	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.

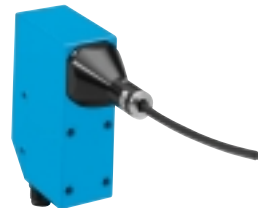
■ KTL 5G-2



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

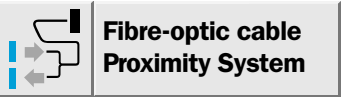
- UV light source with high-pressure mercury-vapour burner,
- supplementary optical filter.

■ CSL



with LBS, LIS fibre-optic cable

- teach-in,
- adjustable colour selectivity.



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

LL 3 Fibre-optic cables

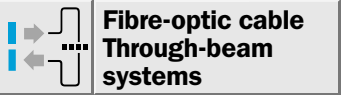
Description	Bend radius (mm)	Type	Part no.
Compact sleeve, M 4, long scanning range	25	LL 3-DM 01	5 308 071
Super compact, sleeve 2.5 mm diameter	15	LL 3-DT 03	5 308 072
Super compact, sleeve M 3	10	LL 3-DS 06	5 308 073
Long scanning range, M 6, coaxial fibre-optic cable	25	LL 3-DB 01	5 308 074
10 m length, M 6, coaxial fibre-optic cable	25	LL 3-DB 01-10	5 308 075
For front lenses, M 3	15	LL 3-DT 01	5 308 076
Thin, short sleeve, M 4, coaxial fibre-optic cable	25	LL 3-DM 02	5 308 077
Highly flexible, M 6, long scanning range	4	LL 3-DR 01	5 308 078
Highly flexible, small sleeve, M 3	4	LL 3-DR 02	5 308 079
Highly flexible, 3 mm diameter, thin sleeve	4	LL 3-DR 03	5 308 080
Highly flexible, 1.5 mm diameter, thin sleeve	4	LL 3-DR 04 ⁴⁾	5 308 081
Highly flexible, M 4, compact sleeve	4	LL 3-DR 06	5 308 082
Supple sleeve, M 6, long scanning ranges	25/10 ³⁾	LL 3-DB 02	5 308 083
Supple sleeve, M 4	25/10 ³⁾	LL 3-DM 03	5 308 084
Thin long tip, M 3	15	LL 3-DT 02	5 308 085
Thin long tip, M 3, coaxial fibre-optic cable	15	LL 3-DT 04 ⁴⁾	5 308 086
diameter 3.0 mm, thin tip, 0.82 mm diameter	4	LL 3-DR 05 ⁴⁾	5 308 087
90° offset, 5.0 mm diameter	25	LL 3-DV 01	5 308 088
90° offset, small sleeve, 3.0 mm diameter	15	LL 3-DV 02	5 308 089
90° offset, M 6	25	LL 3-DV 03	5 308 090
Temperature resistant to 180 °C, M 6, long scanning range	30	LL 3-DH 01 ⁵⁾	5 308 091
Temperature resistant to 100 °C, M 6	25	LL 3-DH 02 ⁶⁾	5 308 092
Teflon sheath, resistant to chemicals, 6.0 mm diameter	40	LL 3-DY 01	5 308 093
Level switch, clear liquid, 6.0 mm diameter	50	LL 3-DF 01	5 308 094
Level switch, cloudy liquid, 6.0 mm diameter	50	LL 3-DF 02	5 308 095

Scanning distance SD ¹⁾ and minimum target diameter MD ⁷⁾ in mm in combination with sensor type																									
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	
												5 V	3 V												
SD	MD	SD	MD	SD	MD		SD	MD	SD	MD	SD	SD	MD	SD	MD	SD	MD		SD	MD	SD	MD	SD	MD	
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	●	●	●	●	●	●		
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	●	●	●	●	●	●		
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	●	●	●	●	●	●		
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	
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	●	●	●	●	●	●		
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	●	●	●	●	●	●		
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	●	●	●	●	●	●		
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	
9	0.02	9	0.015	6	0.015		8	0.015	●		●	●		14	0.015	●		●	●	●	●	●	●		
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	●	●	●	●	●	●		
9	0.02	9	0.015	6	0.015		8	0.015	●		●	●		14	0.015	●		2M2	4	0.02	●		4	0.02	
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	●	●	●	●	●	●		
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	●	●	●	●	●	●		
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	●	●	●	●	●	●		
5	0.02	5	0.015	3	0.015		5	0.015	●		●	●		6	0.015	●		●	●	●	●	●	●		
9	0.02	9	0.015	5	0.015		10	0.015	●		●	●		13	0.015	●		2M2	6	0.02	●		6	0.02	
5	0.02	5	0.015	3	0.015		5	0.015	●		●	●		8	0.015	●		2M2	4	0.02	●		4	0.02	
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	●	●	●	●	●	●		
9	0.02	8	0.015	5	0.015		9	0.015	●		●	●		12	0.015	●		●	●	●	●	●	●		
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	
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	
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	●	●	●	●	●	●		
●		45	0.02	●			50	0.02	●		●	●		60	0.02	●		●	●	●	●	●	●		
●		yes		●			yes		●		●	●		yes		●		●	●	●	●	●	●		
●		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



Features



- Highly flexible
- Small bend radii
- Most fibre-optic cables can be easily 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				Scanning range SR ¹⁾ and minimum target diameter MD ⁶⁾ in mm in combination with sensor type																								
Through-beam systems																												
LL 3 Fibre-optic cables																												
Description	Bend radius (mm)	Type	Part no.	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		
				SR	MD	SR	MD	SR	MD	SR	MD	SR	MD	5 V	3 V	MD	SR	MD	SR	MD		SR	MD	SR	MD	SR	MD	SR
Standard M 4	25	LL 3-TB 02	5 308 048	200/2000 ²⁾	0,2/4,0	200/2000 ²⁾	0,2/4,0	150/1500 ²⁾	0,2/4,0		280/2500 ²⁾	0,2	80/500 ²⁾	0,2	95	135	0,2	350/3200 ²⁾	0,2	75/650 ²⁾	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 ²⁾	0,5/4,0	400/1500 ²⁾	0,2/4,0	280/1500 ²⁾	0,2/4,0		460/2000 ²⁾	0,5	130/400 ²⁾	0,5	160	230	0,5	580/2500 ²⁾	0,5	140/600 ²⁾	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 ²⁾	0,5/4,0	250/900 ²⁾	0,5/4,0	190/660 ²⁾	0,5/4,0		250/1000 ²⁾	0,5	75/200 ²⁾	0,5	80	110	0,5	300/1200 ²⁾	0,5	120/500 ²⁾	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 ²⁾	0,2/4,0	180/1200 ²⁾	0,2/4,0	130/850 ²⁾	0,2/4,0		230/1000 ²⁾	0,3	60/400 ²⁾	0,3	80	110	0,3	270/2500 ²⁾	0,3	60/550 ²⁾	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 ²⁾	0,2/4,0	180/1500 ²⁾	0,2/4,0	130/1050 ²⁾	0,2/4,0		180/2000 ²⁾	0,2	60/400 ²⁾	0,2	70	95	0,2	250/2500 ²⁾	0,2	25/300 ²⁾	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 supple 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

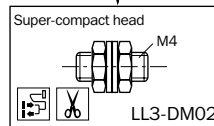
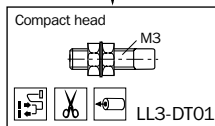
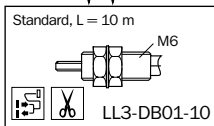
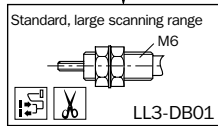
Adaptor for WLL 12-2		
Type	Part no.	LL-φ
AD-LL 1M0	2 015 026	1.0 mm
AD-LL 2M2	2 015 210	2.2 mm

Flow chart – selection of fibre-optic cables

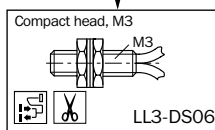
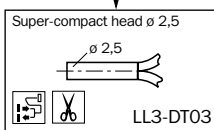
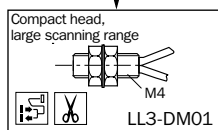


