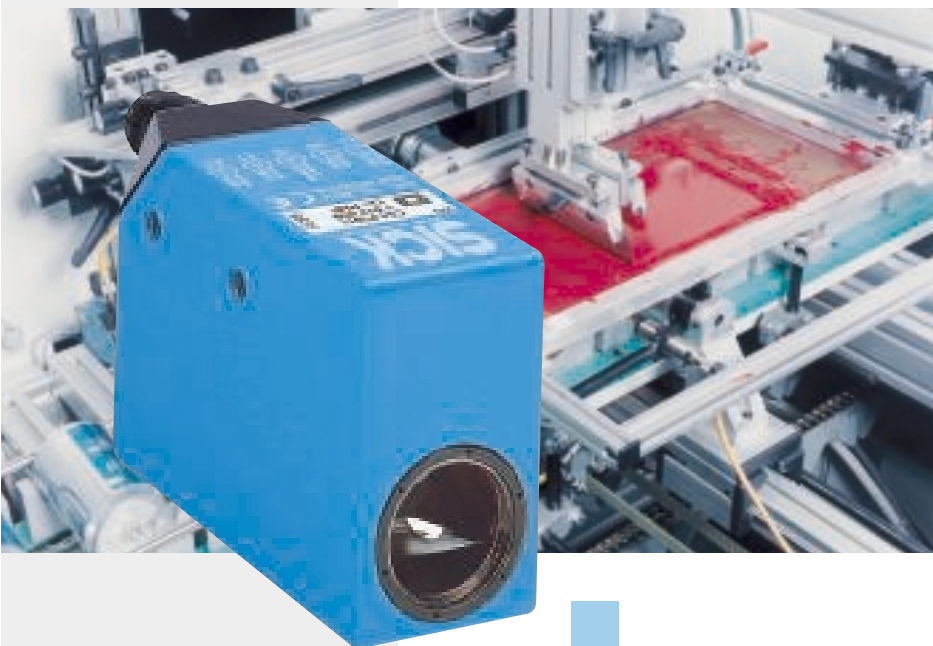




# CS Colour sensors: When it's the colour that counts



A brief description of the process: an object is illuminated using light of varying spectral composition. The light reflected is received by the sensor, digitised, and then evaluated and stored by a micro-processor. These measured values are compared with previously stored reference values. If the values are within the tolerance range, a switching output used to control the machine is set.

Identification, sorting, checking and evaluation – automation involves many tasks where colour is an important factor. CS colour sensors are able to detect colour as a control and quality criterion quickly and precisely – both with incident light and with transmitted light, with transparent and non-transparent materials.

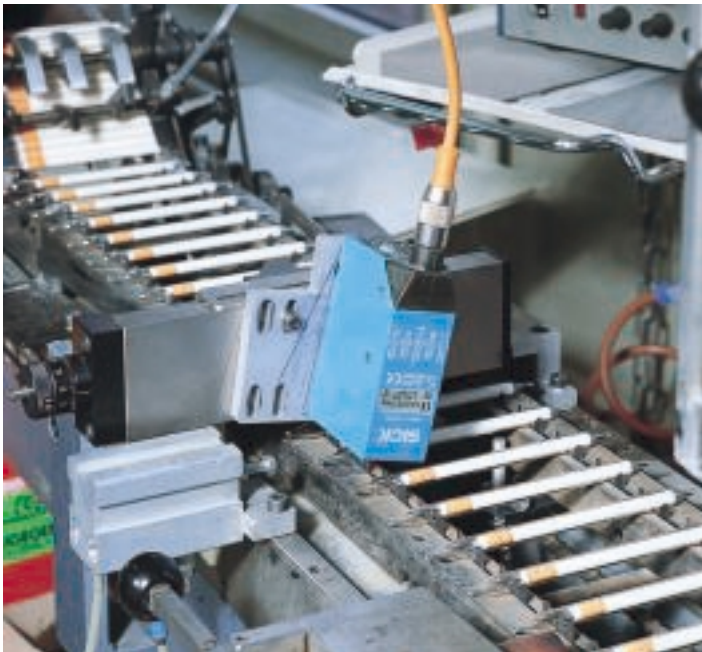
Two colour sensor variants are available:

- up to 3 colours can be saved in memory,
- scanning distances of 12.5 and 60 mm,
- simple operation using a teach-in function,
- die-cast housing,
- enclosure rating IP 67,
- rotatable M 12 plug,
- PNP and NPN switching outputs.

► A CS colour sensor ensuring that all cans are packed the same way up so that they are displayed facing the right way on supermarket shelves.





▼ A CS colour sensor checking whether analysis tubes used for pollutant detection have been filled correctly.



