

Laser type with potentiometer

BGS-DL series**Optex will discontinue the BGS-DL series in 2023**

- **Last Order Date is December 31, 2023**
- **Recommended Replacement: BGS-ZL series**
(see pages 5 to 12 of this brochure)
- **Contact Ramco for Application/Technical support**

The low cost laser BGS sensor!

Class 2 laser

2PD (2-photo-diode) used for the receiver element

Low cost potentiometer type

Related products

C-MOS laser
**BGS-HL,
BGS-HDL**
● P.310



Small laser BGS
BGS-ZL
● P.326



Analog output
CD22
● P.464

**Selection table**

Type	Shape	Sensing distance	Receiver element	Distance adjustment	Model (Models in parentheses are connector types)	
					NPN type	PNP type
Laser BGS		40 to 100 mm	2PD	Potentiometer type	BGS-DL10N (BGS-DL10CN)	BGS-DL10P (BGS-DL10CP)
		100 to 300 mm	2PD	Potentiometer type	BGS-DL30N (BGS-DL30CN)	BGS-DL30P (BGS-DL30CP)
		100 to 700 mm	2PD	Potentiometer type	BGS-DL70N (BGS-DL70CN)	BGS-DL70P (BGS-DL70CP)

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

Low cost potentiometer type featuring a 2PD (2-photo-diode) for the receiver element

This is a potentiometer type without digital monitor for customers who love conventional potentiometer type sensors. Because it features a laser light source, it boasts high level positioning performance.

Options/Accessories**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



Photoelectric
SensorsSpecialized
Photoelectric
SensorsLaser
Displacement
Sensors

BGS Sensors

BGS-HL,
BGS-HDL

BGS-DL

BGS-ZL,
BGS-Z

BGS-ZM

BGS-S,
BGS-2S

BGS

BGS-DL
(potentiometer type)

Specifications

Type		Laser BGS type (potentiometer type)			
Model	NPN	Cable type	BGS-DL10N	BGS-DL30N	BGS-DL70N
		Connector type	BGS-DL10CN	BGS-DL30CN	BGS-DL70CN
	PNP	Cable type	BGS-DL10P	BGS-DL30P	BGS-DL70P
		Connector type	BGS-DL10CP	BGS-DL30CP	BGS-DL70CP
Sensing distance		10 to 100 mm ^{*1}	50 to 300 mm ^{*1}	50 to 700 mm ^{*1}	
Adjustable distance range		40 to 100 mm ^{*1}	100 to 300 mm ^{*1}	100 to 700 mm ^{*1}	
Light source		Red semiconductor laser Class 2 (IEC/JIS) ^{*2} Wavelength: 650 nm Pulse width: 6 μs			
		Maximum output: 2 mW		Maximum output: 3 mW	
Spot size		Approx. ø3 mm / at a distance of 80 mm	Approx. ø6 mm / at a distance of 200 mm	Approx. ø2.5 mm / at a distance of 300 mm	
Response time		0.7 ms or less			
Hysteresis		5% or less		5 to 20%	
Distance adjustment		4-turn endless potentiometer			
Indicators		Output indicator (orange) Laser emission indicator (green)			
Control output		NPN/PNP open collector Max. 100 mA/30 VDC			
Output mode		Light ON / Dark ON selectable			
Connection type		Cable type: Cable length: 2 m (ø4 mm) / Connector type: M8, 4-pin			
Insulation resistance		20 MΩ or more (with 500 VDC)			
Rating	Supply voltage	10 to 30 VDC, including 10% ripple (p-p)			
	Current consumption	35 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 +40°C (no freezing) / 35 to 85% RH (no condensation)			
	Ambient illuminance	Sunlight: 10,000 lx or less Incandescent light: 3,000 lx or less			
	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 ²), 3 times in each of the X, Y, and Z directions			
	Degree of protection	IP67			
Material		Housing: ABS Front cover: PMMA			
Weight without cable		Approx. 20 g (excluding cable)			
Included accessories		Mounting bracket: BEF-WK-190			

*1. Using a 100 × 100 mm white sheet of paper.

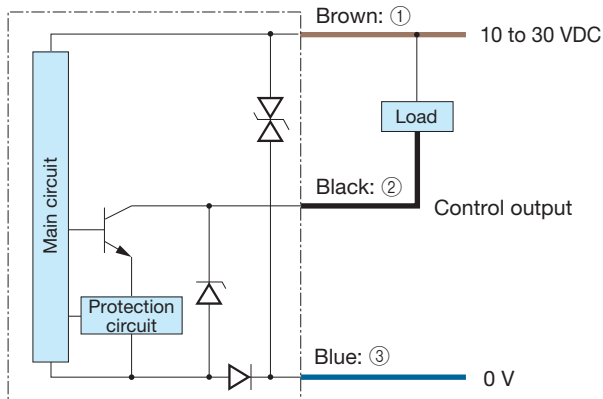
*2. Classified as Class II in the US FDA standards.

