

Amplifier built-in type

# Z-L series



## Industry standard sized laser sensors with built-in amplifiers

Same low cost as LED light source types

Laser class 1 for through-beam type

Outstanding environmental resistance

Related products

BGS type  
**BGS-ZL**  
● P.326



Amplifier separate type  
**DS**  
● P.280



LED light source  
**Z3**  
● P.148



### Selection table

Type	Shape	Sensing distance (Adjustable distance range shown in parentheses)	Light source	Model (Models in parentheses are connector types)	
				NPN type	PNP type
Laser Through-beam		30 m	Class 1 laser	<b>ZT-L3000N</b> (ZT-L3000CN)	<b>ZT-L3000P</b> (ZT-L3000CP)
Laser Retro-reflective		0.2 to 10 m	Class 2 laser	<b>ZR-L1000N</b> (ZR-L1000CN)	<b>ZR-L1000P</b> (ZR-L1000CP)
Laser Diffuse-reflective		400 mm	Class 2 laser	<b>ZD-L40N</b> (ZD-L40CN)	<b>ZD-L40P</b> (ZD-L40CP)
Laser BGS		5 to 100 mm (20 to 100 mm)	Class 1 laser	<b>BGS-ZL10N</b> (BGS-ZL10CN) ● P.326	<b>BGS-ZL10P</b> (BGS-ZL10CP) ● P.326
		10 to 300 mm (50 to 300 mm)		<b>BGS-ZL30N</b> (BGS-ZL30CN) ● P.326	<b>BGS-ZL30P</b> (BGS-ZL30CP) ● P.326

● For the connector type, please purchase an optional JCN series connector cable.

### Options/Accessories

#### Reflector

##### Standard

**P250F**  
Sensing distance:  
0.2 to 10 m  
61 × 51 mm  
Included with retro-reflective type



##### Small (optional)

**PL20F**  
Sensing distance:  
0.2 to 8 m  
60 × 20 mm



##### Ultra-small (optional)

**PL10F**  
Sensing distance:  
0.2 to 7 m  
32 × 20 mm



#### Protective mounting bracket

● Ultra-durable 2 mm thick type ● Rust-resistant stainless steel ● Sensor is firmly secured using an M3 Hex socket head cap screws ● The bracket is also firmly secured using M6 screw



#### Connector cables

##### Straight

**JCN-S**  
Cable length: 2 m  
**JCN-5S**  
Cable length: 5 m  
**JCN-10S**  
Cable length: 10 m

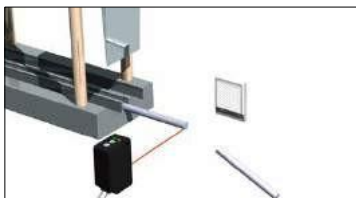


##### L-shaped

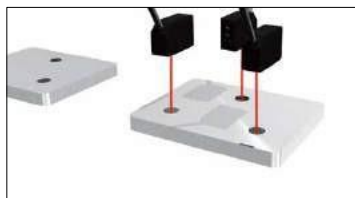
**JCN-L**  
Cable length: 2 m  
**JCN-5L**  
Cable length: 5 m  
**JCN-10L**  
Cable length: 10 m



#### Parts cut sizing



#### Hole drilling detection for metal parts



#### Liquid crystal glass mapping



**Small spot size that can be achieved by lasers**

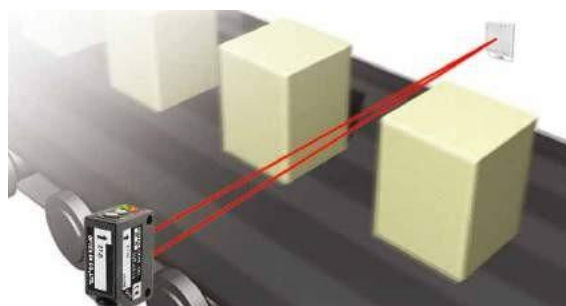
Approx.  $\varnothing 2$  mm spot size at a distance of 400 mm (diffuse-reflective type)

Optimal for applications that in which small object detection and high repeat accuracy are required.

