

**L U T 3**  
**L u m i n e s c e n c e S c a n n e r**

**SICK**

## General

SICK Luminescence Scanners detect fluorescent materials or markings. They convert an optical signal into a digital electrical signal. High-contrast markings, which stand out clearly against the background, are reliably detected by photo-electrical sensors. The LUT 3 Luminescence Scanner, however, detects fluorescent markings on any carrier material, regardless of the pattern, colour or the kind of surface.

## Applications

Luminescence Scanners are used wherever standard scanners or contrast scanners do not ensure reliable and unmistakable detection. Practical applications include e.g. monitoring adhesives, the grease in ball-bearings, control and positioning of labels etc.

The product can be marked with fluorescent chalk, ink, labels or the like. According to the kind of product, fluorescent markings can also be added. Thanks to the fact that most fluorescent markings are invisible to the human eye, sorting, positioning and commissioning tasks or genuineness check can be solved easily.

## Features

- Long-life UV light 385 nm or 370 nm
- No lamp replacement
- Status and readiness indicator
- Choice of scanning ranges through interchangeable objective lenses
- Time delay adjustable (3, 5, 10, 20 ms, LUT 3-8 and LUT 3-9)
- Insensitive to surface and mirror reflections
- PNP and NPN output shortcircuit proof up to 100 mA
- Two-position M 12 plug, 5-pin
- Robust die-cast metal housing, IP 65
- Analogue output (LUT 3-8 and LUT 3-9)
- Supply voltage 12 to 30 V DC, reverse-polarity protected
- High switching frequency
- Short response time
- Fibre-optic cable connection LUT 3-8 and LUT 3-9

## Luminophors

A variety of fluorescent marking agents are commercially available, some of which are ready for use. These substances owe their properties of fluorescence to added luminophors. These are small particles converting ultraviolet light of different wavelengths and intensity into visible light. Luminophors can be added to almost any substance. Current fluorescent marking agents include:

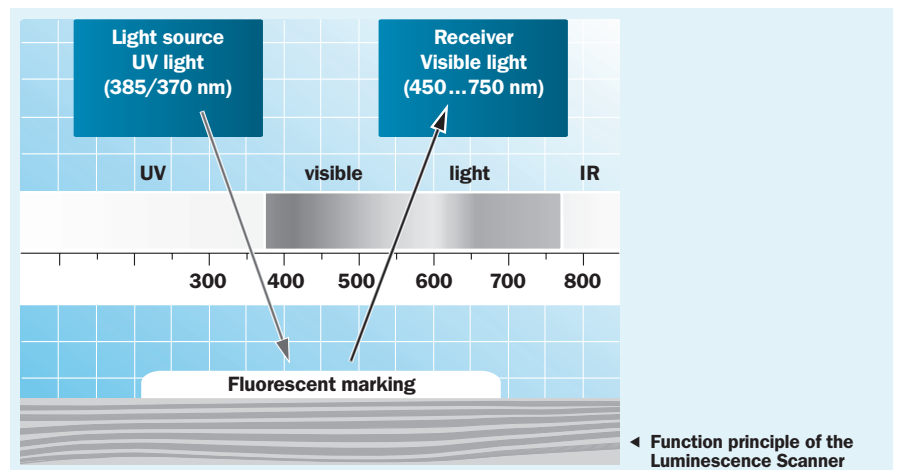
- Daylight paints
- Chalks and crayons
- Labels
- Fluorescent inks (including invisible ones)
- Oils and greases
- Felt-tip pens

A list of further fluorescent marking agents including sources of supply can be ordered directly from SICK: "Fluorescent Marking Agents".

## Function Principle

The luminescence scanner LUT 3 emits modulated UV light with a wavelength of 385 nm (LUT 3-6 and LUT 3-8) and 370 nm (LUT 3-9). This activates fluorescent material (tracers), which transmit long-wave light back to the visible wavelength range (approx. 420–750 nm). The LUT detects and evaluates this light, which has the same modulation frequency as the transmitted UV light. Contrary to other proximity switches, the luminescence scanner does not receive its own transmitted light, but instead light converted by fluorescent marking. The optic signal is processed electronically and is available at the output as a digital switching signal. The equipment sensitivity is set using a potentiometer to adjust it optimally to the fluorescent marking.