▲ It's the colour that counts: a CS sensor checking the colour of sewing silk before it is packed.

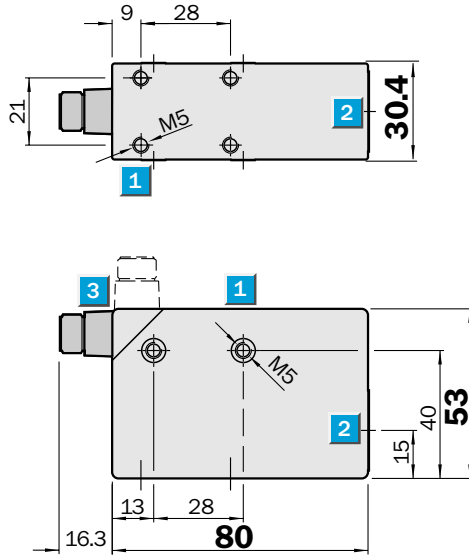
◀ Colour sensors lending the Treasury a helping hand: a CS 1 sensor checking the presence of revenue stamps on cigarette packets.

	<b>Scanning distance</b> 12.5/60 mm
	<b>Scanning range</b> 50...1000 mm
<b>Colour sensors</b>	

- Colour recognition in reflected and transmitted light
- Programming using the teach-in method (manually or via the input line)
- Switching frequency 1 kHz
- Adjustable colour selectivity
- Blanking input



**Dimensional drawing**



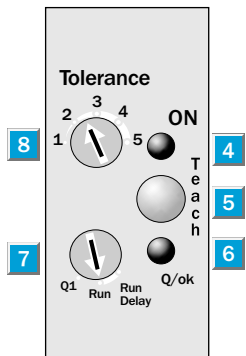
- 1 M5 threaded mounting hole, 5.5 mm deep
- 2 Centre of optical axis
- 3 5-pin, M 12 plug (rotatable)
- 4 Operating indicator, green
- 5 Teach-in button
- 6 Function indicator output/teach-in (yellow)
- 7 Program selector switch
- 8 Colour tolerance selector switch

**Adjustments possible**

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

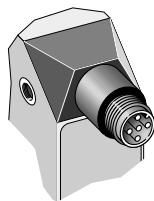
**Adjustments**

In order to simplify adjustment and operation of the device, the reference colour is programmed using the teach-in method. The colours can be selected individually by changing the position on the rotary switch. Reference colours can be stored by simply pressing a button. The programming procedure can also be carried out automatically via the external teach-in (ET) input cable. With each pulse, the sensor moves into programming mode, establishes the colour of the object being scanned and is then ready to be used again. After external teach-in the device is ready for use after 200 ms.

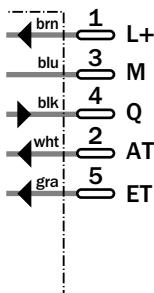


**Connection type**

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



5-pin, M 12



<b>Accessories</b>	page
Cable receptacles	496
Reflectors	520

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 dimensions</b>	2 x 4 mm ∅ 13 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 V<sub>S</sub></b>												
Supply voltage V <sub>S</sub>	12...30 V DC <sup>2)</sup>											
Ripple <sup>3)</sup>	< 5 V											
Current consumption <sup>4)</sup>	< 80 mA											
<b>Switching outputs</b>												
Switching outputs	PNP: HIGH = V <sub>S</sub> - < 2 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>5)</sup>	< 700 μs											
Switching frequency <sup>6)</sup>	1 kHz											
<b>Time delay</b>												
Time delay	20 ms deactivation delay, adjustable											
<b>Teach-in input ET</b>												
Teach-in input ET	PNP: Teach > 12 V... < V <sub>S</sub> Run < 2 V or unswitched NPN: Teach 0 V...12 V Run V <sub>S</sub> or unswitched											
Pulse duration	ET > 0.5 ms											
<b>Blanking input AT</b>												
Blanking input AT	Blanked PNP: > 12 V... < V <sub>S</sub> Free running < 2 V or unswitched Blanked NPN: 0 V...V <sub>S</sub> Free running V <sub>S</sub> or unswitched											
Response time	< 0.2 ms											
<b>Connection type</b>												
Connection type	Plug											
<b>VDE protection class<sup>7)</sup></b>												
VDE protection class <sup>7)</sup>	□											
<b>Circuit protection<sup>8)</sup></b>												
Circuit protection <sup>8)</sup>	A, B, C											
<b>Enclosure rating</b>												
Enclosure rating	IP 67											
<b>Ambient temperature T<sub>A</sub></b>												
Ambient temperature T <sub>A</sub>	Operation - 10 °C...+ 55 °C Storage - 25 °C...+ 70 °C											
<b>Shock load</b>												
Shock load	To IEC 68											
<b>Weight</b>												
Weight	Approx. 400 g											
<b>Housing material</b>												
Housing material	Zinc die-cast housing											



