



## Color sensors for detection of a single color and high speed production sequences

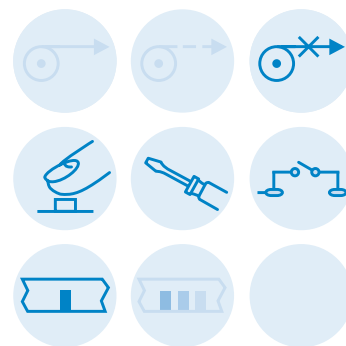
In detecting, monitoring and sorting according to colors in automation technology there is no better sensor than the CS 1 color sensor. High speed performance and the detection of just one color are clear advantages to choosing the CS 1, in addition to a good price-/performance ratio.

The facility of being able to use the color sensors in both regular operation, and in synchronised mode, offers benefits regarding the speed of operation during use.

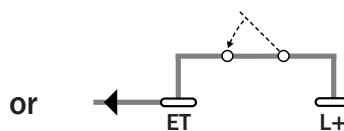
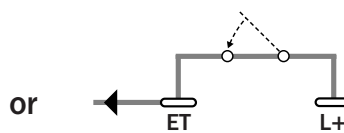
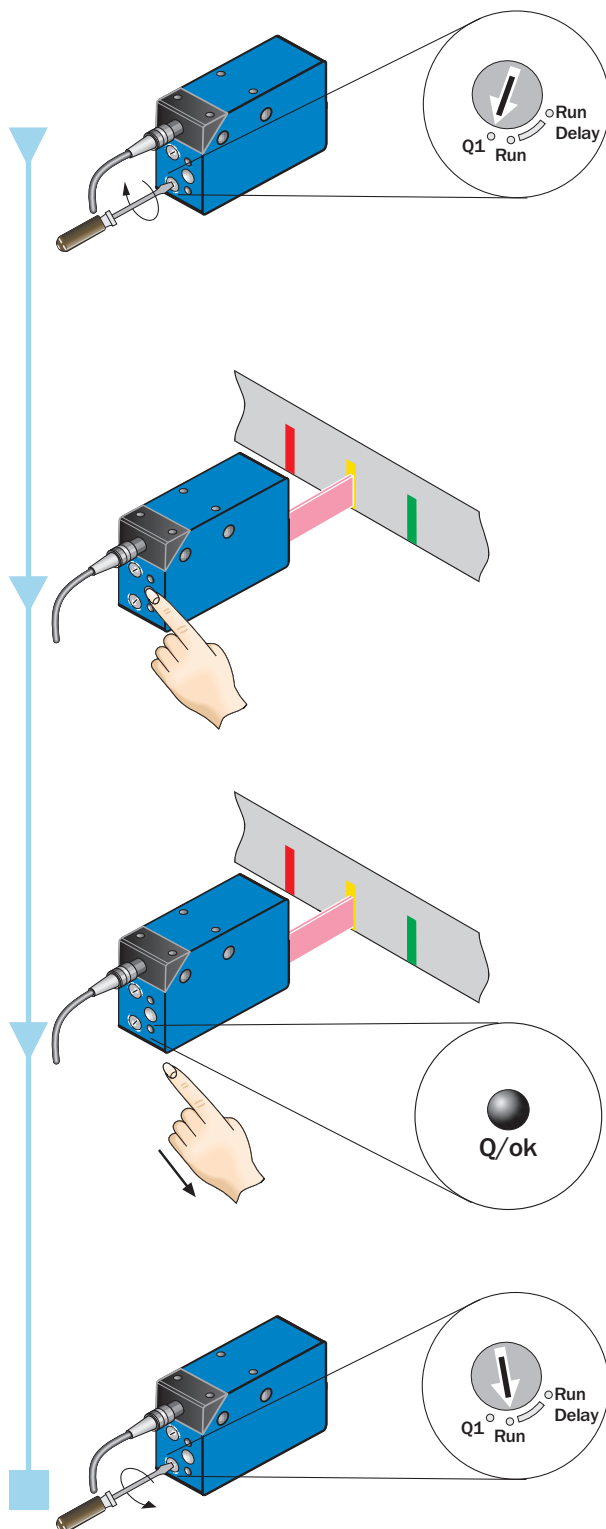
The switching frequency of 1 kHz, the scanning distances of optionally 12.5 or 60 mm, and scanning mode or reflector mode cover a broad field of applications for color detection.