**For high-speed lines**

**Response time: 250  $\mu$ s**

The laser sensor provides a top class response time. This feature makes detection in high speed production line possible.

**Outstanding environmental resistance**

**Degree of protection: IP67, Shock resistance: 50 G**

Its integrally molded structure enables all models to conform to IP67 and achieve a shock resistance up to 50 G. It doesn't break even when wet and can be used in locations where vibrations are generated.

**Standard specification size**

**25.4 mm standard pitch**

Features an industry standard pitch of 25.4 mm.



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## Specifications

Type		Through-beam type	Retro-reflective type	Diffuse-reflective type	
Model	NPN	Cable type	<b>ZT-L3000N</b>	<b>ZR-L1000N</b>	<b>ZD-L40N</b>
		Connector type	<b>ZT-L3000CN</b>	<b>ZR-L1000CN</b>	<b>ZD-L40CN</b>
	PNP	Cable type	<b>ZT-L3000P</b>	<b>ZR-L1000P</b>	<b>ZD-L40P</b>
		Connector type	<b>ZT-L3000CP</b>	<b>ZR-L1000CP</b>	<b>ZD-L40CP</b>
Sensing distance		30 m	0.2 to 10 m <sup>*1</sup>	400 mm <sup>*2</sup>	
Light source		Red semiconductor laser Class 1 (IEC/JIS) <sup>*3</sup> Wavelength: 650 nm, Maximum output: 390 μW	Red semiconductor laser Class 2 (IEC/JIS) <sup>*3</sup> Wavelength: 650 nm, Maximum output: 3 mW		
Spot size (at focal distance)		Approx. ø2 mm <sup>*4</sup> Distance: 2 m (at ordinal temperatures)	Approx. ø2.5 mm <sup>*4</sup> Distance: 2 m (at ordinal temperatures)	Approx. ø2 mm <sup>*4</sup> Distance: 400 mm (at ordinal temperatures)	
Response time		250 μs or less			
Hysteresis		—		20%	
Distance adjustment		1-turn potentiometer			
Indicators		Output indicator (orange LED), Laser emission indicator (green LED: stability indicator for through-beam type receiver)			
Control output		NPN/PNP type Open collector Max. 100 mA/30 VDC			
Output mode		Light ON / Dark ON selection switch			
Connection type		Cable type: Cable length: 2 m ø3.8 mm / Connector type: M8, 4-pin			
Rating	Supply voltage	10 to 30 VDC, including 10% ripple (p-p)			
	Current consumption	Emitter: 15 mA or less Receiver: 15 mA or less	20 mA or less		
Applicable regulations		EMC directive (2004/108/EC) / FDA regulations (21 CFR 1040.10)			
Applicable standards		EN 60947-5-2			
Company standards		Noise resistance: Feilen Level 3 cleared			
Environmental resistance	Ambient temperature/humidity	-10 to +50°C (no freezing) / 35 to 85% RH (no condensation)			
	Ambient illuminance	Sunlight: 10,000 lx/Incandescent lamp: 3,000 lx			
	Vibration resistance	10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions			
	Shock resistance	Approx. 50 G (500 m/s <sup>2</sup> ); 3 times in each of the X, Y, and Z directions			
	Degree of protection	IP67			
Material		Housing: ABS (glassfiber reinforced), Front cover: PMMA			
Weight without cable		Approx. 20 g	Approx. 10 g		
Included accessories		Mounting bracket: BEF-W100-B <sup>*5</sup>	Mounting bracket: BEF-W100-B <sup>*5</sup> Reflector: P250F	Mounting bracket: BEF-W100-B <sup>*5</sup>	

\*1. With P250F reflector \*2. 100 mm × 100 mm white paper \*3. Classified as class II in the US FDA standards

\*4. Defined with center strength 1/e<sup>2</sup> (13.5%).

There may be light leakage outside of the specified spot size. The sensor may be affected when there is a highly reflective object close to the target area.