Coaxial structure for precise switching

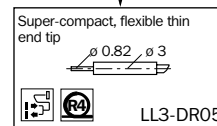
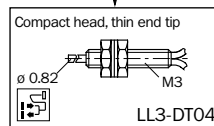
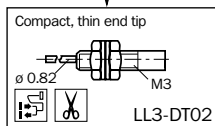
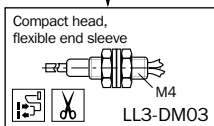
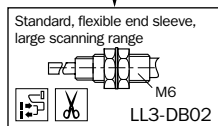
Fibre-optic cable
length 10 m



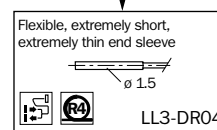
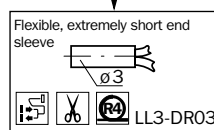
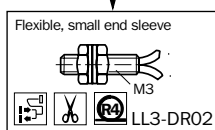
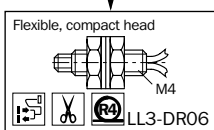
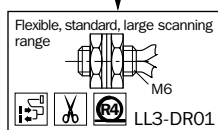
Compact end sleeve, excellent scanning ranges



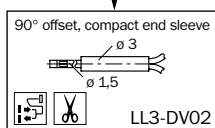
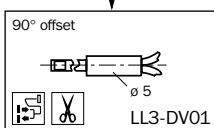
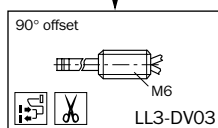
Thin end sleeves, long, very thin and flexible end tips: ideal for small, inaccessible objects



Extremely flexible fibre-optic cable, bend radius R4, for dynamic mechanical systems



Integrated 90° offset, extremely short installation depths

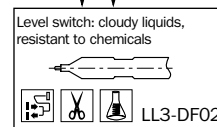
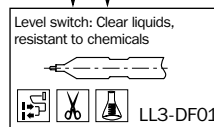
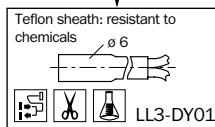
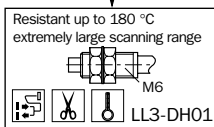
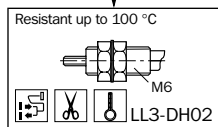


Special applications:

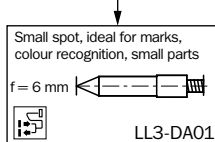
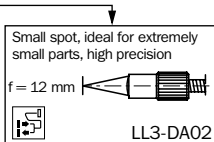
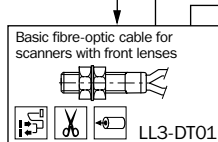
Level switches

Chemicals

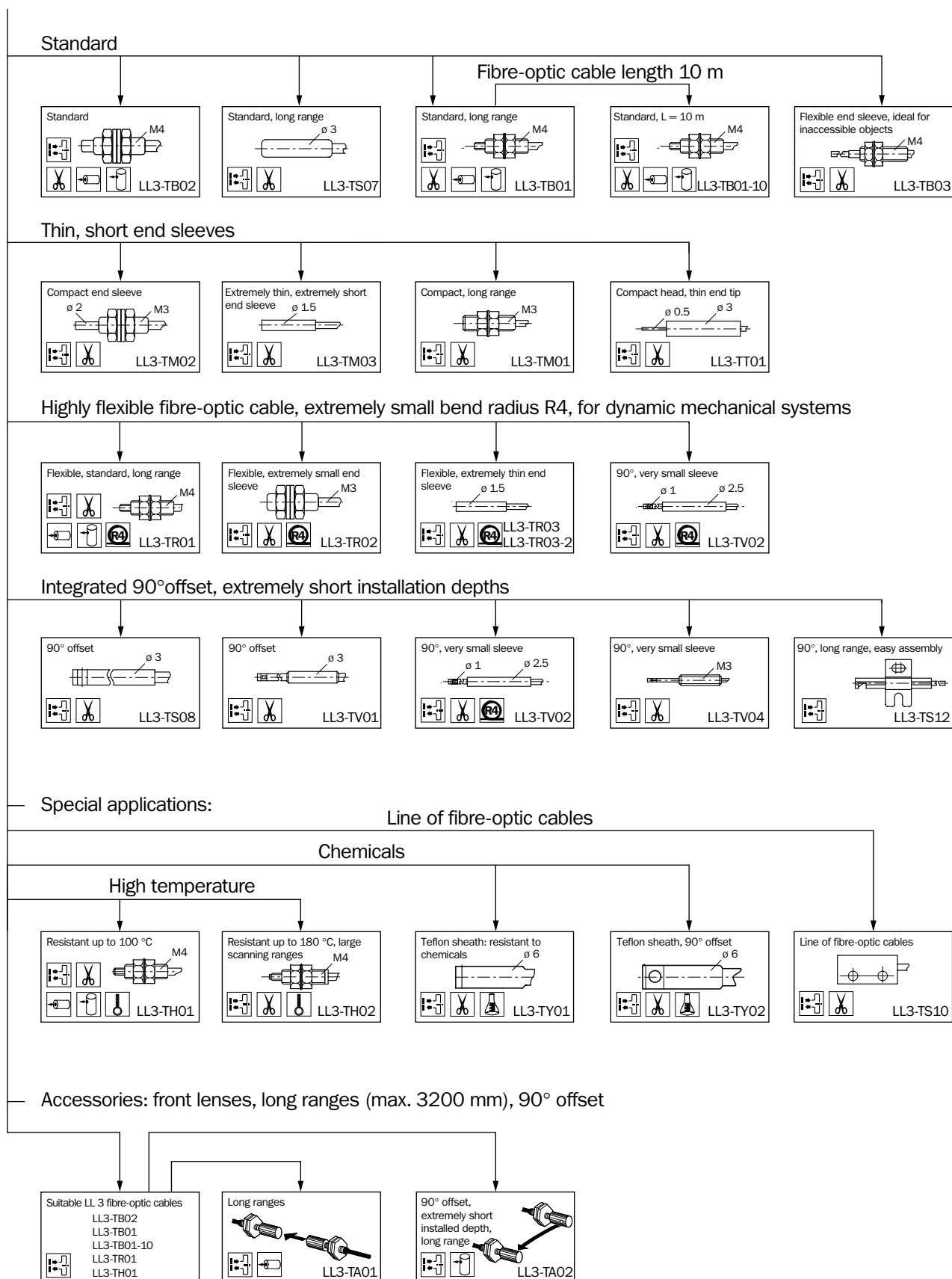
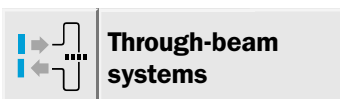
High temperature



Accessories: lenses at the front with focused optics



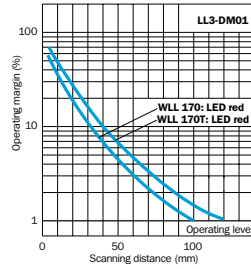
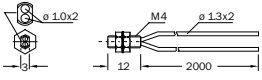
Flow chart – selection of fibre-optic cables



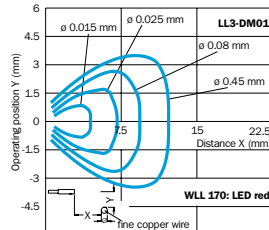
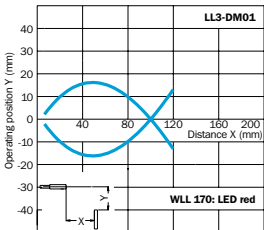
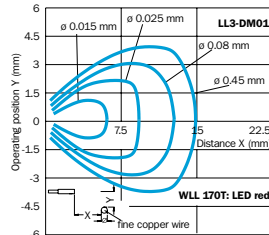
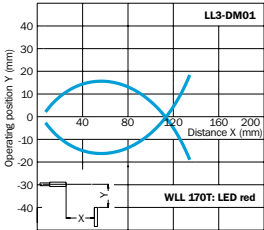
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – proximity systems

Order information

Type	Part no.
LL 3-DM01	5 308 071

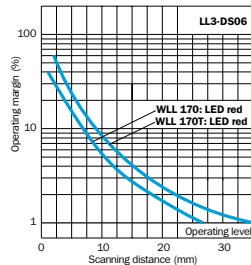
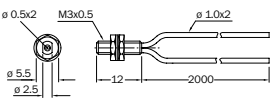