One other benefit: as an option in fibre-optic mode, the CS 1 also has an advantage where restricted space and high temperatures are concerned.





Teach-in: Setting the switch threshold





Status

- Upon successful Teach process the “Q/ok” indicator (yellow LED) illuminates.

Notes

- If the “Q/ok” indicator does not illuminate, then the intensity is too low. Increase the color tolerance of the selector switch. If the indicator flashes the intensity is too high (reflection/gloss). Reduce the color tolerance of the selector switch.
- After resetting the programme selector switch to “Run” or to “Run Delay” the sensor is ready to use.

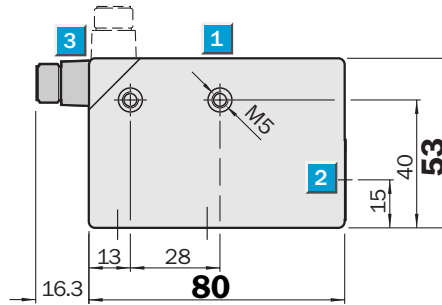
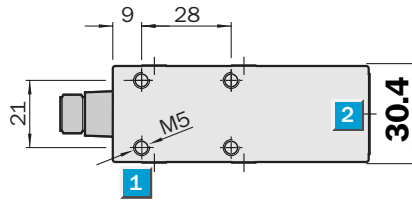
## CS 1 Color sensors

	<b>Scanning distance</b> 12.5/60 mm
<b>Color sensors scanning principle</b>	
	<b>Scanning range</b> 50 ... 1000 mm
<b>Color sensors through-beam principle</b>	

- Color recognition in reflected and transmitted light
- Static Teach-in for objects via the control wire or the operating console
- Switching frequency 1 kHz
- Adjustable color selectivity
- Blanking input



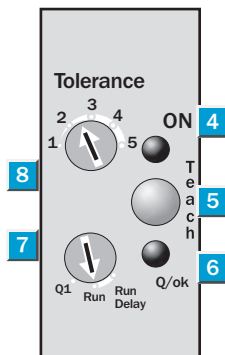
### Dimensional drawing



### Adjustments possible

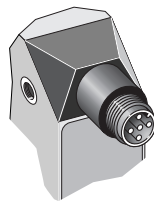
CS 1-P 1111	CS 1-P 3611
CS 1-N 1111	CS 1-N 3611

- 1 M5 threaded mounting hole, 5.5 mm deep
- 2 Centre of optical axis
- 3 5-pin, M12 plug (rotatable)
- 4 Operating indicator, green
- 5 Teach-in button
- 6 Function indicator output/teach-in (yellow)
- 7 Programme selector switch
- 8 Color tolerance selector switch