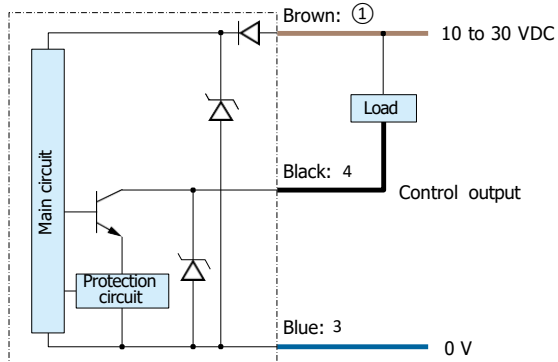
\*5. Mounting bracket BEF-W100-A is included with the connector type.

● Specifications are subject to change without prior notice for product improvement purposes.

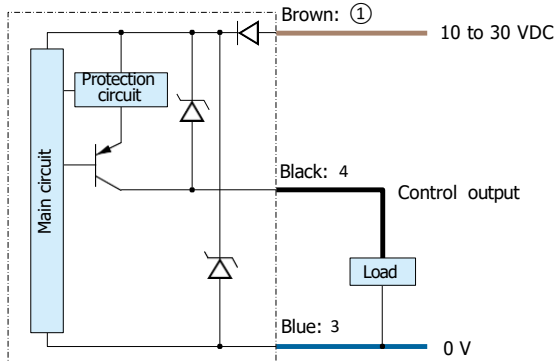
## Output circuit diagram

### Retro-reflective type/Diffuse-reflective type

#### NPN output type

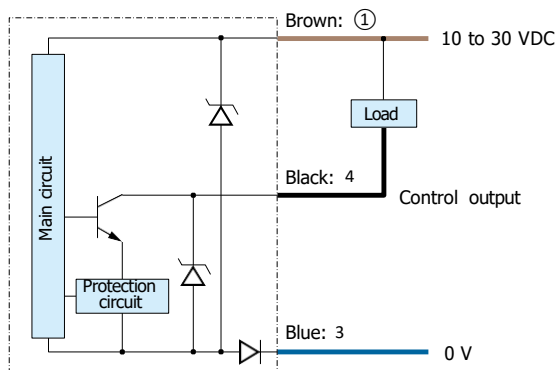


#### PNP output type

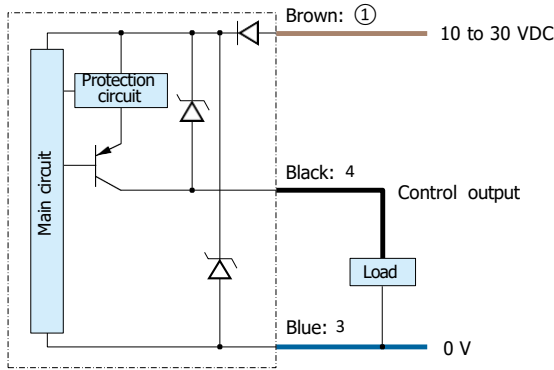


### Through-beam type receiver

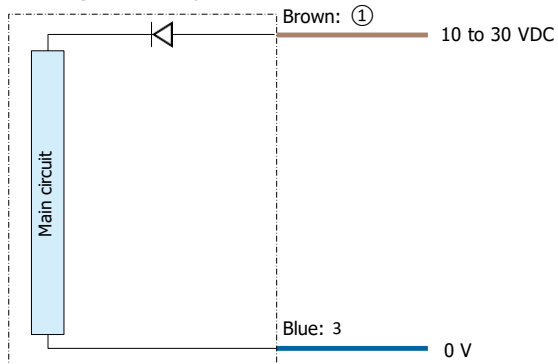
#### NPN output type



#### PNP output type

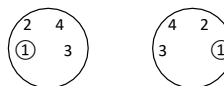


### Through-beam type emitter



#### Connector type

(Pin configuration) Sensor side Connector cable side



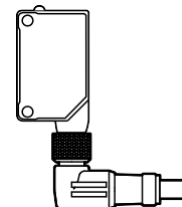
① 10 to 30 VDC  
2 —  
3 0 V  
4 Control output

#### Connecting

- ① to 4 are connector pin No.

