

158

Stainless steel housing type

Z-M series



Excellent water resistance/oil resistance! Suitable for automobiles, machine tools and food industry

- | Longest sensing distance in the class!
- | Employs a low deterioration 4 element red LED for the light source
- | Degree of protection: IP69K (cable type), Equivalent to IP67g (connector type)

Related products

BGS type

BGS-ZM
● P.334



Laser type

Z-L
● P.272



General-purpose type

Z3
● P.148

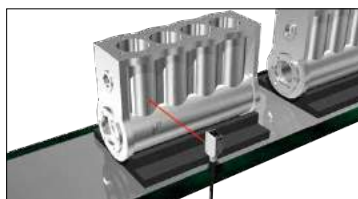


Selection table

	Type	Shape	Sensing distance (Adjustable distance range shown in parentheses)	Degree of protection	Model	
					NPN type	PNP type
Cable type	Through-beam type		30 m	IP67 IP69K*	ZT-M3000N	ZT-M3000P
	Retro-reflective type		0.01 to 5.5 m		ZR-M550N	ZR-M550P
	Diffuse-reflective type		0 to 800 mm		ZD-M80N	ZD-M80P
	BGS		10 to 100 mm (20 to 100 mm)		BGS-ZM10N ● P.334	BGS-ZM10P ● P.334
			10 to 300 mm (20 to 300 mm)		BGS-ZM30N ● P.334	BGS-ZM30P ● P.334
Connector type	Through-beam type		30 m	IP67 Equivalent to IP67g*	ZT-M3000CN4	ZT-M3000CP4
	Retro-reflective type		0.01 to 5.5 m		ZR-M550CN4	ZR-M550CP4
	Diffuse-reflective type		0 to 800 mm		ZD-M80CN4	ZD-M80CP4
	BGS		10 to 100 mm (20 to 100 mm)		BGS-ZM10CN4 ● P.334	BGS-ZM10CP4 ● P.334
			10 to 300 mm (20 to 300 mm)		BGS-ZM30CN4 ● P.334	BGS-ZM30CP4 ● P.334

● For the connector type, please purchase an optional oil resistant connector cable. ● For the BGS type, please refer to P.334. *Reflector degree of protection is IP67.

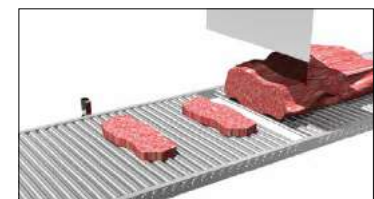
Engine block detection



Drill breakage on NC machine



For meat/fresh food lines (cable type)



Tough against oil and coolant! Cost effective sensor with excellent oil resistance



Connector type features oil resistance of equivalent to IP67g



PPSU is used for the front window!

*Excluding the retro-reflective type

The through-beam type and diffuse-reflective type are the only in the industry in which a PPSU (polyphenylsulfone resin) material is used. This material has superior oil resistant properties to the PMMA (acrylic resin) materials often used in the industry.

Connector cable: PUR (polyurethane)

A PUR (polyurethane) material with excellent oil resistance is used for the connector type cable. A PVC (polyvinyl chloride) material with excellent chemical resistance is used for the cable type cable.



Top cover: PES (polyether sulfone)

Excellent resistance against oil and cleaning solutions.

Switch and Potentiometer: PEEK (polyether ether ketone)

Features excellent shock resistance, wear resistance, and chemical resistance and is ideal for cutting, etc.

Housing: SUS316L

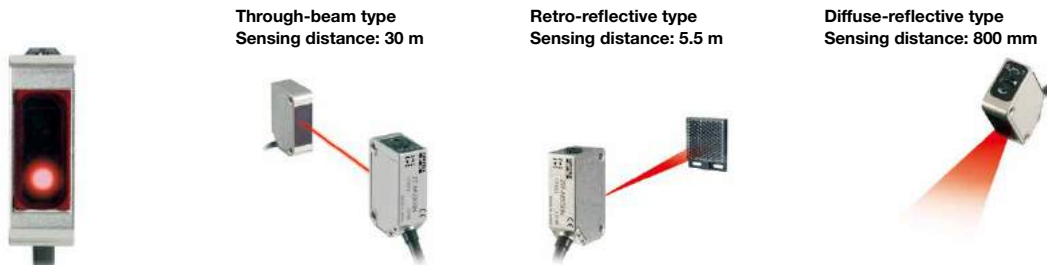
Excellent corrosion-resistance to chemicals.

