



# G2F

OUTSTANDING PERFORMANCE IN MINIATURE FORMAT

Photoelectric sensors

**SICK**  
Sensor Intelligence.

# OUTSTANDING PERFORMANCE IN MINIATURE FORMAT









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## Product description

The G2 Flat is a miniature photoelectric sensor for use in particularly compact plants and robotics systems. With powerful background suppression (HGA), the sensor can be relied upon to detect objects at distances starting from just 8 mm – virtually regardless of object size and surface. This makes it an excellent solution for all kinds of tasks wherever space is at a premium

and opens up entirely new possibilities for miniaturization in industrial environments. Sensor integration and handling could not be easier. As one of the smallest photoelectric sensor product families from SICK, the G2 Flat is the smart application solution in a miniature format for industrial automation.

## At a glance

- Ultra-thin housing for the tightest of installation spaces
- BGS: Object detection starting from just 8 mm
- Detection of objects from 0.1 mm in size
- Reliable detection of jet-black, specular, transparent, and shiny objects
- PinPoint LED
- VISTAL® housing, steel mounting plates
- Can be adjusted individually to OEM requirements

## Your benefits

- The ultra-thin G2 Flat sensors can be integrated into miniature plants and very tight installation spaces
- Reliable detection: Detect objects with excellent and high-performance background suppression starting from just 8 mm
- Even the smallest of objects can be detected without problems
- Versatility of use: The G2 Flat can be relied upon to detect jet-black, specular, transparent, and shiny objects
- Easy installation and maintenance – not least thanks to easy differentiation between sender and receiver
- Ultra-reliable sensor design with VISTAL® housing and steel mounting plates

→ [www.sick.com/G2F](http://www.sick.com/G2F)

For more information, simply 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

	GTB2 Flat	GSE2 Flat	GSE2 Flat Side
<b>Sensor principle</b>	Photoelectric proximity sensor	Through-beam photoelectric sensor	
<b>Detection principle</b>	Background suppression	-	
<b>Dimensions (W x H x D)</b>	14 mm x 24 mm x 3.5 mm	10 mm x 27 mm x 3.5 mm	11 mm x 21 mm x 4.5 mm
<b>Housing design (light emission)</b>	Rectangular		
<b>Minimum detectable object (MDO)</b>	0.1 mm <sup>1)</sup>	0.2 mm 0.5 mm 1 mm (depending on type)	
<b>Sensing range max.</b>	1 mm ... 35 mm (depending on type)	0 mm ... 700 mm (depending on type)	
<b>Sensing range</b>	1 mm ... 8 mm <sup>2)</sup> 1 mm ... 15 mm <sup>2)</sup> 1 mm ... 30 mm <sup>2)</sup> (depending on type)	0 mm ... 40 mm 0 mm ... 150 mm 0 m ... 500 mm (depending on type)	
<b>Type of light</b>	Visible red light		
<b>Light source <sup>3)</sup></b>	PinPoint LED		
<b>Light spot size (distance)</b>	Ø 1 mm (5 mm) Ø 2.5 mm (15 mm) Ø 4 mm (30 mm) (depending on type)	Ø 4 mm (40 mm) Ø 20 mm (150 mm) Ø 70 mm (500 mm) (depending on type)	Ø 4 mm (40 mm) Ø 15 mm (150 mm) Ø 60 mm (500 mm) (depending on type)
<b>Wave length</b>	660 nm		
<b>Adjustment</b>	None		

<sup>1)</sup> In 5 mm distance.

<sup>2)</sup> Object with 90 % reflectance (referred to standard white, DIN 5033).

<sup>3)</sup> Average service life: 100,000 h at T<sub>v</sub> = +25 °C.

