
	Fibre-optic cables Proximity system
	Fibre-optic cables Through-beam system

Fibre-optic systems: Bending light the easy way

Sensors which are to be used in fully automatic production processes must be compact and extremely powerful. However, many situations demand more complex solutions. For example if not enough space is available, or a reduction in weight is necessary. Also if the environment of the device is subject to severe vibrations, electromagnetic interference or excessive temperatures. Once again, SICK has the answer: fibre-optic systems. SICK offers an extensive range of both pre-assembled fibre-optic cables and cables which can be adapted and cut to length to meet your own specific needs. Cables are available with plastic or metal jacket, plug or screw connections, and a wide selection of different end sleeves.

The different types of fibre-optic cables are distinguished by their jacket and the number, as well as arrangement, cross section and material of the optical fibres. Glass fibre-optic cables can be used in temperatures of up to 315 °C. Fibre-optic cables with plastic fibres can usually be shortened to any length and their bending radii are smaller.

Assignment of systems to fibre-optic cable types:

- **LL3-D: Standard proximity system** (from page 530)
 - tip adapters as accessories,
 - plastic fibres and jackets,
 - in most cases can be cut to any length,
 - approx. 25 variants, each optimised for different physical loads and installation dimensions.
- **LL3-T: Standard through-beam system** (from page 532)
 - tip adapters as accessories,
 - plastic fibres and jackets,
 - in most cases can be cut to any length,
 - approx. 25 variants, each optimised for different physical loads and installation dimensions.
- **LT: Proximity system** (from page 552)
 - glass fibres in chromium-plated metal jackets.
- **LM: Through-beam system** (from page 552)
 - glass fibres in metal jackets and PVC coating.
- **LBS: Proximity system** (from page 548)
 - glass fibres in stainless steel jackets,
 - Ambient operating temperature –58 to +315 °C.
- **LIS: Through-beam system** (from page 548)
 - glass fibres in stainless steel jackets,
 - Ambient operating temperature –58 to +315 °C.
- **LLUV: Proximity system** (from page 555)
 - UV fibre-optic cable.



Which fibre-optic cable fits which sensor?

■ **WLL 160(T)**



- WLL 160**
with LL 3 fibre-optic cable, plastic
- manual sensitivity adjustment,
 - pre-failure signalling output and test input,
 - timer 0 to 100 ms,
 - light-/dark-switching.

- WLL 160T**
with LL 3 fibre-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 fibre-optic cable, plastic
- manual sensitivity adjustment,
 - red light LED sender,
 - large scanning ranges,
 - timer and L.ON-/D.ON selector.

- WLL 170 high-speed**
with LL 3 fibre-optic cable, plastic
- high-speed 10,000/s,
 - red light LED sender,
 - timer and L.ON-/D.ON selector.

- WLL 170 analogue**
with LL 3 fibre-optic cable, plastic
- analogue output voltage 1 to 5 V,
 - red light LED sender,
 - variable gain.

- WLL 170T**
with LL 3 fibre-optic cable, plastic
- teach-in sensitivity adjustment via button on device,
 - large scanning ranges,
 - red light LED sender,
 - optional: anti-interference.

- WLL 170T mark sensor**
with LL 3 fibre-optic cable, plastic
- teach-in sensitivity adjustment via button on device,
 - green light LED sender,
 - optional: anti-interference.

■ **WLL 12**



- with LL 3, LT, LM fibre-optic cable
- red, infrared or green light LED sender,
 - complementary switching outputs, selectable via control cable,
 - switching frequency: 1,300/s.

■ **WLL 24 Exi**



- with LL 3 fibre-optic cable (ø 2.2 mm)
- explosion protection E Ex ia IIC T6,
 - switching outputs to NAMUR EN 50 277,
 - terminal chamber or M 12 plug.

■ **WLL 260**



- WLL 260 DC**
with LBS, LIS fibre-optic cable
- direct voltage supply,
 - terminal chamber or M 12 plug,
 - test input.

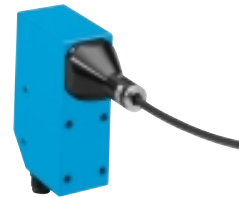
- WLL 260 UC**
with LBS, LIS fibre-optic cable
- universal voltage supply, relay switching output,
 - terminal chamber.

■ **KTL 5G-2**



- with LBS, LIS fibre-optic cable
- green light LED sender,
 - switching frequency 10,000/s.

■ **LUT**



- LUT 3-820**
with LLUV 8 fibre-optic cable
- UV light source,
 - supplementary optical filter.

- LUT 1-4**
with LLUV 5 fibre-optic cable
- UV light source with high-pressure mercury-vapour burner,
 - supplementary optical filter.

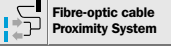
■ **CSL**



- with LBS, LIS fibre-optic cable
- teach-in,
 - adjustable colour selectivity.

LL 3 Plastic Fibre-optic cable

LL 3 Fibre-optic cable



Features

- Highly flexible
- Small bend radii
- Most fibre-optic cables can easily be cut to length using cutter (supplied)
- Operating temperature - 40 ... + 70 °C, special designs up to 180 °C

Selection table: sensors, fibre-optic cables, scanning ranges

Proximity Systems				Scanning distance SD ¹⁾ and minimum target diameter MD ²⁾												in mm in combination with sensor type															
LL 3 Fibre-optic cables				WLL 160 Red light		WLL 160 T Red light (NORM/MAX)		WLL 160 T Red light (FAST)		WLL 170 Red light		WLL 170 Red light High-speed		WLL 170 A Analogue		WLL 170 T Red light		WLL 170 T Green light		Adaptor for WLL 12-2 AD-LL		WLL 12-2 Red light		WLL 12-2 Infra-red light		WLL 24-2 Ext Red light					
				SD	MD	SD	MD	SD	MD	SD	MD	SD	MD	5 V	3 V	MD	SD	MD	SD	MD	SD	MD	SD	MD	SD	MD	SD	MD	SD	MD	
Description	Bend radius (mm)	Type	Part no.																												
Compact sleeve, M 4, long scanning range	25	LL 3-DM 01	5 308 071	70	0.015	70	0.015	50	0.015	90	0.015	25	0.015	30	45	0.015	90	0.015	25	0.015											
Super compact, sleeve 2.5 mm diameter	15	LL 3-DT 03	5 308 072	20	0.015	20	0.015	14	0.015	22	0.015	7	0.015	11	15	0.015	25	0.015	4	0.015											
Super compact, sleeve M 3	10	LL 3-DS 06	5 308 073	20	0.015	20	0.015	14	0.015	22	0.015	7	0.015	11	15	0.015	25	0.015	4	0.015											
Long scanning range, M 6, coaxial fibre-optic cable	25	LL 3-DB 01	5 308 074	70	0.02	70	0.015	50	0.015	90	0.015	25	0.015	28	40	0.015	100	0.015	25	0.015	2M2	30	0.02	12	0.02	30	0.02				
10 m length, M 6, coaxial fibre-optic cable	25	LL 3-DB 01.10	5 308 075	40	0.015	40	0.015	30	0.015	40	0.015	8	0.015	15	20	0.015	50	0.015	20	0.015											
For front lenses, M 3	15	LL 3-DT 01	5 308 076	25	0.02	25/12 ²⁾	0.015	18	0.015	30/12 ²⁾	0.015	8/12 ²⁾	0.015	15	20	0.015	35/12 ²⁾	0.015	7/12 ²⁾	0.015											
Thin, short sleeve, M 4, coaxial fibre-optic cable	25	LL 3-DM 02	5 308 077	25	0.02	25	0.015	18	0.015	30	0.015	8	0.015	15	20	0.015	35	0.015	7	0.015											
Highly flexible, M 6, long scanning range	4	LL 3-DR 01	5 308 078	70	0.02	70	0.015	50	0.015	75	0.015	25	0.015	25	35	0.015	85	0.015	20	0.015	2M2	40	0.02	8	0.02	40	0.02				
Highly flexible, small sleeve, M 3	4	LL 3-DR 02	5 308 079	9	0.02	9	0.015	6	0.015	8	0.015						14	0.015													
Highly flexible, 3 mm diameter, thin sleeve	4	LL 3-DR 03	5 308 080	20	0.02	20	0.015	14	0.015	22	0.015	4	0.015	7	10	0.015	25	0.015	3	0.015											
Highly flexible, 1.5 mm diameter, thin sleeve	4	LL 3-DR 04 ³⁾	5 308 081	9	0.02	9	0.015	6	0.015	8	0.015						14	0.015			2M2	4	0.02			4	0.02				
Highly flexible, M 4, compact sleeve	4	LL 3-DR 06	5 308 082	20	0.02	20	0.015	14	0.015	22	0.015	4	0.015	7	10	0.015	25	0.015	3	0.015											
Supple sleeve, M 6, long scanning ranges	25/10 ³⁾	LL 3-DB 02	5 308 083	70	0.02	70	0.015	50	0.015	90	0.015	25	0.015	30	40	0.015	100	0.015	25	0.015											
Supple sleeve, M 4	25/10 ³⁾	LL 3-DM 03	5 308 084	20	0.02	20	0.015	14	0.015	22	0.015	6	0.015	11	15	0.015	25	0.015	4	0.015											
Thin long tip, M 3	15	LL 3-DT 02	5 308 085	5	0.02	5	0.015	3	0.015	5	0.015						6	0.015													
Thin long tip, M 3, coaxial fibre-optic cable	15	LL 3-DT 04 ³⁾	5 308 086	9	0.02	9	0.015	5	0.015	10	0.015						13	0.015			2M2	6	0.02			6	0.02				
diameter 3.0 mm, thin tip, 0.82 mm diameter	4	LL 3-DR 05 ⁴⁾	5 308 087	5	0.02	5	0.015	3	0.015	5	0.015						8	0.015			2M2	4	0.02			4	0.02				
90° offset, 5.0 mm diameter	25	LL 3-DV 01	5 308 088	40	0.03	40	0.025	30	0.025	40	0.025	10	0.025	17	24	0.025	50	0.025	10	0.025											
90° offset, small sleeve, 3.0 mm diameter	15	LL 3-DV 02	5 308 089	9	0.02	8	0.015	5	0.015	9	0.015						12	0.015													
90° offset, M 6	25	LL 3-DV 03	5 308 090	40	0.03	40	0.025	30	0.025	40	0.025	10	0.025	17	24	0.025	50	0.025	10	0.025	2M2	20	0.03			20	0.03				
Temperature resistant to 180 °C, M 6, long scanning range	30	LL 3-DH 01 ⁵⁾	5 308 091	100	0.02	100	0.015	70	0.015	110	0.015	40	0.015	45	65	0.015	135	0.015	25	0.015	2M2	50	0.02	15	0.02	50	0.02				
Temperature resistant to 100 °C, M 6	25	LL 3-DH 02 ⁶⁾	5 308 092	55	0.02	55	0.015	50	0.015	60	0.015	18	0.015	22	30	0.015	75	0.015	5	0.015											
Teflon sheath, resistant to chemicals, 6.0 mm diameter	40	LL 3-DY 01	5 308 093			45	0.02			50	0.02						60	0.02													
Level switch, clear liquid, 6.0 mm diameter	50	LL 3-DF 01	5 308 094			yes				yes							yes														
Level switch, cloudy liquid, 6.0 mm diameter	50	LL 3-DF 02	5 308 095			yes				yes							yes														