The LUT 3-9 can be used in all situations when a high degree of system sensitivity is required. Contrary to the LUT 3-6 and LUT 3-8, the LUT 3-9 works using a UV diode in a wavelength of 370 nm. This improves stimulation of the pigments and provides them with better luminosity. Thanks to the higher degree of system sensitivity, greater scanning distances are also possible using the LUT 3-9.



## Installation

It is advisable to mount the LUT 3 at a place where motions of the scanned object are reduced to a minimum. The light spot, which is parallel with the axis of the scanner, is focused at the scanned object. The fluorescent markings must be arranged parallel with the light spot to ensure most accurate positioning.

## Adjustments

The green LED lights when power is supplied: Power On. The yellow LED lights when the LUT detects luminous scanned objects. Then the output switches.

When the background has no base luminescence, turn the sensitivity control to the right (ex works setting). The luminescence scanner then reacts to the luminescent markings. Equipment with optical filters in the reception channel is available for suppressing base luminescence. For example, the RG 610 filter filters out blue base luminescence, and then the receiver only reacts to light starting from 610 nm. Consequently, the marking must contain pigments that light up in the wavelength greater than 610 nm.

If the base luminescence is weak in the background, the following setting is recommended:

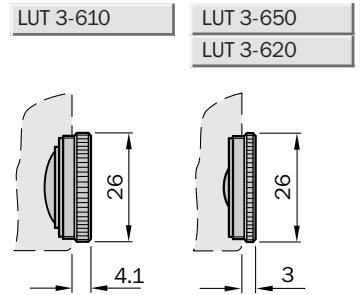
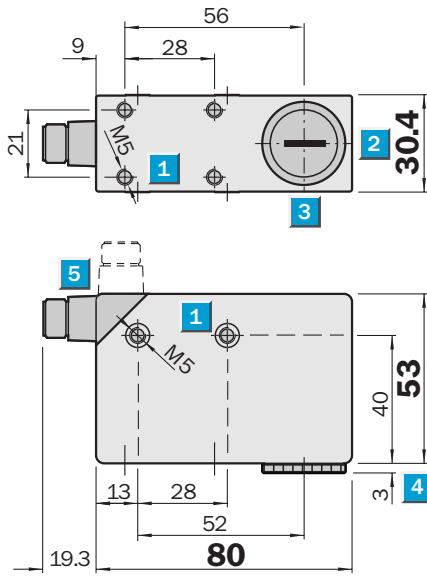
- Set sensitivity to maximum.
- Align background with slight base luminescence with the detection field of the scanner.
- Turn the sensitivity control to the left until the LED (yellow) just switches off. Note the position of the knob.
- Align luminescent marking with the detection field of the scanner.
- Turn the sensitivity control to the left until the LED just switches off. Note the position of the knob.
- Reset the sensitivity control approximately in the middle of the two noted positions.

**Scanning distance**  
10 ... 50 mm

Luminescence scanners

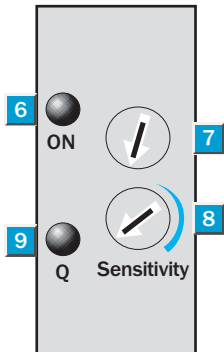
- UV semi-conductor light source
- No lamp replacement
- Scanning distance selectable by using interchangeable lenses

**Dimensional drawing**



**Adjustments possible**

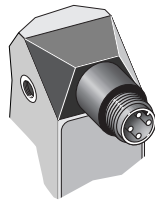
All types



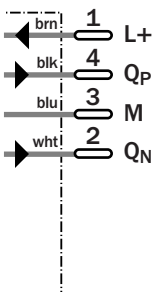
- 1 M 5 threaded mounting hole, 5.5 mm deep
- 2 Light spot direction
- 3 Centre of optical axis
- 4 See dimensional drawing for lens
- 5 M 12 plug (rotatable)
- 6 Operating indicator
- 7 Not used
- 8 Sensitivity adjustment
- 9 Output indicator

