



Fiber-optic photoelectric sensors

The solution for your automation tasks.

Fiber-optic photoelectric sensors – the solution for difficult application tasks where space is at a premium

Fiber-optic cables are the solution whenever there is little space around the objects to be detected. Extensive physical and chemical resistance properties offer further possibilities.

SMALL



Slimline end sleeves simplify access to objects.

- End sleeves from Ø 1.5 mm
- Integral 90° deflection
- Long, thin end sleeves



Uses:

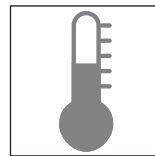
- Special purpose machinery
- Assembly and handling systems
- Semiconductor and electronic industries

TEMPERATURE



Without equal at higher ambient temperatures.

- Plastic fiber-optic cables up to +70 °C
- Plastic fiber-optic cables up to +180 °C (optional)
- Glass fiber-optic cables up to +250 °C



Uses:

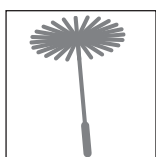
- Drying systems
- Heat treatment in finishing processes
- Furnaces

LIGHTWEIGHT



Plastic fibers offer a lightweight solution.

- Lightweight plastic fibers
- Can be cut to desired length
- Small end sleeves



Uses:

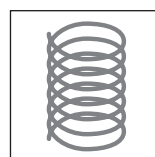
- Robotics
- Pick and place systems
- Assembly robots

VIBRATION



Vibration and shock proof.

- Vibration loading
- Shock loading
- Impact loading



Uses:

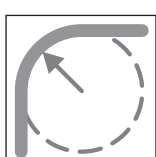
- Assembly and handling systems
- Conveying systems
- Material handling

FLEXIBLE



Seeing around corners.

- Bending radii from 2 mm
- Bending radii and ranges in optimized fiber combinations



Uses:

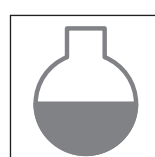
- Semiconductor and electronic industries
- Special purpose machines
- Packaging machinery

CHEMICALS



Resistant to chemical stresses.

- Plastic fiber-optic cables
- Glass fibers protected by a protective plastic/metal sheath



Uses:

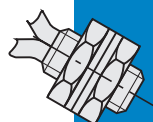
- Food processing
- Picking and handling of chemicals

We offer sensor solutions with special fiber-optic cables and fiber-optic sensors and combinations, on request.



Fiber-optic cables

LL3 from p. 6 onwards
LBS/LIS from p. 102 onwards
LM/LT from p. 108 onwards



Dimensional draw. Fiber-optic cables

LL3 from p. 116 onwards
LBS/LIS from p. 129 onwards
LM/LT from p. 131 onwards



Smart

WLL190T-2
from p. 136 onwards



High power

WLL180T
from p. 154 onwards



Versatile

WLL170(T)
from p. 162 onwards



Reliable

WLL260
from p. 178 onwards



Robust

WLL12 from p. 184 onwards

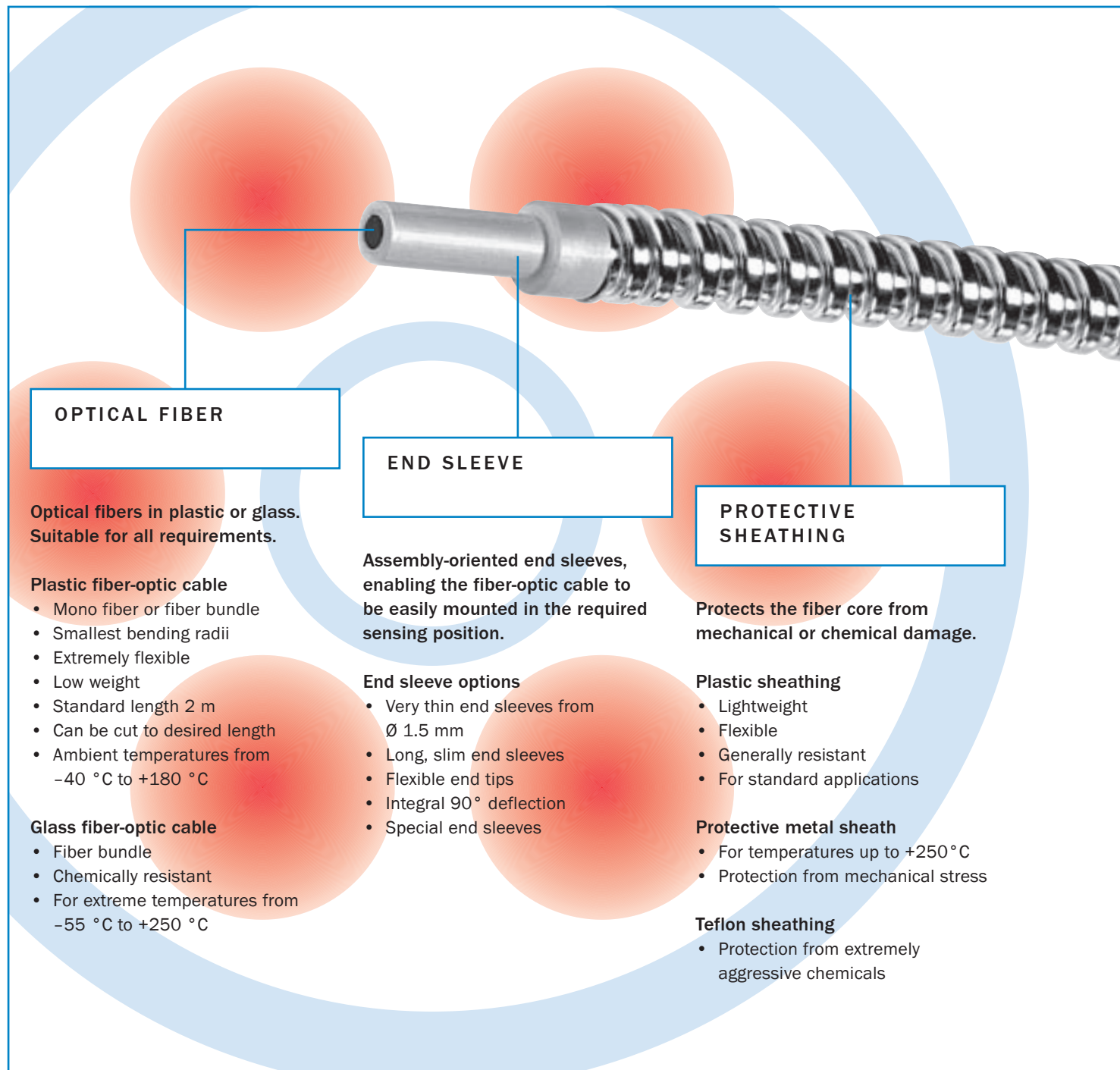


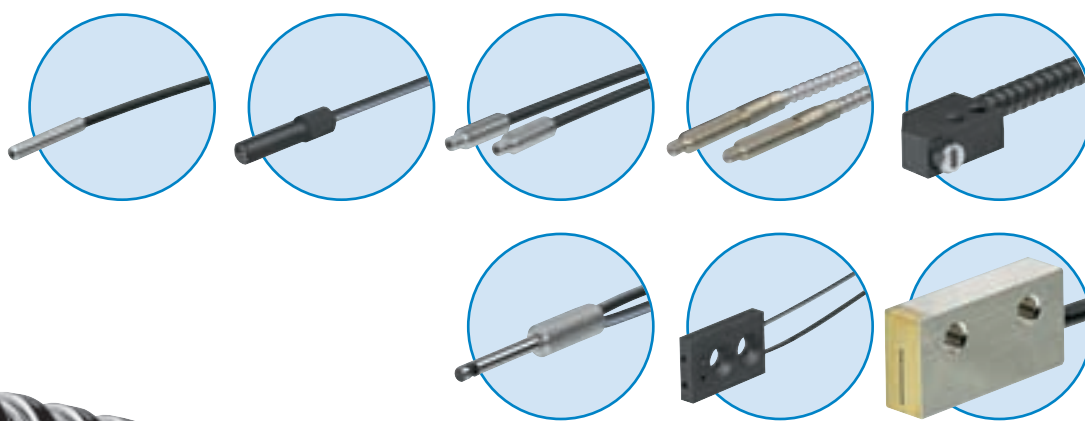
Accessories

from p. 188 onwards

Solving automation tasks, with fiber-optic cables.

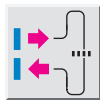
Fiber-optic cables provide “slimline” and flexible connection between the sensor and the sensing target. They are key to sensing solutions and often the only way to detect inaccessible objects, details, and printed marks.





OPERATING PRINCIPLES

Through-beam fiber-optic cable or proximity fiber-optic cable, both basic principles are available.



Through-beam principle

- Sender and receiver fiber are mounted separately
- Very long ranges
- For accurate positioning
- Detection of smallest objects
- Standard applications



Proximity principle

- Sender and receiver fibers are sheathed and mounted together
- Easy mounting
- Standard applications
- Ideal for color and printed marks

ANCILLARY LENS

Lenses extend the functionality. They bundle, focus and deflect.

Lenses for through-beam fiber-optic cables

- Light spot control
- Very long ranges
- 90° deflection, plus long ranges

Lenses for proximity fiber-optic cables

- Precise, focussed light spot
- Detection of very small parts
- Detection of color and printed marks
- Blanking of background interferences

LL3-DM01	LL3-DT03	LL3-DS06	LL3-DK06
Order no.: 5308071	Order no.: 5308072	Order no.: 5308073	Order no.: 5313019
Standard type	Standard type	Standard type	Standard type
Features:	Features:	Features:	Features:
Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m
Minimum bend radius: R25 mm	Minimum bend radius: R15 mm	Minimum bend radius: R15 mm	Minimum bend radius: R25 mm
Dimensioning mounting sleeve: M4	Dimensioning mounting sleeve: ø 2.5 mm	Dimensioning mounting sleeve: M3	Dimensioning mounting sleeve: M6

WLL190T-2 – Scanning distance [mm]



Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
130	35	35	130
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
280	90	90	280
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
450	130	130	450
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
40	6	6	40
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
80	15	15	80
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
160	30	30	160

WLL190T-2 – Scanning distance [mm]			
			
Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
130	130	70	130
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
280	280	150	280
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
450	480	280	480
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
40	30	20	25
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
80	70	50	60
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
160	100	80	100

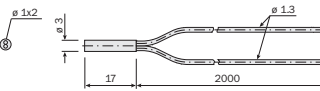
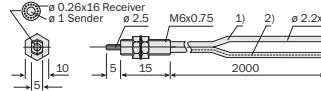
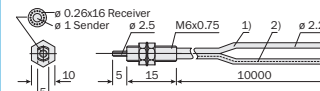
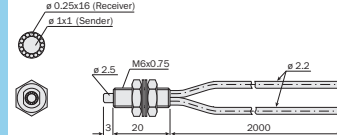
WLL180T – Scanning distance [mm]			
			
Red light, 16 µs	Red light, 16 µs	Red light, 16 µs	Red light, 16 µs
75	18	18	100
Red light, 70 µs	Red light, 70 µs	Red light, 70 µs	Red light, 70 µs
255	55	55	300
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
420	95	95	500
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
800	190	190	900
Red light, 8 ms	Red light, 8 ms	Red light, 8 ms	Red light, 8 ms
1300	360	360	1400



WLL170 – Scanning distance [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
160	45	45	160
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
45	5	5	45
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
60	15	15	60
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
160	45	45	160
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
35	5	5	35
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
60	15	15	60
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
30	11	11	30
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
45	15	15	45
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
170	60	60	170

WLL170 – Scanning distance [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
160	150	80	150
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
45	45	35	45
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
60	60	25	60
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
160	150	80	150
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
35	35	30	35
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
60	60	25	60
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
30	28	15	28
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
45	40	20	40
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
170	170	90	170

WLL12 – Scanning distance [mm]			
			
Red light	Red light	Red light	Red light
on request	on request	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	on request	on request

LL3-DK04	LL3-DB01	LL3-DB01-10	LL3-DB03
			
Order no.: 5313020	Order no.: 5308074	Order no.: 5308075	Order no.: 5313021
Standard type	Coaxial cable	Coaxial cable	Coaxial cable
Features:	Features:	Features:	Features:
Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 2 m	LL3 length: 2 m	LL3 length: 10 m	LL3 length: 2 m
Minimum bend radius: R25 mm	Minimum bend radius: R25 mm	Minimum bend radius: R25 mm	Minimum bend radius: R25 mm
Dimensioning mounting sleeve: ø 3 mm	Dimensioning mounting sleeve: M6	Dimensioning mounting sleeve: M6	Dimensioning mounting sleeve: M6

WLL12 – Scanning distance [mm]



Red light	Red light	Red light	Red light
on request	30	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	12	on request	on request

LL3-DT01	Lens LL3-DA01	Lens LL3-DA02	LL3-DM02
Order no.: 5308076	Order no.: 5308127	Order no.: 5308130	Order no.: 5308077
Coaxial cable	LL3 proximity	LL3 proximity	Coaxial cable
Features:	Features:	Features:	Features:
Minimum object size: ø 0.015 mm	Combined with LL3-DT01	Combined with LL3-DT01	Minimum object size: ø 0.015 mm
Standard object white 90 %	Focus 6 mm	Focus 12 mm	Standard object white 90 %
LL3 length: 2 m	Spot size ø 0.25 mm	Spot size ø 3 mm	LL3 length: 2 m
Minimum bend radius: R15 mm			Minimum bend radius: R15 mm
Dimensioning mounting sleeve: M3			Dimensioning mounting sleeve: M4

WLL190T-2 – Scanning distance [mm]



Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
60	6 ± 1	12 ± 3	60
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
140	6 ± 1	12 ± 3	140
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
280	6 ± 1	12 ± 3	280
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
6	6 ± 1	12 ± 3	6
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
20	6 ± 1	12 ± 3	20
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
40	6 ± 1	12 ± 3	40

WLL190T-2 – Scanning distance [mm]			
			
Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s
130	17	100	100
Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s
280	50	210	210
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
480	90	350	350
Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s
30	4	20	20
Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s
70	7	45	45
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
100	15	80	80

WLL180T – Scanning distance [mm]			
			
Red light, 16 µs	Red light, 16 µs	Red light, 16 µs	Red light, 16 µs
40	6 ± 1	12 ± 3	40
Red light, 70 µs	Red light, 70 µs	Red light, 70 µs	Red light, 70 µs
130	6 ± 1	12 ± 3	130
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
200	6 ± 1	12 ± 3	200
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
350	6 ± 1	12 ± 3	350
Red light, 8 ms	Red light, 8 ms	Red light, 8 ms	Red light, 8 ms
600	6 ± 1	12 ± 3	600

WLL180T – Scanning distance [mm]			
			
Red light, 16 µs	Red light, 16 µs	Red light, 16 µs	Red light, 16 µs
90	14	90	90
Red light, 70 µs	Red light, 70 µs	Red light, 70 µs	Red light, 70 µs
280	45	300	300
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
500	75	500	500
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
900	135	900	900
Red light, 8 ms	Red light, 8 ms	Red light, 8 ms	Red light, 8 ms
1350	200	1400	1400

WLL170 – Scanning distance [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
70	6 ± 1	12 ± 3	70
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
10	6 ± 1	12 ± 3	10
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
20	6 ± 1	12 ± 3	20
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
70	6 ± 1	12 ± 3	70
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
10	6 ± 1	12 ± 3	10
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
20	6 ± 1	12 ± 3	20
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
15	6 ± 1	12 ± 3	15
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
20	6 ± 1	12 ± 3	20
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
90	6 ± 1	12 ± 3	90

WLL170 – Scanning distance [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
150	20	110	110
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
45	4	25	25
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
65	5	45	45
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
140	15	110	110
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
25	3	25	25
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
30	5	35	45
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
28	not possible	25	25
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
40	not possible	35	35
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
170	not possible	140	140

WLL12 – Scanning distance [mm]			
			
Red light	Red light	Red light	Red light
on request	on request	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	on request	on request

LL3-DK23	LL3-DK21	LL3-DK66	LL3-DK67
Order no.: 5313022	Order no.: 5313023	Order no.: 5313024	Order no.: 5313025
Coaxial cable	Coaxial cable	Super flexible	Super flexible
Features:	Features:	Features:	Features:
Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 500 mm	LL3 length: 500 mm	LL3 length: 2 m	LL3 length: 2 m
Minimum bend radius: R25 mm	Minimum bend radius: R15 mm	Minimum bend radius: R2 mm	Minimum bend radius: R2 mm
Dimensioning mounting sleeve: ø 3 mm	Dimensioning mounting sleeve: M3	Dimensioning mounting sleeve: M4	Dimensioning mounting sleeve: M6

WLL12 – Scanning distance [mm]			
Red light	Red light	Red light	Red light
on request	on request	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	on request	on request

LL3-DK04Z	LL3-DK63Z	LL3-DR01	LL3-DR02
Order no.: 5313026	Order no.: 5313027	Order no.: 5308078	Order no.: 5308079
Super flexible	Super flexible	Flexible	Flexible
Features:	Features:	Features:	Features:
Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m	LL3 length: 1 m
Minimum bend radius: R2 mm	Minimum bend radius: R2 mm	Minimum bend radius: R4 mm	Minimum bend radius: R4 mm
Dimensioning mounting sleeve: ø 3 mm	Dimensioning mounting sleeve: M4	Dimensioning mounting sleeve: M6	Dimensioning mounting sleeve: M3

WLL190T-2 – Scanning distance [mm]



Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
100	100	100	20
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
210	210	230	40
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
350	350	380	90
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
20	20	30	3
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
45	45	50	7
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
80	80	100	15

WLL190T-2 – Scanning distance [mm]			
			
Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s
30	20	30	130
Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s
70	40	70	280
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
140	90	140	480
Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s
5	3	5	30
Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s
12	7	12	70
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
25	15	25	100

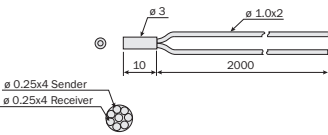
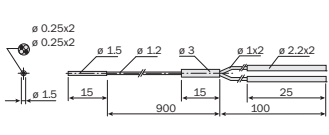
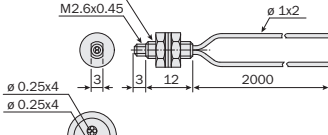
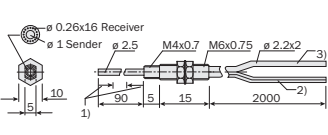
WLL180T – Scanning distance [mm]			
			
Red light, 16 µs	Red light, 16 µs	Red light, 16 µs	Red light, 16 µs
65	90	90	18
Red light, 70 µs	Red light, 70 µs	Red light, 70 µs	Red light, 70 µs
200	300	280	50
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
350	500	450	90
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
650	900	880	200
Red light, 8 ms	Red light, 8 ms	Red light, 8 ms	Red light, 8 ms
1000	1400	1350	370

WLL180T – Scanning distance [mm]			
			
Red light, 16 µs	Red light, 16 µs	Red light, 16 µs	Red light, 16 µs
30	20	18	100
Red light, 70 µs	Red light, 70 µs	Red light, 70 µs	Red light, 70 µs
85	70	60	350
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
140	110	100	580
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
300	220	220	850
Red light, 8 ms	Red light, 8 ms	Red light, 8 ms	Red light, 8 ms
600	360	360	1300

WLL170 – Scanning distance [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
110	110	130	20
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
25	25	15	2
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
45	45	45	8
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
110	110	130	20
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
25	25	25	2
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
45	45	45	8
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
25	25	25	not possible
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
35	35	35	not possible
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
140	140	140	not possible

WLL170 – Scanning distance [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
35	20	35	150
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
5	2	5	45
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
10	8	10	65
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
35	20	35	150
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
5	5	2	40
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
10	8	10	65
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
7	not possible	7	30
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
10	not possible	10	40
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
43	not possible	43	160

WLL12 – Scanning distance [mm]			
			
Red light	Red light	Red light	Red light
on request	on request	40	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	8	on request

LL3-DR03	LL3-DR04	LL3-DR06	LL3-DB02
			
Order no.: 5308080	Order no.: 5308081	Order no.: 5308082	Order no.: 5308083
Flexible	Flexible	Flexible	Long end tips
Features:	Features:	Features:	Features:
Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m
Minimum bend radius: R4 mm	Minimum bend radius: R4 mm	Minimum bend radius: R4 mm	Minimum bend radius: R25 mm
Dimensioning mounting sleeve: ø 3 mm	Dimensioning mounting sleeve: ø 1.5 mm	Dimensioning mounting sleeve: M4	Dimensioning mounting sleeve: M6

WLL12 – Scanning distance [mm]



Red light	Red light	Red light	Red light
on request	 4	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	on request	on request

LL3-DM03	LL3-DT02	LL3-DT04	LL3-DT05
Order no.: 5308084	Order no.: 5308085	Order no.: 5308086	Order no.: 5313028
Long end tips	Long end tips	Long end tips	Long end tips
Features:	Features:	Features:	Features:
Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 2 m	LL3 length: 2 m	LL3 length: 0.5 m	LL3 length: 2 m
Minimum bend radius: R15 mm	Minimum bend radius: R4 mm	Minimum bend radius: R4 mm	Minimum bend radius: R15 mm
Dimensioning mounting sleeve: M4	Dimensioning mounting sleeve: M3	Dimensioning mounting sleeve: M3	Dimensioning mounting sleeve: M4

WLL190T-2 – Scanning distance [mm]



Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
40	8	18	40
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
80	20	50	80
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
150	70	100	130
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
6	1,5	3	6
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
15	3	6	15
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
30	6	12	30

WLL190T-2 – Scanning distance [mm]			
			
Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s
8	60	15	60
Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s
20	140	80	150
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
70	280	130	250
Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s
1,5	6	6	15
Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s
6	20	15	35
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
6	40	30	80

WLL180T – Scanning distance [mm]			
			
Red light, 16 µs	Red light, 16 µs	Red light, 16 µs	Red light, 16 µs
10	10	13	10
Red light, 70 µs	Red light, 70 µs	Red light, 70 µs	Red light, 70 µs
25	30	45	28
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
45	60	80	45
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
90	140	140	95
Red light, 8 ms	Red light, 8 ms	Red light, 8 ms	Red light, 8 ms
170	225	280	170

WLL180T – Scanning distance [mm]			
			
Red light, 16 µs	Red light, 16 µs	Red light, 16 µs	Red light, 16 µs
10	40	10	40
Red light, 70 µs	Red light, 70 µs	Red light, 70 µs	Red light, 70 µs
30	135	28	135
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
60	200	45	180
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
140	400	93	270
Red light, 8 ms	Red light, 8 ms	Red light, 8 ms	Red light, 8 ms
225	620	170	330

WLL170 – Scanning distance [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
45	10	15	45
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
5	2	2	5
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
15	3	3	15
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
45	8	8	45
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
7	2	2	7
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
15	3	3	15
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
11	not possible	not possible	11
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
15	not possible	not possible	15
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
60	not possible	not possible	60

WLL170 – Scanning distance [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
10	70	45	90
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
2	10	5	25
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
3	20	15	40
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
10	70	45	90
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
2	10	7	20
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
3	20	15	40
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
not possible	15	7	17
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
not possible	20	10	24
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
not possible	90	43	170

WLL12 – Scanning distance [mm]			
			
Red light	Red light	Red light	Red light
on request	on request	6	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	on request	on request

LL3-DR05	LL3-DK22	LL3-DK43	LL3-DV01
Order no.: 5308087	Order no.: 5313029	Order no.: 5313030	Order no.: 5308088
Long end tips	Long end tips	Long end tips	Integrated 90° deflection
Features:	Features:	Features:	Features:
Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.025 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 0.5 m	LL3 length: 0.5 m	LL3 length: 2 m	LL3 length: 2 m
Minimum bend radius: R4 mm	Minimum bend radius: R15 mm	Minimum bend radius: R15 mm	Minimum bend radius: R25 mm
Dimensioning mounting sleeve: ø 3 mm	Dimensioning mounting sleeve: ø 2.5 mm	Dimensioning mounting sleeve: ø 4 mm	Dimensioning mounting sleeve: ø 5 mm

WLL12 – Scanning distance [mm]



Red light	Red light	Red light	Red light
4	on request	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	on request	on request

LL3-DV02	LL3-DV03	LL3-DV05	LL3-DV06
Order no.: 5308089	Order no.: 5308090	Order no.: 5322549	Order no.: 5322550
Integrated 90° deflection	Integrated 90° deflection	Integrated 90° deflection	Integrated 90° deflection
Features:	Features:	Features:	Features:
Minimum object size: ø 0.015 mm	Minimum object size: ø 0.025 mm	Minimum object size: ø 0.015 mm	Minimum object size: ø 0.015 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m
Minimum bend radius: R15 mm	Minimum bend radius: R25 mm	Minimum bend radius: R25 mm	Minimum bend radius: R25 mm
Dimensioning mounting sleeve: ø 3 mm	Dimensioning mounting sleeve: M6	Dimensioning mounting sleeve: 11.5 x 13 x 14.4 mm	Dimensioning mounting sleeve: 11.5 x 13 x 14.4 mm

WLL190T-2 – Scanning distance [mm]



Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
10	60	25	25
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
40	150	80	80
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
100	250	120	120
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
3	15	5	1
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
8	35	25	9
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
15	80	40	15

WLL190T-2 – Scanning distance [mm]			
			
Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s
10	60	-	-
Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s
45	150	-	-
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
65	250	-	-
Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s
1	15	-	-
Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s
10	35	-	-
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
18	80	-	-



WLL180T – Scanning distance [mm]			
			
Red light, 16 µs	Red light, 16 µs	Red light, 16 µs	Red light, 16 µs
20	35	-	-
Red light, 70 µs	Red light, 70 µs	Red light, 70 µs	Red light, 70 µs
110	135	-	-
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
180	170	-	-
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
400	290	-	-
Red light, 8 ms	Red light, 8 ms	Red light, 8 ms	Red light, 8 ms
650	320	-	-

WLL170 – Scanning distance [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
15	90	45	45
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
3	25	15	10
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
5	40	15	10
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
15	90	45	45
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
3	20	15	10
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
3	40	15	10
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
not possible	17	8	8
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
not possible	24	12	12
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
not possible	170	80	80

WLL170 – Scanning distance [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
15	90	–	–
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
10	25	not possible	not possible
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
10	40	–	–
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
15	90	–	–
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
10	20	not possible	not possible
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
10	40	–	–
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
2	17	not possible	not possible
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
4	24	not possible	not possible
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
25	170	not possible	not possible

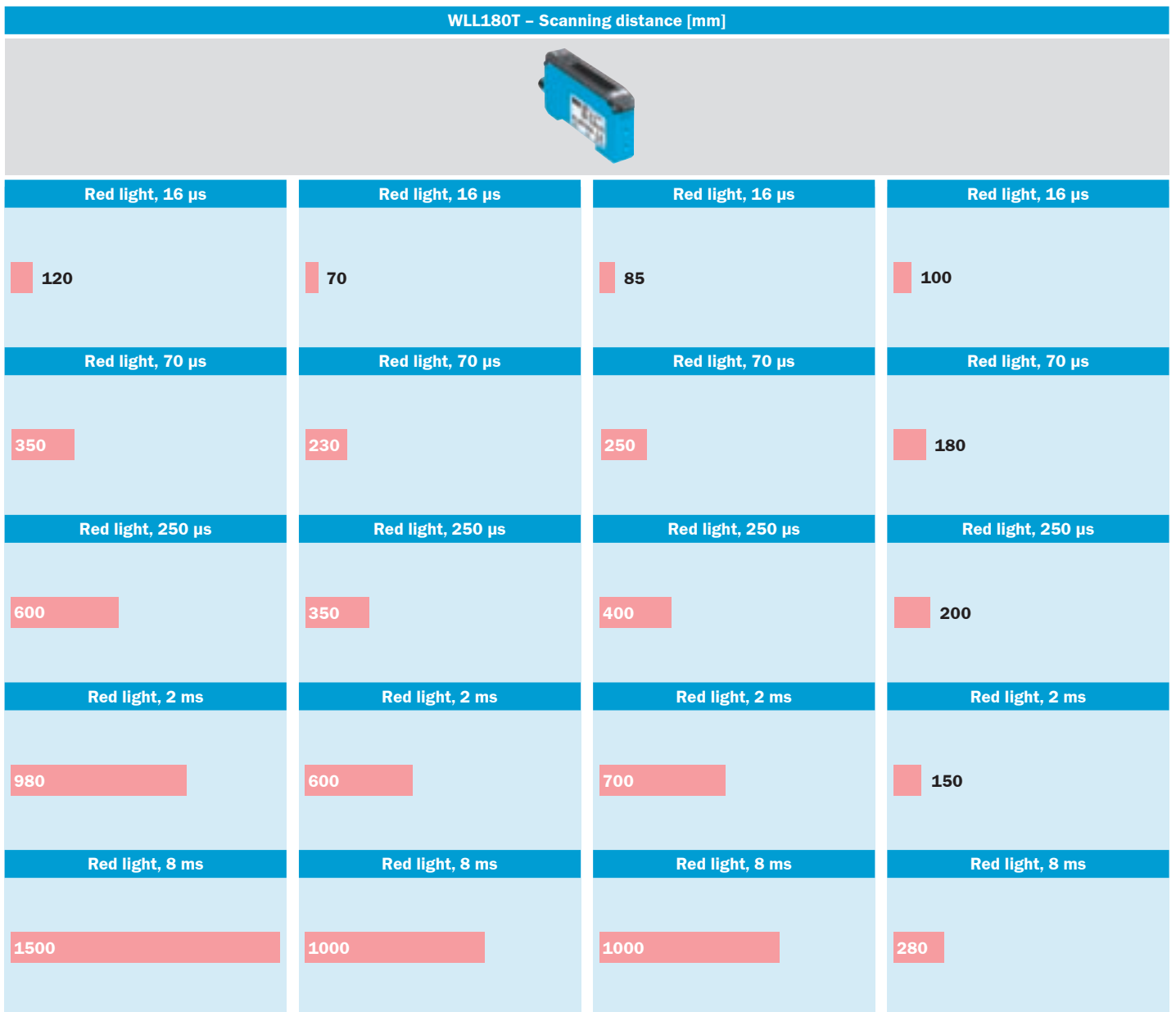
WLL12 – Scanning distance [mm]			
			
Red light	Red light	Red light	Red light
on request	20	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	on request	on request

WLL12 – Scanning distance [mm]			
			
Red light	Red light	Red light	Red light
on request	on request	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	on request	on request

WLL190T-2 – Scanning distance [mm]	
	

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WLL190T-2 – Scanning distance [mm]	
	
Red light, 60 µs	Red light, 60 µs
3	6
Red light, 250 µs	Red light, 250 µs
3	6
Red light, 2 ms	Red light, 2 ms
3	6
Green light, 60 µs	Green light, 60 µs
3	6
Green light, 250 µs	Green light, 250 µs
3	6
Green light, 2 ms	Green light, 2 ms
3	6

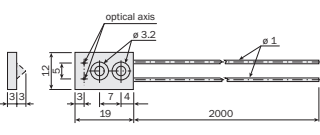
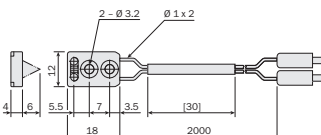


WLL180T – Scanning distance [mm]	
	
Red light, 16 µs	Red light, 16 µs
3	6
Red light, 70 µs	Red light, 70 µs
3	6
Red light, 250 µs	Red light, 250 µs
3	6
Red light, 2 ms	Red light, 2 ms
3	6
Red light, 8 ms	Red light, 8 ms
3	6

WLL170 – Scanning distance [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
210	110	140	45
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
40	7	25	10
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
90	40	55	5
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
210	110	140	45
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
40	7	25	10
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
90	40	55	25
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
45	22	40	not possible
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
65	30	60	not possible
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
200	125	180	not possible

WLL170 – Scanning distance [mm]	
	
WLL170-2, Red light	WLL170-2, Red light
3	6
WLL170-2, Green light	WLL170-2, Green light
1,5	6
WLL170-2 High-Speed	WLL170-2 High-Speed
3	6
WLL170T-2, Red light	WLL170T-2, Red light
3	6
WLL170T-2, Green light	WLL170T-2, Green light
2	6
WLL170T-2 High-Speed	WLL170T-2 High-Speed
2	6
WLL170A (5 V)	WLL170A (5 V)
3	6
WLL170A (3 V)	WLL170A (3 V)
3	6
WLL170A (1 V)	WLL170A (1 V)
4	6

WLL12 – Scanning distance [mm]			
			
Red light	Red light	Red light	Red light
50	on request	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
15	on request	on request	on request

LL3-DC01	LL3-DC38
	
Order no.: 5313033	Order no.: 5322472
Fix focus	Fix focus
Features:	Features:
Minimum object size: ø 0.02 mm	Minimum object size: ø 0.02 mm
Standard object white 90 %	Standard object white 90 %
LL3 length: 2 m	LL3 length: 2 m
Minimum bend radius: R15 mm	Minimum bend radius: R25 mm
Dimensioning mounting sleeve: 19 x 12 x 3 mm	Dimensioning mounting sleeve: 18 x 12 x 4 mm

WLL12 – Scanning distance [mm]	
	
Red light	Red light
on request	on request
Infrared light	Infrared light
on request	on request

Operating range – fiber-optic cables, through-beam systems

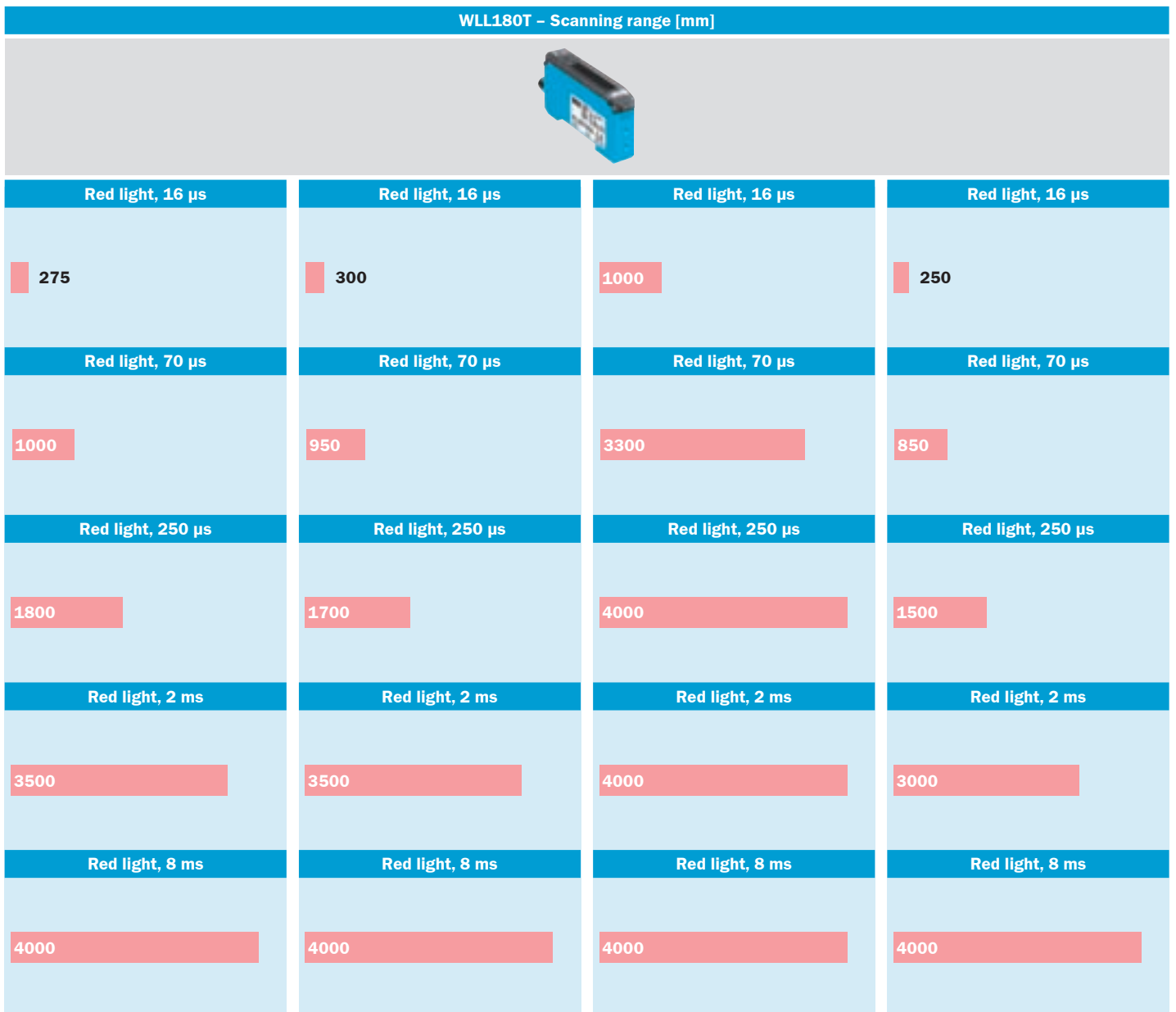
LL3-TS07	LL3-TB01	Lens LL3-TA01	Lens LL3-TA02
Order no.: 5308049	Order no.: 5308050	Order no.: 5308128	Order no.: 5308129
Standard type	Standard type	LL3 through-beam	LL3 through-beam
Features:	Features:	Features:	Features:
Minimum object size: Ø 0.5 mm	Minimum object size: Ø 0.5 mm	Combined with LL3-TB01	Combined with LL3-TB01
Standard object white 90 %	Standard object white 90 %	Axial optic	Integrated 90° deflection
LL3 length: 2 m	LL3 length: 2 m	Largest scanning ranges	Large scanning ranges
Minimum bend radius: R30 mm	Minimum bend radius: R30 mm		
Dimensioning mounting sleeve: Ø 3 mm	Dimensioning mounting sleeve: M4		

WLL190T-2 – Scanning range [mm]



Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
550	550	2000	500
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
1000	1000	4000	1000
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
2000	2000	4000	1700
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
200	200	800	200
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
400	400	1800	500
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
300	300	3000	900

WLL190T-2 – Scanning range [mm]			
			
Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s
350	1300	350	300
Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s
600	3000	700	600
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
1200	4000	1300	1100
Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s
150	600	150	100
Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s
300	1500	350	250
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
600	3000	600	450



WLL180T – Scanning range [mm]			
			
Red light, 16 µs	Red light, 16 µs	Red light, 16 µs	Red light, 16 µs
230	1000	250	225
Red light, 70 µs	Red light, 70 µs	Red light, 70 µs	Red light, 70 µs
650	3300	850	650
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
1200	4000	1500	1200
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
2450	4000	3000	2500
Red light, 8 ms	Red light, 8 ms	Red light, 8 ms	Red light, 8 ms
4000	4000	4000	4000

WLL170 – Scanning range [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
700	700	3000	600
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
350	350	1200	200
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
350	350	1200	200
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
700	700	2800	600
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
270	270	1200	200
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
300	300	1100	170
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
160	160	650	180
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
230	230	950	260
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
1000	1000	4000	1100

WLL170 – Scanning range [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
400	1900	450	450
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
260	1100	250	130
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
160	800	180	160
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
400	1600	400	450
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
220	1100	230	130
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
160	750	150	160
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
80	350	80	95
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
110	480	110	135
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
500	2200	500	590