## Mechanics/electronics

	GTB2 Flat	GSE2 Flat	GSE2 Flat Side
<b>Supply voltage <sup>1)</sup></b>	10 V DC ... 30 V DC		
<b>Ripple <sup>2)</sup></b>	≤ 5 V <sub>pp</sub>		
<b>Power consumption <sup>3)</sup></b>	20 mA		
<b>Switching output</b>	NPN PNP (depending on type)		
<b>Switching mode</b>	Dark switching / Light switching (depending on type)		
<b>Output current I<sub>max</sub>.</b>	< 50 mA		
<b>Response time <sup>4)</sup></b>	< 0.625 ms		
<b>Switching frequency <sup>5)</sup></b>	800 Hz		
<b>Connection type</b>	Cable, 2 m <sup>6)</sup> Cable with male connector, M8, 200 mm <sup>6)</sup> (depending on type)		
<b>Circuit protection</b>	A <sup>7)</sup> C <sup>8)</sup> D <sup>9)</sup>		
<b>Housing material</b>	Plastic, VISTAL <sup>®</sup> , stainless steel mounting plate		
<b>Optics material</b>	Plastic, MABS		
<b>Enclosure rating</b>	IP67		

	GTB2 Flat	GSE2 Flat	GSE2 Flat Side
Ambient operating temperature	-20 °C ... +50 °C		
Ambient storage temperature	-40 °C ... +70 °C		
Repeatability (T <sub>a</sub> not constant)	0.1 mm		
Hysteresis	< 0.3 mm ... < 2 mm (depending on type)	-	

<sup>1)</sup> Limit values when operated in short-circuit protected network: max. 8 A.

<sup>2)</sup> May not exceed or fall below U<sub>i</sub> tolerances.

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

<sup>4)</sup> Signal transit time with resistive load.

<sup>5)</sup> With light/dark ratio 1:1.

<sup>6)</sup> Do not bend below 0 °C.

<sup>7)</sup> A = V<sub>s</sub> connections reverse-polarity protected.

<sup>8)</sup> C = interference suppression.

<sup>9)</sup> D = outputs overcurrent and short-circuit protected.

## Ordering information

Other models → [www.sick.com/G2F](http://www.sick.com/G2F)

### GTB2 Flat

- **Sensor principle:** Photoelectric proximity sensor
- **Minimum detectable object (MDO):** 0.1 mm (In 5 mm distance.)
- **Detection principle:** Background suppression

Sensing range <sup>1)</sup>	Sensing range max.	Light spot size (distance)	Hysteresis	Switching output	Switching mode	Connection	Connection diagram	Type	Part no.
1 mm 8 mm	1 mm ... 9 mm	Ø 1 mm (5 mm)	< 0.3 mm	NPN	Dark switching	Cable, 3-wire 2 m PVC	cd-043	GTB2F-E1141	1093738
				PNP	Dark switching	Cable, 3-wire 2 m PVC	cd-043	GTB2F-F1141	1093735
				NPN	Light switching	Cable, 3-wire 2 m PVC	cd-043	GTB2F-N1141	1093726
				PNP	Light switching	Cable, 3-wire 2 m PVC	cd-043	GTB2F-P1141	1093723
				NPN	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-045	GTB2F-E5141	1093744
				PNP	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-045	GTB2F-F5141	1093741
				NPN	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-045	GTB2F-N5141	1093732
				PNP	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-045	GTB2F-P5141	1093729

<sup>1)</sup> Object with 90 % reflectance (referred to standard white, DIN 5033).

Sensing range <sup>1)</sup>	Sensing range max.	Light spot size (distance)	Hysteresis	Switching output	Switching mode	Connection	Connection diagram	Type	Part no.
1 mm 15 mm	1 mm ... 18 mm	Ø 2.5 mm (15 mm)	< 0.5 mm	NPN	Dark switching	Cable, 3-wire 2 m PVC	cd-043	GTB2F-E1111	1093736
				PNP	Dark switching	Cable, 3-wire 2 m PVC	cd-043	GTB2F-F1111	1093733
				NPN	Light switching	Cable, 3-wire 2 m PVC	cd-043	GTB2F-N1111	1093724
				PNP	Light switching	Cable, 3-wire 2 m PVC	cd-043	GTB2F-P1111	1093721
				NPN	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-045	GTB2F-E5111	1093742
				PNP	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-045	GTB2F-F5111	1093739
				NPN	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-045	GTB2F-N5111	1093730
				PNP	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-045	GTB2F-P5111	1093727

<sup>1)</sup> Object with 90 % reflectance (referred to standard white, DIN 5033).