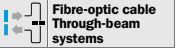
1) For white scanned object, 90 % remission, minimum object diameter = size of light (aperture LL: approx. 65°) fibre-optic cable not shortened
 2) With scanning front lens for LL 3, see front lenses for LL 3
 3) Bend radius of the supple end sleeve
 4) Cannot be cut
 5) Ambient operating temperature - 40 ... + 180 °C
 6) Ambient operating temperature - 40 ... + 100 °C
 7) Minimum object diameter: scanning range reduction

● not available

Adaptor for WLL 12-2		
Type	Part no.	LL-Ø
AD-LL 2M2	2 015 210	2.2 mm

LL 3 Plastic fibre-optic cable

LL 3 Fibre-optic cable



Features

- Highly flexible
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- Operating temperature – 40 ... +70 °C, special designs up to 180 °C

Selection table: sensors, fibre-optic cables, scanning ranges				Scanning range SR ¹⁾ and minimum target diameter MD ²⁾										in mm in combination with sensor type													
Through-beam systems				WLL 160 Red light		WLL 160 T Red light (NORM/MAX)		WLL 160 T Red light (FAST)		WLL 170 Red light		WLL 170 Red light High-speed		WLL 170 A Analogue		WLL 170 T Red light		WLL 170 T Green light		Adaptor for WLL 12-2 AD-LL		WLL 12-2 Red Light		WLL 12-2 Infra-red light		WLL 24-2 Exi Red light	
Description	Bend radius (mm)	Type	Part no.	SR	MD	SR	MD	SR	MD	SR	MD	SR	MD	5 V	3 V	SR	MD	SR	MD	SR	MD	SR	MD	SR	MD	SR	MD
				LL 3 Fibre-optic cables																							
Standard M 4	25	LL 3-TB 02	5 308 048	200/2000 ³⁾	0,2/4,0	200/2000 ³⁾	0,2/4,0	150/1500 ³⁾	0,2/4,0	280/2500 ³⁾	0,2	80/500 ³⁾	0,2	95	135	0,2	350/3200 ³⁾	0,2	75/650 ³⁾	0,2	2M2	120	0,2	25	0,2	110	0,2
Standard, 3 mm diameter, long range	35	LL 3-TS 07	5 308 049	500	0,5	500	0,5	360	0,5	460	0,5	130	0,5	160	230	0,5	580	0,5	140	0,5	2M2	180	0,5	45	0,5	140	0,5
Standard, M 4, long range	25	LL 3-TB 01	5 308 050	400/1500 ³⁾	0,5/4,0	400/1500 ³⁾	0,2/4,0	280/1500 ³⁾	0,2/4,0	460/2000 ³⁾	0,5	130/400 ³⁾	0,5	160	230	0,5	580/2500 ³⁾	0,5	140/600 ³⁾	0,5	2M2	180	0,5	45	0,5	140	0,5
Standard, M 4, length 10 m	25	LL 3-TB 01-10	5 308 051	250/900 ³⁾	0,5/4,0	250/900 ³⁾	0,5/4,0	190/660 ³⁾	0,5/4,0	250/1000 ³⁾	0,5	75/200 ³⁾	0,5	80	110	0,5	300/1200 ³⁾	0,5	120/500 ³⁾	0,5	2M2	70	0,5	25	0,5	55	0,5
Highly flexible, M 4, long range	4	LL 3-TR 01	5 308 052	180/1200 ³⁾	0,2/4,0	180/1200 ³⁾	0,2/4,0	130/850 ³⁾	0,2/4,0	230/1000 ³⁾	0,3	60/400 ³⁾	0,3	80	110	0,3	270/2500 ³⁾	0,3	60/550 ³⁾	0,3	2M2	110	0,3	25	0,3	85	0,3
Highly flexible, M 3	4	LL 3-TR 02	5 308 053	50	0,2	50	0,1	40	0,2	60	0,1	15	0,1	25	35	0,1	80	0,1	15	0,1	1M0	25	0,2	4	0,2	•	•
Small sleeve, 1,5 mm diameter, highly flexible, length 1 m	4	LL 3-TR 03	5 308 054	50	0,2	50	0,1	40	0,2	60	0,1	15	0,1	25	35	0,1	80	0,1	15	0,1	•	•	•	•	•	•	
Small sleeve, 1,5 mm diameter, highly flexible, length 2 m	4	LL 3-TR 03-2	5 308 055	50	0,2	50	0,1	40	0,2	60	0,1	15	0,1	25	35	0,1	80	0,1	15	0,1	•	•	•	•	•	•	
Flexible end sleeve, M 4	25/10 ³⁾	LL 3-TB 03	5 308 056	200	0,2	200	0,2	150	0,2	280	0,2	80	0,2	90	125	0,2	330	0,2	75	0,2	•	•	•	•	•	•	
Compact, M 3, end piece 1,0 mm diameter	15	LL 3-TT 01	5 308 057	18	0,1	18	0,1	10	0,2	18	0,1	•	•	6	8	0,1	23	0,1	•	•	•	•	•	•	•	•	
90° offset, standard, 3 mm diameter	25	LL 3-TV 01	5 308 058	150	0,2	150	0,2	130	0,2	160	0,2	30	0,2	80	110	0,2	230	0,2	55	0,2	•	•	•	•	•	•	
90° offset, compact, 2,5 mm diameter	15	LL 3-TV 02	5 308 059	40	0,2	40	0,2	30	0,2	50	0,1	15	0,1	23	33	0,1	60	0,1	15	0,1	•	•	•	•	•	•	
90° offset, compact, M 3	15	LL 3-TV 04	5 308 060	40	0,2	40	0,2	30	0,2	50	0,1	15	0,1	23	33	0,1	60	0,1	15	0,1	•	•	•	•	•	•	
90° offset, standard, 3 mm diameter	25	LL 3-TS 08	5 308 061	200	0,2	200	0,2	150	0,2	200	0,2	65	0,2	80	110	0,2	250	0,2	55	0,2	2M2	60	0,2	10	0,2	45	0,2
90° offset, long range	25	LL 3-TS 12	5 308 062	700	0,5	700	0,5	400	0,5	800	0,5	340	0,5	550	800	0,5	1000	0,5	450	0,5	2M2	400	0,5	•	•	340	0,5
Fibre-optic cable cell	25	LL 3-TS 10	5 308 063	260	1,0	260	1,0	190	1,0	230	0,1	70	0,1	85	120	0,1	330	0,1	60	0,1	2M2	75	1,0	20	1,0	60	1,0
Temperature-resistant, M 4	25	LL 3-TH 01 ⁴⁾	5 308 064	180/1500 ³⁾	0,2/4,0	180/1500 ³⁾	0,2/4,0	130/1050 ³⁾	0,2/4,0	180/2000 ³⁾	0,2	60/400 ³⁾	0,2	70	95	0,2	250/2500 ³⁾	0,2	25/300 ³⁾	0,2	2M2	70	0,2	15	0,2	60	0,2
Temperature-resistant up to 180 °C, M 4	30	LL 3-TH 02 ⁵⁾	5 308 065	350	0,5	350	0,5	240	0,5	400	0,5	120	0,5	130	180	0,5	500	0,5	85	0,5	2M2	160	0,5	30	0,5	110	0,5
Teflon sheath, 6,0 mm diameter, chemically resistant	40	LL 3-TY 01	5 308 066	1000	0,8	1000	0,5	700	0,5	800	0,3	300	0,3	•	•	•	1800	0,3	200	0,3	2M2	620	0,8	70	0,8	460	0,8
Teflon sheath, 6,0 mm diameter, chemically resistant	40	LL 3-TY 02	5 308 067	250	0,5	250	0,3	180	0,3	280	0,3	60	0,3	•	•	•	380	0,3	120	0,3	2M2	160	0,5	25	0,5	150	0,5
90° offset																											
Small end sleeve, M 3, long range	25	LL 3-TM 01	5 308 068	200	0,2	200	0,2	150	0,2	280	0,2	80	0,2	95	135	0,2	350	0,2	75	0,2	•	•	•	•	•	•	
Small end sleeve M 3	15	LL 3-TM 02	5 308 069	70	0,2	70	0,1	50	0,1	80	0,1	20	0,1	27	38	0,1	100	0,1	15	0,1	1M0	30	0,2	4	0,2	25	0,2
Small end sleeve, 1,5 mm diameter	15	LL 3-TM 03	5 308 070	70	0,2	70	0,1	50	0,1	80	0,1	20	0,1	27	38	0,1	100	0,1	15	0,1	•	•	•	•	•	•	

