

# Laser Sensors

A laser light source is ideally suited for BGS sensing, it is also very good for transparent object detection. This type of sensor offers excellent repeat accuracy and performance.



## Laser Sensor

# Z-L / BGS-ZL series

### Thru-beam type

(Sensing distance : 30m)  
 · ZT-L3000N / P / CN / CP

### Polarized Retro-reflective

(Sensing distance : 10m)  
 · ZR-L1000N / P / CN / CP

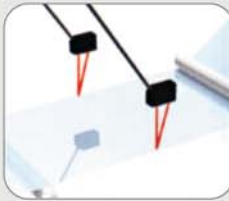
### Diffuse-reflective

(Sensing distance : 400mm)  
 · ZD-L40N / P / CN / CP

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- The Laser light source projects a 2 mm spot at 400 mm distance (Diffuse mode).
- BGS (Background Suppression) sensing is also available in the BGS-ZL series.

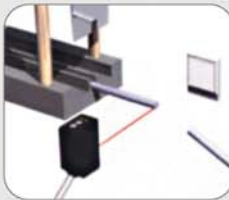
### Applications



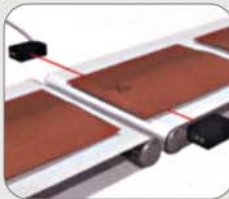
Edge control  
(BGS-ZL30)



Height control of  
multi-colored object  
(BGS-ZL30)



Counting metal parts  
(ZR-L1000)



Thin plates counting  
(ZT-L3000)

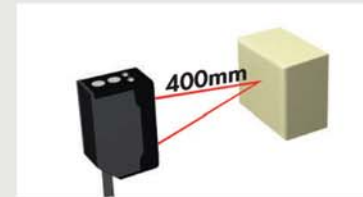
### Features

#### Thru-Beam type



ZT-L3000

#### Diffuse type



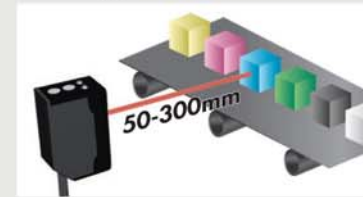
ZD-L40

#### Retro Reflective type



ZR-L1000

#### BGS type



BGS-ZL30  
 BGS-ZL10

### Class 2/Class II IEC, FDA Regulation

Conforms to Class 2 (IEC) and Class II (FDA) regulations.  
 (Class 1 for Thru-beam type)



**Long distance**

(Sensing distance : 50-300mm)  
 · BGS-ZL30N / P / CN / CP

**Short distance**

(Sensing distance : 20-100mm)  
 · BGS-Z10N / P / CN / CP

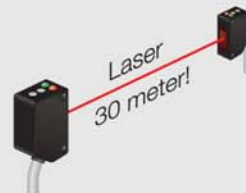
**Laser Thru-beam / RetroType**

- **30 meter sensing distance (Thru-beam type), fast 250μsec. response time.**
- **Compact size with Laser source, small 2 mm diameter projected beam.**
- **IP67 rating**
- **M8 QD types are available**

**Features**

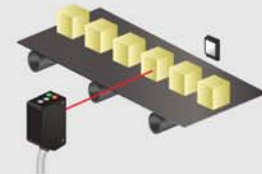
**Thru-beam type, ZT-L series**

30mm spot size at 30 meter sensing distance



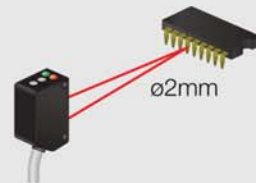
**250μsec response**

Good for fast moving objects.



**Diffuse Reflective, ZD-L type**

Fine 2mm spot at 400mm sensing distance



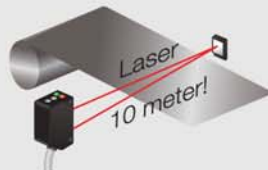
**Cross-talk prevention**

2 sensors can be mounted side-by-side.



