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. Irrespective of pattern, colour or surface texture, luminescence scanners detect fluorescent markings on any carrier material.

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, LUT3-8 and LUT3-9)
- Insensitive to surface and mirror reflections
- PNP and NPN output shortcircuit proof up to 100 mA
- Two-position M12 plug, 5-pin (LUT3)
- Robust housing IP 67
- Analogue output (LUT3-8 and LUT3-9)
- Supply voltage from 12 ... 30 V DC, (LUT3) and 24 V DC (LUT2).
  Both units offer reverse polarity protection.
- High switching frequency
- Short response time
- Fibre-optic cable connection (LUT3-8 and LUT3-9)
- Static Teach-in for the marking and/or operating field, or control wire for LUT2

Luminophors

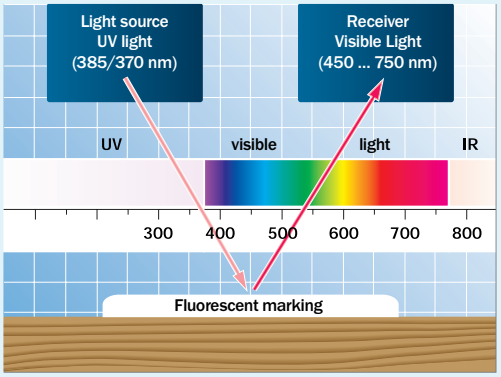
A variety of fluorescent marking agents are commercially available, some of which are ready for use. These substances owe their properties of fluorescence to added luminophors. These are small particles converting ultraviolet light of different wavelengths and intensity into visible light. Luminophors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

LUT3-6 and 3-8 Luminescence scanners transmit modulated UV light with a wavelength of 385 nm. LUT3-9 and LUT 2 transmit modulated UV light with a wavelength of 370 nm. 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 LUT3-9 can be used in all situations when a high degree of system sensitivity is required. Contrary to the LUT3-6 and LUT3-8, the LUT3-9 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 LUT3-9. With applications having a low level of fluorescence, LUT2 should be installed, as the switching threshold can be changed on this unit.



◄ Function principle of the Luminescence Scanner

Installation

Luminescence scanners should be installed in a location where the position of the material to be scanned involves minimal movement. The light spot, which is parallel with the axis of the scanner, is focussed at the scanned object. The fluorescent markings must be arranged parallel with the light spot to ensure most accurate positioning.

Adjustments

LUT3

The green LED lights when power is supplied: Power On. The yellow LED lights when the LUT3 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.

LUT2

Setting the sensitivity on the LUT2 is described in the Technical Data on Page 1157.

Scanning distance
50 ... 150 mm

Luminescence scanners

- Stepless control of switching threshold via film keypad
- Switching frequency 600/s to 6000/s
- Large scanning distances