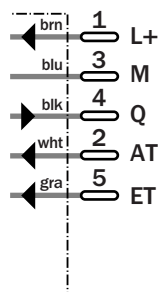


### Connection type

CS 1-P 1111	CS 1-P 3611
CS 1-N 1111	CS 1-N 3611



### 5-pin, M12



### Accessories

Cables and connectors  
Reflectors

Technical data		CS 1-	P 1111	N 1111	P 3611	N 3611						
<b>Scanning distance</b> , from front edge of lens	12.5 mm 60 mm											
<b>Scanning distance tolerance</b>	± 2 mm ± 9 mm											
<b>Light spot dimension</b>	2 x 4 mm (at 12.5 mm) Ø 13 mm (at 60 mm)											
Light spot direction	Longitudinal											
<b>Light source<sup>1)</sup>; light type</b>	LED; green, red, blue											
<b>Scanning range</b>												
With PL 80 A reflector	100 ... 250 mm, object-dependent 250 ... 1000 mm, object-dependent											
With PL 30 A reflector	50 ... 150 mm, object-dependent 200 ... 750 mm, object-dependent											
<b>Supply voltage <math>V_S</math></b>	12 ... 30 V DC <sup>2)</sup>											
Ripple <sup>3)</sup>	< 5 V											
Current consumption <sup>4)</sup>	< 80 mA											
<b>Switching outputs</b>	PNP: HIGH = $V_S - < 2$ V/LOW = 0 V NPN: HIGH = $V_S$ /LOW = < 2 V											
Output current $I_A$ max.	100 mA											
Response time <sup>5)</sup> ; Switching frequency <sup>6)</sup>	< 700 µs; 1000/s											
<b>Time delay</b>	20 ms deactivation delay, adjustable											
<b>Teach-in input ET</b>	PNP: Teach > 12 V ... < $V_S$ Run < 2 V or unswitched NPN: Teach 0 V ... 12 V Run $V_S$ or unswitched											
Pulse duration	ET > 0.5 ms											
<b>Blanking input AT</b>												
Blanked	PNP: > 12 V ... < $V_S$ Free running < 2 V or unswitched											
Blanked	NPN: 0 V ... $V_S$ Free running $V_S$ or unswitched											
Response time	< 0.2 ms											
<b>Connection type</b>	M12 plug, 5-pin											
<b>VDE protection class<sup>7)</sup></b>	□											
<b>Circuit protection<sup>8)</sup></b>	A, B, C											
<b>Enclosure rating</b>	IP 67											
<b>Ambient temperature <math>T_A</math></b>	Operation -10 °C ... +55 °C Storage -25 °C ... +70 °C											
<b>Shock load</b>	To IEC 68											
<b>Weight</b>	Approx. 400 g											
<b>Housing material</b>	Zinc die-cast housing											

<sup>1)</sup> Average service life 100,000 h at  $T_A = +25$  °C

<sup>2)</sup> Limit values

<sup>3)</sup> May not exceed or fall short of  $V_S$  tolerances

<sup>4)</sup> Without load

<sup>5)</sup> Signal transit time with resistive load

<sup>6)</sup> With light/dark ratio 1:1

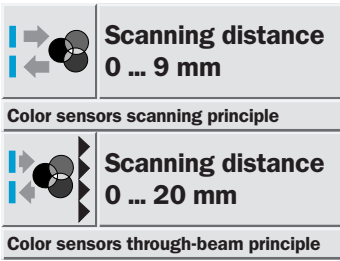
<sup>7)</sup> Reference voltage 50 V DC

<sup>8)</sup> A =  $V_S$  connections reverse-polarity protected

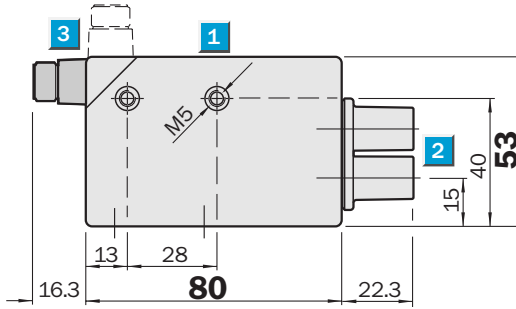
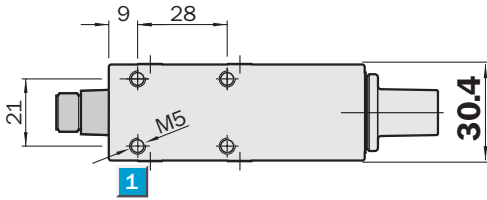
B = Outputs Q short-circuit protected

C = Interference pulse suppression

Order information	
Type	Part no.
CS 1-P 1111	1 012 858
CS 1-N 1111	1 012 862
CS 1-P 3611	1 012 859
CS 1-N 3611	1 012 863



## Dimensional drawing

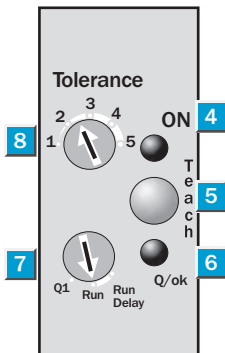


- Fibre optic cable connection
- Fibre optic cable for high temperatures
- Static Teach-in for objects via the control wire or the operating console
- Adjustable color selectivity
- Blanking input

## Adjustments possible

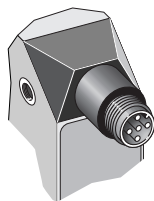
CSL 1-P 11  
CSL 1-N 11

- 1** M5 threaded mounting hole, 5.5 mm deep
- 2** Centre of optical axis
- 3** 5-pin, M12 plug (rotatable)
- 4** Operating indicator, green
- 5** Teach-in button
- 6** Function indicator output/teach-in (yellow)
- 7** Programme selector switch
- 8** Color tolerance selector switch

