# GTB6L-F4211

G6

**PHOTOELECTRIC SENSORS**

**SICK**
Sensor Intelligence.

# GTB6L-F4211 | G6
## PHOTOELECTRIC SENSORS



Illustration may differ
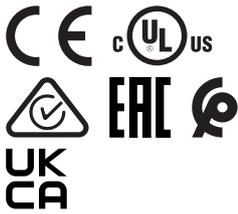
## Ordering information

| Type | part no. |
|---|---|
| GTB6L-F4211 | 1109660 |

Other models and accessories ➜ www.sick.com/G6

## Detailed technical data

### Features

| | |
|---|---|
| **Functional principle** | Photoelectric proximity sensor |
| **Functional principle detail** | Background suppression |
| **Sensing range** | |
| Sensing range min. | 10 mm |
| Sensing range max. | 400 mm |
| Adjustable switching threshold for background suppression | 30 mm ... 400 mm |
| Reference object | Object with 90% remission factor (complies with standard white according to DIN 5033) |
| Minimum distance between set sensing range and background (black 6% / white 90%) | 3 mm, at a distance of 75 mm |
| Recommended sensing range for the best performance | 30 mm ... 180 mm |
| **Emitted beam** | |
| Light source | Laser |
| Type of light | Visible red light |
| Shape of light spot | Point-shaped |
| Light spot size (distance) | Ø 0.4 mm (150 mm) |
| Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle) | < +/- 1.5 ° (at Ta = +23 °C) |
| **Key laser figures** | |
| Normative reference | IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11 |
| Laser class | 1 [1] |

[1] Do not intentionally look into the laser beam. Never point the laser beam at people's eyes.

| | |
|---|---|
| Wave length | 680 nm |
| Pulse duration | 2 µs |
| Maximum pulse power | ≤ 11.9 mW |
| Average service life | 100,000 h at $T_a$ = +25 °C |
| **Smallest detectable object (MDO) typ.** | |
| | 0.4 mm, at 150 mm distance (object with 90% remission factor (corresponds to standard white according to DIN 5033)) |
| **Adjustment** | |
| Potentiometer | For setting the sensing range, 5 rotations |
| Operating mode switch | For inverting the switching function (light/dark switching) |
| **Display** | |
| LED green | Operating indicator<br>Static on: power on |
| LED yellow | Status of received light beam<br>Static on: object present<br>Static off: object not present |

[1] Do not intentionally look into the laser beam. Never point the laser beam at people's eyes.

## Safety-related parameters

| | |
|---|---|
| **$MTTF_D$** | 662 years |
| **$DC_{avg}$** | 0 % |
| **$T_M$ (mission time)** | 10 years |

## Electronics

| | |
|---|---|
| **Supply voltage $U_B$** | 10 V DC … 30 V DC [1] |
| **Ripple** | < 5 $V_{pp}$ |
| **Usage category** | DC-13 (According to EN 60947-5-2) |
| **Current consumption** | ≤ 20 mA, without load. At $U_B$ = 24 V |
| **Protection class** | III |
| **Digital output** | |
| Number | 2 (Complementary) |
| Type | PNP |
| Switching mode | Light/dark switching |
| Signal voltage PNP HIGH/LOW | Approx. $U_B$-3 V / 0 V |
| Output current $I_{max.}$ | ≤ 100 mA [2] |
| Circuit protection outputs | Reverse polarity protected |
| | Overcurrent protected |
| | Short-circuit protected |
| Response time | ≤ 625 µs |
| Switching frequency | 1,000 Hz [3] |
| **Pin/Wire assignment** | |

[1] Limit values.

[2] At $U_B$ > 24 V, I max. = 50 mA.

[3] With light/dark ratio 1:1.

| | |
|---|---|
| Function of pin 4/black (BK) | Digital output, light switching, object present → output Q HIGH |
| Function of pin 4/black (BK) – detail | The pin 4 function of the sensor can be switched |
| | Additional possible settings via operating mode switch |
| Function of pin 2/white (WH) | Digital output, dark switching, object present → output Q̄ LOW |
| Function of pin 2/white (WH) – detail | The pin 2 function of the sensor can be switched |
| | Additional possible settings via operating mode switch |

[1] Limit values.