WLL12 – Scanning range [mm]			
			
Red light	Red light	Red light	Red light
180	180	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
45	45	on request	on request

LL3-TB01-10	Lens LL3-TA01	Lens LL3-TA02	LL3-TB02
Order no.: 5308051	Order no.: 5308128	Order no.: 5308129	Order no.: 5308048
Standard type	LL3 through-beam	LL3 through-beam	Standard type
Features:	Features:	Features:	Features:
Minimum object size: Ø 0.5 mm	Combined with LL3-TB01	Combined with LL3-TB01	Minimum object size: Ø 0.5 mm
Standard object white 90 %	Axial optic	Integrated 90° deflection	Standard object white 90 %
LL3 length: 10 m	Largest scanning ranges	Large scanning ranges	LL3 length: 2 m
Minimum bend radius: R30 mm			Minimum bend radius: R25 mm
Dimensioning mounting sleeve: M4			Dimensioning mounting sleeve: M4

WLL12 – Scanning range [mm]			
Red light	Red light	Red light	Red light
70	on request	on request	120
Infrared light	Infrared light	Infrared light	Infrared light
25	on request	on request	25

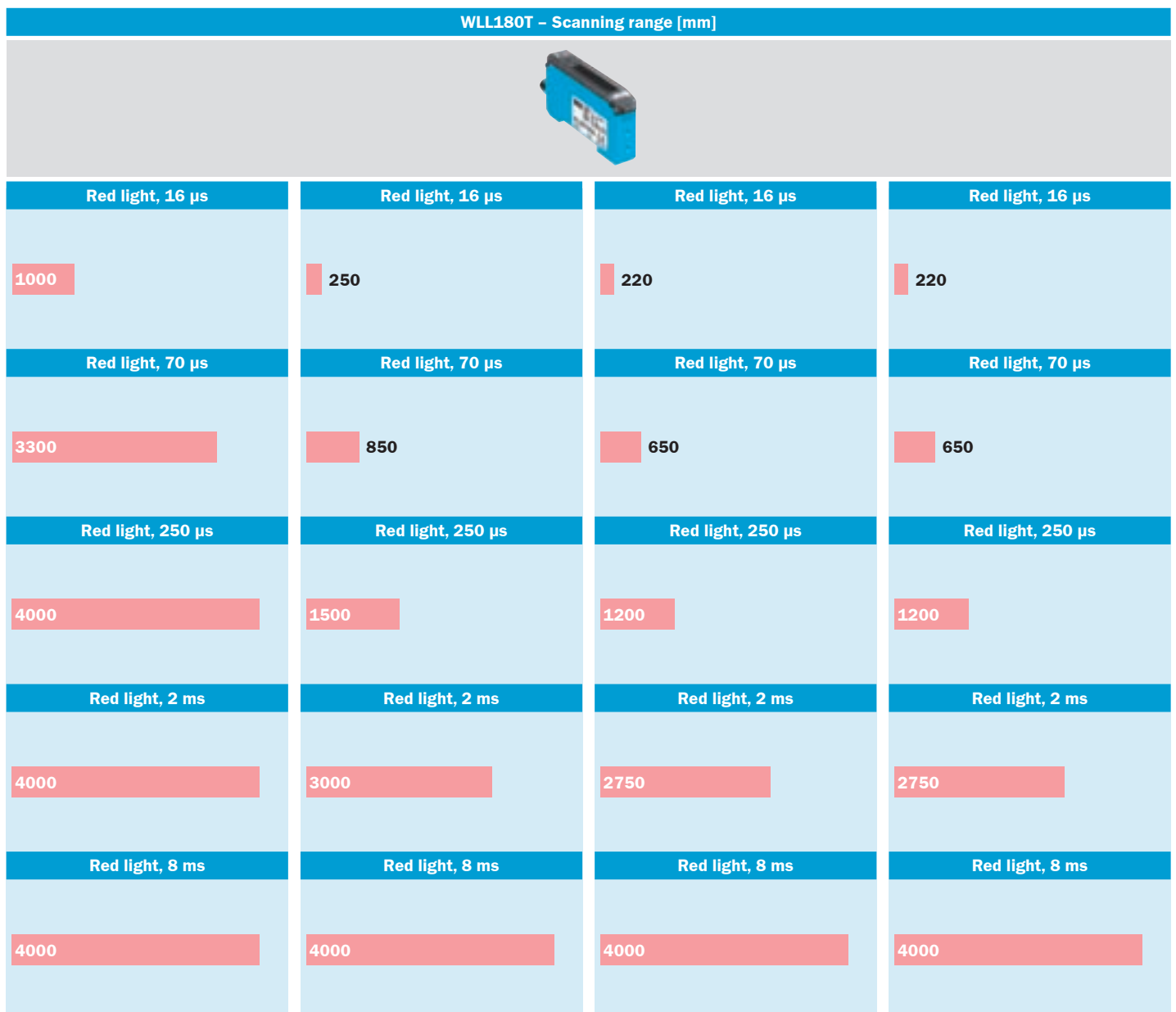
Lens LL3-TA01	Lens LL3-TA02	LL3-TK05	LL3-TK77
Order no.: 5308128	Order no.: 5308129	Order no.: 5313034	Order no.: 5313035
LL3 through-beam	LL3 through-beam	Super flexible	Super flexible
Features:	Features:	Features:	Features:
Combined with LL3-TB01	Combined with LL3-TB01	Minimum object size: Ø 0.2 mm	Minimum object size: Ø 0.2 mm
Axial optic	Integrated 90° deflection	Standard object white 90 %	Standard object white 90 %
Largest scanning ranges	Large scanning ranges	LL3 length: 2 m	LL3 length: 2 m
		Minimum bend radius: R2 mm	Minimum bend radius: R2 mm
		Dimensioning mounting sleeve: Ø 3 mm	Dimensioning mounting sleeve: M6

WLL190T-2 – Scanning range [mm]



Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
3500	500	250	250
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
4000	1200	500	500
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
4000	1700	900	900
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
1500	250	90	90
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
3000	600	200	200
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
4000	1000	350	350

WLL190T-2 – Scanning range [mm]			
			
Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
3500	500	300	3500
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
4000	1000	500	4000
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
4000	1800	1000	4000
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
3000	350	120	1500
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
4000	500	250	3000
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
4000	9000	500	4000



WLL180T – Scanning range [mm]			
			
Red light, 16 µs	Red light, 16 µs	Red light, 16 µs	Red light, 16 µs
2500	400	200	2200
Red light, 70 µs	Red light, 70 µs	Red light, 70 µs	Red light, 70 µs
4000	1000	600	4000
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
4000	2000	1000	4000
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
4000	4000	2400	4000
Red light, 8 ms	Red light, 8 ms	Red light, 8 ms	Red light, 8 ms
4000	4000	4000	4000

WLL170 – Scanning range [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
4000	600	360	360
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
1700	250	110	110
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
1600	200	120	120
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
3500	550	360	360
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
1600	230	110	110
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
1500	240	120	120
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
900	170	95	95
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
1300	250	135	135
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
5500	1100	590	590

WLL170 – Scanning range [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
4000	600	330	3000
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
1500	250	120	1100
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
1400	200	120	1500
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
4000	550	270	2700
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
1450	200	60	1000
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
1200	170	120	1400
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
900	170	80	640
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
1300	250	110	880
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
5500	1100	500	4000

WLL12 – Scanning range [mm]			
			
Red light	Red light	Red light	Red light
on request	on request	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	on request	on request

Lens LL3-TA01	Lens LL3-TA02	LL3-TR01	Lens LL3-TA01
Order no.: 5308128	Order no.: 5308129	Order no.: 5308052	Order no.: 5308128
LL3 through-beam	LL3 through-beam	Flexible	LL3 through-beam
Features:	Features:	Features:	Features:
Combined with LL3-TK77	Combined with LL3-TK77	Minimum object size: ø 0.3 mm	Combined with LL3-TR01
Axial optic	Integrated 90° deflection	Standard object white 90 %	Axial optic
Largest scanning ranges	Large scanning ranges	LL3 length: 2 m	Largest scanning ranges
		Minimum bend radius: R4 mm	
		Dimensioning mounting sleeve: M4	

WLL12 – Scanning range [mm]			
Red light	Red light	Red light	Red light
on request	on request	110	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	25	on request

Operating range – fiber-optic cables, through-beam systems

Lens LL3-TA02	LL3-TR02	LL3-TR03	LL3-TR03-02
Order no.: 5308129	Order no.: 5308053	Order no.: 5308054	Order no.: 5308055
LL3 through-beam	Flexible	Flexible	Flexible
Features:	Features:	Features:	Features:
Combined with LL3-TR01	Minimum object size: ø 0.1 mm	Minimum object size: ø 0.1 mm	Minimum object size: ø 0.1 mm
Integrated 90° deflection	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
Large scanning ranges	LL3 length: 2 m	LL3 length: 1 m	LL3 length: 2 m
	Minimum bend radius: R4 mm	Minimum bend radius: R4 mm	Minimum bend radius: R4 mm
	Dimensioning mounting sleeve: M3	Dimensioning mounting sleeve: ø 1.5 mm	Dimensioning mounting sleeve: ø 1.5 mm

WLL190T-2 – Scanning range [mm]



Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
500	110	110	110
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
900	220	220	220
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
1200	400	400	400
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
250	20	20	20
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
400	40	40	40
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
600	70	70	70

WLL190T-2 – Scanning range [mm]			
			
Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s
300	25	100	250
Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s
700	50	200	500
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
1200	100	350	900
Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s
120	5	30	80
Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s
250	10	55	150
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
500	25	100	300



WLL180T – Scanning range [mm]			
			
Red light, 16 µs	Red light, 16 µs	Red light, 16 µs	Red light, 16 µs
240	10	72	120
Red light, 70 µs	Red light, 70 µs	Red light, 70 µs	Red light, 70 µs
700	30	175	400
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
1400	60	330	800
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
2500	140	750	1800
Red light, 8 ms	Red light, 8 ms	Red light, 8 ms	Red light, 8 ms
2900	200	1100	2750

WLL170 – Scanning range [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
500	110	110	110
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
150	20	20	20
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
200	35	35	35
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
450	110	110	110
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
140	20	20	20
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
170	35	35	35
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
110	25	25	25
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
150	35	35	35
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
690	150	150	150

WLL170 – Scanning range [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
450	30	120	320
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
130	4	25	85
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
160	12	40	110
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
450	30	110	320
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
130	4	25	85
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
160	12	40	110
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
90	6	27	80
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
125	8	38	110
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
540	35	160	450

WLL12 – Scanning range [mm]			
			
Red light	Red light	Red light	Red light
on request	25	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	4	on request	on request

LL3-TB03	LL3-TT01	LL3-TK75	LL3-TV01
Order no.: 5308056	Order no.: 5308057	Order no.: 5313036	Order no.: 5308058
Long end tip	Long end tip	Long end tip	Integrated 90° deflection
Features:	Features:	Features:	Features:
Minimum object size: Ø 0.2 mm	Minimum object size: Ø 0.1 mm	Minimum object size: Ø 0.1 mm	Minimum object size: Ø 0.2 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m
Minimum bend radius: R25 mm	Minimum bend radius: R15 mm	Minimum bend radius: R15 mm	Minimum bend radius: R25 mm
Dimensioning mounting sleeve: M4	Dimensioning mounting sleeve: Ø 3 mm	Dimensioning mounting sleeve: M3	Dimensioning mounting sleeve: Ø 3 mm

WLL12 – Scanning range [mm]			
Red light	Red light	Red light	Red light
on request	on request	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	on request	on request

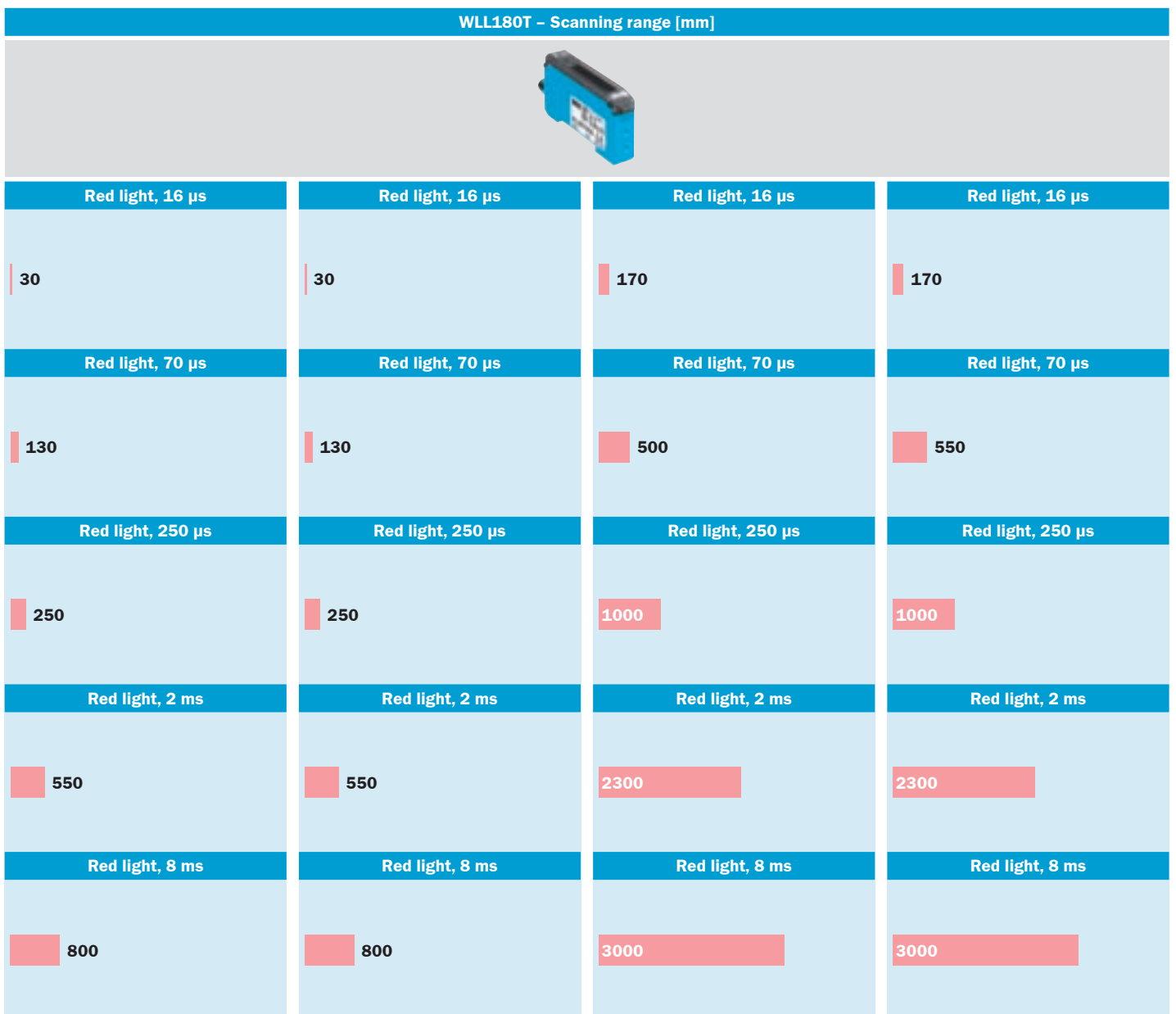
LL3-TV02	LL3-TV04	LL3-TS08	LL3-TS12
Order no.: 5308059	Order no.: 5308060	Order no.: 5308061	Order no.: 5308062
Integrated 90° deflection	Integrated 90° deflection	Integrated 90° deflection	Integrated 90° deflection
Features:	Features:	Features:	Features:
Minimum object size: ø 0.1 mm	Minimum object size: ø 0.1 mm	Minimum object size: ø 0.2 mm	Minimum object size: ø 0.5 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m
Minimum bend radius: R15 mm	Minimum bend radius: R15 mm	Minimum bend radius: R25 mm	Minimum bend radius: R25 mm
Dimensioning mounting sleeve: ø 2.5 mm	Dimensioning mounting sleeve: M3	Dimensioning mounting sleeve: ø 3 mm	Dimensioning mounting sleeve: ø 4 mm

WLL190T-2 – Scanning range [mm]



Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
80	80	250	2500
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
180	180	500	3500
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
250	250	900	4000
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
15	15	80	400
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
45	45	150	900
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
80	80	300	1600

WLL190T-2 – Scanning range [mm]			
			
Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s
250	2500	200	150
Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s
500	3500	600	500
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
900	4000	800	750
Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s
70	450	100	40
Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s
150	1000	250	120
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
300	1800	400	150



WLL180T – Scanning range [mm]			
			
Red light, 16 µs	Red light, 16 µs	Red light, 16 µs	Red light, 16 µs
120	180	350	180
Red light, 70 µs	Red light, 70 µs	Red light, 70 µs	Red light, 70 µs
400	600	750	550
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
800	1100	1800	900
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
1800	2500	4000	2100
Red light, 8 ms	Red light, 8 ms	Red light, 8 ms	Red light, 8 ms
2750	3300	4000	3500

WLL170 – Scanning range [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
75	75	350	1700
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
15	15	110	750
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
25	25	120	830
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
75	75	350	1700
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
15	15	110	750
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
25	25	120	830
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
23	23	80	550
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
33	33	110	800
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
140	140	450	2500

WLL170 – Scanning range [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
320	2000	350	300
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
85	800	150	100
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
110	900	150	130
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
320	2000	350	300
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
80	800	150	100
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
110	900	150	130
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
80	600	90	80
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
110	900	140	130
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
450	3000	570	540

WLL12 – Scanning range [mm]			
			
Red light	Red light	Red light	Red light
on request	on request	60	400
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	10	on request

LL3-TK34	LL3-TK16	LL3-TV05	LL3-TV06
Order no.: 5313037	Order no.: 5313038	Order no.: 5322546	Order no.: 5322547
Integrated 90° deflection	Integrated 90° deflection	Integrated 90° deflection	Integrated 90° deflection
Features:	Features:	Features:	Features:
Minimum object size: ø 0.2 mm	Minimum object size: ø 0.2 mm	Minimum object size: ø 0.4 mm	Minimum object size: ø 0.4 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m
Minimum bend radius: R25 mm	Minimum bend radius: R25 mm	Minimum bend radius: R25 mm	Minimum bend radius: R25 mm
Dimensioning mounting sleeve: ø 3 mm	Dimensioning mounting sleeve: ø 4 mm	Dimensioning mounting sleeve: 8 x 10.5 x 14.4 mm	Heat resistant up to 105 °C
Dimensioning mounting sleeve: ø 3 mm	Dimensioning mounting sleeve: ø 4 mm	Dimensioning mounting sleeve: 8 x 10.5 x 14.4 mm	Dimensioning mounting sleeve: 8 x 10.5 x 14.4 mm
WLL12 – Scanning range [mm]			
Red light	Red light	Red light	Red light
on request	on request	on request	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	on request	on request

Operating range – fiber-optic cables, through-beam systems

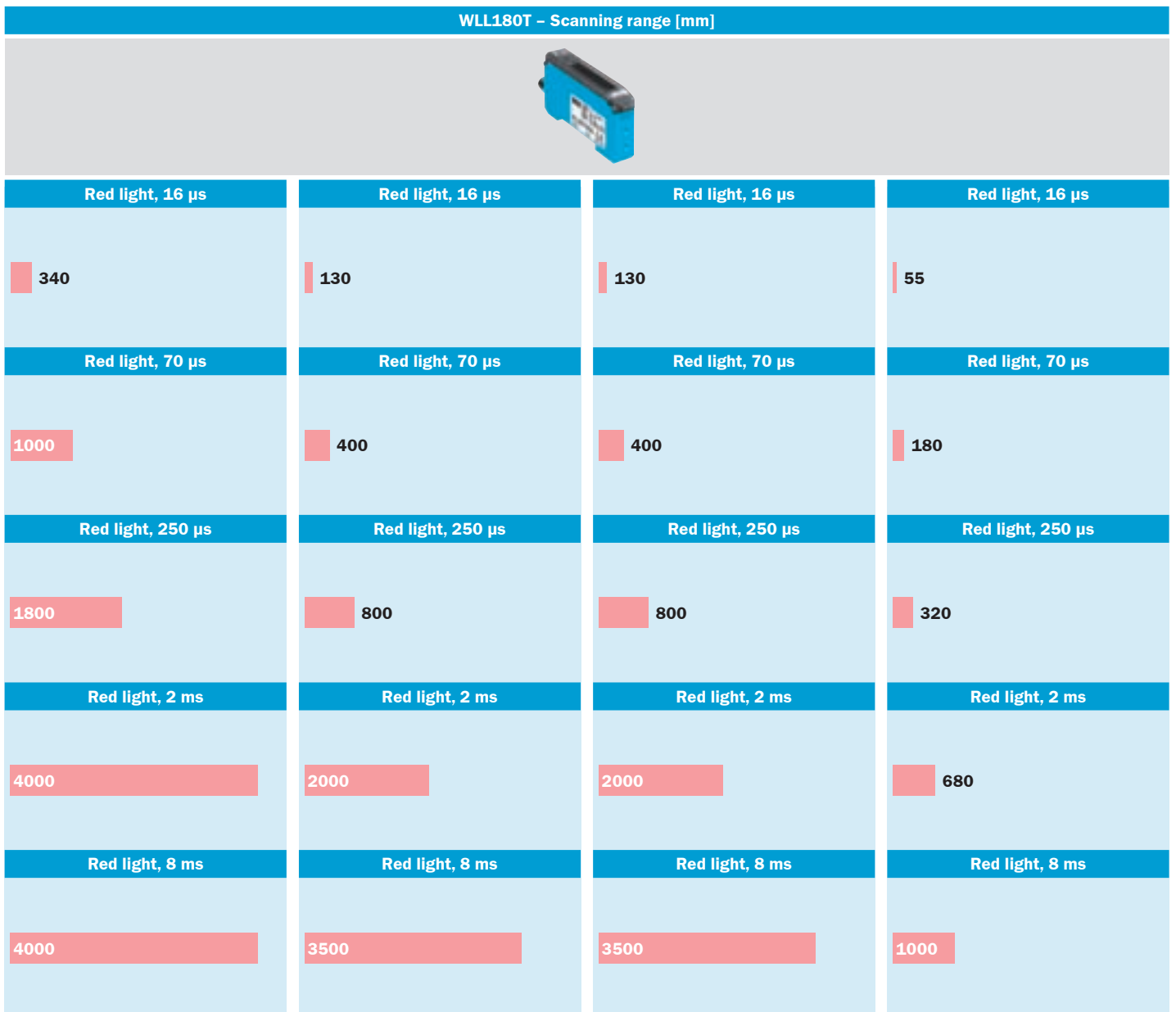
LL3-TV07	LL3-TS10	LL3-TS14	LL3-TH01
Order no.: 5322548	Order no.: 5308063	Order no.: 5313039	Order no.: 5308064
Integrated 90° deflection	Fiber-optic cable cell	Fiber-optic cable cell	Temperature-resistant
Features:	Features:	Features:	Features:
Minimum object size: ø 0.4 mm	Minimum object size: ø 1 mm	Minimum object size: ø 0.5 mm	Minimum object size: ø 0.2 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m
Minimum bend radius: R2 mm	Minimum bend radius: R25 mm	Minimum bend radius: R25 mm	Minimum bend radius: R25 mm
Dimensioning mounting sleeve: 8 x 10.5 x 14.4 mm	Dimensioning mounting sleeve: 10 x 20 x 5 mm	Dimensioning mounting sleeve: 19 x 25 x 5 mm	Dimensioning mounting sleeve: M4

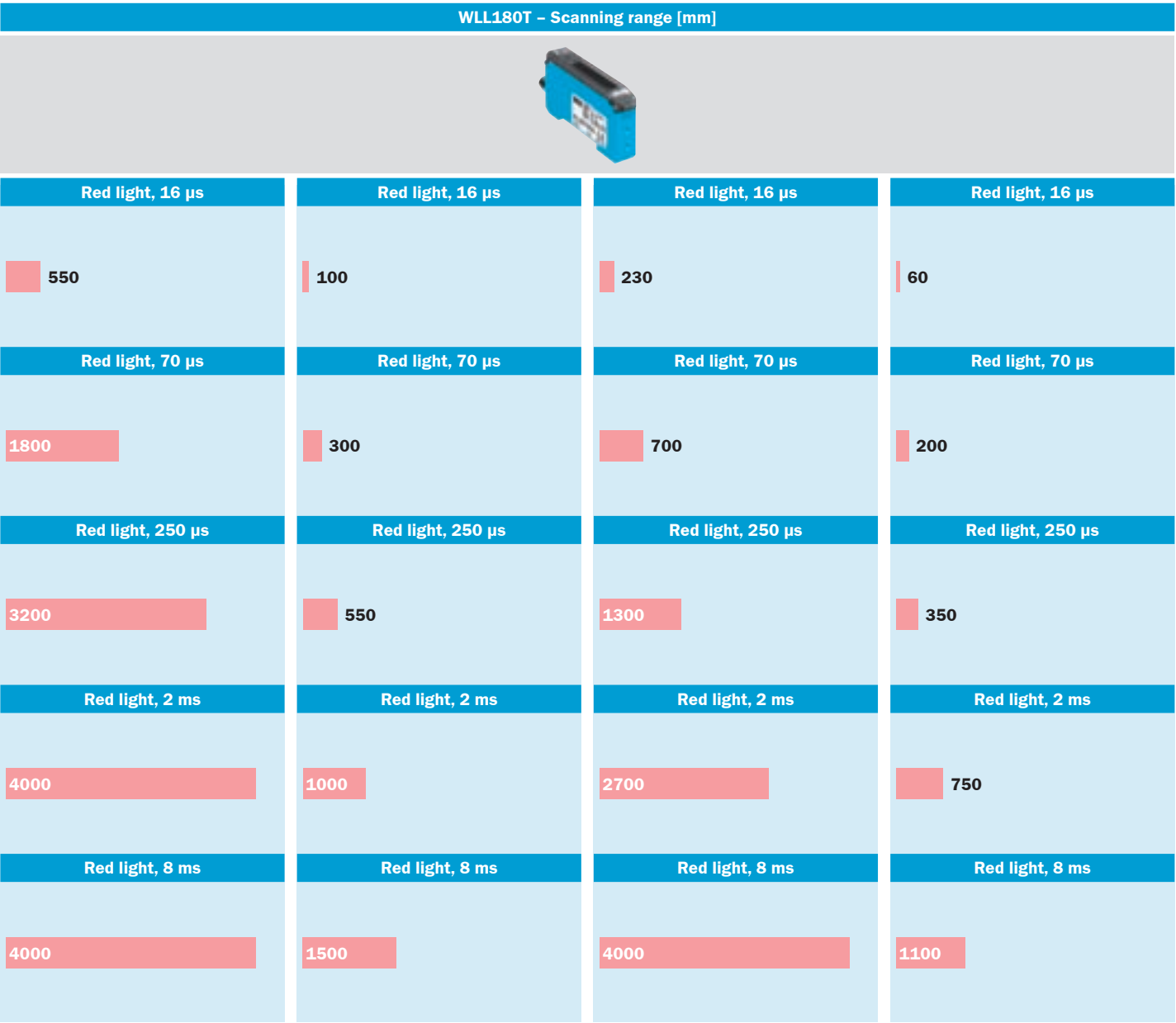
WLL190T-2 – Scanning range [mm]



Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
150	280	280	250
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
500	550	550	450
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
600	900	900	800
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
70	80	80	40
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
250	200	200	80
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
300	300	300	150

WLL190T-2 – Scanning range [mm]			
			
Red light, 60 µs	Red light, 60 µs	Red light, 60 µs	Red light, 60 µs
3000	500	400	250
Red light, 250 µs	Red light, 250 µs	Red light, 250 µs	Red light, 250 µs
4000	1000	750	450
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
4000	1200	1200	900
Green light, 60 µs	Green light, 60 µs	Green light, 60 µs	Green light, 60 µs
1000	350	80	80
Green light, 250 µs	Green light, 250 µs	Green light, 250 µs	Green light, 250 µs
2500	550	180	180
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
4000	800	350	350





WLL170 – Scanning range [mm]



WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
270	330	330	300
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
130	85	85	40
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
130	120	120	120
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
270	330	330	300
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
130	85	85	60
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
130	120	120	120
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
60	85	85	70
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
100	120	120	95
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
400	530	530	430

WLL170 – Scanning range [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
4000	500	600	350
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
800	90	120	130
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
1500	200	250	150
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
4000	450	600	350
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
750	80	120	130
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
1300	210	250	150
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
700	100	130	65
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
950	150	180	90
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
4300	670	770	380

WLL12 – Scanning range [mm]			
			
Red light	Red light	Red light	Red light
on request	75	on request	70
Infrared light	Infrared light	Infrared light	Infrared light
on request	20	on request	15

Lens LL3-TA01	Lens LL3-TA02	LL3-TH02	LL3-TH84
Order no.: 5308128	Order no.: 5308129	Order no.: 5308065	Order no.: 5313040
LL3 through-beam	LL3 through-beam	Temperature-resistant	Temperature-resistant
Features:	Features:	Features:	Features:
Combined with LL3-TH01	Combined with LL3-TH01	Minimum object size: Ø 0.5 mm	Minimum object size: Ø 0.2 mm
Axial optic	Integrated 90° deflection	Standard object white 90 %	Standard object white 90 %
Largest scanning ranges	Large scanning ranges	LL3 length: 2 m	LL3 length: 1 m
		Minimum bend radius: R35 mm	Minimum bend radius: R25 mm
		Heat resistant up to 180 °C	Heat resistant up to 300 °C
		Core: Si/Sheath: FEP	Core: Glass/Sheath: 1.4305
		Dimensioning mounting sleeve: M4	Dimensioning mounting sleeve: M4

WLL12 – Scanning range [mm]			
Red light	Red light	Red light	Red light
on request	on request	160	on request
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	30	on request

LL3-TY01	LL3-TY02	LL3-TM01	LL3-TM02
Order no.: 5308066	Order no.: 5308067	Order no.: 5308068	Order no.: 5308069
Teflon sheath	Teflon sheath	Smallest end sleeve	Smallest end sleeve
Features:	Features:	Features:	Features:
Minimum object size: $\varnothing$ 0.3 mm	Minimum object size: $\varnothing$ 0.3 mm	Minimum object size: $\varnothing$ 0.2 mm	Minimum object size: $\varnothing$ 0.1 mm
Standard object white 90 %	Standard object white 90 %	Standard object white 90 %	Standard object white 90 %
LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m	LL3 length: 2 m
Minimum bend radius: R60 mm	Minimum bend radius: R60 mm	Minimum bend radius: R25 mm	Minimum bend radius: R15 mm
Heat resistant up to 100 °C	Heat resistant up to 100 °C	Dimensioning mounting sleeve: M3	Dimensioning mounting sleeve: M3
Teflon sheath (PTFE)	Teflon sheath (PTFE)		
Dimensioning mounting sleeve: $\varnothing$ 6 mm	Dimensioning mounting sleeve: $\varnothing$ 6 mm		

WLL190T-2 – Scanning range [mm]



Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s	Red light, 60 μ s
1500	500	300	110
Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s	Red light, 250 μ s
2800	1000	700	220
Red light, 2 ms	Red light, 2 ms	Red light, 2 ms	Red light, 2 ms
4000	1700	1200	400
Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s	Green light, 60 μ s
300	130	120	30
Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s	Green light, 250 μ s
1000	300	250	60
Green light, 2 ms	Green light, 2 ms	Green light, 2 ms	Green light, 2 ms
1800	400	500	120

WLL190T-2 – Scanning range [mm]



Red light, 60 μ s

110

Red light, 250 μ s

220

Red light, 2 ms

400

Green light, 60 μ s

30

Green light, 250 μ s

60

Green light, 2 ms

120



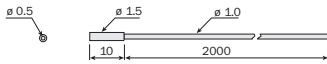


WLL170 – Scanning range [mm]			
			
WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light	WLL170-2, Red light
2000	550	450	120
WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light	WLL170-2, Green light
380	210	130	25
WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed	WLL170-2 High-Speed
400	220	160	40
WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light	WLL170T-2, Red light
2000	550	450	120
WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light	WLL170T-2, Green light
380	200	130	25
WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed	WLL170T-2 High-Speed
400	220	160	40
WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)	WLL170A (5 V)
not possible	not possible	95	27
WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)	WLL170A (3 V)
not possible	not possible	135	38
WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)	WLL170A (1 V)
not possible	not possible	590	160

WLL170 – Scanning range [mm]	
	
WLL170-2, Red light	
	120
WLL170-2, Green light	
	25
WLL170-2 High-Speed	
	40
WLL170T-2, Red light	
	120
WLL170T-2, Green light	
	25
WLL170T-2 High-Speed	
	40
WLL170A (5 V)	
	27
WLL170A (3 V)	
	38
WLL170A (1 V)	
	160

WLL12 – Scanning range [mm]			
			
Red light	Red light	Red light	Red light
on request	on request	on request	30
Infrared light	Infrared light	Infrared light	Infrared light
on request	on request	on request	4

LL3-TM03



Order no.: 5308070

Smallest end sleeve

Features:

Minimum object size:
ø 0.1 mm

Standard object
white 90 %

LL3 length:
2 m

Minimum bend radius:
R15 mm

Dimensioning mounting sleeve:
ø 1.5 mm

WLL12 – Scanning range [mm]

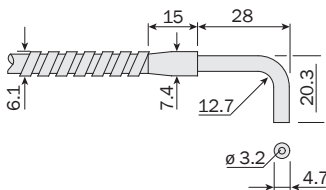
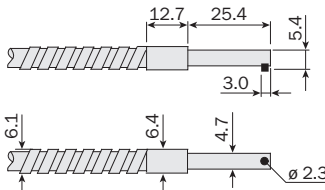
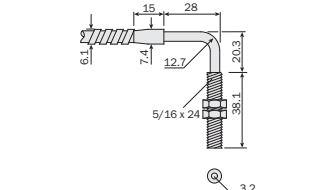
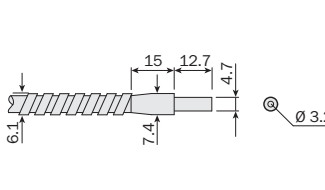


Red light

on request

Infrared light

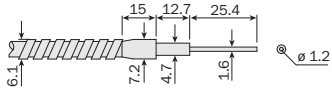
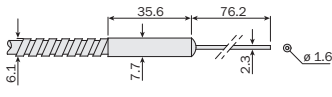
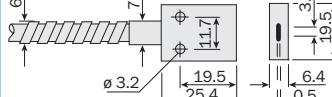
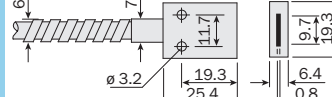
on request

LBSA32900	LBSAA23900	LBSAT32900	LBSF32900
			
Order no.: 7020040	Order no.: 7020103	Order no.: 7020036	Order no.: 7020038
Fiber-optic cables LBS	Fiber-optic cables LBS	Fiber-optic cables LBS	Fiber-optic cables LBS
Features:	Features:	Features:	Features:
End sleeve: ø 7.4 mm	End sleeve: ø 6.4 mm	Mounting: 5/16" x 24	End sleeve: ø 7.4 mm
LL: ø 3.2 mm	LL: ø 2.3 mm	LL: ø 3.2 mm	LL: ø 3.2 mm
LL Length: 900 mm	LL Length: 900 mm	LL Length: 900 mm	LL Length: 900 mm
Bend radius: R19 mm	Bend radius: R19 mm	Bend radius: R19 mm	Bend radius: R19 mm
Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath

WLL260 – Scanning distance [mm]



WLL260	WLL260	WLL260	WLL260
50	30	50	50

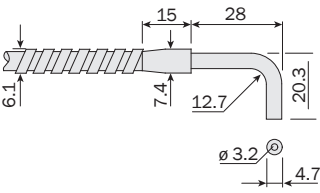
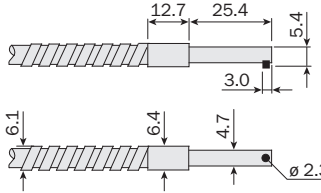
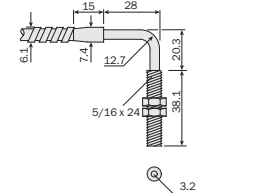
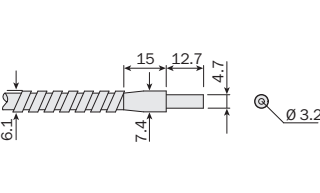
LBSM12900	LBSP16900	LBSR16900	LBSR32900
			
Order no.: 7020054	Order no.: 7020044	Order no.: 7020050	Order no.: 7020042
Fiber-optic cables LBS	Fiber-optic cables LBS	Fiber-optic cables LBS	Fiber-optic cables LBS
Features:	Features:	Features:	Features:
End sleeve: ø 8 mm	End sleeve: ø 7.9 mm	Fiber-optic cable cell: 0.5 mm x 3.8 mm	Fiber-optic cable cell: 0.8 mm x 9.7 mm
LL: ø 1.2 mm	LL: ø 1.6 mm		
LL Length: 900 mm	LL Length: 900 mm	LL Length: 900 mm	LL Length: 900 mm
Bend radius: R19 mm	Bend radius: R19 mm	Bend radius: R19 mm	Bend radius: R19 mm
Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath

WLL260 – Scanning distance [mm]			
			
WLL260	WLL260	WLL260	WLL260
6	6	15	50

LBSR40900	LBST32900	LBSTA32900
Order no.: 7020052	Order no.: 7020046	Order no.: 7020048
Fiber-optic cables LBS	Fiber-optic cables LBS	Fiber-optic cables LBS
Features:	Features:	Features:
Fiber-optic cable cell: 0.2 mm x 38.1 mm	Mounting: 5/16" x 24	Mounting: 5/16" x 24
	LL: ø 3.2 mm	LL: ø 3.2 mm
LL Length: 900 mm	LL Length: 900 mm	LL Length: 900 mm
Bend radius: R19 mm	Bend radius: R19 mm	Bend radius: R19 mm
Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath

WLL260 - Scanning distance [mm]		
WLL260	WLL260	WLL260
90	50	50

Fiber-optic cables LIS, through-beam systems

LISA32900	LISAA23900	LISAT32900	LISF32900
			
Order no.: 7020039	Order no.: 7020102	Order no.: 7020035	Order no.: 7020037
Fiber-optic cables LIS	Fiber-optic cables LIS	Fiber-optic cables LIS	Fiber-optic cables LIS
Features:	Features:	Features:	Features:
End sleeve: ø 7.4 mm	End sleeve: ø 6.4 mm	Mounting: 5/16" x 24	End sleeve: ø 7.4 mm
LL: ø 3.2 mm	LL: ø 2.3 mm	LL: ø 3.2 mm	LL: ø 3.2 mm
LL Length: 900 mm	LL Length: 900 mm	LL Length: 900 mm	LL Length: 900 mm
Bend radius: R19 mm	Bend radius: R19 mm	Bend radius: R19 mm	Bend radius: R19 mm
Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath