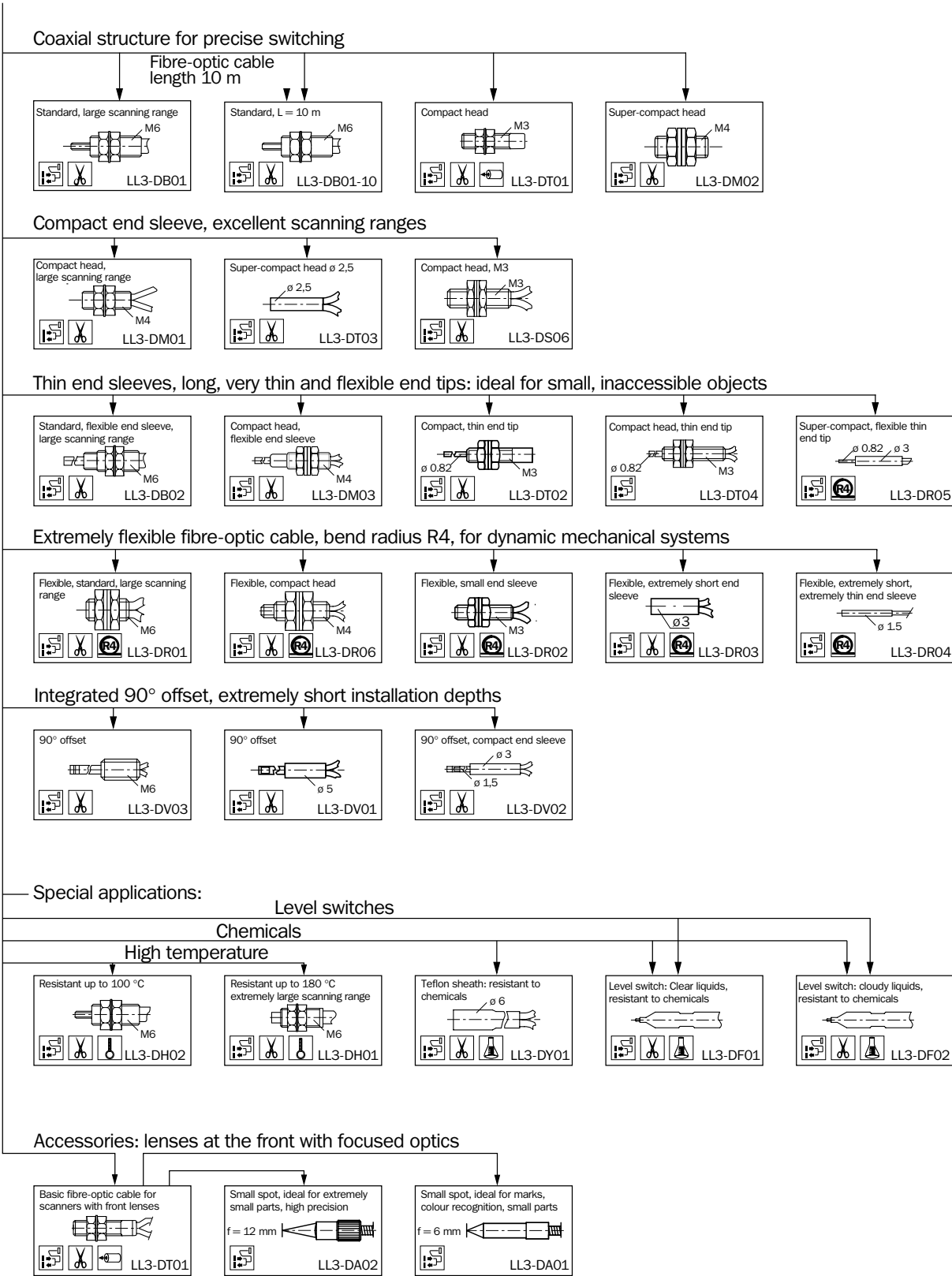
1) Fibre-optic cable not shortened
 2) With scanning front lens for LL 3, see front lenses for LL 3
 3) Bend radius of the supply end sleeve
 4) Ambient operating temperature – 40 ... + 180 °C
 5) Ambient operating temperature – 40 ... + 100 °C
 6) Minimum object diameter: scanning range reduction!

• not available

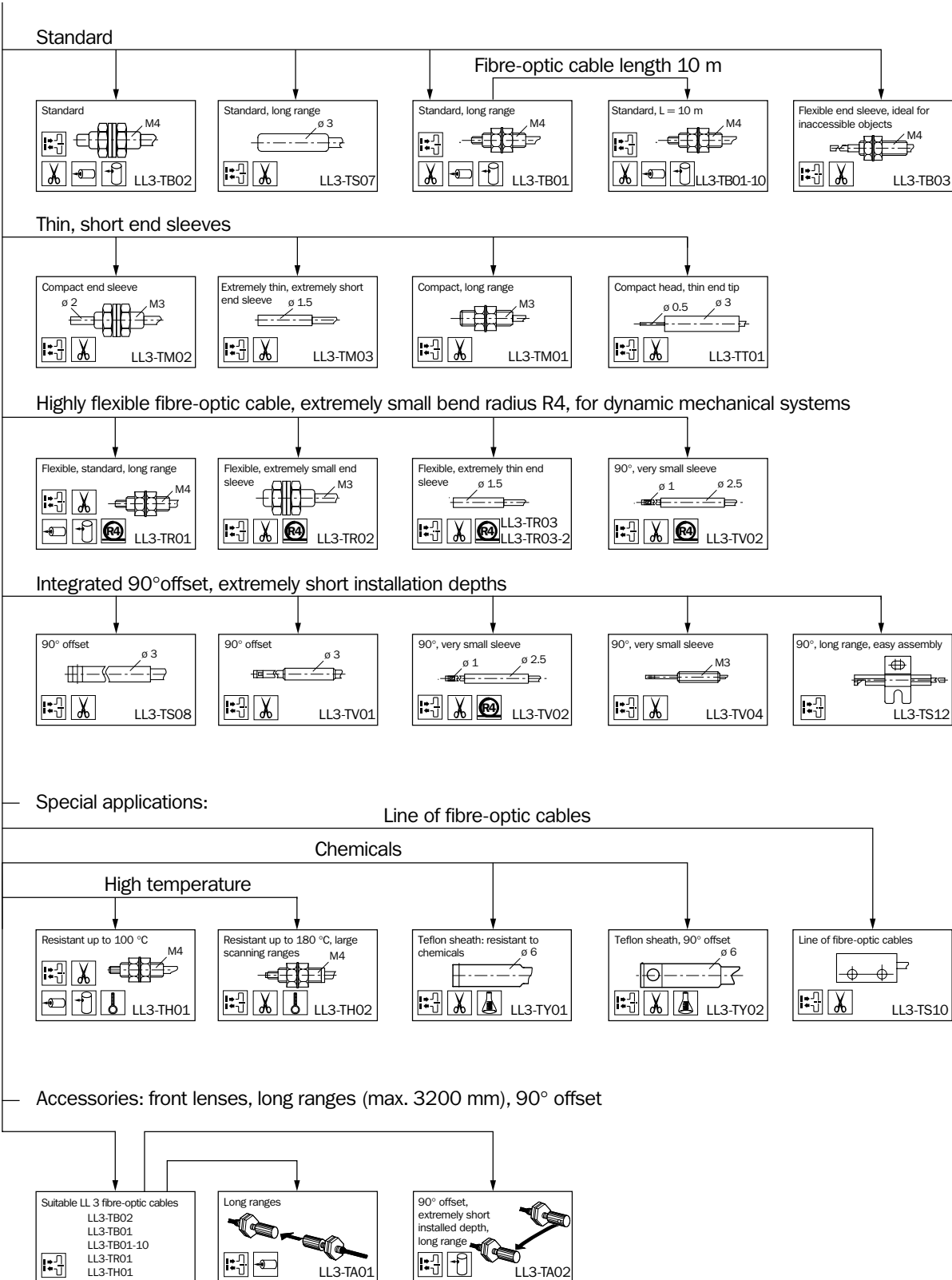
Adaptor for WLL 12-2		
Type	Part no.	LL-φ
AD-LL 1M0	2 015 026	1,0 mm
AD-LL 2M2	2 015 210	2,2 mm

