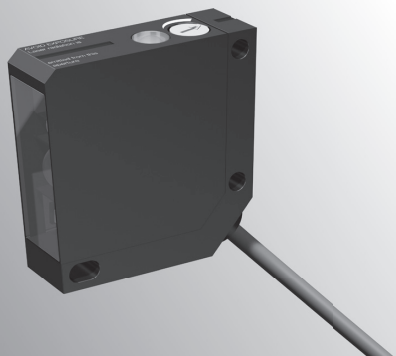


Long-Distance Detection Laser Sensors

HLA Series

High-accuracy detection of very small targets using the direct reflection method.

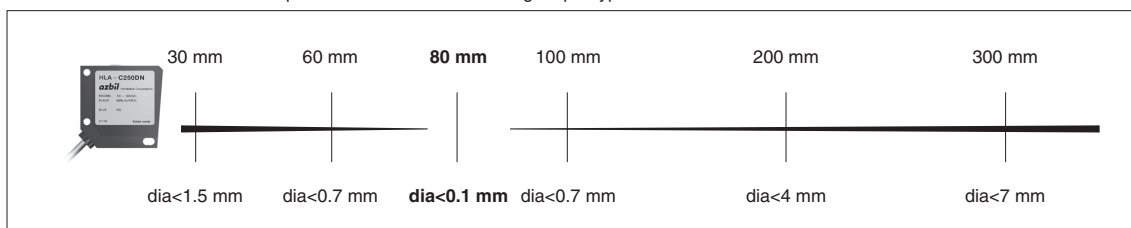


- Detecting a long distant and very small spot. Switching output type: 0.1 mm dia. at 80 mm
- Line-up of “contrast setting” and “distance setting” types for the switching output type

FEATURES

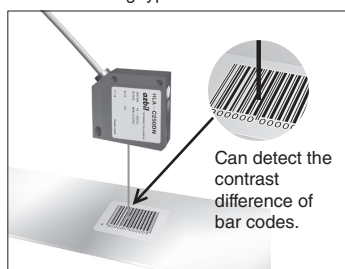
● Long-distance and minute spot

Realized the detection of 0.1 mm spot diameter with the switching output type of 80 mm.

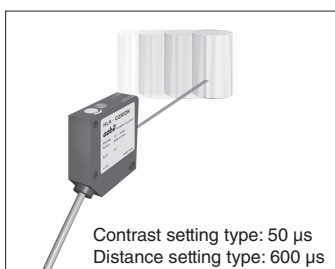


● “Contrast Setting”, “Distance Setting”

Contrast setting type HLA-C250D



● High speed detection



CATALOG LISTING

Type	External appearance	Detecting distance	Power supply	Output Actuation	Catalog listing
Switching output contrast setting reflective	250 mm max. (focal distance 80 mm)	18 to 30 Vdc	NPN(with pull-up)	Light ON	HLA-C250DN

SPECIFICATIONS

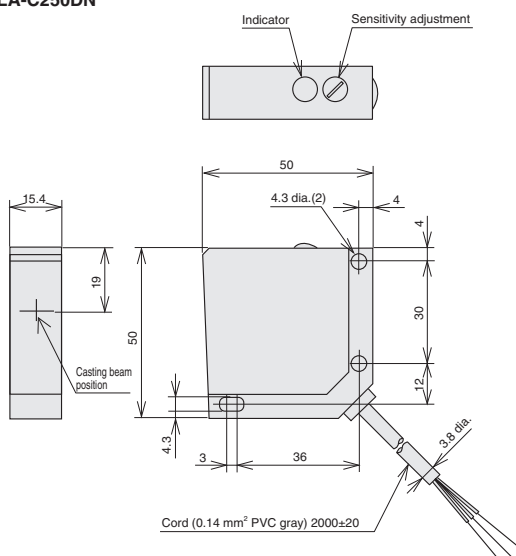
Type	Contrast setting reflective
Catalog listing	HLA-C250DN
Power supply	18 to 30 Vdc, with protective circuit for reverse connection
Consumption current	65 mA
Detecting distance	100 to 250 mm
Focal distance	80 mm
Focal spot diameter	0.1 mm dia. max. (at focal distance)
Operation mode	Light ON
Output	NPN (with pull-up) *
Control output	Load current: 200 mA max., Saturation voltage: 1.8V max., Short circuit protection
Response time	50 μ s max. for actuation/release
Sensitivity adjustment	14-turn potentiometer
Casting beam	Laser diode of 675 nm
Indication	Output indicator (yellow), Supply indicator (green)
Ambient temperature	-10 to +50°C
Operating humidity	90% RH max.
Laser class	Class2(21CFR 1040.10)
Wiring	Brown: Vcc, Black: output, Blue: 0V
Protection	IP67
Connection method	Preloaded
Shock resistance	Max. acceleration: 294 m/s ² (IEC 68-2-27)
Vibration resistance	Frequency 10 to 55 Hz, amplitude 0.5 mm (IEC 68-2-6)
Withstand voltage	1,000 Vdc
Housing material	Die-cast zinc

