Minimum  | Thread       | Outside Ø | Lens          | Housing |                          |                                                                                                                                                                                                                                                      |
|                                                     |          | Focus 6 mm, spot size Ø 0.25 mm |          |              |           |               |         |                          |                                                                                                                                                                                                                                                      |
| 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 fiber LL3                    |          |                                 |          |              |           |               |         |                          |                                                                                                                                                                                                                                                      |
| LL3-DT01                                            | 5308076  | Ø 0.25 mm                       | Ø 0.1 mm |              |           | Glass         | Al      | -40...70° C              |                                                                                                                                                                                                                                                      |
|                                                     |          |                                 |          |              |           |               |         |                          |                                                                                                                                                                                                                                                      |
| Focus 12 mm, spot size Ø 3.0 mm                     |          |                                 |          |              |           |               |         |                          |                                                                                                                                                                                                                                                      |
| 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 fiber LL3                    |          |                                 |          |              |           |               |         |                          |                                                                                                                                                                                                                                                      |
| LL3-DT01                                            | 5308076  | Ø 3.0 mm                        | Ø 0.1 mm |              |           | Glass         | Al      | -40...70° C              |                                                                                                                                                                                                                                                      |

| Type LL3 through-beam lenses for extended sensing ranges | Part no.  | Object size                         |                                          | Dimensioning |           | Lens material |         | Operating temperature | Remark                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------|-----------|-------------------------------------|------------------------------------------|--------------|-----------|---------------|---------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                          |           | Standard                            | Minimum                                  | Thread       | Outside Ø | Lens          | Housing |                       |                                                                                                                                                                                                                                                                                                                        |
|                                                          |           | Axial optic, largest sensing ranges |                                          |              |           |               |         |                       |                                                                                                                                                                                                                                                                                                                        |
| LL3-TA01                                                 | 5 308 128 |                                     |                                          | 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 sensing ranges (up to factor 10 x)</li><li>• Light spot diameter: approx. 170 mm at 1000 mm</li></ul>                                                                                                                         |
| Combined with standard fibers LL3                        |           |                                     |                                          |              |           |               |         |                       |                                                                                                                                                                                                                                                                                                                        |
| LL3-TB01                                                 | 5 308 050 | –                                   | Ø 3 mm <sup>1)</sup> /4 mm <sup>2)</sup> |              |           |               |         | -40...70° C           |                                                                                                                                                                                                                                                                                                                        |
| LL3-TB01-10                                              | 5 308 051 | –                                   | Ø 3 mm <sup>1)</sup> /4 mm <sup>2)</sup> |              |           |               |         | -40...70° C           |                                                                                                                                                                                                                                                                                                                        |
| LL3-TB02                                                 | 5 308 048 | –                                   | Ø 3 mm <sup>1)</sup> /4 mm <sup>2)</sup> |              |           |               |         | -40...70° C           |                                                                                                                                                                                                                                                                                                                        |
| Combined with super flexible fibers                      |           |                                     |                                          |              |           |               |         |                       |                                                                                                                                                                                                                                                                                                                        |
| LL3-TK77                                                 | 5 313 035 | –                                   | Ø 3 mm <sup>1)</sup> /4 mm <sup>2)</sup> |              |           |               |         | -40...70° C           |                                                                                                                                                                                                                                                                                                                        |
| Combined with flexible fibers                            |           |                                     |                                          |              |           |               |         |                       |                                                                                                                                                                                                                                                                                                                        |
| LL3-TR01                                                 | 5 308 052 | –                                   | Ø 3 mm <sup>1)</sup> /4 mm <sup>2)</sup> |              |           |               |         | -40...100° C          |                                                                                                                                                                                                                                                                                                                        |
| Combined with heat resisting fibers (100 °C)             |           |                                     |                                          |              |           |               |         |                       |                                                                                                                                                                                                                                                                                                                        |
| LL3-TH01                                                 | 5 308 064 | –                                   | Ø 3 mm <sup>1)</sup> /4 mm <sup>2)</sup> |              |           |               |         | -40...100° C          |                                                                                                                                                                                                                                                                                                                        |
|                                                          |           |                                     |                                          |              |           |               |         |                       |                                                                                                                                                                                                                                                                                                                        |
| Integrated 90° deflection, large sensing ranges          |           |                                     |                                          |              |           |               |         |                       |                                                                                                                                                                                                                                                                                                                        |
| LL3-TA02                                                 | 5 308 129 |                                     |                                          | M2.6         | Ø 5.0 mm  | Glass         | CuZn    | -40...300° C          | <ul style="list-style-type: none"><li>• For through-beam systems</li><li>• Integrated 90° deflection</li><li>• For increased sensing ranges</li><li>• Light spot diameter: x-axis approx. 110 mm, y-axis approx. 170 mm (for 200 mm in each case)</li><li>• Aperture: x-axis approx. 30°, y-axis approx. 40°</li></ul> |
| Combined with standard fibers LL3                        |           |                                     |                                          |              |           |               |         |                       |                                                                                                                                                                                                                                                                                                                        |
| LL3-TB01                                                 | 5 308 050 | –                                   | Ø 3 mm                                   |              |           |               |         | -40...70° C           |                                                                                                                                                                                                                                                                                                                        |
| LL3-TB01-10                                              | 5 308 051 | –                                   | Ø 3 mm                                   |              |           |               |         | -40...70° C           |                                                                                                                                                                                                                                                                                                                        |
| LL3-TB02                                                 | 5 308 048 | –                                   | Ø 3 mm                                   |              |           |               |         | -40...70° C           |                                                                                                                                                                                                                                                                                                                        |
| Combined with super flexible fibers                      |           |                                     |                                          |              |           |               |         |                       |                                                                                                                                                                                                                                                                                                                        |
| LL3-TK77                                                 | 5 313 035 | –                                   | Ø 3 mm                                   |              |           |               |         | -40...70° C           |                                                                                                                                                                                                                                                                                                                        |
| Combined with flexible fibers                            |           |                                     |                                          |              |           |               |         |                       |                                                                                                                                                                                                                                                                                                                        |
| LL3-TR01                                                 | 5 308 052 | –                                   | Ø 3 mm                                   |              |           |               |         | -40...70° C           |                                                                                                                                                                                                                                                                                                                        |
| Combined with heat resisting fibers (100° C)             |           |                                     |                                          |              |           |               |         |                       |                                                                                                                                                                                                                                                                                                                        |
| LL3-TH01                                                 | 5 308 064 | –                                   | Ø 3 mm                                   |              |           |               |         | -40...70° C           |                                                                                                                                                                                                                                                                                                                        |

# Fiber-Optic Cables



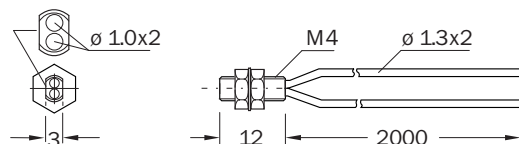
## Proximity systems

### Dimensional drawings and order information

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

##### Standard type

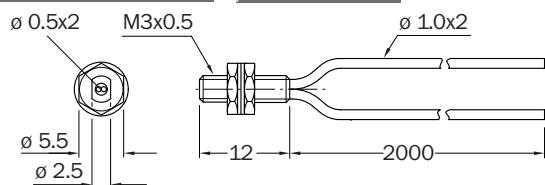
| Type     | Part no.  |
|----------|-----------|
| LL3-DM01 | 5 308 071 |



dimensions in mm

##### Standard type

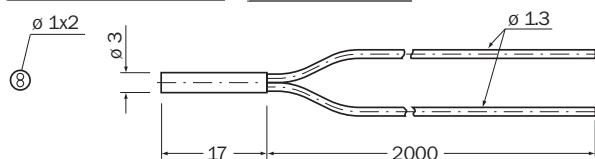
| Type     | Part no.  |
|----------|-----------|
| LL3-DS06 | 5 308 073 |



dimensions in mm

##### Standard type

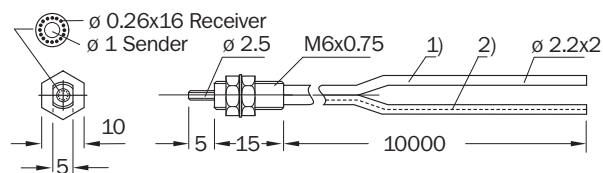
| Type     | Part no.  |
|----------|-----------|
| LL3-DK04 | 5 313 020 |



dimensions in mm

##### Standard type

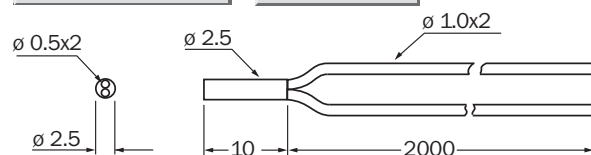
| Type        | Part no.  |
|-------------|-----------|
| LL3-DB01-10 | 5 308 075 |



dimensions in mm

##### Standard type

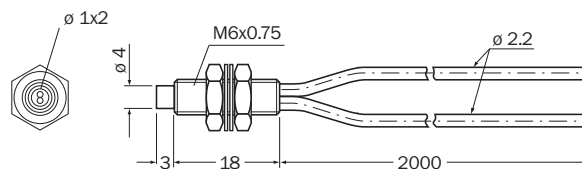
| Type     | Part no.  |
|----------|-----------|
| LL3-DT03 | 5 308 072 |



dimensions in mm

##### Standard type

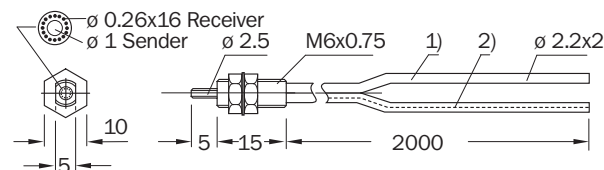
| Type     | Part no.  |
|----------|-----------|
| LLD-DK06 | 5 313 019 |



dimensions in mm

##### Standard type

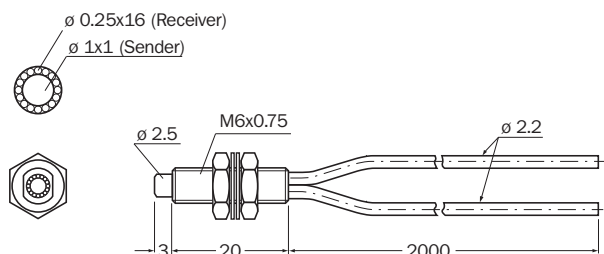
| Type     | Part no.  |
|----------|-----------|
| LL3-DB01 | 5 308 074 |



dimensions in mm

##### Standard type

| Type     | Part no.  |
|----------|-----------|
| LL3-DB03 | 5 313 021 |



dimensions in mm

# Fiber-Optic Cables



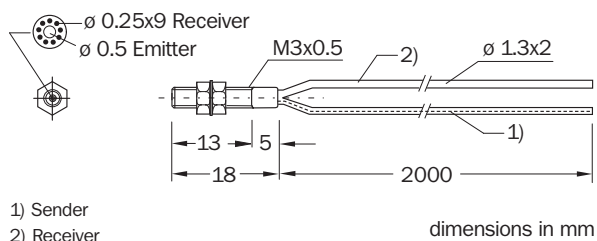
## Proximity systems

### Dimensional drawings and order information

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

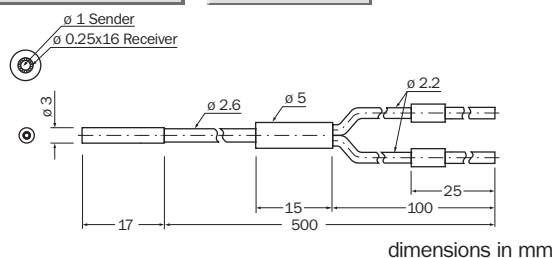
##### Coaxial cable

| Type     | Part no.  |
|----------|-----------|
| LL3-DT01 | 5 308 076 |



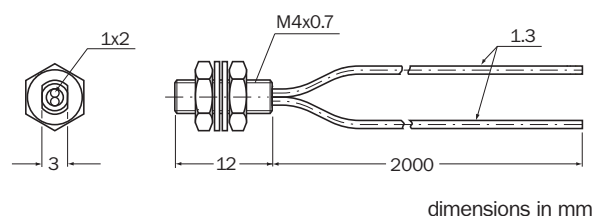
##### Coaxial cable

| Type     | Part no.  |
|----------|-----------|
| LL3-DK23 | 5 313 022 |



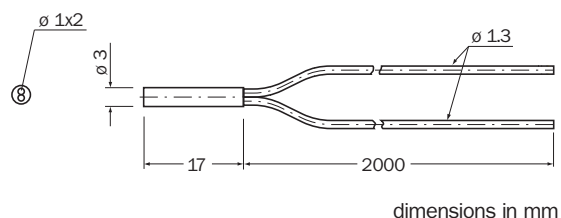
##### Super flexible, bend radius R = 2 mm

| Type     | Part no.  |
|----------|-----------|
| LL3-DK66 | 5 313 024 |



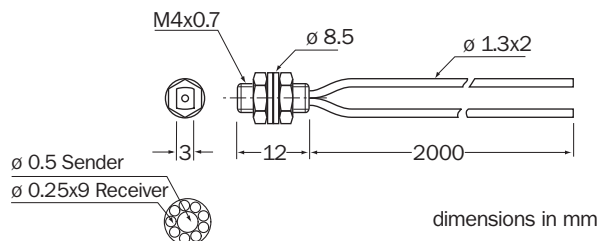
##### Super flexible, bend radius R = 2 mm