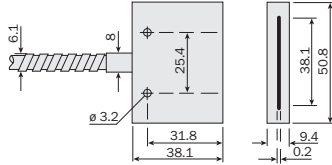
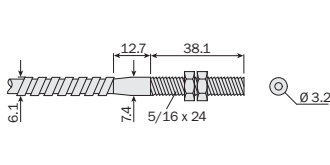
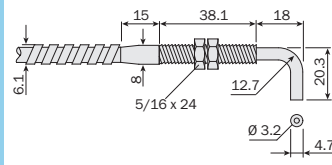
WLL260 – Scanning range [mm]			
			
WLL260	WLL260	WLL260	WLL260
700	240	700	700

LISM12900	LISP16900	LISR16900	LISR32900
Order no.: 7020053	Order no.: 7020043	Order no.: 7020049	Order no.: 7020041
Fiber-optic cables LIS	Fiber-optic cables LIS	Fiber-optic cables LIS	Fiber-optic cables LIS
Features:	Features:	Features:	Features:
End sleeve: ø 8 mm	End sleeve: ø 7.9 mm	Fiber-optic cable cell: 0.5 mm x 3.8 mm	Fiber-optic cable cell: 0.8 mm x 9.7 mm
LL: ø 1.2 mm	LL: ø 1.6 mm		
LL Length: 900 mm	LL Length: 900 mm	LL Length: 900 mm	LL Length: 900 mm
Bend radius: R19 mm	Bend radius: R19 mm	Bend radius: R19 mm	Bend radius: R19 mm
Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath

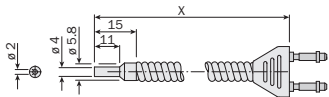
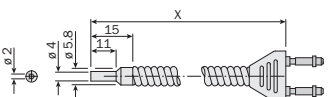
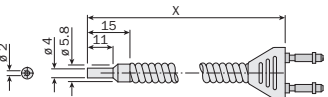
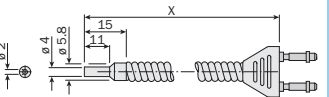
WLL260 – Scanning range [mm]



WLL260	WLL260	WLL260	WLL260
90	100	220	700

LISR40900	LIST32900	LISTA32900
		
Order no.: 7020051	Order no.: 7020045	Order no.: 7020047
Fiber-optic cables LIS	Fiber-optic cables LIS	Fiber-optic cables LIS
Features:	Features:	Features:
Fiber-optic cable cell: 0.2 mm x 38.1 mm	Mounting: 5/16" x 24	Mounting: 5/16" x 24
	LL: ø 3.2 mm	LL: ø 3.2 mm
LL Length: 900 mm	LL Length: 900 mm	LL Length: 900 mm
Bend radius: R19 mm	Bend radius: R19 mm	Bend radius: R19 mm
Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath	Glass fiber-optic cable with stainless steel sheath

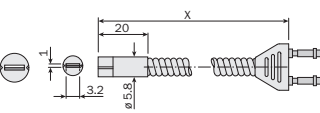
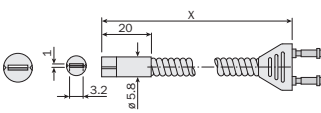
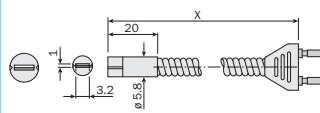
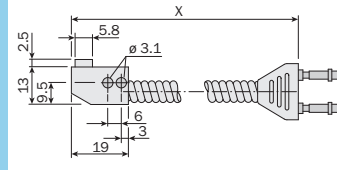
WLL260 – Scanning range [mm]		
		
WLL260	WLL260	WLL260
600	700	700

LM31-150	LM31-450	LM31-750	LM31-1500
			
Order no.: 2015225	Order no.: 2015223	Order no.: 2015224	Order no.: 2017381
Fiber-optic cables LM	Fiber-optic cables LM	Fiber-optic cables LM	Fiber-optic cables LM
Features:	Features:	Features:	Features:
150 mm	450 mm	750 mm	1500 mm
Minimum bend radius: 20 mm	Minimum bend radius: 20 mm	Minimum bend radius: 20 mm	Minimum bend radius: 20 mm
Glass fiber-optic cable within a helical metal spring	Glass fiber-optic cable within a helical metal spring	Glass fiber-optic cable within a helical metal spring	Glass fiber-optic cable within a helical metal spring

WLL12 – Scanning distance [mm]



WLL12-B5181, Red light	WLL12-B5181, Red light	WLL12-B5181, Red light	WLL12-B5181, Red light
50	50	50	50
WLL12-B5281, Infrared light	WLL12-B5281, Infrared light	WLL12-B5281, Infrared light	WLL12-B5281, Infrared light
60	60	60	60
WLL12-B5381, Green light	WLL12-B5381, Green light	WLL12-B5381, Green light	WLL12-B5381, Green light
5	5	5	5

LM35-150	LM35-450	LM35-750	LM36-150
			
Order no.: 2015226	Order no.: 2015230	Order no.: 2015231	Order no.: 2015232
Fiber-optic cables LM	Fiber-optic cables LM	Fiber-optic cables LM	Fiber-optic cables LM
Features:	Features:	Features:	Features:
150 mm, with rectangular light outlet	450 mm, with rectangular light outlet	750 mm, with rectangular light outlet	150 mm, with 90° offset head and rectangular light outlet
Minimum bend radius: 20 mm	Minimum bend radius: 20 mm	Minimum bend radius: 20 mm	Minimum bend radius: 20 mm
Glass fiber-optic cable within a helical metal spring	Glass fiber-optic cable within a helical metal spring	Glass fiber-optic cable within a helical metal spring	Glass fiber-optic cable within a helical metal spring

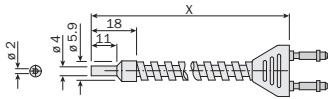
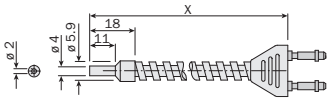
WLL12 – Scanning distance [mm]			
			

WLL12-B5181, Red light	WLL12-B5181, Red light	WLL12-B5181, Red light	WLL12-B5181, Red light
50	50	50	50
WLL12-B5281, Infrared light	WLL12-B5281, Infrared light	WLL12-B5281, Infrared light	WLL12-B5281, Infrared light
60	60	60	60
WLL12-B5381, Green light	WLL12-B5381, Green light	WLL12-B5381, Green light	WLL12-B5381, Green light
5	5	5	5

LM36-450	LM36-750	LM36-1000	LM36-1250
Order no.: 2015233	Order no.: 2015234	Order no.: 2015775	Order no.: 2016792
Fiber-optic cables LM	Fiber-optic cables LM	Fiber-optic cables LM	Fiber-optic cables LM
Features:	Features:	Features:	Features:
450 mm, with 90° offset head and rectangular light outlet	750 mm, with 90° offset head and rectangular light outlet	1000 mm, with 90° offset head and rectangular light outlet	1000 mm, with 90° offset head and rectangular light outlet
Minimum bend radius: 20 mm	Minimum bend radius: 20 mm	Minimum bend radius: 20 mm	Minimum bend radius: 20 mm
Glass fiber-optic cable within a helical metal spring	Glass fiber-optic cable within a helical metal spring	Glass fiber-optic cable within a helical metal spring	Glass fiber-optic cable within a helical metal spring

WLL12 – Scanning distance [mm]			
WLL12-B5181, Red light	WLL12-B5181, Red light	WLL12-B5181, Red light	WLL12-B5181, Red light
50	50	50	50
WLL12-B5281, Infrared light	WLL12-B5281, Infrared light	WLL12-B5281, Infrared light	WLL12-B5281, Infrared light
60	60	60	60
WLL12-B5381, Green light	WLL12-B5381, Green light	WLL12-B5381, Green light	WLL12-B5381, Green light
5	5	5	5

WLL12 – Scanning distance [mm]			
			
WLL12-B5181, Red light	WLL12-B5181, Red light	WLL12-B5181, Red light	WLL12-B5181, Red light
50	50	50	50
WLL12-B5281, Infrared light	WLL12-B5281, Infrared light	WLL12-B5281, Infrared light	WLL12-B5281, Infrared light
60	60	60	60
WLL12-B5381, Green light	WLL12-B5381, Green light	WLL12-B5381, Green light	WLL12-B5381, Green light
5	5	5	5

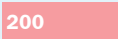
LT31-750	LT31-2200
	
Order no.: 2015228	Order no.: 2017871
Fiber-optic cables LT	Fiber-optic cables LT
Features:	Features:
750 mm, up to 250 °C	2200 mm, up to 250 °C
Minimum bend radius: 20 mm	Minimum bend radius: 20 mm
Glass fiber-optic cable within a helical metal spring	Glass fiber-optic cable within a helical metal spring

WLL12 – Scanning distance [mm]	
	
WLL12-B5181, Red light	WLL12-B5181, Red light
50	50
WLL12-B5281, Infrared light	WLL12-B5281, Infrared light
60	60
WLL12-B5381, Green light	WLL12-B5381, Green light
5	5

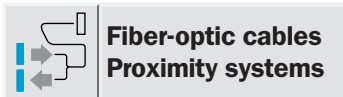
Fiber-optic cables

2010-01-15
Subject to change without notice

WLL12 – Scanning range [mm]			
			
WLL12-B5181, Red light	WLL12-B5181, Red light	WLL12-B5181, Red light	WLL12-B5181, Red light
200	330	200	200
WLL12-B5281, Infrared light	WLL12-B5281, Infrared light	WLL12-B5281, Infrared light	WLL12-B5281, Infrared light
300	550	300	300
WLL12-B5381, Green light	WLL12-B5381, Green light	WLL12-B5381, Green light	WLL12-B5381, Green light
20	32	20	20

WLL12 – Scanning range [mm]	
	
WLL12-B5181, Red light	WLL12-B5181, Red light
	
WLL12-B5281, Infrared light	WLL12-B5281, Infrared light
	
WLL12-B5381, Green light	WLL12-B5381, Green light
	

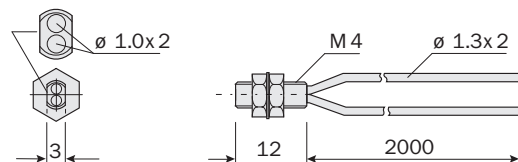
Dimensional drawings and order information



Dimensional drawings for LL3 fiber-optic cables, proximity systems

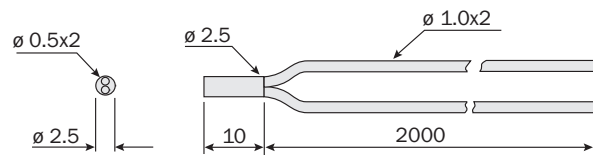
Standard type

Type	Order no.
LL3-DM01	5308071



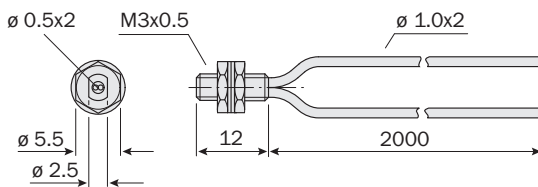
Standard type

Type	Order no.
LL3-DT03	5308072



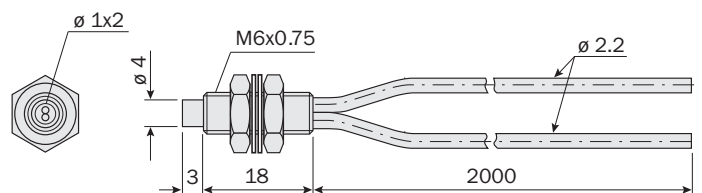
Standard type

Type	Order no.
LL3-DS06	5308073



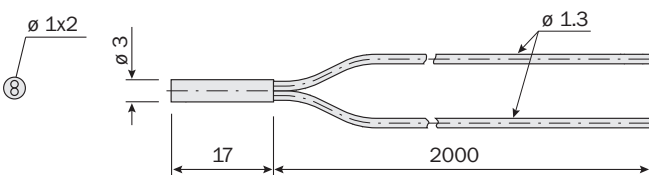
Standard type

Type	Order no.
LL3-DK06	5313019



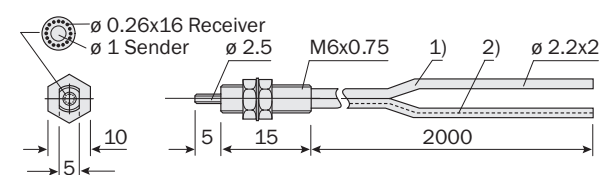
Standard type

Type	Order no.
LL3-DK04	5313020



Coaxial cable

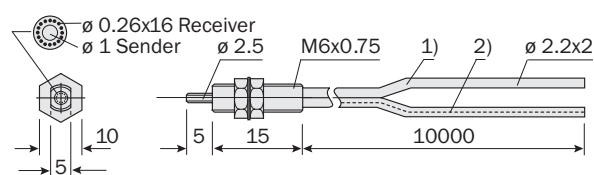
Type	Order no.
LL3-DB01	5308074



- 1) Receiver
2) Sender

Coaxial cable

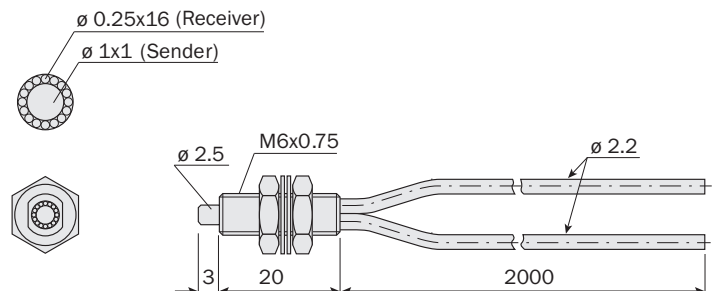
Type	Order no.
LL3-DB01-10	5308075



- 1) Receiver
2) Sender

Coaxial cable

Type	Order no.
LL3-DB03	5313021



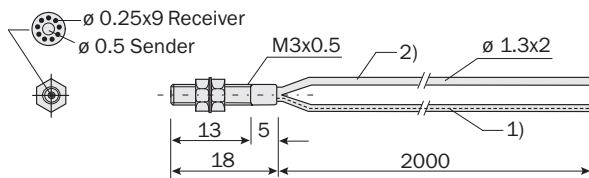
Dimensional drawings and order information



Dimensional drawings for LL3 fiber-optic cables, proximity systems

Coaxial cable

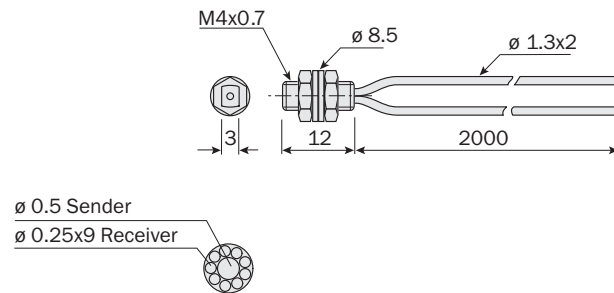
Type	Order no.
LL3-DT01	5308076



- 1) Sender
2) Receiver

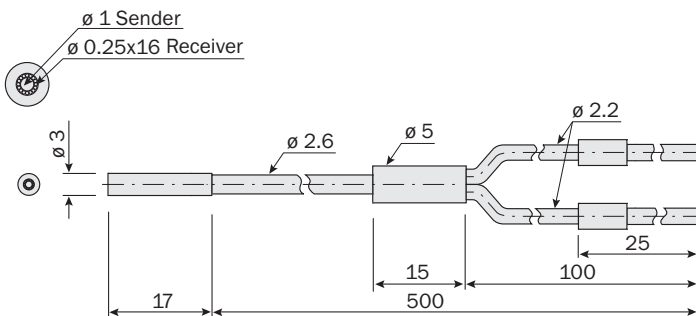
Coaxial cable

Type	Order no.
LL3-DM02	5308077



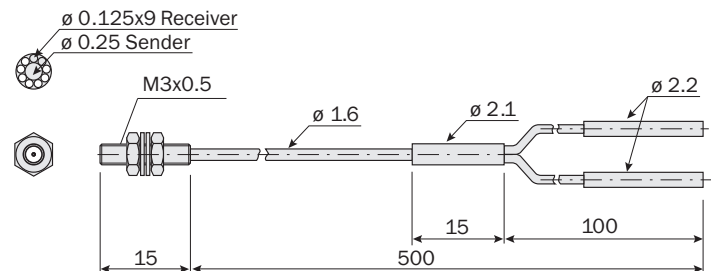
Coaxial cable

Type	Order no.
LL3-DK23	5313022



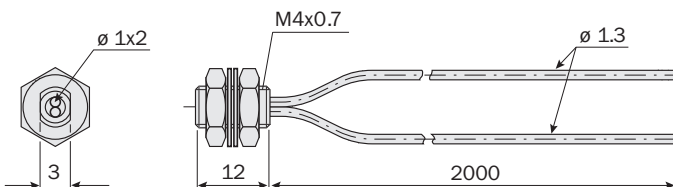
Coaxial cable

Type	Order no.
LL3-DK21	5313023



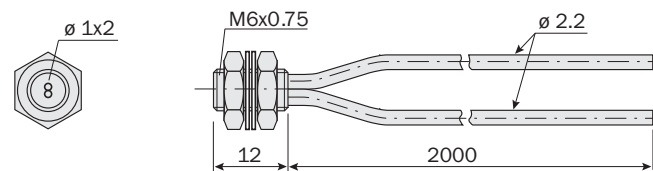
Super flexible, bend radius R2 mm

Type	Order no.
LL3-DK66	5313024



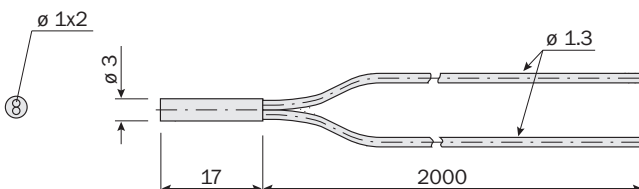
Super flexible, bend radius R2 mm

Type	Order no.
LL3-DK67	5313025



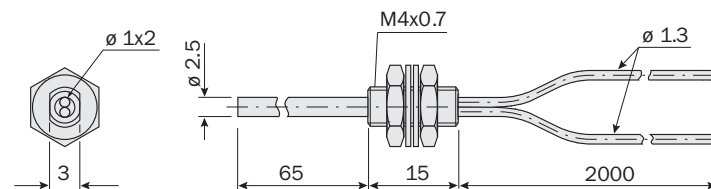
Super flexible, bend radius R2 mm

Type	Order no.
LL3-DK04Z	5313026

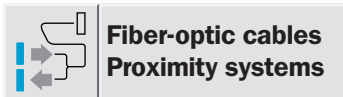


Super flexible, bend radius R2 mm

Type	Order no.
LL3-DK63Z	5313027



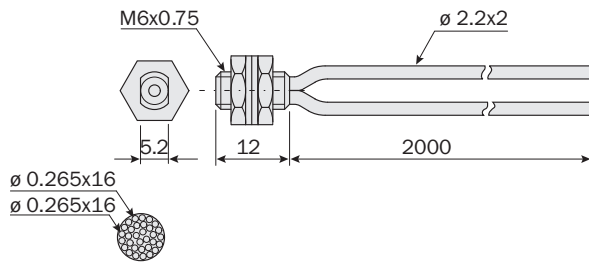
Dimensional drawings and order information



Dimensional drawings for LL3 fiber-optic cables, proximity systems

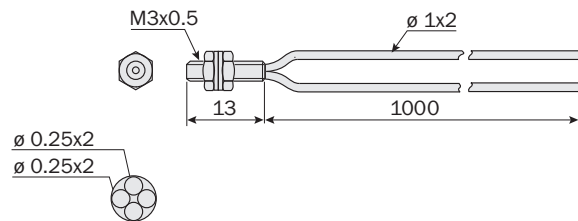
Flexible, bend radius R4 mm

Type	Order no.
LL3-DR01	5308078



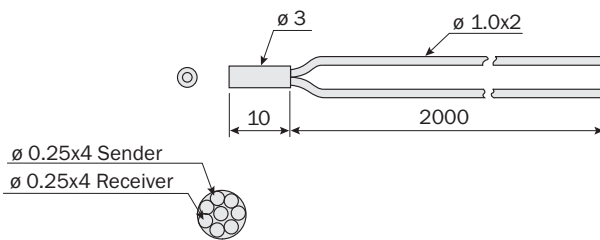
Flexible, bend radius R4 mm

Type	Order no.
LL3-DR02	5308079



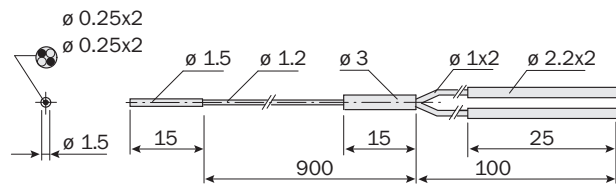
Flexible, bend radius R4 mm

Type	Order no.
LL3-DR03	5308080



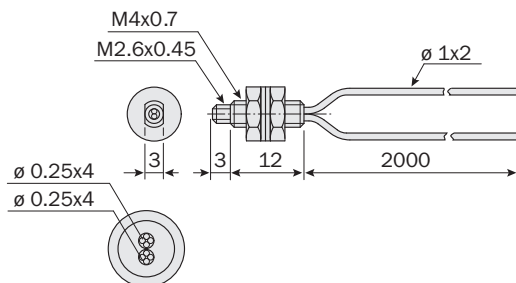
Flexible, bend radius R4 mm

Type	Order no.
LL3-DR04	5308081



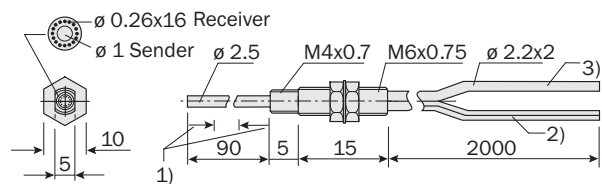
Flexible, bend radius R4 mm

Type	Order no.
LL3-DR06	5308082



Long end tips

Type	Order no.
LL3-DB02	5308083



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

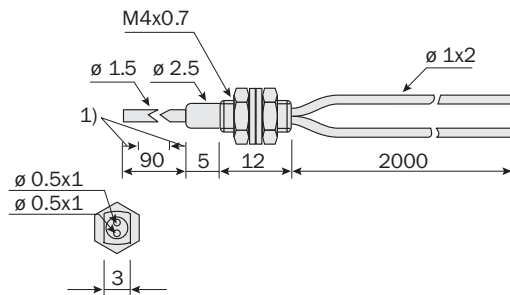
Dimensional drawings and order information



Dimensional drawings for LL3 fiber-optic cables, proximity systems

Long end tips

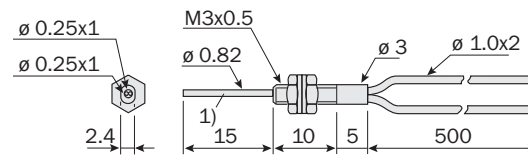
Type	Order no.
LL3-DM03	5308084



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

Long end tips

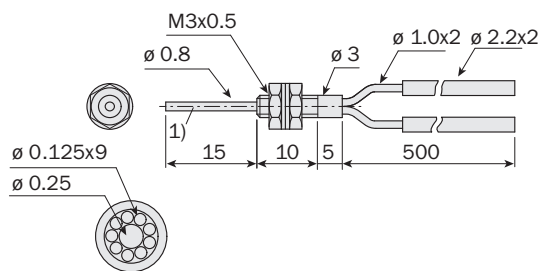
Type	Order no.
LL3-DT02	5308085



1) End tip cannot be bent

Long end tips

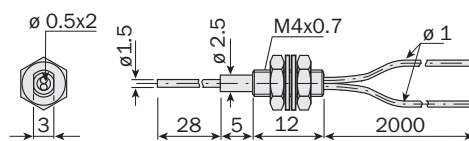
Type	Order no.
LL3-DT04	5308086



1) End tip cannot be bent

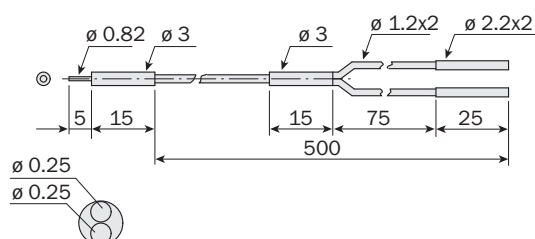
Long end tips

Type	Order no.
LL3-DT05	5313028



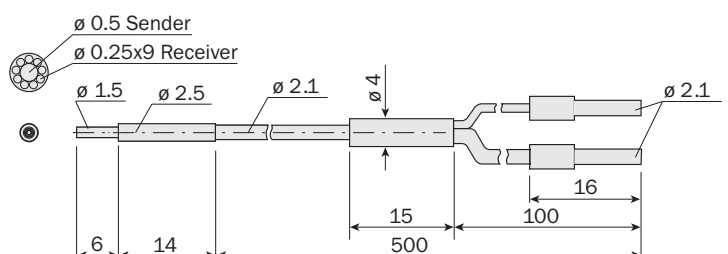
Long end tips

Type	Order no.
LL3-DR05	5308087

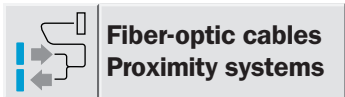


Long end tips

Type	Order no.
LL3-DK22	5313029



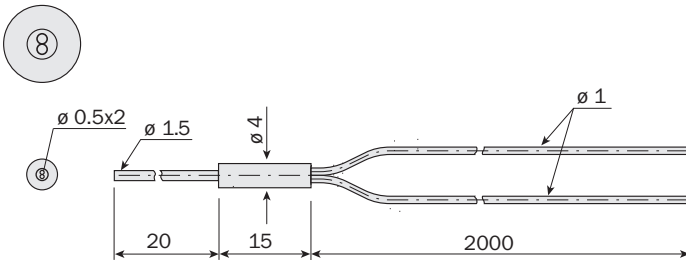
Dimensional drawings and order information



Dimensional drawings for LL3 fiber-optic cables, proximity systems

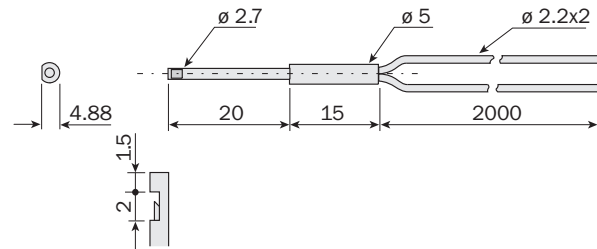
Long end tips

Type	Order no.
LL3-DK43	5313030



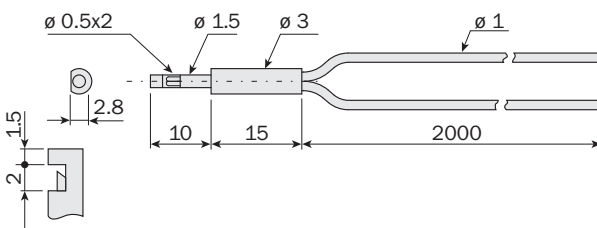
Integrated 90° deflection

Type	Order no.
LL3-DV01	5308088



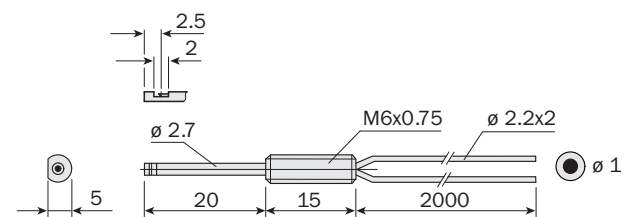
Integrated 90° deflection

Type	Order no.
LL3-DV02	5308089



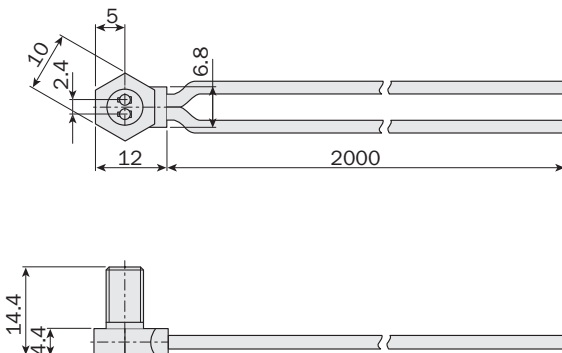
Integrated 90° deflection

Type	Order no.
LL3-DV03	5308090



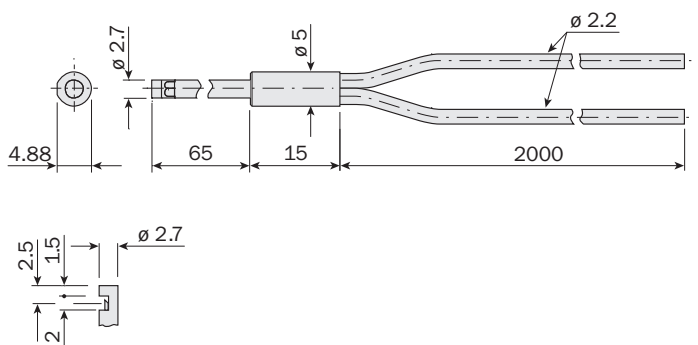
Integrated 90° deflection

Type	Order no.
LL3-DV05	5322549
LL3-DV06	5322550
LL3-DV07	5322551



Integrated 90° deflection

Type	Order no.
LL3-DK33	5313031



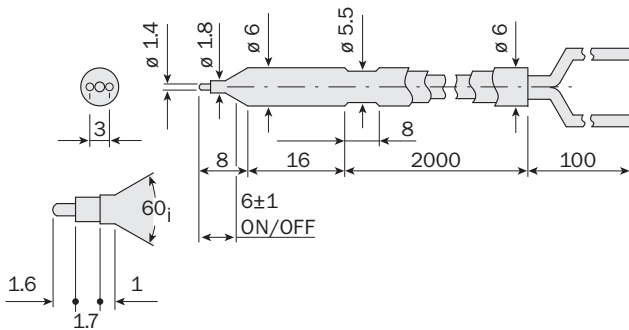
Dimensional drawings and order information



Dimensional drawings for LL3 fiber-optic cables, proximity systems

Level switch for liquids

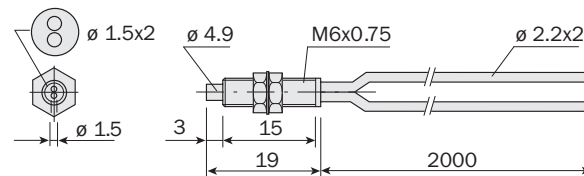
Type	Order no.
LL3-DF01	5308094 ¹⁾
LL3-DF02	5308095 ²⁾



- ¹⁾ For transparent liquids
²⁾ For cloudy liquids

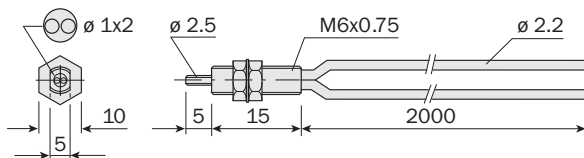
Temperature-resistant

Type	Order no.
LL3-DH01	5308091



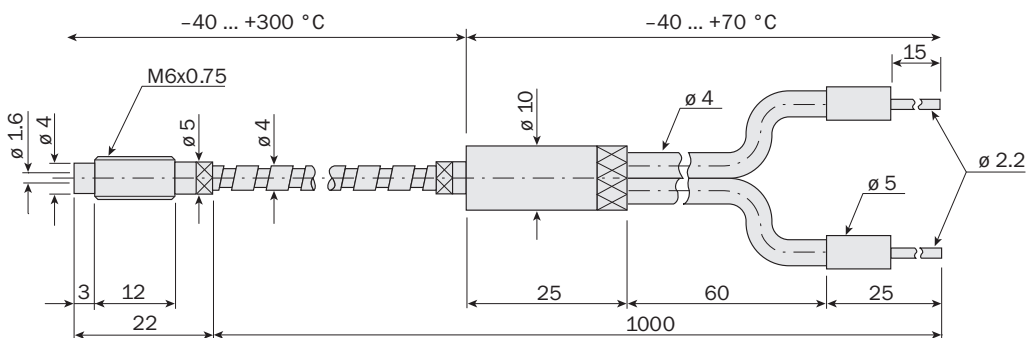
Temperature-resistant

Type	Order no.
LL3-DH02	5308092



Temperature-resistant

Type	Order no.
LL3-DH83	5313032



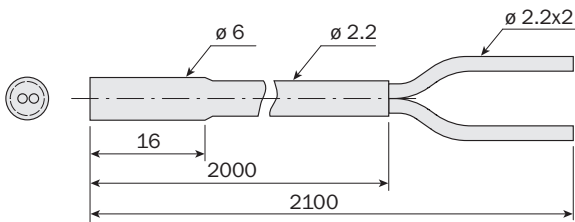
Dimensional drawings and order information

Fiber-optic cables
Proximity systems

Dimensional drawings for LL3 fiber-optic cables, proximity systems

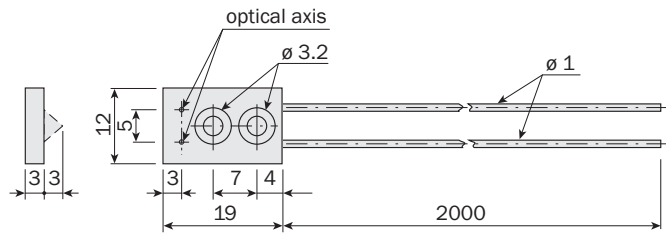
Teflon sheath

Type	Order no.
LL3-DY01	5308093



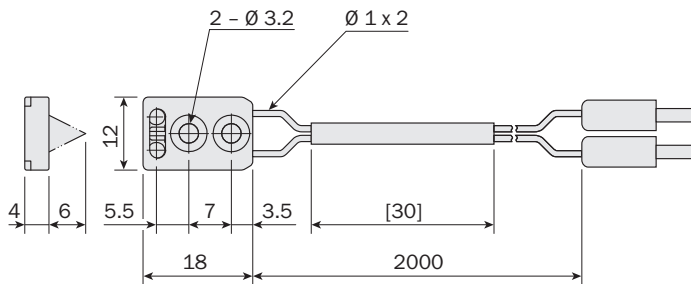
Fix focus

Type	Order no.
LL3-DC01	5313033

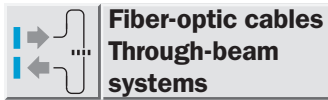


Fix focus

Type	Order no.
LL3-DC38	5322472



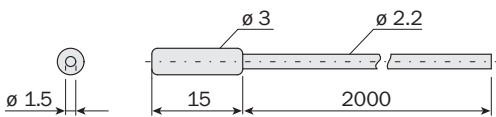
Dimensional drawings and order information



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

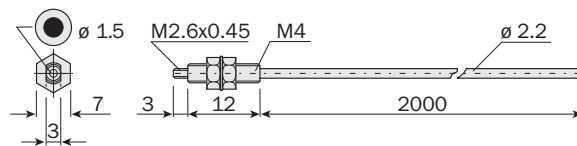
Standard type

Type	Order no.
LL3-TS07	5308049



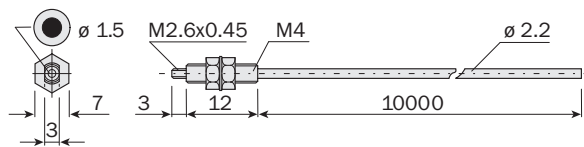
Standard type

Type	Order no.
LL3-TB01	5308050



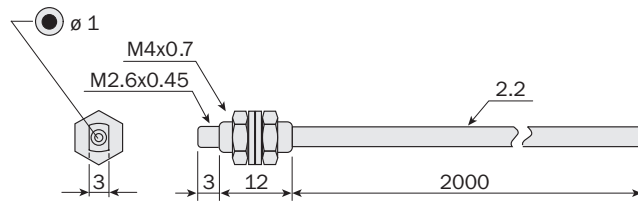
Standard type

Type	Order no.
LL3-TB01-10	5308051



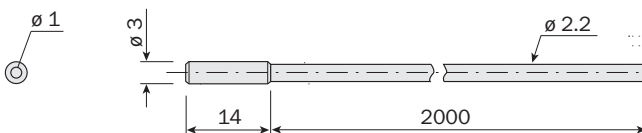
Standard type

Type	Order no.
LL3-TB02	5308048



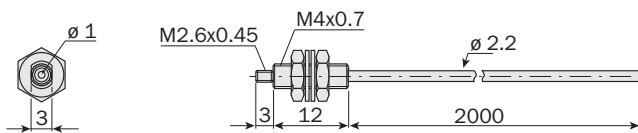
Super flexible, bend radius R2 mm

Type	Order no.
LL3-TK05	5313034



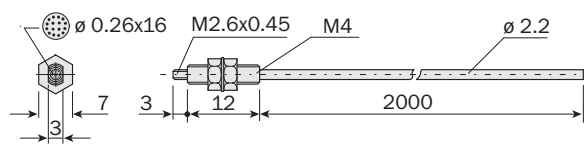
Super flexible, bend radius R2 mm

Type	Order no.
LL3-TK77	5313035



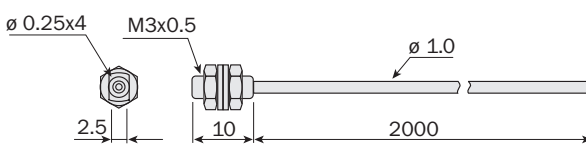
Flexible, bend radius R4 mm

Type	Order no.
LL3-TR01	5308052

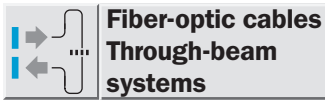


Flexible, bend radius R4 mm

Type	Order no.
LL3-TR02	5308053



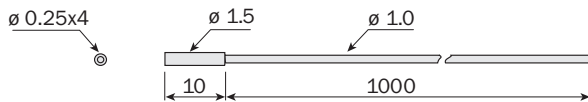
Dimensional drawings and order information