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

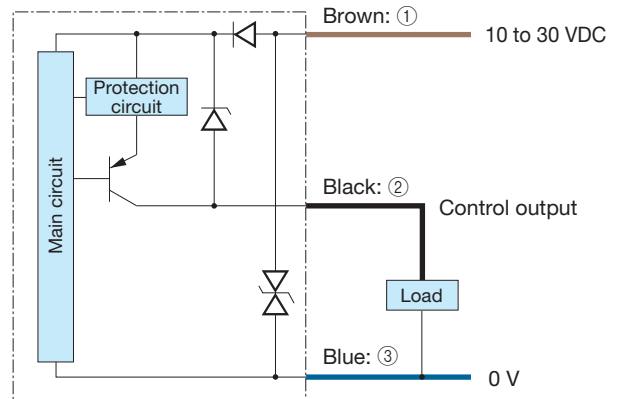
Laser type with potentiometer **BGS-DL** series

Output circuit diagram

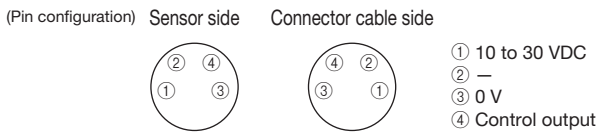
■ **NPN output type**



■ **PNP output type**



■ **Connector type**

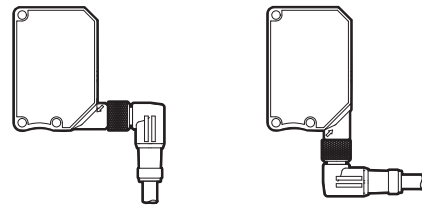


Connecting

■ 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.
- Because wiring sensor wires with high-voltage wires or power supply wires can result in malfunctions due to noise, which can cause damage, make sure to wire separately.
- Avoid using the transient state while the power is on (approx. 100 ms).
- The connector direction is fixed as the drawing below when you use L-shaped connector cable.

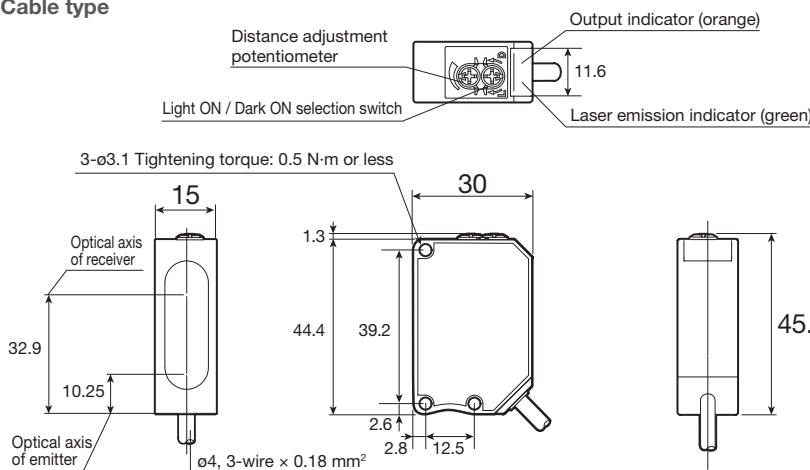


Dimensions

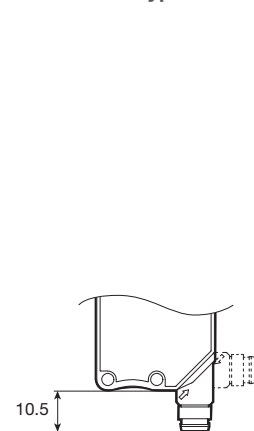
Sensor

(Unit: mm)