| Type      | Part no.  |
|-----------|-----------|
| LL3-DK04Z | 5 313 026 |



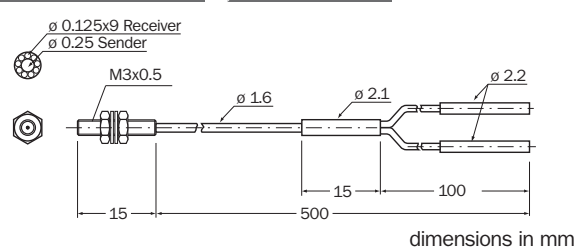
##### Coaxial cable

| Type     | Part no.  |
|----------|-----------|
| LL3-DM02 | 5 308 077 |



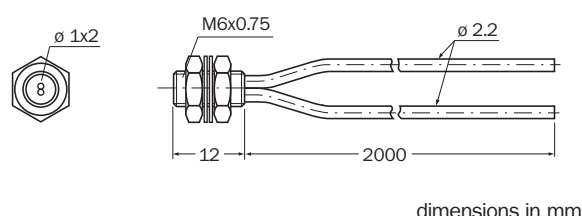
##### Coaxial cable

| Type     | Part no.  |
|----------|-----------|
| LL3-DK21 | 5 313 023 |



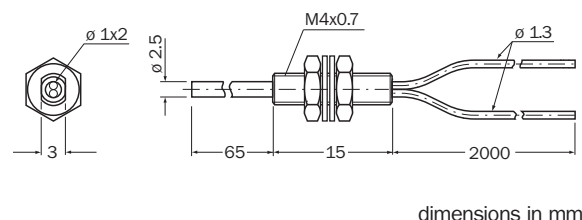
##### Super flexible, bend radius R = 2 mm

| Type     | Part no.  |
|----------|-----------|
| LL3-DK67 | 5 313 025 |



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

| Type      | Part no.  |
|-----------|-----------|
| LL3-DK63Z | 5 313 027 |



# Fiber-Optic Cables



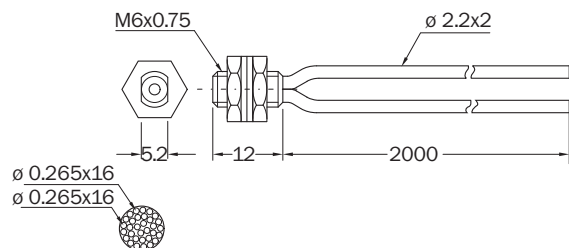
## Proximity systems

### Dimensional drawings and order information

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

##### Flexible, bend radius R = 4 mm

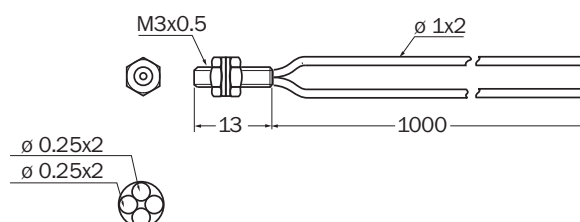
| Type     | Part no.  |
|----------|-----------|
| LL3-DR01 | 5 308 078 |



dimensions in mm

##### Flexible, bend radius R = 4 mm

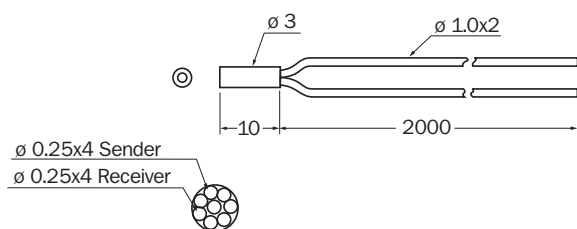
| Type     | Part no.  |
|----------|-----------|
| LL3-DR02 | 5 308 079 |



dimensions in mm

##### Flexible, bend radius R = 4 mm

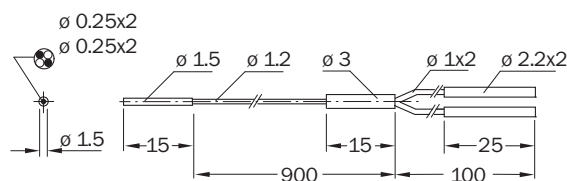
| Type     | Part no.  |
|----------|-----------|
| LL3-DR03 | 5 308 080 |



dimensions in mm

##### Flexible, bend radius R = 4 mm

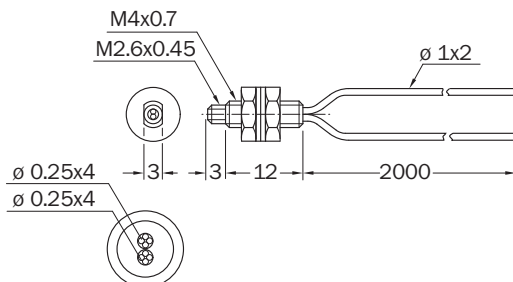
| Type     | Part no.  |
|----------|-----------|
| LL3-DR04 | 5 308 081 |



dimensions in mm

##### Flexible, bend radius R = 4 mm

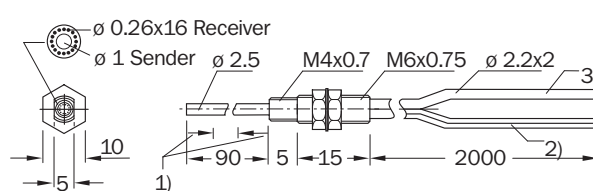
| Type     | Part no.  |
|----------|-----------|
| LL3-DR06 | 5 308 082 |



dimensions in mm

##### Long end tips

| Type     | Part no.  |
|----------|-----------|
| LL3-DB02 | 5 308 083 |



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

dimensions in mm

# Fiber-Optic Cables



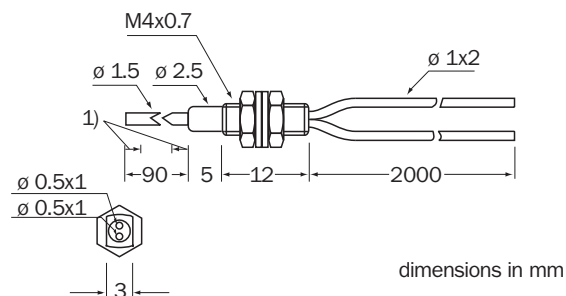
## Proximity systems

### Dimensional drawings and order information

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

##### Long end tips

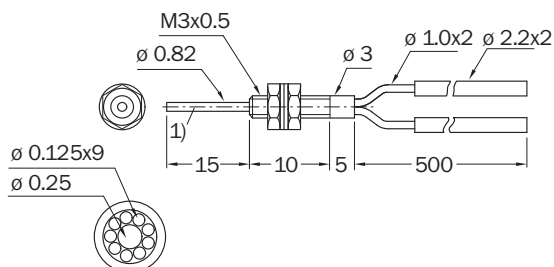
| Type     | Part no.  |
|----------|-----------|
| LL3-DM03 | 5 308 084 |



dimensions in mm

##### Long end tips

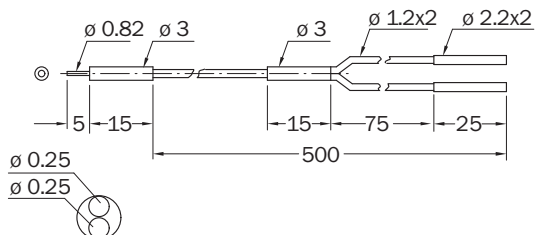
| Type     | Part no.  |
|----------|-----------|
| LL3-DT04 | 5 308 086 |



dimensions in mm

##### Long end tips

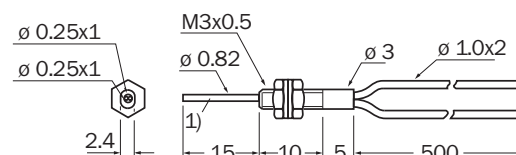
| Type     | Part no.  |
|----------|-----------|
| LL3-DR05 | 5 308 087 |



dimensions in mm

##### Long end tips

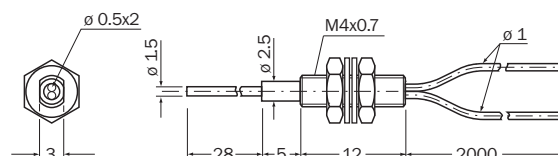
| Type     | Part no.  |
|----------|-----------|
| LL3-DT02 | 5 308 085 |



dimensions in mm

##### Long end tips

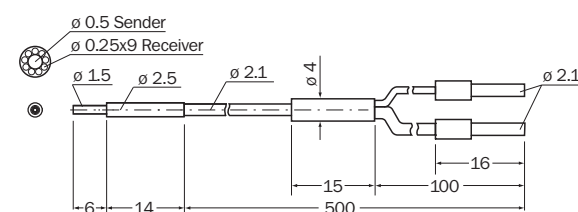
| Type     | Part no.  |
|----------|-----------|
| LL3-DT05 | 5 313 028 |



dimensions in mm

##### Long end tips

| Type     | Part no.  |
|----------|-----------|
| LL3-DK22 | 5 313 029 |



dimensions in mm

# Fiber-Optic Cables



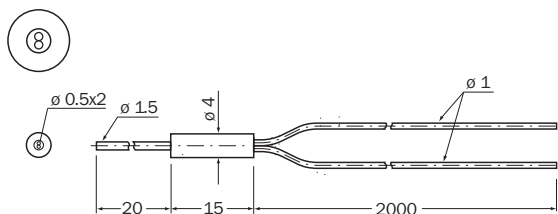
## Proximity systems

### Dimensional drawings and order information

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

##### Long end tips

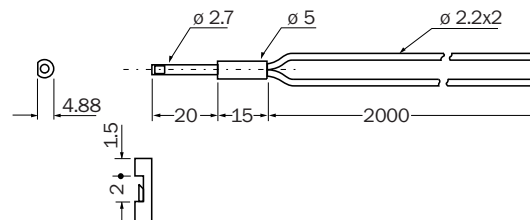
| Type     | Part no.  |
|----------|-----------|
| LL3-DK43 | 5 313 030 |



dimensions in mm

##### Integrated 90° deflection

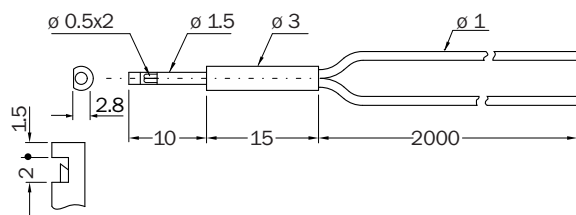
| Type     | Part no.  |
|----------|-----------|
| LL3-DV01 | 5 308 088 |



dimensions in mm

##### Integrated 90° deflection

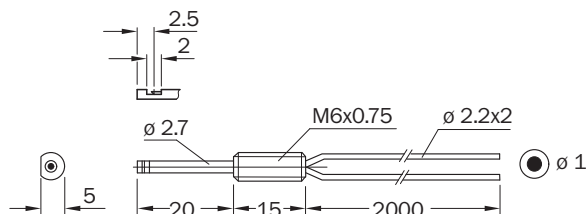
| Type     | Part no.  |
|----------|-----------|
| LL3-DV02 | 5 308 089 |



dimensions in mm

##### Integrated 90° deflection

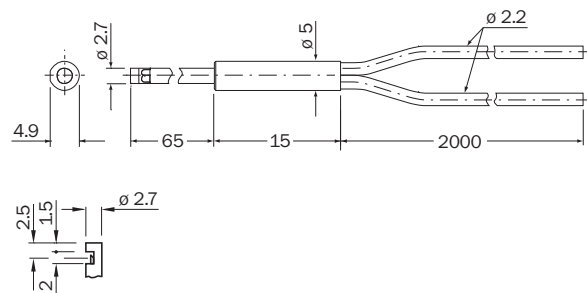
| Type     | Part no.  |
|----------|-----------|
| LL3-DV03 | 5 308 090 |



dimensions in mm

##### Integrated 90° deflection

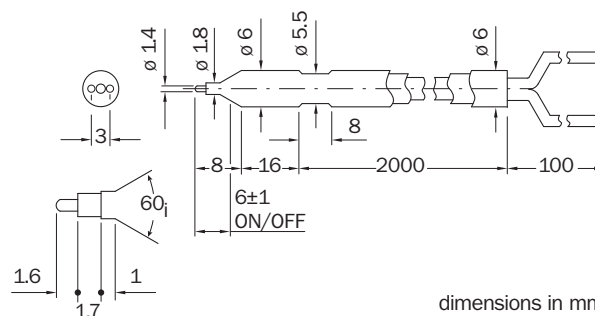
| Type     | Part no.  |
|----------|-----------|
| LL3-DK33 | 5 313 031 |



dimensions in mm

##### Level switch for liquids

| Type     | Part no.                |
|----------|-------------------------|
| LL3-DF01 | 5 308 094 <sup>1)</sup> |
| LL3-DF02 | 5 308 095 <sup>2)</sup> |



dimensions in mm

- 1) For transparent liquids
- 2) For cloudy liquids



# Fiber-Optic Cables



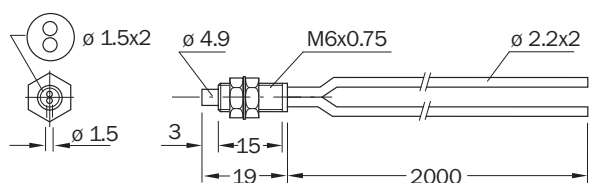
## Proximity systems

### Dimensional drawings and order information

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

##### Temperature-resistant

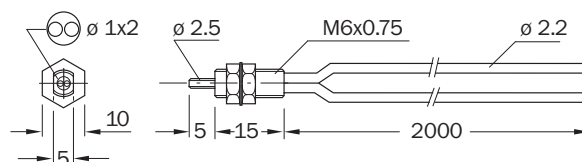
| Type     | Part no.  |
|----------|-----------|
| LL3-DH01 | 5 308 091 |