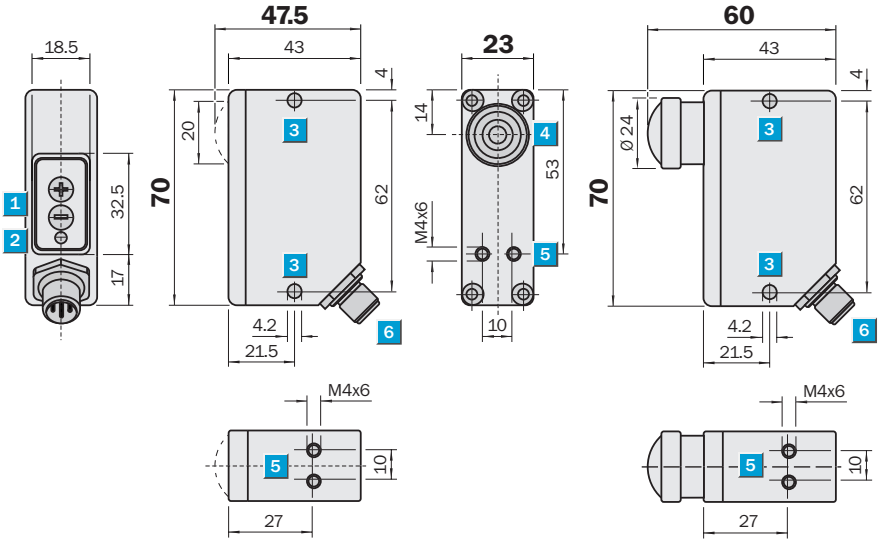
See chapter Accessories

Connectors
Mounting systems
Lenses

Dimensional drawing

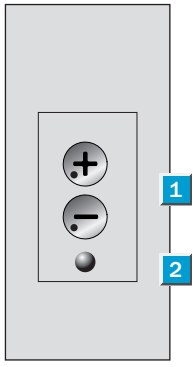
LUT1B-11325
LUT1B-12205*)
LUT1B-31225
LUT1B-41225
LUT1U-11331
LUT1B-41235

*) lens planar to surface



Adjustment possible

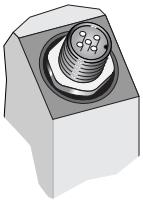
All types



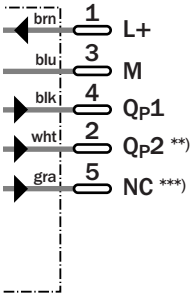
1 Control switches
2 LED signal strength indicator
3 Mounting hole
4 Optical axis
5 Threaded mounting hole
6 M12 plug, 5-pin

Connection type

All types



5-pin, M12



**) Q_P2 or control output
***) NC or analogue output

Technical data	LUT1	U-11331	B-11325	B-12205	B-31325	B-41225	B-41235
Scanning distance[1]	50 mm		■		■	■	
	80 mm			■			
	150 mm	■					■
Light source[2]**/light type**	UV-LED, wave length 370 nm	■					
	Blue LED, wave length 480 nm		■	■	■	■	■
Light spot diameter	5 mm		■	■	■	■	
	12 mm	■					■
Light spot	10 x 70 mm			■			
Supply voltage U_V	10 ... 30 V DC[3]	■	■	■	■	■	■
Ripple[4]	< 5 V_{PP}	■	■	■	■	■	■
Current consumption[5]	< 40 mA	■	■	■	■	■	■
Switching outputs Q1 and Q2	PNP light-/dark-switching	■	■	■			
	PNP light-switching + control output					■	■
	PNP light-switching + NPN light-switching				■		
Analogue output Q_A	0.5 ... 10 mA			■			
Output current I_A max.	200 mA	■	■	■	■	■	■
Response time max.[6]	100 µs/750 µs	■	■	■	■	■	■
Switching frequency[7]	600/s	■	■		■		
	6000/s	■	■	■	■	■	■
Connection types	Plug, M12, 5-pin	■	■	■	■	■	■
VDE protection class[8]	⧫	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Ambient temperature T_A	Operation –20 °C ... +60 °C	■	■	■	■	■	■
	Storage –40 °C ... +70 °C	■	■	■	■	■	■
Weight	Approx. 240 g	■	■	■	■	■	■
Housing material	Zinc die-cast housing	■	■	■	■	■	■

1) From front edge of lens
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
9) A = V_S connections reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression

Switching threshold

Stepless control via film keypad: Maximum (+) to Minimum (–).