Sensing range <sup>1)</sup>	Sensing range max.	Light spot size (distance)	Hysteresis	Switching output	Switching mode	Con- nection	Con- nection diagram	Type	Part no.
1 mm 30 mm	1 mm ... 35 mm	Ø 4 mm (30 mm)	< 2 mm	NPN	Dark switching	Cable, 3-wire 2 m PVC	cd-043	GTB2F-E1131	1093737
				PNP	Dark switching	Cable, 3-wire 2 m PVC	cd-043	GTB2F-F1131	1093734
				NPN	Light switching	Cable, 3-wire 2 m PVC	cd-043	GTB2F-N1131	1093725
				PNP	Light switching	Cable, 3-wire 2 m PVC	cd-043	GTB2F-P1131	1093722
				NPN	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-045	GTB2F-E5131	1093743
				PNP	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-045	GTB2F-F5131	1093740
				NPN	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-045	GTB2F-N5131	1093731
				PNP	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-045	GTB2F-P5131	1093728

<sup>1)</sup> Object with 90 % reflectance (referred to standard white, DIN 5033).

**GSE2 Flat**

- **Sensor principle:** Through-beam photoelectric sensor

Minimum detectable object (MDO)	Sensing range	Sensing range max.	Light spot size (distance)	Switching output	Switching mode	Connection	Connection diagram	Type	Part no.
0.2 mm	0 mm 40 mm	0 mm ... 60 mm	Ø 4 mm (40 mm)	NPN	Dark switching	Cable, 3-wire 2 m PVC	cd-049	GSE2F-E1111	1095443
				PNP	Dark switching	Cable, 3-wire 2 m PVC	cd-049	GSE2F-F1111	1095440
				NPN	Light switching	Cable, 3-wire 2 m PVC	cd-049	GSE2F-N1111	1095437
				PNP	Light switching	Cable, 3-wire 2 m PVC	cd-049	GSE2F-P1111	1095433
				NPN	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2F-E5111	1095455
				PNP	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2F-F5111	1095452
				NPN	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2F-N5111	1095449
				PNP	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2F-P5111	1095446

Minimum detectable object (MDO)	Sensing range	Sensing range max.	Light spot size (distance)	Switching output	Switching mode	Connection	Connection diagram	Type	Part no.
0.5 mm	0 mm 150 mm	0 mm ... 200 mm	Ø 20 mm (150 mm)	NPN	Dark switching	Cable, 3-wire 2 m PVC	cd-049	GSE2F-E1121	1095444
				PNP	Dark switching	Cable, 3-wire 2 m PVC	cd-049	GSE2F-F1121	1095441
				NPN	Light switching	Cable, 3-wire 2 m PVC	cd-049	GSE2F-N1121	1095438
				PNP	Light switching	Cable, 3-wire 2 m PVC	cd-049	GSE2F-P1121	1095435
				NPN	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2F-E5121	1095456
				PNP	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2F-F5121	1095453
				NPN	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2F-N5121	1095450
				PNP	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2F-P5121	1095447



Minimum detectable object (MDO)	Sensing range	Sensing range max.	Light spot size (distance)	Switching output	Switching mode	Connection	Connection diagram	Type	Part no.
1 mm	0 m 500 mm	0 mm ... 700 mm	Ø 70 mm (500 mm)	NPN	Dark switching	Cable, 3-wire 2 m PVC	cd-049	GSE2F-E1151	1095445
				PNP	Dark switching	Cable, 3-wire 2 m PVC	cd-049	GSE2F-F1151	1095442
				NPN	Light switching	Cable, 3-wire 2 m PVC	cd-049	GSE2F-N1151	1095439
				PNP	Light switching	Cable, 3-wire 2 m PVC	cd-049	GSE2F-P1151	1095436
				NPN	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2F-E5151	1095457
				PNP	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2F-F5151	1095454
				NPN	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2F-N5151	1095451
				PNP	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2F-P5151	1095448