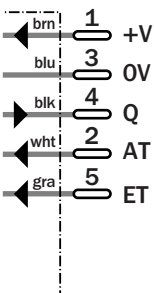


## Connection type

CSL 1-P 11  
CSL 1-N 11



## M12, 5-pin



## Accessories

Cables and connectors  
Reflectors  
Fibre-optic cables

Technical data		CSL 1-	P 11	N 11								
<b>Scanning distance</b>	0 ... 9 mm											
<b>Scanning range</b>	0 ... 20 mm											
<b>Light source<sup>1)</sup>; light type</b>	LED; green, red, blue											
<b>Supply voltage <math>V_S</math></b>	12 ... 30 V DC <sup>2)</sup>											
Ripple <sup>3)</sup>	< 5 V											
Current consumption <sup>4)</sup>	< 80 mA											
<b>Switching outputs</b>	PNP: HIGH = $V_S - < 2$ V/LOW = 0 V											
	NPN: HIGH = $V_S$ /LOW = < 2 V											
Output current $I_A$ max.	100 mA											
Response time <sup>5)</sup> ; Switching frequency <sup>6)</sup>	< 700 $\mu$ s; 1000/s											
<b>Time delay</b>	20 ms deactivation delay, adjustable											
<b>Teach-in-Eingang ET</b>	PNP: Teach > 12 V ... < $V_S$											
	Run < 2 V or unswitched											
	NPN: Teach 0 V ... 12 V											
	Run $V_S$ or unswitched											
Pulse duration	ET > 0.5 ms											
<b>Blanking input AT</b>												
Blanked	PNP: > 12 V ... < $V_S$											
Free running	< 2 V or unswitched											
Blanked	NPN: 0 V ... $V_S$											
Free running	$V_S$ or unswitched											
Response time	< 0.2 ms											
<b>Connection type</b>	M12 plug, 5-pin											
<b>VDE protection class<sup>7)</sup></b>	<input type="checkbox"/>											
<b>Circuit protection<sup>8)</sup></b>	A, B, C											
<b>Enclosure rating</b>	IP 67											
<b>Ambient temperature <math>T_A</math></b>	Operation -10 °C ... +55 °C											
	Storage -25 °C ... +70 °C											
<b>Shock load</b>	To IEC 68											
<b>Weight</b>	Approx. 400 g											
<b>Housing material</b>	Zinc die-cast housing											

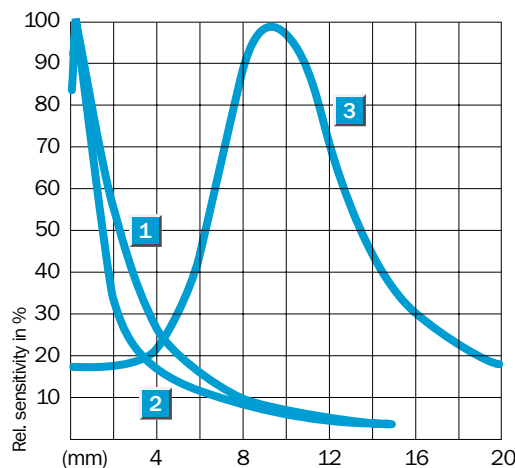
1) Average service life 100,000 h at  $T_A = +25$  °C  
 2) Limit values

3) May not exceed or fall short of  $V_S$  tolerances  
 4) Without load

5) Signal transit time with resistive load  
 6) With light/dark ratio 1:1  
 7) Reference voltage 50 V DC

8) A =  $V_S$  connections reverse-polarity protected  
 B = Outputs Q short-circuit protected  
 C = Interference pulse suppression

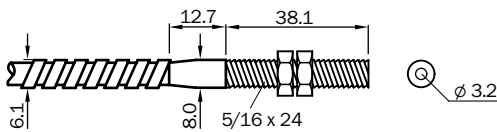
Scanning distance		Order information	
<b>1</b>	Fibre-optic cable LBST 32900	<b>Type</b>	<b>Part no.</b>
<b>2</b>	Fibre-optic cable 32900	CSL 1-P 11	1 016 292
<b>3</b>	Fibre-optic cable OCSL	CSL 1-N 11	1 016 293