dimensions in mm

##### Temperature-resistant

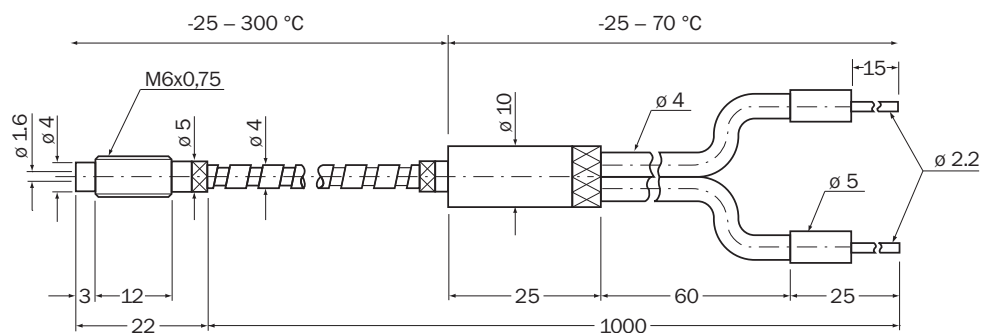
| Type     | Part no.  |
|----------|-----------|
| LL3-DH02 | 5 308 092 |



dimensions in mm

##### Temperature-resistant

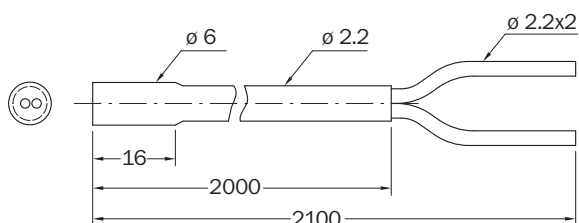
| Type     | Part no.  |
|----------|-----------|
| LL3-DH83 | 5 313 032 |



dimensions in mm

##### Teflon sheath

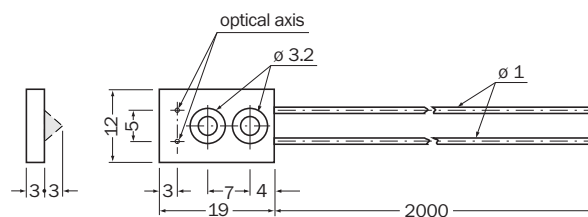
| Type     | Part no.  |
|----------|-----------|
| LL3-DY01 | 5 308 093 |



dimensions in mm

##### Fix focus

| Type     | Part no.  |
|----------|-----------|
| LL3-DC01 | 5 313 033 |



dimensions in mm

# Fiber-Optic Cables



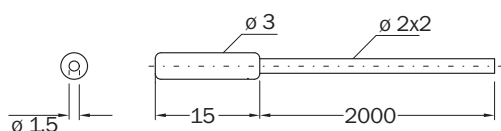
## Through-beam systems

### Dimensional drawings and order information

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

##### Standard type

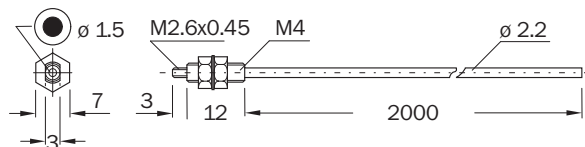
| Type     | Part no.  |
|----------|-----------|
| LL3-TS07 | 5 308 049 |



dimensions in mm

##### Standard type

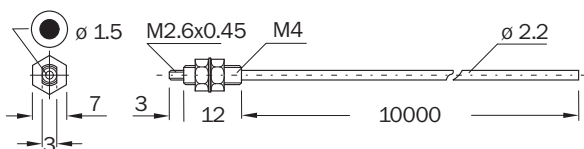
| Type     | Part no.  |
|----------|-----------|
| LL3-TB01 | 5 308 050 |



dimensions in mm

##### Standard type

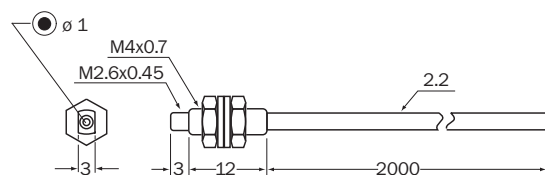
| Type        | Part no.  |
|-------------|-----------|
| LL3-TB01-10 | 5 308 051 |



dimensions in mm

##### Standard type

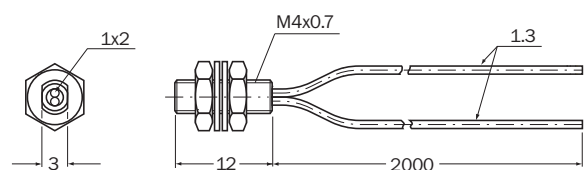
| Type     | Part no.  |
|----------|-----------|
| LL3-TB02 | 5 308 048 |



dimensions in mm

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

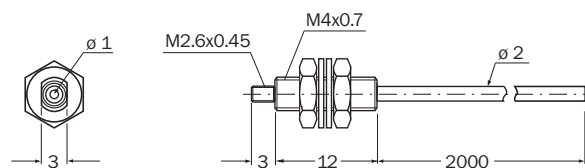
| Type     | Part no.  |
|----------|-----------|
| LL3-TK05 | 5 313 034 |



dimensions in mm

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

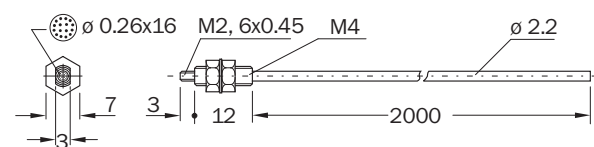
| Type     | Part no.  |
|----------|-----------|
| LL3-TK77 | 5 313 035 |



dimensions in mm

##### Super flexible, bend radius R = 4 mm

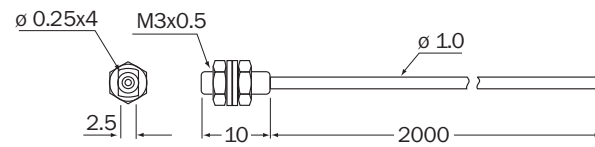
| Type     | Part no.  |
|----------|-----------|
| LL3-TR01 | 5 308 052 |



dimensions in mm

##### Super flexible, bend radius R = 4 mm

| Type     | Part no.  |
|----------|-----------|
| LL3-TR02 | 5 308 053 |



dimensions in mm

# Fiber-Optic Cables



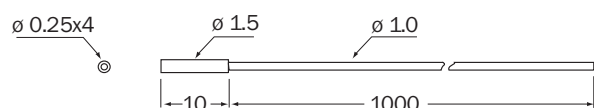
## Through-beam systems

### Dimensional drawings and order information

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

##### Flexible, bend radius R = 4 mm

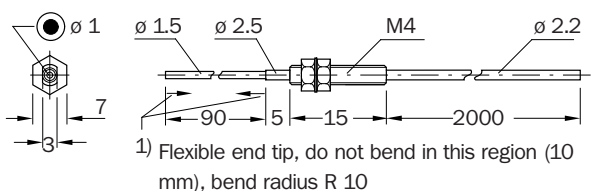
| Type     | Part no.  |
|----------|-----------|
| LL3-TR03 | 5 308 054 |



dimensions in mm

##### Long end tips

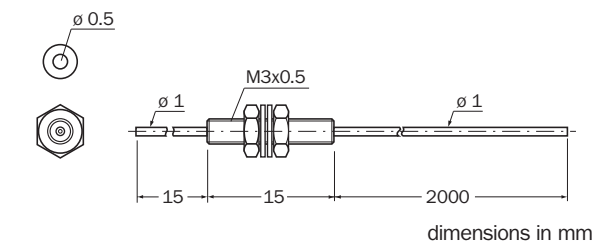
| Type     | Part no.  |
|----------|-----------|
| LL3-TB03 | 5 308 056 |



dimensions in mm

##### Long end tips

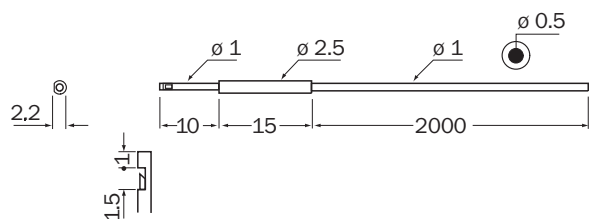
| Type     | Part no.  |
|----------|-----------|
| LL3-TK75 | 5 313 036 |



dimensions in mm

##### Integrated 90° deflection

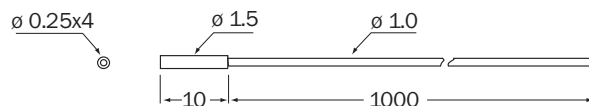
| Type     | Part no.  |
|----------|-----------|
| LL3-TV02 | 5 308 059 |



dimensions in mm

##### Flexible, bend radius R = 4 mm

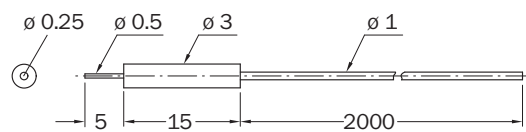
| Type        | Part no.  |
|-------------|-----------|
| LL3-TR03-02 | 5 308 055 |



dimensions in mm

##### Long end tips

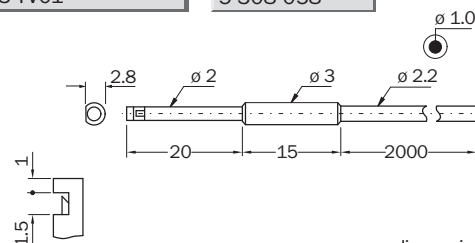
| Type     | Part no.  |
|----------|-----------|
| LL3-TT01 | 5 308 057 |



dimensions in mm

##### Integrated 90° deflection

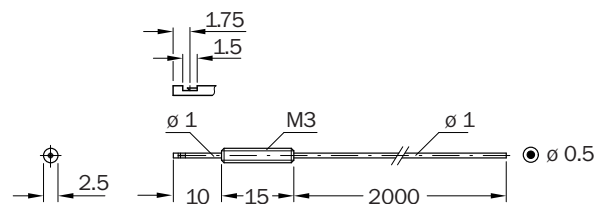
| Type     | Part no.  |
|----------|-----------|
| LL3-TV01 | 5 308 058 |



dimensions in mm

##### Integrated 90° deflection

| Type     | Part no.  |
|----------|-----------|
| LL3-TV04 | 5 308 060 |

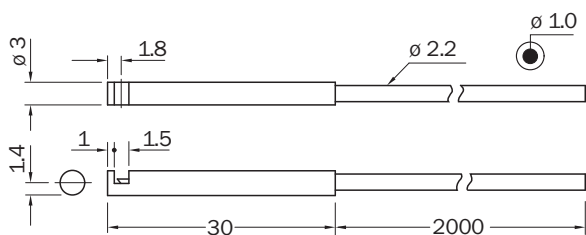


dimensions in mm

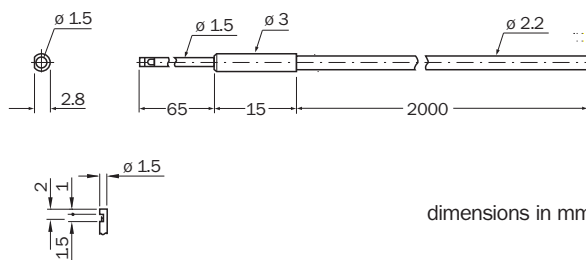
### Dimensional drawings and order information

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

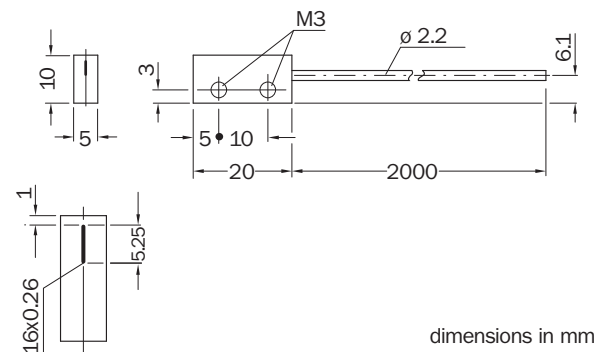
|          |           |
|----------|-----------|
| Type     | Part no.  |
| LL3-TS08 | 5 308 061 |



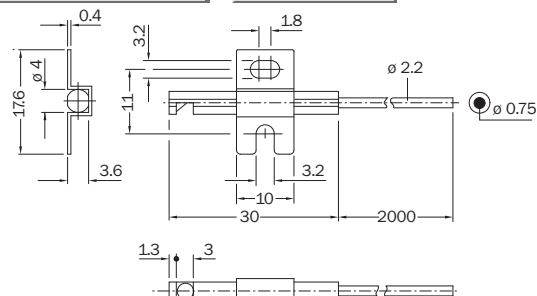
| Integrated 90° deflection |           |
|---------------------------|-----------|
| Type                      | Part no.  |
| LL3-TK34                  | 5 313 037 |



|          |           |
|----------|-----------|
| Type     | Part no.  |
| LL3-TS10 | 5 308 063 |

