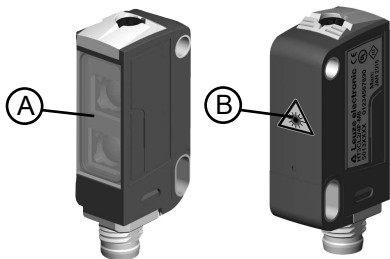


Laser diffuse reflection sensor

HT3CL



1



2

50134032

LASERSTRALHUND
NICHT IN DEN STRAHL BLOEKEN
 Min. Latching (peak): $\leq 4,5$ mW
 Impulsbreite: $\leq 5,1$ μ s
 Blaulichtgrenz:
 650 nm
LASER-KLASSE 2
 EN EN 60825-1:2008-05

LASER RADIATION
DO NOT STARE INTO BEAM
 Maximum Output (peak): $\leq 4,5$ mW
 Pulse duration: $\leq 5,1$ μ s
 Blue-light limit:
 650 nm
CLASS 2 LASER PRODUCT
 EN 60825-1:2007

AVIS D'EXPOSURE – LASER RADIATION
 ÉVITEZ DE REGARDER PAR CETTE OUVERTURE

RADIAZIONE LASER
NON FISSARE IL FASCIO
 Potenza max. (peak): $\leq 4,5$ mW
 Durata dell'impulso:
 $\leq 5,1$ μ s
 Lunghezza d'onda:
 650 nm
STRUMENTO LASER DI CLASSE 2
 EN 60825-1:2007

RAYONNEMENT LASER
NE PAS REGARDER DANS LE FASCICUL
 Puissance max. (cime): $\leq 4,5$ mW
 Durée d'impulsion:
 $\leq 5,1$ μ s
 Longueur d'onde:
 650 nm
APPAREIL LASER DE CLASSE 2
 EN 60825-1:2007

ÉVITEZ D'UN REGARDER DANS CETTE OUVERTURE
 LASER EST ÉVITÉ PAR CETTE OUVERTURE

RADIACION LASER
NO MIRAR FUNDAMENTEAL LAZ
 Potencia máx. (peak): $\leq 4,5$ mW
 Duración del impulso:
 $\leq 5,1$ μ s
 Longitud de onda:
 650 nm
PRODUCTO LASER DE CLASE 2
 EN 60825-1:2007

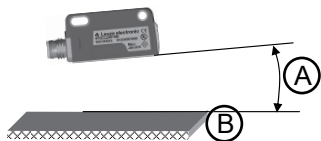
LASER RADIATION
DO NOT STARE INTO BEAM
 Maximum Output (peak): $\leq 4,5$ mW
 Pulse duration: $\leq 5,1$ μ s
 Blue-light limit:
 650 nm
CLASS 2 LASER PRODUCT
 EN 60825-1:2007
 Complies with IEC 60825-1:07

RADIAÇÃO LASER
NÃO OLHAR FUNDAMENTEAL FEIXE
 Potência máx. (peak): $\leq 4,5$ mW
 Período de pulso:
 $\leq 5,1$ μ s
 Comprimento de onda:
 650 nm
EQUIPAMENTO LASER CLASSE 2
 EN 60825-1:2007

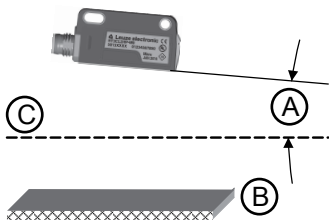
激光辐射
勿直视光束
 最大峰值功率: $\leq 4,5$ mW
 脉冲持续时间: $\leq 5,1$ μ s
 波长: 650 nm
2 类激光产品
 EN 60825-1:2007



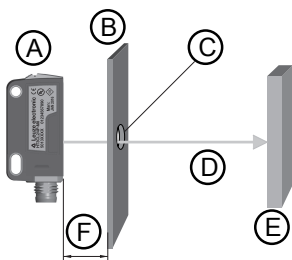
3



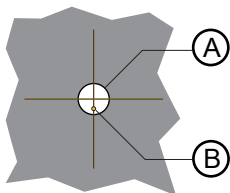
4



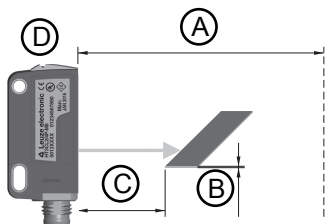
5



6



7



Laser safety notices - laser class 1

WARNING

LASER RADIATION – LASER CLASS 1

The device satisfies the requirements of IEC 60825-1:2007 (EN 60825-1:2007) safety regulations for a product of **laser class 1** as well as the U.S. 21 CFR 1040.10 regulations with deviations corresponding to "Laser Notice No. 50" from June 24, 2007.