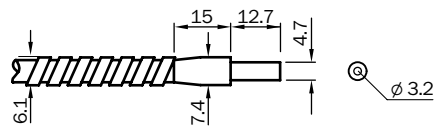
## Dimensional drawings and order information

- Glass-fibre cable with stainless steel sheath
- Sender and receiver fibres are randomly mixed (proximity systems)
- Operating temperature  $-58$  to  $+315$  °C
- Length of fibre-optic cable 900 mm (other lengths upon request)
- Bend radius  $\geq 19$  mm

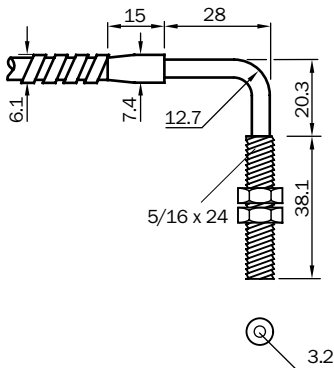
LIS/LBS 32 900 Fibre-optic cables			
System	Type	Part no.	Scanning range*
Through-beam	LIST 32 900	7 020 045	20 mm
Proximity system	LBST 32 900	7 020 046	9 mm



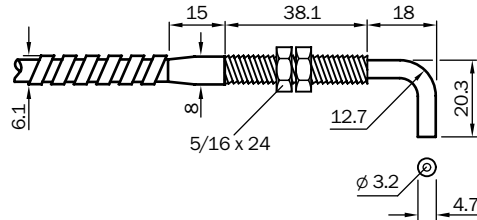
LIS/LBS 32 900 Fibre-optic cables			
System	Type	Part no.	Scanning range*
Through-beam	LISF 32 900	7 020 037	20 mm
Proximity system	LBSF 32 900	7 020 038	9 mm



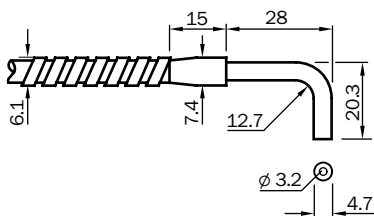
LIS/LBS 32 900 Fibre-optic cables			
System	Type	Part no.	Scanning range*
Through-beam	LISAT 32 900	7 020 035	20 mm
Proximity system	LBSAT 32 900	7 020 036	9 mm



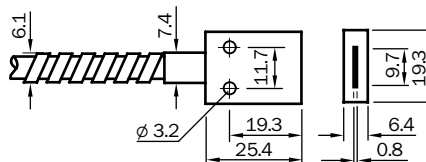
LIS/LBS 32 900 Fibre-optic cables			
System	Type	Part no.	Scanning range*
Through-beam	LISTA 32 900	7 020 047	20 mm
Proximity system	LBSTA 32 900	7 020 048	9 mm



LIS/LBS 32 900 Fibre-optic cables			
System	Type	Part no.	Scanning range*
Through-beam	LISA 32 900	7 020 039	20 mm
Proximity system	LBSA 32 900	7 020 040	9 mm



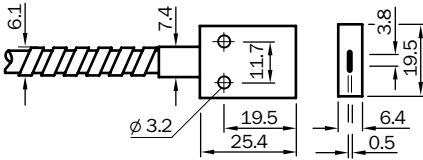
LIS/LBS 32 900 Fibre-optic cables			
System	Type	Part no.	Scanning range*
Through-beam	LISR 32 900	7 020 041	20 mm
Proximity system	LBSR 32 900	7 020 042	9 mm



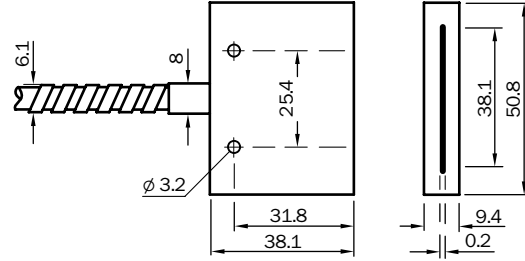
\* Operating range or scanning distance  
 Scanned material 90 % remission (DIN 5033)  
 Size of scanned material = diameter of light spot (aperture approx. 60°)

The part no. indicates the presence of a fibre-optic cable.  
 For through-beam systems two fibre-optic cables are needed.