#### Notes

- When using a switching regulator for the power supply, be sure to ground the frame ground terminal.
- Avoid wiring in parallel with or in the same piping as high-voltage wires or power lines. Doing so may lead to malfunctions caused by noise. Also, shorten the power supply and signal wires as much as possible.
- Avoid using the transient state while the power is on (approx. 100 ms).
- The connector direction is fixed as in the drawing to the right when you use L-shaped connector cable. Be aware that rotation is not possible.

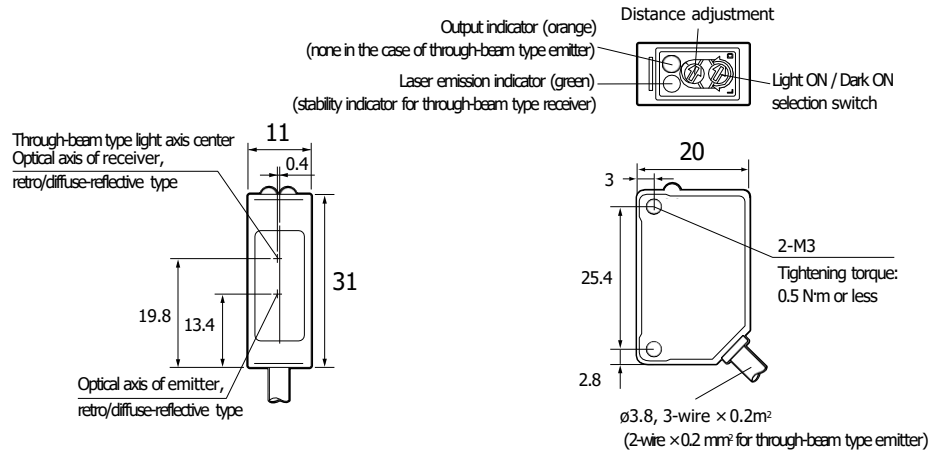


Dimensions

Sensor

(Unit: mm)

■ Cable type

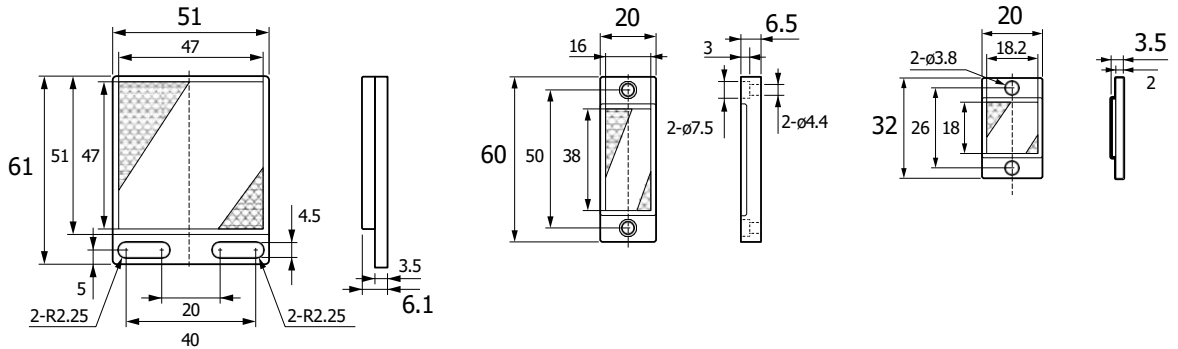


Reflector

■ P250F (included with ZR-L1000N)

■ PL20F (optional)

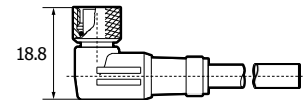
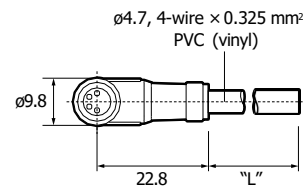
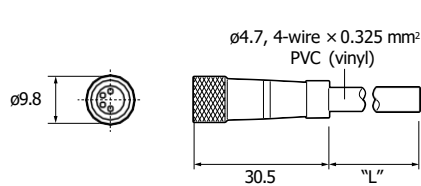
■ PL10F (optional)



Connector cable (optional)