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

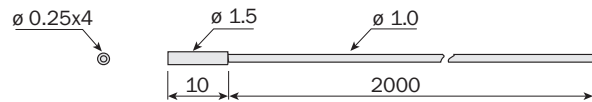
Flexible, bend radius R4 mm

Type	Order no.
LL3-TR03	5308054



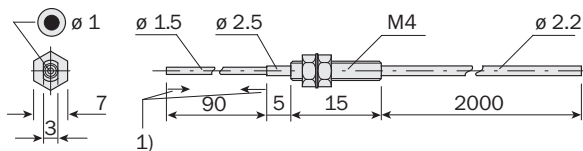
Flexible, bend radius R4 mm

Type	Order no.
LL3-TR03-02	5308055



Long end tips

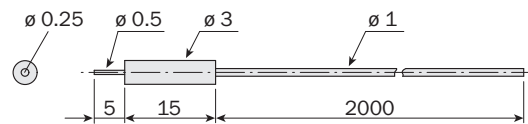
Type	Order no.
LL3-TB03	5308056



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

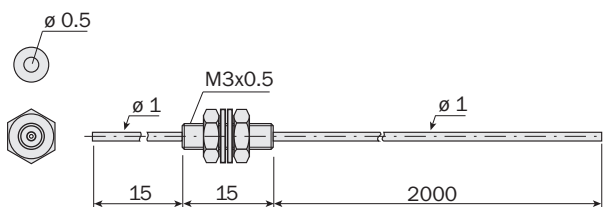
Long end tips

Type	Order no.
LL3-TT01	5308057



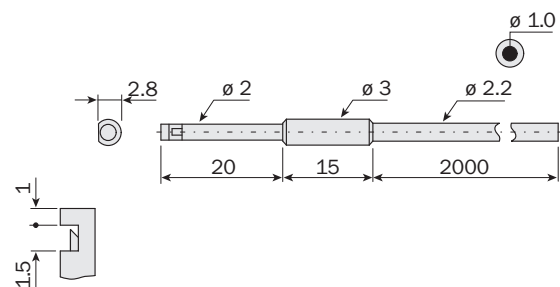
Long end tips

Type	Order no.
LL3-TK75	5313036



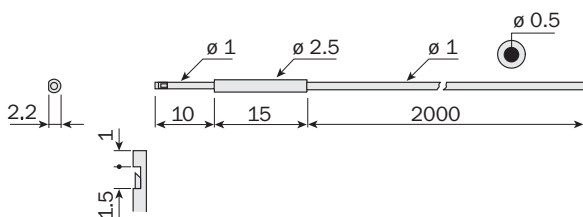
Integrated 90° deflection

Type	Order no.
LL3-TV01	5308058



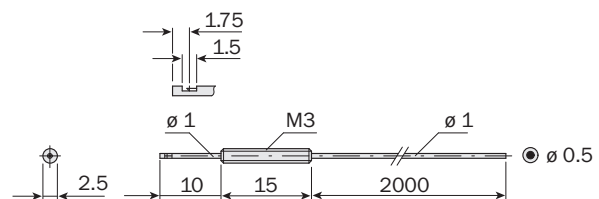
Integrated 90° deflection

Type	Order no.
LL3-TV02	5308059

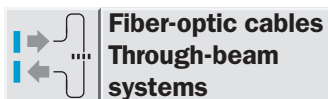


Integrated 90° deflection

Type	Order no.
LL3-TV04	5308060



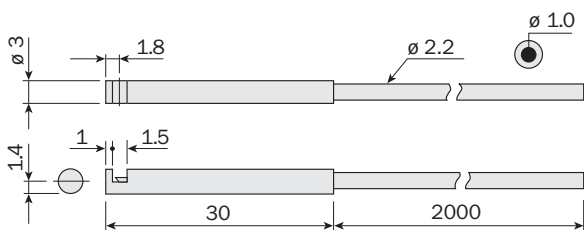
Dimensional drawings and order information



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

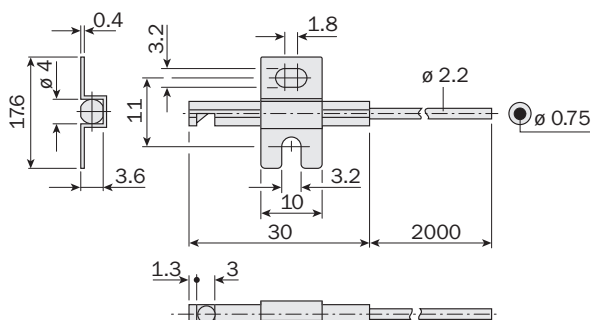
Integrated 90° deflection

Type	Order no.
LL3-TS08	5308061



Integrated 90° deflection

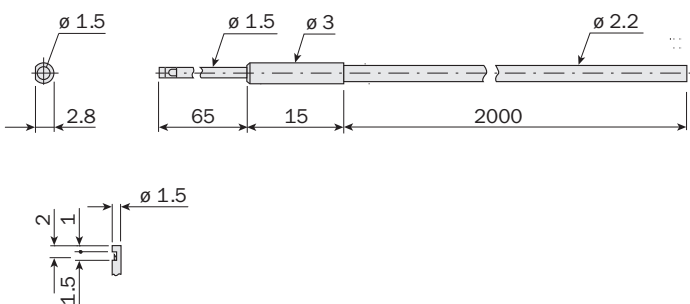
Type	Order no. *)
LL3-TS12	5308062



*) Mounting bracket included with delivery

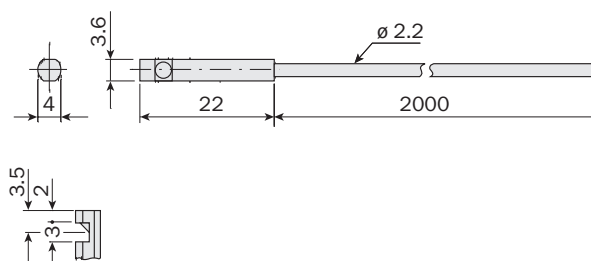
Integrated 90° deflection

Type	Order no.
LL3-TK34	5313037



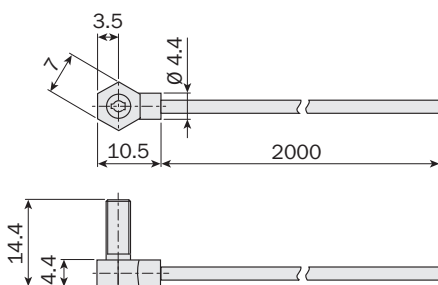
Integrated 90° deflection

Type	Order no.
LL3-TK16	5313038



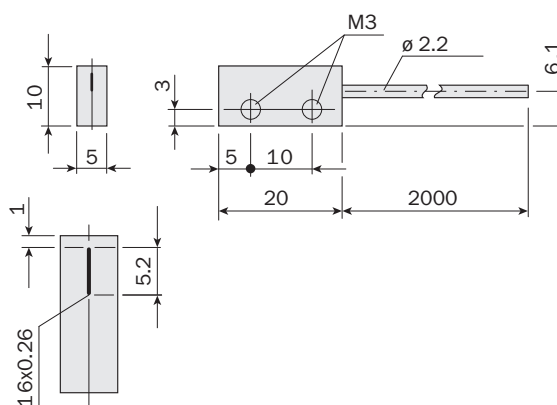
Integrated 90° deflection

Type	Order no.
LL3-TV05	5322546
LL3-TV06	5322547
LL3-TV07	5322548

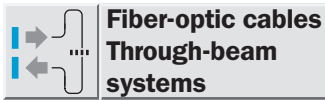


Fiber-optic cable cell

Type	Order no.
LL3-TS10	5308063



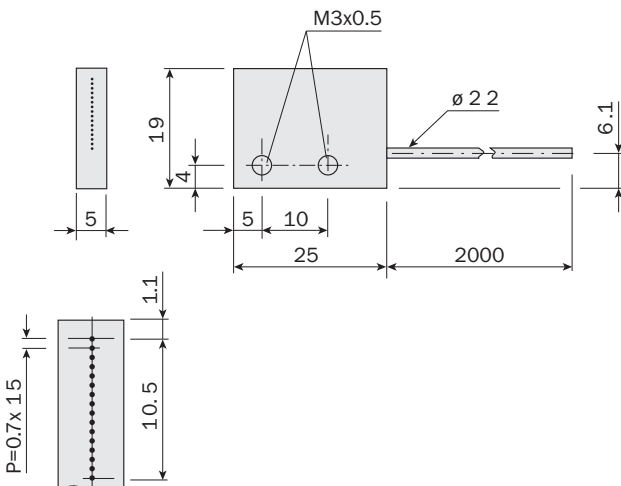
Dimensional drawings and order information



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

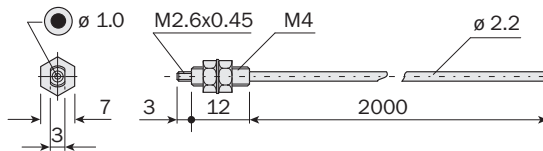
Fiber-optic cable cell

Type	Order no.
LL3-TS14	5313039



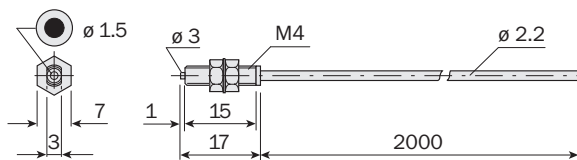
Temperature-resistant

Type	Order no.
LL3-TH01	5308064



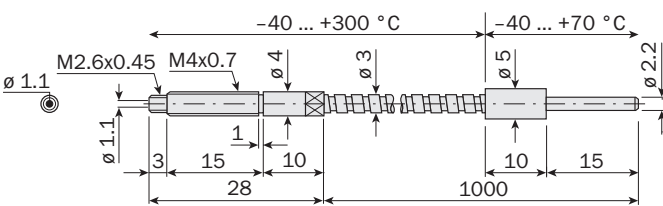
Temperature-resistant

Type	Order no.
LL3-TH02	5308065



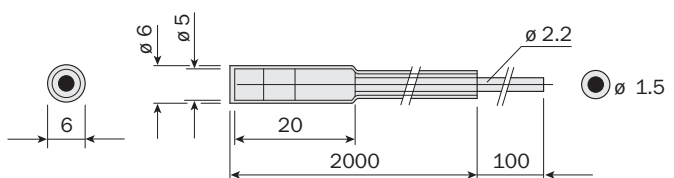
Temperature-resistant

Type	Order no.
LL3-TH84	5313040



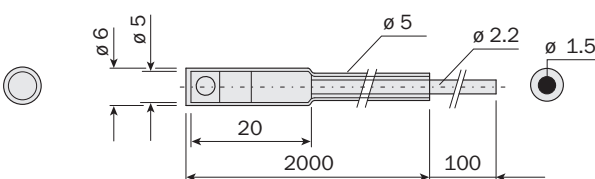
Teflon sheath

Type	Order no.
LL3-TY01	5308066



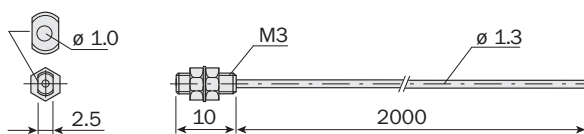
Teflon sheath

Type	Order no.
LL3-TY02	5308067



Smallest end sleeves

Type	Order no.
LL3-TM01	5308068



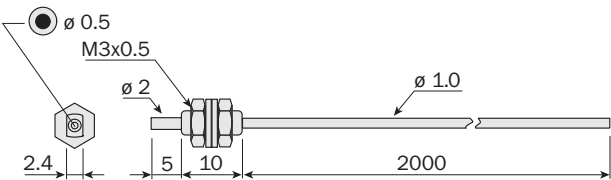
Dimensional drawings and order information

Fiber-optic cables
Through-beam
systems

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

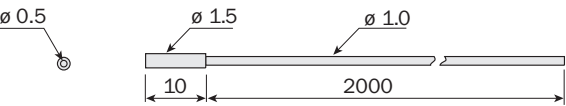
Smallest end sleeves

Type	Order no.
LL3-TM02	5308069



Smallest end sleeves

Type	Order no.
LL3-TM03	5308070



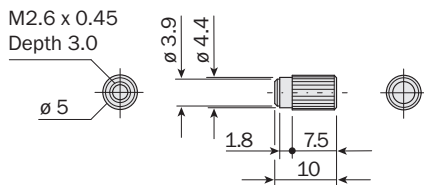
Dimensional drawings and order information

Accessories
LL3 Fiber-optic cables

Dimensional drawings for auxiliary lenses for LL3 fiber-optic cables

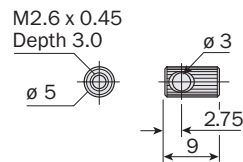
Order information

Type	Order no.
LL3-TA01	5308128



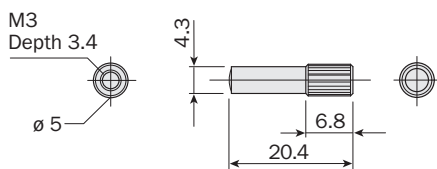
Order information

Type	Order no.
LL3-TA02	5308129



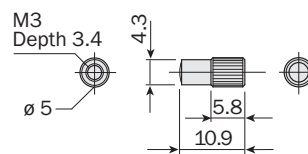
Order information

Type	Order no.
LL3-DA01	5308127

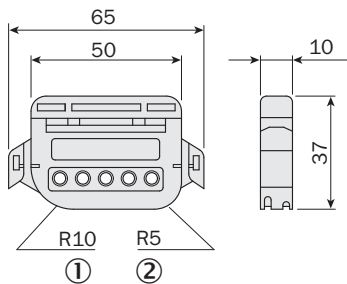


Order information

Type	Order no.
LL3-DA02	5308130

Cutter for fiber-optic cables ¹⁾

Type	Order no.
FC	5304141



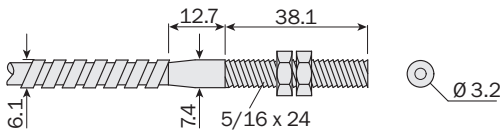
- ① Templing for bend radius R10 mm, for end tips Ø 1.5 mm and Ø 2.5 mm
- ② Bend radius R5 mm

¹⁾ Supplied with fiber-optic cable for cutting to length

Dimensional drawings and order information

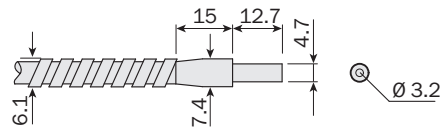
LIS/LBS 32 900 Fiber-optic cables

System	Type	Order no.
Through-beam	LIST 32 900	7020045
Proximity system	LBST 32 900	7020046



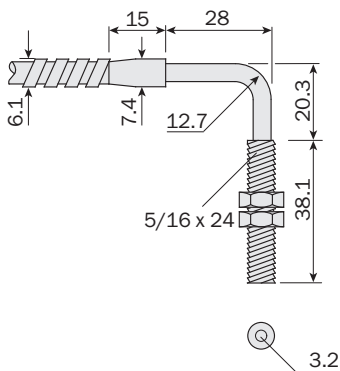
LIS/LBS 32 900 Fiber-optic cables

System	Type	Order no.
Through-beam	LISF 32 900	7020037
Proximity system	LBSF 32 900	7020038



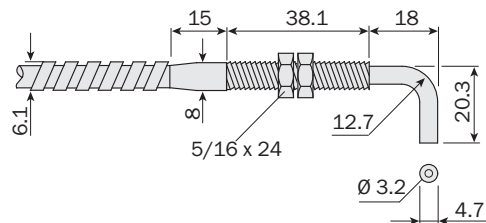
LIS/LBS 32 900 Fiber-optic cables

System	Type	Order no.
Through-beam	LISAT 32 900	7020035
Proximity system	LBSAT 32 900	7020036



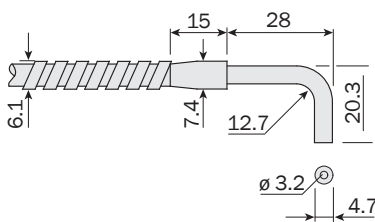
LIS/LBS 32 900 Fiber-optic cables

System	Type	Order no.
Through-beam	LISTA 32 900	7020047
Proximity system	LBSTA 32 900	7020048



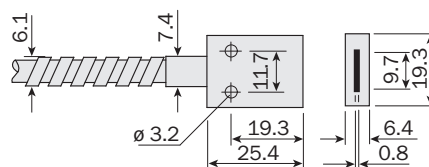
LIS/LBS 32 900 Fiber-optic cables

System	Type	Order no.
Through-beam	LISA 32 900	7020039
Proximity system	LBSA 32 900	7020040



LIS/LBS 32 900 Fiber-optic cables

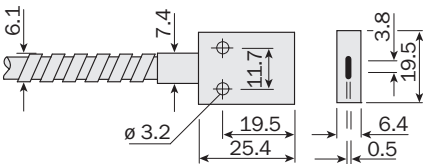
System	Type	Order no.
Through-beam	LISR 32 900	7020041
Proximity system	LBSR 32 900	7020042



Dimensional drawings and order information

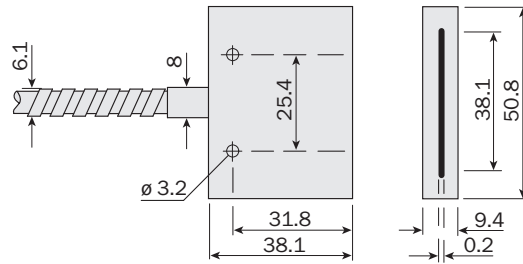
LIS/LBS 16 900 Fiber-optic cables

System	Type	Order no.
Through-beam	LISR 16 900	7020049
Proximity system	LBSR 16 900	7020050



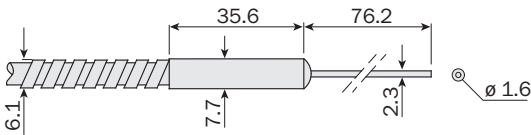
LIS/LBS 40 900 Fiber-optic cables

System	Type	Order no.
Through-beam	LISR 40 900	7020051
Proximity system	LBSR 40 900	7020052



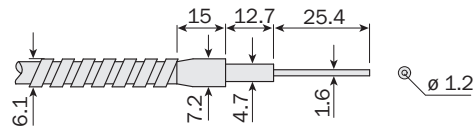
LIS/LBS 16 900 Fiber-optic cables

System	Type	Order no.
Through-beam	LISP 16 900	7020043
Proximity system	LBSP 16 900	7020044



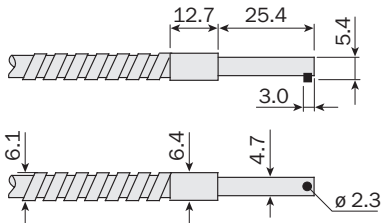
LIS/LBS 12 900 Fiber-optic cables

System	Type	Order no.
Through-beam	LISM 12 900	7020053
Proximity system	LBSM 12 900	7020054



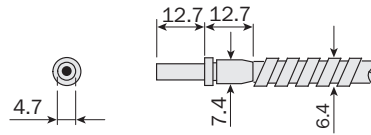
LIS/LBS 23 900 Fiber-optic cables

System	Type	Order no.
Through-beam	LISAA 23 900	7020102
Proximity system	LBSAA 23 900	7020103

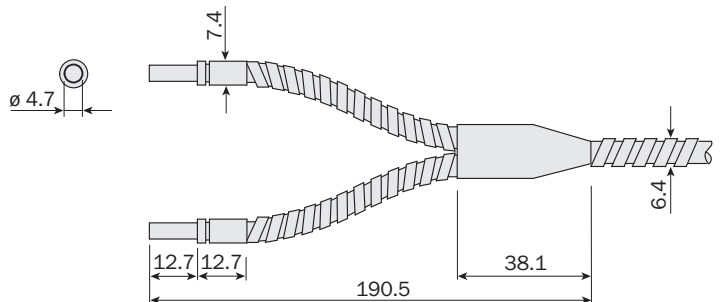


Adaptation of fiber-optic cables

Through-beam systems



Proximity systems

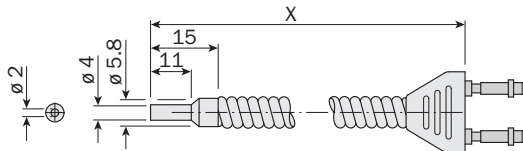


Mounting materials (cap nut, clamp ring, O-ring seal and mounting instructions) are included with fiber-optic cables.

Dimensional drawings and order information

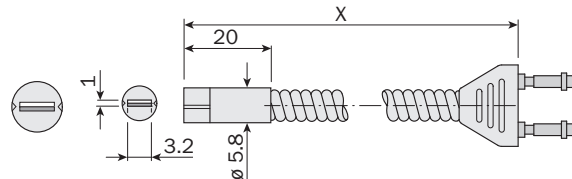
LM 31 Fiber-optic cables, helical metal spring with PVC sheath

Type	Order no.	Length X
LM 31-150	2015225	150 mm
LM 31-450	2015223	450 mm
LM 31-750	2015224	750 mm
LM 31-1500	2017381	1500 mm



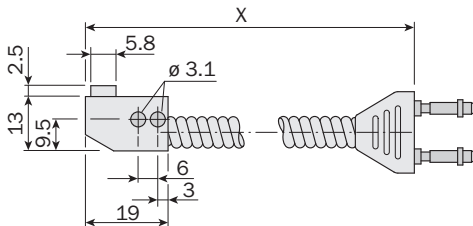
LM 35 Fiber-optic cables, helical metal spring with PVC sheath

Type	Order no.	Length X
LM 35-150	2015226	150 mm
LM 35-450	2015230	450 mm
LM 35-750	2015231	750 mm



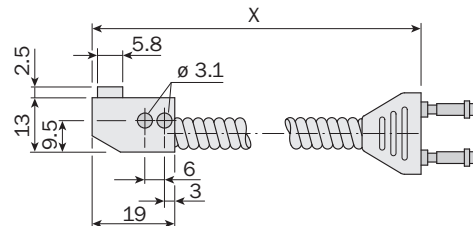
LM 36 Fiber-optic cables, helical metal spring with PVC sheath

Type	Order no.	Length X
LM 36-150	2015232	150 mm
LM 36-450	2015233	450 mm
LM 36-750	2015234	750 mm
LM 36-1000	2016772	1000 mm
LM 36-1250	2016792	1250 mm



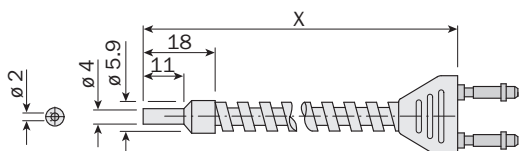
LM 37 Fiber-optic cables, helical metal spring with PVC sheath

Type	Order no.	Length X
LM 37-150	2015235	150 mm
LM 37-450	2015236	450 mm
LM 37-750	2015237	750 mm



LT 31 Fiber-optic cables, helical metal spring, chrome-plated

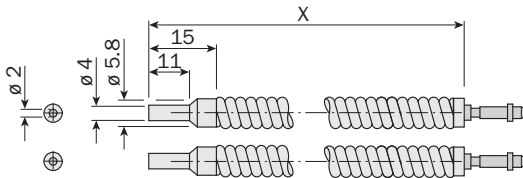
Type	Order no.	Length X
LT 31-450	2015227	450 mm
LT 31-750	2015228	750 mm
LT 31-2200	2017871	2200 mm



Dimensional drawings and order information

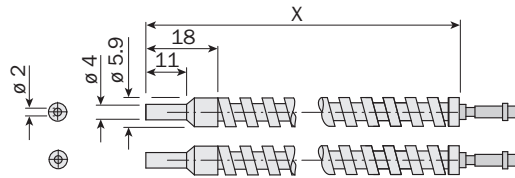
LM 32 Fiber-optic cables, helical metal spring with PVC sheath

Type	Order no.	Length X
LM 32-450	2014850	450 mm
LM 32-750	2015038	750 mm



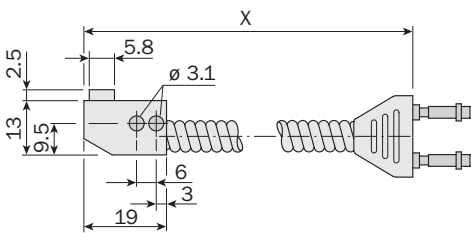
LT 32 Fiber-optic cables, helical metal spring, chrome-plated

Type	Order no.	Length X
LT 32-450	2015072	450 mm
LT 32-750	2015073	750 mm



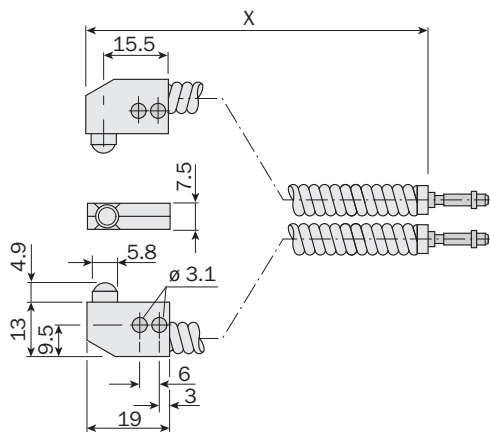
LM 38 Fiber-optic cables, helical metal spring with PVC sheath

Type	Order no.	Length X
LM 38-150	2015788	150 mm
LM 38-450	2015049	450 mm
LM 38-750	2015050	750 mm



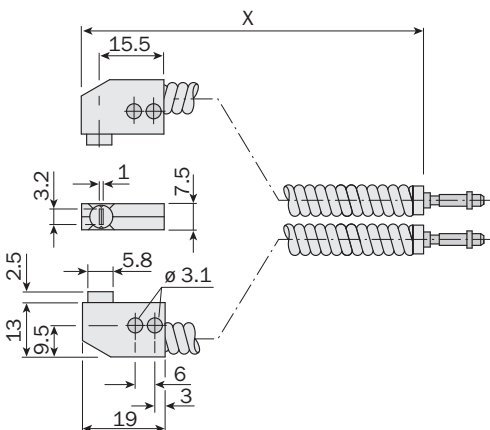
LM 38 Fiber-optic cables, with tip adapter, helical metal spring with PVC sheath

Type	Order no.	Length X
LM 38-751	2015970	750 mm

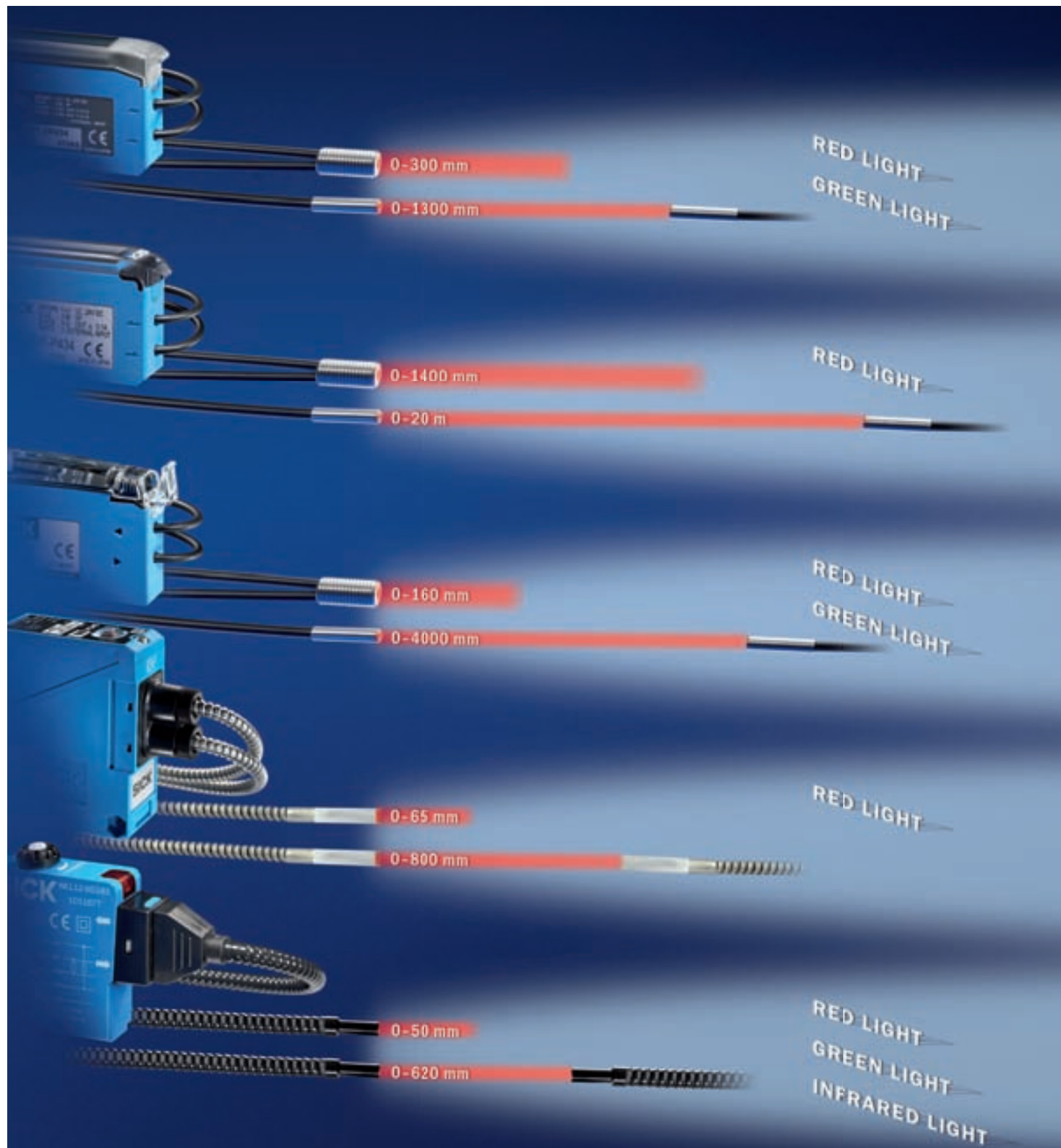


LM 39 Fiber-optic cables, helical metal spring with PVC sheath

Type	Order no.	Length X
LM 39-450	2015047	450 mm
LM 39-750	2015048	750 mm



Fiber-optic sensor series – ranges and other features available





TIME DELAY — DC — NPN/PNP — PLUG — TEACH-IN-BUTTON
CABLE — EXTERNAL TEACH

WLL190T-2
Page 136-153

TIME DELAY — DC — NPN/PNP — PLUG — TEACH-IN-BUTTON
CABLE — EXTERNAL TEACH

WLL180T
Page 154-161

TIME DELAY — DC — NPN/PNP — PLUG — TEACH-IN-BUTTON
CABLE

WLL170(T)
Page 162-177

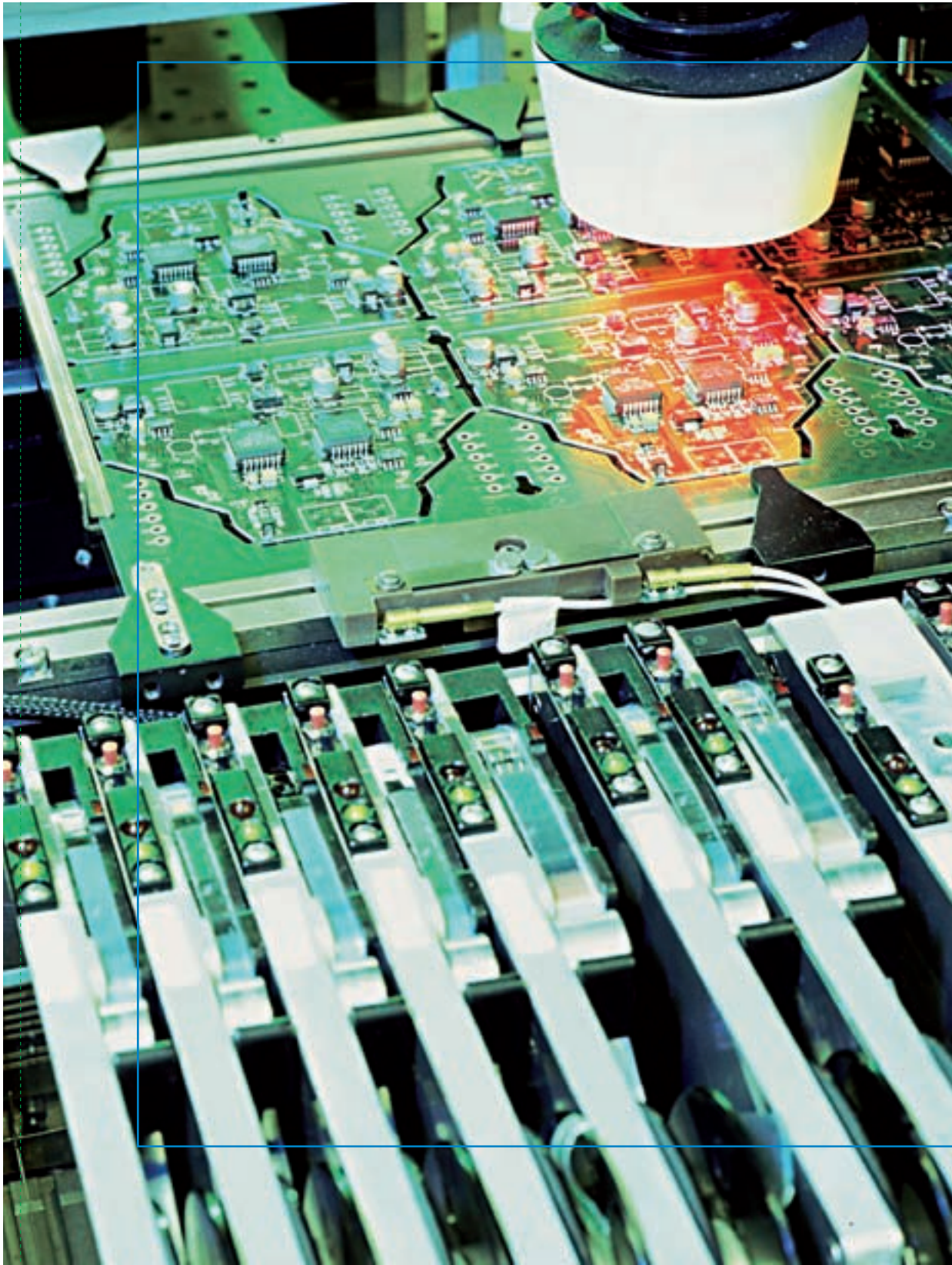
TIME DELAY — DC — NPN/PNP — PLUG — POTENTIOMETER
UC — RELAIS — TERMINALS

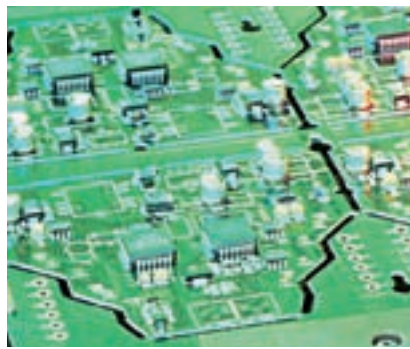
WLL260
Page 178-183

DC — NPN/PNP — PLUG — POTENTIOMETER

WLL12
Page 184-187

WLL190T-2 – Smart





WLL190T-2
Smart

WLL190T-2

- Easy commissioning and product changeover through external teach input
- Easy monitoring of nominal and actual values through 2 x 4-digit digital display
- Reliable switching in high speed applications due to fast response time
- Reduced wiring through wire-saving in bus mode

WLL190T-2 →

WLL190T-2 – stand-alone, anti-interference and wire-saving



STAND-ALONE

Stand-alone

- IP 66
- Three connection types:
M8, 3/4-way, cable
- Easy adjustment via display and buttons



BASE UNIT

Base unit with 8-fold anti-interference

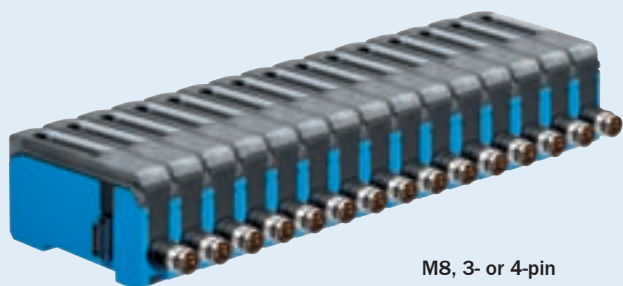
- Large range:
4,000 mm (through-beam)/
480 mm (proximity)
- Three connection types: M8, 3/4-way, cable
- Easy adjustment via display and buttons
- Automatic Power Control (APC):
Stable and consistent LED power
for stabilized switching thresholds





As an individual sensor (stand-alone) or in the bus combination of base unit and extension unit – WLL190T-2 sensors are the solution for complex applications.