Order information

Type	Order no.
LUT1B-41225	1 024 125
LUT1B-41235	1 024 126
LUT1B-11325	1 024 127
LUT1U-11331	1 024 128
LUT1B-31325	1 027 593
LUT1B-12205	1 027 497

Scanning distance
10 ... 50 mm

Luminescence scanners

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

CE

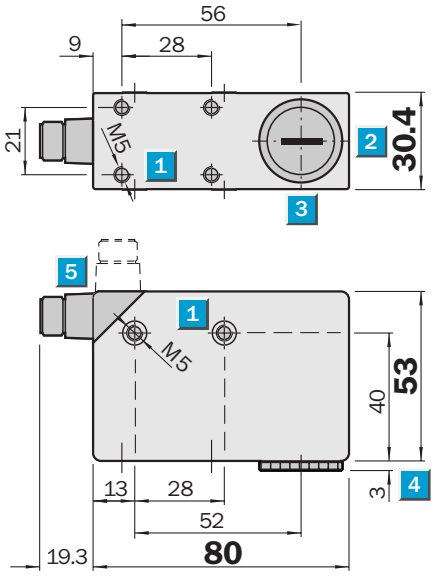
See chapter Accessories

Connectors

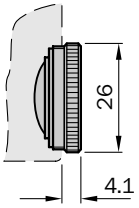
Mounting systems

Lenses

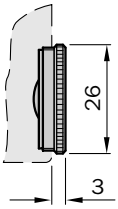
Dimensional drawing



LUT 3-610

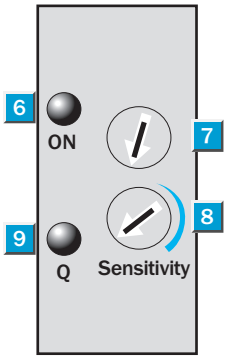


LUT 3-650
LUT 3-620



Adjustments possible

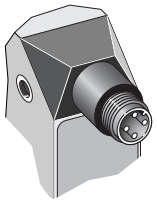
All types



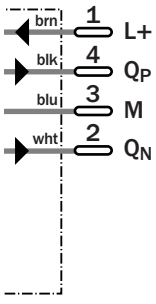
1 M5 threaded mounting hole, 5.5 mm deep
2 Light spot direction
3 Centre of optical axis
4 See dimensional drawing for lens
5 M12 plug (rotatable)
6 Operating indicator
7 Not used
8 Sensitivity adjustment
9 Output indicator

Connection type

All types



4-pin, M12

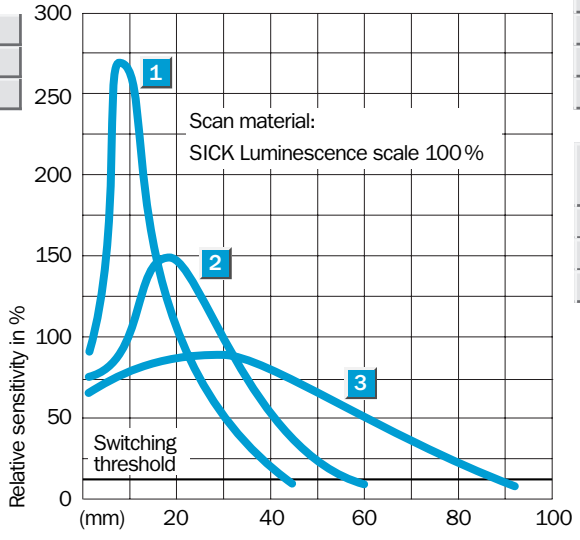


Technical data	LUT3-	610	620	650
Scannig distance [1]/light spot sizes	10 mm/Ø 2 x 6 mm	■		
	20 mm/Ø 3 x 9 mm		■	
	50 mm/Ø 5 x 15 mm			■
Light spot direction	Longitudinal	■	■	■
Light source [2], light type	UV light source	■	■	■
Wavelength	**385 nm**	■	■	■
Supply voltage V_S	12 ... 30 V DC [3]	■	■	■
Ripple [4]	max. 2 V	■	■	■
Current consumption [5]	60 mA	■	■	■
Switching outputs	Light-switching	■	■	■
	PNP: HIGH = V_S – <3 V/LOW = 0 V	■	■	■
	NPN: HIGH = V_S/LOW = <2 V	■	■	■
Output current I_A max.	100 mA	■	■	■
Response time [6]	0.3 ms	■	■	■
Switching frequency [7]	1.5 kHz	■	■	■
Connection type	Plug	■	■	■
VDE protection class [8]	⧈	■	■	■
Circuit protection [9]	A, B, C	■	■	■
Enclosure rating	IP 67	■	■	■
Ambient temperature T_A	Operation –10 °C ... +55 °C	■	■	■
	Storage –25 °C ... +75 °C	■	■	■
Shock load	To IEC 68	■	■	■
Weight	400 g	■	■	■
Housing material	Die-cast metal	■	■	■