**Retro Reflective, ZR-L type**

10mm spot size at 10 meter sensing distance



**IP67 rating**

Hose it down!  
 Water-tightness is tested to IP67.



**Specifications**

Model	Thru-beam	Polarized Retro-reflective	Diffuse-reflective
<b>Cable type</b>	NPN ZT-L3000N PNP ZT-L3000P	ZR-L1000N ZR-L1000P	ZD-L40N ZD-L40P
<b>M8 connector type</b>	NPN ZT-L3000CN PNP ZT-L3000CP	ZR-L1000CN ZR-L1000CP	ZD-L40CN ZD-L40CP
<b>Supply voltage</b>	DC10~30V Inc. 10% ripple		
<b>Power consumption</b>	30mA max.	20mA max.	
<b>Sensing distance</b>	30meter	10meter (Reflector : P250F)	400mm
<b>Spot size</b>	30mm/30m	10mm/8m	2mm/400mm
<b>Response time</b>	250μsec		
<b>Hysteresis</b>	-		
<b>Operating temp</b>	-10 to +50°C		
<b>Operating humidity</b>	35 to 85%		
<b>Storage temp / humidity</b>	-25 to +70°C/35 to 95%		
<b>Vibration resistance</b>	10 to 55Hz width 1.5mm		
<b>Shock resistance</b>	50 G (500 m/s <sup>2</sup> )		
<b>Protection category</b>	IP67		
<b>Light source</b>	Laser (650nm)		
<b>Laser class (IEC)</b>	class 1	class 2	
<b>Laser class (FDA)</b>	class I	class II	
<b>Output indicator</b>	Orange(Yellow) LED		
<b>Laser power indicator</b>	Green LED		
<b>Sensitivity adjustment</b>	Single turn potentiometer		
<b>Operating mode</b>	Light On / Dark On selectable (switch)		
<b>Connection</b>	2m cable / M8 connector		

## BGS - Laser Type

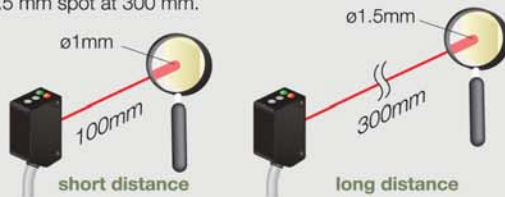
Fine spot / high speed applications

- **BGS (Background Suppression Type) Sensors are not influenced by the background, available with conventional Laser light source.**
- **250  $\mu$ sec fast response (Laser light source models)**
- **1 mm projected spot size with BGS optical system (BGS-ZL Laser types)**

### Features

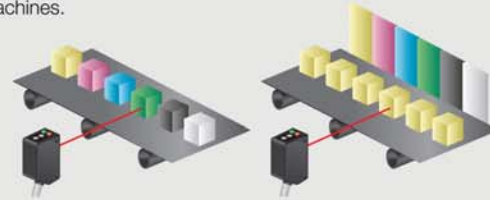
#### 1 mm projected spot size

The Short distance BGS Laser sensor projects a very small  $\phi 1$  mm spot at 100 mm distance. Ideal for the detection of small targets at long distance without being influenced by the background. The Long distance type projects a  $\phi 1.5$  mm spot at 300 mm.



#### BGS optical system designed with Laser light source

Extremely small BGS type sensors are only 17 x 10 x 20mm. Ideal for use in OEM equipment such as Printed Circuit Board processing machines.



#### External control of Laser Beam

External control of laser OFF is possible by connecting gray wire to GND (NPN type) or DC10-30V (PNP type). (This function is not available in 3 pin types)



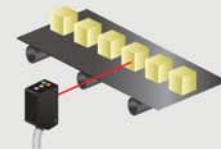
#### 4 Turn adjustment pot.

A four turn adjustment pot. is built-in for precise adjustment of the sensing distance. The potentiometer has a slip clutch that protects it from damage when it is turned past the end.