■ **Cable type**



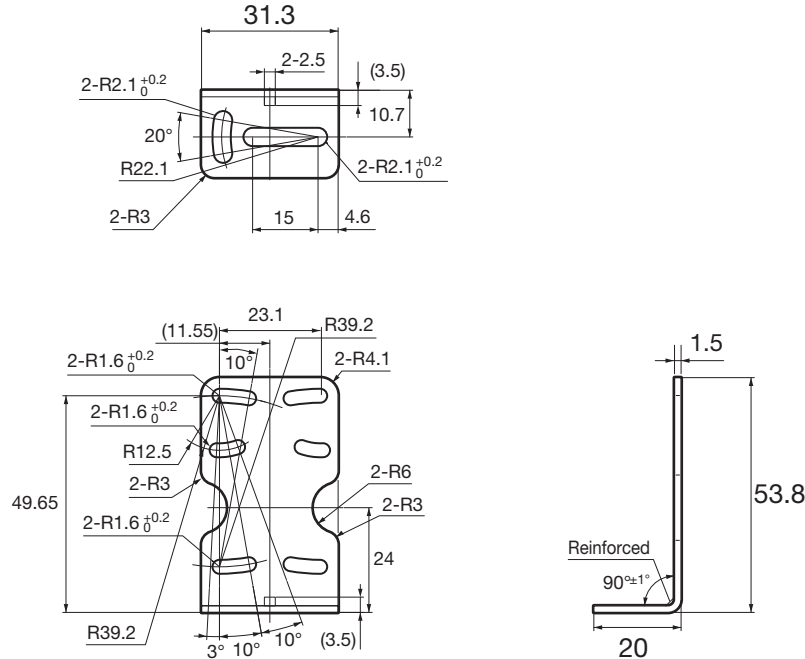
■ **Connector type**



(Unit: mm)

Mounting bracket

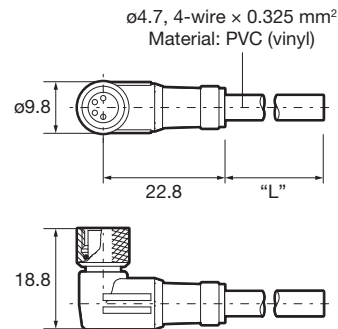
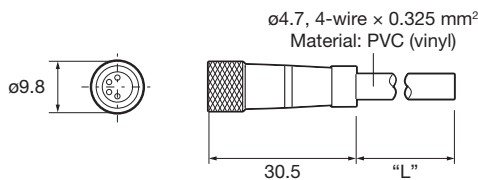
■ BEF-WK-190 (included)



Connector cable (optional)

■ JCN-S, JCN-5S, JCN-10S

■ JCN-L, JCN-5L, JCN-10L



Photoelectric Sensors
Specialized Photoelectric Sensors
Laser Displacement Sensors
BGS Sensors
BGS-HL, BGS-HDL
BGS-DL
BGS-ZL, BGS-Z
BGS-ZM
BGS-S, BGS-2S
BGS
BGS-DL (potentiometer type)

Notes for sensor usage

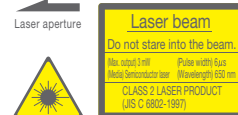
This product emits a Class 2 (II) visible laser beam that is compliant with JIS C6802/IEC/FDA laser safety standards. Warning and explanation labels are affixed to the sides of the sensor.

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.

BGS-DL10□□
BGS-DL30□□



BGS-DL70□□



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Laser, standard type

BGS-ZL ^(Laser) series,
BGS-Z ^(LED) series



Laser type and high power narrow beam LED type BGS!

- | Types with sensing distances of 100 mm and 300 mm
- | Industry standard size
- | Highly accurate height difference detection through low hysteresis

Related products

Higher accuracy
BGS-HL,
BGS-HDL
● P.310



Universal voltage type

BGS-2V
● P.384



Transparent object detection

Z3R-Q
● P.404



Selection table

Type	Shape	Sensing distance (Adjustable distance range shown in parentheses)	Model (Models in parentheses are connector types)	
			NPN type	PNP type
BGS	Class 1 laser	5 to 100 mm (20 to 100 mm)	BGS-ZL10N (BGS-ZL10CN)	BGS-ZL10P (BGS-ZL10CP)
		10 to 300 mm (50 to 300 mm)	BGS-ZL30N (BGS-ZL30CN)	BGS-ZL30P (BGS-ZL30CP)
BGS	High power narrow beam LED	5 to 100 mm (20 to 100 mm)	BGS-Z10N (BGS-Z10CN)	BGS-Z10P (BGS-Z10CP)
		10 to 300 mm (50 to 300 mm)	BGS-Z30N (BGS-Z30CN)	BGS-Z30P (BGS-Z30CP)

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

Options/Accessories

Connector cables

Straight

JCN-5
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



Protective mounting bracket

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

LK-501



LK-502



Laser type application 1

Meander detection of sheet materials



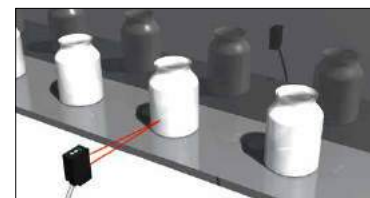
LED type application 1

Detection of multi-colored trays



LED type application 2

Detection of items on stainless steel lines



Laser types (Class 1) and high power narrow beam LED types are available

Laser type (equipped with laser OFF input)

The spot size of the laser type is $\phi 1\text{ mm}$ at 100 mm (short-range type). Optimal for applications that in which **small object detection** and **high repeat accuracy** are required. It is also a Class 1 laser in which eye protection for workers is not necessary.