**Connection type**

All types



4 pin, M 12



**Accessories**

Connectors
Mounting systems
Lenses



Technical data		LUT 3-	610	620	650						
<b>Scanning distance<sup>1)</sup>/light spot sizes</b>	10 mm/∅ 2 x 6 mm										
	20 mm/∅ 3 x 9 mm										
	50 mm/∅ 5 x 15 mm										
Light spot direction	Longitudinal										
<b>Light source<sup>2)</sup>, light type</b>	UV light source										
<b>Wavelength</b>	<b>385 nm</b>										
<b>Supply voltage V<sub>s</sub></b>	12 ... 30 V DC <sup>3)</sup>										
Ripple <sup>4)</sup>	max. 2 V										
Current consumption <sup>5)</sup>	60 mA										
<b>Switching outputs</b>	Light-switching										
	PNP: HIGH = V <sub>s</sub> - <3 V / LOW = 0 V										
	NPN: HIGH = V <sub>s</sub> / LOW = <2 V										
Output current I <sub>A</sub> max.	100 mA										
Response time <sup>6)</sup>	0.3 ms										
Switching frequency <sup>7)</sup>	1.5 kHz										
<b>Connection type</b>	Plug										
<b>VDE protection class<sup>8)</sup></b>	□										
<b>Circuit protection<sup>9)</sup></b>	A, B, C										
<b>Enclosure rating</b>	IP 67										
<b>Ambient temperature T<sub>A</sub></b>	Operation - 10 °C ... + 55 °C										
	Storage - 25 °C ... + 75 °C										
<b>Shock load</b>	To IEC 68										
<b>Weight</b>	400 g										
<b>Housing material</b>	Die-cast metal										

<sup>1)</sup> From front edge of lens  
<sup>2)</sup> Average service life 100,000 h at T<sub>A</sub> = + 25 °C

<sup>3)</sup> Limit values  
<sup>4)</sup> May not exceed or fall short of V<sub>s</sub> tolerances

<sup>5)</sup> Without load  
<sup>6)</sup> Signal transit time with resistive load  
<sup>7)</sup> With light/dark ratio 1:1  
<sup>8)</sup> Reference voltage 50 V DC

<sup>9)</sup> A = V<sub>s</sub> connections reverse-polarity protected  
 B = Outputs Q<sub>p</sub> und Q<sub>N</sub> short-circuit protected  
 C = Interference pulse suppression

Scanning distance		Order information	
<b>1</b>	Scanning distance 10 mm	<b>Type</b>	<b>Part no.</b>
<b>2</b>	Scanning distance 20 mm	LUT 3-610	1 015 396
<b>3</b>	Scanning distance 50 mm	LUT 3-620	1 015 397
		LUT 3-650	1 015 398

Scan material:  
SICK Luminescence Scale 100%

LUT 3-6 is not supplied with additional filter or fibre-optic cable	
OBJ-LUT 3-10	2 016 348
OBJ-LUT 3-20	2 016 349
OBJ-LUT 3-50	2 016 350

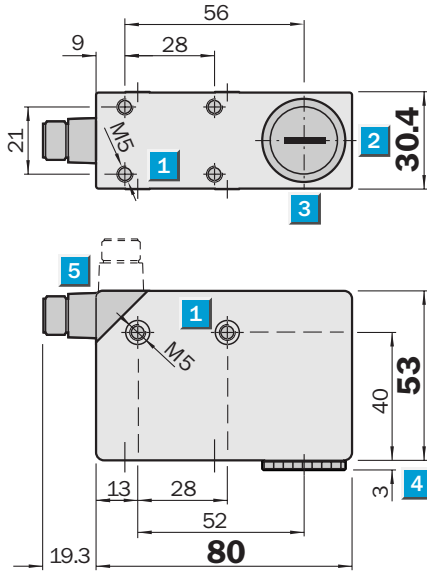
**Scanning distance**  
**10 ... 90 mm**

**Luminescence scanners**

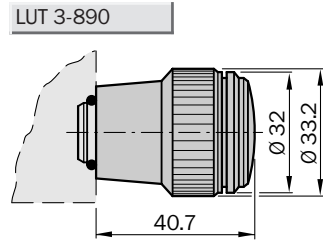
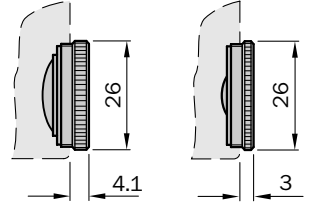
- UV semi-conductor light source
- No lamp replacement
- Scanning distance selectable by using interchangeable lenses
- Fibre-optic cable connection
- Analogue output
- Additional optical filter