Flow chart – selection of fibre-optic cables

Proximity systems

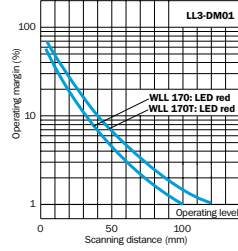
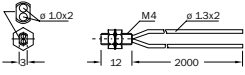


Flow chart – selection of fibre-optic cables

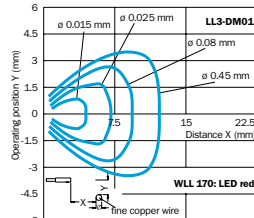
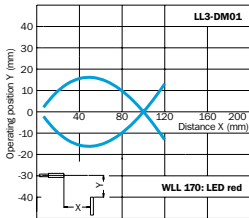
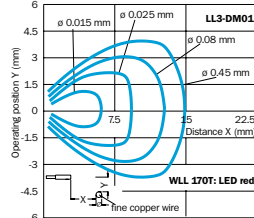
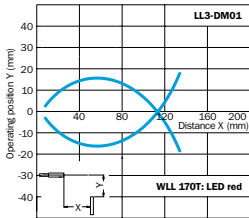


Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – proximity systems

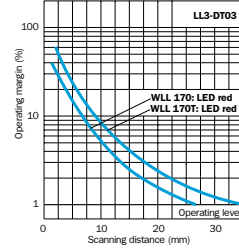
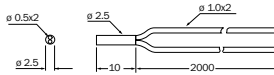
Order information	
Type	Part no.
LL 3-DM01	5 308 071



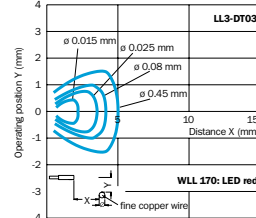
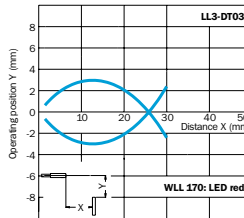
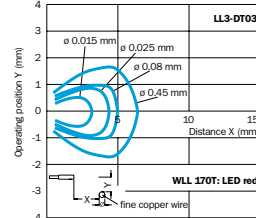
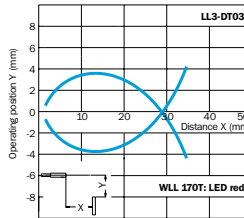
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



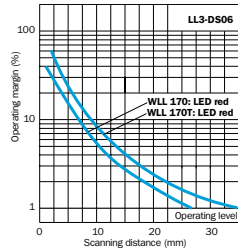
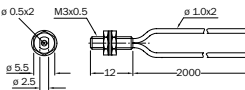
Order information	
Type	Part no.
LL 3-DT03	5 308 072



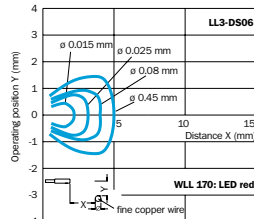
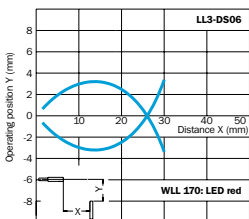
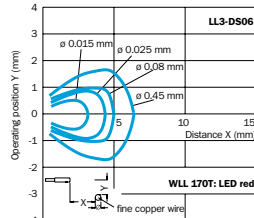
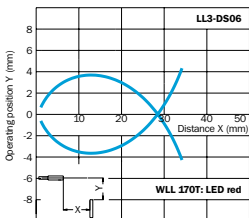
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



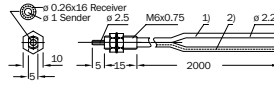
Order information	
Type	Part no.
LL 3-DS06	5 308 073



Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

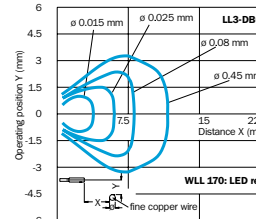
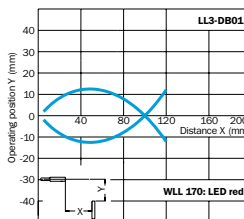
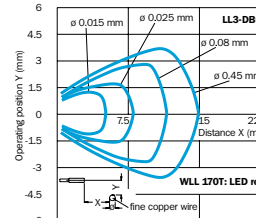
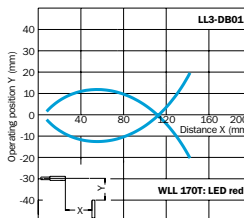
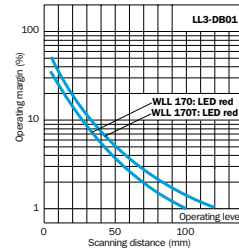


Order information	
Type	Part no.
LL 3-DB01	5 308 074



- 1) Sender
- 2) Receiver

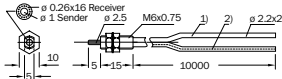
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – proximity systems

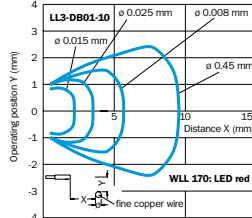
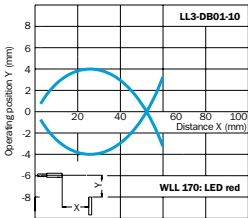
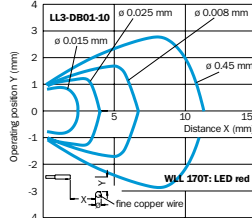
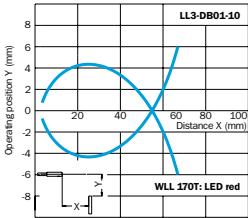
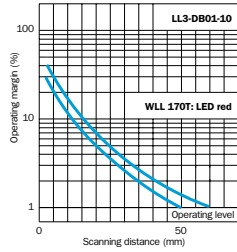
Order information

Type	Part no.
LL 3-DB01-10	5 308 075



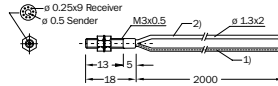
- 1) Sender
- 2) Receiver

Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



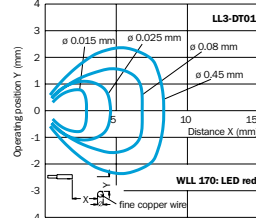
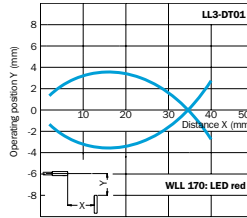
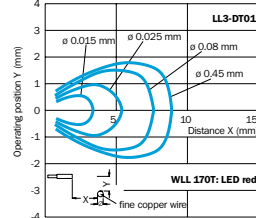
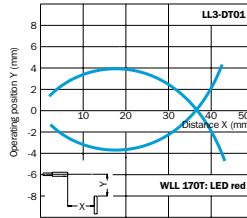
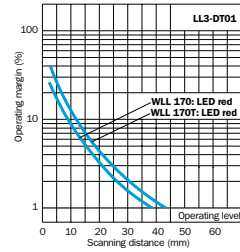
Order information

Type	Part no.
LL 3-DT01	5 308 076



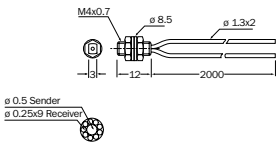
- 1) Sender
- 2) Receiver

Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

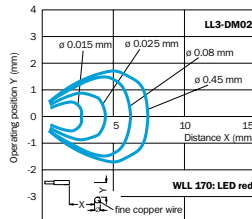
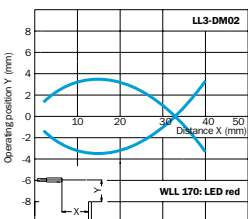
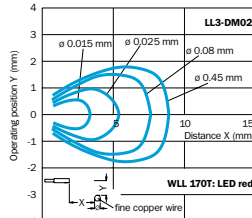
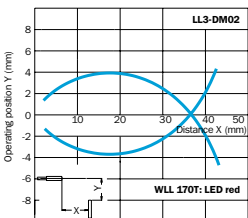
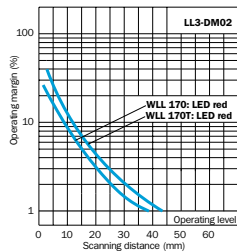


Order information

Type	Part no.
LL 3-DM02	5 308 077

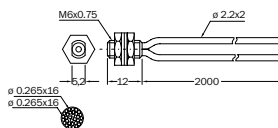


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

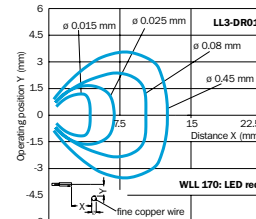
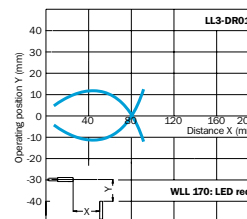
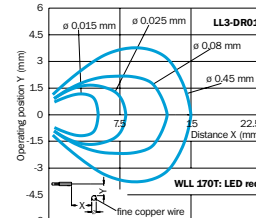
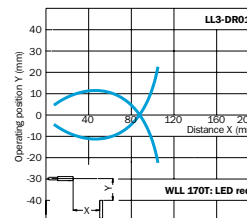
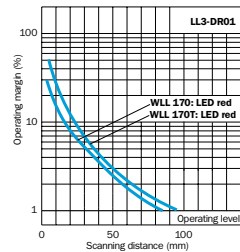


