



# HIGH-PERFORMANCE COLOR SENSING

C



## Product description

The ability to teach up to four colors can lead to faster changeovers and shorter downtime. The CS8 series offers high switching speeds – as fast as 6 kHz (85 µsec) – enabling higher throughput. And, the sensor maintains the extreme precision of the lightspot; this sharp,

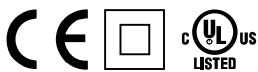
well-defined spot provides tighter process control and more consistent object detection. A bar graph display enables easy setup and provides information about the color quality and detection reliability.

## At a glance

- One (CS8-1) or four (CS8-4) colors can be saved
- 12.5 mm or 60 mm sensing distance
- Fast response time up to 85 µs
- High resolution color
- Bar graph display shows the correlation of the colors
- Extremely precise light spot and high resolution
- Metal housing with two light exits (interchangeable)

## Your benefits

- Identify and store up to four colors. No need to reprogram the sensor for changeovers, reducing downtime.
- High resolution colors can be matched exactly for better process reliability
- Maintains the extreme precision of the light spot, enabling a consistent object detection
- A bar graph display provides information about the color quality and detection reliability, ensuring simple process monitoring
- Broad spectrum of color tolerances enables more flexible use
- Fast response times at high speeds for reliable detection
- Detection reliability is not affected by varying temperatures



## Additional information

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→ [www.sick.com/de/en/CS8](http://www.sick.com/de/en/CS8)

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



## Detailed technical data

### Features

<b>Dimensions (W x H x D)</b>	30.4 mm x 80 mm x 53 mm
<b>Housing design (light emission)</b>	Rectangular
<b>Light source <sup>1)</sup></b>	LED
<b>Type of light</b>	RGB
<b>Wave length</b>	640 nm, 525 nm, 470 nm
<b>Teach-in mode</b>	Static 1-point teach-in

<sup>1)</sup> Average service life: 100,000 h at  $T_U = +25\text{ °C}$ .

### Mechanics/electronics

<b>Supply voltage <sup>1)</sup></b>	10 V DC ... 30 V DC
<b>Ripple <sup>2)</sup></b>	$< 5 V_{pp}$
<b>Power consumption <sup>3)</sup></b>	$< 120\text{ mA}$
<b>Switching output</b>	PNP: HIGH = $V_S - \leq 2\text{ V}$ / LOW approx. 0 V / NPN: HIGH = approx. $V_S$ / LOW $\leq 2\text{ V}$ (depending on type)
<b>Output current <math>I_{max.}</math> <sup>4)</sup></b>	$< 100\text{ mA}$
<b>Input, teach-in (ET)</b>	PNP Teach: $U = 10\text{ V} \dots < U_V$ Run: $U < 2\text{ V}$ NPN Teach: $U < 2\text{ V}$ Run: $U = 10\text{ V} \dots < U_V$
<b>Input, blanking input (AT)</b>	PNP Blanked: $U > 10\text{ V} \dots < U_V$ Free-running: $U < 2\text{ V}$ <sup>5)</sup> NPN Blanked: $U < 2\text{ V}$ Free-running: $U > 10\text{ V} \dots < U_V$ <sup>5)</sup>
<b>Retention time (ET)</b>	25 ms, non-volatile memory
<b>Time delay</b>	Deactivation delay 20 ms, shiftable
<b>Connection type</b>	Connector M12, 5-pin, male connector M12, 8-pin (depending on type)
<b>Protection class <sup>6)</sup></b>	II
<b>Circuit protection</b>	$V_S$ connections reverse-polarity protected, Output Q short-circuit protected, Interference suppression
<b>Fieldbus interface</b>	-
<b>Enclosure rating</b>	IP 67
<b>Weight</b>	400 g
<b>Housing material</b>	Metal, zinc diecast

<sup>1)</sup> Limit values; operation in short-circuit protected network max. 8 A.

<sup>2)</sup> May not exceed or fall below  $U_V$  tolerances.

<sup>3)</sup> Without load.

<sup>4)</sup> Consumption count Q1 / Q2.

<sup>5)</sup> AT > 200  $\mu\text{s}$ .

<sup>6)</sup> Reference voltage DC 32 V.

### Ambient data

<b>Ambient operating temperature</b>	$-10\text{ °C} \dots +55\text{ °C}$
<b>Ambient storage temperature</b>	$-20\text{ °C} \dots +75\text{ °C}$
<b>Shock load</b>	According to IEC 60068
<b>UL File No.</b>	NRKH.E181493 & NRKH7.E181493

Ordering information

Other models → [www.sick.com/de/en/CS8](http://www.sick.com/de/en/CS8)

CS8-1, 1 color

- **Switching frequency:** 1 kHz, 3 kHz, 6 kHz (adjustable, with light/dark ratio 1:1.)
- **Response time:** 500 µs, 160 µs, 85 µs (Signal transit time with resistive load.)
- **Connection type:** connector M12, 5-pin

Sensing distance <sup>1)</sup>	Sensing distance tolerance	Light spot size	Light spot direction	Output type	Connection diagram	Type	Part no.
12.5 mm	± 3 mm	2 mm x 4 mm	Vertical	PNP	Cd-313	CS81-P1112	1028224
				NPN	Cd-313	CS81-N1112	1028228
60 mm	± 9 mm	13 mm x 13 mm	-	PNP	Cd-313	CS81-P3612	1028225
				NPN	Cd-313	CS81-N3612	1028229

<sup>1)</sup> From front edge of lens.