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

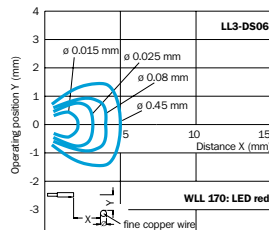
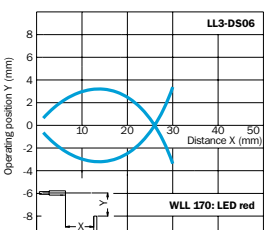
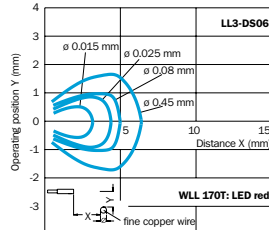
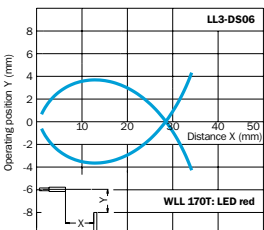


Order information

Type	Part no.
LL 3-DS06	5 308 073

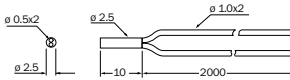


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

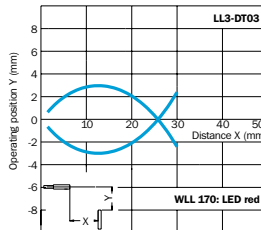
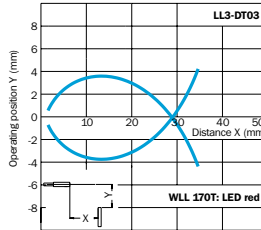


Order information

Type	Part no.
LL 3-DT03	5 308 072

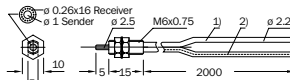


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



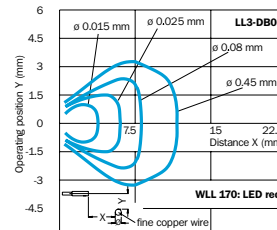
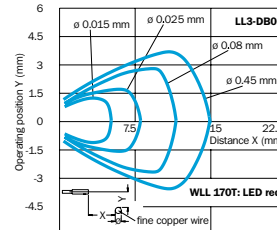
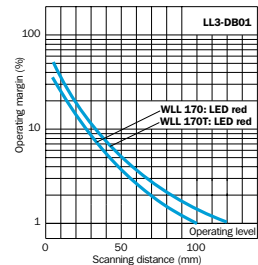
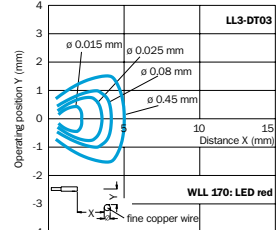
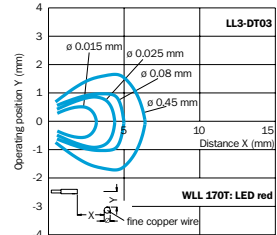
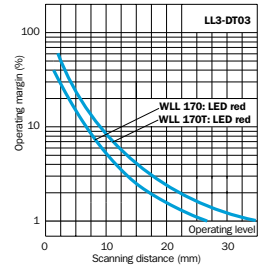
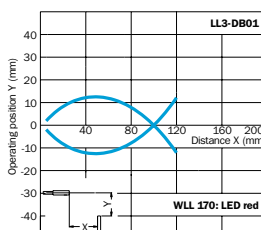
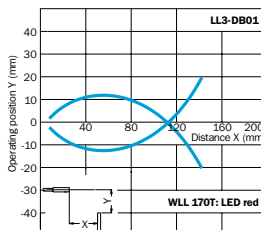
Order information

Type	Part no.
LL 3-DB01	5 308 074



- 1) Sender
- 2) Receiver

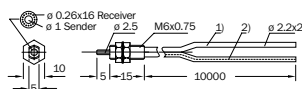
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



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

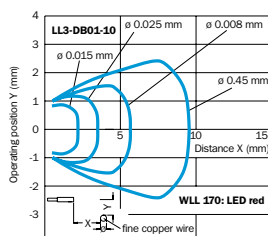
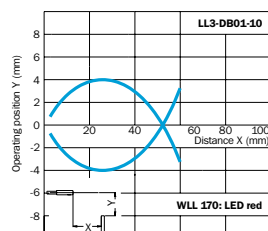
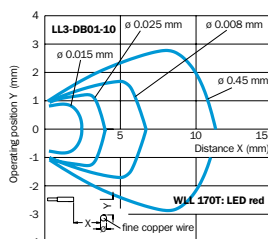
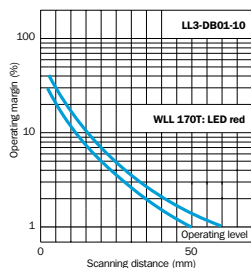
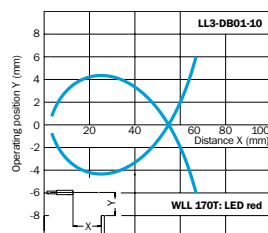
Order information

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



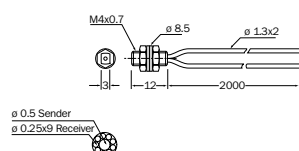
- 1) Sender
- 2) Receiver

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

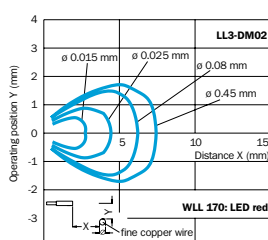
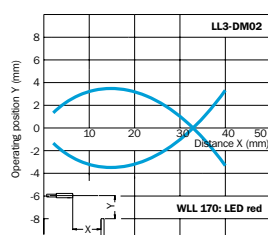
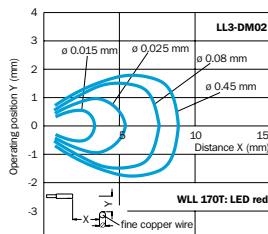
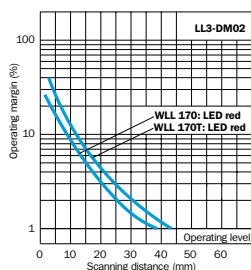
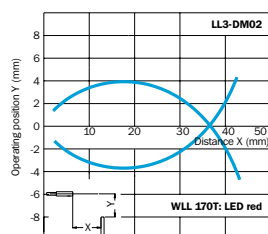


Order information

Type	Part no.
LL 3-DM02	5 308 077

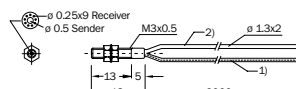


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



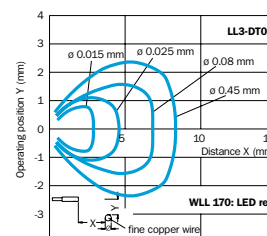
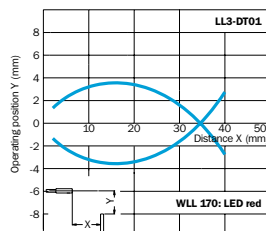
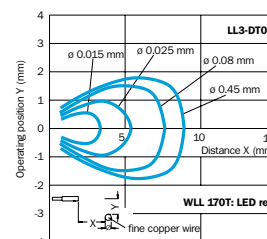
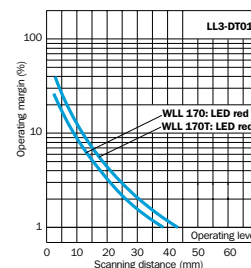
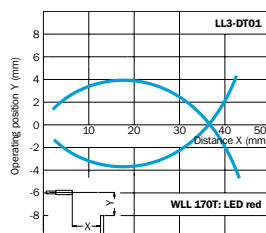
Order information

Type	Part no.
LL 3-DT01	5 308 076



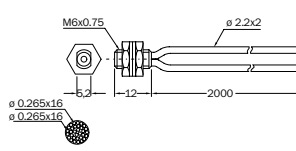
- 1) Sender
- 2) Receiver

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

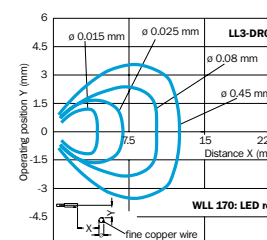
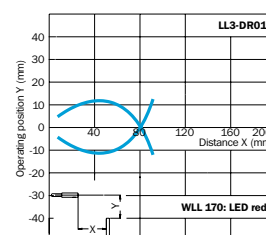
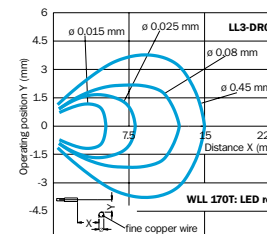
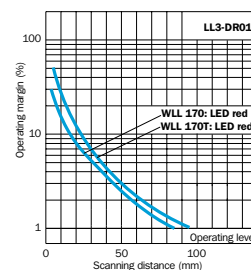
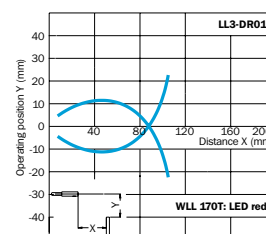