### Dimensional drawing

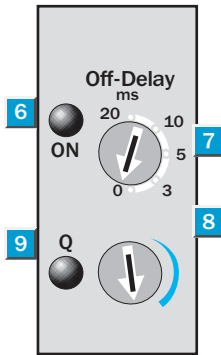


LUT 3-810	LUT 3-820
LUT 3-850	LUT 3-851
LUT 3-852	LUT 3-853



### Adjustments possible

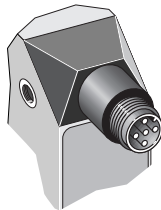
All types



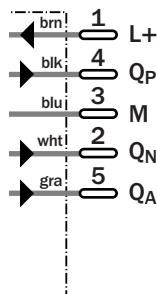
- 1 M 5 threaded mounting hole, 5.5 mm deep
- 2 Light spot direction
- 3 Centre of optical axis
- 4 See dimensional drawing for lens
- 5 M 12 plug (rotatable)
- 6 Operating indicator
- 7 Time delay selector switch
- 8 Sensitivity adjustment
- 9 Output indicator

### Connection type

All types



5 pin, M 12



**Accessories**

Connectors
Mounting systems
Lenses
Fibre-optic cable



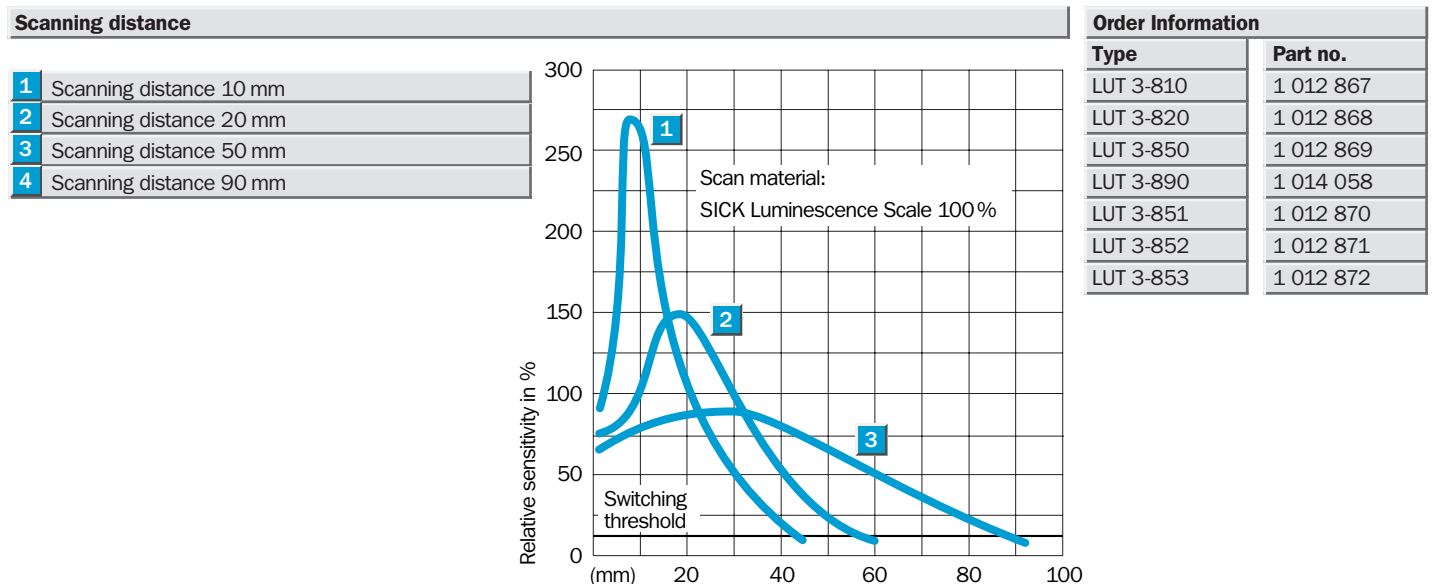
Technical data		810	820	850	890	851	852	853			
<b>Scanning distance<sup>1)</sup>/light spot sizes</b>	10 mm/Ø 2 x 6 mm										
	20 mm/Ø 3 x 9 mm										
	50 mm/Ø 5 x 15 mm										
	90 mm/Ø 8 x 20 mm										
Light spot direction	Longitudinal										
<b>Light source<sup>2)</sup>, light type</b>	UV light source										
<b>Wavelength</b>	<b>385 nm</b>										
<b>Receiver filter</b>	OG 570										
	RG 610										
	RG 665										
<b>Supply voltage V<sub>s</sub></b>	12 ... 30 V DC <sup>3)</sup>										
Ripple <sup>4)</sup>	max. 2 V										
Current consumption <sup>5)</sup>	60 mA										
<b>Switching outputs</b>	Light-switching										
	PNP: HIGH = V <sub>s</sub> - <3 V / LOW = 0 V										
	NPN: HIGH = V <sub>s</sub> / LOW = <2 V										
Output current I <sub>A</sub> max.	100 mA										
Response time <sup>6)</sup>	0.3 ms										
Switching frequency <sup>7)</sup>	1.5 kHz										
Time delay (deactivation delay)	3 ms, 5 ms, 10 ms, 20 ms, adjustable										
Analogue output Q <sub>A</sub>	0.5 ... 10 mA										
<b>Connection type</b>	Plug										
<b>VDE protection class<sup>8)</sup></b>	□										
<b>Circuit protection<sup>9)</sup></b>	A, B, C										
<b>Enclosure rating</b>	IP 67										
<b>Ambient temperature</b>	Operation - 10 °C ... + 55 °C										
	Storage - 25 °C ... + 75 °C										
<b>Shock load</b>	To IEC 68										
<b>Weight</b>	400 g										
<b>Housing material</b>	Die-cast metal										