GSE2 Flat Side

- **Sensor principle:** Through-beam photoelectric sensor

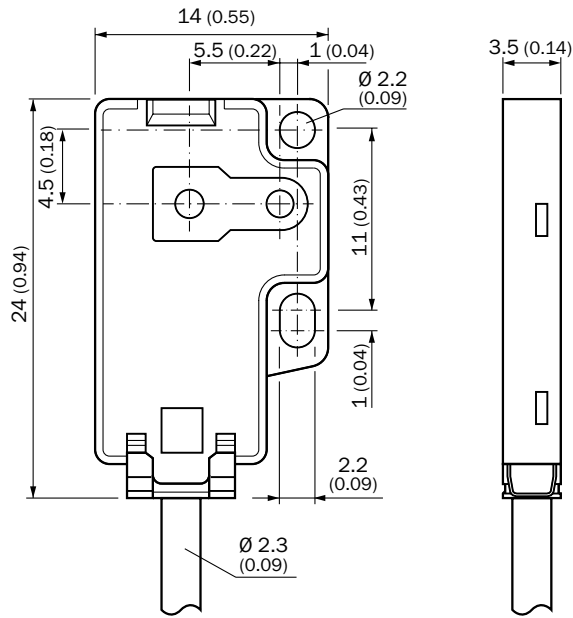
Minimum detectable object (MDO)	Sensing range	Sensing range max.	Light spot size (distance)	Switching output	Switching mode	Connection	Connection diagram	Type	Part no.
0.2 mm	0 mm 40 mm	0 mm ... 60 mm	Ø 4 mm (40 mm)	NPN	Dark switching	Cable, 3-wire 2 m PVC	cd-049	GSE2FS-E1111	1095469
				PNP	Dark switching	Cable, 3-wire 2 m PVC	cd-049	GSE2FS-F1111	1095466
				NPN	Light switching	Cable, 3-wire 2 m PVC	cd-049	GSE2FS-N1111	1095463
				PNP	Light switching	Cable, 3-wire 2 m PVC	cd-049	GSE2FS-P1111	1095459
				NPN	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2FS-E5111	1095481
				PNP	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2FS-F5111	1095478
				NPN	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2FS-N5111	1095475
				PNP	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2FS-P5111	1095472

Minimum detectable object (MDO)	Sensing range	Sensing range max.	Light spot size (distance)	Switching output	Switching mode	Connection	Connection diagram	Type	Part no.
0.5 mm	0 mm 150 mm	0 mm ... 200 mm	Ø 15 mm (150 mm)	NPN	Dark switching	Cable, 3-wire 2 m PVC	cd-049	GSE2FS-E1121	1095470
				PNP	Dark switching	Cable, 3-wire 2 m PVC	cd-049	GSE2FS-F1121	1095467
				NPN	Light switching	Cable, 3-wire 2 m PVC	cd-049	GSE2FS-N1121	1095464
				PNP	Light switching	Cable, 3-wire 2 m PVC	cd-049	GSE2FS-P1121	1095461
				NPN	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2FS-E5121	1095482
				PNP	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2FS-F5121	1095479
				NPN	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2FS-N5121	1095476
				PNP	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2FS-P5121	1095473