1) From front edge of lens
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
9) A = V_S connections reverse-polarity protected
B = Outputs Q_P und Q_N short-circuit protected
C = Interference pulse suppression

Scanning distance

1 Scanning distance 10 mm
2 Scanning distance 20 mm
3 Scanning distance 50 mm



Order information

Type	Order no.
LUT3-610	1 015 396
LUT3-620	1 015 397
LUT3-650	1 015 398

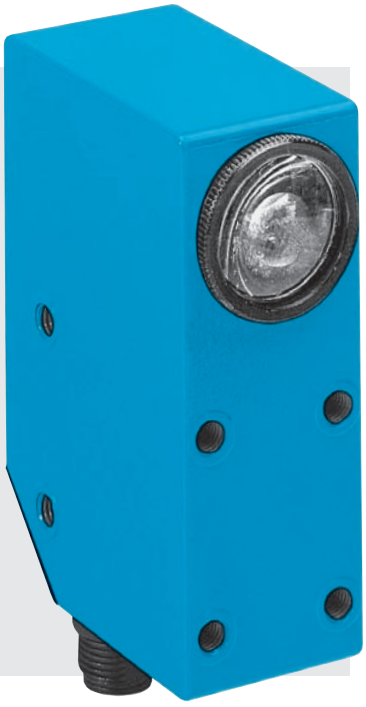
LUT3-6 is not sipplied with additional filter or fibre-optic cable

OBJ-LUT3-10	2 016 348
OBJ-LUT3-20	2 016 349
OBJ-LUT3-50	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

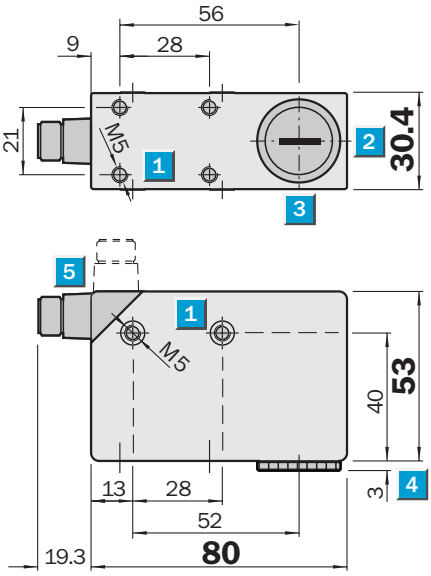


CE

See chapter Accessories

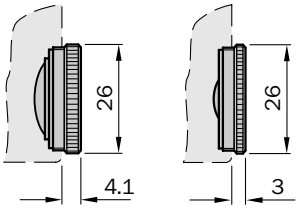
- Connectors
- Mounting systems
- Lenses
- Fibre-optic cable
- Luminescence scale