Employs a newly developed high-brightness 4 element LED

Longest sensing distance in the class!

Equipped with a newly developed 4 element red LED light source. In addition to minimizing the decreases in emitted light that occur over time, it features a through-beam type sensor with a longest-in-class 30 m sensing distance! Not only is detection over long distances possible, but it is also tolerant against dust and fine particles.

High brightness 4 element red LED



Degree of protection of cable type is IP69K

Achieved a degree of protection on IP66 that is tough against humidity, water, steam cleaning, etc. Sensor features a tough design that doesn't break even when exposed to high-pressure washing on food processing machinery or when used in severe environments. Of course, it has also cleared IP67.

What is IP69K?

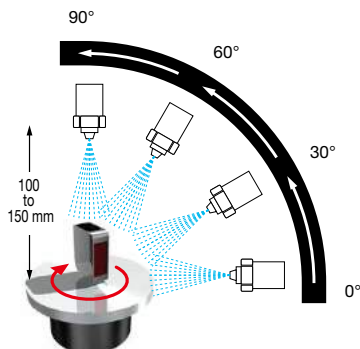
IP69K is a protection rating stipulated by German standard DIN40050 Part 9.

Test details:

Sensors are placed on a turntable and rotated 5 times per minute while being sprayed with water under the following conditions.

- Water pressure: 80 to 100 bar
- Flow rate: 14 to 16 l/m
- Water temperature: +80°C / -5°C
- Distance from spray nozzle: 100 to 150 mm
- Spray angle: 0°, 30°, 60°, 90°
- Spray time: 30 seconds at each angle

*IP69k does not guarantee operation under the above conditions. Water or oil that adhere to the optical surface could cause light to refract and prevent detection from being performed correctly.
*Excluding connector type and reflector.



Z3

Z-M

Z2

E

J

K

S

S2

C-R

C2

PLN

Stainless steel housing type **Z-M** series

Specifications

■ Cable type

Type		Through-beam type	Retro-reflective type	Diffuse-reflective type
Model	NPN type	ZT-M3000N	ZR-M550N	ZD-M80N
	PNP type	ZT-M3000P	ZR-M550P	ZD-M80P
Sensing distance		30 m	0.01 to 5.5 m ^{*1}	0 to 800 mm ^{*2}
Light source		4 element red LED		
Spot size		Approx. ø1200 mm (at distance of 30 m)	Approx. ø300 mm (at distance of 5.5 m)	Approx. ø40 mm (at distance of 800 mm)
Response time		500 µs or less		
Hysteresis		—	—	20% or less
Distance adjustment		1-turn potentiometer		
Indicators		Output indicator: orange LED, Stability indicator: green LED (no indicator equipped on through-beam type emitter)		
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 (ø4)		
Rating	Supply voltage	10 to 30 VDC, including 10% ripple (p-p)		
	Current consumption	Emitter/receiver: 15 mA or less	18 mA or less	18 mA or less
Applicable regulations		EMC directive (2004/108/EC)		
Applicable standards		EN 60947-5-2		
Company standards		Noise resistance: Feilen Level 3 cleared		
Environmental resistance	Ambient temperature/humidity	-25 to +55°C (no freezing) / 35 to 85% RH (no condensation)		
	Ambient illuminance	Sunlight: 10,000 lx or less Incandescent lamp: 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. 100 G (1000 m/s ²); 3 times in each of the X, Y, and Z directions		
Degree of protection	IP67	IP67	IP67	IP67
	DIN standard: IP69K	DIN standard: IP69K (IP67 for reflector)	DIN standard: IP69K	DIN standard: IP69K
Material	Housing: SUS316L Top cover: PES Front window: PPSU Switch, potentiometer: PEEK Cable: PVC Gasket: FKM	Housing: SUS316L Top cover: PES Front window: PMMA Switch, potentiometer: PEEK Cable: PVC Gasket: FKM	Housing: SUS316L Top cover: PES Front window: PPSU Switch, potentiometer: PEEK Cable: PVC Gasket: FKM	Housing: SUS316L Top cover: PES Front window: PPSU Switch, potentiometer: PEEK Cable: PVC Gasket: FKM
	Weight without cable			
Included accessories		Mounting bracket: BEF-W100-B	Mounting bracket: BEF-W100-B Reflector: V-61	Mounting bracket: BEF-W100-B