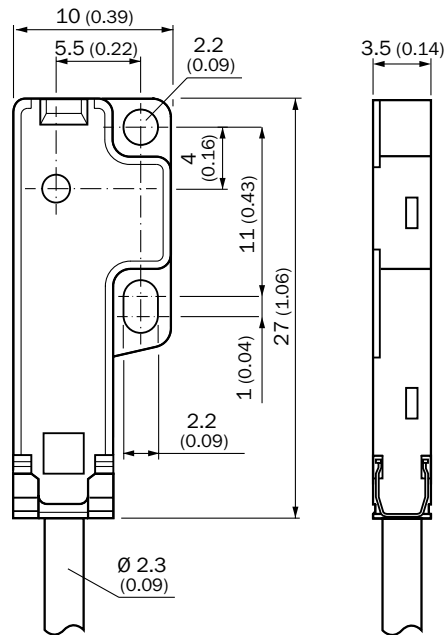
Minimum detectable object (MDO)	Sensing range	Sensing range max.	Light spot size (distance)	Switching output	Switching mode	Connection	Connection diagram	Type	Part no.
1 mm	0 mm 500 mm	0 mm ... 700 mm	Ø 60 mm (500 mm)	NPN	Dark switching	Cable, 3-wire 2 m PVC	cd-049	GSE2FS-E1151	1095471
				PNP	Dark switching	Cable, 3-wire 2 m PVC	cd-049	GSE2FS-F1151	1095468
				NPN	Light switching	Cable, 3-wire 2 m PVC	cd-049	GSE2FS-N1151	1095465
				PNP	Light switching	Cable, 3-wire 2 m PVC	cd-049	GSE2FS-P1151	1095462
				NPN	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2FS-E5151	1095483
				PNP	Dark switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2FS-F5151	1095480
				NPN	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2FS-N5151	1095477
				PNP	Light switching	Cable with connector M8, 3-pin 200 mm PVC	cd-051	GSE2FS-P5151	1095474

Dimensional drawings (Dimensions in mm (inch))