Dimensional drawing

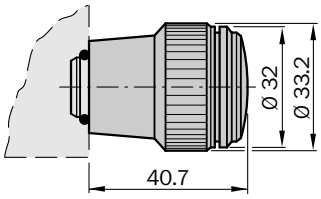


LUT3-810

LUT3-820
LUT3-850
LUT3-851
LUT3-852
LUT3-853

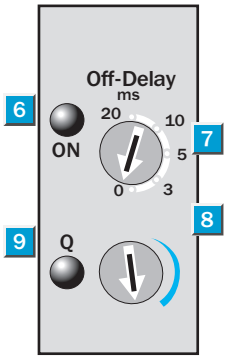


LUT3-890



Adjustments possible

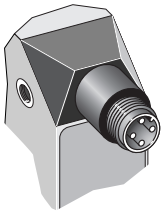
All types



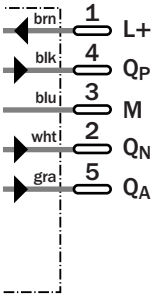
1 M5 threaded mounting hole, 5.5 mm deep
2 Light spot direction
3 Centre of optical axis
4 See dimensional drawing for lens
5 M12 plug (rotatable)
6 Operating indicator
7 Time delay selector switch
8 Sensitivity adjustment
9 Output indicator

Connection type

All types



5-pin, M12

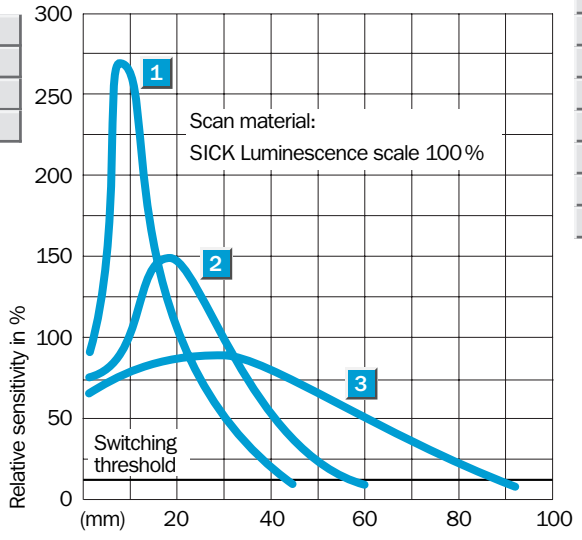


Technical data	LUT3-	810	820	850	890	851	852	853
Scanning distance [1]/light spot sizes	10 mm/Ø 2 x 6 mm	■						
	20 mm/Ø 3 x 9 mm		■					
	50 mm/Ø 5 x 15 mm			■		■	■	■
	90 mm/Ø 8 x 20 mm				■			
Light spot direction	Longitudinal	■	■	■	■	■	■	■
Light source [2], light type	UV light source	■	■	■	■	■	■	■
Wavelength	**385 nm**	■	■	■	■	■	■	■
Receiver filter	OG 570					■		
	RG 610						■	
	RG 665							■
Supply voltage V_S	12 ... 30 V DC [3]	■	■	■	■	■	■	■
Ripple [4]	max. 2 V	■	■	■	■	■	■	■
Current consumption [5]	60 mA	■	■	■	■	■	■	■
Switching outputs	Light-switching	■	■	■	■	■	■	■
	PNP: HIGH = V_S – <3 V/LOW = 0 V	■	■	■	■	■	■	■
	NPN: HIGH = V_S/LOW = <2 V	■	■	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■	■
Response time [6]	0.3 ms	■	■	■	■	■	■	■
Switching frequency [7]	1.5 kHz	■	■	■	■	■	■	■
Time delay (deactivation delay)	3 ms, 5 ms, 10 ms, 20 ms, adjustable	■	■	■	■	■	■	■
Analogue output Q_A	0.5 ... 10 mA	■	■	■	■	■	■	■
Connection type	Plug	■	■	■	■	■	■	■
VDE protection class [8]	⧈	■	■	■	■	■	■	■
Circuit protection [9]	A, B, C	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■
Ambient temperature	Operation –10 °C ... +55 °C	■	■	■	■	■	■	■
	Storage –25 °C ... +75 °C	■	■	■	■	■	■	■
Shock load	To IEC 68	■	■	■	■	■	■	■
Weight	400 g	■	■	■	■	■	■	■
Housing material	Die-cast metal	■	■	■	■	■	■	■