■ JCN-S, JCN-5S, JCN-10S

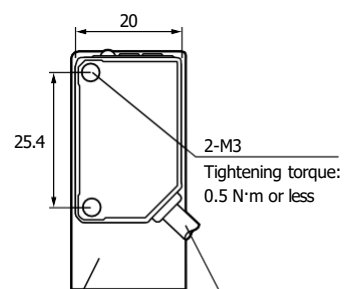
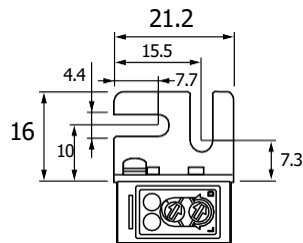
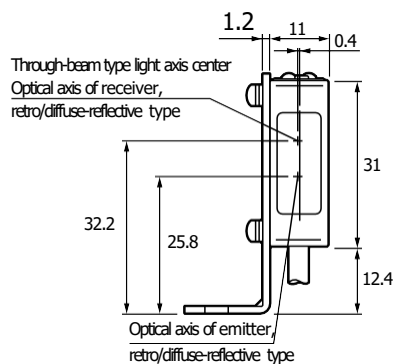
■ JCN-L, JCN-5L, JCN-10L



Mounting bracket

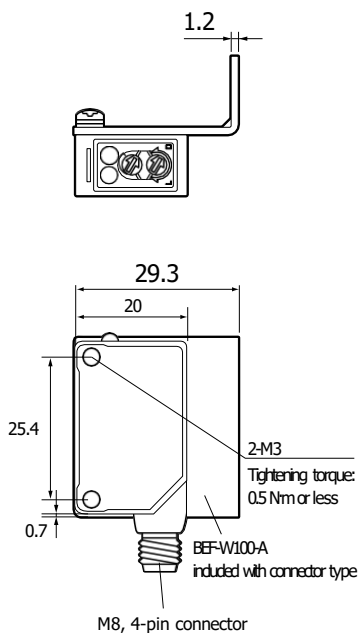
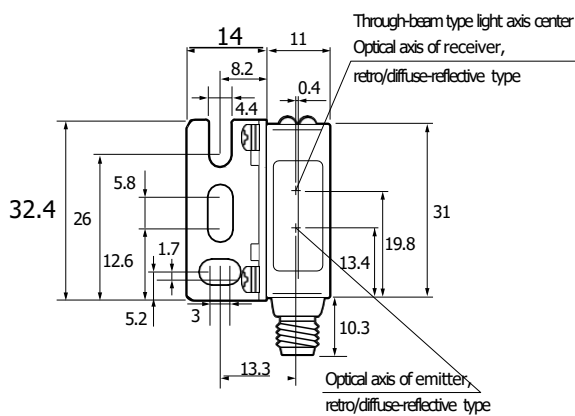
- Cable type (when using BEF-W100-B)

(Unit: mm)



BEF-W100-B included with cable type  $\varnothing 3.8$ , 3-wire  $\times 0.2\text{mm}^2$  (2-wire  $\times 0.2\text{mm}^2$  for through-beam type emitter)

- Connector type (when using BEF-W100-A)



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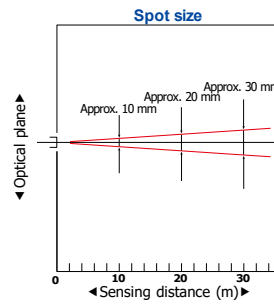
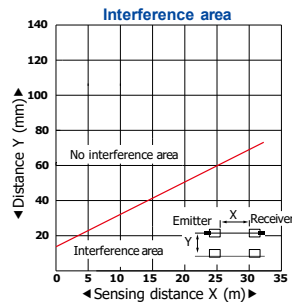
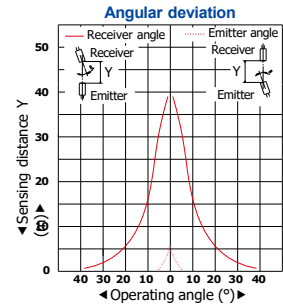
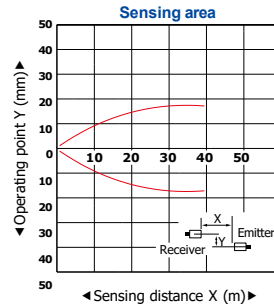
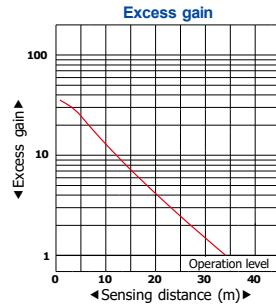
DS

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Typical characteristic data

\*Contact us for any other characteristic data that may be required.