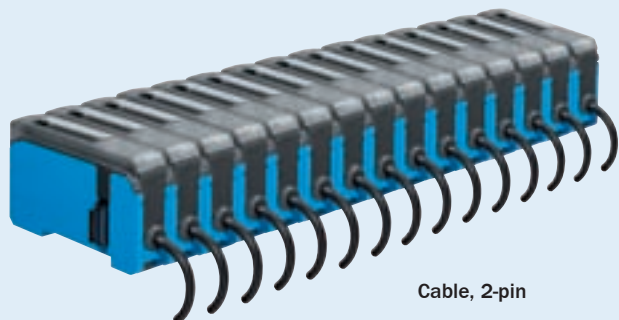
EXTENSION UNIT



M8, 3- or 4-pin

Extension unit with
8-fold anti-interference

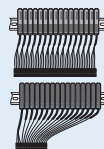
- Software bus
- Settings can be copied



Cable, 2-pin

Extension unit with wire-saving
for reduced wiring and 8-fold
anti-interference

- Voltage is only fed in once
- Up to 15 slaves are contacted (2-core)



64 terminals

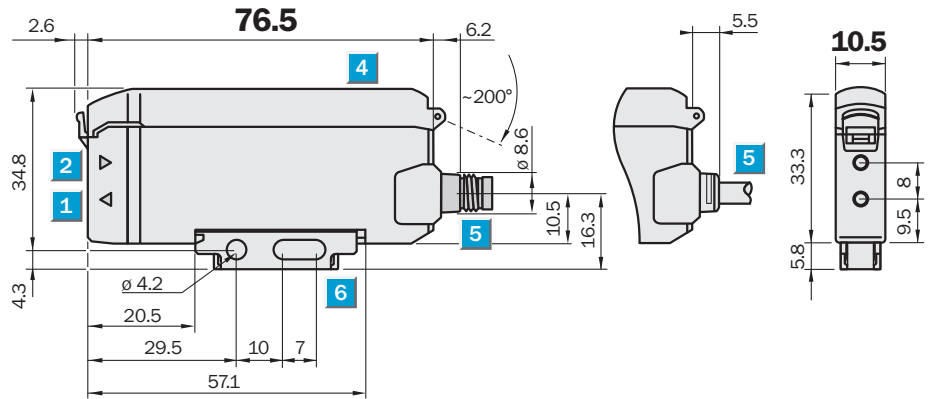
– 34 terminals

saved = 30 x wiring

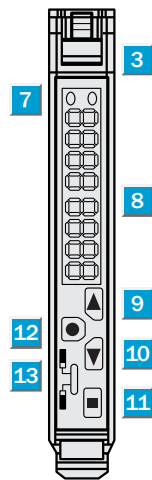
	Scanning distance 0 ... 480 mm
	Scanning range 0 ... 4,000 mm
Fiber-optic photoelectric sensor	

- Longest ranges
- Fast switching frequency
- Precise, stable switching point
- Dual display
- Interactive user prompting
- Appropriate for the LL3 fiber-optic cable series

Dimensional drawing



Adjustments possible



- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver LED, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Locking of fiber-optic cables
- 4 Protective hood: can be folded out approx. 180°
- 5 Connector
- 6 Mounting bracket included (see accessories)
- 7 2 x indicator LED, orange: lights up when switching output is active
- 8 Numeric display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
- 9 Step button < (manual switching threshold: higher; or next function parameter)
- 10 Step button > (manual switching threshold: lower; or previous function parameter)
- 11 "Teach-in" pushbutton
- 12 Mode/Enter button (programming button)
- 13 Operating mode selector switch:
"SET": active teach-in-switching threshold
"RUN": sensor mode and function parameter selection

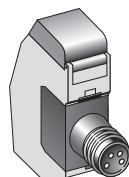


Accessories

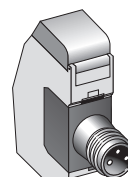
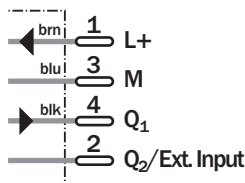
- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Fiber-optic cables
- Mounting systems
- Tip adaptors

Connection type

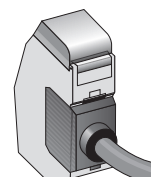
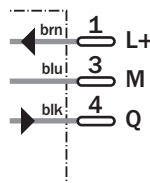
WLL190T-2N434	WLL190T-2N333	WLL190T-2N432
WLL190T-2P434	WLL190T-2P333	WLL190T-2P432



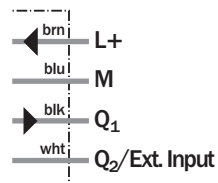
M8, 4-pin



M8, 3-pin



4 x 0.2 mm²



WLL190T-2		N333	N432	N434	P333	P432	P434				
Operating distance	0 ... 480 mm ¹⁾										
Fiber-optic cable (proximity system)	LL3-DB01										
Adjustment of operating distance	Teach-in: single-teach button										
	Teach-in: single-teach button & cable										
Scanning range typ. max.	0 ... 4,000 mm ²⁾										
Fiber-optic cable (through-beam system)	LL3-TB01 and tip adapter LL3-TA01										
Scanning range, recommended	0 ... 2,000 mm ²⁾										
Fiber-optic cable (through-beam system)	LL3-TB01										
Sensitivity adjustment	Teach-in: single-teach button										
	Teach-in: single-teach button & cable										
Precise correction	Step button +/- manual										
Light source, light type	LED, red light, 650 nm ³⁾										
Light spot diameter	Depending on scanning range										
Angle of dispersion	Approx. 65 ° (deviations see LL3 data)										
Supply voltage V_s	12 ... 24 V DC ⁴⁾										
Ripple	≤ 10 % ⁵⁾										
Power consumption	≤ 50 mA ⁶⁾										
Switching outputs	NPN, Q										
	NPN, Q1, Q2 ⁷⁾										
	PNP, Q										
	PNP, Q1, Q2 ⁷⁾										
Switching mode	Light-/dark-switching, selectable										
Output current I _a max	≤ 100 mA										
Response time	Selectable: 60 μs / 250 μs / 2 ms										
Switching frequency	8333 Hz / 2000 Hz / 250 Hz										
Time delay	Programmable 0 ms ... 9,999 ms										
Time type	Programmable OFF/T _{OFF} /T _{ON} /ONE-SHOT										
Connection type	Connector, M8, 3-pin										
	Cable, PVC, 2 m ⁸⁾										
	Connector, M8, 4-pin										
VDE protection class	⚡										
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected										
Enclosure rating	IP 66 ⁹⁾										
Ambient temperature operation	-25 °C ... +55 °C										
Ambient temperature storage	-40 °C ... +70 °C										
Weight	Approx. 25 g										
	Approx. 20 g										
Housing material	ABS, PC										

¹⁾ Object with 90 % remission (based on standard white to DIN 5033). Scanning distance at response time 2 ms. Distance reduction at shorter response time (see LL3/ WLL190T-2 table)

²⁾ Scanning range at response time 2 ms. Range reduction at shorter response time (see LL3/ WLL190T-2 table)
³⁾ Average service life 100,000 h at T_a = +25 °C

⁴⁾ ± 10 %

⁵⁾ May not exceed or fall short of V_s tolerances

⁶⁾ Without load

⁷⁾ Selectable Q2, ext. teach or counter reset

⁸⁾ Do not bend below 0 °C

⁹⁾ Only with correct adaptation of the LL3 fiber-optic cable

Sensitivity setting

The following optimization modes can be programmed:

a) Normal mode (default) - 4 alternatives

- max. teach-in,
- 1-point teach-in,
- 2-point teach-in,
- Auto teach-in

b) Zone teach-in (window technology)

c) Glass teach-in (detection of transparent objects)

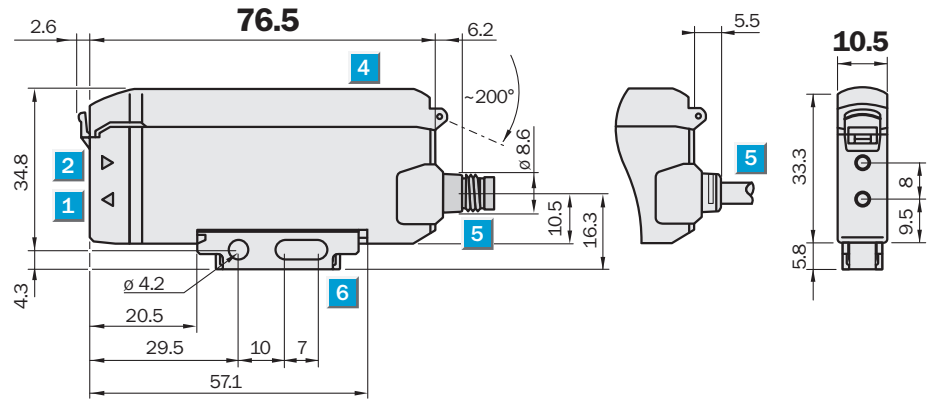
Ordering information

Type	Order no.
WLL190T-2N333	6032556
WLL190T-2N432	6032552
WLL190T-2N434	6032554
WLL190T-2P333	6032555
WLL190T-2P432	6032551
WLL190T-2P434	6032553

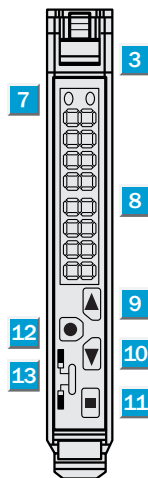
	Scanning distance 0 ... 160 mm
	Scanning range 0 ... 4,000 mm
Fiber-optic photoelectric sensor	

- For detection of marks
- Longest ranges
- Fast switching frequency
- Precise, stable switching point
- Dual display
- Interactive user prompting
- Appropriate for the LL3 fiber-optic cable series

Dimensional drawing



Adjustments possible



- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver LED, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Locking of fiber-optic cables
- 4 Protective hood: can be folded out approx. 180°
- 5 Connector
- 6 Mounting bracket included (see accessories)
- 7 2 x indicator LED, orange: lights up when switching output is active
- 8 Numeric display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
- 9 Step button < (manual switching threshold: higher; or next function parameter)
- 10 Step button > (manual switching threshold: lower; or previous function parameter)
- 11 "Teach-in" pushbutton
- 12 Mode/Enter button (programming button)
- 13 Operating mode selector switch:
"SET": active teach-in-switching threshold
"RUN": sensor mode and function parameter selection

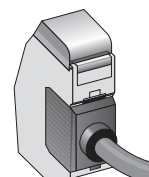
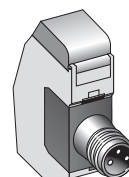
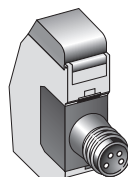


Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Fiber-optic cables
- Mounting systems
- Tip adaptors

Connection type

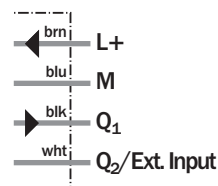
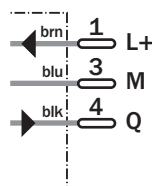
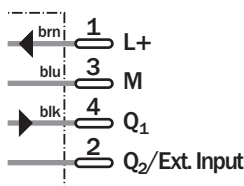
WLL190T-2N494	WLL190T-2N393	WLL190T-2N492
WLL190T-2P494	WLL190T-2P393	WLL190T-2P492



M8, 4-pin

M8, 3-pin

4 x 0.2 mm²



WLL190T-2		N393	N492	N494	P393	P492	P494				
Operating distance	0 ... 160 mm ¹⁾										
Fiber-optic cable (proximity system)	LL3-DM01										
Adjustment of operating distance	Teach-in: single-teach button										
	Teach-in: single-teach button & cable										
Scanning range typ. max.	0 ... 4,000 mm ²⁾										
Fiber-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01										
Scanning range, recommended	0 ... 900 mm ²⁾										
Fiber-optic cable (through-beam system)	LL3-TB01										
Sensitivity adjustment	Teach-in: single-teach button										
	Teach-in: single-teach button & cable										
Precise correction	Step button +/- manual										
Light source, light type	LED, green light, 525 nm ³⁾										
Light spot diameter	Depending on scanning range										
Angle of dispersion	Approx. 65 ° (deviations see LL3 data)										
Supply voltage V_s	12 ... 24 V DC ⁴⁾										
Ripple	≤ 10 % ⁵⁾										
Power consumption	≤ 50 mA ⁶⁾										
Switching outputs	NPN, Q										
	NPN, Q1, Q2 ⁷⁾										
	PNP, Q										
	PNP, Q1, Q2 ⁷⁾										
Switching mode	Light-/dark-switching, selectable										
Output current I _a max	≤ 100 mA										
Response time	Selectable: 60 μs / 250 μs / 2 ms										
Switching frequency	8333 Hz / 2000 Hz / 250 Hz										
Time delay	Programmable 0 ms ... 9,999 ms										
Time type	Programmable OFF/T _{OFF} /T _{ON} /ONE-SHOT										
Connection type	Connector, M8, 3-pin										
	Cable, PVC, 2 m ⁸⁾										
	Connector, M8, 4-pin										
VDE protection class	ⓘ										
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected										
Enclosure rating	IP 66 ⁹⁾										
Ambient temperature operation	-25 °C ... +55 °C										
Ambient temperature storage	-40 °C ... +70 °C										
Weight	Approx. 25 g										
	Approx. 20 g										
Housing material	ABS, PC										

¹⁾ Object with 90 % remission (based on standard white to DIN 5033). Scanning distance at response time 2 ms. Distance reduction at shorter response time (see LL3/ WLL190T-2 table)

²⁾ Scanning range at response time 2 ms. Range reduction at shorter response time (see LL3/ WLL190T-2 table)
³⁾ Average service life 100,000 h at T_a = +25 °C

⁴⁾ ± 10 %

⁵⁾ May not exceed or fall short of V_s tolerances

⁶⁾ Without load

⁷⁾ Selectable Q2, ext. teach or counter reset

⁸⁾ Do not bend below 0 °C

⁹⁾ Only with correct adaptation of the LL3 fiber-optic cable

Sensitivity setting

The following optimization modes can be programmed:

a) Normal mode (default) - 4 alternatives

- max. teach-in,
- 1-point teach-in,
- 2-point teach-in,
- Auto teach-in

b) Zone teach-in (window technology)

c) Glass teach-in (detection of transparent objects)

Ordering information

Type	Order no.
WLL190T-2N393	6032564
WLL190T-2N492	6032560
WLL190T-2N494	6032562
WLL190T-2P393	6032563
WLL190T-2P492	6032559
WLL190T-2P494	6032561



- Fiber-optic cables
- Mounting systems
- Tip adaptors

Diagram of the 6-pin connector pinout:

- Pin 1: L+ (brown)
- Pin 2: M (blue)
- Pin 3: Q1 (black)
- Pin 4: Analog-Out (white-black)
- Pin 5: Analog GND (shield)

WLL190T-2		N532	P532										
Operating distance	0 ... 480 mm ¹⁾												
Fiber-optic cable (proximity system)	LL3-DB01												
Adjustment of operating distance	Teach-in: single-teach button												
Scanning range typ. max.	0 ... 4,000 mm ²⁾												
Fiber-optic cable (through-beam system)	LL3-TB01 and tip adapter LL3-TA01												
Scanning range, recommended	0 ... 2,000 mm ²⁾												
Fiber-optic cable (through-beam system)	LL3-TB01												
Sensitivity adjustment	Teach-in: single-teach button												
Precise correction	Step button +/- manual												
Light source, light type	LED, red light, 650 nm ³⁾												
Light spot diameter	Depending on scanning range												
Angle of dispersion	Approx. 65 ° (deviations see LL3 data)												
Supply voltage V_s	12 ... 24 V DC ⁴⁾												
Ripple	≤ 10 % ⁵⁾												
Power consumption	≤ 50 mA ⁶⁾												
Switching outputs	NPN, Q												
	PNP, Q												
Analog output	4 ... 20 mA												
Switching mode	Light-/dark-switching, selectable												
Output current I _a max	≤ 100 mA												
Response time	Selectable: 60 µs / 250 µs / 2 ms												
Switching frequency	8333 Hz / 2000 Hz / 250 Hz												
Time delay	Programmable 0 ms ... 9,999 ms												
Time type	Programmable OFF/T _{OFF} /T _{ON} /ONE-SHOT												
Connection type	Cable, PVC, 2 m ⁷⁾												
VDE protection class	ⓘ												
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected												
Enclosure rating	IP 66 ⁸⁾												
Ambient temperature operation	-25 °C ... +55 °C												
Ambient temperature storage	-40 °C ... +70 °C												
Weight	Approx. 20 g												
Housing material	ABS, PC												

¹⁾ Object with 90 % remission (based on standard white to DIN 5033). Scanning distance at response time 2 ms. Distance reduction at shorter response time (see

LL3/ WLL190T-2 table)
²⁾ Scanning range at response time 2 ms. Range reduction at shorter response time (see LL3/ WLL190T-2 table)

³⁾ Average service life 100,000 h at T_a = +25 °C
⁴⁾ ± 10 %
⁵⁾ May not exceed or fall short of

V_s tolerances
⁶⁾ Without load
⁷⁾ Do not bend below 0 °C
⁸⁾ Only with correct adaptation of the LL3 fiber-optic cable

Sensitivity setting

The following optimization modes can be programmed:

a) Normal mode (default) - 4 alternatives

- max. teach-in,
- 1-point teach-in,
- 2-point teach-in,
- Auto teach-in

b) Zone teach-in (window technology)

c) Glass teach-in (detection of transparent objects)

Ordering information

Type	Order no.
WLL190T-2N532	6032558
WLL190T-2P532	6032557

	Scanning distance 0 ... 480 mm
	Scanning range 0 ... 4,000 mm
Fiber-optic photoelectric sensor	

- Cable saving bus mode
- Automatic anti-interference
- Longest ranges
- Fast switching frequency
- Dual display

WLL190T-2

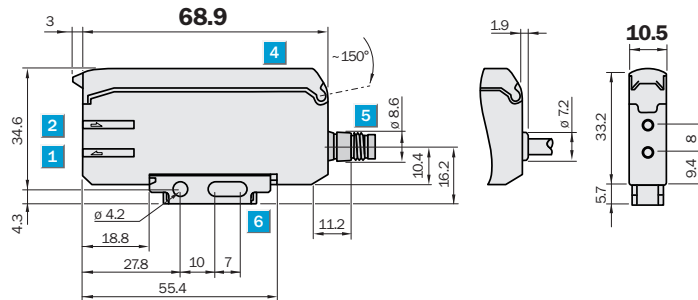


Accessories

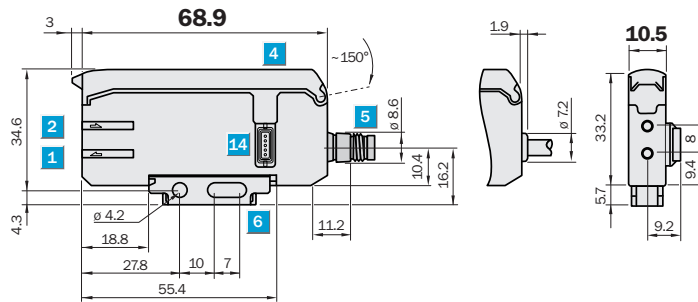
Connector, M8, 3-pin
Connector, M8, 4-pin
Fiber-optic cables
Mounting systems
Tip adaptors

Dimensional drawing

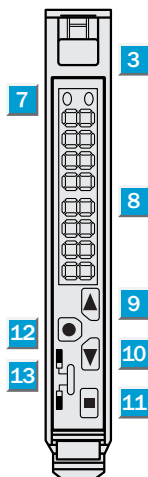
Base unit



Expansion unit



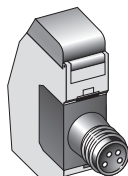
Adjustments possible



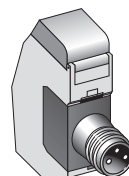
- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver LED, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Locking of fiber-optic cables
- 4 Protective hood: can be folded out approx. 180°
- 5 Connector
- 6 Mounting bracket included (see accessories)
- 7 2 x indicator LED, orange: lights up when switching output is active
- 8 Numeric display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
- 9 Step button < (manual switching threshold: higher; or next function parameter)
- 10 Step button > (manual switching threshold: lower; or previous function parameter)
- 11 "Teach-in" pushbutton
- 12 Mode/Enter button (programming button)
- 13 Operating mode selector switch:
"SET": active teach-in-switching threshold
"RUN": sensor mode and function parameter selection
- 14 Bus connector

Connection type

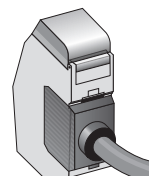
WLL190T-2F434	WLL190T-2F333	WLL190T-2F232
WLL190T-2M434	WLL190T-2M333	WLL190T-2M432



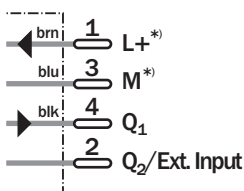
M8, 4-pin



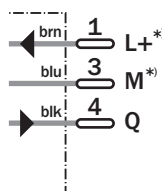
M8, 3-pin



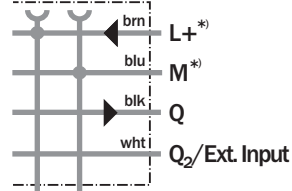
4 x 0.2 mm²



*) Only base unit



*) Only base unit



*) Only base unit

WLL190T-2		M333	M432	M434	F232	F333	F434				
Device type	Base unit ¹⁾										
	Expansion unit										
Operating distance	0 ... 480 mm ²⁾										
Fiber-optic cable (proximity system)	LL3-DB01										
Adjustment of operating distance	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Scanning range typ. max.	0 ... 4,000 mm ³⁾										
Fiber-optic cable (through-beam system)	LL3-TB01 and tip adapter LL3-TA01										
Scanning range, recommended	0 ... 2,000 mm ³⁾										
Fiber-optic cable (through-beam system)	LL3-TB01										
Sensitivity adjustment	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Precise correction	Step button +/- manual										
Light source, light type	LED, red light, 650 nm ⁴⁾										
Light spot diameter	Depending on scanning range										
Angle of dispersion	Approx. 65 ° (deviations see LL3 data)										
Supply voltage V_s	12 ... 24 V DC ⁵⁾										
Ripple	≤ 10 % ⁶⁾										
Power consumption	≤ 50 mA ⁷⁾										
Switching outputs	PNP, Q1, Q2 ⁸⁾										
	PNP, Q										
Switching mode	Light-/dark-switching, selectable										
Output current I _a max	≤ 100 mA										
Response time	Selectable: 60 μs / 250 μs / 2 ms										
Switching frequency	8333 Hz / 2000 Hz / 250 Hz										
Time delay	Programmable 0 ms ... 9,999 ms										
Time type	Programmable OFF/T _{OFF} /T _{ON} /ONE-SHOT										
Connection type	Cable, PVC, 2 m ⁹⁾										
	Connector, M8, 3-pin										
	Connector, M8, 4-pin										
VDE protection class	ⓘ										
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected										
Enclosure rating	IP 54 ¹⁰⁾										
Ambient temperature operation	-25 °C ... +55 °C ¹¹⁾										
	-25 °C ... +55 °C										
Ambient temperature storage	-40 °C ... +70 °C										
Weight	Approx. 20 g										
	Approx. 25 g										
Housing material	ABS, PC										

¹⁾ Up to 15 expansion units can be connected
²⁾ Object with 90 % remission (based on standard white to DIN 5033). Scanning distance at response time 2 ms. Distance reduction at shorter response time (see LL3/ WLL190T-2 table)

³⁾ Scanning range at response time 2 ms. Range reduction at shorter response time (see LL3/ WLL190T-2 table)
⁴⁾ Average service life 100,000 h at T_a = +25 °C
⁵⁾ ± 10 %
⁶⁾ May not exceed or fall short of

V_s tolerances
⁷⁾ Without load
⁸⁾ Selectable Q2, ext. teach or counter reset
⁹⁾ Do not bend below 0 °C
¹⁰⁾ Only with correct adaptation of the LL3 fiber-optic cable

¹¹⁾ Operating temperature may vary depending on number of connected units:
 4 - 8 units: -25 ... +50 °C (output current 50 mA),
 9 - 16 units: -25 ... +45 °C (output current 20 mA)

Sensitivity setting

The following optimization modes can be programmed:

a) Normal mode (default) - 4 alternatives

- max. teach-in,
- 1-point teach-in,
- 2-point teach-in,
- Auto teach-in

b) Zone teach-in (window technology)

c) Glass teach-in (detection of transparent objects)

Ordering information

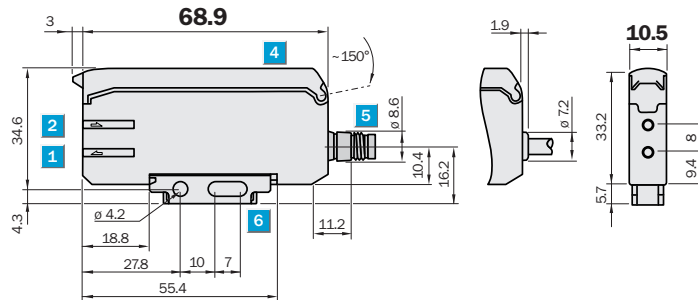
Type	Order no.
WLL190T-2F232	6032571
WLL190T-2F333	6032569
WLL190T-2F434	6032567
WLL190T-2M333	6033294
WLL190T-2M432	6033290
WLL190T-2M434	6033292

	Scanning distance 0 ... 480 mm
	Scanning range 0 ... 4,000 mm
Fiber-optic photoelectric sensor	

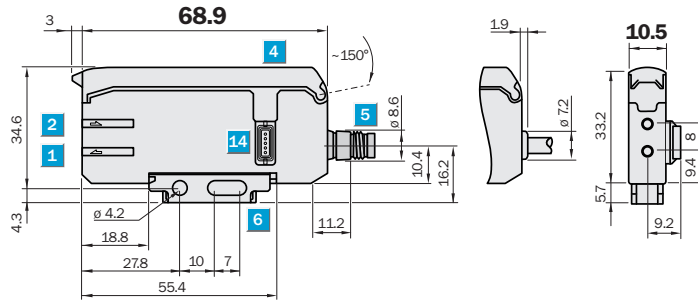
- Cable saving bus mode
- Automatic anti-interference
- Longest ranges
- Fast switching frequency
- Dual display

Dimensional drawing

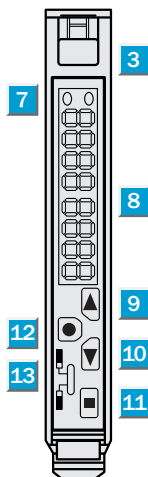
Base unit



Expansion unit



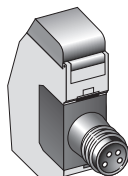
Adjustments possible



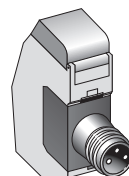
- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver LED, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Locking of fiber-optic cables
- 4 Protective hood: can be folded out approx. 180°
- 5 Connector
- 6 Mounting bracket included (see accessories)
- 7 2 x indicator LED, orange: lights up when switching output is active
- 8 Numeric display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
- 9 Step button < (manual switching threshold: higher; or next function parameter)
- 10 Step button > (manual switching threshold: lower; or previous function parameter)
- 11 "Teach-in" pushbutton
- 12 Mode/Enter button (programming button)
- 13 Operating mode selector switch:
"SET": active teach-in-switching threshold
"RUN": sensor mode and function parameter selection
- 14 Bus connector

Connection type

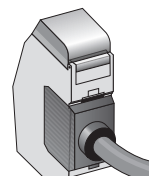
WLL190T-2E434	WLL190T-2E333	WLL190T-2E232
WLL190T-2L434	WLL190T-2L333	WLL190T-2L432



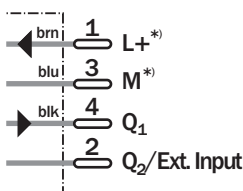
M8, 4-pin



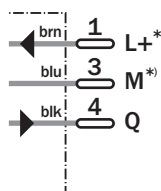
M8, 3-pin



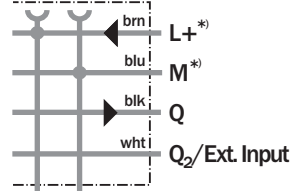
4 x 0.2 mm²



*) Only base unit



*) Only base unit



*) Only base unit

Accessories

Connector, M8, 3-pin
Connector, M8, 4-pin
Fiber-optic cables
Mounting systems
Tip adaptors



WLL190T-2		L333	L432	L434	E232	E333	E434				
Device type	Base unit ¹⁾										
	Expansion unit										
Operating distance	0 ... 480 mm ²⁾										
Fiber-optic cable (proximity system)	LL3-DB01										
Adjustment of operating distance	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Scanning range typ. max.	0 ... 4,000 mm ³⁾										
Fiber-optic cable (through-beam system)	LL3-TB01 and tip adapter LL3-TA01										
Scanning range, recommended	0 ... 2,000 mm ³⁾										
Fiber-optic cable (through-beam system)	LL3-TB01										
Sensitivity adjustment	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Precise correction	Step button +/- manual										
Light source, light type	LED, red light, 650 nm ⁴⁾										
Light spot diameter	Depending on scanning range										
Angle of dispersion	Approx. 65 ° (deviations see LL3 data)										
Supply voltage V_s	12 ... 24 V DC ⁵⁾										
Ripple	≤ 10 % ⁶⁾										
Power consumption	≤ 50 mA ⁷⁾										
Switching outputs	NPN, Q1, Q2 ⁸⁾										
	NPN, Q										
Switching mode	Light-/dark-switching, selectable										
Output current I _a max	≤ 100 mA										
Response time	Selectable: 60 μs / 250 μs / 2 ms										
Switching frequency	8333 Hz / 2000 Hz / 250 Hz										
Time delay	Programmable 0 ms ... 9,999 ms										
Time type	Programmable OFF/T _{OFF} /T _{ON} /ONE-SHOT										
Connection type	Cable, PVC, 2 m ⁹⁾										
	Connector, M8, 3-pin										
	Connector, M8, 4-pin										
VDE protection class	⚡										
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected										
Enclosure rating	IP 54 ¹⁰⁾										
Ambient temperature operation	-25 °C ... +55 °C ¹¹⁾										
	-25 °C ... +55 °C										
Ambient temperature storage	-40 °C ... +70 °C										
Weight	Approx. 20 g										
	Approx. 25 g										
Housing material	ABS, PC										

- ¹⁾ Up to 15 expansion units can be connected
²⁾ Object with 90 % remission (based on standard white to DIN 5033). Scanning distance at response time 2 ms. Distance reduction at shorter response time (see LL3/ WLL190T-2 table)

- ³⁾ Scanning range at response time 2 ms. Range reduction at shorter response time (see LL3/ WLL190T-2 table)
⁴⁾ Average service life 100,000 h at T_a = +25 °C
⁵⁾ ± 10 %
⁶⁾ May not exceed or fall short of

- V_s tolerances
⁷⁾ Without load
⁸⁾ Selectable Q2, ext. teach or counter reset
⁹⁾ Do not bend below 0 °C
¹⁰⁾ Only with correct adaptation of the LL3 fiber-optic cable

- ¹¹⁾ Operating temperature may vary depending on number of connected units:
 4 - 8 units: -25 ... +50 °C (output current 50 mA),
 9 - 16 units: -25 ... +45 °C (output current 20 mA)

Sensitivity setting

The following optimization modes can be programmed:

a) Normal mode (default) - 4 alternatives

- max. teach-in,
- 1-point teach-in,
- 2-point teach-in,
- Auto teach-in

b) Zone teach-in (window technology)

c) Glass teach-in (detection of transparent objects)

Ordering information

Type	Order no.
WLL190T-2E232	6032572
WLL190T-2E333	6032570
WLL190T-2E434	6032568
WLL190T-2L333	6033295
WLL190T-2L432	6033291
WLL190T-2L434	6033293

	Scanning distance 0 ... 160 mm
	Scanning range 0 ... 4,000 mm
Fiber-optic photoelectric sensor	

- For detection of marks
- Cable saving bus mode
- Automatic anti-interference
- Longest ranges
- Fast switching frequency
- Dual display

WLL190T-2

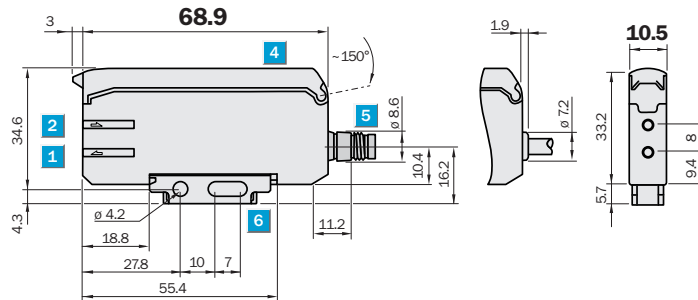


Accessories

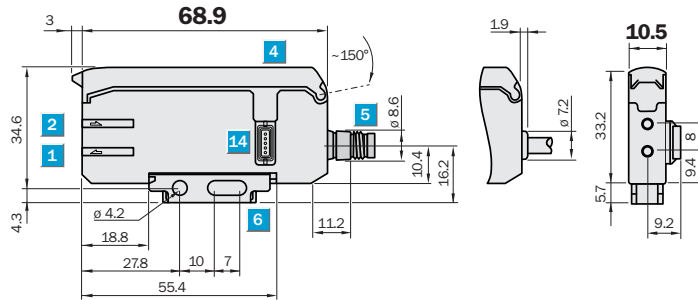
Connector, M8, 3-pin
Connector, M8, 4-pin
Fiber-optic cables
Mounting systems
Tip adaptors

Dimensional drawing

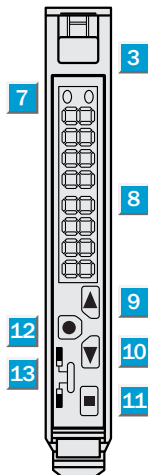
Base unit



Expansion unit



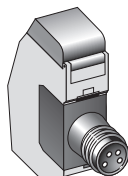
Adjustments possible



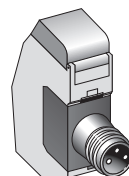
- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver LED, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Locking of fiber-optic cables
- 4 Protective hood: can be folded out approx. 180°
- 5 Connector
- 6 Mounting bracket included (see accessories)
- 7 2 x indicator LED, orange: lights up when switching output is active
- 8 Numeric display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
- 9 Step button < (manual switching threshold: higher; or next function parameter)
- 10 Step button > (manual switching threshold: lower; or previous function parameter)
- 11 "Teach-in" pushbutton
- 12 Mode/Enter button (programming button)
- 13 Operating mode selector switch:
"SET": active teach-in-switching threshold
"RUN": sensor mode and function parameter selection
- 14 Bus connector

Connection type

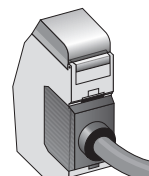
WLL190T-2F494	WLL190T-2F393	WLL190T-2F292
WLL190T-2M494	WLL190T-2M393	WLL190T-2M492



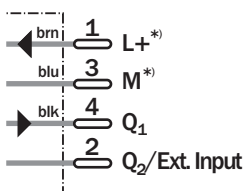
M8, 4-pin



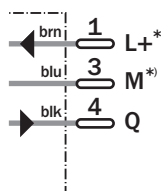
M8, 3-pin



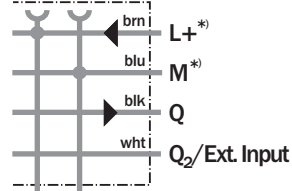
4 x 0.2 mm²



*) Only base unit



*) Only base unit



*) Only base unit

WLL190T-2		M393	M492	M494	F292	F393	F494				
Device type	Base unit ¹⁾										
	Expansion unit										
Operating distance	0 ... 160 mm ²⁾										
Fiber-optic cable (proximity system)	LL3-DM01										
Adjustment of operating distance	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Scanning range typ. max.	0 ... 4,000 mm ³⁾										
Fiber-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01										
Scanning range, recommended	0 ... 900 mm ³⁾										
Fiber-optic cable (through-beam system)	LL3-TB01										
Sensitivity adjustment	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Precise correction	Step button +/- manual										
Light source, light type	LED, green light, 525 nm ⁴⁾										
Light spot diameter	Depending on scanning range										
Angle of dispersion	Approx. 65 ° (deviations see LL3 data)										
Supply voltage V_s	12 ... 24 V DC ⁵⁾										
Ripple	≤ 10 % ⁶⁾										
Power consumption	≤ 50 mA ⁷⁾										
Switching outputs	PNP, Q1, Q2 ⁸⁾										
	PNP, Q										
Switching mode	Light-/dark-switching, selectable										
Output current I _a max	≤ 100 mA										
Response time	Selectable: 60 μs / 250 μs / 2 ms										
Switching frequency	8333 Hz / 2000 Hz / 250 Hz										
Time delay	Programmable 0 ms ... 9,999 ms										
Time type	Programmable OFF/T _{OFF} /T _{ON} /ONE-SHOT										
Connection type	Cable, PVC, 2 m ⁹⁾										
	Connector, M8, 3-pin										
	Connector, M8, 4-pin										
VDE protection class	ⓘ										
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / In- terference suppression / Outputs over- current and short-circuit protected										
Enclosure rating	IP 54 ¹⁰⁾										
Ambient temperature operation	-25 °C ... +55 °C ¹¹⁾										
	-25 °C ... +55 °C										
Ambient temperature storage	-40 °C ... +70 °C										
Weight	Approx. 20 g										
	Approx. 25 g										
Housing material	ABS, PC										

- ¹⁾ Up to 15 expansion units can be connected
²⁾ Object with 90 % remission (based on standard white to DIN 5033). Scanning distance at response time 2 ms. Distance reduction at shorter response time (see LL3/ WLL190T-2 table)

- ³⁾ Scanning range at response time 2 ms. Range reduction at shorter response time (see LL3/ WLL190T-2 table)
⁴⁾ Average service life 100,000 h at T_a = +25 °C
⁵⁾ ± 10 %
⁶⁾ May not exceed or fall short of

- V_s tolerances
⁷⁾ Without load
⁸⁾ Selectable Q2, ext. teach or counter reset
⁹⁾ Do not bend below 0 °C
¹⁰⁾ Only with correct adaptation of the LL3 fiber-optic cable

- ¹¹⁾ Operating temperature may vary depending on number of connected units:
 4 - 8 units: -25 ... +50 °C (output current 50 mA),
 9 - 16 units: -25 ... +45 °C (output current 20 mA)

Sensitivity setting

The following optimization modes can be programmed:

a) Normal mode (default) - 4 alternatives

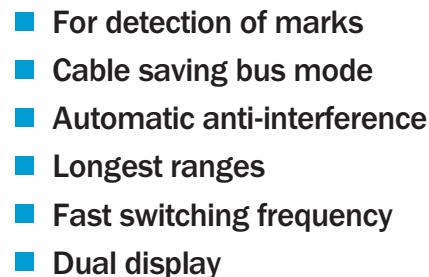
- max. teach-in,
- 1-point teach-in,
- 2-point teach-in,
- Auto teach-in

b) Zone teach-in (window technology)

c) Glass teach-in (detection of transparent objects)

Ordering information

Type	Order no.
WLL190T-2F292	6032579
WLL190T-2F393	6032577
WLL190T-2F494	6032575
WLL190T-2M393	6033300
WLL190T-2M492	6033296
WLL190T-2M494	6033298



- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Fiber-optic cables
- Mounting systems
- Tip adaptors

Base unit

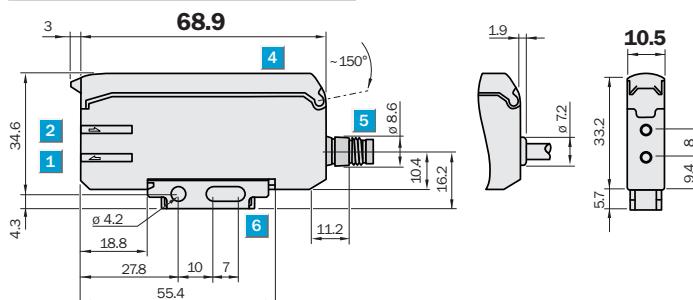
[illegible]

Diagram of the rear panel of the device with numbered callouts:

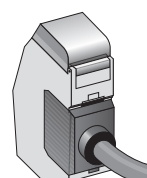
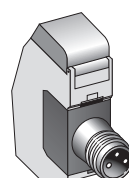
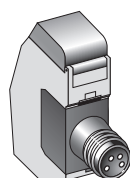
- 7: Power button
- 8: Ethernet ports
- 9: USB Type-A port
- 10: USB Type-C port
- 11: Audio jacks
- 12: Volume up button
- 13: Volume down button

- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver LED, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Locking of fiber-optic cables
- 4 Protective hood: can be folded out approx. 180°
- 5 Connector
- 6 Mounting bracket included (see accessories)
- 7 2 x indicator LED, orange:
lights up when switching output is active
- 8 Numeric display: 2 x 4-digit

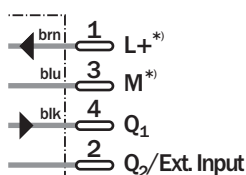
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
- 9 Step button < (manual switching threshold: higher;
or next function parameter)
- 10 Step button > (manual switching threshold: lower;
or previous function parameter)
- 11 "Teach-in" pushbutton
- 12 Mode/Enter button (programming button)
- 13 Operating mode selector switch:

"SET": active teach-in-switching threshold
"RUN": sensor mode and function parameter selection
- 14 Bus connector

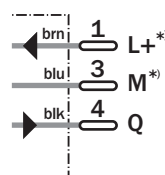
WLL190T-2E494	WLL190T-2E393	WLL190T-2E292
WLL190T-2L494	WLL190T-2L393	WLL190T-2L492



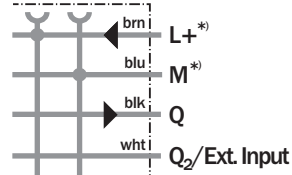
4 x 0.2 mm²



*) Only base unit



*) Only base unit



*) Only base unit

WLL190T-2		L393	L492	L494	E292	E393	E494				
Device type	Base unit ¹⁾										
	Extension unit										
Operating distance	0 ... 160 mm ²⁾										
Fiber-optic cable (proximity system)	LL3-DM01										
Adjustment of operating distance	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Scanning range typ. max.	0 ... 4,000 mm ³⁾										
Fiber-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01										
Scanning range, recommended	0 ... 900 mm ³⁾										
Fiber-optic cable (through-beam system)	LL3-TB01										
Sensitivity adjustment	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Precise correction	Step button +/- manual										
Light source, light type	LED, green light, 525 nm ⁴⁾										
Light spot diameter	Depending on scanning range										
Angle of dispersion	Approx. 65 ° (deviations see LL3 data)										
Supply voltage V_s	12 ... 24 V DC ⁵⁾										
Ripple	≤ 10 % ⁶⁾										
Power consumption	≤ 50 mA ⁷⁾										
Switching outputs	NPN, Q1, Q2 ⁸⁾										
	NPN, Q										
Switching mode	Light-/dark-switching, selectable										
Output current I _a max	≤ 100 mA										
Response time	Selectable: 60 μs/250 μs/2 ms										
Switching frequency	8333 Hz / 2000 Hz / 250 Hz										
Time delay	Programmable 0 ms ... 9,999 ms										
Time type	Programmable OFF/T _{OFF} /T _{ON} /ONE-SHOT										
Connection type	Cable, PVC, 2 m ⁹⁾										
	Connector, M8, 3-pin										
	Connector, M8, 4-pin										
VDE protection class	ⓘ										
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected										
Enclosure rating	IP 54 ¹⁰⁾										
Ambient temperature operation	-25 °C ... +55 °C ¹¹⁾										
	-25 °C ... +55 °C										
Ambient temperature storage	-40 °C ... +70 °C										
Weight	Approx. 20 g										
	Approx. 25 g										
Housing material	ABS, PC										

- ¹⁾ Up to 15 expansion units can be connected
²⁾ Object with 90 % remission (based on standard white to DIN 5033). Scanning distance at response time 2 ms. Distance reduction at shorter response time (see LL3/ WLL190T-2 table)

- ³⁾ Scanning range at response time 2 ms. Range reduction at shorter response time (see LL3/ WLL190T-2 table)
⁴⁾ Average service life 100,000 h at T_a = +25 °C
⁵⁾ ± 10 %
⁶⁾ May not exceed or fall short of

- V_s tolerances
⁷⁾ Without load
⁸⁾ Selectable Q2, ext. teach or counter reset
⁹⁾ Do not bend below 0 °C
¹⁰⁾ Only with correct adaptation of the LL3 fiber-optic cable

- ¹¹⁾ Operating temperature may vary depending on number of connected units:
 4 - 8 units: -25 ... +50 °C (output current 50 mA),
 9 - 16 units: -25 ... +45 °C (output current 20 mA)

Sensitivity setting

The following optimization modes can be programmed:

a) Normal mode (default) - 4 alternatives

- max. teach-in,
- 1-point teach-in,
- 2-point teach-in,
- Auto teach-in

b) Zone teach-in (window technology)

c) Glass teach-in (detection of transparent objects)

Ordering information

Type	Order no.
WLL190T-2E292	6032580
WLL190T-2E393	6032578
WLL190T-2E494	6032576
WLL190T-2L393	6033301
WLL190T-2L492	6033297
WLL190T-2L494	6033299

WLL180T – High power fiber-optic sensor





WLL180T

High power fiber-optic sensor

- World-wide shortest response time of a fiber-optic sensor to detect fast processes without loss of reliability
- High resolution signal processing for perfect detection of the tiniest or transparent objects
- Easy monitoring of nominal and actual values through 2 x 4-digit digital display
- Easy commissioning and product changeover through external teach input
- Reduced wiring through wire-saving in bus mode

WLL180T

WLL180T →

WLL180T – stand-alone and bus version with anti-interference and wire-saving

STAND-ALONE

Stand-alone

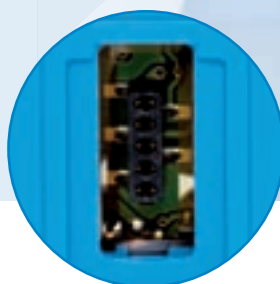
- Large range:
20 m (through-beam)/
1.400 mm (proximity)
- M8, 4-pin or cable
- Easy adjustment via display and buttons



BASE UNIT

Base and extension unit with 8-fold anti-interference

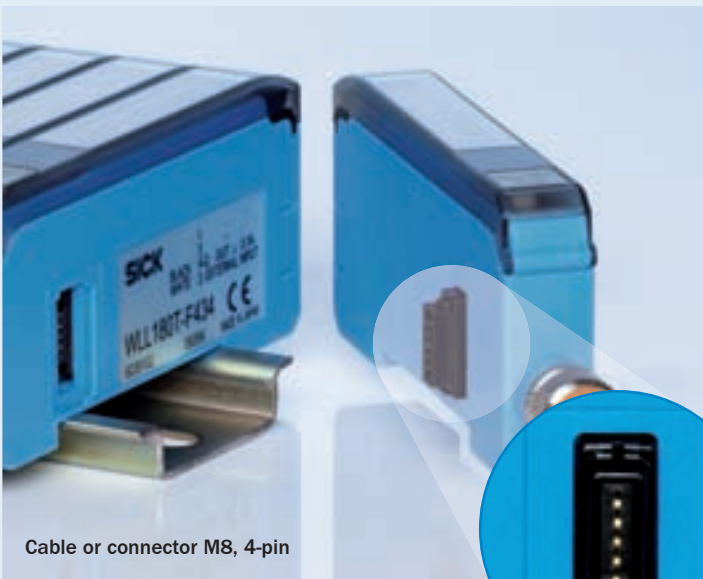
- Large range:
20 m (through-beam)/
1.400 mm (proximity)
- M8, 4-pin, cable
- Easy adjustment via display and buttons
- Anti-interference logic to avoid mutual interference if fiber heads are mounted close to each other





As an individual sensor (stand-alone) or in the bus combination of base unit and extension unit – WLL180T always fits.