Order information

Type	Part no.
LL 3-DR01	5 308 078



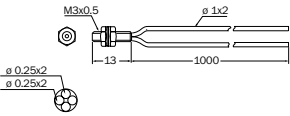
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



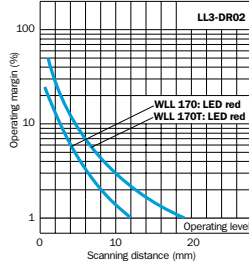
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – proximity systems

Order information

Type	Part no.
LL 3-DR02	5 308 079

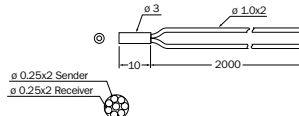


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

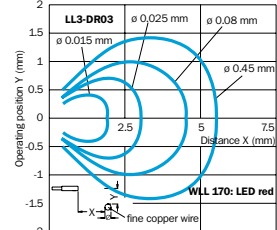
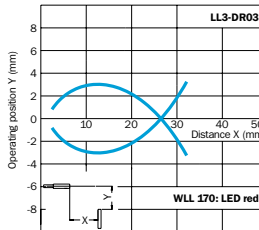
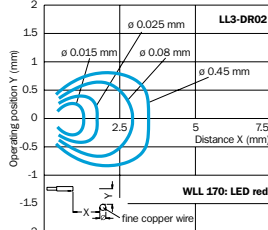
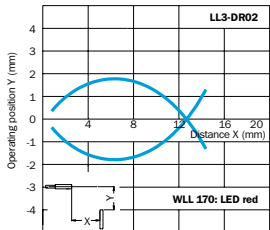
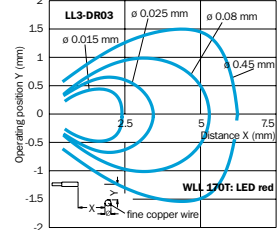
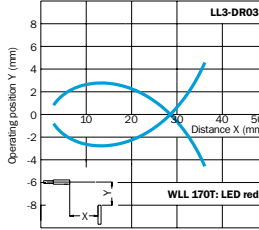
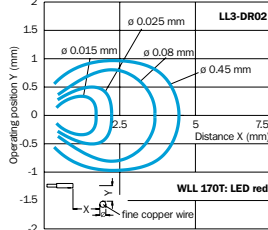
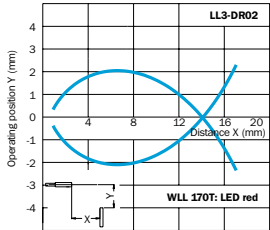
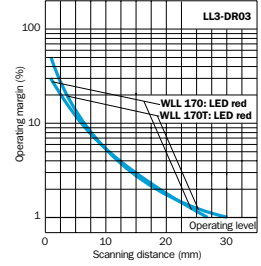


Order information

Type	Part no.
LL 3-DR03	5 308 080

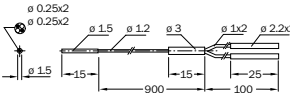


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

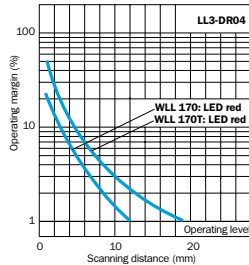


Order information

Type	Part no.
LL 3-DR04	5 308 081

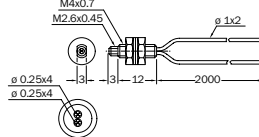


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

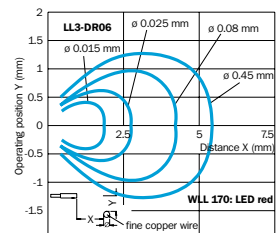
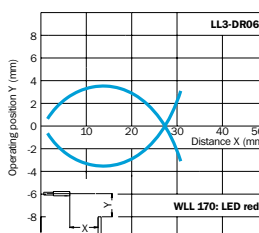
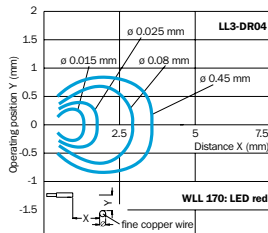
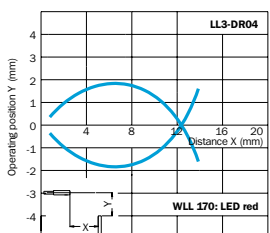
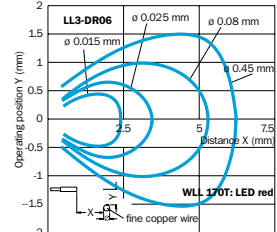
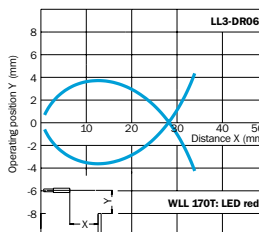
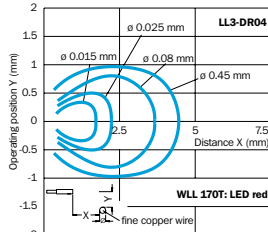
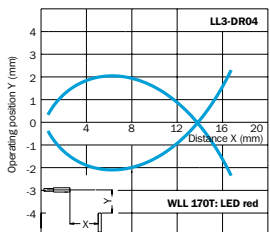
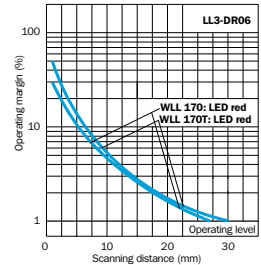


Order information

Type	Part no.
LL 3-DR06	5 308 082



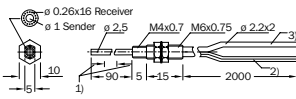
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



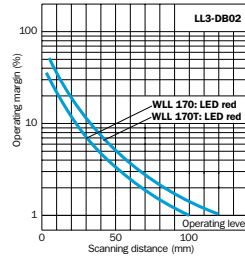
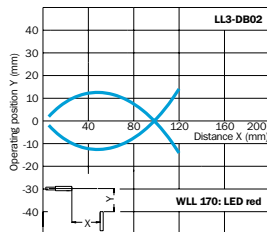
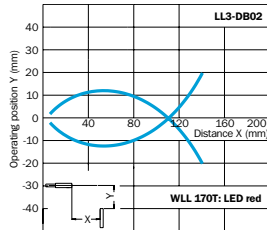
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – proximity systems

Order information

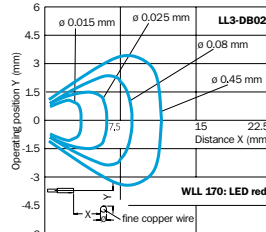
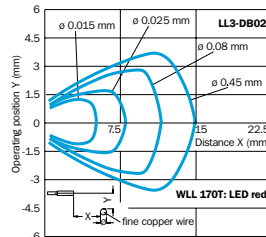
Type	Part no.
LL 3-DB02	5 308 083



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

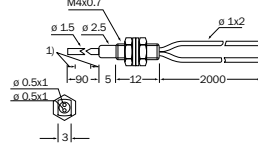


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

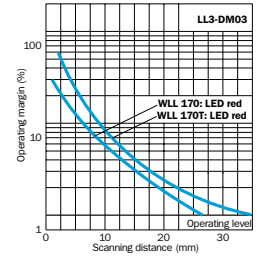
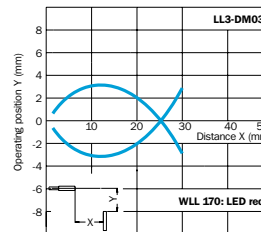
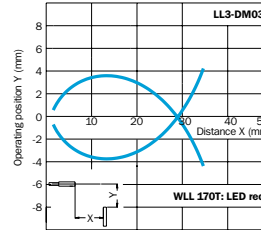