* The sensor can be connected to a voltage input device without the addition of a pull-up resistor to the input device side. Connecting the sensor to an input device whose power supply voltage is different from that of the sensor might create difficulties. In such a case, contact Azbil Corporation first.

(unit: mm)

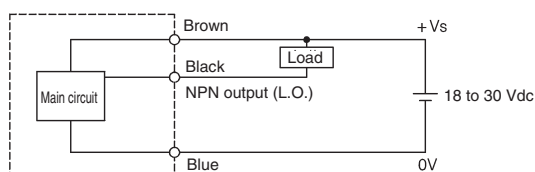
EXTERNAL DIMENSIONS

HLA-C250DN



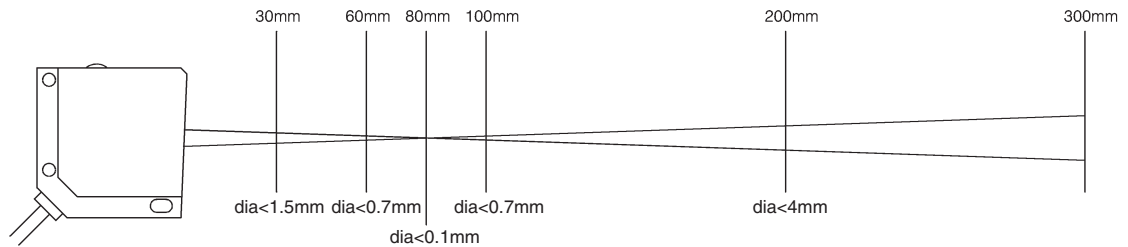
OUTPUT CIRCUIT

HLA-C250DN



NOTES FOR USE OF HLA SERIES WITH SWITCHING OUTPUT

1. Laser beam spot diameter



⚠ WARNING

Precautions related to laser light

- This is a JIS (Japan Industrial Standards) Class 2 laser product.
- Avoid looking directly at the laser beam or a specular reflection of the beam. Never point the beam toward someone's eye.
- Provide shielding so that the human body is not directly exposed to laser radiation.



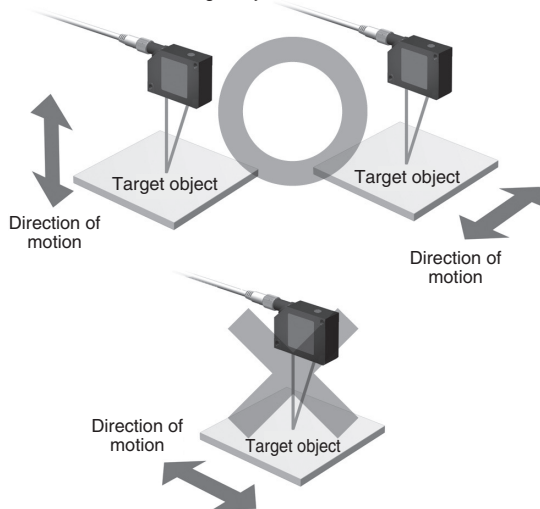
- For safety, stop the laser beam at the end of its path with a diffuse reflecting or absorbing surface having suitable reflectance and temperature properties.

- If the installation conditions make the laser warning label difficult to read, before using the laser be sure to post the enclosed warning label in a place where its details can be read easily.

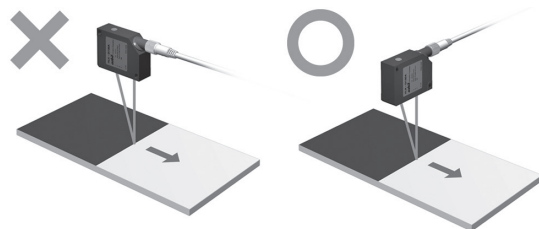
2. Precautions for use

2.1 Precautions for installation

- Make sure that the sensing surface is not exposed to strong light from the sun, fluorescent lights, incandescent lights, etc.
- Pay attention to the orientation of the sensor with respect to the direction of travel of target objects.