*Classified as Class II in the US FDA standards.



High power narrow beam LED light source type

Features a **high power narrow beam LED light source**. Because the spot light can be seen clearly even in bright factories regardless of the LED light, confirmation of detection position is easier than for any other conventional model.

*Compared to conventional models: Using LED light source.

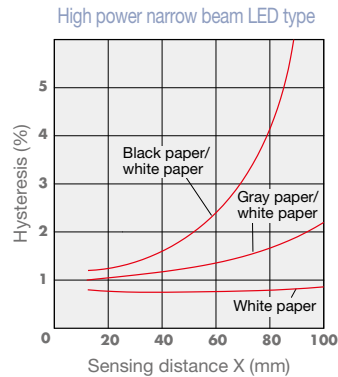
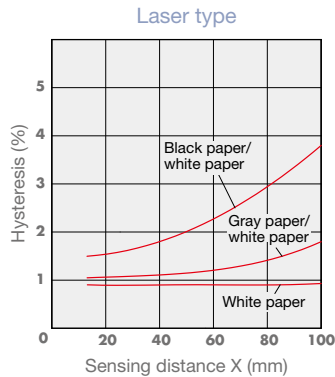


Ideal for height difference detection using low hysteresis

Short-range type hysteresis $\leq 3\%$ (typical value)

A short-range type with a sensing distance of 100 mm that achieves a low hysteresis of $\leq 3\%$. Demonstrates its strength in small height difference detection.

*A mid-range type with a sensing distance of 300 mm that achieves a hysteresis of $\leq 5\%$.



Industry standard size

Mounting hole pitch: 25.4 mm

Features an industry standard pitch of 25.4 mm.



Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

BGS Sensors

BGS-HL, BGS-HDL

BGS-DL

BGS-ZL, BGS-Z

BGS-ZM

BGS-S, BGS-2S

BGS

BGS-DL (potentiometer type)

Laser, standard type **BGS-ZL, BGS-Z** series

Specifications

Type		Short-range type (laser)	Mid-range type (laser)	Short-range type (LED)	Mid-range type (LED)	
Model	NPN	Cable type	BGS-ZL10N	BGS-ZL30N	BGS-Z10N	BGS-Z30N
		Connector type	BGS-ZL10CN	BGS-ZL30CN	BGS-Z10CN	BGS-Z30CN
	PNP	Cable type	BGS-ZL10P	BGS-ZL30P	BGS-Z10P	BGS-Z30P
		Connector type	BGS-ZL10CP	BGS-ZL30CP	BGS-Z10CP	BGS-Z30CP
Sensing distance		5 to 100 mm ¹	10 to 300 mm ¹	5 to 100 mm ¹	10 to 300 mm ¹	
Adjustable distance range		20 to 100 mm ¹	50 to 300 mm ¹	20 to 100 mm ¹	50 to 300 mm ¹	
Light source		Red semiconductor laser Class 1 (IEC/JIS) ² Wavelength: 650 nm, Maximum output: 3.5 mW		Red LED		
Spot size (focal length)		Approx. ø1 mm ³ Distance: 100 mm (at normal temperatures)	Approx. ø1.5 mm ³ Distance: 300 mm (at normal temperatures)	Approx. ø10 mm Distance: 100 mm	Approx. ø30 mm Distance: 300 mm	
Response time		250 µs or less		500 µs or less		
Hysteresis		3%	5%	3%	5%	
Distance adjustment		4-turn endless potentiometer				
Indicators		Output indicator (orange) Laser emission indicator (green)		Output indicator (orange) Stability indicator (green)		
Control output		NPN/PNP type open collector Max. 100 mA/30 VDC				
Output mode		Light ON / Dark ON selectable				
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	30 mA or less				
Applicable regulations		EMC directive (2004/108/EC) / FDA regulations (21 CFR 1040.10)		EMC directive (2004/108/EC)		
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)		-25 to +55°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 ²); 3 times in each of the X, Y, and Z directions		Approx. 100 G (1000 m/s ²); 3 times in each of the X, Y, and Z directions		
Degree of protection		IP67				
Material		Housing: ABS (glass fiber filled), Front cover: PMMA				
Weight without cable		Approx. 10 g				
Included accessories		Mounting bracket: BEF-W100-B ⁴				

*1. Using a 100 × 100 mm white sheet of paper.