1) From front edge of lens
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
9) A = V_S connections reverse-polarity protected
B = Outputs Q_P und Q_N short-circuit protected
C = Interference pulse suppression

Scanning distance

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



Order Information

Type	Order no.
LUT3-810	1 012 867
LUT3-820	1 012 868
LUT3-850	1 012 869
LUT3-890	1 014 058
LUT3-851	1 012 870
LUT3-852	1 012 871
LUT3-853	1 012 872

Scanning distance
10 ... 90 mm

Luminescence scanners

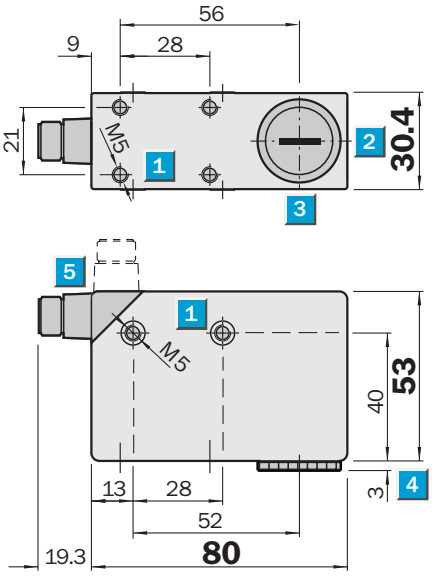
- UV semi-conductor light source
- No lamp replacement
- Scanning distance selectable by using interchangeable lenses
- Fibre-optic cable connection
- Analogue output
- Additional optical filter

CE

See chapter Accessories

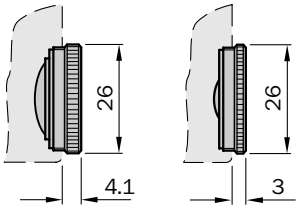
- Connectors
- Mounting systems
- Lenses
- Fibre-optic cable
- Luminescence scale

Dimensional drawing

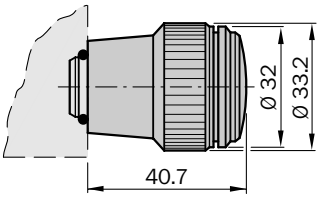


LUT3-910

LUT3-920
LUT3-950
LUT3-951
LUT3-952
LUT3-953

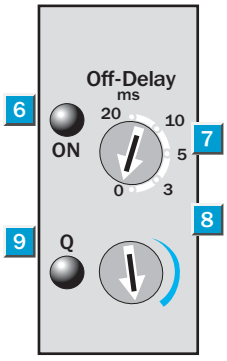


LUT3-990



Adjustments possible

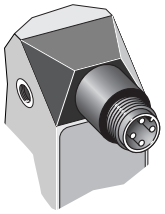
All types



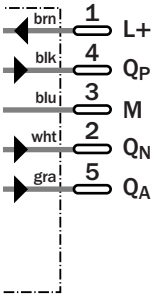
1 M5 threaded mounting hole, 5.5 mm deep
2 Light spot direction
3 Centre of optical axis
4 See dimensional drawing for lens
5 M12 plug (rotatable)
6 Operating indicator
7 Time delay selector switch
8 Sensitivity adjustment
9 Output indicator