1) Average service life 100,000 h at T<sub>A</sub> = + 25 °C  
2) Limit values

3) May not exceed or fall short of V<sub>S</sub> tolerances  
4) Without load

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

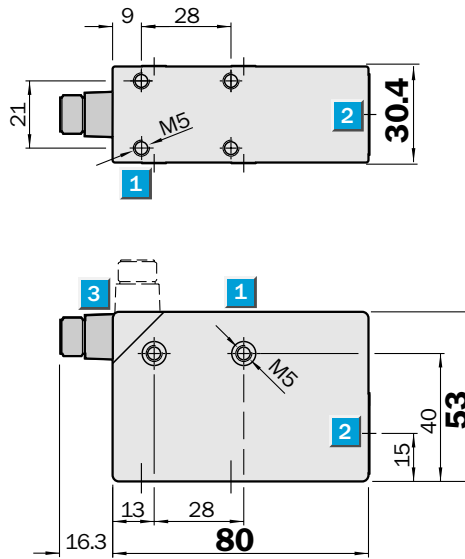
8) A = V<sub>S</sub> connections reverse-polarity protected  
B = Output Q short-circuit protected  
C = Interference pulse suppression

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

	<b>Scanning distance</b> 12.5/60 mm
	<b>Scanning range</b> 50...1000 mm
<b>Colour sensors</b>	

- Colour recognition in reflected and transmitted light
- Programming using teach-in method (manually or channel 1 via the input line)
- Adjustable colour selectivity
- 3 reference colours can be stored
- Blanking input

**Dimensional drawing**



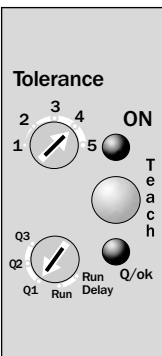
- 1 M5 threaded mounting hole, 5.5 mm deep
- 2 Centre of optical axis
- 3 8-pin, M 12 plug (rotatable)
- 4 Operating indicator, green
- 5 Teach-in button
- 6 Function indicator output/teach-in (yellow)
- 7 Program selector switch
- 8 Colour tolerance selector switch

**Adjustments possible**

CS 3-P 1132	CS 3-P 3632
CS 3-N 1132	CS 3-N 3632

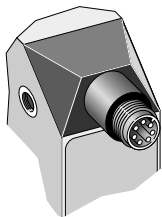
**Adjustments**

In order to simplify adjustment and operation of the device, the reference colour is programmed using the teach-in method. Colour selectivity can be set for each channel individually. Channel and colour tolerance is set by changing the position on the rotary switch. The reference colours can then be stored by simply pressing a button. Channel Q 1 can also be programmed automatically via the external teach-in (ET) input cable. With each pulse, the sensor moves into programming mode, establishes the colour of the object being scanned and is then ready to be used again. After external teach-in the device is ready for use after 200 ms.

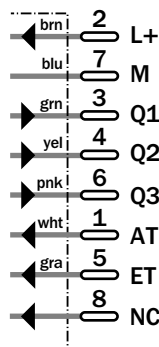


**Connection type**

CS 3-P 1132	CS 3-P 3632
CS 3-N 1132	CS 3-N 3632



8-pin, M 12



<b>Accessories</b>	page
Cable receptacles	496
Reflectors	520

Technical Data		CS 3-	P 1132	N 1132	P 3632	N 3632						
<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 dimensions</b>	2 x 4 mm ∅ 13 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 V<sub>S</sub></b>												
Supply voltage V <sub>S</sub>	12...30 V DC <sup>2)</sup>											
Ripple <sup>3)</sup>	< 5 V											
Current consumption <sup>4)</sup>	< 80 mA											
<b>Switching outputs</b>												
Switching outputs	PNP: HIGH = V <sub>S</sub> - < 2 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>5)</sup>	< 2.5 ms											
Switching frequency <sup>6)</sup>	300 kHz											
<b>Time delay</b>												
Time delay	20 ms deactivation delay, adjustable											
<b>Teach-in input ET</b>												
Teach-in input ET	PNP: Teach > 12 V... < V <sub>S</sub> Run < 2 V or unswitched											
	NPN: Teach 0 V...12 V Run V <sub>S</sub> or unswitched											
Pulse duration	ET > 0.5 ms											
<b>Blanking input AT</b>												
Blanked	PNP: > 12 V... < V <sub>S</sub>											
Free running	< 2 V or unswitched											
Blanked	NPN: 0 V...V <sub>S</sub>											
Free running	V <sub>S</sub> or unswitched											
Response time <sup>5)</sup>	< 0.2 ms											
<b>Connection type</b>												
Connection type	M 12 plug, 8-pin											
<b>VDE protection class<sup>7)</sup></b>												
VDE protection class <sup>7)</sup>	□											
<b>Circuit protection<sup>8)</sup></b>												
Circuit protection <sup>8)</sup>	A, B, C											
<b>Enclosure rating</b>												
Enclosure rating	IP 67											
<b>Ambient temperature T<sub>A</sub></b>												
Ambient temperature T <sub>A</sub>	Operation - 10 °C...+ 55 °C Storage - 25 °C...+ 70 °C											
<b>Shock load</b>												
Shock load	To IEC 68											
<b>Weight</b>												
Weight	Approx. 400 g											
<b>Housing material</b>												
Housing material	Zinc die-cast housing											