*2. Classified as Class II in the US FDA standards.

*3. Defined with center strength 1/e² (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.

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

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

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

BGS Sensors

BGS-HL, BGS-HDL

BGS-DL

BGS-ZL, BGS-Z

BGS-ZM

BGS-S, BGS-2S

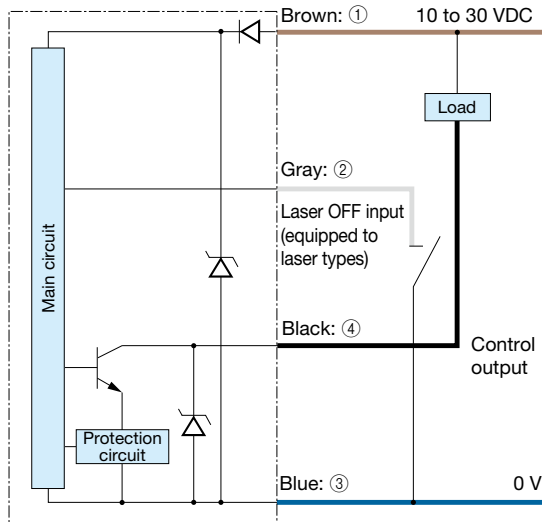
BGS

BGS-DL (potentiometer type)

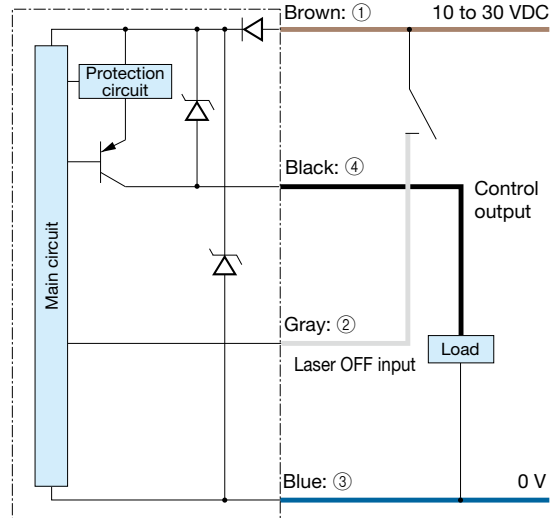
I/O circuit diagram

Laser type: BGS-ZL10□/BGS-ZL30□

■ NPN output type



■ PNP output type



■ Connector type

(Pin configuration) Sensor side Connector cable side



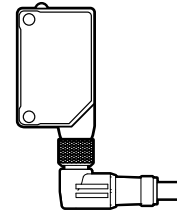
- ① 10 to 30 VDC
- ② Laser OFF input (laser type only)
- ③ 0 V
- ④ Control output

Connecting

- ① to ④ are connector pin No.

Notes

- Connect frame ground to the earth when the switching regulator is used for power supply.
- Because wiring sensor wires with high-voltage wires or power supply wires can result in malfunctions due to noise, which can cause damage, make sure to wire separately.
- 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.



Laser light precautions

This product emits a Class 1 (II) visible laser beam that is compliant with IEC/JIS, FDA laser safety standards.

Warning and explanation labels are affixed to the sides of the sensor.

**CLASS 1
LASER PRODUCT**

Warning Do not look directly at the laser or intentionally shine the laser beam in another person's eyes.

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Specialized Photoelectric Sensors

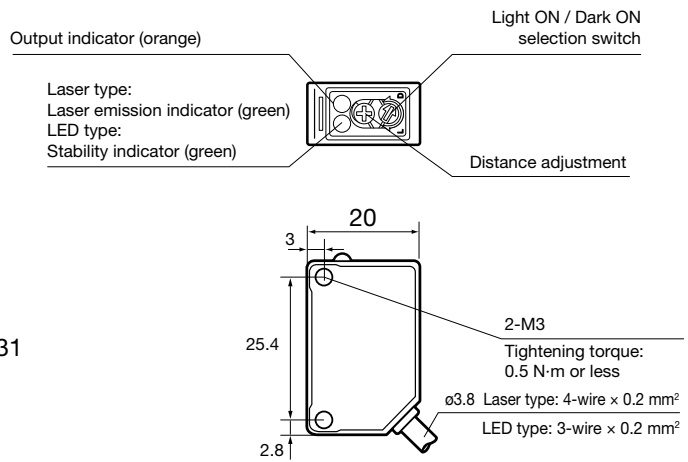
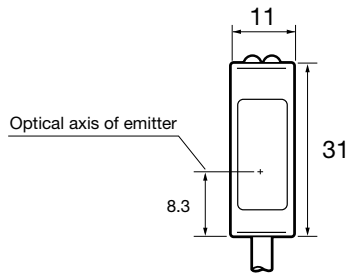
Laser, standard type BGS-ZL, BGS-Z series

