



# GTB6SP-22A1116EZZZ

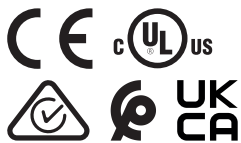
G6

PHOTOELECTRIC SENSORS

**SICK**  
Sensor Intelligence.



Illustration may differ



Ordering information

| Type               | part no. |
|--------------------|----------|
| GTB6SP-22A1116EZZZ | 1141176  |

Other models and accessories → [www.sick.com/G6](http://www.sick.com/G6)

Detailed technical data

Features

|                                              |                                                                                  |                                                                                       |
|----------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Functional principle</b>                  |                                                                                  | Photoelectric proximity sensor                                                        |
| <b>Functional principle detail</b>           |                                                                                  | Background suppression                                                                |
| <b>Sensing range</b>                         |                                                                                  |                                                                                       |
|                                              | Sensing range min.                                                               | 5 mm                                                                                  |
|                                              | Sensing range max.                                                               | 400 mm                                                                                |
|                                              | Adjustable switching threshold for background suppression                        | 35 mm ... 400 mm                                                                      |
|                                              | Minimum distance between set sensing range and background (black 6% / white 90%) | 5 mm, at a distance of 120 mm                                                         |
|                                              | Recommended sensing range for the best performance                               | 35 mm ... 140 mm                                                                      |
| <b>Emitted beam</b>                          |                                                                                  |                                                                                       |
|                                              | Light source                                                                     | PinPoint LED                                                                          |
|                                              | Type of light                                                                    | Visible red light                                                                     |
|                                              | Shape of light spot                                                              | Point-shaped                                                                          |
|                                              | Light spot size (distance)                                                       | Ø 5.6 mm (150 mm)                                                                     |
| <b>Key LED figures</b>                       |                                                                                  |                                                                                       |
|                                              | Normative reference                                                              | EN 62471:2008-09   IEC 62471:2006, modified                                           |
|                                              | LED risk group marking                                                           | Free group                                                                            |
|                                              | Wave length                                                                      | 640 nm                                                                                |
|                                              | Average service life                                                             | 100,000 h at T <sub>a</sub> = +25 °C                                                  |
| <b>Smallest detectable object (MDO) typ.</b> |                                                                                  |                                                                                       |
|                                              |                                                                                  | Object with 90% remission factor (complies with standard white according to DIN 5033) |
| <b>Adjustment</b>                            |                                                                                  |                                                                                       |
|                                              | Potentiometer                                                                    | For setting the sensing range, 5 rotations                                            |

|                |                       |                                                                                      |
|----------------|-----------------------|--------------------------------------------------------------------------------------|
| <b>Display</b> | Operating mode switch | For inverting the switching function (light/dark switching)                          |
|                | LED green             | Operating indicatorStatic on: power on                                               |
|                | LED yellow            | Status of received light beamStatic on: object presentStatic off: object not present |

#### Safety-related parameters

|                                     |             |
|-------------------------------------|-------------|
| <b>MTTF<sub>D</sub></b>             | 3,564 years |
| <b>DC<sub>avg</sub></b>             | 0%          |
| <b>T<sub>M</sub> (mission time)</b> | 20 years    |

#### Electronics

|                                       |                                                                        |
|---------------------------------------|------------------------------------------------------------------------|
| Supply voltage U <sub>B</sub>         | 10 V DC ... 30 V DC <sup>1)</sup>                                      |
| Ripple                                | ≤ 5 V <sub>pp</sub>                                                    |
| Usage category                        | DC-12 (According to EN 60947-5-2)<br>DC-13 (According to EN 60947-5-2) |
| Current consumption                   | Without load. At U <sub>B</sub> = 24 V                                 |
| Protection class                      | III                                                                    |
| Digital output                        |                                                                        |
| Number                                | 1                                                                      |
| Type                                  | PNP                                                                    |
| Switching mode                        | Light switching                                                        |
| Signal voltage PNP HIGH/LOW           | Approx. U <sub>B</sub> -3 V / 0 V                                      |
| Output current I <sub>max.</sub>      | ≤ 100 mA <sup>2)</sup>                                                 |
| Circuit protection outputs            | Reverse polarity protected                                             |
|                                       | Overcurrent protected                                                  |
|                                       | Short-circuit protected                                                |
| Response time                         | ≤ 625 μs <sup>3)</sup>                                                 |
| Switching frequency                   | 1,000 Hz <sup>4)</sup>                                                 |
| Pin/Wire assignment                   |                                                                        |
| 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                 |

<sup>1)</sup> Limit values.