1) Average service life 100,000 h at T<sub>A</sub> = + 25 °C  
2) Limit values

3) May not exceed or fall short of V<sub>S</sub> tolerances  
4) Without load

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

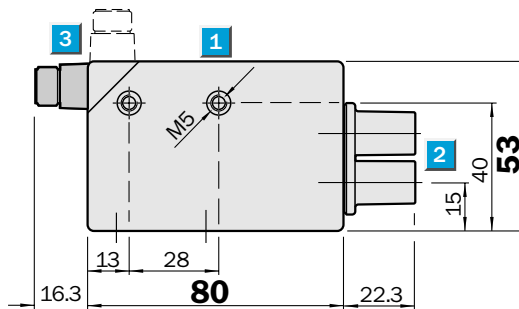
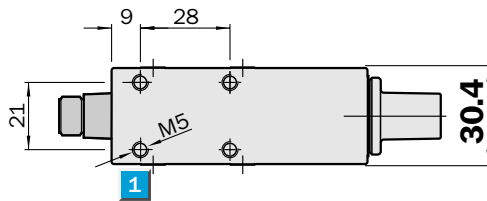
8) A = V<sub>S</sub> connections reverse-polarity protected  
B = Outputs Q<sub>1</sub>, Q<sub>2</sub>, Q<sub>3</sub> short-circuit protected  
C = Interference pulse suppression

Order information	
Type	Part no.
CS 3-P 1132	1 012 860
CS 3-N 1132	1 012 864
CS 3-P 3632	1 012 861
CS 3-N 3632	1 012 865

	<b>Scanning distance</b> 0...9 mm
<b>Switch-principle colour sensors</b>	
	<b>Scanning range</b> 50...20 mm
<b>Through-beam princ. colour sensors</b>	

- Fibre-optic cable connection
- Fibre-optic cable for high temperatures
- Teach-in via cable or Teach button
- Adjustable colour selectivity
- Blanking input

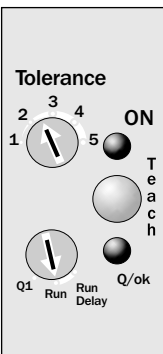
### Dimensional drawing



- 1** M5 threaded mounting hole, 5.5 mm deep
- 2** Centre of optical axis
- 3** 5-pin, M 12 plug (rotatable)
- 4** Operating indicator, green
- 5** Teach-in button
- 6** Function indicator output/teach-in (yellow)
- 7** Program selector switch
- 8** Colour tolerance selector switch

### Adjustments possible

- CSL 1-P 11
- CSL 1-N 11

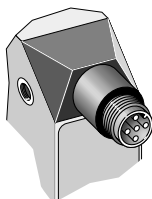


### Adjustment

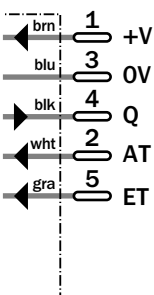
In order to simplify adjustment and operation of the device, the reference colour is programmed using the teach-in method. The colours can be selected individually by changing the position on the rotary switch. Just press the button to store the reference colours. The programming method can also be carried out automatically via the external teach-in (ET) input cable. With each pulse, the sensor moves into programming mode, establishes the colour of the object being scanned and is then ready to be used again.

### Connection type

- CSL 1-P 11
- CSL 1-N 11



### 5-pin, M 12



Accessories	page
Cable receptacles	496
Reflectors	520
Fibre-optic cables	528

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

- 1) Average service life 100,000 h at T<sub>A</sub> = + 25 °C
- 2) Limit values
- 3) May not exceed or fall short of V<sub>S</sub> tolerances
- 4) Without load
- 5) Signal transit time with resistive load
- 6) With light/dark ratio 1:1
- 7) Reference voltage DC 50 V
- 8) A = V<sub>S</sub> connections reverse-polarity protected  
B = Output Q short-circuit protected  
C = Interference pulse suppression

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