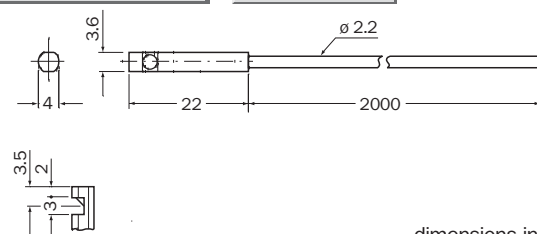


| Type     | Part no.* |
|----------|-----------|
| LL3-TS12 | 5 308 062 |

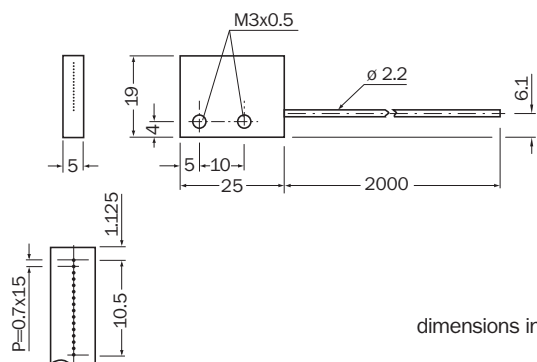


dimensions in mm

|             |                 |
|-------------|-----------------|
| <b>Type</b> | <b>Part no.</b> |
| LL3-TK16    | 5 313 038       |



| Type     | Part no.  |
|----------|-----------|
| LL3-TS14 | 5 313 039 |



dimensions in mm

# Fiber-Optic Cables



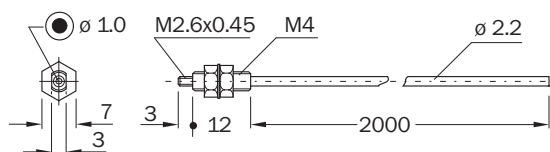
## Through-beam systems

### Dimensional drawings and order information

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

##### Temperature-resistant

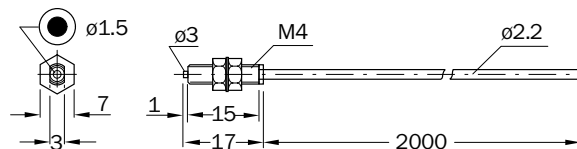
| Type     | Part no.  |
|----------|-----------|
| LL3-TH01 | 5 308 064 |



dimensions in mm

##### Temperature-resistant

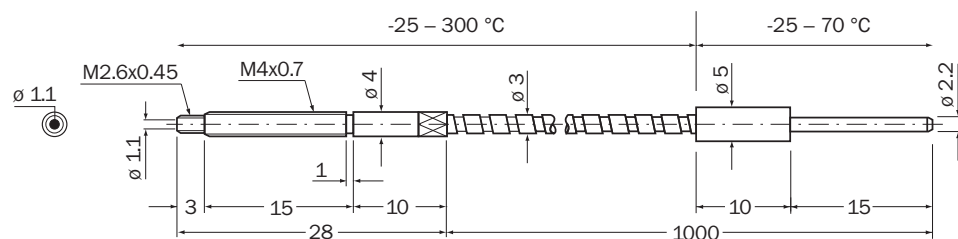
| Type     | Part no.  |
|----------|-----------|
| LL3-TH02 | 5 308 065 |



dimensions in mm

##### Temperature-resistant

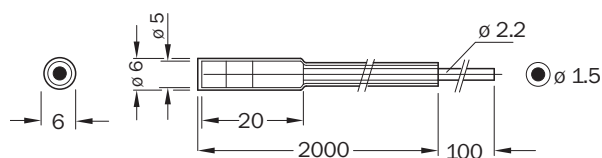
| Type     | Part no.  |
|----------|-----------|
| LL3-TB84 | 5 313 040 |



dimensions in mm

##### Teflon sheath

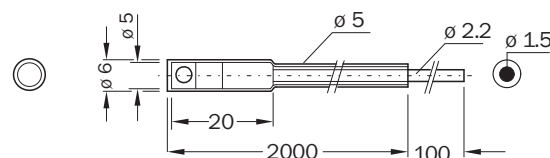
| Type     | Part no.  |
|----------|-----------|
| LL3-TY01 | 5 308 066 |



dimensions in mm

##### Teflon sheath

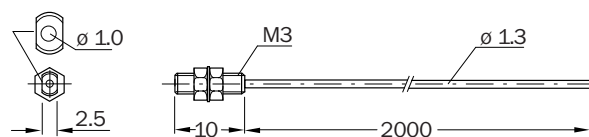
| Type     | Part no.  |
|----------|-----------|
| LL3-TY02 | 5 308 067 |



dimensions in mm

##### Smallest end sleeves

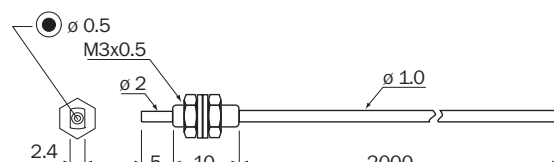
| Type     | Part no.  |
|----------|-----------|
| LL3-TM01 | 5 308 068 |



dimensions in mm

##### Smallest end sleeves

| Type     | Part no.  |
|----------|-----------|
| LL3-TM02 | 5 308 069 |



dimensions in mm



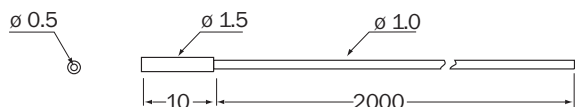
# Through-beam systems

## Dimensional drawings and order information

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

#### Smallest end sleeves

| Type     | Part no.  |
|----------|-----------|
| LL3-TM03 | 5 308 070 |



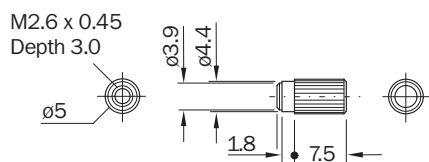
dimensions in mm

## Accessories

### LL3 Fiber-optic cables

#### Order information

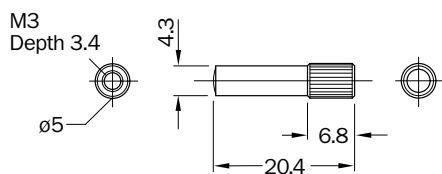
| Type     | Part no.  |
|----------|-----------|
| LL3-TA01 | 5 308 128 |



dimensions in mm

#### Order information

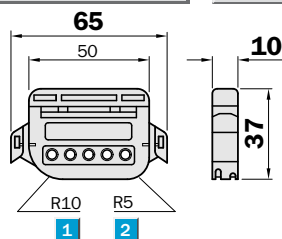
| Type     | Part no.  |
|----------|-----------|
| LL3-DA01 | 5 308 127 |



dimensions in mm

#### Cutter for fiber-optic cables<sup>1)</sup>

| Type | Part no.  |
|------|-----------|
| FC   | 5 304 141 |



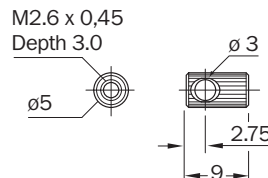
- 1 Templing or bend radius R 10 mm, for end tips Ø 1.5 mm and Ø 2.5 mm
- 2 Bend radius R 5 mm

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

dimensions in mm

#### Order information

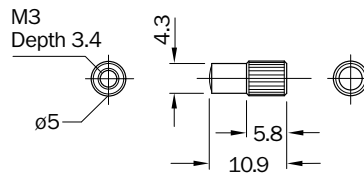
| Type     | Part no.  |
|----------|-----------|
| LL3-TA02 | 5 308 129 |



dimensions in mm

#### Order information

| Type     | Part no.  |
|----------|-----------|
| LL3-DA02 | 5 308 130 |



dimensions in mm

## Accessories

### Dimensional drawings for LLK fiber-optic cables, through-beam systems

| Type        | Part no.  |
|-------------|-----------|
| LLK2-04MM02 | 5 304 155 |



| Order information |           |  |
|-------------------|-----------|--|
| Type              | Part no.  |  |
| LLK1-M4BM02       | 5 304 161 |  |



|             |                 |
|-------------|-----------------|
| <b>Type</b> | <b>Part no.</b> |
| LLK1-M9EB02 | 7 023 977       |



| Type        | Part no.  |
|-------------|-----------|
| LLK1-Y9NM02 | 5 304 167 |



| Type        | Part no.  |
|-------------|-----------|
| LLK1-G8EB02 | 7 023 981 |





# LL3 plastic fiber-optic cables, sensing ranges combined with WLL 190T series

| Type                                        | Part no.  | WLL 190T - LED<br>red high-speed<br>1.24 kHz operating<br>range (mm) | Standard<br>operating range<br>(mm) | Large sensing<br>range operating<br>range (mm) | WLL 190T - LED<br>green high-speed<br>1.25 kHz Operating<br>range (mm) | Standard<br>operating range<br>(mm) | Large sensing<br>range operating<br>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                                              |





Fiber-optic cables  
Proximity systems



## LL3, LLK plastic fiber-optic cables, sensing ranges combined with WLL 170 series

| Type                                        | Part no.  | WLL 170-2,<br>manual sensitivity | WLL 170-2,<br>registration mark<br>sensor, LED green | WLL 170T<br>sensitivity<br>adjustment via<br>teach-in operating<br>range (mm) | WLL 170T,<br>registration mark<br>sensor, LED green | WLL10 A,<br>Analog output 1...5 V |     |     | WLL 170-2, high<br>speed 10,000 Hz |
|---------------------------------------------|-----------|----------------------------------|------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------|-----|-----|------------------------------------|
|                                             |           | operating range<br>(mm)          | operating<br>range (mm)                              | range (mm)                                                                    | operating<br>range (mm)                             | 5V                                | 3V  | 1V  | operating range<br>(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                                 |
| LLK1-M4BM02                                 | 5 304 161 | 27                               | 7                                                    | 25                                                                            | 7                                                   | -                                 | -   | -   | 11                                 |
| <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                                        | np*                               | np* | np* | 5                                  |
| <b>Super flexible, bend radius R = 2 mm</b> |           |                                  |                                                      |                                                                               |                                                     |                                   |     |     |                                    |
| LL3-DK66                                    | 5 313 024 | 110                              | 25                                                   | 80                                                                            | 20                                                  | 25                                | 65  | 140 | 45                                 |
| LL3-DK67                                    | 5 313 025 | 110                              | 25                                                   | 80                                                                            | 20                                                  | 25                                | 35  | 150 | 45                                 |
| LL3-DK04Z                                   | 5 313 026 | 110                              | 25                                                   | 80                                                                            | 20                                                  | 25                                | 35  | 150 | 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                                        | np*                               | np* | np* | 8                                  |
| LL3-DR03                                    | 5 308 080 | 35                               | 5                                                    | 25                                                                            | 3                                                   | 7                                 | 10  | 43  | 10                                 |
| LL3-DR04                                    | 5 308 081 | 20                               | 2                                                    | 14                                                                            | not possible                                        | np*                               | np* | np* | 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                                        | np*                               | np* | np* | 3                                  |
| LL3-DT04                                    | 5 308 086 | 15                               | 2                                                    | 13                                                                            | not possible                                        | np*                               | np* | np* | 8                                  |
| LL3-DT05                                    | 5 313 028 | 45                               | 5                                                    | 25                                                                            | 4                                                   | 11                                | 15  | 60  | 15                                 |
| LL3-DR05                                    | 5 308 087 | 10                               | 2                                                    | 8                                                                             | not possible                                        | np*                               | np* | np* | 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                                        | np                                | np  | np  | 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                                        | np*                               | np* | np* | -                                  |
| LL3-DF02                                    | 5 308 095 | -                                | -                                                    | -                                                                             | not possible                                        | np*                               | np* | np* | -                                  |
| <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                                        | np*                               | np* | np* | 5                                  |
| LLK1-G8EB02                                 | 7 023 981 | 60                               | 12                                                   | 85                                                                            | 12                                                  | -                                 | -   | -   | 60                                 |
| <b>Array head</b>                           |           |                                  |                                                      |                                                                               |                                                     |                                   |     |     |                                    |
| LLK1-Y9NM02                                 | 5 304 167 | 50                               | 15                                                   | 50                                                                            | 15                                                  | -                                 | -   | -   | 20                                 |
| <b>Fix focus</b>                            |           |                                  |                                                      |                                                                               |                                                     |                                   |     |     |                                    |
| LL3-DC01                                    | 5 313 033 | 3                                | 15                                                   | 3                                                                             | 3                                                   | 3                                 | 3   | 4   | 3                                  |

\* Not possible

Web: <https://www.bolenscontrol.com/> - Phone: (800) 658-5241 - Email: [sales@bolenscontrol.com](mailto:sales@bolenscontrol.com)



# LL3, LLK plastic fiber-optic cables, sensing ranges combined with WLL 160 and VLL 18T series

| Type                                        | Part no.  | WLL 160, manual sensitivity | WLL 160T<br>Large sensing range | High-speed 1,666 kHz | VLL 18T, teach-in, LED red |
|---------------------------------------------|-----------|-----------------------------|---------------------------------|----------------------|----------------------------|
|                                             |           | operating range (mm)        | operating range (mm)            | operating range (mm) | 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                         |
| LLK1-M4BM02                                 | 5 304 161 | 20                          | 20                              | 15                   | 15                         |
| <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                                   | 5313027   | 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                         |
| LLK1-M9EB02                                 | 7 023 977 | 60                          | 60                              | 40                   | 30                         |
| LLK1-G8EB02                                 | 7 023 981 | 60                          | 60                              | 40                   | 30                         |
| <b>Array head</b>                           |           |                             |                                 |                      |                            |
| LLK1-Y9NM02                                 | 5 304 167 | 50                          | 35                              | 35                   | 35                         |
| <b>Fix focus</b>                            |           |                             |                                 |                      |                            |
| LL3-DC01                                    | 5 313 033 | 3                           | 3                               | 3                    | not possible               |