[2] At $U_B$ > 24 V, I max. = 50 mA.

[3] With light/dark ratio 1:1.

## Mechanics

| | |
|---|---|
| **Housing** | Rectangular |
| **Dimensions (W x H x D)** | 12 mm x 31.5 mm x 21 mm |
| **Connection** | Male connector M8, 4-pin |
| **Material** | |
| Housing | Plastic, ABS |
| Front screen | Plastic, PMMA |
| Cable | Plastic, PVC |
| Male connector | Metal, copper alloy (C3604 CUZN39PB3) |
| **Weight** | Approx. 60 g |

## Ambient data

| | |
|---|---|
| **Enclosure rating** | IP67 (EN 60529) |
| **Ambient operating temperature** | –20 °C ... +50 °C [1] [2] |
| **Ambient temperature, storage** | –40 °C ... +70 °C |
| **Typ. Ambient light immunity** | Sunlight: ≤ 13,000 lx |
| **Shock resistance** | 30 g, 11 ms (3 positive and 3 negative shocks along X, Y, Z axes, 18 total shocks (EN60068-2-27)) |
| **Vibration resistance** | 10 Hz ... 55 Hz (Amplitude 0.5 mm, 3 x 30 min (EN60068-2-6)) |
| **Air humidity** | 35 % ... 95 %, relative humidity (no condensation) |
| **Electromagnetic compatibility (EMC)** | EN 60947-5-2 |
| **UL File No.** | NRKH.E348498 & NRKH7.E348498 |

[1] As of $T_a$ => 45 °C, a max. supply voltage $U_B$ = 24 V and a max. load current $I_{max.}$ = 50 mA is permitted.

[2] Below $T_u$ = –20 °C, a warm-up time of 3 seconds is required.

## Certificates

| | |
|---|---|
| **EU declaration of conformity** | ✓ |
| **UK declaration of conformity** | ✓ |
| **ACMA declaration of conformity** | ✓ |
| **Moroccan declaration of conformity** | ✓ |
| **China RoHS** | ✓ |
| **cULus certificate** | ✓ |
| **EAC certificate / DoC** | ✓ |
| **Laser safety (IEC 60825-1) declaration of manufacturer** | ✓ |

## Classifications

| | |
|---|---|
| **ECLASS 5.0** | 27270904 |
| **ECLASS 5.1.4** | 27270904 |
| **ECLASS 6.0** | 27270904 |
| **ECLASS 6.2** | 27270904 |
| **ECLASS 7.0** | 27270904 |
| **ECLASS 8.0** | 27270904 |
| **ECLASS 8.1** | 27270904 |
| **ECLASS 9.0** | 27270904 |
| **ECLASS 10.0** | 27270904 |
| **ECLASS 11.0** | 27270904 |
| **ECLASS 12.0** | 27270903 |
| **ETIM 5.0** | EC002719 |
| **ETIM 6.0** | EC002719 |
| **ETIM 7.0** | EC002719 |
| **ETIM 8.0** | EC002719 |
| **UNSPSC 16.0901** | 39121528 |

## Dimensional drawing
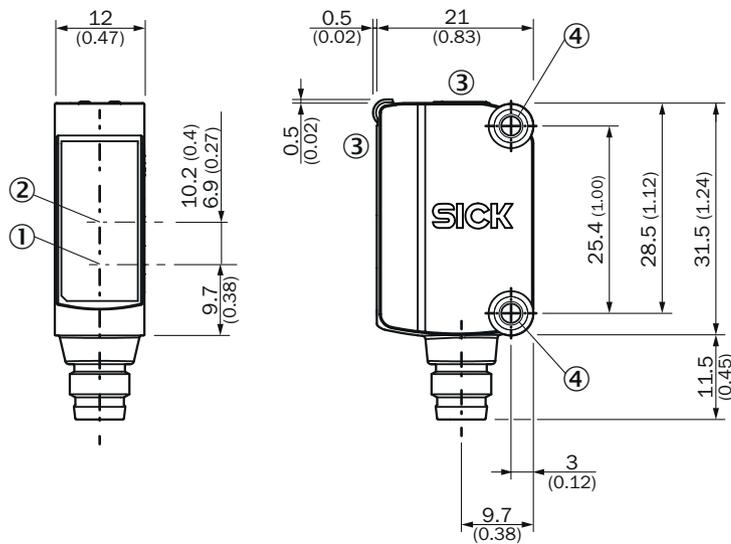


Dimensions in mm (inch)
① Center of optical axis, sender
② Center of optical axis, receiver
③ display and adjustment elements
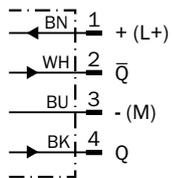④ Mounting holes M3