<sup>1)</sup> From front edge of lens  
<sup>2)</sup> Average service life 100,000 h at T<sub>A</sub> = + 25 °C

<sup>3)</sup> Limit values  
<sup>4)</sup> May not exceed or fall short of V<sub>s</sub> tolerances

<sup>5)</sup> Without load  
<sup>6)</sup> Signal transit time with resistive load  
<sup>7)</sup> With light/dark ratio 1:1  
<sup>8)</sup> Reference voltage 50 V DC

<sup>9)</sup> A = V<sub>s</sub> connections reverse-polarity protected  
 B = Outputs Q<sub>p</sub> und Q<sub>n</sub> short-circuit protected  
 C = Interference pulse suppression



**Scanning distance**  
 10 ... 90 mm

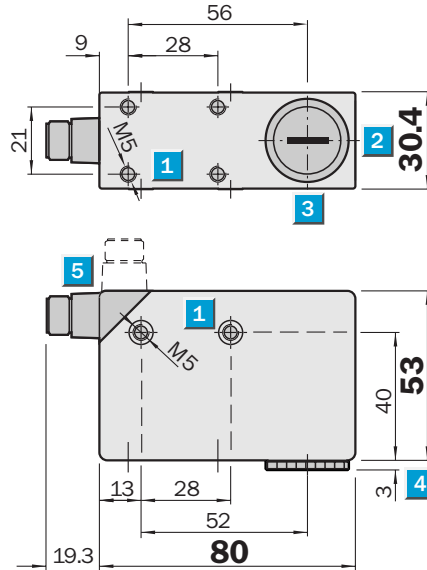
Luminescence scanners

- UV semi-conductor light source
- No lamp replacement
- Scanning distance selectable by using interchangeable lenses
- Fibre-optic cable connection
- Analogue output
- Additional optical filter

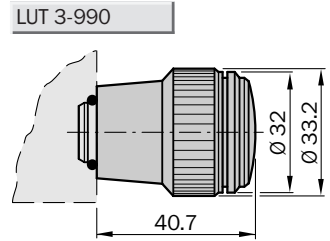
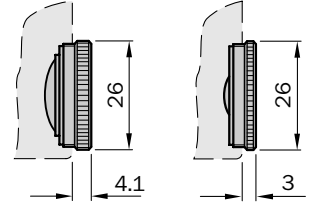