Order information

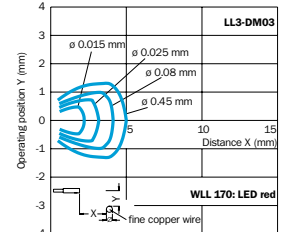
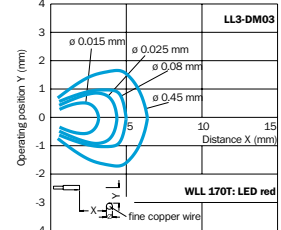
Type	Part no.
LL 3-DM03	5 308 084



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

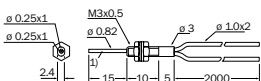


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



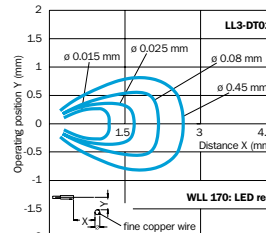
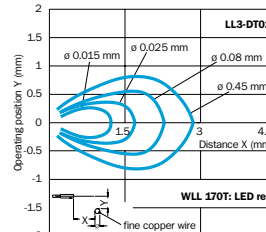
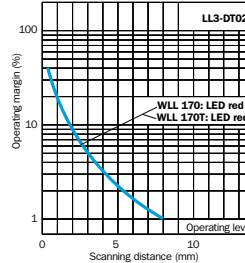
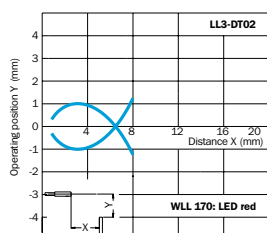
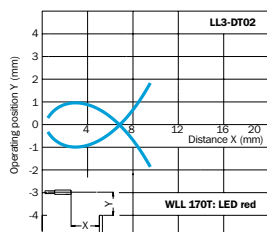
Order information

Type	Part no.
LL 3-DT02	5 308 085



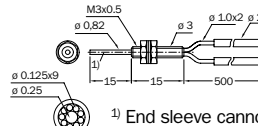
- 1) End sleeve cannot be bent

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



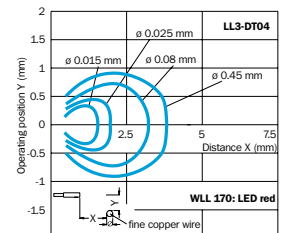
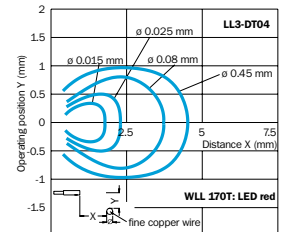
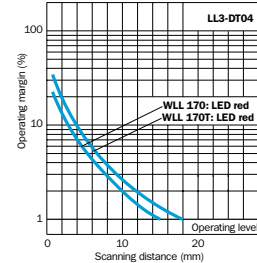
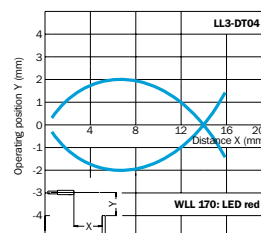
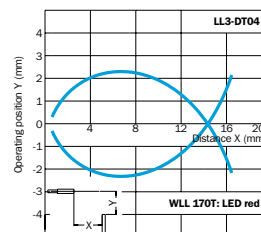
Order information

Type	Part no.
LL 3-DT04	5 308 086



- 1) End sleeve cannot be bent

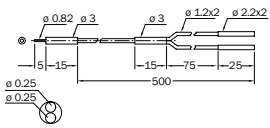
Material: Core: PMMA, Sheath: PE
Sleeve: CuZn, nickel-plated brass



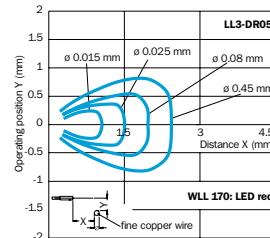
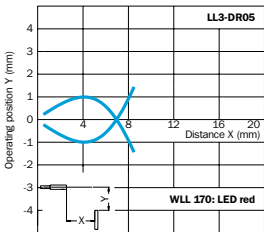
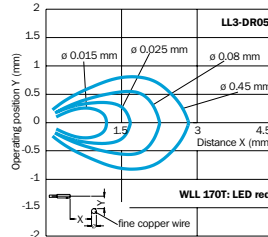
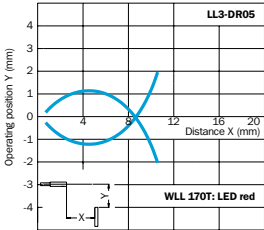
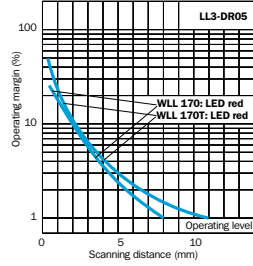
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – proximity systems

Order information

Type	Part no.
LL 3-DR05	5 308 087

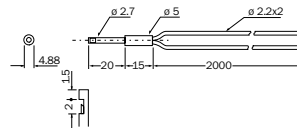


Material: Core: PMMA, Sheath: PE
Sleeve: CuZn, nickel-plated brass

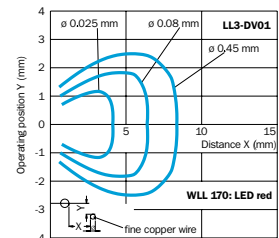
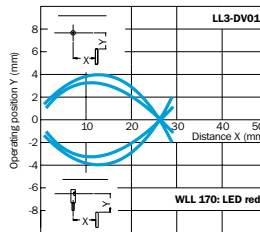
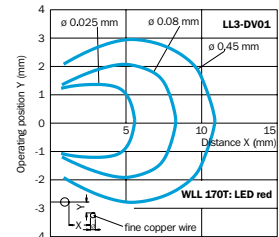
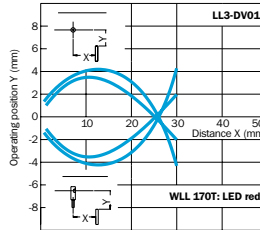
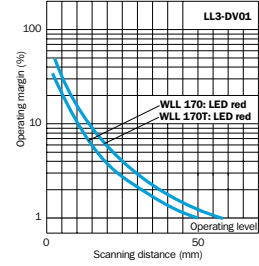


Order information

Type	Part no.
LL 3-DV01	5 308 088

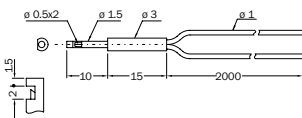


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

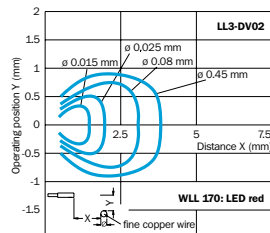
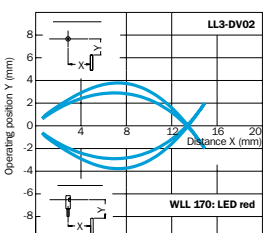
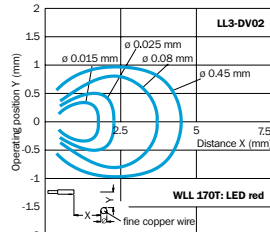
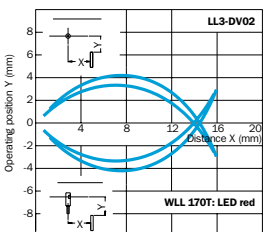
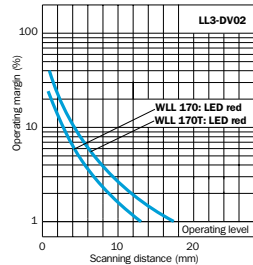