Connection type

All types



5-pin, M12

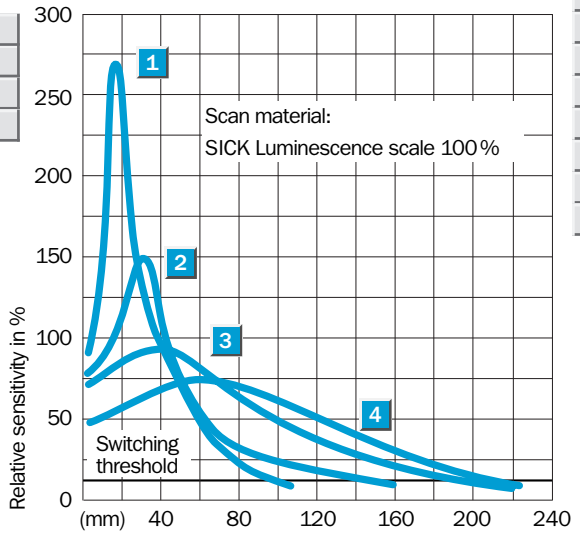


Technical data	LUT3-	910	920	950	990	951	952	953
Scanning distance [1]/light spot sizes	10 mm/Ø 2 x 6 mm	■						
	20 mm/Ø 3 x 9 mm		■					
	50 mm/Ø 5 x 15 mm			■		■	■	■
	90 mm/Ø 8 x 20 mm				■			
Larger scanning distances on request								
Light spot direction	Longitudinal	■	■	■	■	■	■	■
Light source [2], light type	UV light source	■	■	■	■	■	■	■
Wavelength	**370 nm**	■	■	■	■	■	■	■
Receiver filter	OG 570					■		
	RG 610						■	
	RG 665							■
Supply voltage V_S	12 ... 30 V DC [3]	■	■	■	■	■	■	■
Ripple [4]	max. 2 V	■	■	■	■	■	■	■
Current consumption [5]	60 mA	■	■	■	■	■	■	■
Switching outputs	Light-switching	■	■	■	■	■	■	■
	PNP: HIGH = V_S – <3 V/LOW = 0 V	■	■	■	■	■	■	■
	NPN: HIGH = V_S / LOW = <2 V	■	■	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■	■
Response time [6]	0.3 ms	■	■	■	■	■	■	■
Switching frequency [7]	1.5 kHz	■	■	■	■	■	■	■
Time delay (deactivation delay)	3 ms, 5 ms, 10 ms, 20 ms, adjustable	■	■	■	■	■	■	■
Analogue output Q_A	0.5 ... 10 mA	■	■	■	■	■	■	■
Connection type	Plug	■	■	■	■	■	■	■
VDE protection class [8]	⧈	■	■	■	■	■	■	■
Circuit protection [9]	A, B, C	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■
Ambient temperature	Operation –10 °C ... +55 °C	■	■	■	■	■	■	■
	Storage –25 °C ... +75 °C	■	■	■	■	■	■	■
Shock load	To IEC 68	■	■	■	■	■	■	■
Weight	400 g	■	■	■	■	■	■	■
Housing material	Die-cast metal	■	■	■	■	■	■	■

1) From front edge of lens
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
9) A = V_S connections reverse-polarity protected
B = Outputs Q_P und Q_N short-circuit protected
C = Interference pulse suppression

Scanning distance

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



Order information

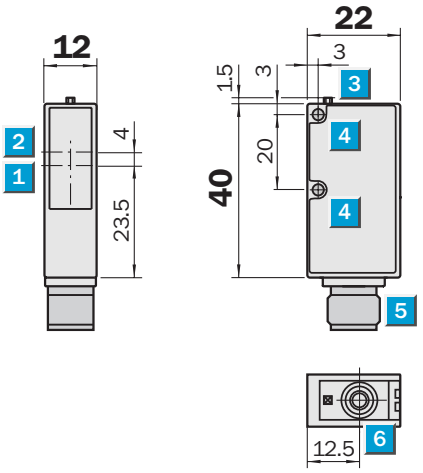
Type	Order no.
LUT3-910	1 019 285
LUT3-920	1 019 286
LUT3-950	1 019 287
LUT3-990	1 019 291
LUT3-951	1 019 288
LUT3-952	1 019 289
LUT3-953	1 019 290