Fiber-optic cables  
Through-beam systems

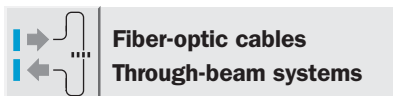
| Type                                        | Part no.* | WLL 190T - LED<br>red high-speed<br>1.25 kHz operating<br>range (mm) | Standard<br>operating range<br>(mm) | Large sensing<br>range<br>operating range<br>(mm) | WLL 190T - LED<br>green high-speed<br>1.25 kHz operating<br>range (mm) | Standard<br>operating range<br>(mm) | Large sensing<br>range<br>operating range<br>(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 | 25                                                                   | 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>Fiber-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 | 250                                                                  | 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                                               |

\* The part number includes 2 fiber-optic cables,  
which are needed for a through-beam system

# Fiber-Optic Cables



## LL3, LLK plastic fiber-optic cables, sensing ranges combined with WLL 170 series



| Type                                        | Part no.* | WLL 170-2, manual sensitivity operating range (mm) | WLL 170-2, registration mark sensor, LED green operating range (mm) | WLL 170T sensitivity adjustment via teach-in operating range (mm) | WLL 170T, registration mark sensor, LED green operating range (mm) | WLL 170A, analog output 1...5 V |              |              | WLL 170-2, high-speed 10,000 Hz operating range (mm) |
|---------------------------------------------|-----------|----------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------|--------------|--------------|------------------------------------------------------|
|                                             |           |                                                    |                                                                     |                                                                   |                                                                    | 5V                              | 3V           | 1V           |                                                      |
| <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                                                  |
| LLK2-M4AM02                                 | 5 304151  | 90                                                 | 25                                                                  | 100                                                               | 25                                                                 | –                               | –            | –            | 25                                                   |
| <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>Fiber-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                                                  |
| LLK2-M6DB02                                 | 7 024 459 | 800                                                | 150                                                                 | 1400                                                              | 150                                                                | –                               | –            | –            | 200                                                  |
| LLK2-M4DB02                                 | 7 023 478 | 100                                                | 90                                                                  | 350                                                               | 90                                                                 | –                               | –            | –            | 100                                                  |
| <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                                                   |
| <b>Sleeve</b>                               |           |                                                    |                                                                     |                                                                   |                                                                    |                                 |              |              |                                                      |
| LLK2-04MM02                                 | 5 304 155 | 175                                                | 90                                                                  | 175                                                               | 90                                                                 | –                               | –            | –            | 100                                                  |

\* The part number includes 2 fiber-optic cables, which are needed for a through-beam system

# Fiber-Optic Cables



Fiber-optic cables  
Through-beam systems



## LL3, LLK plastic fiber-optic cables, sensing ranges combined with WLL 160 and VLL 18T

| Type                                        | Part no.* | WLL 160,<br>manual sensitivity<br>operating range<br>(mm) | WLL 160T,<br>large sensing range<br>operating range<br>(mm) | High-speed 1,660 kHz<br>operating range<br>(mm) | VLL 18T, teach-in, LED red<br>operating range<br>(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                                                   |
| LLK2-M4AM02                                 | 5 304 151 | 70                                                        | 70                                                          | 50                                              | 40                                                    |
| <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                                    | 5 308 037 | 150                                                       | 150                                                         | 130                                             | 70                                                    |
| LL3-TK16                                    | 5 313 038 | 800                                                       | 800                                                         | 500                                             | 450                                                   |
| <b>Fiber-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                                                   |
| LLK2-M6DB02                                 | 7 024 459 | 750                                                       | 750                                                         | 500                                             | 400                                                   |
| LLK2-M4DB02                                 | 7 023 478 | 200                                                       | 200                                                         | 150                                             | 125                                                   |
| <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                                          |
| <b>Sleeve</b>                               |           |                                                           |                                                             |                                                 |                                                       |
| LLK2-04MM02                                 | 5 304 155 | 140                                                       | 140                                                         | 100                                             | 120                                                   |

\* The part number includes 2 fiber-optic cables,  
which are needed for a through-beam system

# Fiber-Optic Cables



## Tip adapters for LL3 plastic fiber-optic cables, sensing ranges combined with WLL 190T series

| Type<br>LL3 proximity, lenses<br>with focused optic           | Part no.  | WLL 190T - LED<br>red high-speed<br>1.25 kHz operating<br>range (mm) | Standard operating<br>range (mm) | Large sensing<br>range<br>operating range<br>(mm) | WLL 190T - LED<br>green (registration<br>mark sensor)<br>high-speed 1.25 kHz<br>operating range (mm) | Standard<br>operating range<br>(mm) | Large sensing<br>range<br>operating<br>range (mm) |
|---------------------------------------------------------------|-----------|----------------------------------------------------------------------|----------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------|
| <b>Focus 6 mm, spot size <math>\varnothing</math> 0.25 mm</b> |           |                                                                      |                                  |                                                   |                                                                                                      |                                     |                                                   |
| LL3-DA01                                                      | 5 308 127 |                                                                      |                                  |                                                   |                                                                                                      |                                     |                                                   |
| Combined with standard fiber LL 3                             |           |                                                                      |                                  |                                                   |                                                                                                      |                                     |                                                   |
| LL3-DT01                                                      | 5 308 076 | 6 $\pm$ 1                                                            | 6 $\pm$ 1                        | 6 $\pm$ 1                                         | 6 $\pm$ 1                                                                                            | 6 $\pm$ 1                           | 6 $\pm$ 1                                         |
| <b>Focus 12 mm, spot size <math>\varnothing</math> 3.0 mm</b> |           |                                                                      |                                  |                                                   |                                                                                                      |                                     |                                                   |
| LL3-DA02                                                      | 5 308 130 |                                                                      |                                  |                                                   |                                                                                                      |                                     |                                                   |
| Combined with standard fiber LL 3                             |           |                                                                      |                                  |                                                   |                                                                                                      |                                     |                                                   |
| LL3-DT01                                                      | 5 308 076 | 12 $\pm$ 3                                                           | 12 $\pm$ 3                       | 12 $\pm$ 3                                        | 12 $\pm$ 3                                                                                           | 12 $\pm$ 3                          | 12 $\pm$ 3                                        |

| Type<br>LL3 through-beam,<br>lenses for extended<br>sensing ranges | Part no.  | WLL 190T - LED<br>red high-speed<br>1.25 kHz operating<br>range (mm) | Standard<br>operating range<br>(mm) | Large sensing<br>range operating<br>range (mm) | WLL 190T - LED<br>green (mark sensor)<br>high-speed 1.25 kHz<br>operating range (mm) | Standard<br>operating range<br>(mm) | Large sensing<br>range<br>operating<br>range (mm) |
|--------------------------------------------------------------------|-----------|----------------------------------------------------------------------|-------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------|
| <b>Axial optic, largest sensing ranges</b>                         |           |                                                                      |                                     |                                                |                                                                                      |                                     |                                                   |
| LL3-TA01                                                           | 5 308 128 |                                                                      |                                     |                                                |                                                                                      |                                     |                                                   |
| Combined with standard fibers 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 fibers                                |           |                                                                      |                                     |                                                |                                                                                      |                                     |                                                   |
| LL3-TK77                                                           | 5 313 035 | 3500                                                                 | 4000                                | 4000                                           | 1500                                                                                 | 2500                                | 3000                                              |
| Combined with flexible fibers                                      |           |                                                                      |                                     |                                                |                                                                                      |                                     |                                                   |
| LL3-TR01                                                           | 5 308 052 | 3500                                                                 | 4000                                | 4000                                           | 1500                                                                                 | 2500                                | 3000                                              |
| Combined with heat resisting fibers (100° C)                       |           |                                                                      |                                     |                                                |                                                                                      |                                     |                                                   |
| LL3-TH01                                                           | 5 308 064 | 3000                                                                 | 4000                                | 4000                                           | 1500                                                                                 | 2500                                | 3000                                              |
| <b>Integrated 90° deflection, large sensing ranges</b>             |           |                                                                      |                                     |                                                |                                                                                      |                                     |                                                   |
| LL3-TA02                                                           | 5 308 129 |                                                                      |                                     |                                                |                                                                                      |                                     |                                                   |
| Combined with standard fibers 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 fibers                                |           |                                                                      |                                     |                                                |                                                                                      |                                     |                                                   |
| LL3-TK77                                                           | 5 313 035 | 500                                                                  | 700                                 | 1300                                           | 300                                                                                  | 400                                 | 700                                               |
| Combined with flexible fibers                                      |           |                                                                      |                                     |                                                |                                                                                      |                                     |                                                   |
| LL3-TR01                                                           | 5 308 052 | 450                                                                  | 600                                 | 800                                            | 250                                                                                  | 350                                 | 450                                               |
| Combined with heat resisting fibers (100° C)                       |           |                                                                      |                                     |                                                |                                                                                      |                                     |                                                   |
| LL3-TH01                                                           | 5 308 064 | 550                                                                  | 800                                 | 1000                                           | 300                                                                                  | 450                                 | 600                                               |

# Fiber-Optic Cables



## Tip adapters for LL3 plastic fiber-optic cables, sensing ranges combined with WLL 170 series

| Type<br>LL3 proximity, lenses<br>with focused optic | Part no.  | WLL 170-2,<br>manual sensitivity<br>operating range<br>(mm) | WLL 170-2,<br>registration mark<br>sensor, LED green<br>operating range<br>(mm) | WLL 170T,<br>sensitivity adjustment<br>via teach-in<br>operating range<br>(mm) | WLL 170T,<br>registration mark<br>sensor, LED green<br>operating range<br>(mm) | WLL 170A,<br>analog output |     |     | WLL 170-2, high-<br>speed 10,000 Hz<br>operating range<br>(mm) |
|-----------------------------------------------------|-----------|-------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------|-----|-----|----------------------------------------------------------------|
|                                                     |           |                                                             |                                                                                 |                                                                                |                                                                                | 5 V                        | 3 V | 1 V |                                                                |
| Focus 6 mm, spot size ø 0.25 mm                     |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |     |     |                                                                |
| LL3-DA01                                            | 5 308 127 |                                                             |                                                                                 |                                                                                |                                                                                |                            |     |     |                                                                |
| Combined with standard fiber LL 3                   |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |     |     |                                                                |
| LL3-DT01                                            | 5 308 076 | 6 ± 1                                                       | 6 ± 1                                                                           | 6 ± 1                                                                          | 6 ± 1                                                                          | -                          | -   | -   | 6 ± 1                                                          |
| Focus 12 mm, spot size ø 3.0 mm                     |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |     |     |                                                                |
| LL3-DA02                                            | 5 308 130 |                                                             |                                                                                 |                                                                                |                                                                                |                            |     |     |                                                                |
| Combined with standard fiber LL 3                   |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |     |     |                                                                |
| LL3-DT01                                            | 5 308 076 | 12 ± 3                                                      | 12 ± 3                                                                          | 12 ± 3                                                                         | 12 ± 3                                                                         | -                          | -   | -   | 12 ± 3                                                         |

| Type<br>LL3 through-beam,<br>lenses for extended<br>sensing ranges | Part no.  | WLL 170-2,<br>manual sensitivity<br>operating range<br>(mm) | WLL 170-2,<br>registration mark<br>sensor, LED green<br>operating range<br>(mm) | WLL 170T,<br>sensitivity adjustment<br>via teach-in<br>operating range<br>(mm) | WLL 170T,<br>registration mark<br>sensor, LED green<br>operating range<br>(mm) | WLL 170A,<br>analog output |      |      | WLL 170-2, high-<br>speed 10,000 Hz<br>operating range<br>(mm) |
|--------------------------------------------------------------------|-----------|-------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------|------|------|----------------------------------------------------------------|
|                                                                    |           |                                                             |                                                                                 |                                                                                |                                                                                | 5 V                        | 3 V  | 1 V  |                                                                |
| Axial optic, largest sensing ranges                                |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |      |      |                                                                |
| LL3-TA01                                                           | 5 308 128 |                                                             |                                                                                 |                                                                                |                                                                                |                            |      |      |                                                                |
| Combined with standard fibers LL 3                                 |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |      |      |                                                                |
| 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 fibers                                |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |      |      |                                                                |
| LL3-TK77                                                           | 5 313 035 | 4000                                                        | 1500                                                                            | 3200                                                                           | 650                                                                            | 900                        | 1300 | 5500 | 1400                                                           |
| Combined with flexible fibers                                      |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |      |      |                                                                |
| LL3-TR01                                                           | 5 308 052 | 3000                                                        | 1100                                                                            | 2500                                                                           | 550                                                                            | 640                        | 880  | 4000 | 1500                                                           |
| Combined with heat resisting fibers (100° C)                       |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |      |      |                                                                |
| LL3-TH01                                                           | 5 308 064 | 4000                                                        | 800                                                                             | 2500                                                                           | 300                                                                            | 700                        | 950  | 4300 | 1500                                                           |
|                                                                    |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |      |      |                                                                |
| Integrated 90° deflection, large sensing ranges                    |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |      |      |                                                                |
| LL3-TA02                                                           | 5 308 129 |                                                             |                                                                                 |                                                                                |                                                                                |                            |      |      |                                                                |
| Combined with standard fibers 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 fibers                                |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |      |      |                                                                |
| LL3-TK77                                                           | 5 313 035 | 600                                                         | 200                                                                             | 500                                                                            | 130                                                                            | 170                        | 250  | 1100 | 250                                                            |
| Combined with flexible fibers                                      |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |      |      |                                                                |
| LL3-TR01                                                           | 5 308 052 | 500                                                         | 150                                                                             | 320                                                                            | 80                                                                             | 110                        | 150  | 690  | 200                                                            |
| Combined with heat resisting fibers (100° C)                       |           |                                                             |                                                                                 |                                                                                |                                                                                |                            |      |      |                                                                |
| LL3-TH01                                                           | 5 308 064 | 500                                                         | 90                                                                              | 320                                                                            | 55                                                                             | 100                        | 150  | 670  | 200                                                            |