*1. With the V-61 reflector *2. Using a 200 × 200 mm white sheet of paper.

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

Options/Accessories

Reflector (Reflector degree of protection is IP67.)

Standard
(included with
retro-reflective type)**V-61**
60.9 × 50.9 mm
Sensing distance:
0.01 to 5.5 m

Small type

V-42
42 × 35 mm
Sensing distance:
0.015 to 4 m

Vertical type

P45A
54 × 12.4 mm
Sensing distance:
0.015 to 1.5 m

Protective mounting bracket

● Durable 2 mm thick
stainless steel type**LK series**
LK-S01**LK-S02**

■ Connector type

Type		Through-beam type	Retro-reflective type	Diffuse-reflective type
Model	NPN type	ZT-M3000CN4	ZR-M550CN4	ZD-M80CN4
	PNP type	ZT-M3000CP4	ZR-M550CP4	ZD-M80CP4
Sensing distance		30 m	0.01 to 5.5 m ⁻¹	0 to 800 mm ²
Light source		4 element red LED		
Spot size		Approx. ø1200 mm (at distance of 30 m)	Approx. ø300 mm (at distance of 5.5 m)	Approx. ø40 mm (at distance of 800 mm)
Response time		500 µs or less		
Hysteresis		—	—	20% or less
Distance adjustment		1-turn potentiometer		
Indicators		Output indicator: orange LED, Stability indicator: green LED (no indicator equipped on through-beam type emitter)		
Control output		NPN/PNP type Open collector Max. 100 mA/30 VDC		
Output mode		Light ON / Dark ON selection switch		
Connection type		Connector type: M8, 4-pin		
Rating	Supply voltage	10 to 30 VDC, including 10% ripple (p-p)		
	Current consumption	Emitter/receiver: 15 mA or less	18 mA or less	18 mA or less
Applicable regulations		EMC directive (2004/108/EC)		
Applicable standards		EN 60947-5-2		
Company standards		Noise resistance: Feilen Level 3 cleared		
Environmental resistance	Ambient temperature/humidity	-25 to +55°C (no freezing) / 35 to 85% RH (no condensation)		
	Ambient illuminance	Sunlight: 10,000 lx or less Incandescent lamp: 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. 100 G (1000 m/s ²); 3 times in each of the X, Y, and Z directions		
Degree of protection	IP67	IP67	IP67	IP67
	Company standards: Oil resistance (JEM standard: equivalent to IP67g)	Company standards: Oil resistance (JEM standard: equivalent to IP67g) (IP67 for reflector)	Company standards: Oil resistance (JEM standard: equivalent to IP67g)	Company standards: Oil resistance (JEM standard: equivalent to IP67g)
Material		Housing: SUS316L Top cover: PES Front window: PPSU Switch, potentiometer: PEEK Gasket: FKM	Housing: SUS316L Top cover: PES Front window: PMMA Switch, potentiometer: PEEK Gasket: FKM	Housing: SUS316L Top cover: PES Front window: PPSU Switch, potentiometer: PEEK Gasket: FKM
Weight without cable		Approx. 20 g		
Included accessories		Mounting bracket: BEF-W100-A	Mounting bracket: BEF-W100-A Reflector: V-61	Mounting bracket: BEF-W100-A

*1. With the V-61 reflector *2. Using a 200 × 200 mm white sheet of paper.