## display and adjustment elements
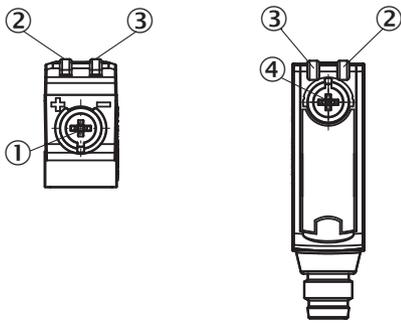
① Potentiometer
② LED yellow
③ LED green
④ operating mode switch

## Connection type Male connector M8, 4-pin
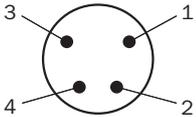
## Connection diagram Cd-084

| | | |
|---|---|---|
| BN | 1 | + (L+) |
| WH | 2 | $\overline{Q}$ |
| BU | 3 | - (M) |
| BK | 4 | Q |

## Truth table PNP - dark switching

| | Dark switching $\overline{Q}$ (normally closed) | |
| --- | --- | --- |
| | Object not present ➜ Output HIGH | Object present ➜ Output LOW |
| Light receive | ⊗ | ✓ |
| Light receive indicator | ⊗ | ☀ |
| Load resistance | ⚡ | ⊗ |



## Truth table PNP - light switching

| | Light switching Q (normally open) | |
| --- | --- | --- |
| | Object not present ➜ Output LOW | Object present ➜ Output HIGH |
| Light receive | ⊗ | ✓ |
| Light receive indicator | ⊗ | ☀ |
| Load resistance | ⊗ | ⚡ |

## Characteristic curve

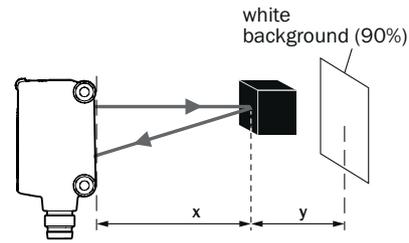Minimum distance in mm (y) between the set sensing range (x) and white background (90% remission)
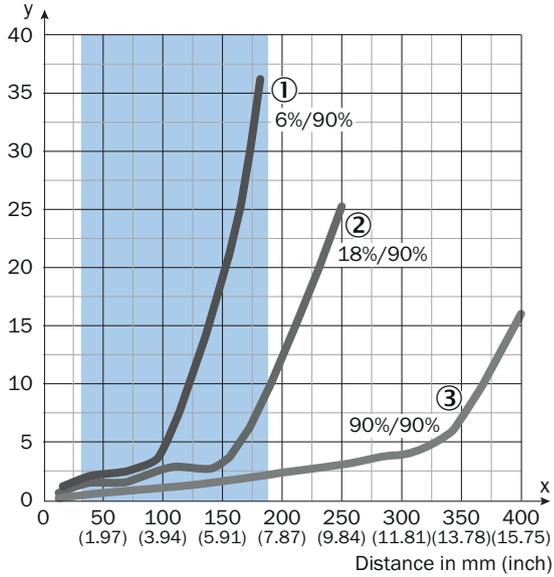


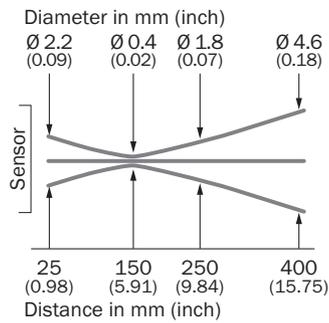Recommended sensing range for the best performance

① Black object, 6% remission factor
② Gray object, 18% remission factor
③ White object, 90% remission factor
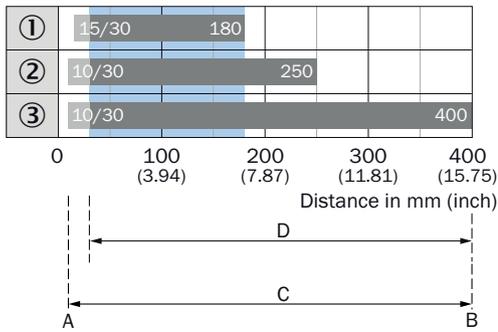
Example:
Safe suppression of the background



white background (90%)

Black object (6% remission)
Set sensing range x = 150 mm. Needed minimum distance to white background y = 20 mm.