- ☞ Observe the applicable statutory and local laser protection regulations.
- ☞ The device must not be tampered with and must not be changed in any way.
There are no user-serviceable parts inside the device.
- ☞ Repairs must only be performed by Leuze electronic GmbH + Co. KG.

Laser safety notices - laser class 2

WARNING

LASER RADIATION – LASER CLASS 2

Never look directly into the beam!

The device satisfies the requirements of IEC 60825-1:2007 (EN 60825-1:2007) safety regulations for a product of **laser class 2** as well as the U.S. 21 CFR 1040.10 regulations with deviations corresponding to "Laser Notice No. 50" from June 24, 2007.



- ☞ Never look directly into the laser beam or in the direction of reflected laser beams! If you look into the beam path over a longer time period, there is a risk of injury to the retina.
- ☞ Do not point the laser beam of the device at persons!
- ☞ Interrupt the laser beam using a non-transparent, non-reflective object if the laser beam is accidentally directed towards a person.
- ☞ When mounting and aligning the device, avoid reflections of the laser beam off reflective surfaces!
- ☞ CAUTION! The use of operating or adjusting devices other than those specified here or carrying out of differing procedures may lead to dangerous exposure to radiation.
- ☞ Observe the applicable statutory and local laser protection regulations.
- ☞ The device must not be tampered with and must not be changed in any way.
There are no user-serviceable parts inside the device.
- ☞ Repairs must only be performed by Leuze electronic GmbH + Co. KG.

NOTICE
Affix laser information and warning signs!

Laser information and warning signs attached to the device. Also included with the device are self-adhesive laser warning and laser information signs (stick-on labels) in multiple languages.

↳ Affix the laser information sheet to the device in the language appropriate for the place of use.

When using the device in the US, use the stick-on label with the "Complies with 21 CFR 1040.10" notice.

↳ Affix the laser information and warning signs near the device if no signs are attached to the device (e.g. because the device is too small) or if the attached laser information and warning signs are concealed due to the installation position.

Affix the laser information and warning signs so that they are legible without exposing the reader to the laser radiation of the device or other optical radiation.


1

A Laser aperture

B Laser warning sign

2

Laser information and warning signs

Application notes
Detection of glossy surfaces within the operating range

When detecting glossy surfaces (e.g. metals), the light beam should not hit the object surface at a right angle. A slight inclination is enough to detect the object reliably. The following applies: the smaller the range, the greater the angle of inclination (approx. 5° to 7°).

3

A Slight inclination 5° ... 7°

B Glossy object surface within the operating range

Avoiding interference from glossy surfaces in the background

If a glossy surface is in the background (distance larger than maximum range), reflections may cause interfering signals. They may be avoided by mounting the device at a slight inclination (see figure).

NOTICE



It is imperative to note the task and the associated inclination of the sensor of approx. $5^\circ \dots 7^\circ$.

- Only move objects in from the right or left side. Avoid moving in objects from the connector side or operating side.
- Outside of the operating range, the sensor operates as an energetic diffuse reflection sensor. Light objects can still be reliably detected up to the maximum range.
- The sensors are equipped with effective measures for the maximum avoidance of mutual interference should they be mounted opposite one another. Opposite mounting of multiple sensors of the same type must absolutely be avoided.

4

- A Slight inclination $5^\circ \dots 7^\circ$
 B Glossy surface in the background
 C Maximum range

Object detection behind diaphragms

It is sometimes necessary to mount the sensor behind plant parts so that the light beam has to pass through an opening (diaphragm) that is as small as possible. Here, the detection depends, among other things, on set range t_w , distance a between diaphragm and sensor, and diaphragm diameter d. Here are some reference values:

NOTICE



Reference values are not guaranteed properties. Due to the multitude of possible influencing factors, they must be confirmed in the application.

Distance a [mm] between sensor and diaphragm	Diaphragm diameter d [mm], dependent on range t_w [mm] on a white object (90 % diffuse reflection) set on the sensor		
	$t_w = 100$	$t_w = 200$	$t_w = 300$
10	10	10	10
30	8	8	9
50	7	8	9
80	6	7	8
100	6	6	8
120		6	8

150		5	6
180		5	6
200		5	6

5

- A Sensor
- B Diaphragm
- C Diaphragm diameter d
- D Range t_w
- E Object
- F Distance a

6

Alignment of the light beam within the diaphragm

- A Diaphragm (diameter d)
- B Light beam (diameter approx. 1 mm)

Detection of smallest objects

The laser sensor can also detect extremely thin parts (e.g. sheet metal plates or wire). Detection here depends, among other things, on set range t_w , distance a to the object, and object size/thickness d .

7

- A Set range $t_w = 50 \dots 200$ mm
- B Reference value for objects: $d \geq 150$ μm
- C Distance a
- D Sensor

NOTICE



Reference values are not guaranteed properties. Due to the multitude of possible influencing factors, they must be confirmed in the application.