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

Options/Accessories

Oil resistant connector cables

Straight



- DOL-0804-G02MC**
Cable length: 2 m
- DOL-0804-G05MC**
Cable length: 5 m
- DOL-0804-G10MC**
Cable length: 10 m

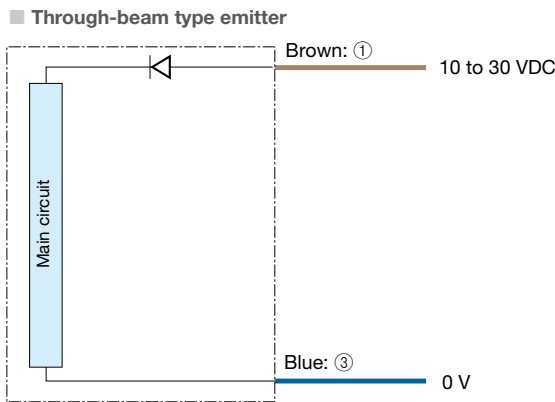
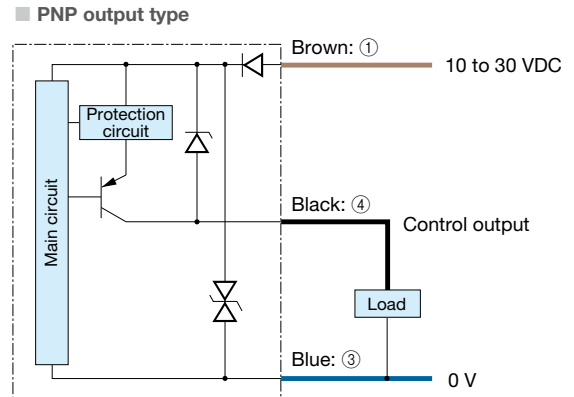
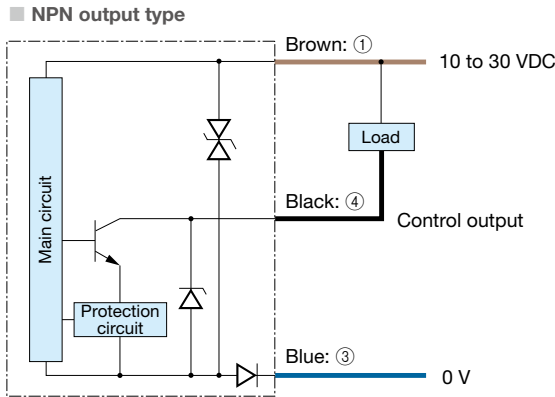
L-shaped



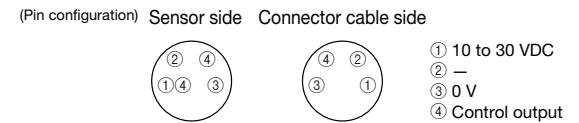
- DOL-0804-W02MC**
Cable length: 2 m
- DOL-0804-W05MC**
Cable length: 5 m
- DOL-0804-W10MC**
Cable length: 10 m

Stainless steel housing type Z-M series

Output circuit diagram



■ Connector type

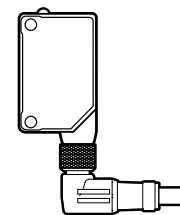


Connecting

■ ① to ④ are connector pin No.