## Light spot size



Diameter in mm (inch)

Ø 2.2 (0.09)   Ø 0.4 (0.02)   Ø 1.8 (0.07)   Ø 4.6 (0.18)

Sensor

25 (0.98)   150 (5.91)   250 (9.84)   400 (15.75)
Distance in mm (inch)

## Sensing range diagram

| | | |
|---|---|---|
| ① | 15/30 | 180 |
| ② | 10/30 | 250 |
| ③ | 10/30 | 400 |

```
0        100      200      300      400
       (3.94)   (7.87)  (11.81)  (15.75)
          Distance in mm (inch)
```

A = Sensing range min. in mm
B = Sensing range max. in mm
C = Viewing range
D = Adjustable switching threshold for background suppression

Recommended sensing range for the best performance

① Black object, 6% remission factor
② Gray object, 18% remission factor
③ White object, 90% remission factor

## Recommended accessories

Other models and accessories ➔ www.sick.com/G6

| Brief description | Type | part no. |
|---|---|---|
| **Mounting systems** | | |
| • **Description:** Clamp bar to fix G6 sensors on rods of 12 mm, clamp-on design up to 4 mm wall thickness<br>• **Material:** Steel<br>• **Details:** Aluminum (clamp bar), stainless steel (bracket)<br>• **Items supplied:** Clamp bar mounting and clamp function, mounting bracket, mounting hardware | BEF-KHS-IS12G6 | 2086865 |
| • **Description:** Mounting bracket for wall mounting<br>• **Material:** Stainless steel<br>• **Details:** Stainless steel<br>• **Items supplied:** Mounting hardware included<br>• **Suitable for:** W8, W8G, W8 Laser, W8 Inox, G6, G6 Inox, W100 Laser, W100-2, KTM Core, KTM Prime, CSM, LUTM, W4S | BEF-W100-A | 5311520 |
| • **Material:** Stainless steel<br>• **Details:** Stainless steel (1.4301)<br>• **Suitable for:** W4S, W4S | BEF-WN-G6 | 2062909 |
| • **Description:** Plate N11N for universal clamp bracket<br>• **Material:** Stainless steel<br>• **Details:** Stainless steel 1.4571 (sheet), Stainless steel 1.4408 (clamp)<br>• **Items supplied:** Universal clamp (5322627), mounting hardware<br>• **Usable for:** DeltaPac, Glare, WTD20E | BEF-KHS-N11N | 2071081 |

| Brief description | Type | part no. |
|---|---|---|
| **connectors and cables** | | |
| • **Connection type head A:** Male connector, M8, 4-pin, straight, A-coded<br>• **Description:** Unshielded<br>• **Connection systems:** Screw-type terminals<br>• **Permitted cross-section:** 0.14 mm² ... 0.5 mm² | STE-0804-G | 6037323 |
| • **Connection type head A:** Female connector, M8, 4-pin, straight, A-coded<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Sensor/actuator cable<br>• **Cable:** 5 m, 4-wire, PUR, halogen-free<br>• **Description:** Sensor/actuator cable, unshielded<br>• **Application:** Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation | YF8U14-050UA3XLEAX | 2094792 |
| • **Connection type head A:** Female connector, M8, 4-pin, straight, A-coded<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Sensor/actuator cable<br>• **Cable:** 5 m, 4-wire, PVC<br>• **Description:** Sensor/actuator cable, unshielded<br>• **Application:** Zones with chemicals, Uncontaminated zones | YF8U14-050VA3XLEAX | 2095889 |

## SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

**For us, that is "Sensor Intelligence."**

## WORLDWIDE PRESENCE:

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Sensor Intelligence.