

Laser diffuse reflection sensor

HT53CL1

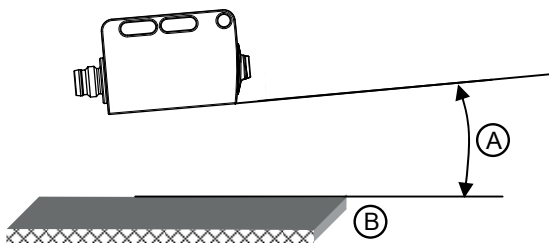
HT55CL1



1

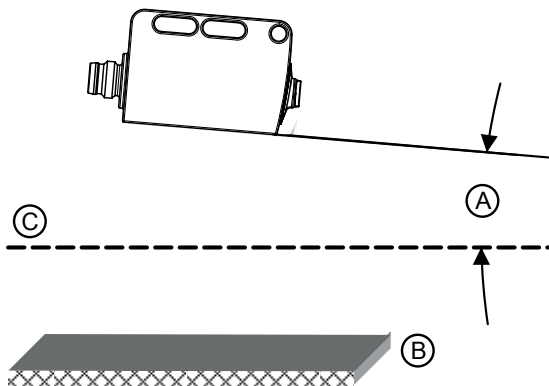


2

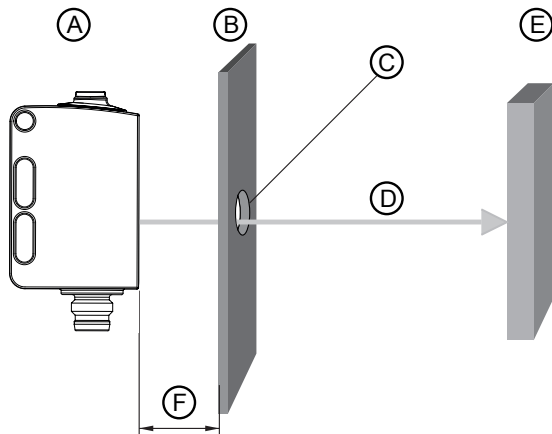


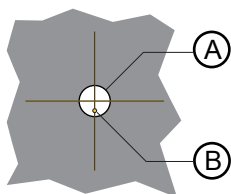
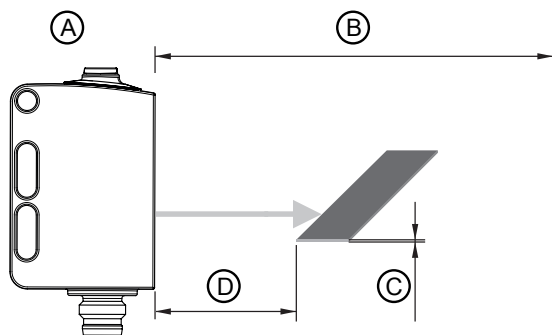
Leuze

3



4



5**6**

Laser safety notices - laser class 1**⚠ ATTENTION****LASER RADIATION – CLASS 1 LASER PRODUCT**

The device satisfies the requirements of IEC/EN 60825-1:2014 safety regulations for a product of **laser class 1** and complies with 21 CFR 1040.10 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

- ↪ 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.

1

A Laser aperture

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°).

2

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° ... 7°.

- 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.

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- 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

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

5**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 .

6

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

NOTICE

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

Electrical connection**⚠ CAUTION****UL applications!**

For UL applications, use is only permitted in Class 2 circuits in accordance with the NEC (National Electric Code).