Dimensions

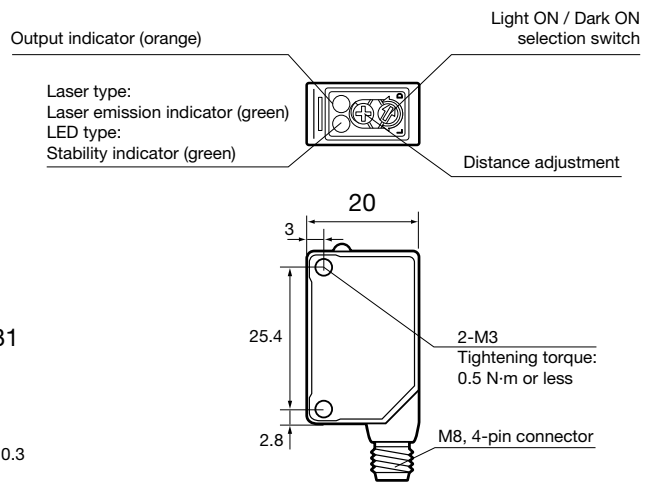
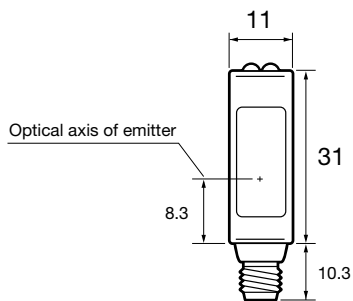
Sensor

■ Cable type

(Unit: mm)

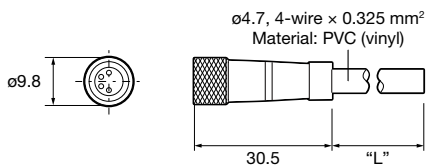


■ Connector type

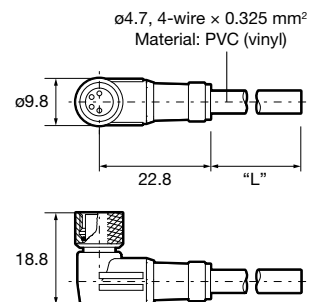


Connector cable (optional)