Order information

Type	Part no.
LL 3-DV02	5 308 089

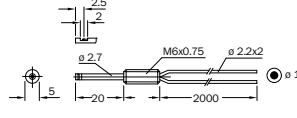


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

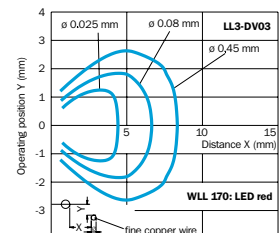
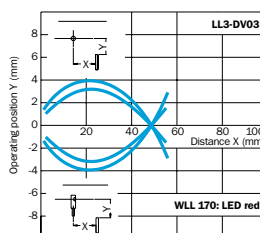
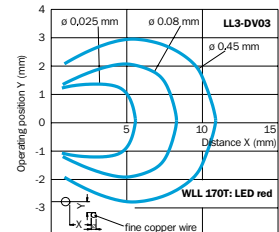
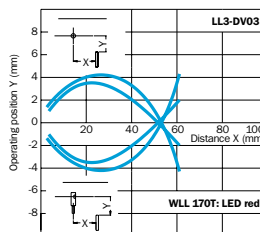
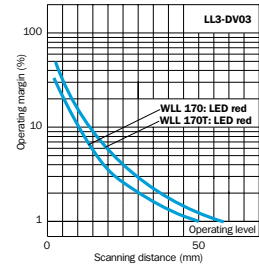


Order information

Type	Part no.
LL 3-DV03	5 308 090



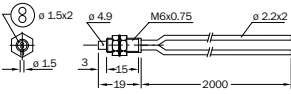
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



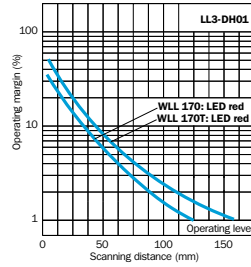
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – proximity systems

Order information

Type	Part no.
LL 3-DH01	5 308 091

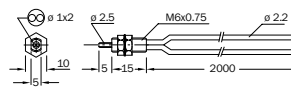


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

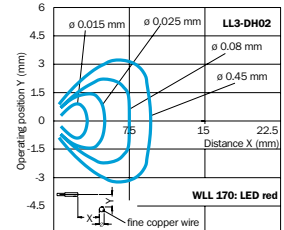
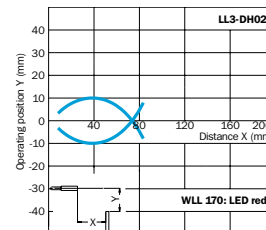
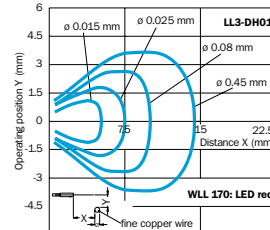
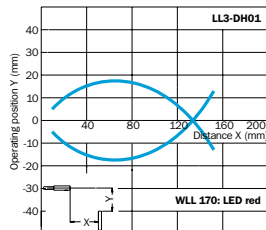
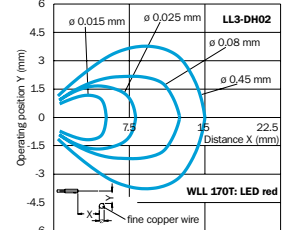
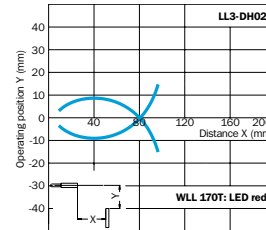
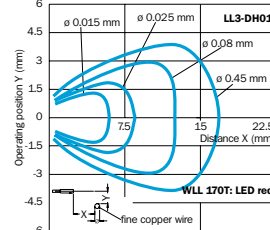
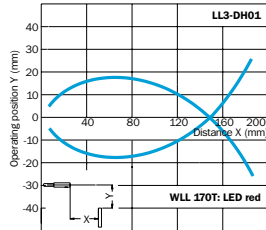
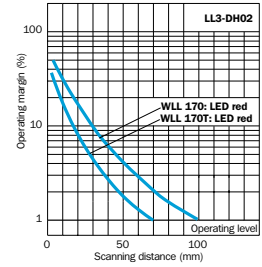


Order information

Type	Part no.
LL 3-DH02	5 308 092

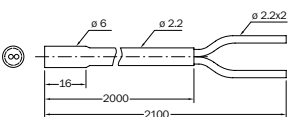


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

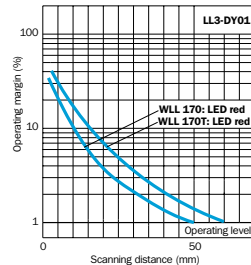


Order information

Type	Part no.
LL 3-DY01	5 308 093

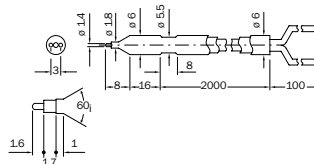


Material: Core: PMMA, Sheath: Teflon
Sleeve: Teflon



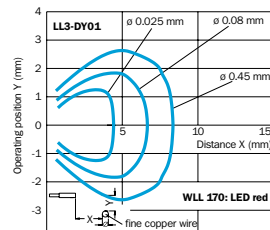
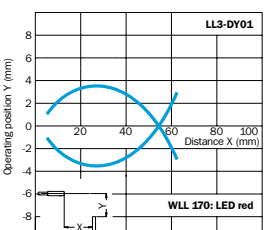
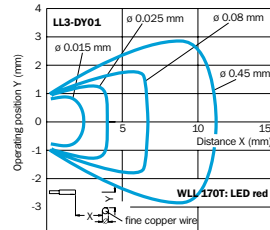
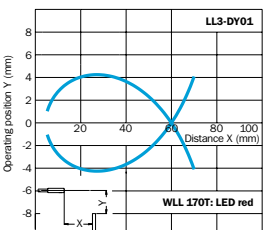
Order information

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



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

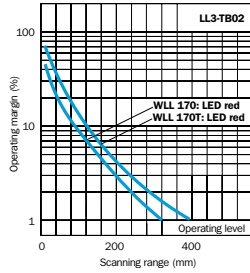
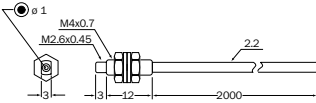
- 1) For transparent liquids
- 2) For cloudy liquids



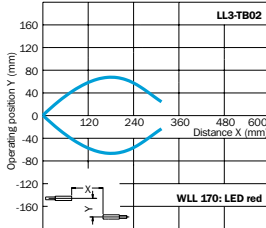
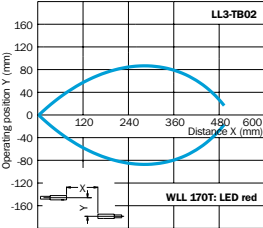
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – through-beam systems

Order information

Type	Part no.
LL 3-TB02	5 308 048

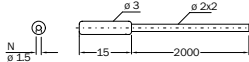


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

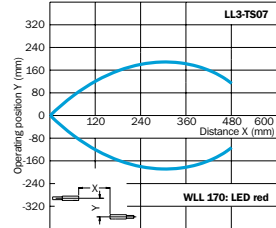
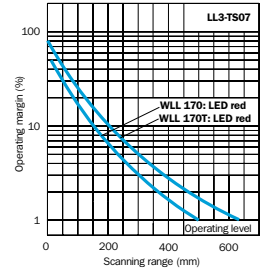


Order information

Type	Part no.
LL 3-TS07	5 308 049

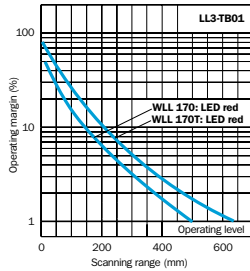
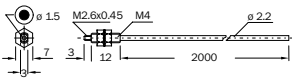


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

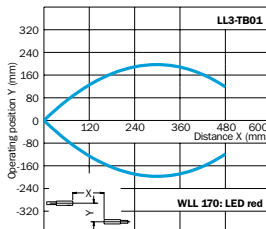
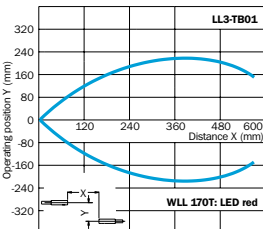


Order information

Type	Part no.
LL 3-TB01	5 308 050

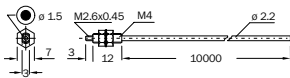


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

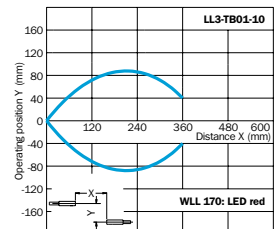
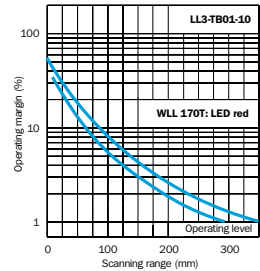