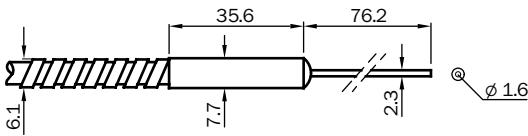
LIS/LBS 16 900 Fibre-optic cables			
System	Type	Part no.	Scanning range*
Through-beam	LISR 16 900	7 020 049	20 mm
Proximity system	LBSR 16 900	7 020 050	9 mm



LIS/LBS 40 900 Fibre-optic cables			
System	Type	Part no.	Scanning range*
Through-beam	LISR 40 900	7 020 051	20 mm
Proximity system	LBSR 40 900	7 020 052	9 mm

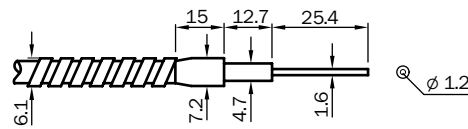


LIS/LBS 16 900 Fibre-optic cables			
System	Type	Part no.	Scanning range*
Through-beam	LISP 16 900	7 020 043	20 mm
Proximity system	L BSP 16 900	7 020 044	9 mm



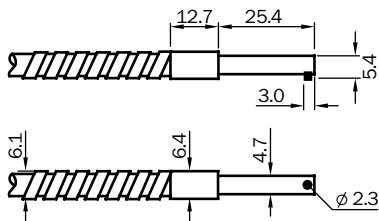
Bend radius of the terminal sleeve  $R_{min} = 12$  mm

LIS/LBS 12 900 Fibre-optic cables			
System	Type	Part no.	Scanning range*
Through-beam	LISM 12 900	7 020 053	20 mm
Proximity system	LBSM 12 900	7 020 054	9 mm



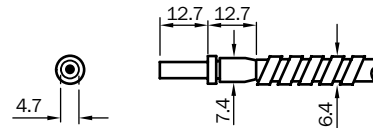
Bend radius of the terminal sleeve  $R_{min} = 6$  mm

LIS/LBS 23 900 Fibre-optic cables			
System	Type	Part no.	Scanning range*
Through-beam	LISAA 23 900	7 020 102	20 mm
Proximity system	LBSAA 23 900	7 020 103	9 mm

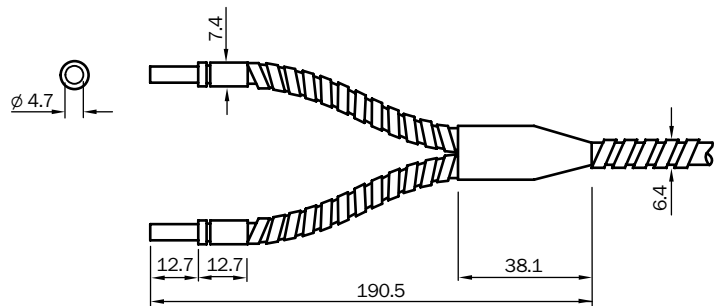


### Adaption of fibre-optic cables

Through-beam

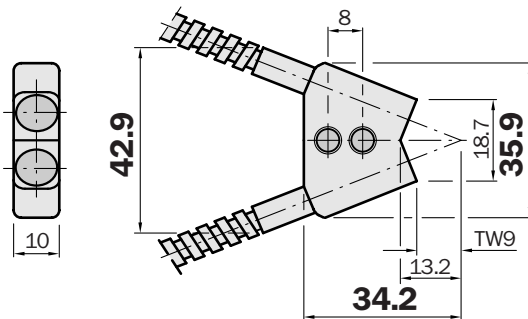


Proximity system



Mounting accessories are included in the scope of supply:  
 Captive nut: WLL 260,  
 Circlip, O-ring and installation instructions: fibre-optic cable WLL 260

OCSL Fibre-optic cables			
System	Type	Part no.	Scanning range*
Proximity system	OCSL	1 016 296	9 mm



\* Operating range or scanning distance  
 Scanned material 90 % remission (DIN 5033)  
 Size of scanned material = diameter of light spot  
 (aperture approx. 60°)

The part no. indicates the presence of a fibre-optic cable.  
 For through-beam systems two fibre-optic cables are needed.