Notes

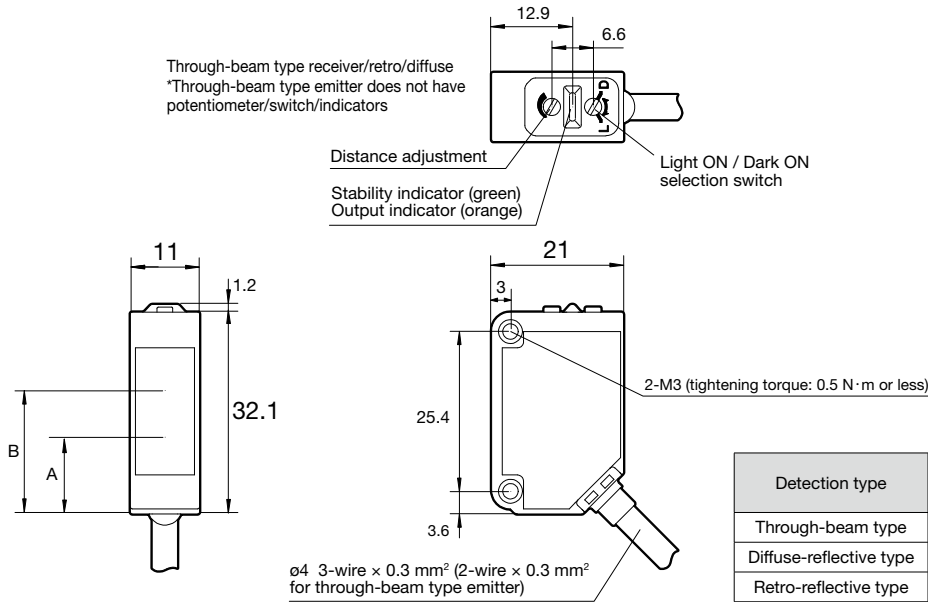
- When using a switching regulator for the power supply, be sure to ground the frame ground terminal.
- Because wiring sensor wires with high-voltage wires or power supply wires can result in malfunctions due to noise, which can cause damage, make sure to wire separately.
- Avoid using the transient 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. Be aware that rotation is not possible.



Dimensions

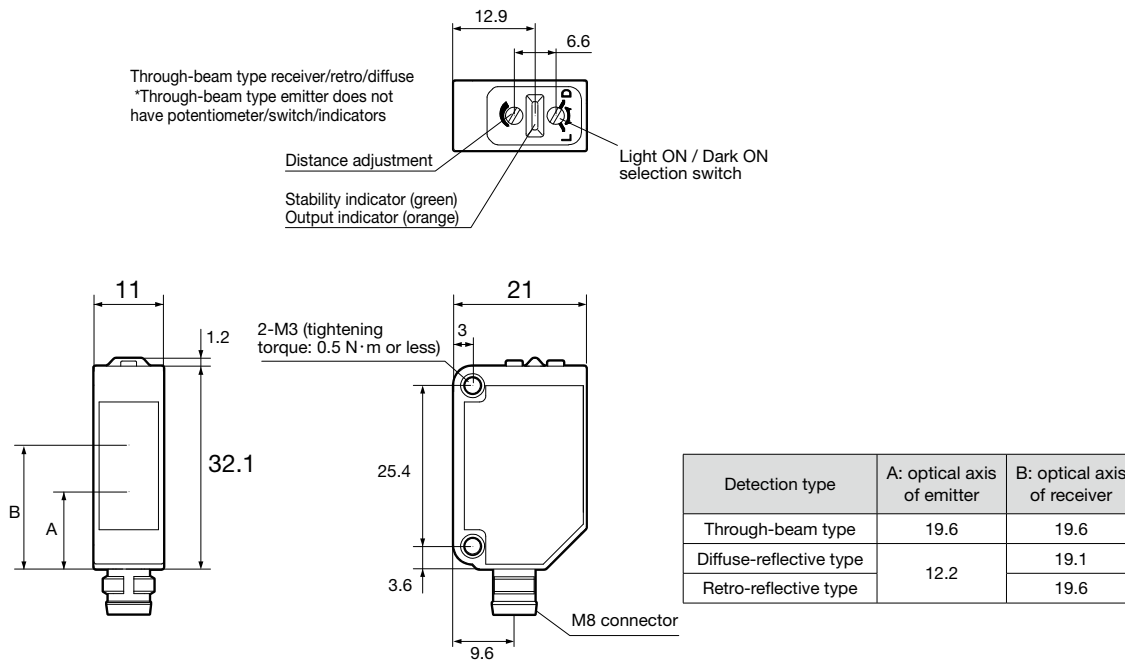
Cable type

(Unit: mm)