Scanning distance
12.5 mm

Luminescence scanners

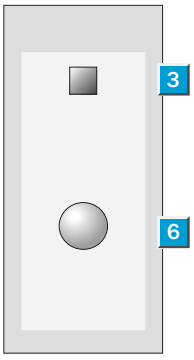
- Switching threshold adjustment for low fluorescence
- Static Teach-in to mark and/or background via control cable or control panel on unit
- Switching frequency 500/s and 2000/s
- M12 equipment plug

Dimension illustration



Adjustments possible

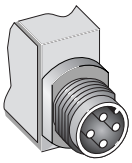
LUT2-P1116
LUT2-N1116



1 Axis of the sender optics
2 Axis of the receiver optics
3 LED signal strength indicator
4 Mounting hole; ∅ 3.2 mm
5 Plug M12, 4-pin
6 Teach-in button

Connection type

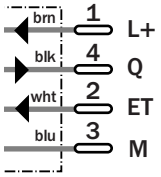
LUT2-P1116
LUT2-N1116



See chapter Accessories

Connectors
Mounting systems

4-pin, M12



Technical data	LUT2	P1116	N1116
Scanning distance	12.5 mm		
from front panel			
Wavelength	370 nm		
Light spot dimensions	2 x 2.5 mm		
Light source [1], light type	UV light source		
Supply voltage V_S	24 VDC ± 20 %		
Ripple [2]	< 5 V_{PP}		
Current consumption [3]	< 30 mA		
Switching outputs	NPN: HIGH = V_S / LOW = < 2 V		
	PNP: HIGH = V_S - < 2 V/ LOW = ca. 0 V		
Output current I_A max.	100 mA		
Response time [4]	1 ms/250 µs		
Switching frequency [5]	500/s and 2000/s		
Teach-in input ET	PNP: Teach > 10 V ...≤ V_S		
	NPN: Teach 0 V		
Connection type	Plug 4-pin, M12		
VDE protection class [6]	⧈		
Enclosure rating	IP 67		
Circuit protection [7]	A, B, C		
Ambient temperature	Operation –10 ... +55 °C		
	Storage –25 ... +75 °C		
Shock load	To IEC 68		
Weight	Approx. 80 g		
Housing material	ABS		

1) Average service life 100,000 h at T_A = +25 °C
2) May not exceeded or fall short of V_S tolerances
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression

Sensitivity adjustment

Standard applications are available with default setting of the LUT2, no Teach-in procedure is necessary.
Sensor with fix switching threshold and switching frequency 2000/s.

Order information

Type	Order no.
LUT2-P1116	1 023 500
LUT2-N1116	1 023 501

For low fluorescence of the mark and in the case of background fluorescence the sensitivity is set automatically with Teach-in via control panel or via control wire.

Teach-in via control panel:

1. Place mark in light spot.
2. Press the Teach-in button on the sensor for longer than 1 s.
   First Teach-in procedure is triggered.
3. Place the light spot on the background.
   Second Teach-in procedure is triggered.

Teach-in via control wire:

1. Place mark in light spot.
2. Trigger the first Teach-in procedure via the control wire.
3. Place the light spot on the background, and then trigger the second Teach-in procedure via the control wire.

Confirmation:

LED and status indicator do not blink = Teach-in procedure completed with standard sensitivity (2000/s).
LED and status indicator blink 2 x shortly = Teach-in procedure completed with high sensitivity (500/s).
LED and status indicator blink rapidly = Teach-in procedure not completed.

Preselection: high sensitivity, switching frequency 500/s via control panel.

Teach-in via control panel:

1. Place mark in light spot.
2. Press the Teach-in button on the sensor for longer than 1 s.
   First Teach-in procedure is triggered.
3. Place the light spot on the background, and then trigger the second Teach-in procedure via the control wire.
4. Press the Teach-in button in the next 2 seconds.

Confirmation:

LED and status indicator blink 2 x shortly = Teach-in procedure completed with high sensitivity (500/s).
LED and status indicator blink rapidly = Teach-in procedure not completed.