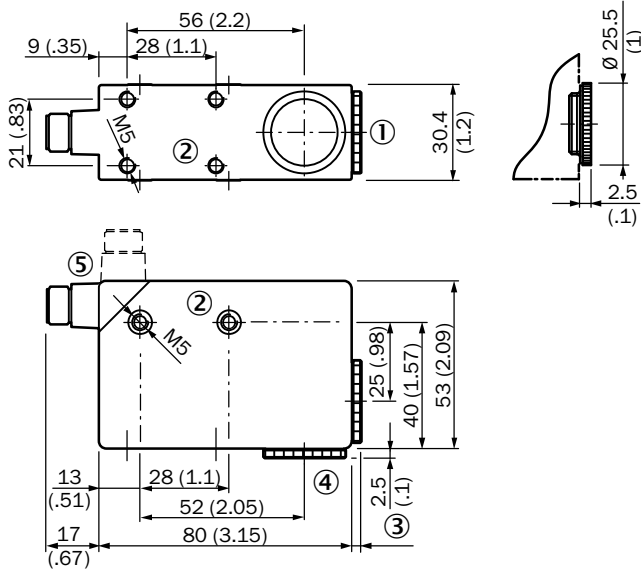
CS8-4, 4 colors

- **Switching frequency:** 0.5 kHz, 1 kHz, 3.5 kHz (adjustable, with light/dark ratio 1:1.)
- **Response time:** 1,000 µs, 500 µs, 145 µs (Signal transit time with resistive load.)
- **Connection type:** male connector M12, 8-pin

Sensing distance <sup>1)</sup>	Sensing distance tolerance	Light spot size	Light spot direction	Output type	Connection diagram	Type	Part no.
12.5 mm	± 3 mm	2 mm x 4 mm	Vertical	PNP	Cd-311	CS84-P1112	1028226
				NPN	Cd-311	CS84-N1112	1028230
60 mm	± 9 mm	13 mm x 13 mm	-	PNP	Cd-311	CS84-P3612	1028227
				NPN	Cd-311	CS84-N3612	1028231

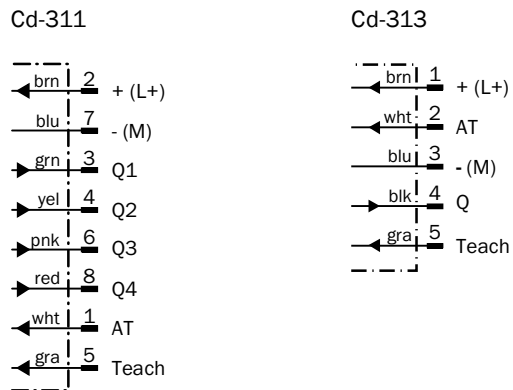
<sup>1)</sup> From front edge of lens.

Dimensional drawing (Dimensions in mm (inch))



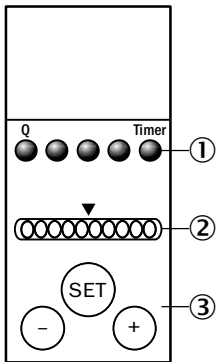
- ① Lens (light transmission)
- ② M5 threaded mounting hole, 5.5 mm deep
- ③ See dimensional drawing for lens
- ④ Blind screw can be replaced by lens
- ⑤ Connector M12 (rotatable up to 90°)

Connection diagram



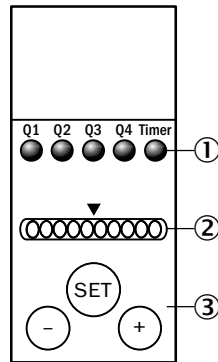
Adjustments

CS8-1



- ① Function signal indicators (yellow)
- ② Bar graph (green), Power on left LED
- ③ Teach-in button/"+" and "-" button

CS8-4



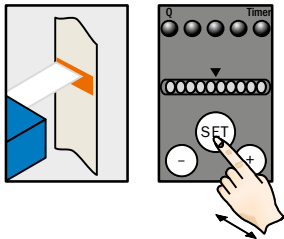
- ① Function signal indicators (yellow)
- ② Bar graph (green), Power on left LED
- ③ Teach-in button/"+" and "-" button

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Setting the switching threshold

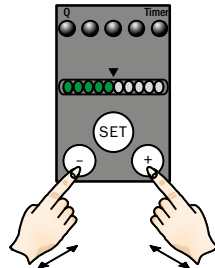
CS8-1

1. Trigger teach-in



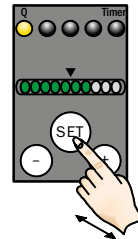
Position object in light field.  
Press SET button > 1 s.