- Install the sensor in the same manner even if the color or surface condition of the target objects changes greatly.



- Make sure that the sensing surface of the sensor is parallel to the surface of the target object (so that the target object is not at an angle).

2.2 Handling precautions

- Mount using M4 screws in the three mounting holes.
- Sensor requires about 75 ms to stabilize after power is supplied.
- If installed outdoors, the sensor should be placed in a housing to prevent direct exposure to the sun or rain.
- Avoid installing the sensor where there is strong vibration or impact, since they might shift the optical axis out of alignment.
- Shield the lens so that it is not directly exposed to water or oil. If it is splashed, malfunction could result.
- Where there is heavy interference from ambient light, shade the sensor with a hood or change the mounting direction to prevent malfunction.
- In the sensor is used in a dusty place, put it in a sealed case or use air purging or other countermeasures to prevent dust from accumulating on the lens.
- The laser sensor is assembled with high precision. Never strike it with another object. In particular, if the lens surface is scratched or cracked, its properties may be impaired.
- If the lens is dirty, wipe it with a soft, dry, clean cloth. If it is especially dirty, clean it with pure alcohol.
- If multiple sensors are used close together, performance may be adversely affected. After installing and before use, check carefully to be sure there is no mutual interference.
- Highly reflective metal surfaces near the laser sensor may cause malfunction.
- Dull or paint nearby metal surfaces so that they are not reflective.

2.3 Precautions for wiring

- Be sure to turn off the power before mounting the sensor.
- Route the laser sensor wiring separately or in its own conduit. If it is put in the same conduit with high voltage lines or power lines, induction may cause malfunction or damage.
- When using a commercially available switching regulator, ground the frame ground terminal. Otherwise, switching noise could cause a malfunction.
- When using a load that generates an inrush current, such as a capacitive load or lamp load, connect a current-limiting resistor between the load and the output terminal. (Otherwise, the output short-circuit protection may be activated.)
- This sensor has miswiring protection, but it may be damaged by incorrect wiring involving the I/O lines. Be sure to wire correctly.

ADJUSTMENT METHOD

Contrast-based retroreflective sensing

- **Detecting an object or a bright-colored mark on a dark earth-tone background (output turns ON when mark detected)**

- (1) Install the sensor pointing toward the detection position.
- (2) With no target object or mark present, gradually turn the sensitivity adjustment potentiometer toward MIN from the MAX position. The position where the yellow output indicator turns off is A.
- (3) Place the target object or mark with the darkest color at the detection position and gradually turn the sensitivity adjustment potentiometer from MIN toward MAX. The position where the yellow output indicator turns on is B.
- (4) Set the sensitivity adjustment potentiometer to C, the midpoint between A and B.

- **Detecting a dark-colored mark on a bright earth-tone background (output turns OFF when mark detected)**

- (1) Install the sensor pointing toward the detection position.
- (2) With no target object present, gradually turn the distance adjustment potentiometer from the MAX position toward MIN. The position where the yellow output indicator turns off is A. If the indicator is unlit even when the distance adjustment potentiometer is at MAX, MAX is A.
- (3) Place a target object in the detection position and gradually turn the distance adjustment potentiometer from MIN toward MAX. The position where the yellow output indicator turns on is B.
- (4) Set the distance adjustment potentiometer to C, the midpoint between A and B.

Distance-based retroreflective sensing

- (1) Install the sensor pointing toward the detection position.
- (2) With no target object present, gradually turn the distance adjustment potentiometer from the MAX position toward MIN. The position where the yellow output indicator turns off is A. If the indicator is unlit even when the distance adjustment potentiometer is at MAX, MAX is A.
- (3) Place a target object in the detection position and gradually turn the distance adjustment potentiometer from MIN toward MAX. The position where the yellow output indicator turns on is B.
- (4) Set the distance adjustment potentiometer to C, the midpoint between A and B.

Before use, thoroughly read the "Precautions for use" and "Precautions for handling" in the Technical Guide on pages **A-141** to **A-156** as well as the instruction manual and product specification for this sensor.