# Fiber-Optic Cables



## Tip adapters for LL3 plastic fiber-optic cables, sensing ranges combined with WLL 160 & VLL 18T

| Type<br>LL3 proximity, lenses<br>with focused optic | Part no.  | WLL 160,<br>manual sensitivity<br>operating range<br>(mm) | WLL 160T,<br>Large sensing range<br>operating range<br>(mm) | High-speed 1,666 kHz<br>operating range<br>(mm) | VLL 18T, teach-in,<br>LED red<br>operating range<br>(mm) |
|-----------------------------------------------------|-----------|-----------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|
| <b>Focus 6 mm, spot size ø 0.25 mm</b>              |           |                                                           |                                                             |                                                 |                                                          |
| LL3-DA01                                            | 5 308 127 |                                                           |                                                             |                                                 |                                                          |
| Combined with standard fiber 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 fiber LL3                    |           |                                                           |                                                             |                                                 |                                                          |
| LL3-DT01                                            | 5 308 076 | 12 ± 3                                                    | 12 ± 3                                                      | not possible                                    | not possible                                             |

| Type<br>LL3 proximity lenses<br>with focused optic     | Part no.  | WLL 160,<br>manual sensitivity<br>operating range<br>(mm) | WLL 160T,<br>Large sensing range<br>operating range<br>(mm) | High-speed 1,666 kHz<br>operating range<br>(mm) | VLL 18T, teach-in,<br>LED red<br>operating range<br>(mm) |
|--------------------------------------------------------|-----------|-----------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|
| <b>Axial optic, largest sensing ranges</b>             |           |                                                           |                                                             |                                                 |                                                          |
| LL3-TA01                                               | 5 308 128 |                                                           |                                                             |                                                 |                                                          |
| Combined with standard fibers LL3                      |           |                                                           |                                                             |                                                 |                                                          |
| 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 fibers                    |           |                                                           |                                                             |                                                 |                                                          |
| LL3-TK77                                               | 5 313 035 | 2000                                                      | 2000                                                        | 1500                                            | 1100                                                     |
| Combined with flexible fibers                          |           |                                                           |                                                             |                                                 |                                                          |
| LL3-TR01                                               | 5 308 052 | 1200                                                      | 1200                                                        | 850                                             | 850                                                      |
| Combined with heat resisting fibers (100° C)           |           |                                                           |                                                             |                                                 |                                                          |
| LL3-TH01                                               | 5 308 064 | 1500                                                      | 1500                                                        | 1050                                            | 850                                                      |
| <b>Integrated 90° deflection, large sensing ranges</b> |           |                                                           |                                                             |                                                 |                                                          |
| LL3-TA02                                               | 5 308 129 |                                                           |                                                             |                                                 |                                                          |
| Combined with standard fibers LL3                      |           |                                                           |                                                             |                                                 |                                                          |
| 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 fibers                    |           |                                                           |                                                             |                                                 |                                                          |
| LL3-TK77                                               | 5 313 035 | 350                                                       | 350                                                         | 250                                             | 170                                                      |
| Combined with flexible fibers                          |           |                                                           |                                                             |                                                 |                                                          |
| LL3-TR01                                               | 5 308 052 | 250                                                       | 250                                                         | 180                                             | 110                                                      |
| Combined with heat resisting fibers (100° C)           |           |                                                           |                                                             |                                                 |                                                          |
| LL3-TH01                                               | 5 308 064 | 250                                                       | 350                                                         | 180                                             | 110                                                      |





## LL3: sensing ranges (mm) combined with WLL 170T-2 series

| Fiber LL3<br>Proximity                         | Part no.  | WLL 170T-2<br>LED red teach-in | WLL 170T-2<br>LED red high-speed<br>teach-in | WLL170T-2 LED<br>green MarkSens<br>teach-in | Minimum object size:<br>reduced sensing ranges |            |
|------------------------------------------------|-----------|--------------------------------|----------------------------------------------|---------------------------------------------|------------------------------------------------|------------|
| Standard type                                  |           | sensing range (mm)             | sensing range (mm)                           | sensing range (mm)                          | standard: white 90%                            | min.       |
| LL3-DM01                                       | 5 308 071 | 160                            | 60                                           | 35                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| LL3-DT03                                       | 5 308 072 | 45                             | 15                                           | 5                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DS06                                       | 5 308 073 | 45                             | 15                                           | 5                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DK06                                       | 5 313 019 | 160                            | 60                                           | 35                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| LL3-DK04                                       | 5 313 020 | 160                            | 60                                           | 35                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| <b>Coaxial</b>                                 |           |                                |                                              |                                             |                                                |            |
| LL3-DB01                                       | 5 308 074 | 150                            | 60                                           | 35                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| LL3-DB01-10                                    | 5 308 075 | 80                             | 25                                           | 30                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| LL3-DB03                                       | 5 313 021 | 150                            | 60                                           | 35                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| LL3-DT01                                       | 5 308 076 | 70                             | 20                                           | 10                                          | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DM02                                       | 5 308 077 | 70                             | 20                                           | 10                                          | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DK23                                       | 5 313 022 | 140                            | 30                                           | 25                                          | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DK21                                       | 5 313 023 | 115                            | 5                                            | 3                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| <b>Super flexible, bending radius R = 2 mm</b> |           |                                |                                              |                                             |                                                |            |
| LL3-DK66                                       | 5 313 024 | 110                            | 45                                           | 25                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| LL3-DK67                                       | 5 313 025 | 110                            | 45                                           | 25                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| LL3-DK04Z                                      | 5 313 026 | 110                            | 45                                           | 25                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| LL3-DK63Z                                      | 5 313 027 | 110                            | 45                                           | 25                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| <b>Flexible, R = 4 mm</b>                      |           |                                |                                              |                                             |                                                |            |
| LL3-DR01                                       | 5 308 078 | 130                            | 45                                           | 15                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| LL3-DR02                                       | 5 308 079 | 20                             | 8                                            | 2                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DR03                                       | 5 308 080 | 35                             | 10                                           | 5                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DR04                                       | 5 308 081 | 20                             | 8                                            | 2                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DR06                                       | 5 308 082 | 35                             | 10                                           | 5                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| <b>Sleeve head</b>                             |           |                                |                                              |                                             |                                                |            |
| LL3-DB02                                       | 5 308 083 | 150                            | 65                                           | 40                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| LL3-DM03                                       | 5 308 084 | 45                             | 15                                           | 7                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DT02                                       | 5 308 085 | 8                              | 3                                            | 2                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DT04                                       | 5 308 086 | 8                              | 3                                            | 2                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DT05                                       | 5 313 028 | 45                             | 15                                           | 7                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DR05                                       | 5 308 087 | 10                             | 3                                            | 2                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DK22                                       | 5 313 029 | 70                             | 20                                           | 10                                          | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DK43                                       | 5 313 030 | 45                             | 15                                           | 7                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| <b>Side view 90°</b>                           |           |                                |                                              |                                             |                                                |            |
| LL3-DV01                                       | 5 308 088 | 90                             | 40                                           | 20                                          | 30 x 30 mm                                     | Ø 0.025 mm |
| LL3-DV02                                       | 5 308 089 | 15                             | 3                                            | 3                                           | 30 x 30 mm                                     | Ø 0.015 mm |
| LL3-DV03                                       | 5 308 090 | 90                             | 40                                           | 20                                          | 30 x 30 mm                                     | Ø 0.025 mm |
| LL3-DK33                                       | 5 313 031 | 90                             | 40                                           | 20                                          | 30 x 30 mm                                     | Ø 0.025 mm |
| <b>Liquid level detection</b>                  |           |                                |                                              |                                             |                                                |            |
| LL3-DF01                                       | 5 308 094 |                                |                                              |                                             | Clear liquid                                   |            |
| LL3-DF02                                       | 5 308 095 |                                |                                              |                                             | Cloudy liquid                                  |            |
| <b>Heat resistance</b>                         |           |                                |                                              |                                             |                                                |            |
| LL3-DH01                                       | 5 308 091 | 210                            | 90                                           | 40                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| LL3-DH02                                       | 5 308 092 | 110                            | 40                                           | 7                                           | 100 x 100 mm                                   | Ø 0.015 mm |
| LL3-DH83                                       | 5 313 032 | 140                            | 55                                           | 25                                          | 100 x 100 mm                                   | Ø 0.015 mm |
| <b>Teflon sheath</b>                           |           |                                |                                              |                                             |                                                |            |
| LL3-DY01                                       | 5 308 093 | 45                             | 25                                           | 10                                          | 100 x 100 mm                                   | Ø 0.02 mm  |
| <b>Limited range (fix focus)</b>               |           |                                |                                              |                                             |                                                |            |
| LL3-DC01                                       | 5 313 033 | 3                              | 2                                            | 2                                           | 30 x 30 mm                                     | Ø 0.015 mm |

# Fiber-Optic Cables



## LL3: sensing ranges (mm) combined with WLL 170T-2 series



Fiber-optic cables  
Through-beam systems

| LL3 Through-beam                               | Part no.* | WLL 170T-2<br>LED red teach-in<br>sensing range (mm) | WLL 170T-2<br>LED red high-speed<br>teach-in<br>sensing range (mm) | WLL170T-2 LED<br>green (mark sensor)<br>teach-in<br>sensing range (mm) | Minimum object size:<br>reduced sensing ranges |          |
|------------------------------------------------|-----------|------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------|----------|
| Standard type                                  |           |                                                      |                                                                    |                                                                        | standard                                       | min.     |
| LL3-TS07                                       | 5 308 049 | 700                                                  | 300                                                                | 270                                                                    | Ø 1.5 mm                                       | Ø 0.5 mm |
| LL3-TB01                                       | 5 308 050 | 700                                                  | 300                                                                | 270                                                                    | Ø 1.5 mm                                       | Ø 0.5 mm |
| LL3-TB01-10                                    | 5 308 051 | 400                                                  | 160                                                                | 220                                                                    | Ø 1.5 mm                                       | Ø 0.5 mm |
| LL3-TB01-30                                    | 5 315 499 |                                                      |                                                                    |                                                                        | Ø 1.5 mm                                       | Ø 0.5 mm |
| LL3-TB02                                       | 5 308 048 | 450                                                  | 160                                                                | 130                                                                    | Ø 1.0 mm                                       | Ø 0.2 mm |
| <b>Super flexible, bending radius R = 2 mm</b> |           |                                                      |                                                                    |                                                                        |                                                |          |
| LL3-TK05                                       | 5 313 034 | 360                                                  | 120                                                                | 110                                                                    | Ø 1.0 mm                                       | Ø 0.2 mm |
| LL3-TK77                                       | 5 313 035 | 360                                                  | 120                                                                | 110                                                                    | Ø 1.0 mm                                       | Ø 0.2 mm |
| <b>Flexible, R = 4 mm</b>                      |           |                                                      |                                                                    |                                                                        |                                                |          |
| LL3-TR01                                       | 5 308 052 | 330                                                  | 120                                                                | 120                                                                    | Ø 1.0 mm                                       | Ø 0.3 mm |
| LL3-TR02                                       | 5 308 053 | 110                                                  | 35                                                                 | 20                                                                     | Ø 0.5 mm                                       | Ø 0.1 mm |
| LL3-TR03                                       | 5 308 054 | 110                                                  | 35                                                                 | 20                                                                     | Ø 0.5 mm                                       | Ø 0.1 mm |
| LL3-TR03-02                                    | 5 308 055 | 110                                                  | 35                                                                 | 20                                                                     | Ø 0.5 mm                                       | Ø 0.1 mm |
| <b>Sleeve head</b>                             |           |                                                      |                                                                    |                                                                        |                                                |          |
| LL3-TB03                                       | 5 308 056 | 450                                                  | 160                                                                | 130                                                                    | Ø 1.0 mm                                       | Ø 0.2 mm |
| LL3-TT01                                       | 5 308 057 | 30                                                   | 12                                                                 | 4                                                                      | Ø 0.25 mm                                      | Ø 0.1 mm |
| LL3-TK75                                       | 5 313 036 | 120                                                  | 40                                                                 | 25                                                                     | Ø 0.5 mm                                       | Ø 0.1 mm |
| <b>Side view 90°</b>                           |           |                                                      |                                                                    |                                                                        |                                                |          |
| LL3-TV01                                       | 5 308 058 | 320                                                  | 110                                                                | 85                                                                     | Ø 1.0 mm                                       | Ø 0.2 mm |
| LL3-TV02                                       | 5 308 059 | 75                                                   | 25                                                                 | 15                                                                     | Ø 0.5 mm                                       | Ø 0.1 mm |
| LL3-TV04                                       | 5 308 060 | 75                                                   | 25                                                                 | 15                                                                     | Ø 0.5 mm                                       | Ø 0.1 mm |
| LL3-TS08                                       | 5 308 061 | 350                                                  | 120                                                                | 110                                                                    | Ø 1.0 mm                                       | Ø 0.2 mm |
| LL3-TS12                                       | 5 308 062 | 1700                                                 | 830                                                                | 750                                                                    | Ø 1.7 mm                                       | Ø 0.5 mm |
| LL3-TK34                                       | 5 313 037 | 320                                                  | 110                                                                | 80                                                                     | Ø 1.0 mm                                       | Ø 0.2 mm |
| LL-TK16                                        | 5 313 038 | 2000                                                 | 900                                                                | 800                                                                    | Ø 1.0 mm                                       | Ø 0.2 mm |
| <b>Array head</b>                              |           |                                                      |                                                                    |                                                                        |                                                |          |
| LL3-TS10                                       | 5 308 063 | 330                                                  | 120                                                                | 85                                                                     | Ø 2.0 mm                                       | Ø 1.0 mm |
| LL3-TS14                                       | 5 313 039 | 330                                                  | 120                                                                | 85                                                                     | Ø 1.5 mm                                       | Ø 0.5 mm |
| <b>Heat resistance</b>                         |           |                                                      |                                                                    |                                                                        |                                                |          |
| LL3-TH01                                       | 5 308 064 | 300                                                  | 120                                                                | 45                                                                     | Ø 1.0 mm                                       | Ø 0.2 mm |
| LL3-TH02                                       | 5 308 065 | 600                                                  | 250                                                                | 120                                                                    | Ø 1.5 mm                                       | Ø 0.5 mm |
| LL3-TH84                                       | 5 313 040 | 350                                                  | 150                                                                | 130                                                                    | Ø 1.5 mm                                       | Ø 0.5 mm |
| <b>Teflon sheath</b>                           |           |                                                      |                                                                    |                                                                        |                                                |          |
| LL3-TY01                                       | 5 308 066 | 2000                                                 | 400                                                                | 380                                                                    | Ø 4.0 mm                                       | Ø 0.3 mm |
| LL3-TY02                                       | 5 308 067 | 550                                                  | 220                                                                | 200                                                                    | Ø 4.0 mm                                       | Ø 0.3 mm |
| <b>Small head</b>                              |           |                                                      |                                                                    |                                                                        |                                                |          |
| LL3-TM01                                       | 5 308 068 | 450                                                  | 160                                                                | 130                                                                    | Ø 1.0 mm                                       | Ø 0.2 mm |
| LL3-TM02                                       | 5 308 069 | 120                                                  | 40                                                                 | 25                                                                     | Ø 0.5 mm                                       | Ø 0.1 mm |
| LL3-TM03                                       | 5 308 070 | 120                                                  | 40                                                                 | 25                                                                     | Ø 0.5 mm                                       | Ø 0.1 mm |