#### 250 $\mu$ sec response

Good for fast moving objects.



### Specifications

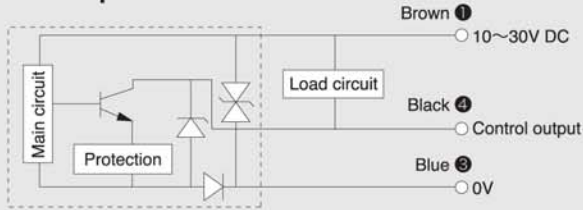
Model		long distance		short distance	
		2m Cable	M8QD 4pin	2m Cable	M8QD 4pin
Type	NPN	BGS-ZL30N	BGS-ZL30CN	BGS-ZL10N	BGS-ZL10CN
	PNP	BGS-ZL30P	BGS-ZL30CP	BGS-ZL10P	BGS-ZL10CP
Adjustable distance		50 - 300 mm (*1)		20 - 100 mm (*1)	
Sensing distance		10 - 300 mm (*1)		5 - 100 mm (*1)	
Response time		250 $\mu$ s			
Spot size		$\phi 1.5$ mm/300mm		$\phi 1$ mm/100mm	
Hysteresis (white to white)		5%		3%	
Operating mode		Light On / Dark On selectable			
Output indicator		Output : orange, Laser Power : green			
Sensitivity adjustment		4-turn, endless pot.			
Control output		NPN or PNP open collector, 100mA max / DC30V			
Supply voltage		DC 10 - 30V, including 10% ripple			
Power consumption		30mA max			
Protection category		IP 67			
Shock resistance		50G			
Operating temp / humidity		-10 to 55°C / 35 to 85% RH			
Materials		Housing : ABS with glass, Lens : PMMA			

\*1 white paper 100 X 100mm

\*M8-QD in 3 pins for European machines" are available with extension code of -CN(P)3, for instance, "BGS-ZL30CN3".

## Circuit diagram

### NPN output

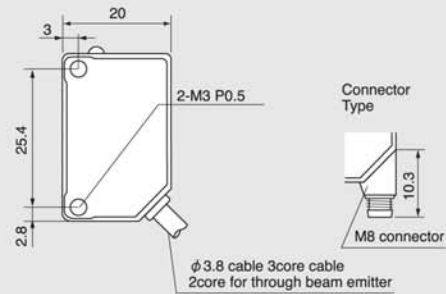
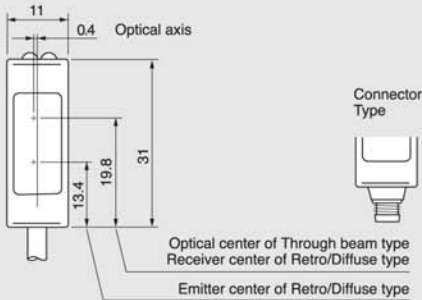
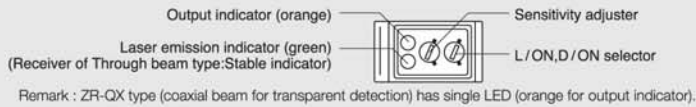


### Emitter of Thru-beam type

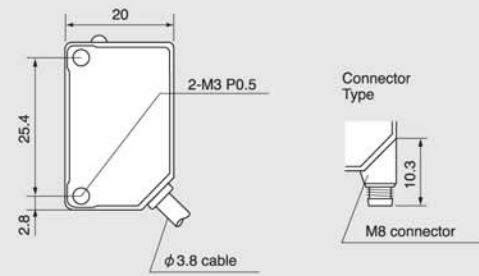
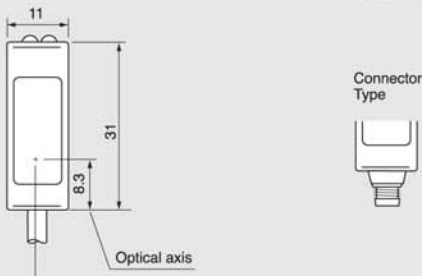