<sup>2)</sup> At U<sub>B</sub> > 24 V, I max. = 50 mA.

<sup>3)</sup> Signal transit time with resistive load.

<sup>4)</sup> With light/dark ratio 1:1.

#### Mechanics

|                               |                          |                                       |
|-------------------------------|--------------------------|---------------------------------------|
| <b>Housing</b>                | Rectangular              |                                       |
| <b>Dimensions (W x H x D)</b> | 12 mm x 31.6 mm x 21 mm  |                                       |
| <b>Connection</b>             | Male connector M8, 4-pin |                                       |
| <b>Material</b>               |                          |                                       |
|                               | Housing                  | Plastic, ABS                          |
|                               | Front screen             | Plastic, PMMA                         |
|                               | Male connector           | Metal, copper alloy (C3604 CUZN39PB3) |

|                                                       |              |
|-------------------------------------------------------|--------------|
| <b>Weight</b>                                         | Approx. 10 g |
| <b>Maximum tightening torque of the fixing screws</b> | 0.4 Nm       |

#### Ambient data

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

#### Certificates

|                                           |   |
|-------------------------------------------|---|
| <b>EU declaration of conformity</b>       | ✓ |
| <b>UK declaration of conformity</b>       | ✓ |
| <b>ACMA declaration of conformity</b>     | ✓ |
| <b>Moroccan declaration of conformity</b> | ✓ |
| <b>China-RoHS</b>                         | ✓ |
| <b>cULus certificate</b>                  | ✓ |

#### Classifications

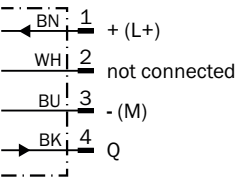
|                       |          |
|-----------------------|----------|
| <b>ECLASS 5.0</b>     | 27270904 |
| <b>ECLASS 5.1.4</b>   | 27270904 |
| <b>ECLASS 6.0</b>     | 27270904 |
| <b>ECLASS 6.2</b>     | 27270904 |
| <b>ECLASS 7.0</b>     | 27270904 |
| <b>ECLASS 8.0</b>     | 27270904 |
| <b>ECLASS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

- ① Center of optical axis, sender
- ② Center of optical axis, receiver
- ③ Mounting holes M3
- ④ display and adjustment elements

- ① LED green
- ② LED yellow
- ③ Potentiometer
- ④ operating mode switch

## A circle with four points labeled 1, 2, 3, and 4. Point 1 is at the top right, point 2 is at the bottom right, point 3 is at the top left, and point 4 is at the bottom left.

Connection diagram Cd-066



Truth table PNP - dark switching  $\bar{Q}$

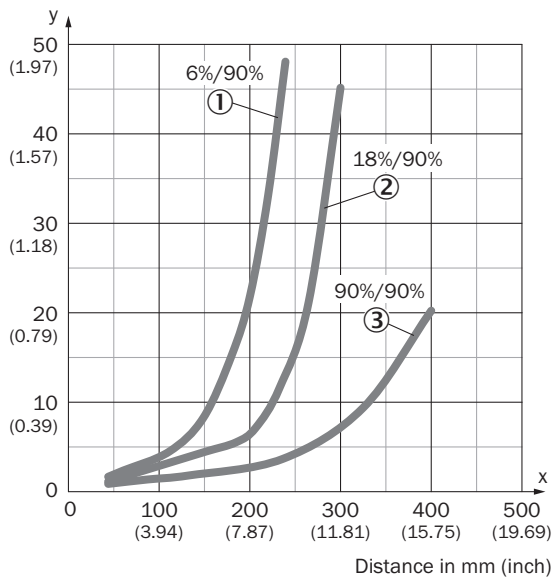
|                         | Dark switching $\bar{Q}$ (normally closed) |                             |
|-------------------------|--------------------------------------------|-----------------------------|
|                         | Object not present → Output HIGH           | Object present → Output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

