

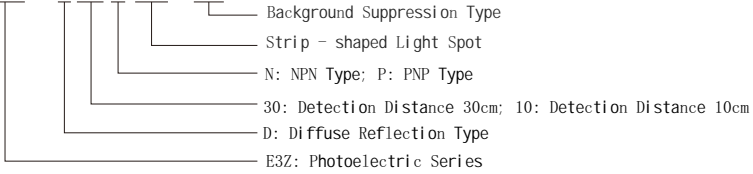
I. Overview

A photoelectric switch is the abbreviation of a photoelectric proximity switch, a displacement sensor with switch output or passive contact output. It has three output modes: NPN, PNP, and relay. It mainly detects the presence or absence of an object by using the blocking or reflection of the light beam by the opaque detected object. Background Suppression (BG) shields the background and is not affected by it. A background suppression photoelectric switch sets the detection distance of the object; if the detected object exceeds the set distance, it cannot be detected, thus well avoiding background interference. Objects are not limited to metal, plastic, glass (not completely transparent), wood, and paper. It can realize automatic signal input with PLC, servo controllers, counters, frequency inverters, relays, and controllers, and is widely used in machinery, textile, light industry, papermaking, printing, packaging and other industries.

Inductive proximity switch detects metal objects (e.g., iron, steel, copper, etc.);
 Capacitive proximity switch detects any objects (e.g., glass, metal, plastic, water, oil, paper, etc.);
 Hall effect proximity switch detects magnetic metal objects (e.g., magnets);
 This series of photoelectric proximity switches complies with the GB/T14048.10 standard.

II. Model Explanation

E3Z - D30N(L) - BG



Note: 1. The working voltage is DC12~24V;
 2. Normally Open/Normally Closed is switched by the wiring method of the white wire.

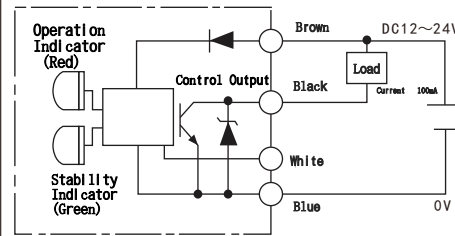
III. Model Types and Technical Data

Detection Method	Background Suppression Type Photoelectric Switch					
Product Model	E3Z-D30N-BG	E3Z-D30P-BG	E3Z-D10N-BG	E3Z-D10P-BG	E3Z-D10NL-BG	E3Z-D10PL-BG
Detection Distance	30~300mm		25~100mm			
Standard Detected Object	10*10cm White Matte Paper			Perforated PCB Circuit Board		
Light Source (Emission Wavelength)	Red LED (660nm)					
Voltage Range	DC12~24V					
Hysteresis Range	5% of Full Scale			8% of Full Scale		
Black and White Error	10% (at 100mm Distance)					
Rated Operating Current	≤100mA					
Leakage Current	≤0.25mA					
Consumption Current	≤30mA					
Ambient Illumination	Incandescent Lamp: Light Spot Intensity Below 3,000lx; Sunlight: Light Spot Intensity Below 1,000lx					
Protection Circuit	Power Reverse Connection Protection / Load Short Circuit Protection / Output Reverse Connection Protection					
Voltage Drop	Voltage Drop 1V (Load Current < 10mA)					
	Voltage Drop 2V (Load Current 10~100mA)					
Control Output	Load Supply Voltage DC24V, Load Current 100mA, Open Collector Output (NPN/PNP Output Varies by Configuration)					
Response Frequency	Operation * Reset: 200Hz					
Ambient Temperature	Operating: -25~+55, Storage: -40~+70 (No Freezing or Condensation)					
Ambient Humidity	Operating: 35~85%RH, Storage: 35~95%RH (No Freezing or Condensation)					
Protection Class	IP54					
Material	Housing: ABS+PC					
	Operating Part and Lens Housing: PC					
Connection Method	Cable Lead Type, Standard Cable Length 2m					

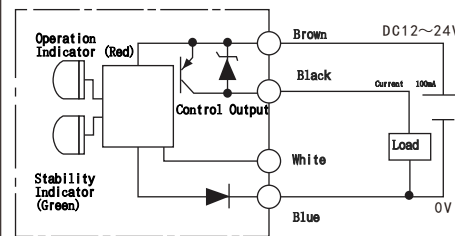
IV. Output Form

Diffuse Reflection Type

• NPN Output

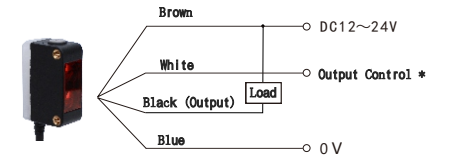


• PNP Output

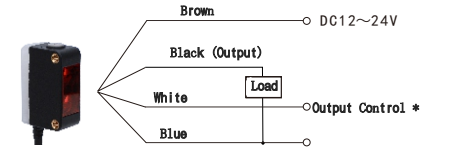


Wiring Sequence	Specification
Brown	+24V
White	Connect to 0V to switch NC
Blue	0V
Black	NO Output (if when light is incident)