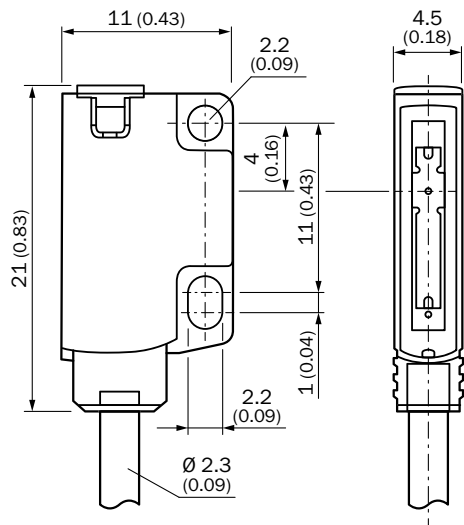
GTB2 Flat



GSE2 Flat

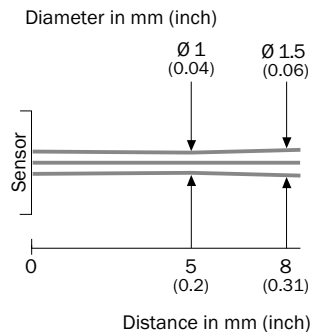


GSE2 Flat Side

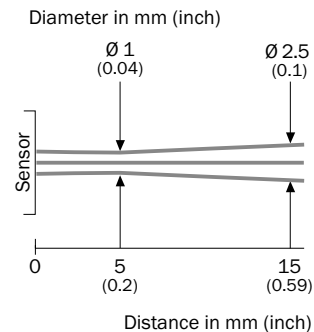


Light spot diameter

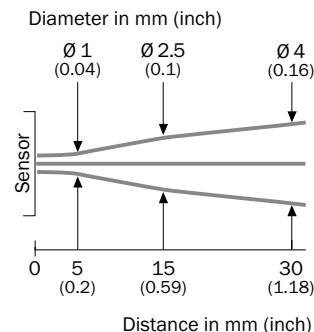
GTB2 Flat, 8 mm



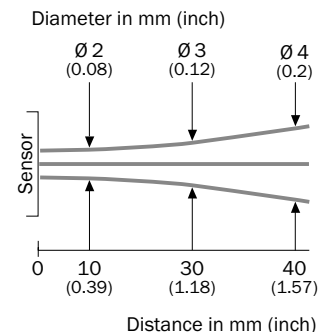
GTB2 Flat, 15 mm



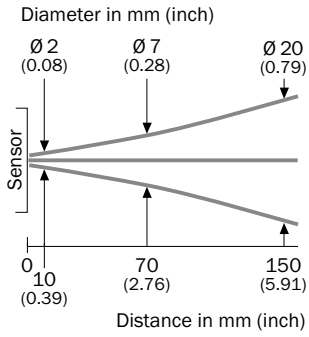
GTB2 Flat, 30 mm



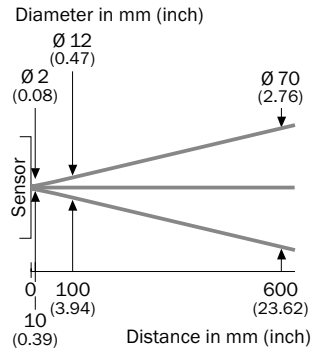
GSE2 Flat, 40 mm



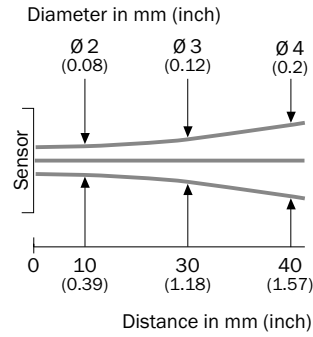
GSE2 Flat, 150 mm



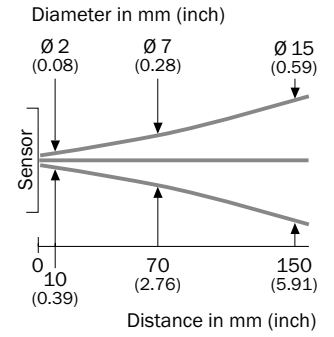
GSE2 Flat, 500 mm



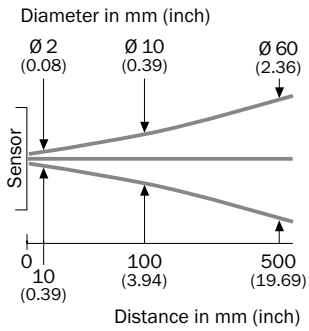
GSE2 Flat Side, 40 mm



GSE2 Flat Side, 150 mm

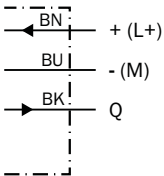


GSE2 Flat Side, 500 mm

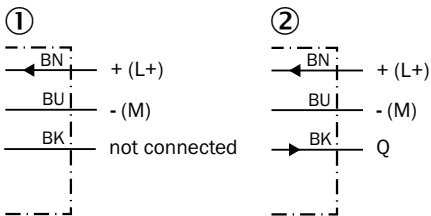


### Connection diagram

Cd-043

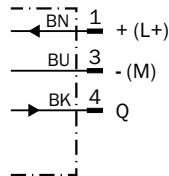


Cd-049

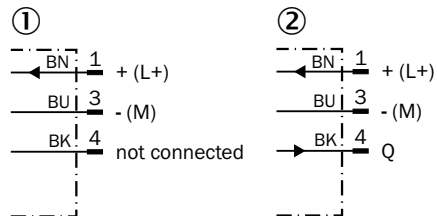


① Sender  
② Receiver

Cd-045



Cd-051

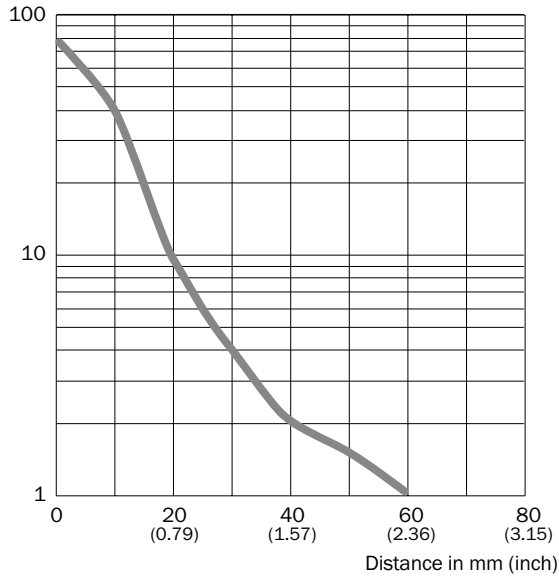