\* The part number includes 2 fiber-optic cables,  
which are needed for a through-beam system

# Fiber-Optic Cables



## Tip adapters for LL3 plastic fiber-optic cables combined with WLL 170T-2 series

| Fiber LL3:<br>Accessories front<br>lenses            | Part no.* | WLL 170T-2<br>LED red teach-in<br><br>sensing range (mm) | WLL 170T-2<br>LED red high-speed<br>teach-in<br>sensing range (mm) | WLL170T-2 LED<br>green (mark sensor)<br>teach-in<br>sensing range (mm) | Minimum object size:<br>reduced sensing ranges<br><br>standard | min.     |
|------------------------------------------------------|-----------|----------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|----------|
| LL3 through-beam, lenses for extended sensing ranges |           |                                                          |                                                                    |                                                                        |                                                                |          |
| Axial optic                                          |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-TA01                                             | 5 308 128 |                                                          |                                                                    |                                                                        |                                                                |          |
| Combined with standard fibers LL3                    |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-TB01                                             | 5 308 050 | 2800                                                     | 110                                                                | 1200                                                                   | –                                                              | Ø 4 mm   |
| LL3-TB01-10                                          | 5 308 051 | 1600                                                     | 750                                                                | 1100                                                                   | –                                                              | Ø 4 mm   |
| LL3-TB02                                             | 5 308 048 | 3500                                                     | 1500                                                               | 1600                                                                   | –                                                              | Ø 4 mm   |
| Combined with super flexible fibers                  |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-TK77                                             | 5 313 035 | 4000                                                     | 1200                                                               | 1450                                                                   | –                                                              | Ø 4 mm   |
| Combined with flexible fibers                        |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-TR01                                             | 5 308 052 | 2700                                                     | 1400                                                               | 1000                                                                   | –                                                              | Ø 4 mm   |
| Combined with heat resisting fibers (100° C)         |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-TH01                                             | 5 308 064 | 4000                                                     | 1300                                                               | 750                                                                    | –                                                              | Ø 4 mm   |
|                                                      |           |                                                          |                                                                    |                                                                        |                                                                |          |
| 90°-optic                                            |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-TA02                                             | 5 308 129 |                                                          |                                                                    |                                                                        |                                                                |          |
| Combined with standard fibers LL3                    |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-TB01                                             | 5 308 050 | 600                                                      | 170                                                                | 200                                                                    | –                                                              | Ø 3 mm   |
| LL3-TB01-10                                          | 5 308 051 | 400                                                      | 150                                                                | 230                                                                    | –                                                              | Ø 3 mm   |
| LL3-TB02                                             | 5 308 048 | 550                                                      | 240                                                                | 2130                                                                   | –                                                              | Ø 3 mm   |
| Combined with super flexible fibers                  |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-TK77                                             | 5 313 035 | 550                                                      | 170                                                                | 200                                                                    | –                                                              | Ø 3 mm   |
| Combined with flexible fibers                        |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-TR01                                             | 5 308 052 | 450                                                      | 170                                                                | 140                                                                    | –                                                              | Ø 3 mm   |
| Combined with heat resisting fibers (100° C)         |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-TH01                                             | 5 308 064 | 450                                                      | 210                                                                | 80                                                                     | –                                                              | Ø 3 mm   |
|                                                      |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3 proximity, lenses with focused optic             |           |                                                          |                                                                    |                                                                        | White 90%                                                      | Min.     |
| Focus 6 mm, spot size , Ø 0.25 mm                    |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-DA01                                             | 5 308 127 |                                                          |                                                                    |                                                                        |                                                                |          |
| Combined with standard fiber LL3                     |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-DT01                                             | 5 308 076 | 6 ± 1 mm                                                 | 6 ± 1 mm                                                           | 6 ± 1 mm                                                               | Ø 0.25 mm                                                      | Ø 0.1 mm |
| Focus 12 mm, spot size, Ø 3.0 mm                     |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-DA02                                             | 5 308 130 |                                                          |                                                                    |                                                                        |                                                                |          |
| Combined with standard fiber LL3                     |           |                                                          |                                                                    |                                                                        |                                                                |          |
| LL3-DT01                                             | 5 308 076 | 12 ± 3 mm                                                | 12 ± 3 mm                                                          | 12 ± 3 mm                                                              | Ø 3.0 mm                                                       | Ø 0.1 mm |

\* The part numbers includes 2 fiber-optic cables,  
which are needed for a through-beam system



## LL3: sensing ranges (mm) combined with WLL 190T-2 series

| Fiber LL3<br>Proximity                         | Part no.  | WLL 190T-2 LED red                        |                                          |                                          | WLL 190T-2 LED green (mark sensor)        |                                          |                                          | Minimum object size:<br>reduced sensing ranges |            |
|------------------------------------------------|-----------|-------------------------------------------|------------------------------------------|------------------------------------------|-------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------------|------------|
|                                                |           | high-speed 60 µs<br>sensing range<br>(mm) | standard 250 µs<br>sensing range<br>(mm) | long range 2 ms<br>sensing range<br>(mm) | high-speed 60 µs<br>sensing range<br>(mm) | standard 250 µs<br>sensing range<br>(mm) | long range 2 ms<br>sensing range<br>(mm) | standard:<br>white 90%                         | min.       |
| <b>Standard type</b>                           |           |                                           |                                          |                                          |                                           |                                          |                                          |                                                |            |
| LL3-DM01                                       | 5 308 071 | 130                                       | 280                                      | 450                                      | 40                                        | 80                                       | 160                                      | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DT03                                       | 5 308 072 | 35                                        | 90                                       | 130                                      | 6                                         | 15                                       | 30                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DS06                                       | 5 308 073 | 35                                        | 90                                       | 130                                      | 6                                         | 15                                       | 30                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DK06                                       | 5 313 019 | 130                                       | 280                                      | 450                                      | 40                                        | 80                                       | 160                                      | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DK04                                       | 5 313 020 | 130                                       | 280                                      | 450                                      | 40                                        | 80                                       | 160                                      | 350 x 350 mm                                   | Ø 0.015 mm |
| <b>Coaxial</b>                                 |           |                                           |                                          |                                          |                                           |                                          |                                          |                                                |            |
| LL3-DB01                                       | 5 308 074 | 130                                       | 280                                      | 480                                      | 30                                        | 70                                       | 100                                      | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DB01-10                                    | 5 308 075 | 70                                        | 150                                      | 280                                      | 20                                        | 50                                       | 80                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DB03                                       | 5 313 021 | 130                                       | 280                                      | 480                                      | 25                                        | 60                                       | 100                                      | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DT01                                       | 5 308 076 | 60                                        | 140                                      | 280                                      | 6                                         | 20                                       | 40                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DM02                                       | 5 308 077 | 60                                        | 140                                      | 280                                      | 6                                         | 20                                       | 40                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DK23                                       | 5 313 022 | 130                                       | 280                                      | 480                                      | 30                                        | 70                                       | 100                                      | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DK21                                       | 5 313 023 | 17                                        | 50                                       | 90                                       | 4                                         | 7                                        | 15                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| <b>Super flexible, bending radius R = 2 mm</b> |           |                                           |                                          |                                          |                                           |                                          |                                          |                                                |            |
| LL3-DK66                                       | 5 313 024 | 100                                       | 210                                      | 350                                      | 20                                        | 45                                       | 80                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DK67                                       | 5 313 025 | 100                                       | 210                                      | 350                                      | 20                                        | 45                                       | 80                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DK04Z                                      | 5 313 026 | 100                                       | 210                                      | 350                                      | 20                                        | 45                                       | 80                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DK04Z-05                                   |           |                                           |                                          |                                          |                                           |                                          |                                          | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DK63Z                                      | 5 313 027 | 100                                       | 210                                      | 350                                      | 20                                        | 45                                       | 80                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| <b>Flexible, R = 4 mm</b>                      |           |                                           |                                          |                                          |                                           |                                          |                                          |                                                |            |
| LL3-DR01                                       | 5 308 078 | 100                                       | 230                                      | 380                                      | 30                                        | 50                                       | 100                                      | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DR02                                       | 5 308 079 | 20                                        | 40                                       | 90                                       | 3                                         | 7                                        | 15                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DR03                                       | 5 308 080 | 30                                        | 70                                       | 140                                      | 5                                         | 12                                       | 25                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DR04                                       | 5 308 081 | 20                                        | 40                                       | 90                                       | 3                                         | 7                                        | 15                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DR06                                       | 5 308 082 | 30                                        | 70                                       | 140                                      | 5                                         | 12                                       | 25                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| <b>Sleeve head</b>                             |           |                                           |                                          |                                          |                                           |                                          |                                          |                                                |            |
| LL3-DB02                                       | 5 308 083 | 130                                       | 280                                      | 480                                      | 30                                        | 70                                       | 100                                      | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DM03                                       | 5 308 084 | 40                                        | 80                                       | 150                                      | 6                                         | 15                                       | 30                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DT02                                       | 5 308 085 | 8                                         | 20                                       | 70                                       | 1.5                                       | 3                                        | 6                                        | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DT04                                       | 5 308 086 | 18                                        | 50                                       | 100                                      | 3                                         | 6                                        | 12                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DT05                                       | 5 313 028 | 40                                        | 80                                       | 130                                      | 6                                         | 15                                       | 30                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DR05                                       | 5 308 087 | 8                                         | 20                                       | 70                                       | 1.5                                       | 3                                        | 6                                        | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DK22                                       | 5 313 029 | 60                                        | 140                                      | 280                                      | 6                                         | 20                                       | 40                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DK43                                       | 5 313 030 | 15                                        | 80                                       | 130                                      | 6                                         | 15                                       | 30                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| <b>Side view 90°</b>                           |           |                                           |                                          |                                          |                                           |                                          |                                          |                                                |            |
| LL3-DV01                                       | 5 308 088 | 60                                        | 150                                      | 250                                      | 15                                        | 35                                       | 80                                       | 350 x 350 mm                                   | Ø 0.025 mm |
| LL3-DV02                                       | 5 308 089 | 10                                        | 40                                       | 100                                      | 3                                         | 8                                        | 15                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DV02-05                                    |           |                                           |                                          |                                          |                                           |                                          |                                          | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DV03                                       | 5 308 090 | 60                                        | 150                                      | 250                                      | 15                                        | 35                                       | 80                                       | 350 x 350 mm                                   | Ø 0.025 mm |
| LL3-DK33                                       | 5 313 031 | 60                                        | 150                                      | 250                                      | 15                                        | 35                                       | 80                                       | 350 x 350 mm                                   | Ø 0.025 mm |
| <b>Liquid level detection</b>                  |           |                                           |                                          |                                          |                                           |                                          |                                          |                                                |            |
| LL3-DF01                                       | 5 308 094 | –                                         | –                                        | –                                        | –                                         | –                                        | –                                        | clear liquid                                   | –          |
| LL3-DF02                                       | 5 308 095 | –                                         | –                                        | –                                        | –                                         | –                                        | –                                        | cloudy liquid                                  | –          |
| <b>Heat resistance</b>                         |           |                                           |                                          |                                          |                                           |                                          |                                          |                                                |            |
| LL3-DH01                                       | 5 308 091 | 170                                       | 300                                      | 500                                      | 25                                        | 60                                       | 100                                      | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DH02                                       | 5 308 092 | 70                                        | 200                                      | 280                                      | 5                                         | 10                                       | 20                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| LL3-DH83                                       | 5 313 032 | 120                                       | 230                                      | 350                                      | 5                                         | 15                                       | 30                                       | 350 x 350 mm                                   | Ø 0.015 mm |
| <b>Teflon sheath</b>                           |           |                                           |                                          |                                          |                                           |                                          |                                          |                                                |            |
| LL3-DY01                                       | 5 308 093 | 80                                        | 90                                       | 120                                      | 10                                        | 20                                       | 50                                       | –                                              | Ø 0.02 mm  |
| <b>Limited range (fix focus)</b>               |           |                                           |                                          |                                          |                                           |                                          |                                          |                                                |            |
| LL3-DC01                                       | 5 313 033 | 3                                         | 3                                        | 3                                        | 3                                         | 3                                        | 3                                        | –                                              | Ø 0.015 mm |