Accessories
Connectors
Mounting systems
Lenses
Fibre-optic cable

**Dimensional drawing**

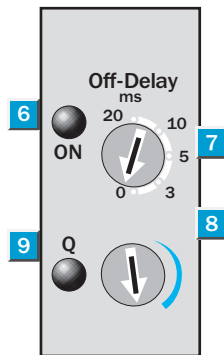


LUT 3-910	LUT 3-920
	LUT 3-950
	LUT 3-951
	LUT 3-952
	LUT 3-953



**Adjustments possible**

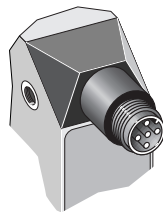
All types



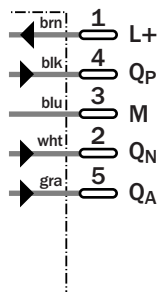
- 1 M 5 threaded mounting hole, 5.5 mm deep
- 2 Light spot direction
- 3 Centre of optical axis
- 4 See dimensional drawing for lens
- 5 M 12 plug (rotatable)
- 6 Operating indicator
- 7 Time delay selector switch
- 8 Sensitivity adjustment
- 9 Output indicator

**Connection type**

All types



5 pin, M 12





Technical data		LUT 3-	910	920	950	990	951	952	953			
<b>Scanning distance<sup>1)</sup>/light spot sizes</b>	10 mm/∅ 2 x 6 mm											
	20 mm/∅ 3 x 9 mm											
	50 mm/∅ 5 x 15 mm											
	90 mm/∅ 8 x 20 mm											
Larger scanning distances on request												
Light spot direction	Longitudinal											
<b>Light source<sup>2)</sup>, light type</b>	UV light source											
<b>Wavelength</b>	<b>370 nm</b>											
<b>Receiver filter</b>	OG 570											
	RG 610											
	RG 665											
<b>Supply voltage V<sub>s</sub></b>	12 ... 30 V DC <sup>3)</sup>											
Ripple <sup>4)</sup>	max. 2 V											
Current consumption <sup>5)</sup>	60 mA											
<b>Switching outputs</b>	Light-switching											
	PNP: HIGH = V <sub>s</sub> - <3 V / LOW = 0 V											
	NPN: HIGH = V <sub>s</sub> / LOW = <2 V											
Output current I <sub>A</sub> max.	100 mA											
Response time <sup>6)</sup>	0.3 ms											
Switching frequency <sup>7)</sup>	1.5 kHz											
Time delay (deactivation delay)	3 ms, 5 ms, 10 ms, 20 ms, adjustable											
Analogue output Q <sub>A</sub>	0.5 ... 10 mA											
<b>Connection type</b>	Plug											
<b>VDE protection class<sup>8)</sup></b>	□											
<b>Circuit protection<sup>9)</sup></b>	A, B, C											
<b>Enclosure rating</b>	IP 67											
<b>Ambient temperature</b>	Operation - 10 °C ... + 55 °C											
	Storage - 25 °C ... + 75 °C											
<b>Shock load</b>	To IEC 68											
<b>Weight</b>	400 g											
<b>Housing material</b>	Die-cast metal											

<sup>1)</sup> From front edge of lens  
<sup>2)</sup> Average service life 100,000 h at T<sub>A</sub> = + 25 °C

<sup>3)</sup> Limit values  
<sup>4)</sup> May not exceed or fall short of V<sub>s</sub> tolerances

<sup>5)</sup> Without load  
<sup>6)</sup> Signal transit time with resistive load  
<sup>7)</sup> With light/dark ratio 1:1  
<sup>8)</sup> Reference voltage 50 V DC

<sup>9)</sup> A = V<sub>s</sub> connections reverse-polarity protected  
 B = Outputs Q<sub>p</sub> und Q<sub>N</sub> short-circuit protected  
 C = Interference pulse suppression

Scanning distance	Order information																
	<table border="1"> <thead> <tr> <th>Type</th> <th>Part no.</th> </tr> </thead> <tbody> <tr> <td>LUT 3-910</td> <td>1 019 285</td> </tr> <tr> <td>LUT 3-920</td> <td>1 019 286</td> </tr> <tr> <td>LUT 3-950</td> <td>1 019 287</td> </tr> <tr> <td>LUT 3-990</td> <td>1 019 291</td> </tr> <tr> <td>LUT 3-951</td> <td>1 019 288</td> </tr> <tr> <td>LUT 3-952</td> <td>1 019 289</td> </tr> <tr> <td>LUT 3-953</td> <td>1 019 290</td> </tr> </tbody> </table>	Type	Part no.	LUT 3-910	1 019 285	LUT 3-920	1 019 286	LUT 3-950	1 019 287	LUT 3-990	1 019 291	LUT 3-951	1 019 288	LUT 3-952	1 019 289	LUT 3-953	1 019 290
Type	Part no.																
LUT 3-910	1 019 285																
LUT 3-920	1 019 286																
LUT 3-950	1 019 287																
LUT 3-990	1 019 291																
LUT 3-951	1 019 288																
LUT 3-952	1 019 289																
LUT 3-953	1 019 290																