① Sender  
② Receiver

Operating reserve

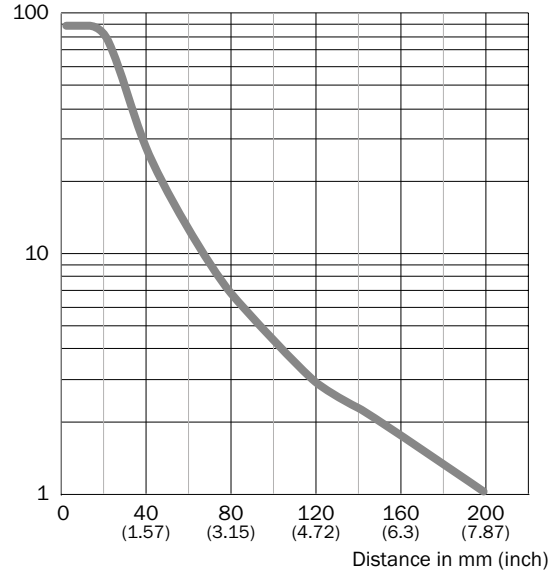
GSE2 Flat, GSE2 Flat Side, 40 mm

Operating reserve



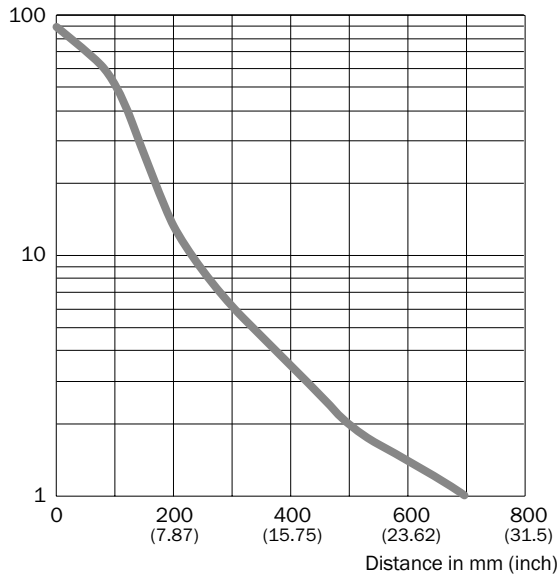
GSE2 Flat, GSE2 Flat Side, 150 mm

Operating reserve



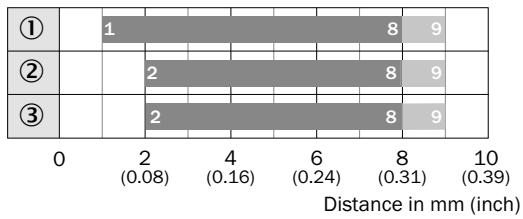
GSE2 Flat, GSE2 Flat Side, 500 mm

Operating reserve



Sensing range

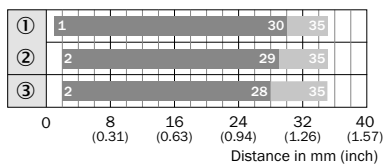
GTB2 Flat, 8 mm



■ Sensing range    ■ Sensing range typ. max.

- ① Sensing range on white, 90 % remission
- ② Sensing range on gray, 18 % remission
- ③ Sensing range on black, 6 % remission

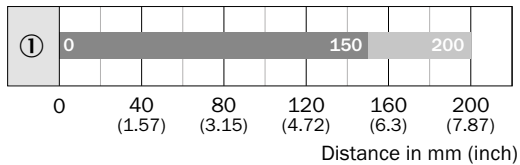
GTB2 Flat, 30 mm



■ Sensing range    ■ Sensing range typ. max.

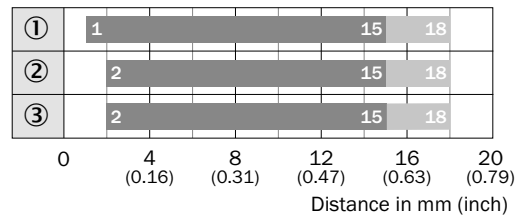
- ① Sensing range in white, 90 % remission
- ② Sensing range on gray, 18 % remission
- ③ Sensing range on black, 6 % remission

GSE2 Flat, GSE2 Flat Side, 150 mm



■ Sensing range    ■ Sensing range max.