Detection type	A: optical axis of emitter	B: optical axis of receiver
Through-beam type	19.6	19.6
Diffuse-reflective type	12.2	19.1
Retro-reflective type		19.6

Connector type



Detection type	A: optical axis of emitter	B: optical axis of receiver
Through-beam type	19.6	19.6
Diffuse-reflective type	12.2	19.1
Retro-reflective type		19.6

Stainless steel housing type Z-M series

Dimensions

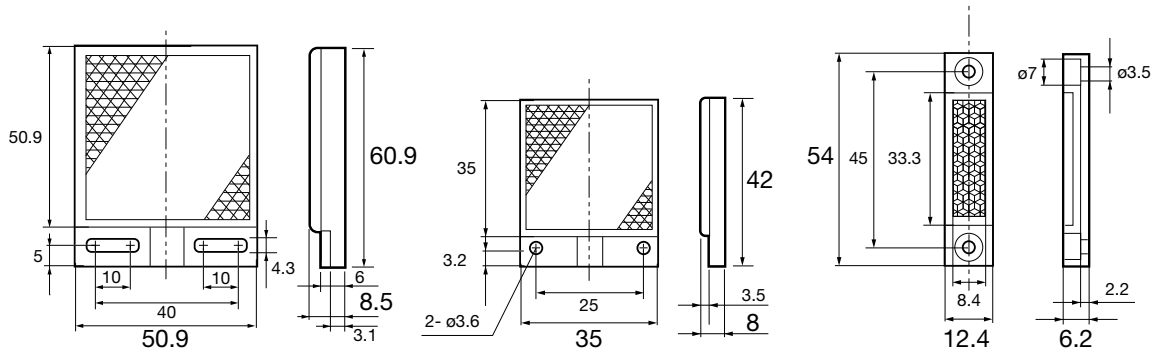
Reflector

(Unit: mm)

■ V-61: Standard type reflector (included with retro-reflective type)

■ V-42: Small reflector (optional)

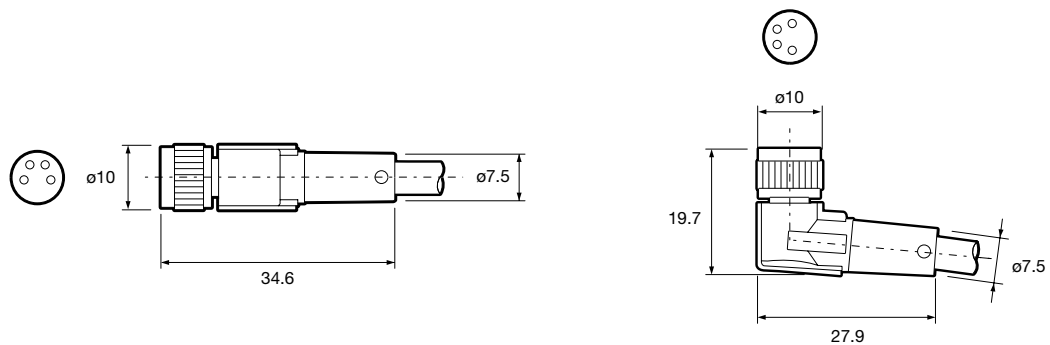
■ P45A: Vertical type reflector (optional)



Oil resistant connector cable (optional)