- 1 Scanning distance 10 mm
- 2 Scanning distance 20 mm
- 3 Scanning distance 50 mm
- 4 Scanning distance 90 mm

Dimensional drawings and order informations

SENSICK circular screwing system M 12, 4/5 pin, enclosure rating IP 67

M 12 cable receptacles, 4/5 pin, straight

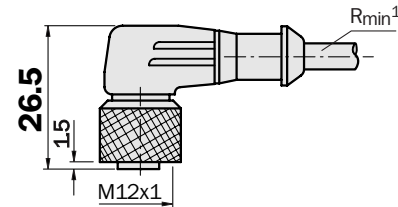
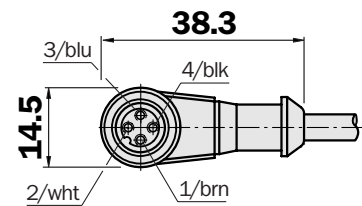
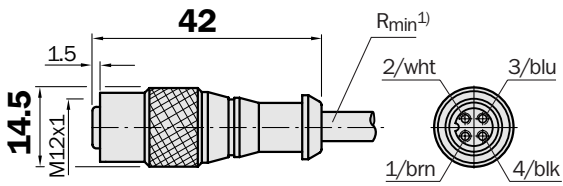
Cable diameter 5 mm, 4 x 0.25 mm<sup>2</sup>, PVC coating

Type	Part no.	Pins	Cable length
DOL-1204-G02M	6 009 382	4	2 m
DOL-1204-G05M	6 009 866	4	5 m
DOL-1204-G10M	6 010 543	4	10 m
DOL-1204-G15M	6 010 753	4	15 m
DOL-1205-G02M	6 008 899	5	2 m
DOL-1205-G05M	6 009 868	5	5 m
DOL-1205-G10M	6 010 544	5	10 m

M 12 cable receptacles, 4/5 pin, angled

Cable diameter 5 mm, 4 x 0.25 mm<sup>2</sup>, PVC coating

Type	Part no.	Pins	Cable length
DOL-1204-W02M	6 009 383	4	2 m
DOL-1204-W05M	6 009 867	4	5 m
DOL-1204-W10M	6 010 541	4	10 m
DOL-1205-W02M	6 008 900	5	2 m
DOL-1205-W05M	6 009 869	5	5 m
DOL-1205-W10M	6 010 542	5	10 m

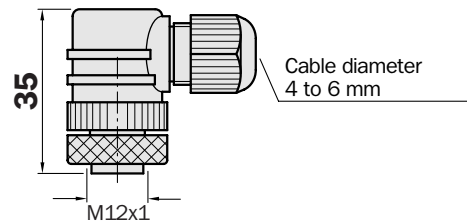
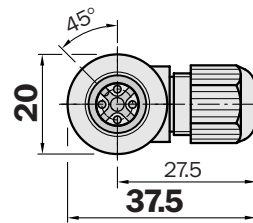
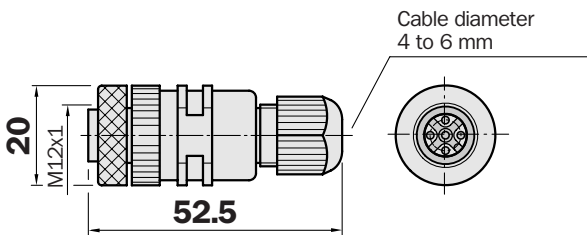