ZT-L3000 □



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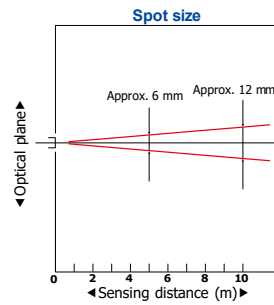
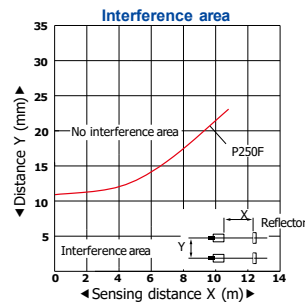
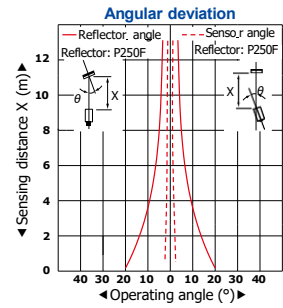
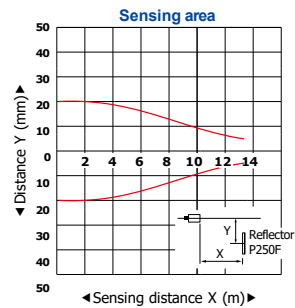
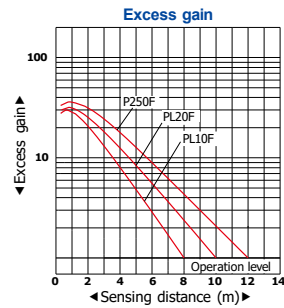
Laser Sensors

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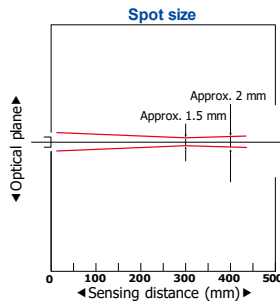
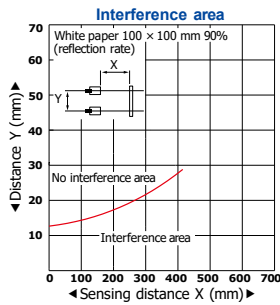
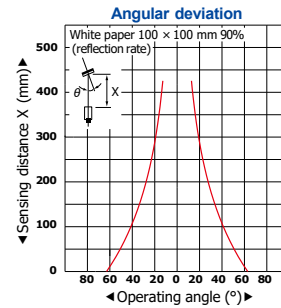
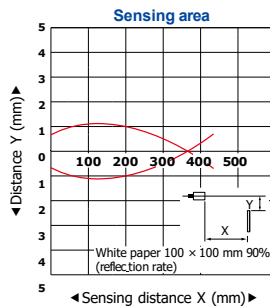
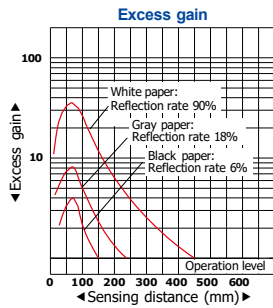
DS

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ZR-L1000 □



ZD-L40□



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Laser Sensors

Z-L

DS

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Notes for sensor usage



**Warning**

Do not look directly at the laser or intentionally shine the laser beam in another person's eyes. Doing so may cause damage to the eyes or health.



ZR-L1000N  
 ZD-L40N



ZT-L3000N

- Regarding the laser label, this product emits a Class 2 (II) visible laser beam that is compliant with JIS C6802/IEC/FDA laser safety standards. A CLASS 2/CLASS II warning label and explanation label (English) is affixed to the side of the sensor head.

\*The ZT-L3000N emitter is Class II in FDA standards (when exported to the United States), but is Class 1 according to JIS/IEC standards, so change the label that it is packaged with for use.