## Dimensions

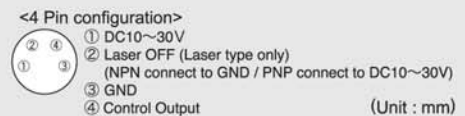
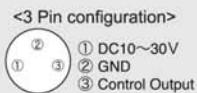
### General Use Type except BGS



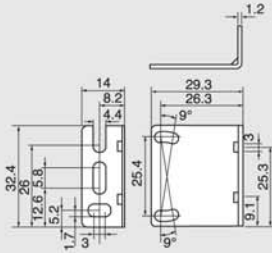
### BGS Type



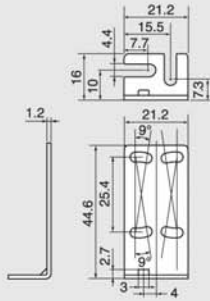
**<Cable>**  
 Brown : DC10~30V  
 Blue : GND  
 Black : Control Output  
 Gray : Laser OFF (Laser type only)  
 (NPN connect to GND / PNP connect to DC10~30V)



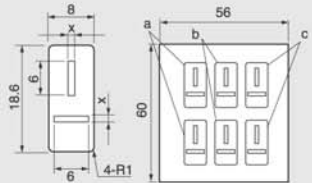
**Standard bracket BEF-W-100-A**  
For M8 QD type sensors



**Standard bracket BEF-W-100-B**  
For cabled type sensors

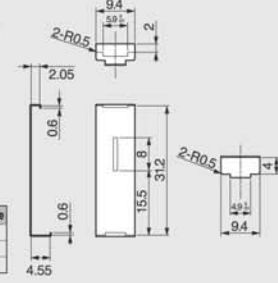


**Slit mask BL-160-SK**  
(for Thru-beam type)

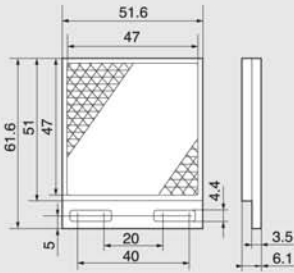


Type	Size	Attached to	Object size (Min)	Scanning range
Slit a	0.5mm	Receiver, Emitter	0.4mm	0.8mm
Slit B	1mm	Receiver, Emitter	0.6mm	2.5mm
Slit C	2mm	Receiver, Emitter	1.5mm	5mm

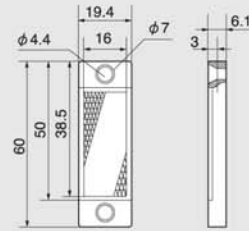
**Slit mask BL-100-M1**



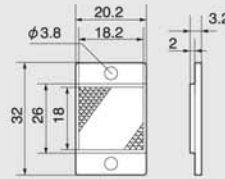
**Reflectors for Laser Type**  
**P250F**  
(Standard, 0.2-10m)



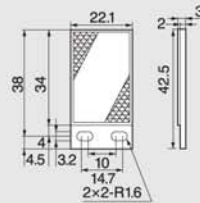
**PL20F**  
(Optional, 0.2-8m)



**PL10F**  
(Optional, 0.2-7m)



**V-42F**  
(Optional, 0.1-5m)



**JCN-S : M8 Standard type**

**PL20F**



**JCN-L : L-shape M8 type**

**PL10F**



**Protective mounting brackets**  
**LK-S01**



**V-42F**



**LK-S02**



JCN-S : 2 meter  
JCN-5S : 5 meter  
JCN-10S : 10 meter

JCN-L : 2 meter  
JCN-5L : 5 meter  
JCN-10L : 10 meter

**Sensor stand**  
**PLN-1**



**Fixture of Reflector**  
**PLN-1M**

D

D2SA

Z-L  
BGS-ZL