M 12 cable receptacles, 4/5 pin, straight

Type	Part no.	Pins
DOS-1204-G	6 007 302	4
DOS-1205-G	6 009 719	5

M 12 cable receptacles, 4/5 pin, angled

Type	Part no.	Pins
DOS-1204-W	6 007 303	4
DOS-1205-W	6 009 720	5

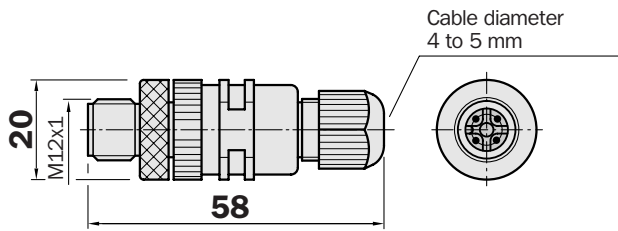


Dimensional drawings and order informations

SENSICK circular screwing system M 12, 4/5 pin, enclosure rating IP 67

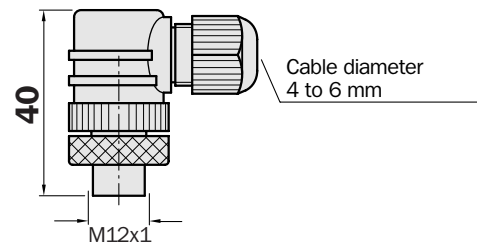
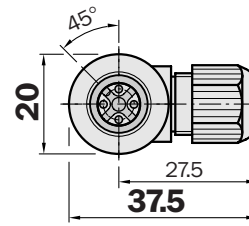
M 12 cable plug, 4/5 pin, straight

Type	Part no.	Pins
STE-1204-G	6 009 932	4
STE-1205-G	6 022 083	5



M 12 cable plug, 4/5 pin, angled

Type	Part no.	Pins
STE-1204-W	6 022 084	4
STE-1205-W	6 022 082	5



Mounting systems

Universal bracket for rod mounting

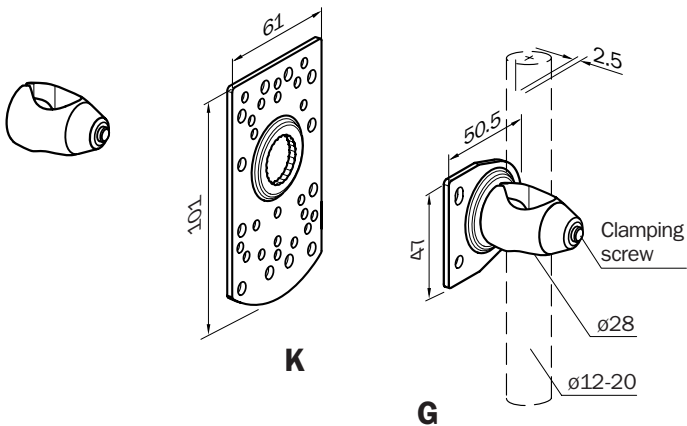


Plate	Type	Part no. <sup>1)</sup>	Sensors/reflectors
G	BEF-KHS-G01	2 022 464	W 24, W 24 Exi, WTA 24, KT 5, KT 10, CS 1, CS 3, LUT 3
K	BEF-KHS-K01	2 022 718	W 11, W 12-2, W 12L-2, W 14, W 18-2, W 23, W 24-2, W 27-2, W 30, W 32, W 34, W 36, KT 2, KT 5, KT 10, CS, LUT 3, DS 60, PL 20 A, PL 30 A, PL 40 A, PL 50 A, PL 80 A, P 250, C 110

	BEF-KHS-KH1	2 022 726	Clamp bracket rod mounting without attachment plate and mounting material
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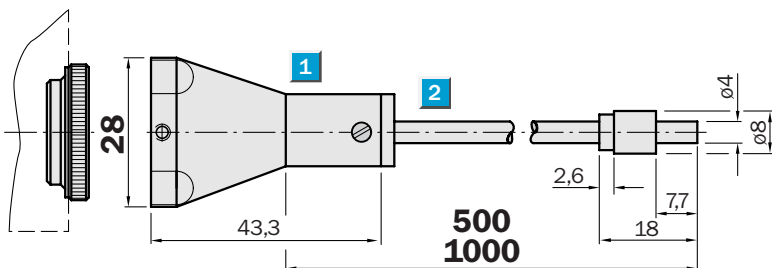
<sup>1)</sup> The part no. contains pole bracket and mounting material.

## Dimensional drawings and order informations

### Fibre-optic cable

#### Fibre-optic cable LLUV 8 for Luminescence scanner LUT 3-820 und LUT 3-920

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



- 1** Adapter
- 2** Fibre-optic cable LLUV 8, smallest bending radius  
 $R_{\min} = 40 \text{ mm}$

### Special accessories

Type	Part no.
Crayon	1 004 460
Writing chalk	1 002 959
Luminescence scale	8 008 840

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