# Fiber-Optic Cables



## LL3: sensing ranges (mm) combined with WLL 190T-2 series



Fiber-optic cables  
Through-beam systems

| Fiber LL3<br>Through-beam<br>Standard type     | Part no.* | WLL 190T-2 LED red                             |                                               |                                          | WLL 190T-2 LED green (mark sensor)             |                                               |                                          | Minimum object size:<br>reduced sensing ranges |          |
|------------------------------------------------|-----------|------------------------------------------------|-----------------------------------------------|------------------------------------------|------------------------------------------------|-----------------------------------------------|------------------------------------------|------------------------------------------------|----------|
|                                                |           | high-speed 60 $\mu$ s<br>sensing range<br>(mm) | standard 250 $\mu$ s<br>sensing range<br>(mm) | long range 2 ms<br>sensing range<br>(mm) | high-speed 60 $\mu$ s<br>sensing range<br>(mm) | standard 250 $\mu$ s<br>sensing range<br>(mm) | long range 2 ms<br>sensing range<br>(mm) | standard                                       | min.     |
| LL3-TS07                                       | 5 308 049 | 550                                            | 1000                                          | 2000                                     | 200                                            | 400                                           | 800                                      | Ø 1 mm                                         | Ø 0.5 mm |
| LL3-TB01                                       | 5 308 050 | 550                                            | 1000                                          | 2000                                     | 200                                            | 400                                           | 800                                      | Ø 1 mm                                         | Ø 0.5 mm |
| LL3-TB01-10                                    | 5 308 051 | 350                                            | 600                                           | 1200                                     | 150                                            | 300                                           | 600                                      | Ø 1 mm                                         | Ø 0.5 mm |
| LL3-TB01-30                                    | 5 315 499 |                                                |                                               |                                          |                                                |                                               |                                          | Ø 1 mm                                         | Ø 0.5 mm |
| LL3-TB02                                       | 5 308 048 | 300                                            | 600                                           | 1100                                     | 100                                            | 250                                           | 450                                      | Ø 1 mm                                         | Ø 0.2 mm |
| <b>Super flexible, bending radius R = 2 mm</b> |           |                                                |                                               |                                          |                                                |                                               |                                          |                                                |          |
| LL3-TK05                                       | 5 313 034 | 250                                            | 500                                           | 900                                      | 90                                             | 200                                           | 350                                      | Ø 1 mm                                         | Ø 0.2 mm |
| LL3-TK77                                       | 5 313 035 | 250                                            | 500                                           | 900                                      | 90                                             | 200                                           | 350                                      | Ø 1 mm                                         | Ø 0.2 mm |
| <b>Flexible, R = 4 mm</b>                      |           |                                                |                                               |                                          |                                                |                                               |                                          |                                                |          |
| LL3-TR01                                       | 5 308 052 | 300                                            | 500                                           | 1000                                     | 120                                            | 250                                           | 500                                      | Ø 1 mm                                         | Ø 0.3 mm |
| LL3-TR02                                       | 5 308 053 | 110                                            | 220                                           | 400                                      | 20                                             | 40                                            | 70                                       | Ø 0.5 mm                                       | Ø 0.1 mm |
| LL3-TR03                                       | 5 308 054 | 110                                            | 220                                           | 400                                      | 20                                             | 40                                            | 70                                       | Ø 0.5 mm                                       | Ø 0.1 mm |
| LL3-TR03-02                                    | 5 308 055 | 110                                            | 220                                           | 400                                      | 20                                             | 40                                            | 70                                       | Ø 0.5 mm                                       | Ø 0.1 mm |
| <b>Sleeve head</b>                             |           |                                                |                                               |                                          |                                                |                                               |                                          |                                                |          |
| LL3-TB03                                       | 5 308 056 | 300                                            | 700                                           | 1200                                     | 120                                            | 250                                           | 500                                      | Ø 1 mm                                         | Ø 0.2 mm |
| LL3-TT01                                       | 5 308 057 | 25                                             | 50                                            | 100                                      | 5                                              | 10                                            | 25                                       | Ø 0.25 mm                                      | Ø 0.1 mm |
| LL3-TK75                                       | 5 313 036 | 100                                            | 200                                           | 350                                      | 30                                             | 55                                            | 100                                      | Ø 0.5 mm                                       | Ø 0.1 mm |
| <b>Side view 90°</b>                           |           |                                                |                                               |                                          |                                                |                                               |                                          |                                                |          |
| LL3-TV01                                       | 5 308 058 | 250                                            | 500                                           | 900                                      | 80                                             | 150                                           | 300                                      | Ø 1 mm                                         | Ø 0.2 mm |
| LL3-TV02                                       | 5 308 059 | 80                                             | 180                                           | 250                                      | 15                                             | 45                                            | 80                                       | Ø 0.5 mm                                       | Ø 0.1 mm |
| LL3-TV04                                       | 5 308 060 | 80                                             | 180                                           | 250                                      | 15                                             | 45                                            | 80                                       | Ø 0.5 mm                                       | Ø 0.1 mm |
| LL3-TS08                                       | 5 308 061 | 250                                            | 500                                           | 900                                      | 80                                             | 150                                           | 300                                      | Ø 0.1 mm                                       | Ø 0.2 mm |
| LL3-TS12                                       | 5 308 062 | 2500                                           | 3500                                          | 4000                                     | 400                                            | 900                                           | 1600                                     | Ø 1.2 mm                                       | Ø 0.5 mm |
| LL3-TK34                                       | 5 313 037 | 250                                            | 500                                           | 900                                      | 70                                             | 150                                           | 300                                      | Ø 0.1 mm                                       | Ø 0.2 mm |
| LL3-TK16                                       | 5 313 038 | 2500                                           | 3500                                          | 4000                                     | 450                                            | 1000                                          | 1800                                     | Ø 0.1 mm                                       | Ø 0.2 mm |
| <b>Array head</b>                              |           |                                                |                                               |                                          |                                                |                                               |                                          |                                                |          |
| LL3-TS10                                       | 5 308 063 | 280                                            | 550                                           | 900                                      | 80                                             | 200                                           | 300                                      | Ø 1.5 mm                                       | Ø 1 mm   |
| LL3-TS14                                       | 5 313 039 | 280                                            | 550                                           | 900                                      | 80                                             | 200                                           | 300                                      | Ø 1.5 mm                                       | Ø 0.5 mm |
| <b>Heat resistance</b>                         |           |                                                |                                               |                                          |                                                |                                               |                                          |                                                |          |
| LL3-TH01                                       | 5 308 064 | 250                                            | 450                                           | 800                                      | 40                                             | 80                                            | 150                                      | Ø 1 mm                                         | Ø 0.2 mm |
| LL3-TH02                                       | 5 308 065 | 400                                            | 750                                           | 1200                                     | 80                                             | 180                                           | 350                                      | Ø 1.5 mm                                       | Ø 0.5 mm |
| LL3-TH84                                       | 5 313 040 | 250                                            | 450                                           | 900                                      | 80                                             | 180                                           | 350                                      | Ø 1 mm                                         | Ø 0.2 mm |
| <b>Teflon sheath</b>                           |           |                                                |                                               |                                          |                                                |                                               |                                          |                                                |          |
| LL3-TY01                                       | 5 308 066 | 1500                                           | 2800                                          | 4000                                     | 300                                            | 1000                                          | 1800                                     | Ø 2 mm                                         | Ø 0.3 mm |
| LL3-TY02                                       | 5 308 067 | 500                                            | 1000                                          | 1700                                     | 130                                            | 300                                           | 400                                      | Ø 2 mm                                         | Ø 0.3 mm |
| <b>Small head</b>                              |           |                                                |                                               |                                          |                                                |                                               |                                          |                                                |          |
| LL3-TM01                                       | 5 308 068 | 300                                            | 700                                           | 1200                                     | 120                                            | 250                                           | 500                                      | Ø 1 mm                                         | Ø 0.2 mm |
| LL3-TM02                                       | 5 308 069 | 110                                            | 220                                           | 400                                      | 30                                             | 60                                            | 120                                      | Ø 0.5 mm                                       | Ø 0.1 mm |
| LL3-TM03                                       | 5 308 070 | 110                                            | 220                                           | 400                                      | 30                                             | 60                                            | 120                                      | Ø 0.5 mm                                       | Ø 0.1 mm |

\* The part number includes 2 fiber-optic cables,  
which are needed for a through-beam system

# Fiber-Optic Cables



## Tip adapter for LL3 plastic fiber-optic cables

| Fiber LL3<br>Accessories front<br>lenses                     | Part no.  | WLL 190T-2 sender: LED red                |                                          |                                          | WLL 190T-2 LED green (mark sensor)        |                                          |                                          | Minimum object size:               |             |
|--------------------------------------------------------------|-----------|-------------------------------------------|------------------------------------------|------------------------------------------|-------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------|-------------|
|                                                              |           | high-speed 60 µs<br>sensing range<br>(mm) | standard 250 µs<br>sensing range<br>(mm) | long range 2 ms<br>sensing range<br>(mm) | high-speed 60 µs<br>sensing range<br>(mm) | standard 250 µs<br>sensing range<br>(mm) | long range 2 ms<br>sensing range<br>(mm) | reduced sensing ranges<br>standard | min.        |
| <b>LL3 through-beam, lenses for extended sensing ranges</b>  |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| Axial optic                                                  |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-TA01                                                     | 5 308 128 |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| <b>Combined with standard fibers LL3</b>                     |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-TB01                                                     | 5 308 050 | 2000                                      | 4000                                     | 4000                                     | 800                                       | 1800                                     | 3000                                     | –                                  | Ø 3 mm      |
| LL3-TB01-10                                                  | 5 308 051 | 1300                                      | 3000                                     | 4000                                     | 600                                       | 1500                                     | 3000                                     | –                                  | Ø 3 mm      |
| LL3-TB02                                                     | 5 308 048 | 3500                                      | 4000                                     | 4000                                     | 1500                                      | 3000                                     | 4000                                     | –                                  | Ø 3 mm      |
| <b>Combined with super flexible fibers</b>                   |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-TK77                                                     | 5 313 035 | 3500                                      | 4000                                     | 4000                                     | 3000                                      | 4000                                     | 4000                                     | –                                  | Ø 3 mm      |
| <b>Combined with flexible fibers</b>                         |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-TR01                                                     | 5 308 052 | 3500                                      | 4000                                     | 4000                                     | 1500                                      | 3000                                     | 4000                                     | –                                  | Ø 3 mm      |
| <b>Combined with heat resisting fibers (100° C)</b>          |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-TH01                                                     | 5 308 064 | 3000                                      | 4000                                     | 4000                                     | 1000                                      | 2500                                     | 4000                                     | –                                  | Ø 3 mm      |
| <b>90°-optic</b>                                             |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-TA02                                                     | 5 308 129 |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| <b>Combined with standard fibers LL3</b>                     |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-TB01                                                     | 5 308 050 | 500                                       | 1000                                     | 1700                                     | 200                                       | 500                                      | 900                                      | –                                  | Ø 3 mm      |
| LL3-TB01-10                                                  | 5 308 051 | 350                                       | 700                                      | 1300                                     | 150                                       | 350                                      | 600                                      | –                                  | Ø 3 mm      |
| LL3-TB02                                                     | 5 308 048 | 500                                       | 1200                                     | 1700                                     | 250                                       | 600                                      | 1000                                     | –                                  | Ø 3 mm      |
| <b>Combined with super flexible fibers</b>                   |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-TK77                                                     | 5 313 035 | 500                                       | 1000                                     | 1800                                     | 350                                       | 500                                      | 900                                      | –                                  | Ø 3 mm      |
| <b>Combined with flexible fibers</b>                         |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-TR01                                                     | 5 308 052 | 500                                       | 900                                      | 1200                                     | 250                                       | 400                                      | 600                                      | –                                  | Ø 3 mm      |
| <b>Combined with heat resisting fibers (100° C)</b>          |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-TH01                                                     | 5 308 064 | 500                                       | 1000                                     | 1200                                     | 350                                       | 550                                      | 800                                      | –                                  | Ø 3 mm      |
| <b>LL3 proximity, lenses with focused optic</b>              |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| <b>Focus 6 mm, spot size ,Ø 0.25 mm</b>                      |           |                                           |                                          |                                          |                                           |                                          |                                          | <b>White 90%</b>                   | <b>Min.</b> |
| LL3-DA01                                                     | 5 308 127 |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| <b>Combined with standard fiber LL3</b>                      |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-DT01                                                     | 5 308 076 | 6 ± 1 mm                                  | 6 ± 1 mm                                 | 6 ± 1 mm                                 | 6 ± 1 mm                                  | 6 ± 1 mm                                 | 6 ± 1 mm                                 | Ø 0.25 mm                          | Ø 0.1 mm    |
| <b>Focus 12 mm, spot size Ø 3.0 mm</b>                       |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-DA02                                                     | 5 308 130 |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| <b>LL3 through-beam, lenses for extending sensing ranges</b> |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| Axial optic                                                  |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| <b>Combined with standard fiber LL3</b>                      |           |                                           |                                          |                                          |                                           |                                          |                                          |                                    |             |
| LL3-DT01                                                     | 5 308 076 | 12 ± 3 mm                                 | 12 ± 3 mm                                | 12 ± 3 mm                                | 12 ± 3 mm                                 | 12 ± 3 mm                                | 12 ± 3 mm                                | Ø 3.0 mm                           | Ø 0.1 mm    |