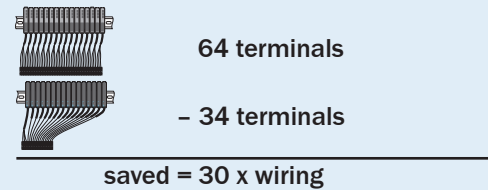
EXTENSION UNIT



Cable or connector M8, 4-pin

Extension unit with wire-saving for reduced wiring and 8-fold anti-interference

- Copying of parameters possible
- Voltage is only fed in once
- Up to 15 slaves are contacted (2-core)

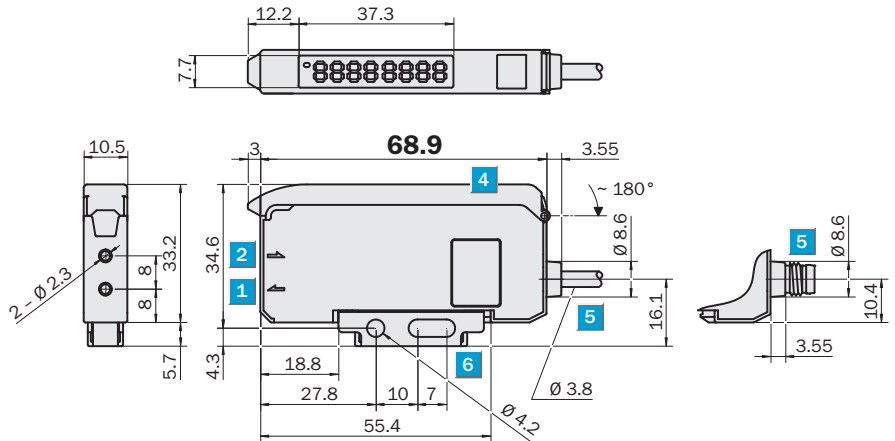


WLL180T

	Scanning distance 0 ... 1,400 mm
	Scanning range 0 ... 20 m
Fiber-optic photoelectric sensor	

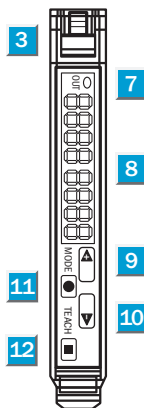
- Longest ranges
- Fast switching frequency
- Precise, stable switching point
- Dual display
- High resolution signal processing
- Appropriate for the LL3 fiber-optic cable series

Dimensional drawing



Adjustments possible

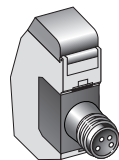
All types



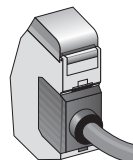
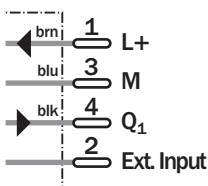
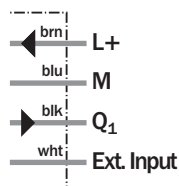
- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Locking of fiber-optic cables
- 4 Protective hood: can be folded out approx. 180°
- 5 Connector
- 6 Mounting bracket included (see accessories)
- 7 Indicator LED, orange: lights up when switching output is active
- 8 Numeric display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
- 9 Step button < (manual switching threshold: higher; or next function parameter)
- 10 Step button > (manual switching threshold: lower or previous function parameter)
- 11 Mode/Enter button (programming button)
- 12 "Teach-in" pushbutton

Connection types

WLL180T-P434	WLL180T-P432
WLL180T-N434	WLL180T-N432



4-pin, M8


4 x 0.2 mm²


Accessories

Mounting systems
Fiber-optic cables
Connector, M8, 4-pin
Tip adapters



Technical data		WLL180T	P434	N434	P432	N432						
Operating distance	0 ... 1,400 mm ¹⁾											
Fiber-optic cable (proximity system)	LL3-DK06											
Adjustment of operating distance	Teach-in: Teach button & cable											
Scanning range typ. max.	0 ... 20 m ²⁾											
Fiber-optic cable (through-beam system)	LL3-TX01											
Scanning range, recommended	0 ... 18 m ²⁾											
Fiber-optic cable (through-beam system)	LL3-TX01											
Sensitivity adjustment	Teach-in: Teach button & cable											
Precise correction	Step button +/- manual											
Light source, light type	LED, red light, 650 nm ³⁾											
Light spot diameter	Depending on scanning range											
Angle of dispersion	Approx. 65° (deviations see LL3 data)											
Supply voltage V_S	12 ... 24 V DC ⁴⁾											
Ripple	≤ 10 % ⁵⁾											
Power consumption	≤ 50 mA ⁶⁾											
Switching outputs	NPN, Q											
	PNP, Q											
Switching mode	Light/dark-switching, selectable											
Output current I _a max	≤ 100 mA											
Response time	Selectable: 16 µs/70 µs/250 µs/2 ms/8ms											
Switching frequency	31.2 kHz/7.1 kHz/2 kHz/250 Hz/62.5 Hz											
Time delay	Programmable 0 ms ... 9,999 ms											
Time type	Programmable											
	OFF/T _{OFF} /T _{ON} /ONE-SHOT/T _{ON} /OFF											
Connection type	Cable, PVC, 2 m ⁷⁾											
	Connector, M8, 4-pin											
VDE protection class	⏏											
Circuit protection	V _S connections reverse-polarity protected/											
	In-/outputs short-circuit protected/											
	Interference suppression/Outputs											
	overcurrent and short-circuit protected											
Enclosure rating	IP 50 ⁸⁾											
Ambient temperature T_A	Operation -25 °C ... +55 °C											
	Storage -40 °C ... +70 °C											
Weight	Approx. 25 g											
	Approx. 20 g											
Housing material	ABS, PC											

¹⁾ Object with 90 % remission (based on standard white DIN 5033). Scanning distance at response time 8 ms. Distance reduction at shorter response time (see LL3/WLL180T table)

²⁾ Scanning range at response time 8 ms. Range reduction at shorter response time (see LL3/WLL180T table)
³⁾ Average service life 100,000 h at T_A = +25 °C

⁴⁾ ± 10 %
⁵⁾ May not exceed or fall short of V_S tolerances
⁶⁾ Without load
⁷⁾ Do not bend below 0 °C

⁸⁾ Only with correct adaption of the LL3 fiber-optic cable

Order information	
Type	Order no.
WLL180T-P432	6039093
WLL180T-N432	6039094
WLL180T-P434	6039095
WLL180T-N434	6039096

Sensitivity setting
The following optimization modes can be programmed:
a) Normal mode (default) – 3 alternatives:
– 1-point teach-in
– 2-point teach-in
– Auto teach-in
b) Zone teach-in (window technology)
c) Glass teach-in (detection of transparent objects)

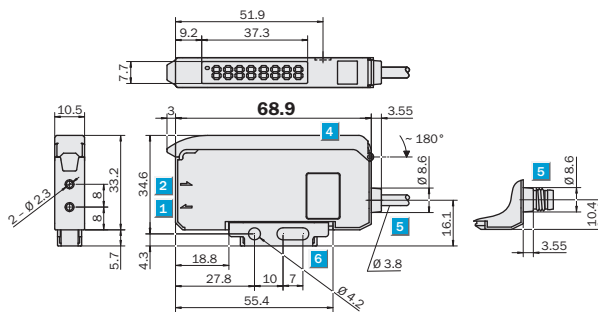
	Scanning distance 0 ... 1,400 mm
	Scanning range 0 ... 20 m
Fiber-optic photoelectric sensor	

- Cable saving bus mode
- Automatic anti-interference
- Longest ranges
- Fast switching frequency
- Dual display
- High resolution signal processing

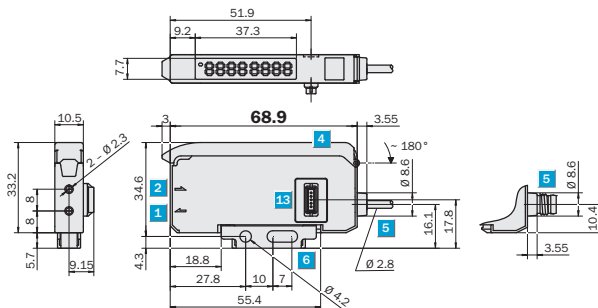


Dimensional drawing

Base unit

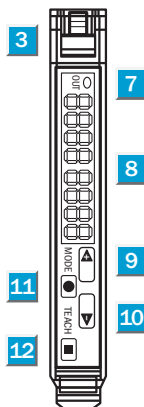


Expansion unit



Adjustments possible

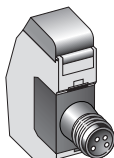
All types



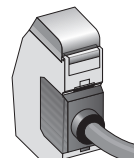
- 1 Sender LED, Installation of LL3 fiber-optic cable (Sender fiber)
- 2 Receiver, Installation of LL3 fiber-optic cable (receiver fiber)
- 3 Locking of fiber-optic cables
- 4 Protective hood: can be folded out approx. 180°
- 5 Connector
- 6 Mounting bracket included (see accessories)
- 7 Indicator LED, orange: lights up when switching output is active
- 8 Numeric display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
- 9 Step button < (manual switching threshold: higher; or next function parameter)
- 10 Step button > (manual switching threshold: lower or previous function parameter)
- 11 Mode/Enter button (programming button)
- 12 "Teach-in" pushbutton
- 13 Bus connector

Connection types

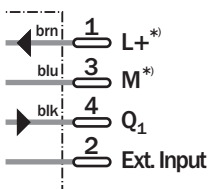
WLL180T-M434	WLL180T-L434	WLL180T-M432	WLL180T-L432
WLL180T-F434	WLL180T-E434	WLL180T-F232	WLL180T-E232



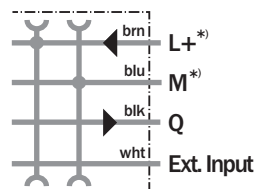
4-pin, M8



4 x 0.2 mm²



*) Only base unit



*) Only base unit

Accessories

Mounting systems
Fiber-optic cables
Connector, M8, 4-pin
Tip adapters

Technical data		WLL180T	M432	L432	M434	L434	F232	E232	F434	E434		
Device type	Base unit ¹⁾											
	Expansion unit											
Operating distance	0 ... 1,400 mm ²⁾											
Fiber-optic cable (proximity system)	LL3-DK06											
Adjustment of operating distance	Teach-in: Teach button & cable											
Scanning range typ. max.	0 ... 20 m ³⁾											
Fiber-optic cable (through-beam system)	LL3-TX01											
Scanning range, recommended	0 ... 18 m ³⁾											
Fiber-optic cable (through-beam system)	LL3-TX01											
Sensitivity adjustment	Teach-in: Teach button & cable											
Precise correction	Step button +/- manual											
Light source, light type	LED, red light, 650 nm ⁴⁾											
Light spot diameter	Depending on scanning range											
Angle of dispersion	Approx. 65° (deviations see LL3 data)											
Supply voltage V_S	12 ... 24 V DC ⁵⁾											
Ripple	≤ 10 % ⁶⁾											
Power consumption	≤ 50 mA ⁷⁾											
Switching outputs	NPN, Q											
	PNP, Q											
Switching mode	Light-/dark-switching, selectable											
Output current I _a max	≤ 100 mA											
Response time	Selectable: 16 µs/70 µs/250 µs/2 ms/8ms											
Switching frequency	31.2 kHz/7.1 kHz/2 kHz/250 Hz/62.5 Hz											
Time delay	Programmable 0 ms ... 9,999 ms											
Time type	Programmable											
	OFF/T _{OFF} /T _{ON} /ONE-SHOT/T _{ON} /OFF											
Connection type	Cable, PVC, 2 m ⁸⁾											
	Connector, M8, 4-pin											
VDE protection class	◊											
Circuit protection	V _S connections reverse-polarity protected/											
	In-/outputs short-circuit protected/											
	Interference suppression/Outputs											
	overcurrent and short-circuit protected											
Enclosure rating	IP 50 ⁹⁾											
Ambient temperature T_A	Operation -25 °C ... +55 °C ¹⁰⁾											
	Storage -40 °C ... +70 °C											
Weight	Approx. 20 g											
	Approx. 25 g											
Housing material	ABS, PC											

- ¹⁾ Up to 15 expansion units can be connected
²⁾ Object with 90 % remission (based on standard white DIN 5033). Scanning distance at response time 8 ms. Distance reduction at shorter response time (see LL3/WLL180T table)

- ³⁾ Scanning range at response time 8 ms. Range reduction at shorter response time (see LL3/WLL180T table)
⁴⁾ Average service life 100,000 h at T_A = +25 °C
⁵⁾ ± 10 %

- ⁶⁾ May not exceed or fall short of V_S tolerances
⁷⁾ Without load
⁸⁾ Do not bend below 0 °C
⁹⁾ Only with correct adaption of the LL3 fiber-optic cable

- ¹⁰⁾ Operation temperature may vary depending on number of connected units:
 4–8 units: -25 °C ... +50 °C (output current 50 mA),
 9–16 units: -25 °C ... +45 °C (output current 20 mA)

Sensitivity adjustment

The following optimization modes can be programmed:

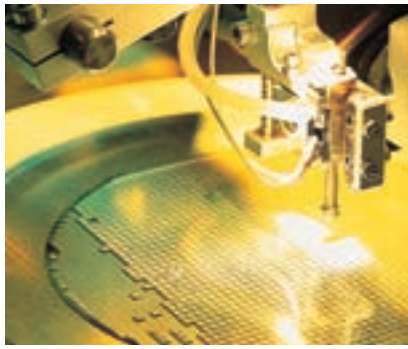
- a) Normal mode (default) – 3 alternatives:
- 1-point teach-in
 - 2-point teach-in
 - Auto teach-in
- b) Zone teach-in (window technology)
- c) Glass teach-in (detection of transparent objects)

Order information

Type	Order no.
WLL180T-M432	6039097
WLL180T-F232	6039098
WLL180T-L432	6039099
WLL180T-E232	6039100
WLL180T-M434	6039101
WLL180T-F434	6039102
WLL180T-L434	6039103
WLL180T-E434	6039104

WLL170(T) – Versatile





WLL170(T)

Versatile

- Fiber-optic cable sensor with easy handling, simple adjustment via potentiometer and switch
- Optimized for the individual applications
 - Manually adjusted sensitivity for all standard applications
 - Teach-in for fast set-up time
 - High-speed for fastest operations
 - Analog output for easy measurement and control

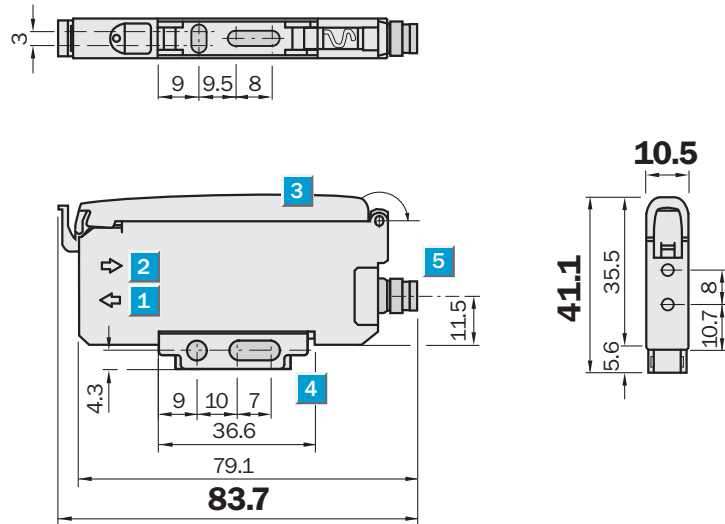
WLL170(T)

WLL170(T) →

	Scanning range 0 ... 4000 mm
Through-beam mode	
	Scanning distance 0 ... 160 mm
Proximity mode	

- Sender LED red
for standard applications
- Manual sensitivity adjustment
- Simple installation and alignment

Dimensional drawing



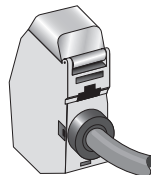
Adjustments possible



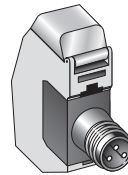
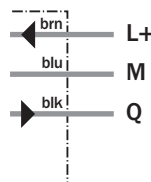
- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Protective hood, can be raised at both ends
- 4 Mounting bracket, included with delivery (see Accessories)
- 5 Connector
- 6 Indication of correct fiber-optic cable mounting
- 7 Indicator LED orange: lights up when switching output is active
- 8 LED signal strength indicator green, lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
- 9 Sensitivity scale 270°
- 10 Sensitivity control (10 revolutions)
- 11 Selector switch for OFF delay: "OFF DLY" (=ON) / "OFF", 40 ms fixed
- 12 Selector switch: "L.ON" (light switching) / "D.ON" (dark switching)

Connection type

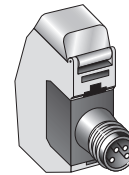
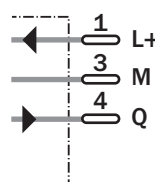
WLL170-2N132	WLL170-2N330	WLL170-2N430
WLL170-2P132	WLL170-2P330	WLL170-2P430



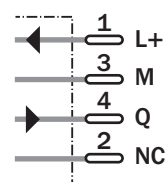
3 x 0.2 mm²



M8, 3-pin



M8, 4-pin



See chapter Accessories

Connector, M8, 3-pin
Connector, M8, 4-pin
Fiber-optic cable
Tip adapters
Mounting systems

Technical data		WLL170-2	N132	N330	N430	P132	P330	P430				
Operating distance	0 ... 160 mm ¹⁾											
Fiber-optic cable (proximity system):	LL3-DK06											
Adjustment of operating distance	Poti, 10 revolutions ²⁾											
Scanning range max. typ.	0 ... 4,000 mm											
Fiber-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01											
Operating range, recommended	0 ... 700 mm											
Fiber-optic cable (through-beam system)	LL3-TB01											
Sensitivity adjustment	Poti, 10 revolutions ²⁾											
Light source, light type	LED, red light, 660 nm ³⁾											
Light spot diameter	Depends on scanning range											
Angle of dispersion	Approx. 65° see LL3 fiber-optic data											
Supply voltage V_s	10 ... 30 V DC ⁴⁾											
Residual ripple	10 % ⁵⁾											
Power consumption	≤ 30 mA ⁶⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light/dark switching, switchable											
Output current I _a max	≤ 100 mA											
Response time	≤ 0.25 ms ⁷⁾											
Switching frequency	2,000 Hz ⁸⁾											
Time delay	40 ms fix, selectable by sliding switch											
Time type	Off delay t _{OFF}											
Connection type	Cable, Ø 3.8 mm, PVC, 2 m ⁹⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	◆											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference pulse suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 66 ¹⁰⁾											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 70 g											
Housing material	ABS/PC											

¹⁾ Object with 90 % remission (based on standard white to DIN 5033)

²⁾ Sensitivity scale 270°

³⁾ Average service life 100,000 h at

T_a = +25 °C

⁴⁾ Limit values

⁵⁾ May not exceed or fall short of V_s

tolerances

⁶⁾ Without load

⁷⁾ Signal transit time with resistive load

⁸⁾ With light/dark ratio 1:1

⁹⁾ Do not bend below 0 °C

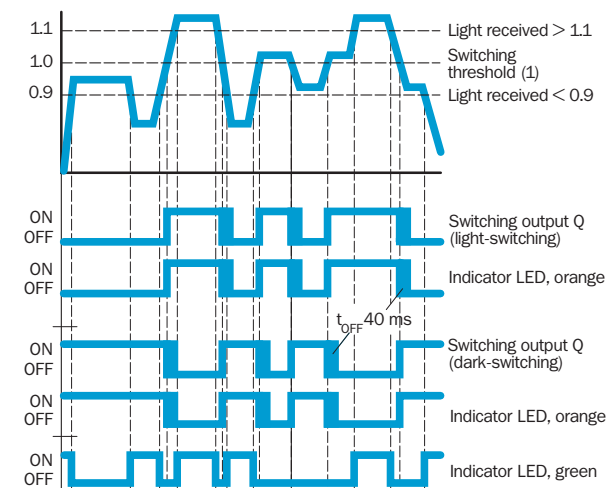
¹⁰⁾ With correctly attached fiber-optic cable LL3 and closed protection hood

Function diagram for WLL170-2

WLL170-2

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

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



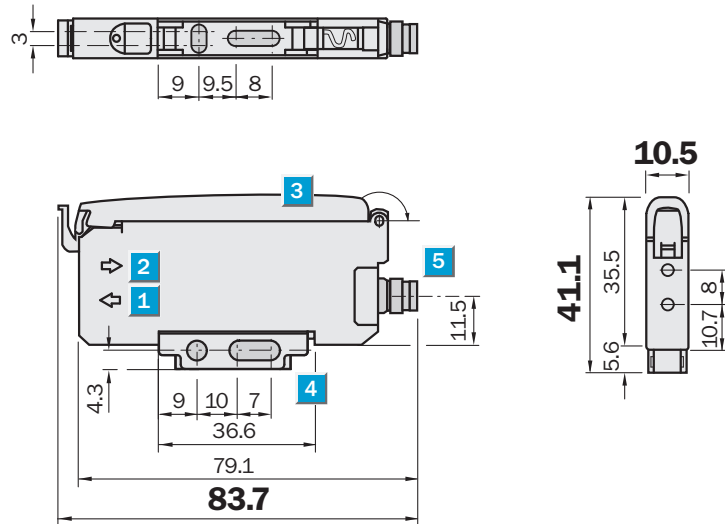
Ordering information

Type	Order no.
WLL170-2N132	6029515
WLL170-2N330	6029517
WLL170-2N430	6029518
WLL170-2P132	6029511
WLL170-2P330	6029513
WLL170-2P430	6029514

	Scanning range 0 ... 1700 mm
Through-beam mode	
	Scanning distance 0 ... 45 mm
Proximity mode	

- Sender LED green
for standard applications
and print mark recognition
- Manual sensitivity adjustment
- Simple installation and alignment

Dimensional drawing



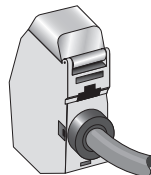
Adjustments possible



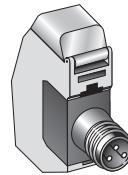
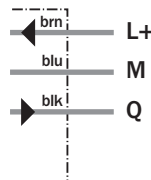
- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Protective hood, can be raised at both ends
- 4 Mounting bracket, included with delivery (see Accessories)
- 5 Connector
- 6 Indication of correct fiber-optic cable mounting
- 7 Indicator LED orange: lights up when switching output is active
- 8 LED signal strength indicator green, lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
- 9 Sensitivity scale 270°
- 10 Sensitivity control (10 revolutions)
- 11 Selector switch for OFF delay: "OFF DLY" (=ON) / "OFF", 40 ms fixed
- 12 Selector switch: "L.ON" (light switching) / "D.ON" (dark switching)

Connection type

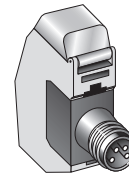
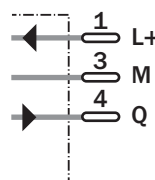
WLL170-2N192	WLL170-2N390	WLL170-2N490
WLL170-2P192	WLL170-2P390	WLL170-2P490



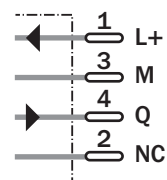
3 x 0.2 mm²



M8, 3-pin



M8, 4-pin



See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Fiber-optic cable
- Tip adapters
- Mounting systems

Technical data		WLL170-2	N192	N390	N490	P192	P390	P490				
Operating distance	0 ... 45 mm ¹⁾											
Fiber-optic cable (proximity system):	LL3-DK06											
Adjustment of operating distance	Poti, 10 revolutions ²⁾											
Scanning range max. typ.	0 ... 1,700 mm											
Fiber-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01											
Operating range, recommended	0 ... 350 mm											
Fiber-optic cable (through-beam system)	LL3-TB01											
Sensitivity adjustment	Poti, 10 revolutions ²⁾											
Light source, light type	LED, green light, 520 nm ³⁾											
Light spot diameter	Depends on scanning range											
Angle of dispersion	Approx. 65° see LL3 fiber-optic data											
Supply voltage V_s	10 ... 30 V DC ⁴⁾											
Residual ripple	10 % ⁵⁾											
Power consumption	≤ 30 mA ⁶⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light/dark switching, switchable											
Output current I _a max	≤ 100 mA											
Response time	≤ 0.25 ms ⁷⁾											
Switching frequency	2,000 Hz ⁸⁾											
Time delay	40 ms fix, selectable by sliding switch											
Time type	Off delay t _{OFF}											
Connection type	Cable, Ø 3.8 mm, PVC, 2 m ⁹⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	◆											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference pulse suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 66 ¹⁰⁾											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 70 g											
Housing material	ABS/PC											

¹⁾ Object with 90 % remission (based on standard white to DIN 5033)

²⁾ Sensitivity scale 270°

³⁾ Average service life 100,000 h at

T_a = +25 °C

⁴⁾ Limit values

⁵⁾ May not exceed or fall short of V_s

tolerances

⁶⁾ Without load

⁷⁾ Signal transit time with resistive load

⁸⁾ With light/dark ratio 1:1

⁹⁾ Do not bend below 0 °C

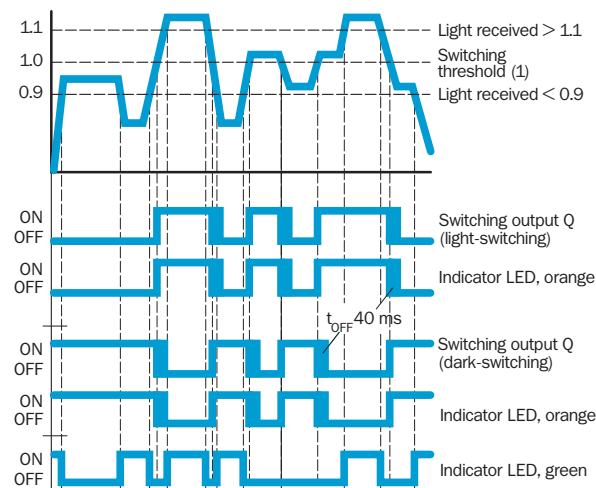
¹⁰⁾ With correctly attached fiber-optic cable LL3 and closed protection hood

Function diagram for WLL170-2

■ WLL170-2

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

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



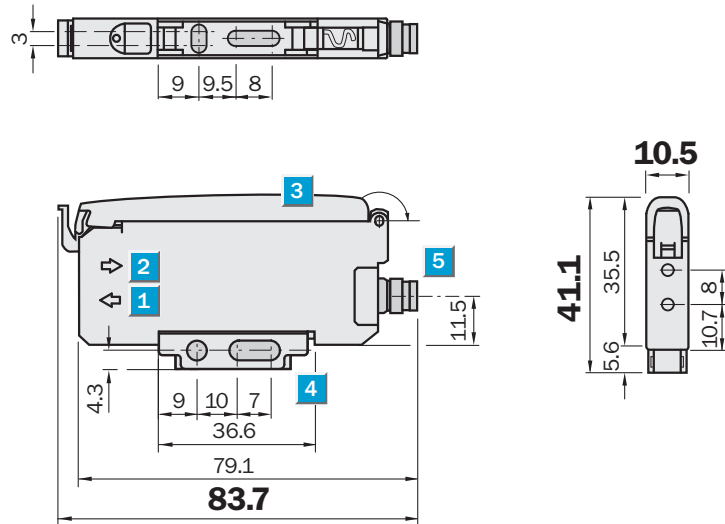
Ordering information

Type	Order no.
WLL170-2N192	6029523
WLL170-2N390	6029525
WLL170-2N490	6029526
WLL170-2P192	6029519
WLL170-2P390	6029521
WLL170-2P490	6029522

	Scanning range 0 ... 1600 mm
Through-beam mode	
	Scanning distance 0 ... 65 mm
Proximity mode	

- High speed 10,000/sec.,
for extremely fast processes
- Sender LED red
- Manual sensitivity adjustment
- Time delay 40 ms
for signal extension

Dimensional drawing



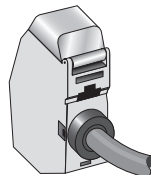
Adjustments possible



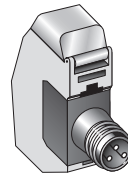
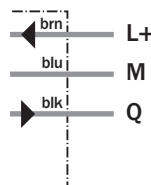
- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Protective hood, can be raised at both ends
- 4 Mounting bracket, included with delivery (see Accessories)
- 5 Connector
- 6 Indication of correct fiber-optic cable mounting
- 7 Indicator LED orange: lights up when switching output is active
- 8 LED signal strength indicator green, lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
- 9 Sensitivity scale 270°
- 10 Sensitivity control (10 revolutions)
- 11 Selector switch for OFF delay: "OFF DLY" (=ON) / "OFF", 40 ms fixed
- 12 Selector switch: "LON" (light switching) / "D.ON" (dark switching)

Connection type

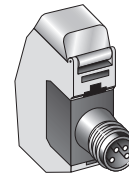
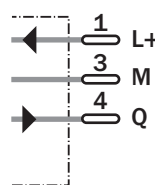
WLL170-2N162	WLL170-2N360	WLL170-2N460
WLL170-2P162	WLL170-2P360	WLL170-2P460



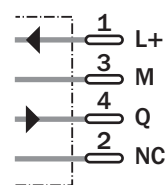
3 x 0.2 mm²



M8, 3-pin



M8, 4-pin



See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Fiber-optic cable
- Tip adapters
- Mounting systems

Technical data		WLL170-2	N162	N360	N460	P162	P360	P460				
Operating distance	0 ... 65 mm ¹⁾											
Fiber-optic cable (proximity system):	LL3-DB01											
Adjustment of operating distance	Poti, 10 revolutions ²⁾											
Scanning range max. typ.	0 ... 1,600 mm											
Fiber-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01											
Operating range, recommended	0 ... 350 mm											
Fiber-optic cable (through-beam system)	LL3-TB01											
Sensitivity adjustment	Poti, 10 revolutions ²⁾											
Light source, light type	LED, Red light, 660 nm ³⁾											
Light spot diameter	Depends on scanning range											
Angle of dispersion	Approx. 65° see LL3 fiber-optic data											
Supply voltage V_s	10 ... 30 V DC ⁴⁾											
Residual ripple	10 % ⁵⁾											
Power consumption	≤ 30 mA ⁶⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light/dark switching, switchable											
Output current I _a max	≤ 100 mA											
Response time	≤ 50 µs ⁷⁾											
Switching frequency	10,000 Hz ⁸⁾											
Time delay	40 ms fix, selectable by sliding switch											
Time type	Off delay t _{OFF}											
Connection type	Cable, Ø 3.8 mm, PVC, 2 m ⁹⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	⊕											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference pulse suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 66 ¹⁰⁾											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 70 g											
Housing material	ABS/PC											

¹⁾ Object with 90 % remission (based on standard white to DIN 5033)

²⁾ Sensitivity scale 270°

³⁾ Average service life 100,000 h at

T_a = +25 °C

⁴⁾ Limit values

⁵⁾ May not exceed or fall short of V_s

tolerances

⁶⁾ Without load

⁷⁾ Signal transit time with resistive load

⁸⁾ With light/dark ratio 1:1

⁹⁾ Do not bend below 0 °C

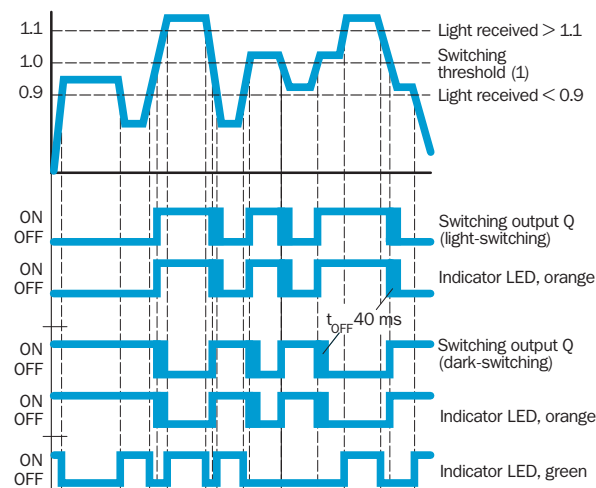
¹⁰⁾ With correctly attached fiber-optic cable LL3 and closed protection hood

Function diagram for WLL170-2

WLL170-2

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

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



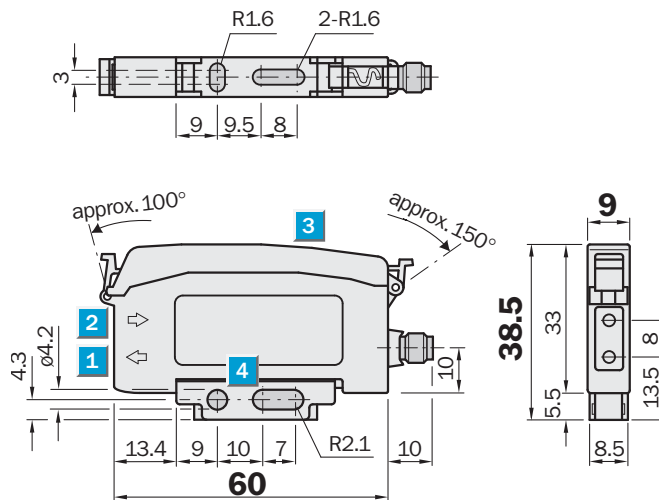
Ordering information

Type	Order no.
WLL170-2N162	6029531
WLL170-2N360	6029533
WLL170-2N460	6029534
WLL170-2P162	6029527
WLL170-2P360	6029529
WLL170-2P460	6029530

- Analog output voltage 1...5 V
- Large range of suitable LL3 fiber-optic cables
- Ideal for more complex requirements, e.g. positioning tasks, turbidity/transmission measurement, contrast resolution



Dimensional drawing



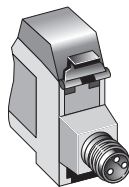
WLL170A-V 132

WLL170A-V 330

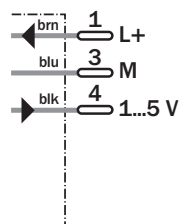
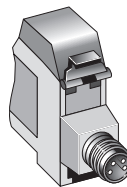
WLL170A-V 430