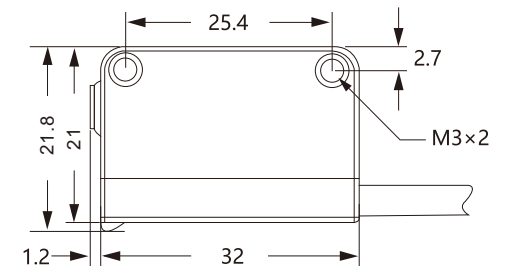
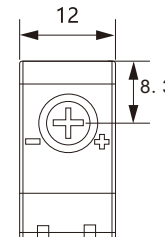
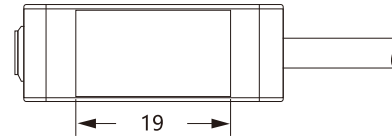
• Connection Diagram



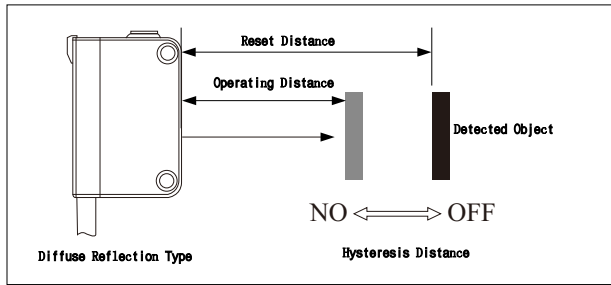
• Connection Diagram



V. Outline and Dimension Drawing (Unit: Millimeter)



VI. Set Distance and Detection Distance

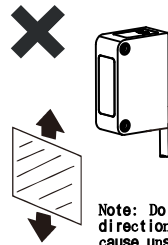


1. When using a diffuse reflection type photoelectric switch, the operating distance refers to the distance from the reference position (sensing surface) to the point where the switch operates when the detected object moves in a certain way.
2. The detection distance indicated on the nameplate of a diffuse reflection type photoelectric switch is relative to the standard detected object. The actual detection distance will vary depending on the size, color, and surface unevenness of the detected object. The detection distance should be set within the rated detection distance.
3. Hysteresis Distance: The absolute value of the difference between the operating distance and the reset distance.

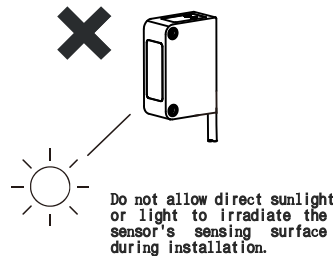
VII. Usage Guidelines

X Incorrect Usage Methods

- Use in places with direct sunlight
- Use in places with high humidity or prone to condensation
- Use in places with corrosive gases
- Use in places where vibration or impact can be directly transmitted to the sensor

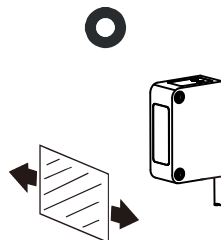
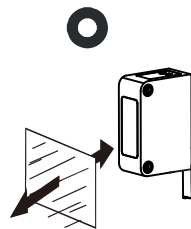


Note: Do not detect objects in this direction with the sensor, as this may cause unstable operation.



Do not allow direct sunlight or light to irradiate the sensor's sensing surface during installation.

○ Correct Object Detection Methods



VIII. Requirements for Power Supply and Load of Photoelectric Switches

1. Surge Protection: When the photoelectric switch is used in areas with severe surge interference (e.g., welding operations with electric welders), a surge absorption device must be added.
 2. The photoelectric switch may malfunction when irradiated by fluorescent lamps. Please keep it away from light sources.
 3. When two photoelectric switches are installed close to each other, malfunctions may occur. Therefore, sufficient space must be reserved between them.
 4. When the DC load current exceeds 100mA, use a small relay for capacity expansion.
 5. The connecting wires of the photoelectric switch should be used within 10 meters as much as possible to reduce interference.
- To ensure the long-term stable operation of the photoelectric switch, similar to general controllers, conduct the following regular inspections:
1. Check whether the installation positions of the detected object and the photoelectric switch are offset, loose, or deformed.
 2. Check whether the wiring and connection parts are loose, have poor contact, or are broken.
 3. Check whether there are deposits such as metal dust adhering to the detection surface.
 4. Check whether the operating temperature and surrounding environmental conditions are abnormal.

IX. Environmental Protection and Other Legal Regulations

To protect the environment, when this product or its components are discarded, please properly dispose of them as industrial waste; or hand them over to a recycling station for classified disassembly, recycling and reuse in accordance with relevant national regulations.

X. Ordering Instructions (Standard Cable Length: 2m)

1. E3Z-D30N-BG: 2m, 100 pieces;
2. E3Z-D30P-BG: 2m, 100 pieces;
3. E3Z-D10N-BG: 2m, 100 pieces;
4. E3Z-D10P-BG: 2m, 100 pieces;
5. E3Z-D10NL-BG: 2m, 100 pieces;
6. E3Z-D10PL-BG: 2m, 100 pieces.



C-Lin

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使用说明书
Products Instructions

E3Z Series Background Suppression
Photoelectric Switch

Thank you very much for using C-Lin brand
sensors. Please read the instruction manual
before using the product!