## Truth table PNP - light switching Q

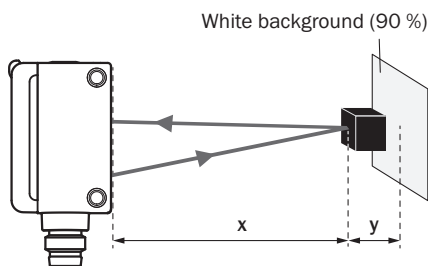
|                         | Light switching Q (normally open) |                              |
|-------------------------|-----------------------------------|------------------------------|
|                         | Object not present → Output LOW   | Object present → Output HIGH |
| Light receive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

## Characteristic curve

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



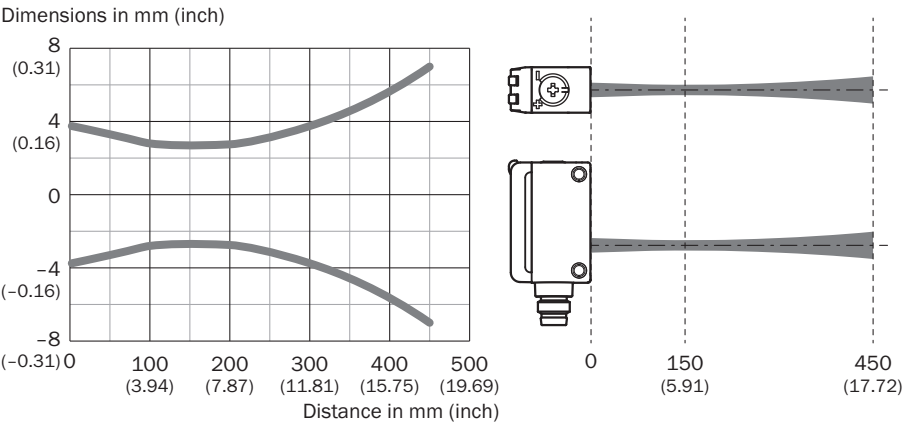
Example:  
Safe suppression of the background



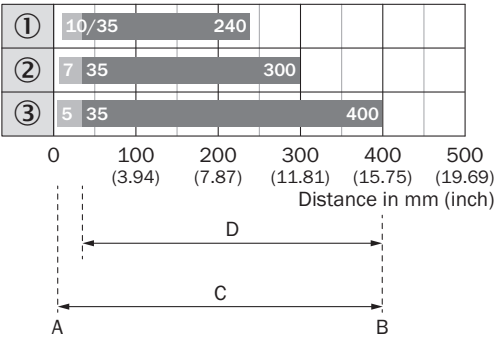
Black object (6 % remission factor)  
Set sensing range  $x = 120$  mm  
Needed minimum distance to white background  $y = 5$  mm

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

Light spot size



Sensing range diagram



|   |                                                  |
|---|--------------------------------------------------|
|   |                                                  |
| 1 | Black object, 6% remission factor                |
| 2 | Gray object, 18% remission factor                |
| 3 | White object, 90% remission factor               |
| A | Sensing range min. in mm                         |
| B | Sensing range max. in mm                         |
| C | Maximum distance range from sensor to object     |
| D | Recommended distance range from sensor to object |



## Recommended accessories

Other models and accessories → [www.sick.com/G6](http://www.sick.com/G6)

|                                                                                   | Brief description                                                                                                                                                                                                                                                                                                                                                                         | Type           | part no. |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|
| Mounting systems                                                                  |                                                                                                                                                                                                                                                                                                                                                                                           |                |          |
|  | <ul style="list-style-type: none"> <li>• <b>Description:</b> Clamp bar to fix G6 sensors on rods of 12 mm, clamp-on design up to 4 mm wall thickness</li> <li>• <b>Material:</b> Steel</li> <li>• <b>Details:</b> Aluminum (clamp bar), stainless steel (bracket)</li> <li>• <b>Items supplied:</b> Clamp bar mounting and clamp function, mounting bracket, mounting hardware</li> </ul> | BEF-KHS-IS12G6 | 2086865  |
|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                           | BEF-WN-G6      | 2062909  |

## 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:

Contacts and other locations –[www.sick.com](http://www.sick.com)