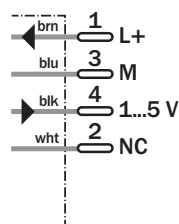
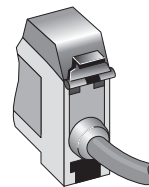
- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Protective hood: can be raised at both ends, removable
- 4 Mounting bracket, included (see Accessories)
- 5 Indicator LED, orange: analog output with saturation ($\geq 5\text{ V}$)
- 6 LED signal strength indicator, green: lights up when light received
- 7 Sensitivity scale, min./max. = 270°
- 8 Sensitivity control (min./max. = 7 revolutions)
- 9 Selector switch for analog output response time

WLL170A-V330

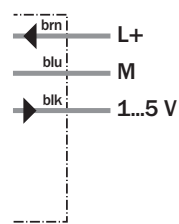
3-pin, M8

WLL170A-V 430

4-pin, M8

WLL170A-V 132

Ø 4 mm



Technical data		WLL170T-	V 132	V 330	V 430							
Suitable fiber-optic cable	LL3 plastic fiber-optic cables											
Scanning range¹⁾	Depends on fiber-optic cable used											
Recommended operating ranges¹⁾	Max. 0 ... 600 mm (through-beam syst.) (with tip adapters 0 ... 3200 mm)											
Recommended operating distance¹⁾	Max. 0 ... 100 mm ²⁾ (proximity system)											
Light source³⁾, light type	LED, visible red light											
Light spot diameter of LL3	Depends on scanning range											
Disp. angle of LL3 fiber-optic cable	Approx. 65° ⁴⁾											
Supply voltage V_S⁵⁾	10 ... 30 V DC											
Ripple ⁶⁾	10 %											
Current consumption ⁷⁾	≤ 40 mA											
Analog output												
Voltage output	1 ... 5 V											
	1 V = no light received											
	5 V = saturation											
Load current (max.)	10 mA											
Output resistance (R_i)	47 Ω											
Load resistance	≥ 5 kΩ (recommended)											
Response time, selectable⁸⁾	1 ms/10 ms											
Sensitivity, adjustable	Potentiometer, 7 turns ⁹⁾											
Connection types cable ¹⁰⁾	PVC, 2 m; 3 x 0.2 mm ² , Ø 4.0 mm											
	plug	M8, 3-pin										
	plug	M8, 4-pin										
Cable extension	Max. 100 m; signal loss to be expected											
Circuit protection¹¹⁾	A, C, D											
VDE protection class	◆											
Enclosure rating	IP 50											
Ambient temperature T_A	Operation -25 °C ... +55 °C											
	Storage -40 °C ... +70 °C											
Weight												
with cable	Approx. 60 g											
with M8 plug	Approx. 20 g											
Housing material	ABS											

1) See Accessories; selection table for LL3 fiber-optic cables

2) Object with 90 % remission (based on standard white to DIN 5033)

3) Average service life 100,000 h at T_A = +25 °C

4) Deviations, see data for LL3

5) Limit values

6) May not exceed or fall short of V_S tolerances

7) Without load

8) Delay time: change in received light/change in analog output, (90 % of upper range value)

9) Scale 270°

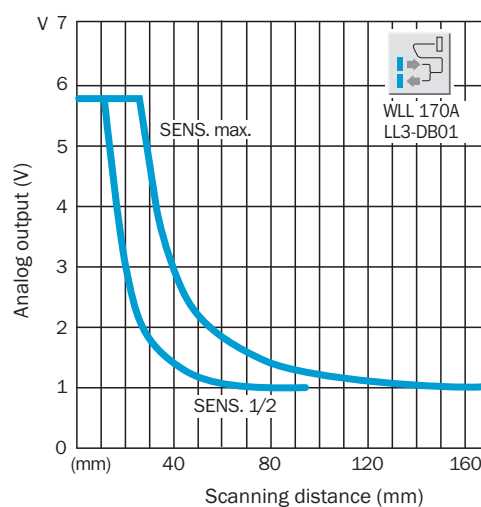
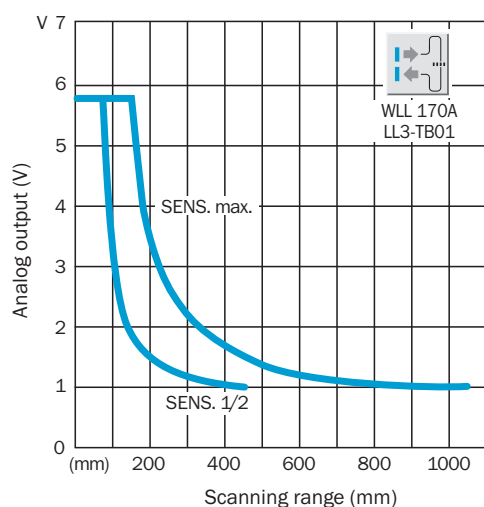
10) Do not bend below 0 °C

11) A = V_S connections reverse-polarity protected

C = Interference pulse suppression

D = Outputs overcurrent and short-circuit protected

WLL170A, analog, typical curves



Order information

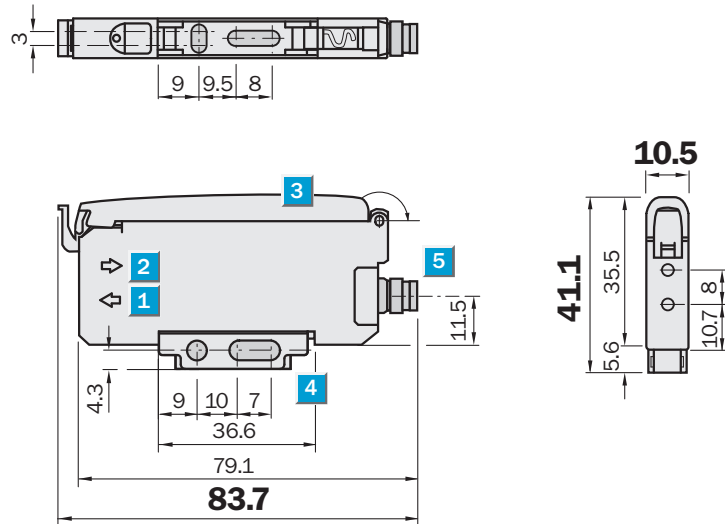
Type	Order no.
WLL170A-V132	6021078
WLL170A-V330	6021962
WLL170A-V430	6021080

	Scanning distance 0 ... 160 mm
	Scanning range 0 ... 3,500 mm

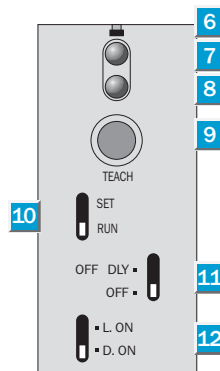
Fiber-optic photoelectric sensor

- Red sender LED
- For standard applications and mark recognition
- Easy alignment and commissioning by teach-in

Dimensional drawing



Adjustments possible



- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Protective hood, can be raised at both ends
- 4 Mounting bracket, included with delivery (see Accessories)
- 5 Connector
- 6 Indication of correct fiber-optic cable mounting
- 7 Indicator LED orange: lights up when switching output is active
- 8 LED signal strength indicator green, lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
- 9 Teach-in button
- 10 Mode selector switch: SET = teach-in mode. RUN = sensor mode
- 11 Selector switch for OFF delay: "OFF DLY" (=ON) / "OFF", 40 ms fixed
- 12 Selector switch: "L.ON" (light switching) / "D.ON" (dark switching)

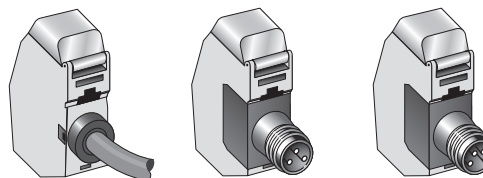


Accessories

Connector, M8, 3-pin
Connector, M8, 4-pin
Fiber-optic cables
Mounting systems
Tip adapters

Connection type

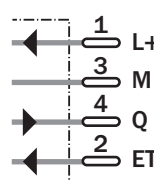
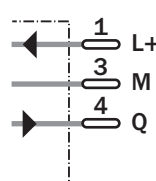
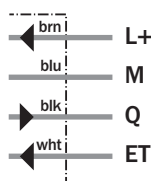
WLL170T-2N132	WLL170T-2N330	WLL170T-2N430
WLL170T-2P132	WLL170T-2P330	WLL170T-2P430



4 x 0.2 mm²

M8, 3-pin

M8, 4-pin



WLL170T-2		N132	N330	N430	P132	P330	P430				
Operating distance	0 ... 160 mm ¹⁾										
Fiber-optic cable (proximity system)	LL3-DM01										
Adjustment of operating distance	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Scanning range typ. max.	0 ... 3,500 mm										
Fiber-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01										
Scanning range, recommended	0 ... 700 mm										
Fiber-optic cable (through-beam system)	LL3-TB01										
Sensitivity adjustment	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Light source, light type	LED, red light, 660 nm ²⁾										
Light spot diameter	Depends on scanning range										
Angle of dispersion	Ca. 65° (see LL3 data for deviations)										
Supply voltage V_s	10 ... 30 V DV ³⁾										
Ripple	10 % ⁴⁾										
Power consumption	≤ 30 mA ⁵⁾										
Switching outputs	NPN: open collector: Q										
	PNP: open collector: Q										
Switching mode	Light/dark-switching via slide switch										
Output current I _a max	100 mA										
Response time	≤ 0.25 ms ⁶⁾										
Switching frequency	2,000 Hz ⁷⁾										
Time delay	OFF delay 40 ms fix, selectable by sliding switch										
Teach-in input (ET)	Teach 0 V										
	Run V _s or unswitched										
	Teach > 10 V ... < V _s										
	Run 0 V or unswitched										
Time type	Off delay t _{OFF}										
Connection type	Cable, PVC, 2 m ⁸⁾										
	Connector, M8, 3-pin										
	Connector, M8, 4-pin										
VDE protection class	◊										
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected										
Enclosure rating	IP 66 ⁹⁾										
Ambient temperature operation	-25 °C ... +55 °C										
Ambient temperature storage	-40 °C ... +70 °C										
Weight	Ca. 60 g										
Housing material	ABS										

¹⁾ Object with 90 % remission (based on standard white to DIN 5033)
²⁾ Average service life 100,000 h

at T_a = +25 °C
³⁾ Limit values
⁴⁾ May not exceed or fall short of

V_s tolerances
⁵⁾ Without load
⁶⁾ Signal transit time with resistive load

⁷⁾ With light/dark ratio 1:1
⁸⁾ Do not bend below 0 °C
⁹⁾ With correctly attached fiber-optic cable LL3 and closed protection hood

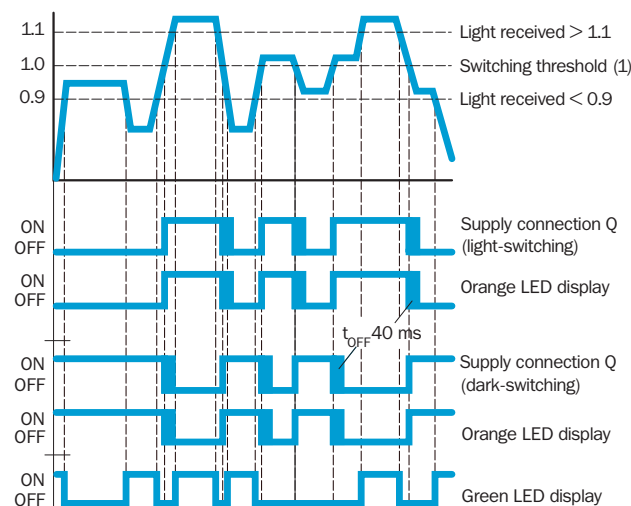
Function diagram

WLL170T-2 in sensor mode

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

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

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



Ordering information

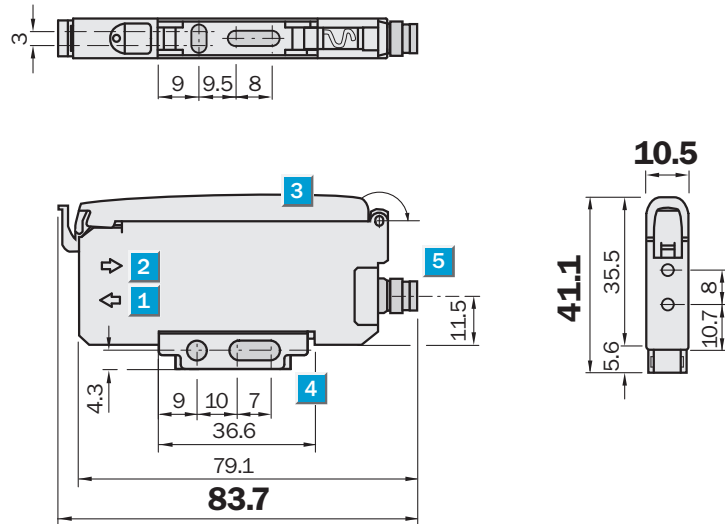
Type	Order No.
WLL170T-2N132	6033951
WLL170T-2N330	6033952
WLL170T-2N430	6033953
WLL170T-2P132	6033948
WLL170T-2P330	6033949
WLL170T-2P430	6033950

	Scanning distance 0 ... 35 mm
	Scanning range 0 ... 1,600 mm

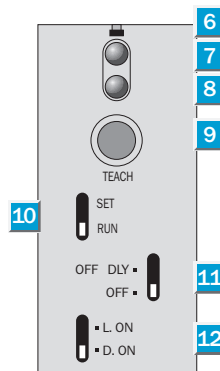
Fiber-optic photoelectric sensor

- Green sender LED
- Ideal for recognition of red marks, contrasts or parts
- Easy alignment and commissioning by teach-in

Dimensional drawing



Adjustments possible



- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Protective hood, can be raised at both ends
- 4 Mounting bracket, included with delivery (see Accessories)
- 5 Connector
- 6 Indication of correct fiber-optic cable mounting
- 7 Indicator LED orange: lights up when switching output is active
- 8 LED signal strength indicator green, lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
- 9 Teach-in button
- 10 Mode selector switch: SET = teach-in mode. RUN = sensor mode
- 11 Selector switch for OFF delay: "OFF DLY" (=ON) / "OFF", 40 ms fixed
- 12 Selector switch: "L.ON" (light switching) / "D.ON" (dark switching)

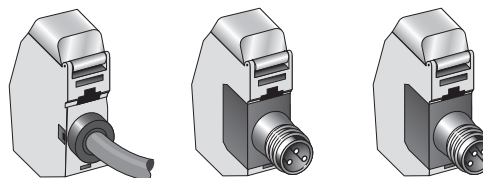


Accessories

Connector, M8, 3-pin
Connector, M8, 4-pin
Fiber-optic cables
Mounting systems
Tip adapters

Connection type

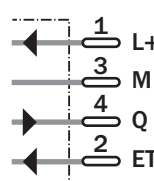
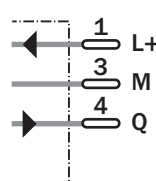
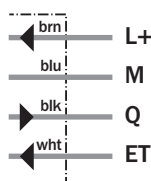
WLL170T-2N192	WLL170T-2N390	WLL170T-2N490
WLL170T-2P192	WLL170T-2P390	WLL170T-2P490



4 x 0.2 mm²

M8, 3-pin

M8, 4-pin



WLL170T-2		N192	N390	N490	P192	P390	P490				
Operating distance	0 ... 35 mm ¹⁾										
Fiber-optic cable (proximity system)	LL3-DM01										
Adjustment of operating distance	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Scanning range typ. max.	0 ... 1,600 mm										
Fiber-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01										
Scanning range, recommended	0 ... 270 mm										
Fiber-optic cable (through-beam system)	LL3-TB01										
Sensitivity adjustment	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Light source, light type	LED, green light, 525 nm ²⁾										
Light spot diameter	Depends on scanning range										
Angle of dispersion	Ca. 65° (see LL3 data for deviations)										
Supply voltage V_s	10 ... 30 V DC ³⁾										
Ripple	10 % ⁴⁾										
Power consumption	≤ 30 mA ⁵⁾										
Switching outputs	NPN: open collector: Q										
	PNP: open collector: Q										
Switching mode	Light/dark-switching via slide switch										
Output current I _a max	100 mA										
Response time	≤ 0.25 ms ⁶⁾										
Switching frequency	2,000 Hz ⁷⁾										
Time delay	OFF delay 40 ms fix, selectable by sliding switch										
Teach-in input (ET)	Teach 0 V										
	Run V _s or unswitched										
	Teach > 10 V ... < V _s										
	Run 0 V or unswitched										
Time type	Off delay t _{OFF}										
Connection type	Cable, PVC, 2 m ⁸⁾										
	Connector, M8, 3-pin										
	Connector, M8, 4-pin										
VDE protection class	◊										
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected										
Enclosure rating	IP 66 ⁹⁾										
Ambient temperature operation	-25 °C ... +55 °C										
Ambient temperature storage	-40 °C ... +70 °C										
Weight	Ca. 60 g										
Housing material	ABS										

¹⁾ Object with 90 % remission (based on standard white to DIN 5033)
²⁾ Average service life 100,000 h

at T_a = +25 °C
³⁾ Limit values
⁴⁾ May not exceed or fall short of

V_s tolerances
⁵⁾ Without load
⁶⁾ Signal transit time with resistive load

⁷⁾ With light/dark ratio 1:1
⁸⁾ Do not bend below 0 °C
⁹⁾ With correctly attached fiber-optic cable LL3 and closed protection hood

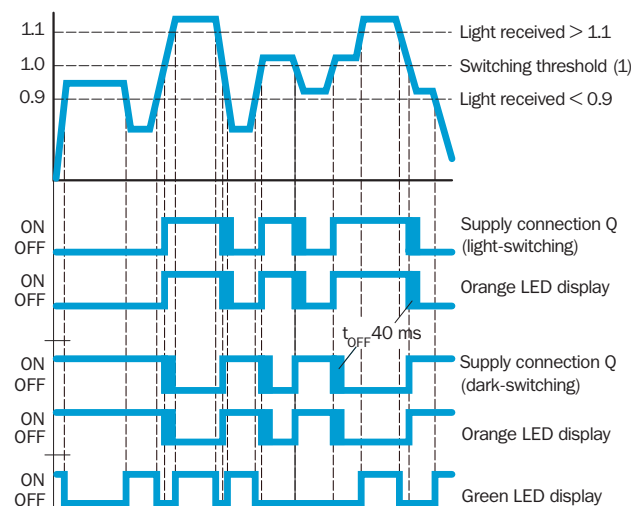
Function diagram

WLL170T-2 in sensor mode

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

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

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



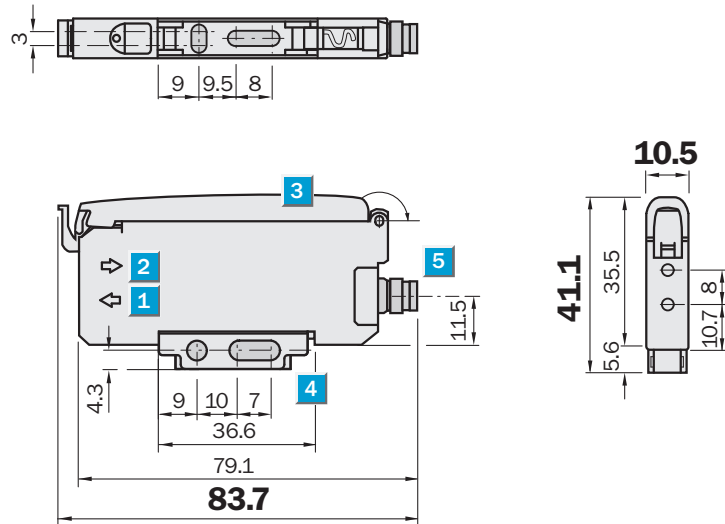
Ordering information

Type	Order No.
WLL170T-2N192	6033957
WLL170T-2N390	6033958
WLL170T-2N490	6033959
WLL170T-2P192	6033954
WLL170T-2P390	6033955
WLL170T-2P490	6033956

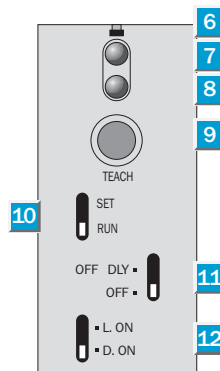
	Scanning distance 0 ... 60 mm
	Scanning range 0 ... 1,500 mm
Fiber-optic photoelectric sensor	

- High speed 10,000/sec., for extremely fast processes
- Red sender LED
- Easy alignment and commissioning by teach-in

Dimensional drawing



Adjustments possible



- 1 Sender LED, installation of LL3 fiber-optic cable (sender fiber)
- 2 Receiver, installation of LL3 fiber-optic cable (receiver fiber)
- 3 Protective hood, can be raised at both ends
- 4 Mounting bracket, included with delivery (see Accessories)
- 5 Connector
- 6 Indication of correct fiber-optic cable mounting
- 7 Indicator LED orange: lights up when switching output is active
- 8 LED signal strength indicator green, lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
- 9 Teach-in button
- 10 Mode selector switch: SET = teach-in mode. RUN = sensor mode
- 11 Selector switch for OFF delay: "OFF DLY" (=ON) / "OFF", 40 ms fixed
- 12 Selector switch: "L.ON" (light switching) / "D.ON" (dark switching)

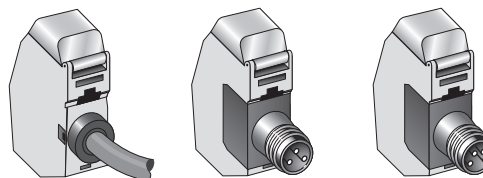


Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Fiber-optic cables
- Mounting systems
- Tip adapters

Connection type

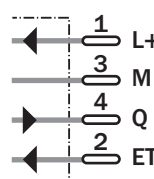
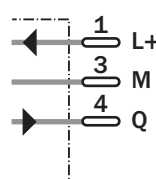
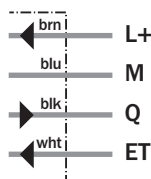
WLL170T-2N162	WLL170T-2N360	WLL170T-2N460
WLL170T-2P162	WLL170T-2P360	WLL170T-2P460



4 x 0.2 mm²

M8, 3-pin

M8, 4-pin



WLL170T-2		N162	N360	N460	P162	P360	P460				
Operating distance	0 ... 60 mm ¹⁾										
Fiber-optic cable (proximity system)	LL3-DM01										
Adjustment of operating distance	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Scanning range typ. max.	0 ... 1,500 mm										
Fiber-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01										
Scanning range, recommended	0 ... 300 mm										
Fiber-optic cable (through-beam system)	LL3-TB01										
Sensitivity adjustment	Teach-in: single-teach button & cable										
	Teach-in: single-teach button										
Light source, light type	LED, red light, 660 nm ²⁾										
Light spot diameter	Depends on scanning range										
Angle of dispersion	Ca. 65° (see LL3 data for deviations)										
Supply voltage V_s	10 ... 30 V DC ³⁾										
Ripple	10 % ⁴⁾										
Power consumption	≤ 30 mA ⁵⁾										
Switching outputs	NPN: open collector: Q										
	PNP: open collector: Q										
Switching mode	Light/dark-switching via slide switch										
Output current I _a max	100 mA										
Response time	≤ 50 µs ⁶⁾										
Switching frequency	10,000 Hz ⁷⁾										
Time delay	OFF delay 40 ms fix, selectable by sliding switch										
Teach-in input (ET)	Teach 0 V										
	Run V _s or unswitched										
	Teach > 10 V ... < V _s										
	Run 0 V or unswitched										
Time type	Off delay t _{OFF}										
Connection type	Cable, PVC, 2 m ⁸⁾										
	Connector, M8, 3-pin										
	Connector, M8, 4-pin										
VDE protection class	◊										
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit										
Enclosure rating	IP 66 ⁹⁾										
Ambient temperature operation	-25 °C ... +55 °C										
Ambient temperature storage	-40 °C ... +70 °C										
Weight	Ca. 60 g										
Housing material	ABS										

¹⁾ Object with 90 % remission (based on standard white to DIN 5033)
²⁾ Average service life 100,000 h

at T_a = +25 °C
³⁾ Limit values
⁴⁾ May not exceed or fall short of

V_s tolerances
⁵⁾ Without load
⁶⁾ Signal transit time with resistive load

⁷⁾ With light/dark ratio 1:1
⁸⁾ Do not bend below 0 °C
⁹⁾ With correctly attached fiber-optic cable LL3 and closed protection hood

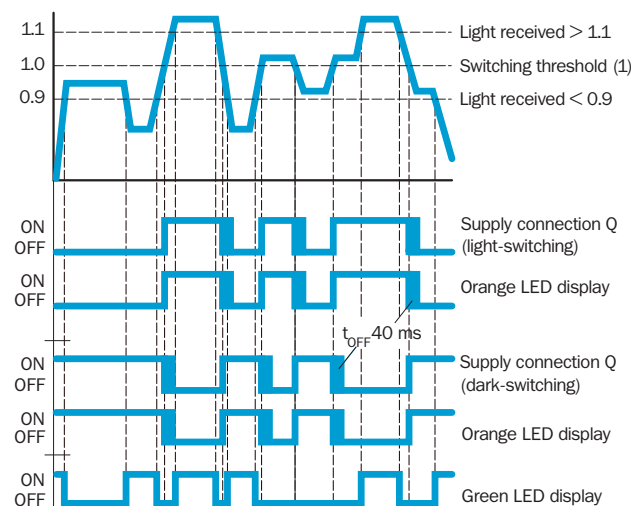
Function diagram

WLL170T-2 in sensor mode

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

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

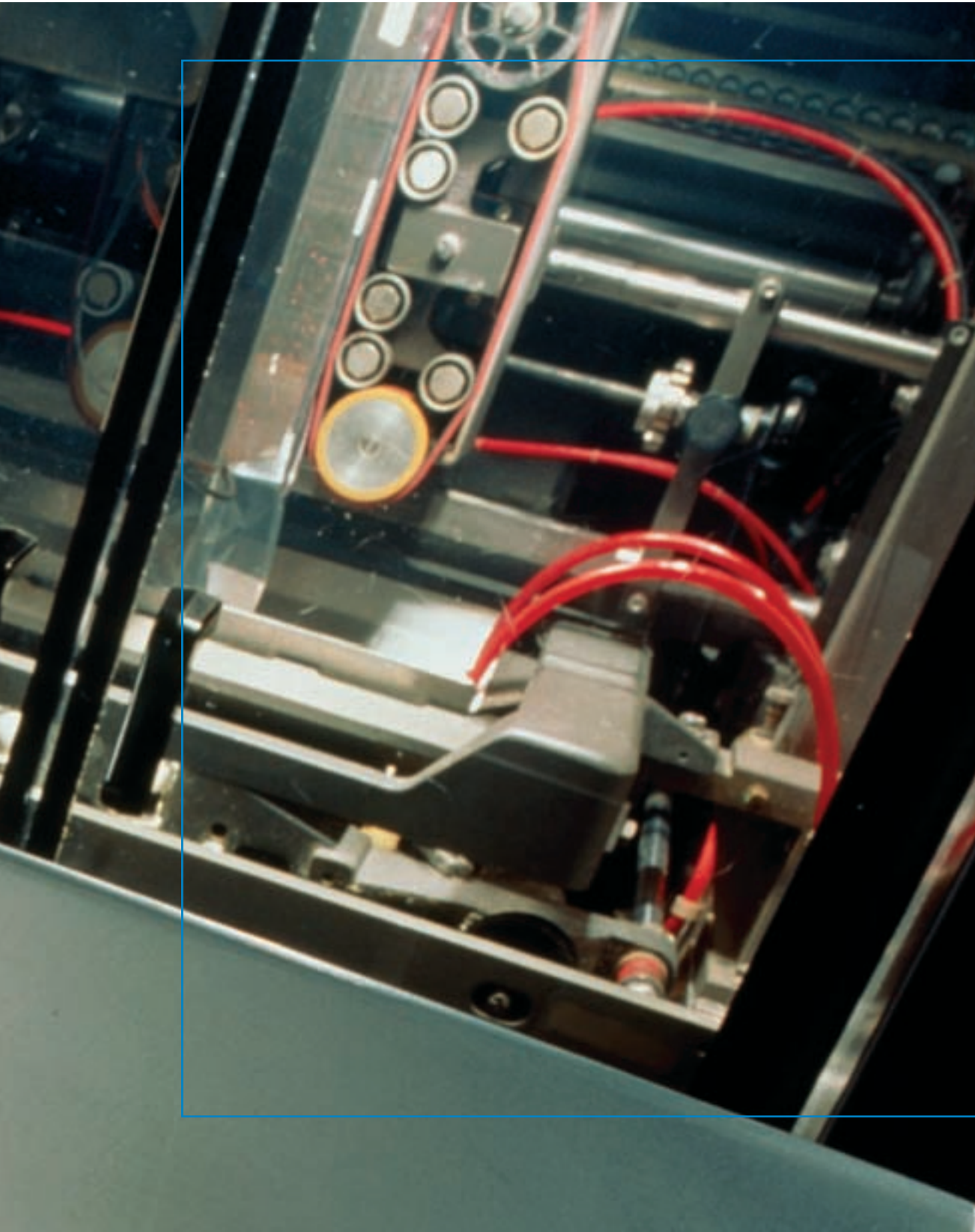
Green LED display: lights up if light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).



Ordering information

Type	Order No.
WLL170T-2N162	6033960
WLL170T-2N360	6033961
WLL170T-2N460	6033962
WLL170T-2P162	6033963
WLL170T-2P360	6033964
WLL170T-2P460	6033965

WLL260 – Reliable





WLL260
Reliable

- Flexible electrical connection
M12 plug connector or terminal block
- Anti-tamper through screw-on cover
- Open for every supply voltage
10 ... 30 V DC or 24 ... 240 V AC

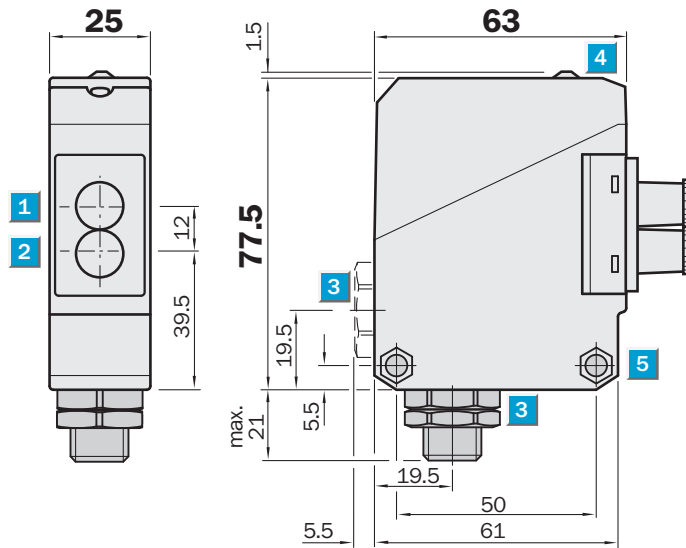
WLL260 →

	Scanning range max. 800 mm
Through-beam systems	
	Scanning distance max. 65 (110) mm
Proximity systems	

- Broad range of fiber-optic cables for through-beam and proximity applications
- Easy adaption of fiber-optic cable using cap nut
- Sensitivity, adjustable
- Terminal chamber, at bottom and rear or plug M12, 4-pin
- Test input

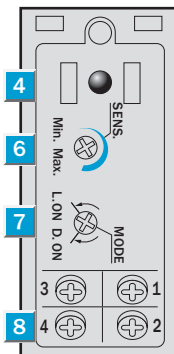


Dimensional drawing



Adjustments possible

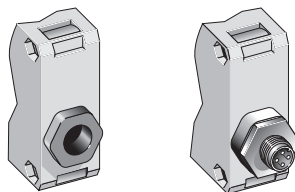
WLL260-F240
WLL260-F440
WLL260-E240



- 1 Middle of optic axis, receiver
- 2 Middle of optic axis, sender
- 3 Cable entry gland 1/2" PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear; or M12 equipment plug, bottom
- 4 LED signal strength indicator, red
- 5 Through hole Ø 5.2 mm on both sides for M5 hex nut
- 6 Sensitivity control
- 7 Light/dark rotary switch L.ON = light-switching, D.ON = dark-switching
- 8 Terminals

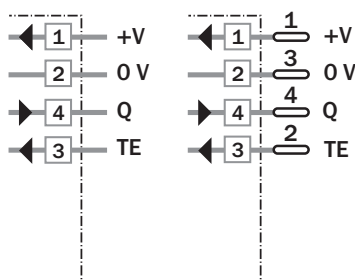
Connection type

WLL260-E240	WLL260-F440
WLL260-F240	



Terminals

4-pin, M12



See chapter Accessories

Cables and connectors
Mounting systems ^{*)}
Fiber-optic cables

^{*)} Mounting bracket included with delivery

Technical data		WLL 260-	F 240	F 440	E 240							
Suitable fiber-optic cable	Fiber-optic cable series LIS/LBS											
Scanning distance/range	Depends on the fiber-optic cable used											
Proximity system												
Typ. max. scanning distance ¹⁾	0 ... 65 mm											
	0 ... 110 mm with special fiber-optic cable											
Operating distance ¹⁾	0 ... 50 mm											
	0 ... 90 mm with special fiber-optic cable											
Through-beam system												
Typ. max. scanning range	0 ... 800 mm											
Operating range	0 ... 700 mm											
Sensitivity	Adjustable, potentiometer 270°											
Light source²⁾	LED, visible red light											
Light spot diameter	Depends on scanning range											
Aperture fiber-optic cable	Approx. 65°											
Supply voltage V_S	10 ... 30 V DC ³⁾											
Ripple ⁴⁾	≤ 5 V _{PP}											
Current consumption ⁵⁾	≤ 35 mA											
Switching outputs												
	PNP, open collector: Q											
	NPN, open collector: Q											
Output current I _A max.	100 mA											
Light receiver, switching mode	Light-/dark-switching by rotary switch											
Response time ⁶⁾	≤ 0.7 ms											
Switching frequency max. ⁷⁾	700/s											
Test input »TE« sender off												
	PNP: TE following + V _S											
	NPN: TE following 0 V											
Connection type												
	Terminal chamber											
	Plug M12, 4-pin											
VDE protection class⁸⁾	□											
Circuit protection⁹⁾	A, B, C, D											
Enclosure rating	IP 66											
Ambient temperature T_A	Operation – 25 °C ... + 55 °C											
	Storage – 40 °C ... + 70 °C											
Weight	Approx. 120 g											
Material	Housing: ABS											

¹⁾ Object with 90 % remission (based on standard white DIN 5033)

²⁾ Average service life 100,000 h at T_A = + 25 °C

³⁾ Limit values, operation in short circuit protected network max. 8 A

⁴⁾ Must be within V_S tolerances

⁵⁾ Without load

⁶⁾ With resistive load

⁷⁾ With light/dark ratio 1:1

⁸⁾ Reference voltage 50 V DC

⁹⁾ A = V_S connections reverse-polarity protected

B = Inputs/outputs reverse-polarity protected

C = Interference suppression

D = Outputs overcurrent and short-circuit protected

Order information

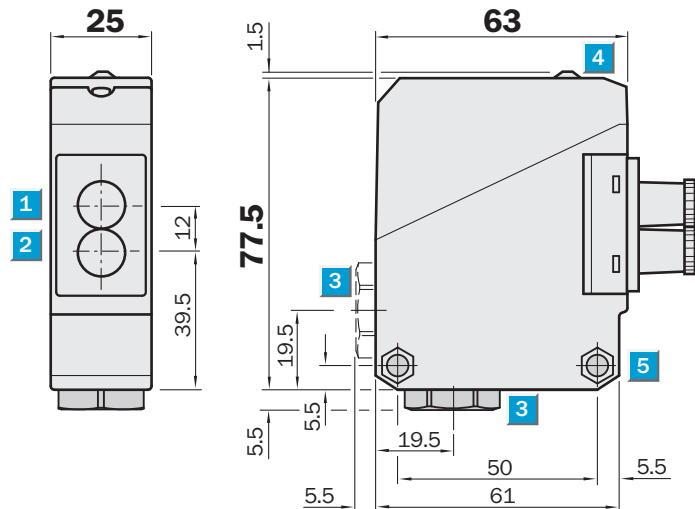
Type	Order no.
WLL260-F240	6020064
WLL260-F440	6020065
WLL260-E240	6020063

	Scanning range max. 800 mm
Through-beam systems	
	Scanning distance max. 65 (110) mm
Proximity systems	

- Universal voltage
- Broad range of fiber-optic cables for through-beam and proximity applications
- Easy adaption of fiber-optic cable using cap nut
- Sensitivity, adjustable
- Terminal chamber
- Relay output, SPDT, time delays



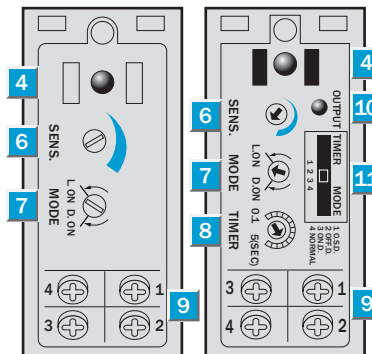
Dimensional drawing



Adjustments possible

WLL260-S240

WLL260-R240



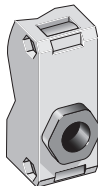
- 1 Middle of optic axis, receiver
- 2 Middle of optic axis, sender
- 3 Cable entry gland 1/2" PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear
- 4 LED signal strength indicator, red
- 5 Through hole Ø 5.2 mm on both sides for M5 hex nut
- 6 Sensitivity control
- 7 Light/dark rotary switch
L.ON = light-switching, D.ON = dark-switching
- 8 Time range control
- 9 Terminals
- 10 Red LED status indicator, switching output active
- 11 Time delay selector switch
O.S.D. = One Shot
OFF.D. = OFF delay
ON.D. = ON delay
Normal = No delay