■ JCN-S, JCN-5S, JCN-10S



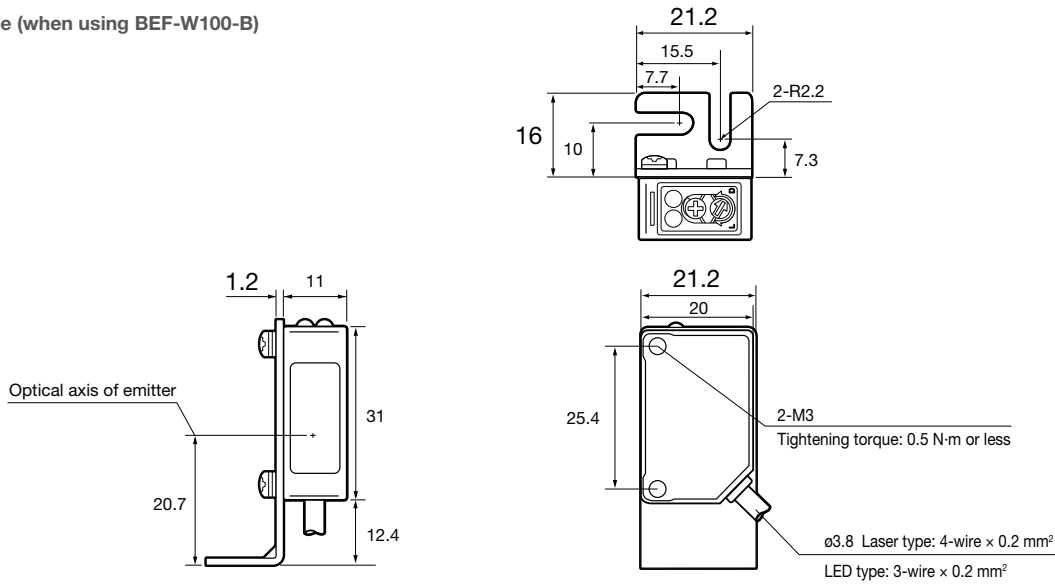
■ JCN-L, JCN-5L, JCN-10L



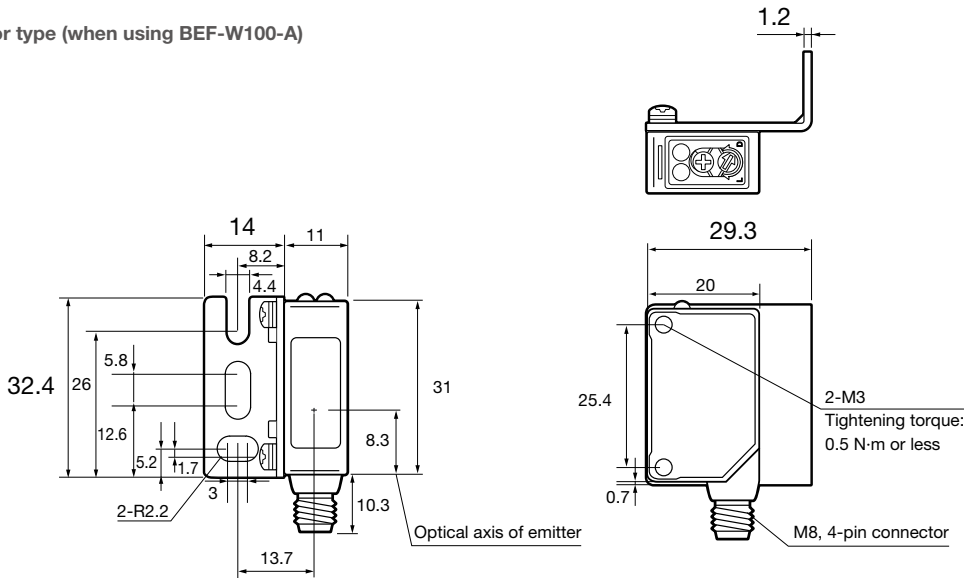
Mounting bracket

■ Cable type (when using BEF-W100-B)

(Unit: mm)



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



Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

BGS Sensors

BGS-HL, BGS-HDL

BGS-DL

BGS-ZL, BGS-Z

BGS-ZM

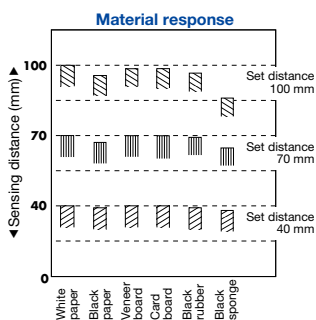
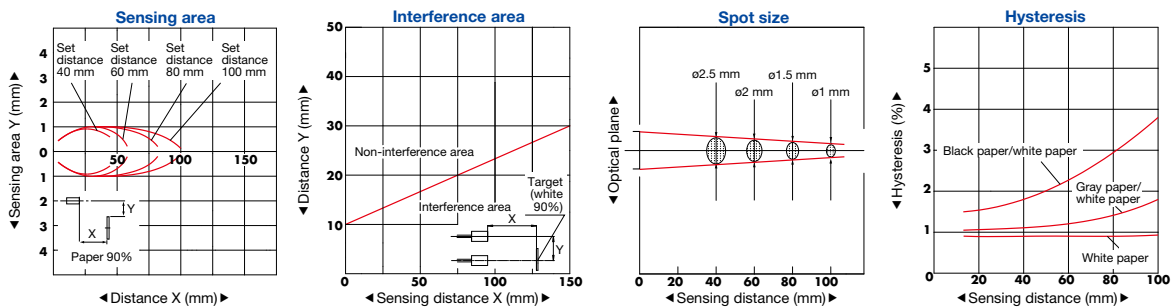
BGS-S, BGS-2S