Order information

Type	Part no.
LL 3-DR01	5 308 078

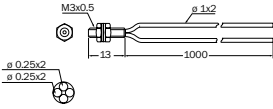


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

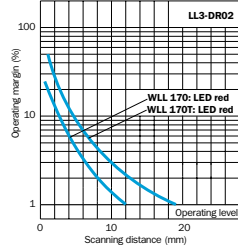


Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – proximity systems

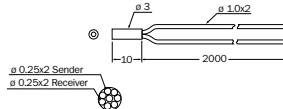
Order information	
Type	Part no.
LL 3-DR02	5 308 079



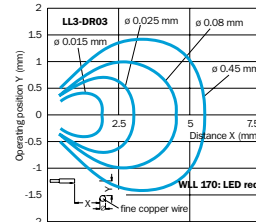
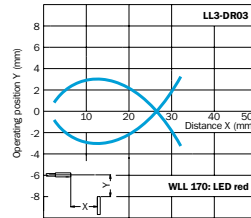
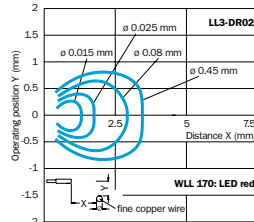
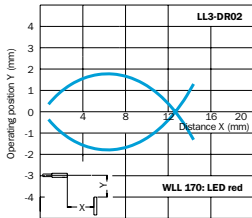
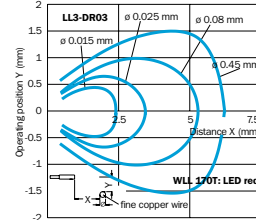
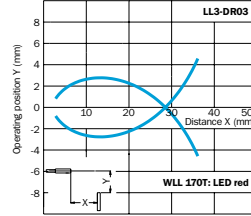
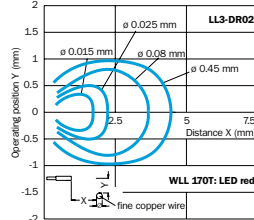
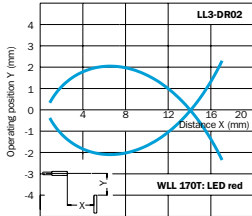
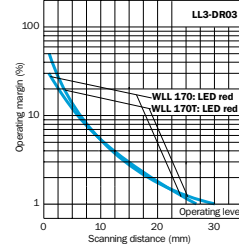
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



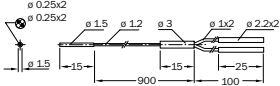
Order information	
Type	Part no.
LL 3-DR03	5 308 080



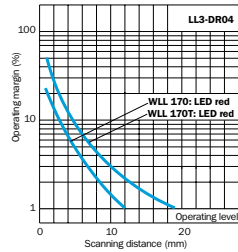
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



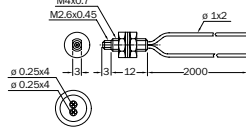
Order information	
Type	Part no.
LL 3-DR04	5 308 081



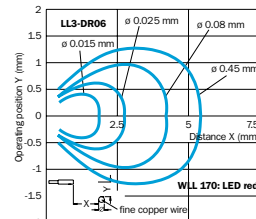
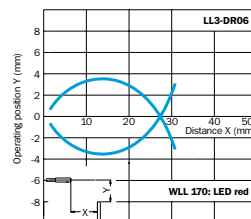
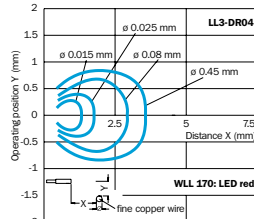
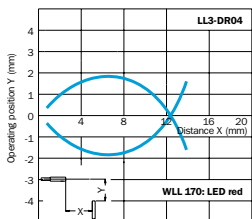
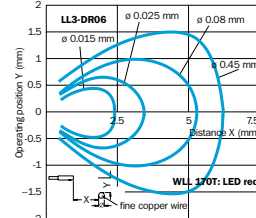
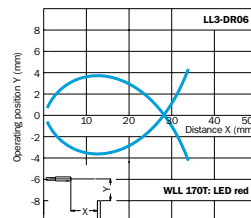
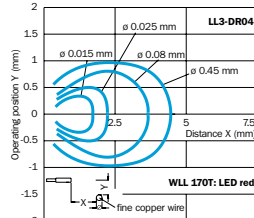
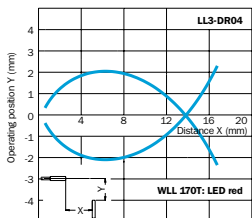
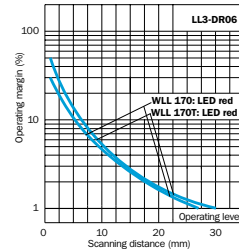
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



Order information	
Type	Part no.
LL 3-DR06	5 308 082



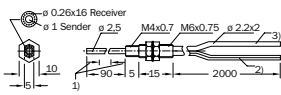
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



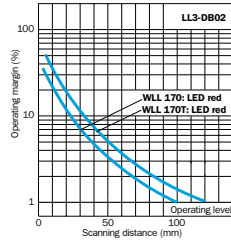
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – proximity systems

Order information

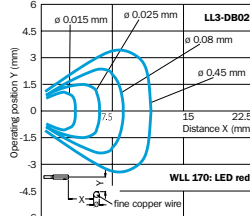
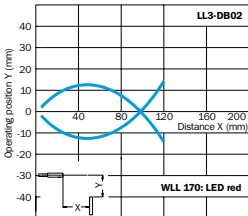
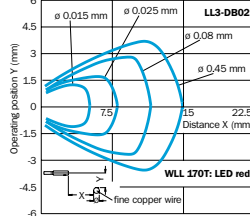
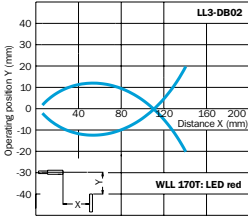
Type	Part no.
LL 3-DB02	5 308 083



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

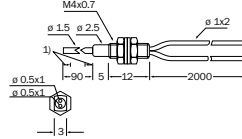


Material: Core: PMMA, Sheath: PE; Sleeve: 1.4305 (German materials no.) Stainless steel, resistant to rusting and acids

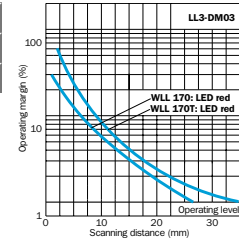


Order information

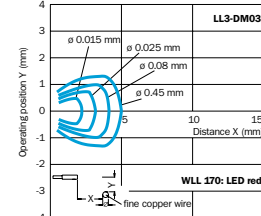
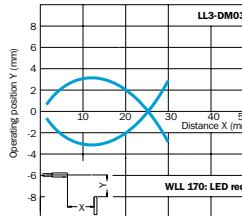
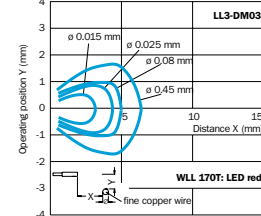
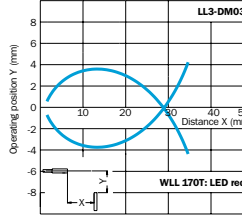
Type	Part no.
LL 3-DM03	5 308 084



- 1) Flexible end sleeve, do not bend in this region (10 mm), bend radius R10

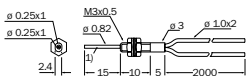


Material: Core: PMMA, Sheath: PE; Sleeve: 1.4305 (German materials no.) Stainless steel, resistant to rusting and acids



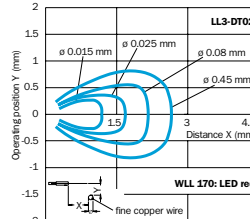
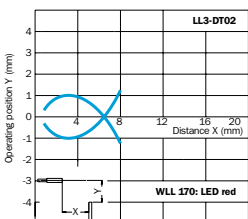
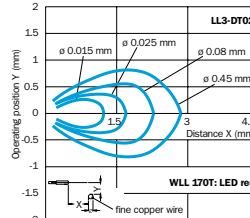
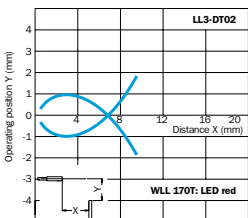
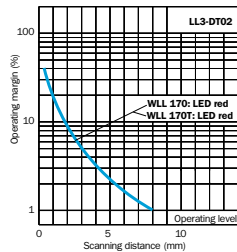
Order information

Type	Part no.
LL 3-DT02	5 308 085



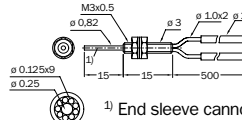
- 1) End sleeve cannot be bent

Material: Core: PMMA, Sheath: PE; Sleeve: 1.4305 (German materials no.) Stainless steel, resistant to rusting and acids