Connection type

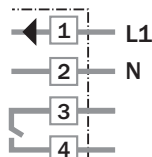
WLL260-S240

WLL260-R240

Time delays

 $t = 0.1-5 \text{ s}$


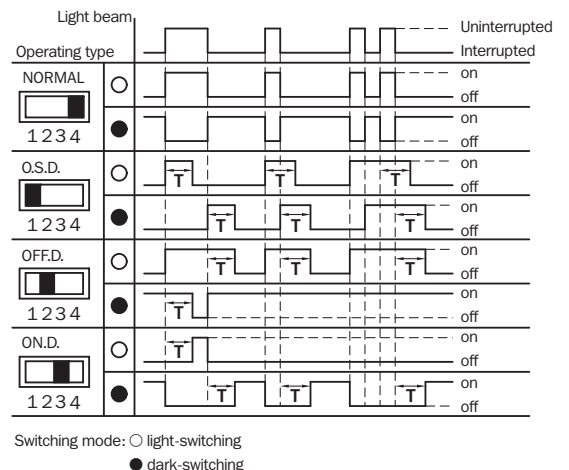
Terminals



See chapter Accessories

Mounting systems^{*)}

Fiber-optic cables

^{*)} Mounting bracket included with delivery


Technical data		WLL 260-	S 240	R 240									
Suitable fiber-optic cable	Fiber-optic cable series LIS/LBS												
Scanning distance/range	Depends on the fiber-optic cable used												
Proximity system													
Typ. max. scanning distance ¹⁾	0 ... 65 mm												
	0 ... 110 mm with special fiber-optic cable												
Operating distance ¹⁾	0 ... 50 mm												
	0 ... 90 mm with special fiber-optic cable												
Through-beam system													
Typ. max. scanning range	0 ... 800 mm												
Operating range	0 ... 700 mm												
Sensitivity	Adjustable, potentiometer 270°												
Light source²⁾	LED, visible red light												
Light spot diameter	Depends on scanning range												
Aperture fiber-optic cable	Approx. 65°												
Supply voltage V_s³⁾	12 ... 240 V DC												
	24 ... 240 V AC												
Power consumption	≤ 5 VA												
Switching output	Relay, SPDT, electrically isolated ⁴⁾												
Switching current I max.	3 A/240 V AC; 3 A/30 V DC ⁵⁾												
Light receiver, switching mode	Light-/dark-switching by rotary switch												
Response time	≤ 20 ms												
Switching frequency max. ⁶⁾	25/s												
Time delays	With indicator LED: Switching output active												
Switch position "1 O.S.D."	"One shot"												
"2 OFF.D."	OFF delay t _{OFF}												
"3 ON.D."	ON delay t _{ON}												
"4 Normal"	No delay												
Time range	Adjustable, 0.1 to 5 s; potentiometer 270°												
Connection type	Terminal chamber												
VDE protection class⁷⁾	□												
Circuit protection⁸⁾	A, C												
Enclosure rating	IP 66												
Ambient temperature T_A	Operation - 25 °C ... + 55 °C												
	Storage - 40 °C ... + 70 °C												
Weight	Approx. 120 g												
Material	Housing: ABS												

¹⁾ Object with 90 % remission (based on standard white DIN 5033)

²⁾ Average service life 100,000 h at T_A = + 25 °C

³⁾ ± 10 %

⁴⁾ Provide suitable spark suppression for inductive or capacitive loads

⁵⁾ Usage category to EN 60947-1, 15 AC, 13 DC

⁶⁾ With light/dark ratio 1:1

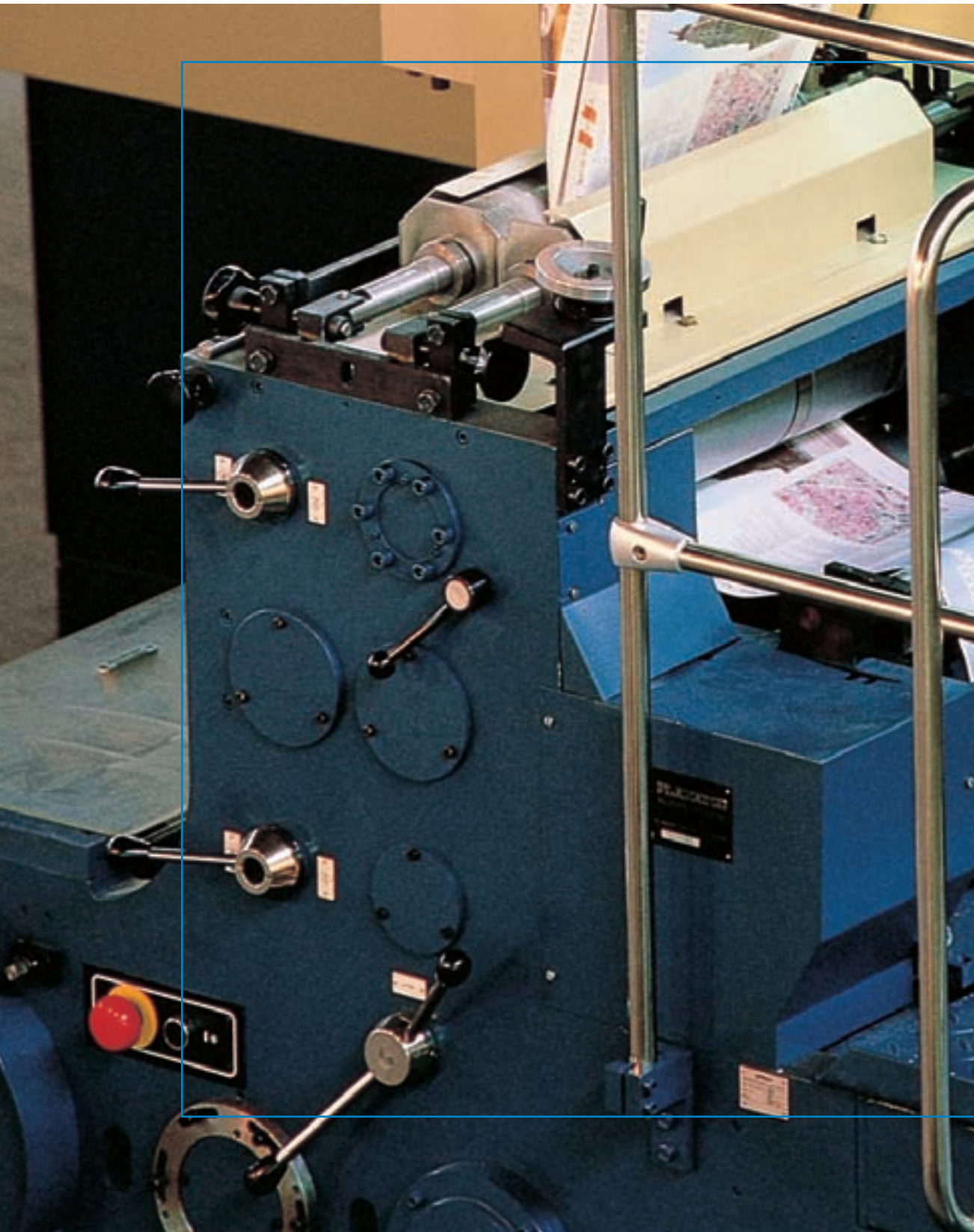
⁷⁾ Reference voltage 50 V DC

⁸⁾ A = V_s connections reverse-polarity protected
C = Interference suppression

Order information

Type	Order no.
WLL260-S240	6009504
WLL260-R240	6009503

WLL12 – Robust





WLL12
Robust

- Ideal for use in harsh environments
- Robust metal housing
- Flexible use for every application
- Optional connection of fiber-optic cables of the LL3 and LM/LT series
- Different light sources:
red light, infrared light, green light

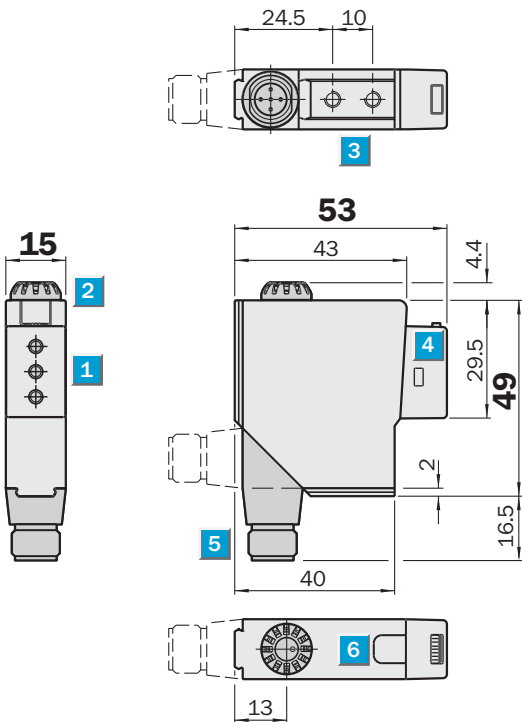
WLL12 →

	Scanning distance 0 ... 280 mm
	Scanning range 0 ... 300 mm
Fiber-optic photoelectric sensor	

- Red, infrared or green light
- Plug-in fiber-optic cables
- Switch-selectable light-/dark-switching
- Adjustable sensitivity



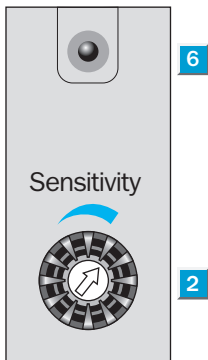
Dimensional drawing



Adapter AD* for		
Fiber-optic cable	Type	Order no.
LL3-...	AD-LL-1M0	2015026
∅ (1.0 mm)		
LL3-...	AD-LL-2M2	2015210
∅ (2.2 mm)		
LM/LT-...	AD-LL-GF	2015034
LH10-1000	AD-LL-HGA	2015033

* not included with delivery

Adjustments possible

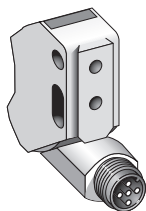


- 1 Connector for fiber-optic cable
- 2 Sensitivity control
- 3 M4 threaded mounting hole - 4 mm deep
- 4 Adapter
- 5 Plug not rotatable. Plug facing backwards on request
- 6 LED signal strength indicator

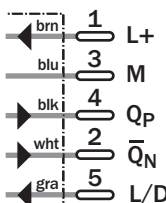


Connection type

WLL12-B5181
WLL12-B5281
WLL12-B5381
WLL12-B5481



M12, 5-pin



See chapter Accessories
Adapter for fiber-optic cables
Connector, M12, 5-pin
Fiber-optic cables
Mounting systems

Technical data		WLL12-B	5181	5281	5381	5481							
Scanning distance typ. max.	0 ... 280 mm ¹⁾												
	0 ... 60 mm ¹⁾												
Fiber-optic cable (proximity system)	LM/LT												
Scanning range typ. max.	0 ... 200 mm												
	0 ... 300 mm												
	0 ... 20 mm												
Fiber-optic cable (through-beam system)	LM/LT												
Light source, light type	LED, Red light ²⁾												
	LED, Infrared light ²⁾												
	LED, Green light ²⁾												
Supply voltage V_s	10 ... 30 V DC ³⁾												
Ripple	≤ 5 V _{pp} ⁴⁾												
Power consumption	≤ 35 mA ⁵⁾												
Switching outputs	PNP: Q/NPN: Q												
Switching mode	Light/dark-switching, switchable												
Output current I _a max	100 mA												
Response time	360 μs ⁶⁾												
Switching frequency	1,300 Hz ⁷⁾												
Connection type	Connector, M12, 5-pin												
VDE protection class	□ ⁸⁾												
Circuit protection	V _s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression												
Enclosure rating	IP 67												
Ambient temperature operation	-25 °C ... +60 °C												
Ambient temperature storage	-25 °C ... +70 °C												
Weight	Approx. 130 g												
Housing material	Zinc die-cast												

¹⁾ Object with 90 % remission (based on standard white to DIN 5033)

²⁾ Average service life 100,000 h

at T_a = +25 °C

³⁾ Limit values

⁴⁾ May not exceed or fall short of

V_s tolerances

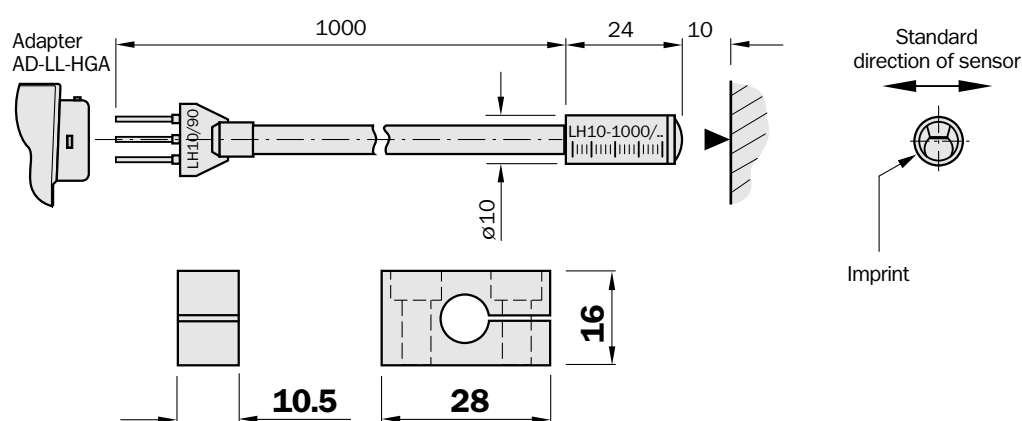
⁵⁾ Without load

⁶⁾ Signal transit time with resistive load

⁷⁾ With light/dark ratio 1:1

⁸⁾ Reference voltage 50 V DC

Proximity system with background suppression, WLL12-B5481 with LH 10-1000 fiber-optic cable



Scanning distance:	10 mm (-1 mm), fixed
Light spot diameter:	approx. 2.5 x 3.5 mm
Switching hysteresis:	≤ 0.3 mm, based on standard white 90 % to standard black 6 %

Order information	
Type	Order no.
WLL12-B5181	1011677
WLL12-B5281	1011687
WLL12-B5381	1011688
WLL12-B5481	1011965

Accessories





FIBER-OPTIC CABLES Accessories

- Pre-fabricated assembled cables for fast installation
- Versatile mountings for secure hold
- Accessories for customizing fiber-optic cables

Accessories →

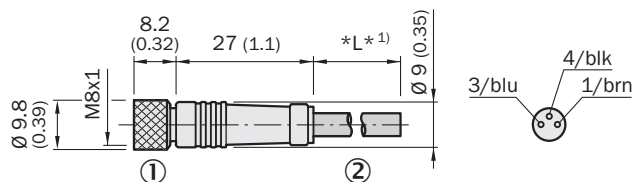
Dimensional drawings and order information

SENSICK screw-in system M8, 3-pin/4-pin, enclosure rating IP 67

Female connector M8, 3-pin, straight

Cable diameter 5 mm, 3 x 0.34 mm², sheath PVC

Type	Order no.	Cable length
DOL-0803-G02M	6010785	2 m
DOL-0803-G05M	6022009	5 m
DOL-0803-G10M	6022011	10 m



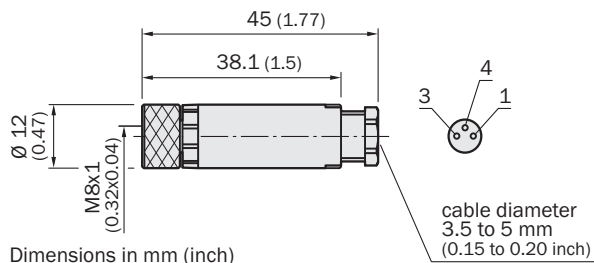
Dimensions in mm (inch)

- ① With screw locking
② Connecting cable Ø 5 mm

1) Minimum bend radius in dynamic use
 $R_{min} = 20 \times \text{cable diameter}$

Female connector M8, 3-pin, straight

Type	Order no.	
DOS-0803-G	7902077	Cutable to size for cable Ø 3.5 – 5 mm with screw locking

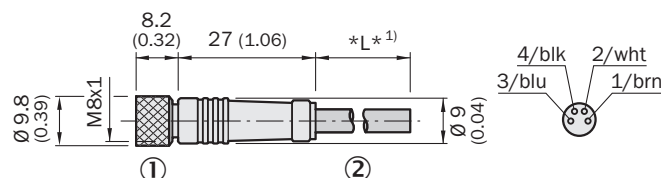


Dimensions in mm (inch)

Female connector M8, 4-pin, straight. Contacts as defined by EN 50044

Cable diameter 5 mm, 4 x 0.25 mm², sheath PVC

Type	Order no.	Cable length
DOL-0804-G02M	6009870	2 m
DOL-0804-G05M	6009872	5 m
DOL-0804-G10M	6010754	10 m



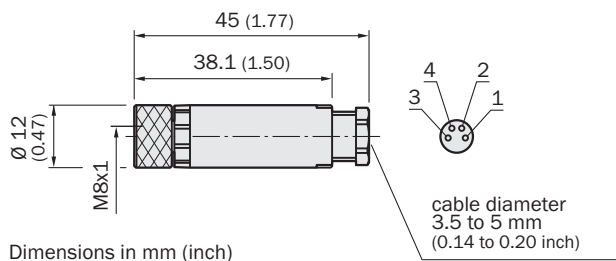
Dimensions in mm (inch)

- ① With screw locking
② Connecting cable Ø 5 mm

1) Minimum bend radius in dynamic use
 $R_{min} = 20 \times \text{cable diameter}$

Female connector M8, 4-pin, straight

Type	Order no.	
DOS-0804-G	6009974	Cutable to size for cable Ø 3.5 – 5 mm with screw locking



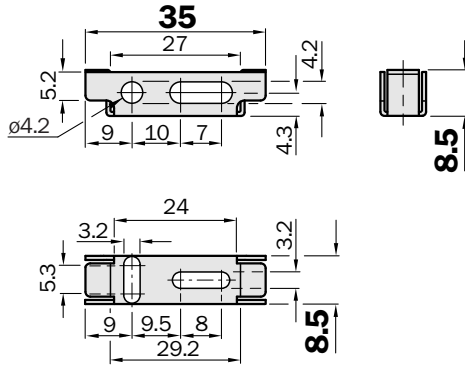
Dimensions in mm (inch)

Dimensional drawings and order information

SENSICK fiber-optic accessories

Mounting bracket ¹⁾

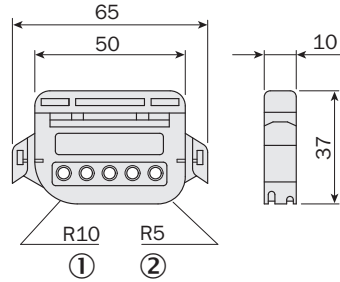
Type	Order no.
BEF-WLL 170	5306574



¹⁾ Included with delivery of WLL190T-2, WLL180T and WLL170(T)

Cutter for fiber-optic cables*

Type	Order no.
FC	5304141

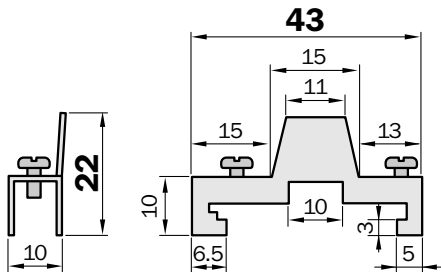


- ① Templing for bend radius R10 mm, for end tips Ø 1.5 mm and Ø 2.5 mm
- ② 2 Bend radius R5 mm

* Supplied with fiber-optic cable for cutting to length

Endcap for block installation on DIN-rail mounting

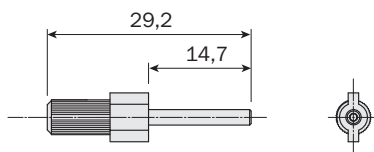
Type	Order no.
BF-EB01-W190	5313011



Adapter sleeve for fiber-optic cables LL3 Ø 1.0 mm ¹⁾

Type	Order no.
BF-WLL160-10	5305479

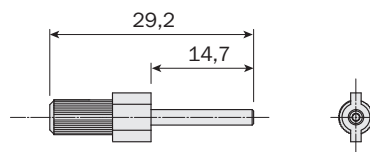
¹⁾ Included with delivery of LL3



Adapter sleeve for fiber-optic cables LL3 Ø 1.3 mm ¹⁾

Type	Order no.
BF-WLL160-13	5306094

¹⁾ Included with delivery of LL3



Dimensional drawings and order information

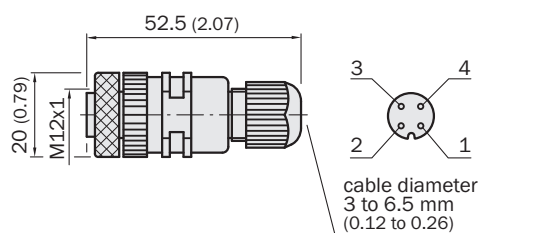
Pin assignment to EN 50044

DC coding

SENSICK screw-in system M12, 4-/5-pin, enclosure rating IP 67

Female connector M12, 4- or 5-pin, straight

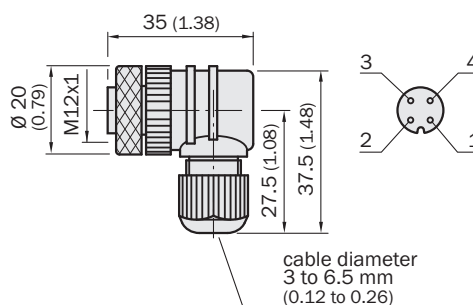
Type	Order no.	Contacts
DOS-1204-G	6007302	4
DOS-1205-G	6007719	5



Dimensions in mm (inch)

Female connector M12, 4- or 5-pin, angled

Type	Order no.	Contacts
DOS-1204-W	6007303	4
DOS-1205-W	6007720	5

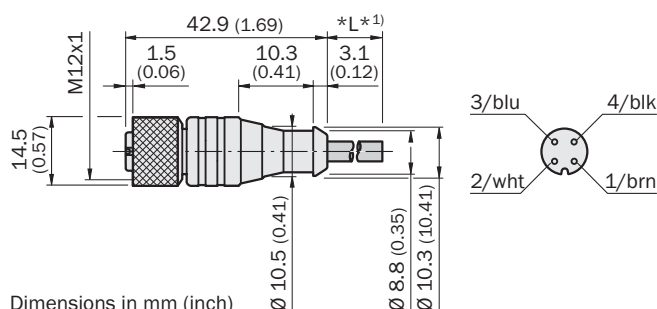


Dimensions in mm (inch)

Female connector M12, 4- or 5-pin, straight

Cable diameter 5/6 mm, 4/5 x 0.25 mm², sheath PVC

Type	Order no.	Contacts	Cable length
DOL-1204-G02M	6009382	4	2 m
DOL-1204-G05M	6009866	4	5 m
DOL-1204-G10M	6010543	4	10 m
DOL-1205-G02M	6008899	5	2 m
DOL-1205-G05M	6009868	5	5 m
DOL-1205-G10M	6010544	5	10 m

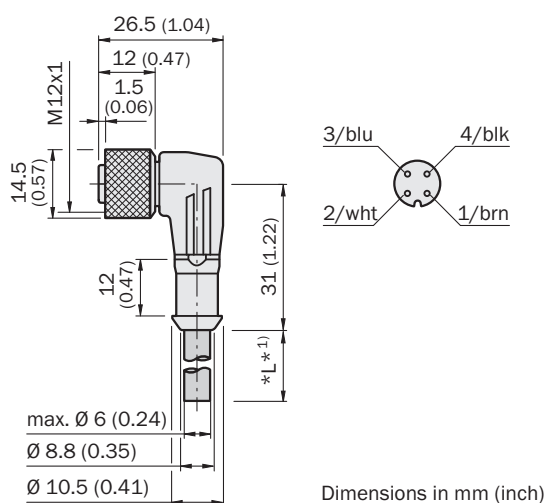


Dimensions in mm (inch)

Female connector M12, 4- or 5-pin, angled

Cable diameter 5/6 mm, 4/5 x 0.25 mm², sheath PVC

Type	Order no.	Contacts	Cable length
DOL-1204-W02M	6009383	4	2 m
DOL-1204-W05M	6009867	4	5 m
DOL-1204-W10M	6010541	4	10 m
DOL-1205-W02M	6008900	5	2 m
DOL-1205-W05M	6009869	5	5 m
DOL-1205-W10M	6010542	5	10 m



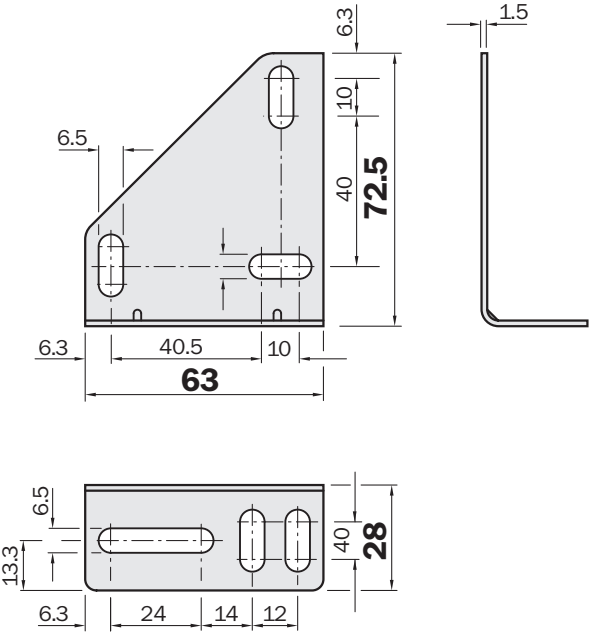
Dimensions in mm (inch)

1) Minimum bend radius in dynamic use
 $R_{min} = 20 \times \text{cable diameter}$

Dimensional drawings and order information

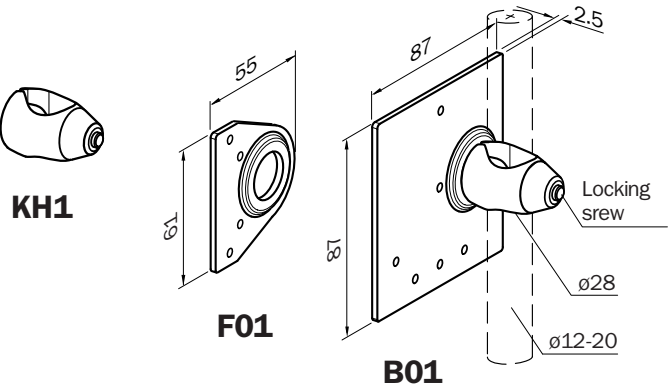
Mounting bracket

Type	Order no.
BEF-W260	5304819



Included with W260.

Universal bar clamps for sensors and reflectors



Mounting plates	Type	Order no. ¹⁾	for device/reflector type
B01	BEF-KHS-B01	2022459	P250, PL30 A, PL40 A, PL50 A, PL80 A, C110
F01	BEF-KHS-F01	2022463	W260, PL20 A, P250
KH1	BEF-KHS-KH1	2022726	Clamp bracket rod mounting without attachment plate and mounting material

¹⁾ Universal bracket and mounting screws included

Dimensional drawings and order information

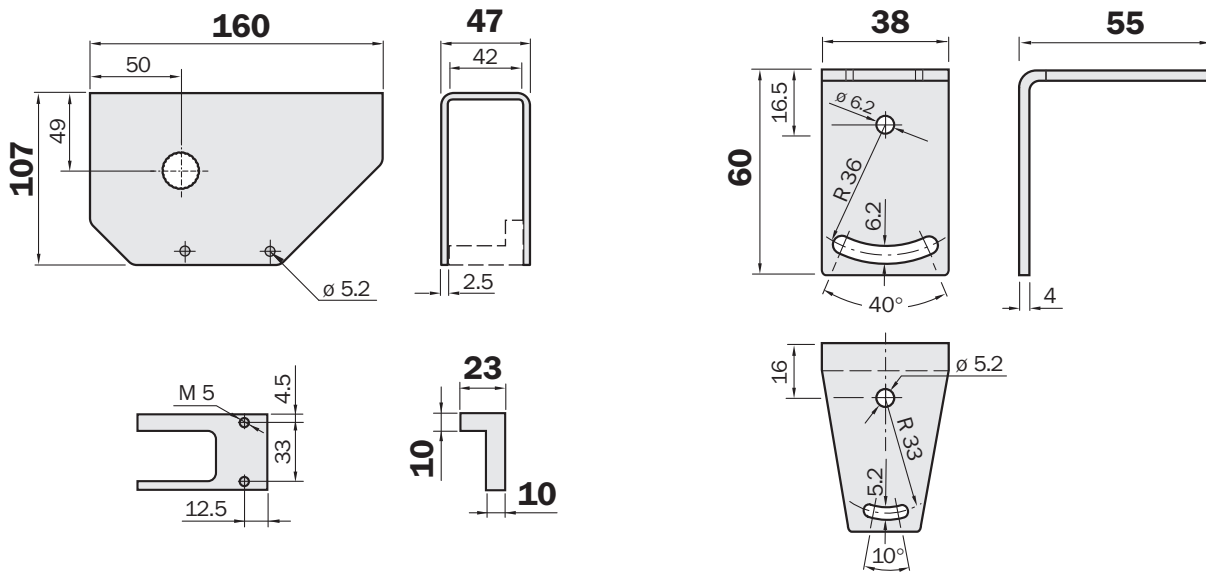
Special accessories

Weather protection hood *)

Type	Order no.
OBW-KHS-M01	2023240

Mounting bracket for weather protection hood OBW-KHS-M01

Type	Order no.
BEF-WN-OBW	2023251



*) Can also be used as pole clamp in connection with separate clamp BEF-KHS-KH1 (order no. 2022726)

Adapter for fiber-optic cables

Type	Order no.
BF-WLL260	5305402

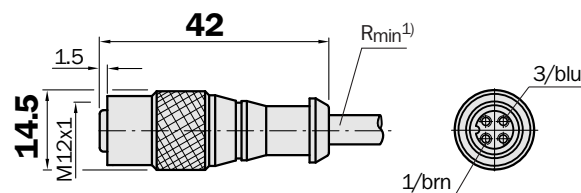
Dimensional drawings and order information

SENSICK screw-in system M12, 2-pin, enclosure rating IP 67

Female connector M12, 2-pin, straight

Cable diameter 5 mm, 2 x 0.34 mm², sheath PVC

Type	Order no.	Cable length
DOL-1202-G02M	6010728	2 m

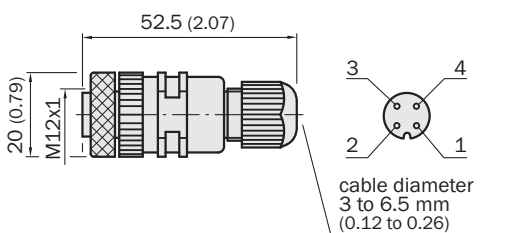


1) Minimum bend radius in dynamic use
 $R_{min} = 20 \times \text{cable diameter}$

SENSICK screw-in system M12, 4-/5-pin, enclosure rating IP 67

Female connector M12, 4- or 5-pin, straight

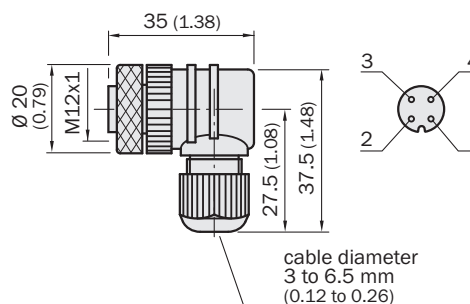
Type	Order no.	Contacts
DOS-1204-G	6007302	4
DOS-1205-G	6009719	5



Dimensions in mm (inch)

Female connector M12, 4- or 5-pin, angled

Type	Order no.	Contacts
DOS-1204-W	6007303	4
DOS-1205-W	6009720	5

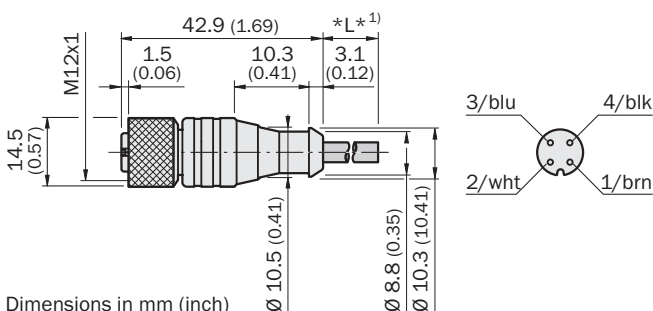


Dimensions in mm (inch)

Female connector M12, 4- or 5-pin, straight

Cable diameter 5/6 mm, 4/5 x 0.25 mm², sheath PVC

Type	Order no.	Contacts	Cable length
DOL-1204-G02M	6009382	4	2 m
DOL-1204-G05M	6009866	4	5 m
DOL-1204-G10M	6010543	4	10 m
DOL-1204-G15M	6010753	4	15 m
DOL-1205-G02M	6008899	5	2 m
DOL-1205-G05M	6009868	5	5 m
DOL-1205-G10M	6010544	5	10 m



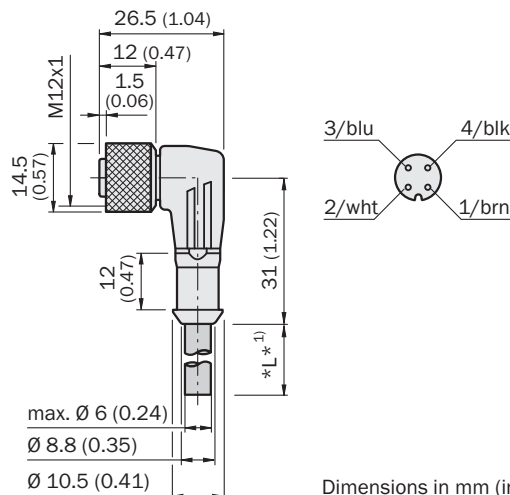
Dimensions in mm (inch)

1) Minimum bend radius in dynamic use
 $R_{min} = 20 \times \text{cable diameter}$

Female connector M12, 4- or 5-pin, angled

Cable diameter 5/6 mm, 4/5 x 0.25 mm², sheath PVC

Type	Order no.	Contacts	Cable length
DOL-1204-W02M	6009383	4	2 m
DOL-1204-W05M	6009867	4	5 m
DOL-1204-W10M	6010541	4	10 m
DOL-1205-W02M	6008900	5	2 m
DOL-1205-W05M	6009869	5	5 m
DOL-1205-W10M	6010542	5	10 m



Dimensions in mm (inch)

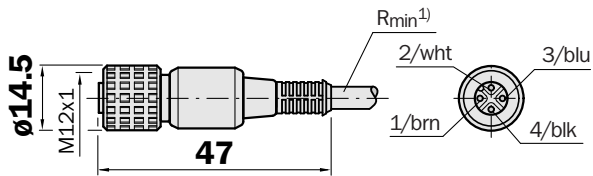
Dimensional drawings and order information

SENSICK screw-in system M12, 4-/5-pin, enclosure rating IP 67

Female connector M12, 4-pin, straight

Cable diameter 4,5 mm, 4 x 0.34 mm², sheath PUR

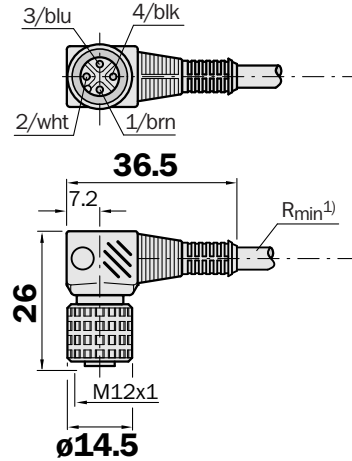
Type	Order no.	Cable length
DOL-1204-G05MB	7902084	5 m



Female connector M12, 4-pin, angled

Cable diameter 4,5 mm, 4 x 0.34 mm², sheath PUR

Type	Order no.	Cable length
DOL-1204-W05MB	7902085	5 m

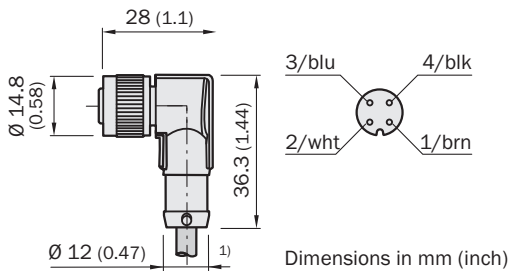


Female connector M12, 4-pin, angled

Cable diameter 5 mm, 4 x 0.34 mm², sheath PUR/PVC

With built-in LED-operation and function indicators, PNP complementary²⁾

Type	Order no.	Contacts	Cable length
DOL-1204-W05ME	6020398	4	5 m



Dimensions in mm (inch)

¹⁾ Minimum bend radius in dynamic use

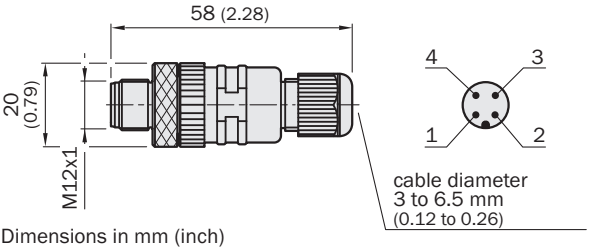
 $R_{min} = 20 \times \text{cable diameter}$
²⁾ Not suitable for sender in through-beam systems

Dimensional drawings and order information

SENSICK screw-in system M12, 4-/5-pin, enclosure rating IP 67

Male connector M12, 4- or 5-pin, straight, configurable

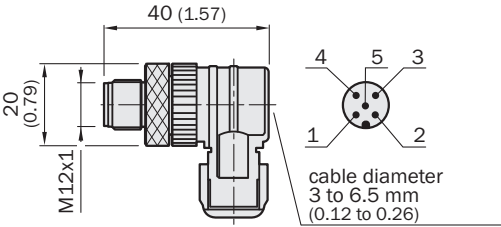
Type	Order no.	Contacts
STE-1204-G	6009932	4
STE-1205-G	6022083	5



Dimensions in mm (inch)

Male connector M12, 4- or 5-pin, angled, configurable

Type	Order no.	Contacts
STE-1204-W	6022084	4
STE-1205-W	6022082	5

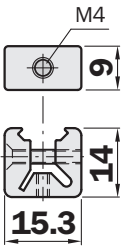


Dimensions in mm (inch)

Clamp/Mounting bracket

Clamp

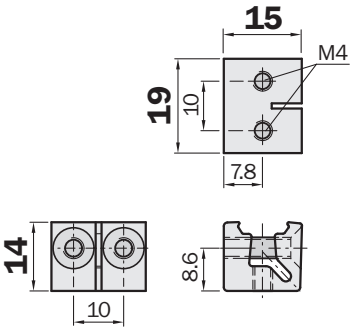
Type	Order no.
BEF-KH-W12	2013285



Countersunk screw M4 x 15 mm included with delivery

Double clamp

Type	Order no.
BEF-DKH-W12	2013947



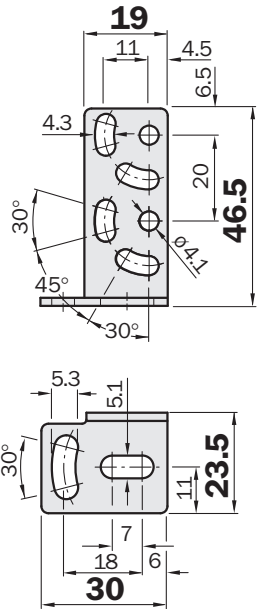
2 countersunk screws M4 x 15 mm included with delivery

Dimensional drawings and order information

Clamp/Mounting bracket

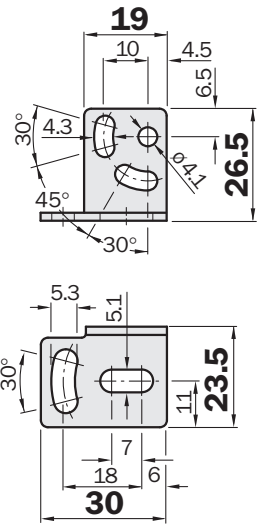
Mounting bracket, large (stainless steel)

Type	Order no.
BEF-WG-W12	2013942



Mounting bracket, small (stainless steel)

Type	Order no.
BEF-WK-W12	2012938





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