Order information

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

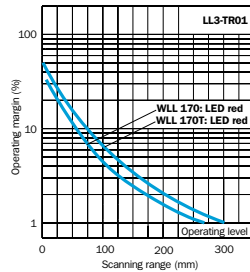
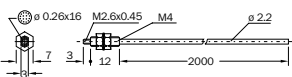


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

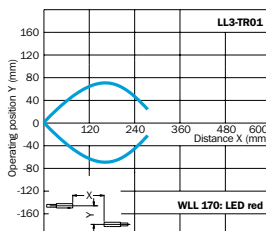
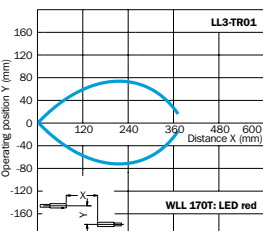


Order information

Type	Part no.
LL 3-TR01	5 308 052

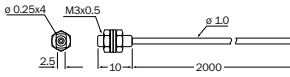


Material: Core: PMMA, Sheath: PE
Sleeve: CuZn, nickel-plated brass

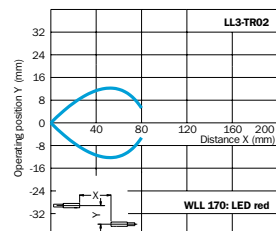
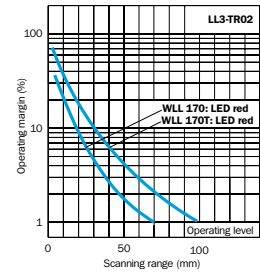


Order information

Type	Part no.
LL 3-TR02	5 308 053



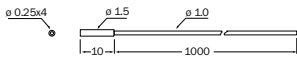
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



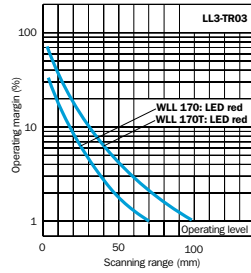
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – through-beam systems

Order information

Type	Part no.
LL 3-TR03	5 308 054

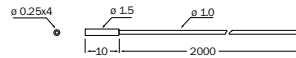


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

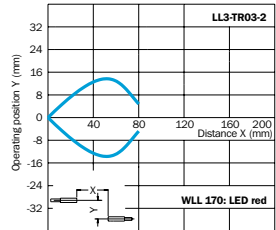
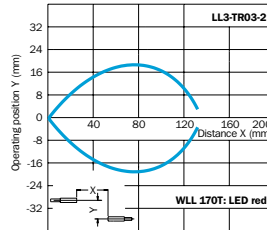
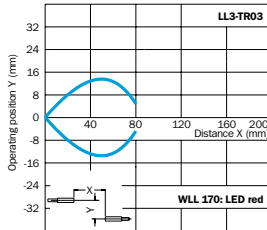
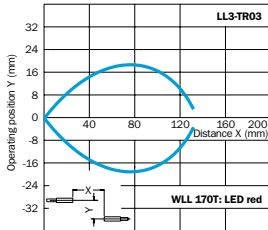
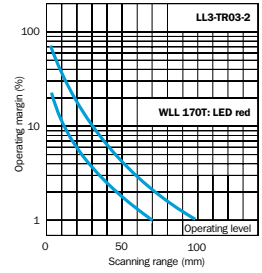


Order information

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

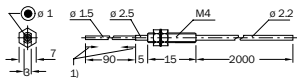


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



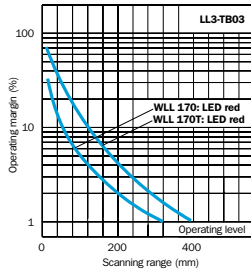
Order information

Type	Part no.
LL 3-TB03	5 308 056



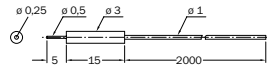
1) Flexible end sleeve, do not bend in this area (10 mm), radius of curvature R10

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

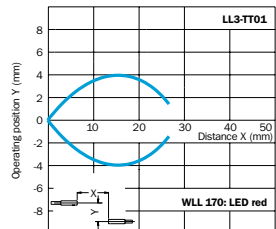
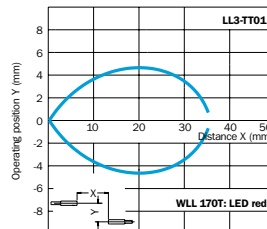
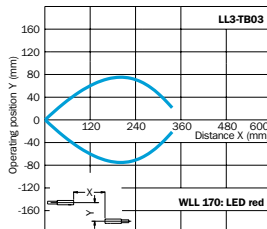
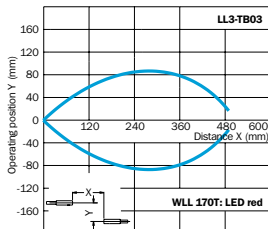
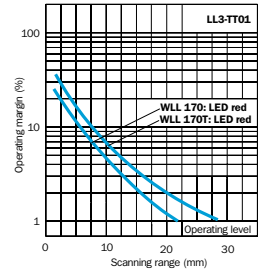


Order information

Type	Part no.
LL 3-TT01	5 308 057

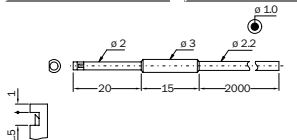


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

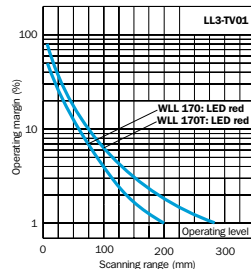


Order information

Type	Part no.
LL 3-TV01	5 308 058

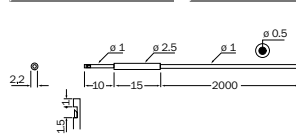


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

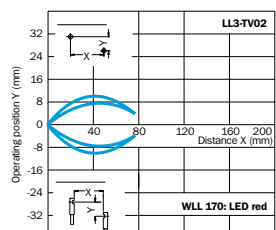
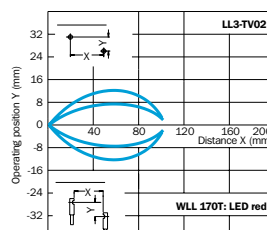
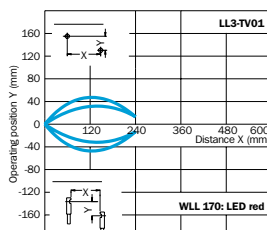
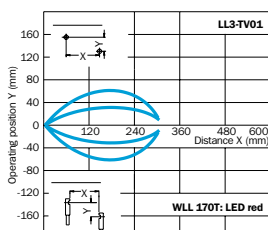
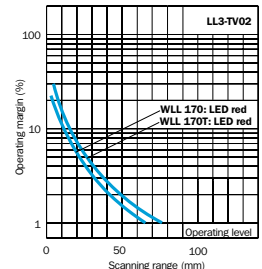


Order information

Type	Part no.
LL 3-TV02	5 308 059



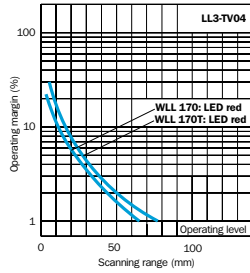
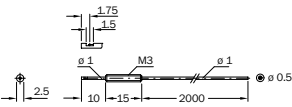
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



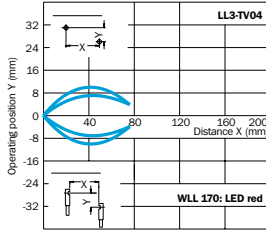
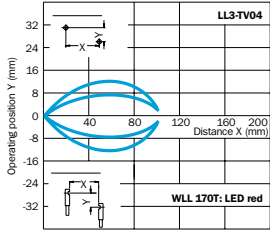
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – through-beam systems

Order information

Type	Part no.
LL 3-TV04	5 308 060

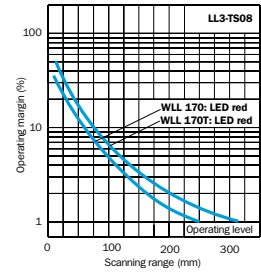
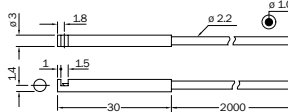