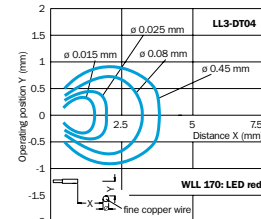
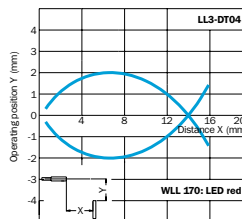
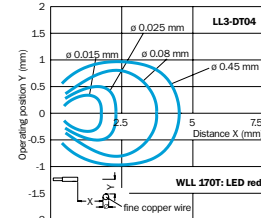
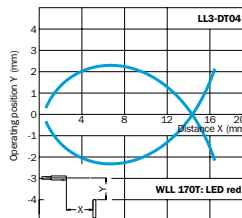
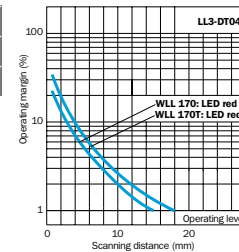
Order information

Type	Part no.
LL 3-DT04	5 308 086



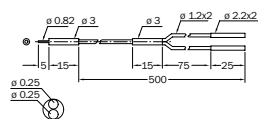
- 1) End sleeve cannot be bent

Material: Core: PMMA, Sheath: PE; Sleeve: CuZn, nickel-plated brass

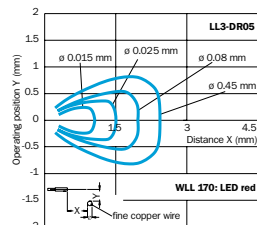
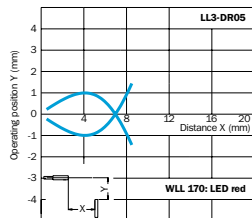
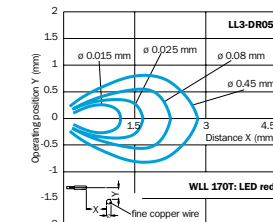
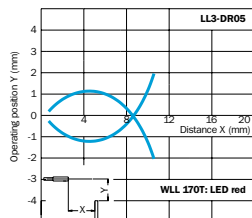
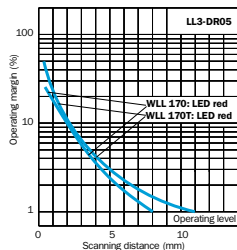


Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – proximity systems

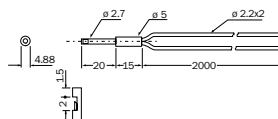
Order information	
Type	Part no.
LL 3-DR05	5 308 087



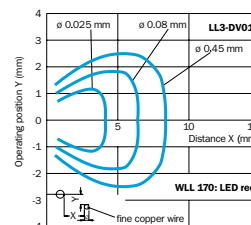
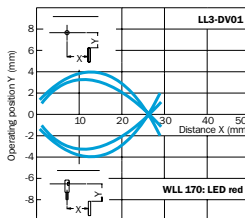
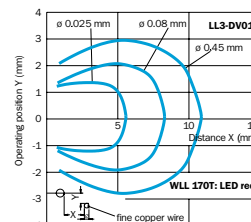
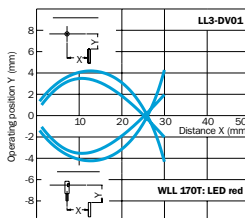
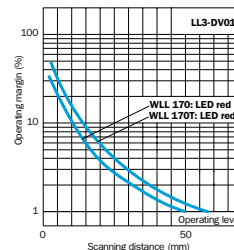
Material: Core: PMMA, Sheath: PE
Sleeve: CuZn, nickel-plated brass



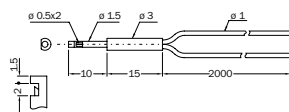
Order information	
Type	Part no.
LL 3-DV01	5 308 088



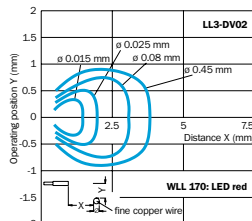
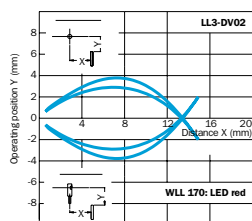
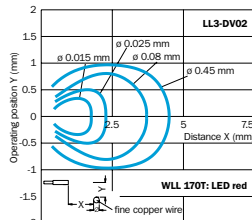
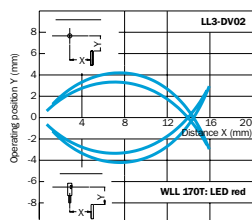
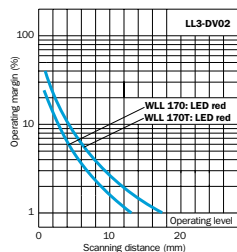
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



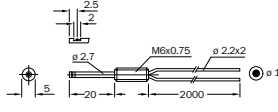
Order information	
Type	Part no.
LL 3-DV02	5 308 089



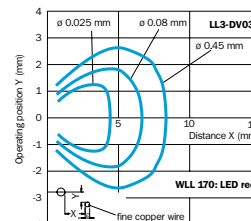
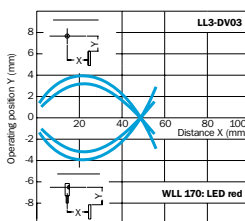
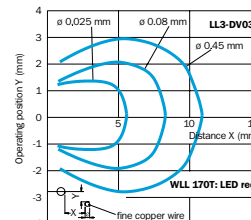
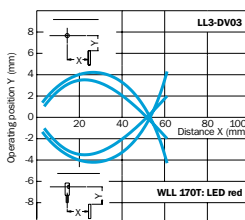
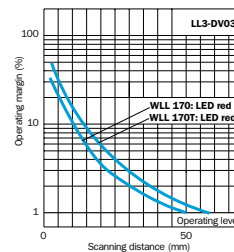
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



Order information	
Type	Part no.
LL 3-DV03	5 308 090



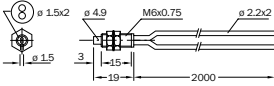
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



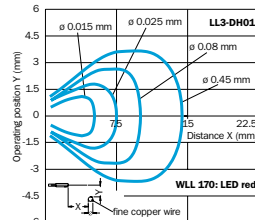
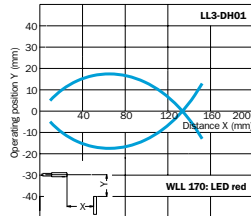
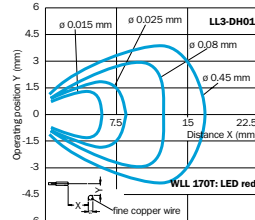
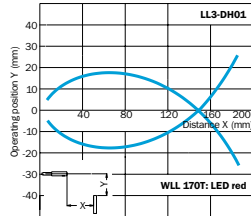
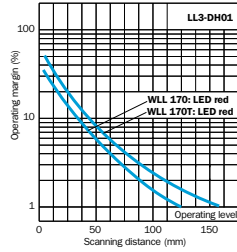
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – proximity systems

Order information

Type	Part no.
LL 3-DH01	5 308 091

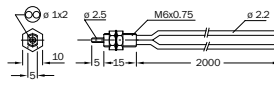


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

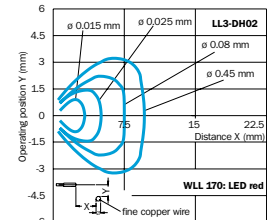
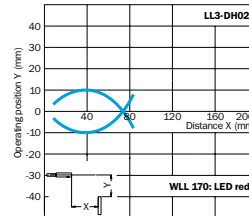
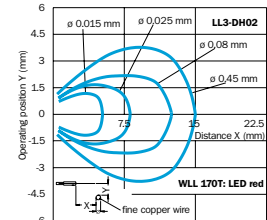
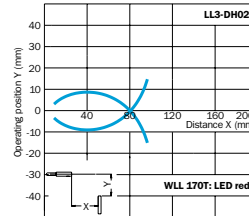
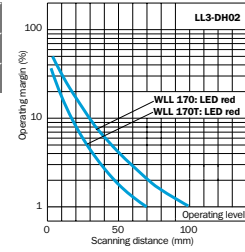


Order information

Type	Part no.
LL 3-DH02	5 308 092

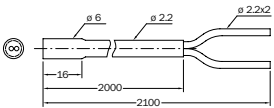


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

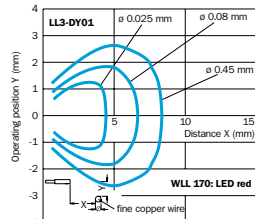
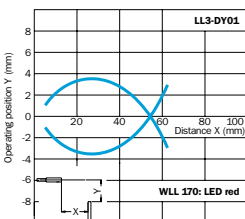
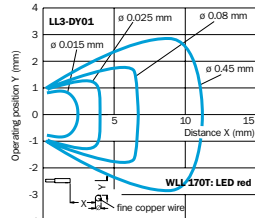
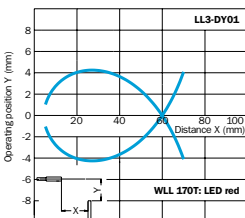
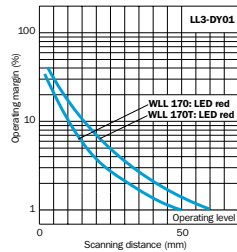