BGS

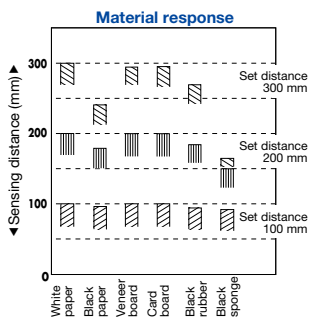
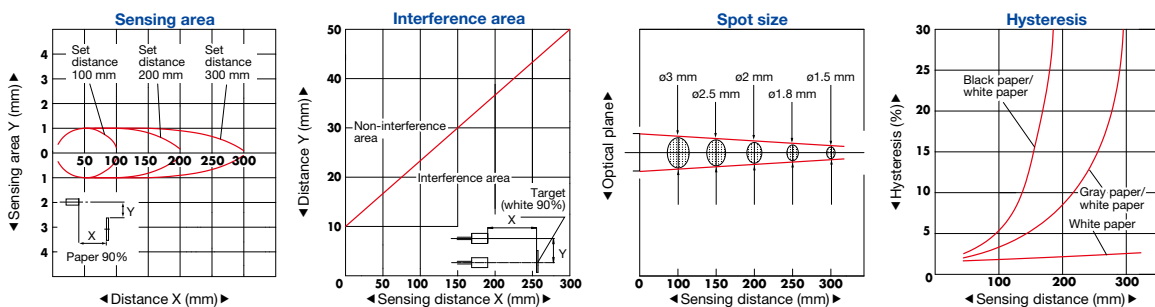
BGS-DL (potentiometer type)

Typical characteristic data

BGS-ZL10 Laser type



BGS-ZL30 Laser type



Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

BGS Sensors

BGS-HL, BGS-HDL

BGS-DL

BGS-ZL, BGS-Z

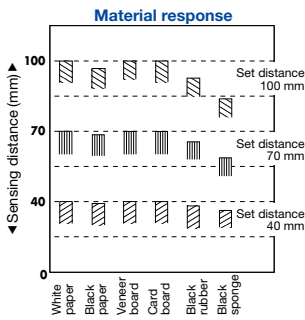
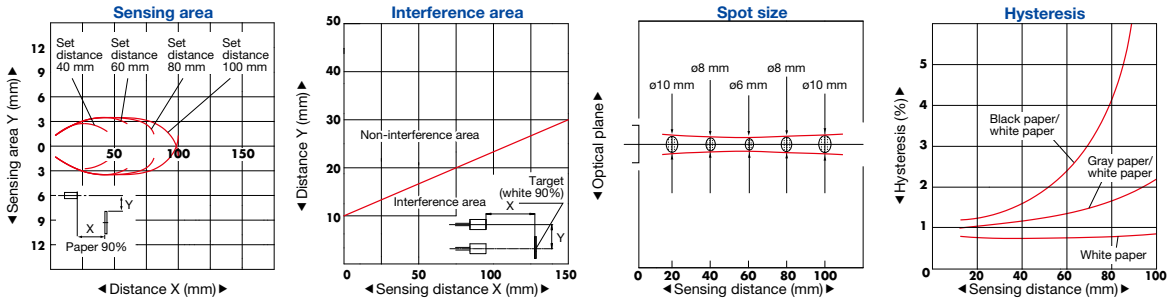
BGS-ZM

BGS-S, BGS-2S

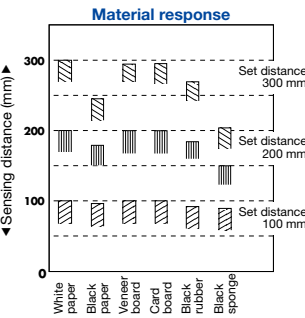
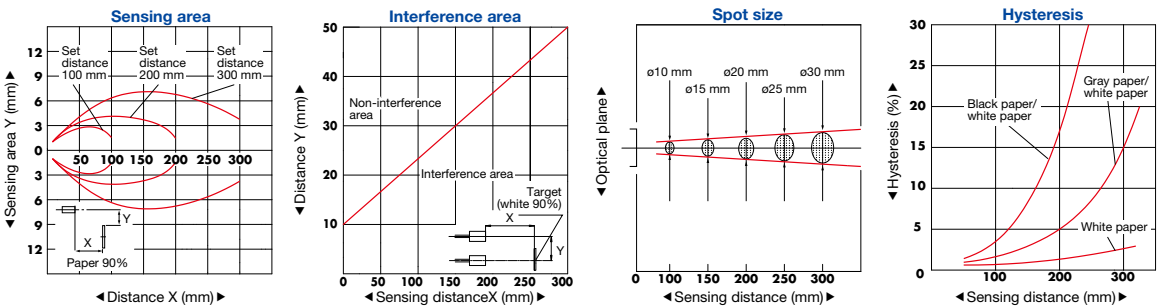
BGS

BGS-DL (potentiometer type)

BGS-Z10 LED type



BGS-Z30 LED type



Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

BGS Sensors

BGS-HL, BGS-HDL

BGS-DL

BGS-ZL, BGS-Z

BGS-ZM

BGS-S, BGS-2S

BGS

BGS-DL (potentiometer type)