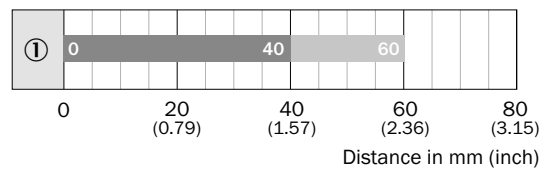
GTB2 Flat, 15 mm



■ Sensing range    ■ Sensing range typ. max.

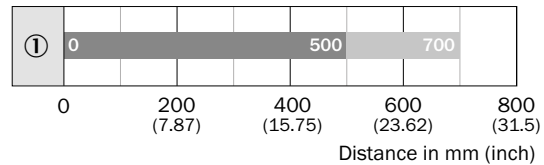
- ① Sensing range in white, 90 % remission
- ② Sensing range on gray, 18 % remission
- ③ Sensing range on black, 6 % remission

GSE2 Flat, GSE2 Flat Side, 40 mm



■ Sensing range    ■ Sensing range max.

GSE2 Flat, GSE2 Flat Side, 500 mm




■ Sensing range    ■ Sensing range max.




**Accessories**

Plug connectors and cables

Connecting cables M8, 3-pin, PVC, Sensor/actuator cable

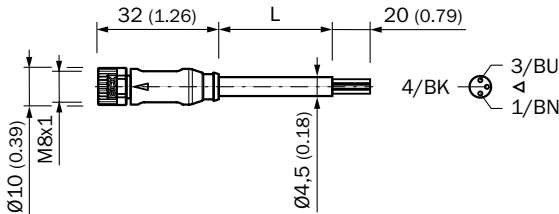
Figure	Connection type head A	Connection type head B	Connecting cable	Type	Part no.
	Female connector, M8, 3-pin, straight, A-coded, unshielded	Flying leads	5 m, 3-wire, PVC	YF8U13-050VA1XLEAX	2095884

Field-attachable connectors M8, 3-pin

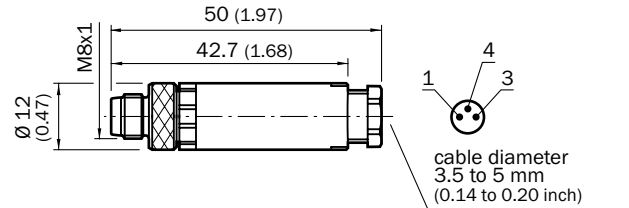
Figure	Connection type head A	Connection type head B	Connector material	Type	Part no.
	Male connector, M8, 3-pin, straight, unshielded	Screw-type terminals	PBT/PA	STE-0803-G	6037322

**Dimensional drawings**

YF8U13-050VA1XLEAX



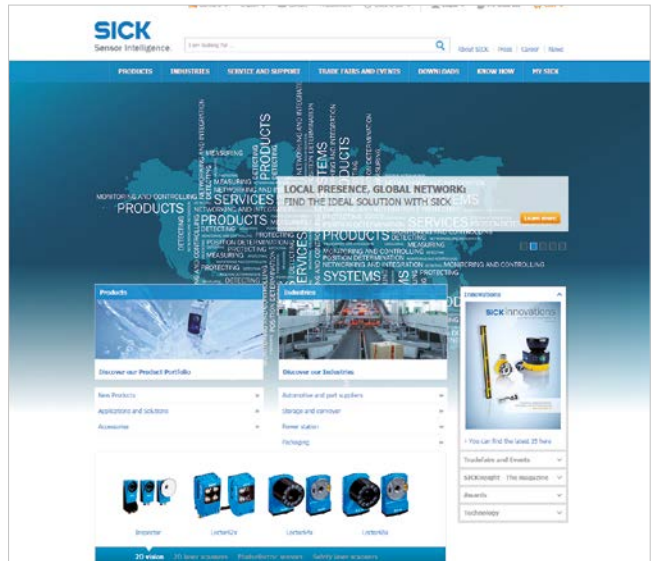
STE-0803-G





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