Order information

Type	Part no.
LL 3-DY01	5 308 093

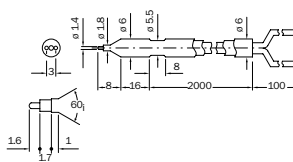


Material: Core: PMMA, Sheath: Teflon
Sleeve: Teflon



Order information

Type	Part no.
LL 3-DF01	5 308 094 ¹⁾
LL 3-DF02	5 308 095 ²⁾

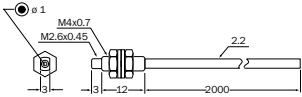


Material: Core: PMMA, Sheath: Teflon
Sleeve: Teflon

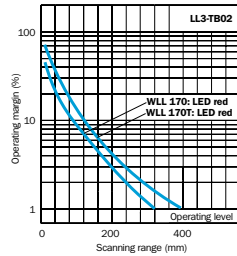
- ¹⁾ For transparent liquids
- ²⁾ For cloudy liquids

Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – through-beam systems

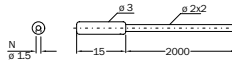
Order information	
Type	Part no.
LL 3-TB02	5 308 048



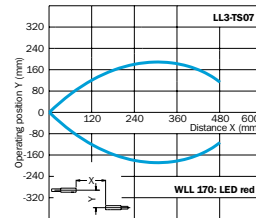
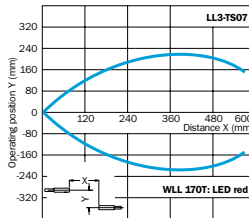
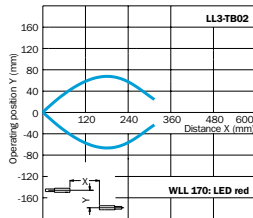
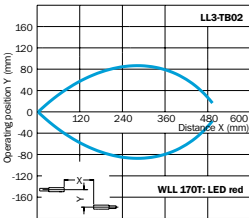
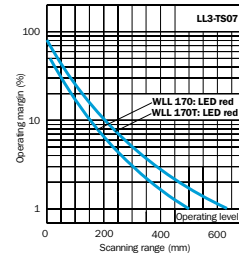
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



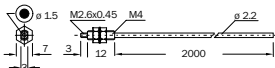
Order information	
Type	Part no.
LL 3-TS07	5 308 049



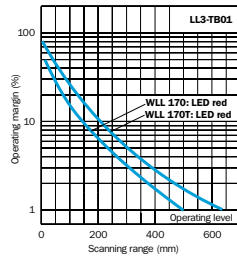
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



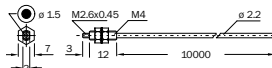
Order information	
Type	Part no.
LL 3-TB01	5 308 050



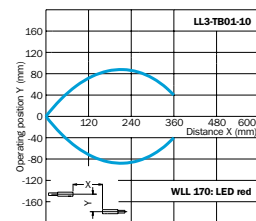
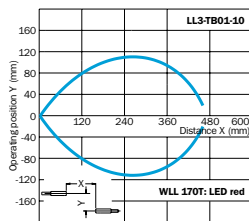
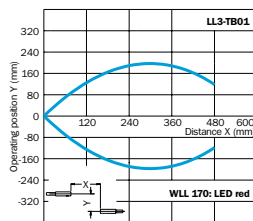
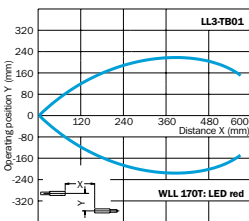
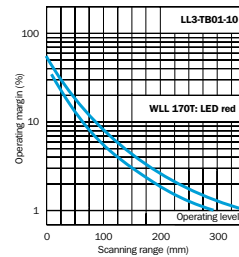
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



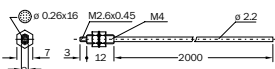
Order information	
Type	Part no.
LL 3-TB01-10	5 308 051



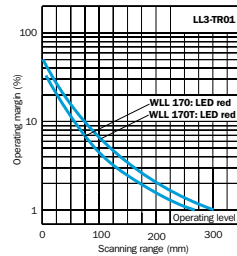
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



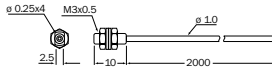
Order information	
Type	Part no.
LL 3-TR01	5 308 052



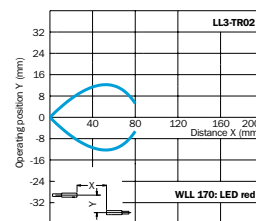
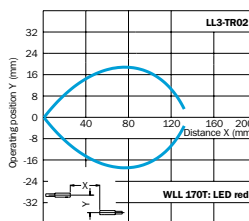
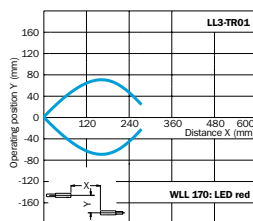
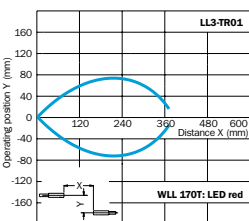
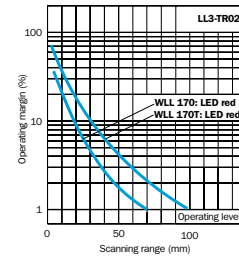
Material: Core: PMMA, Sheath: PE
Sleeve: CuZn, nickel-plated brass



Order information	
Type	Part no.
LL 3-TR02	5 308 053



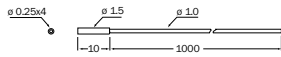
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



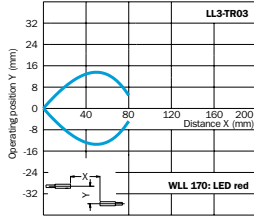
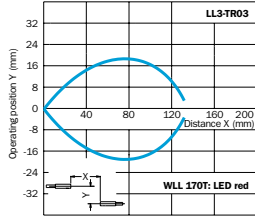
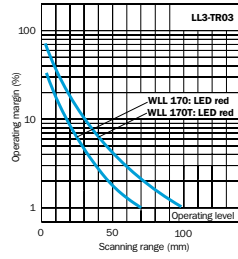
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – through-beam systems

Order information

Type	Part no.
LL 3-TR03	5 308 054

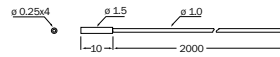


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

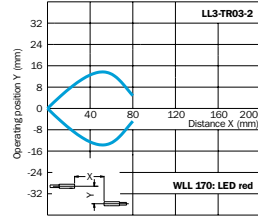
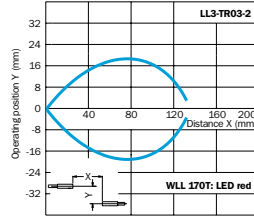
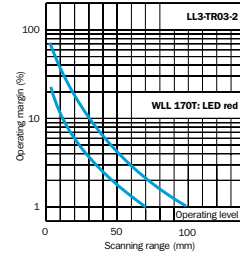


Order information

Type	Part no.
LL 3-TR03-2	5 308 055

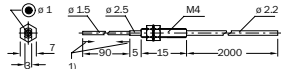


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

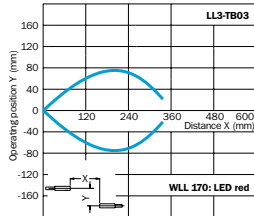
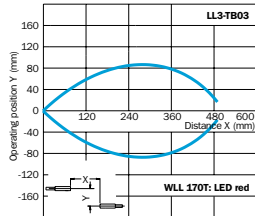
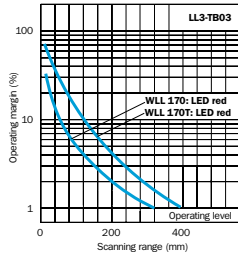


Order information

Type	Part no.
LL 3-TB03	5 308 056

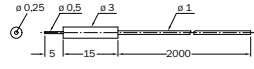


1) Flexible end sleeve, do not bend in this area (10 mm), radius of curvature R10
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

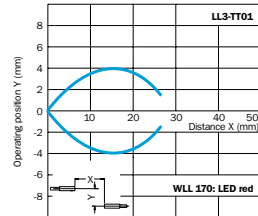
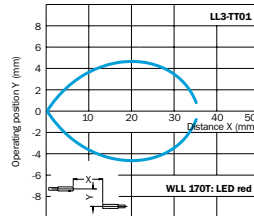
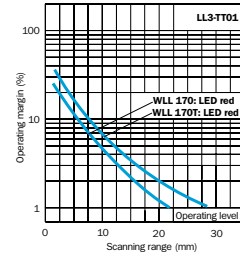


Order information

Type	Part no.
LL 3-TT01	5 308 057

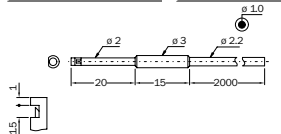


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

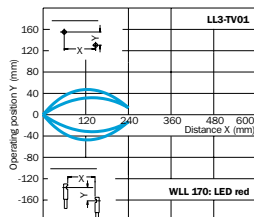
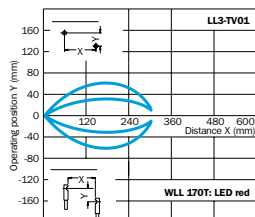
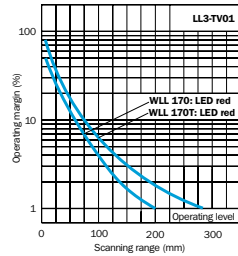