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

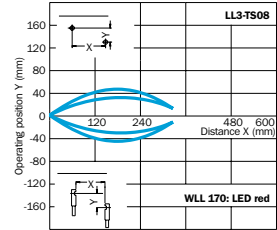
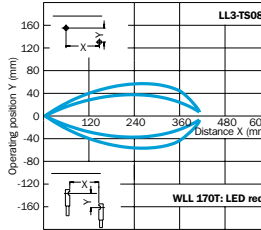


Order information

Type	Part no.
LL 3-TS08	5 308 061

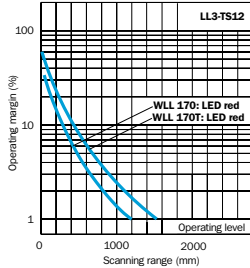
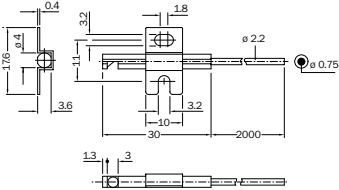


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

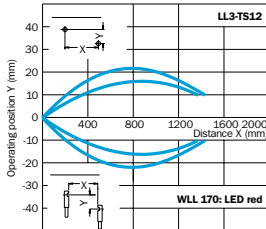
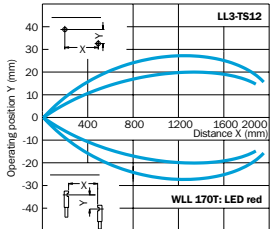


Order information

Type	Part no.
LL 3-TS12	5 308 062

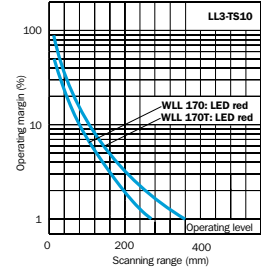
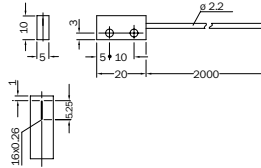


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

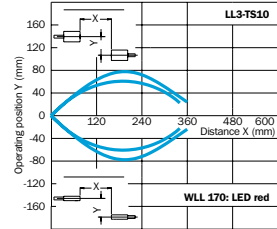
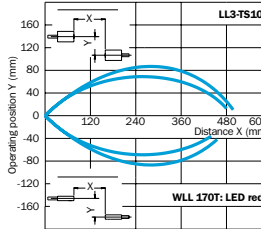


Order information

Type	Part no.
LL 3-TS10	5 308 063

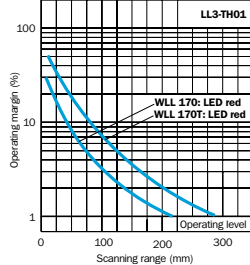
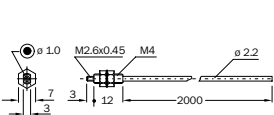


Material: Core: PMMA, Sheath: PE
Sleeve: CuZn, nickel-plated brass

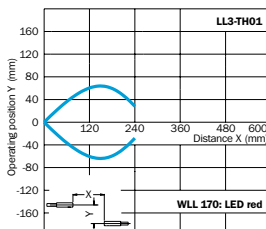
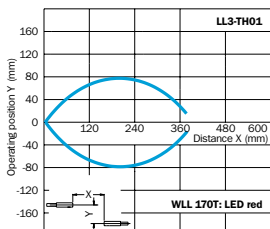


Order information

Type	Part no.
LL 3-TH01	5 308 064

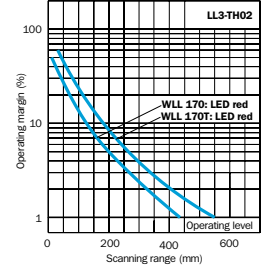
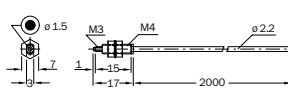


Material: Core: PMMA, Sheath: PE
Sleeve: CuZn, nickel-plated brass

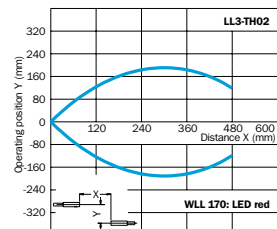
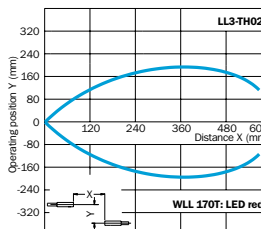


Order information

Type	Part no.
LL 3-TH02	5 308 065



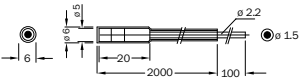
Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



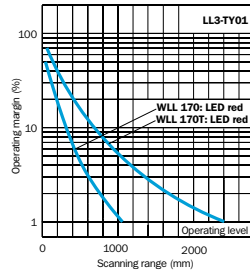
Dimensional drawings and characteristic curves (WLL 170/T) for LL 3 fibre-optic cables – through-beam systems

Order information

Type	Part no.
LL 3-TY01	5 308 066

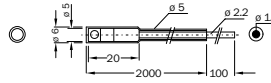


Material: Core: PMMA; Sheath: Teflon;
Sleeve: Teflon

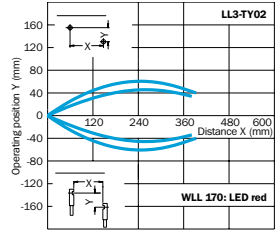
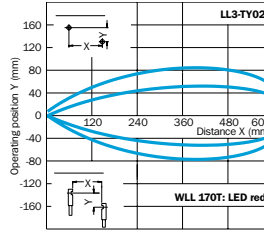
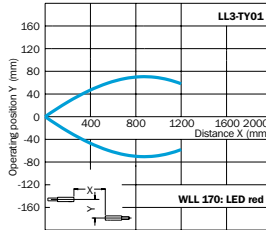
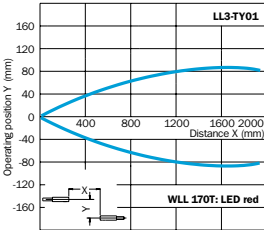
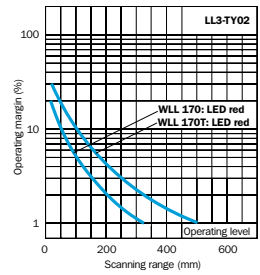


Order information

Type	Part no.
LL 3-TY02	5 308 067

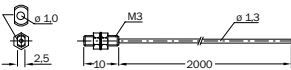


Material: Core: PMMA; Sheath: Teflon;
Sleeve: Teflon

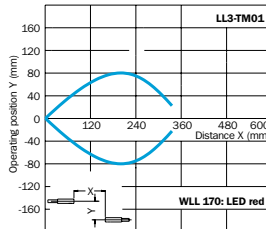
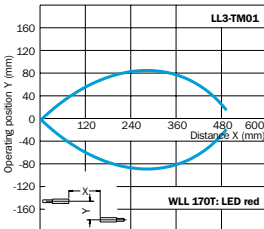
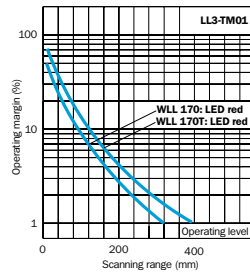


Order information

Type	Part no.
LL 3-TM01	5 308 068

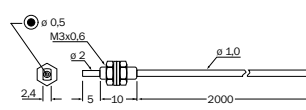


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids

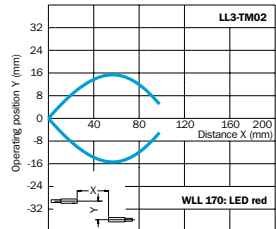
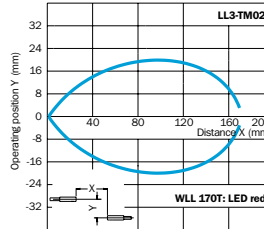
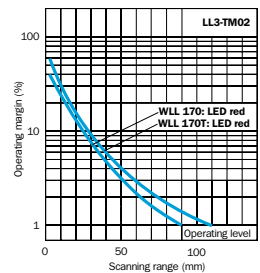


Order information

Type	Part no.
LL 3-TM02	5 308 069

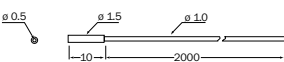


Material: Core: PMMA, Sheath: PE;
Sleeve: 1.4305 (German materials no.)
Stainless steel, resistant to rusting and acids



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