2. Select color tolerance



If necessary adapt tolerance with  
"+" button (more coarse) or  
"-" button (more precise).

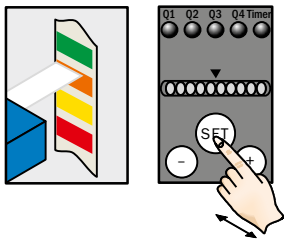
3. Confirm teach-in



Press SET button > 1 s.  
Color correspondence is  
visualized via bar graph display.

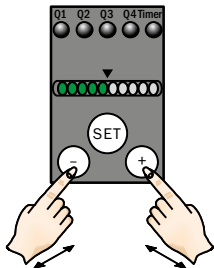
CS8-4

1. Trigger teach-in



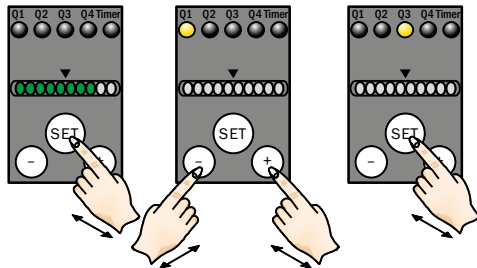
Position object in light field.  
Press SET button > 1 s.

2. Select color tolerance



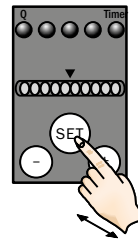
If requested adapt tolerance with  
"+" button (more coarse) or  
"-" button (more precise).  
Press SET button > 1 s.

3. Allocate channel to color



Allocate channel for color with  
"+" button (Q1 to Q4) or  
"-" button (Q4 to Q1).  
Press SET button > 1 s.

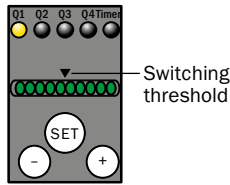
4. Confirm teach-in



Press SET button > 1 s.  
Color correspondence is  
visualized via bar graph  
display.

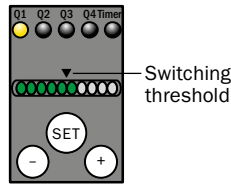
Display of the color correspondence

1. Full correspondence



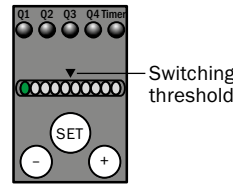
Color detected  
= Q active.

2. Correspondence



Color just detected  
= Q active.

3. No correspondence



Color not detected  
= Q inactive.

Special settings

“Evaluation mode,” “Tolerance change during operation,” “Show quality,” “Time stage,” and “Output logic” can be set via a special menu (cf. appropriate operating instructions for the device).

- and
- > 1 s = enter/exit
- or
- < 1 s = navigate
- 
- > 1 s = select/confirm

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Recommended accessories

Universal bar clamp systems

Figure	Material	Description	Type	Part no.
	Steel, zinc coated	Plate G for universal clamp bracket	BEF-KHS-G01	2022464
		Plate K for universal clamp bracket	BEF-KHS-K01	2022718
		Universal clamp bracket for rod mounting	BEF-KHS-KH1	2022726
		Mounting bar, straight, 200 mm, steel	BEF-MS12G-A	4056054
		Mounting bar, straight, 300 mm, steel	BEF-MS12G-B	4056055
		Mounting bar, L-shaped, 150 mm x 150 mm, steel	BEF-MS12L-A	4056052
		Mounting bar, L-shaped, 250 x 250 mm, steel	BEF-MS12L-B	4056053

Plug connectors and cables


Connecting cables with female connector

M12, 5-pin, PVC, chemical resistant

Figure	Connection type head A	Connection type head B	Connecting cable	Type	Part no.
	Female connector, M12, 5-pin, straight, unshielded	Cable, open conductor heads	2 m, 5-wire	DOL-1205-G02M	6008899
			5 m, 5-wire	DOL-1205-G05M	6009868
			10 m, 5-wire	DOL-1205-G10M	6010544
	Female connector, M12, 5-pin, angled, unshielded	Cable, open conductor heads	2 m, 5-wire	DOL-1205-W02M	6008900
			5 m, 5-wire	DOL-1205-W05M	6009869
			10 m, 5-wire	DOL-1205-W10M	6010542

M12, 8-pin, PVC

Figure	Connection type head A	Connection type head B	Connecting cable	Type	Part no.
	Female connector, M12, 8-pin, straight, shielded	Cable, open conductor heads	2 m, 8-wire	DOL-1208-G02MA	6020633
			5 m, 8-wire	DOL-1208-G05MA	6020993

Figure	Connection type head A	Connection type head B	Connecting cable	Type	Part no.
	Female connector, M12, 8-pin, angled, shielded	Cable, open conductor heads	2 m, 8-wire	DOL-1208-W02MA	6020992
			5 m, 8-wire	DOL-1208-W05MA	6021033

→ For additional accessories, please see page K-240

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