Order information

Type	Part no.
LL 3-TV01	5 308 058

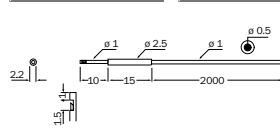


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

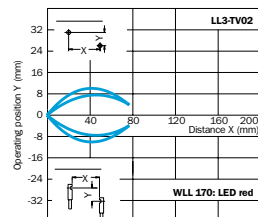
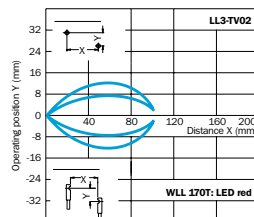
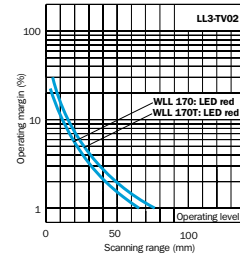


Order information

Type	Part no.
LL 3-TV02	5 308 059



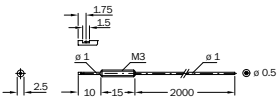
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



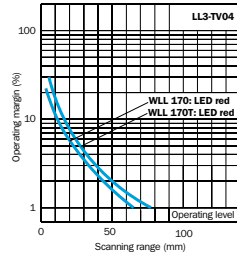
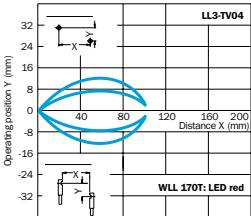
LL 3 Plastic fibre-optic cables, through-beam systems

Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – through-beam systems

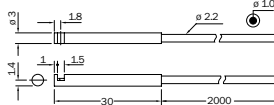
Order information	
Type	Part no.
LL 3-TV04	5 308 060



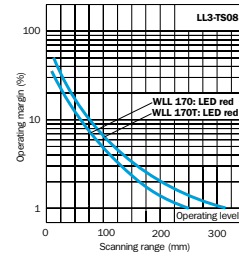
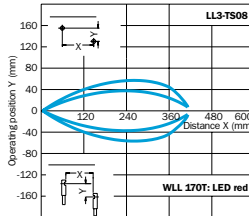
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



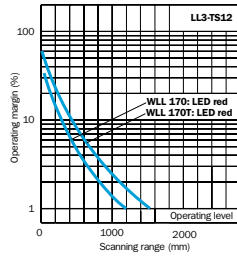
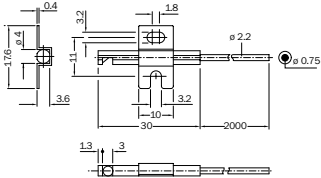
Order information	
Type	Part no.
LL 3-TS08	5 308 061



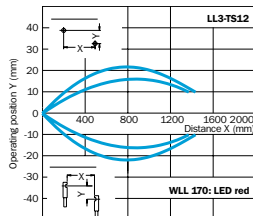
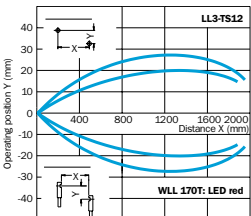
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



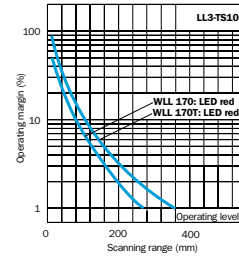
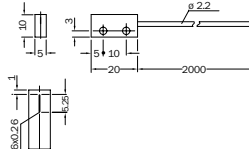
Order information	
Type	Part no.
LL 3-TS12	5 308 062



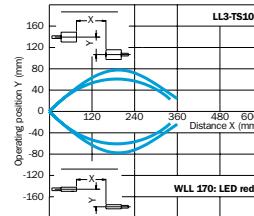
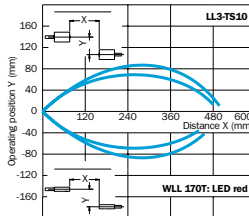
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



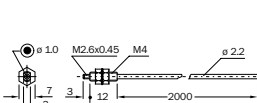
Order information	
Type	Part no.
LL 3-TS10	5 308 063



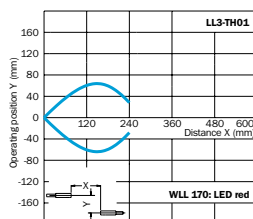
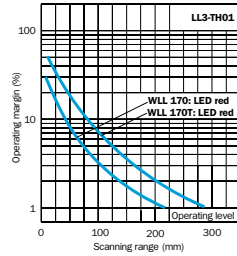
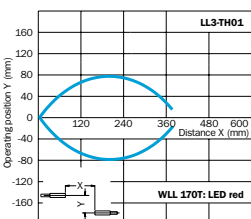
Material: Core: PMMA, Sheath: PE
Sleeve: CuZn, nickel-plated brass



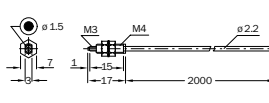
Order information	
Type	Part no.
LL 3-TH01	5 308 064



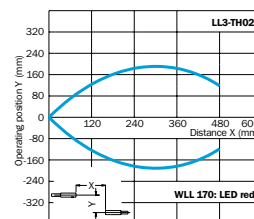
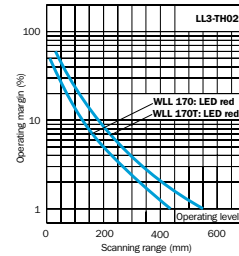
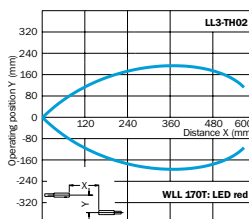
Material: Core: PMMA, Sheath: PE
Sleeve: CuZn, nickel-plated brass



Order information	
Type	Part no.
LL 3-TH02	5 308 065



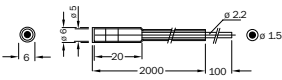
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



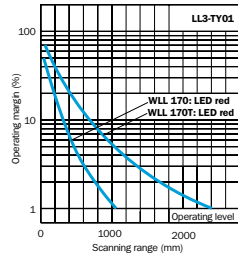
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – through-beam systems

Order information

Type	Part no.
LL 3-TY01	5 308 066

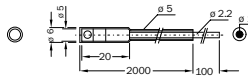


Material: Core: PMMA; Sheath: Teflon;
Sleeve: Teflon

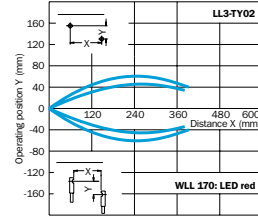
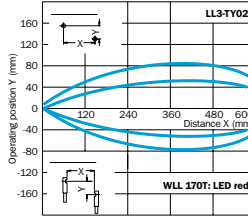
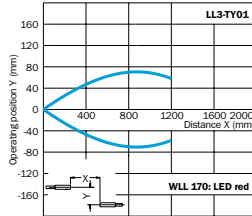
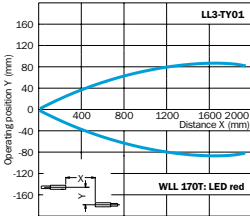
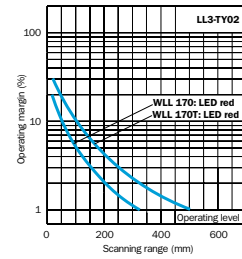


Order information

Type	Part no.
LL 3-TY02	5 308 067

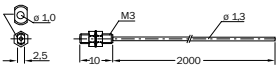


Material: Core: PMMA; Sheath: Teflon;
Sleeve: Teflon

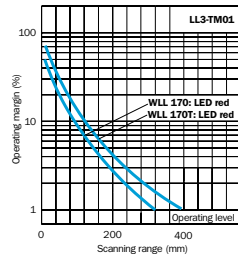


Order information

Type	Part no.
LL 3-TM01	5 308 068

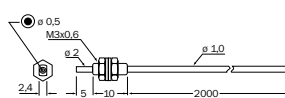


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

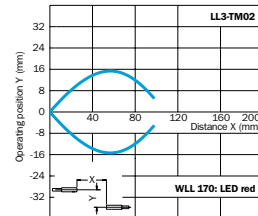
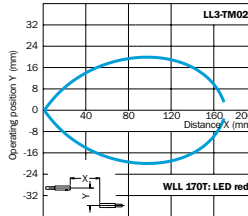
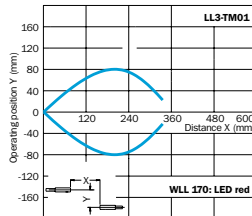
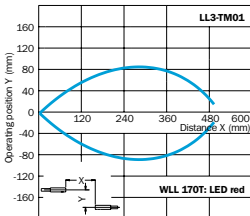
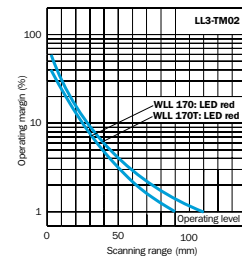


Order information

Type	Part no.
LL 3-TM02	5 308 069

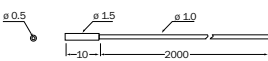


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



Order information

Type	Part no.
LL 3-TM03	5 308 070



Material: Core: PMMA, Sheath: PE
Sleeve: 1.4305 (German material no.)
Stainless steel, rust- and acid-resistant