■ DOL-0804-G02MC
DOL-0804-G05MC
DOL-0804-G10MC

■ DOL-0804-W02MC
DOL-0804-W05MC
DOL-0804-W10MC

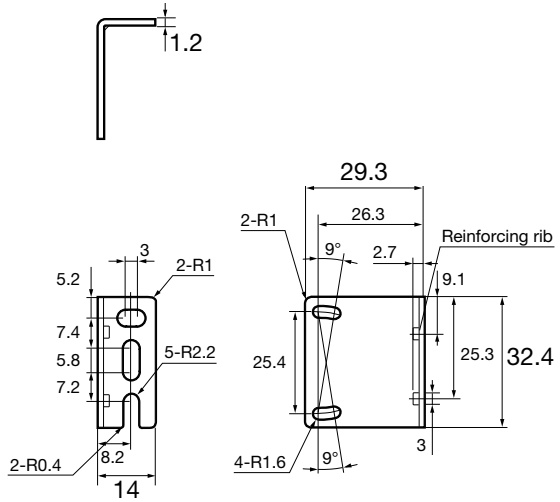
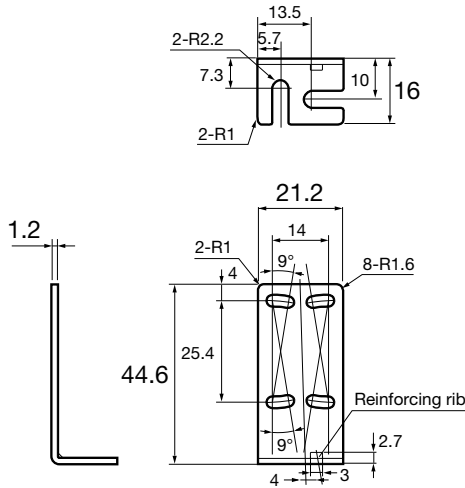


Mounting bracket

(Unit: mm)

■ BEF-W100-B (included with cable type)

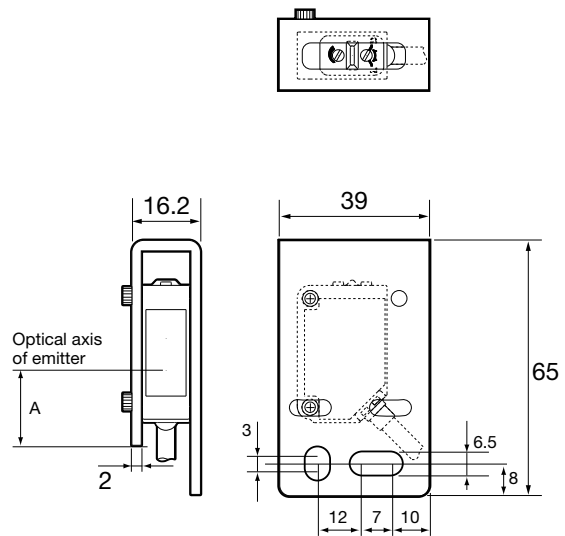
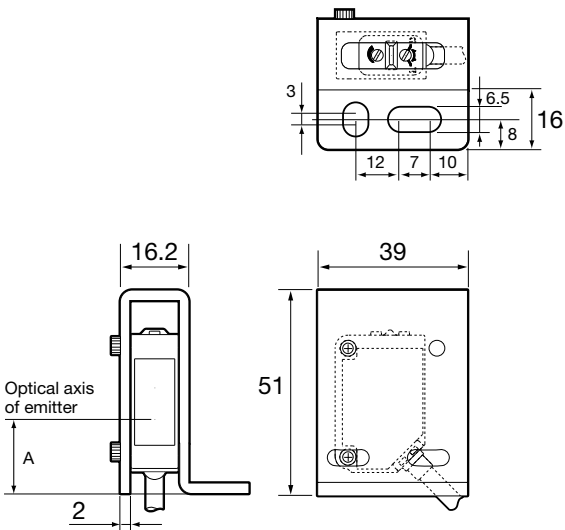
■ BEF-W100-A (included with connector type)



Protective mounting bracket (option for cable type)

■ LK-S01

■ LK-S02



Detection type	A: optical axis of emitter
Through-beam type	26.6
Diffuse-reflective type Retro-reflective type	19.2

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

Sensors with Built-in Amplifier

Z3

Z-M

Z2

E

J

K

S

S2

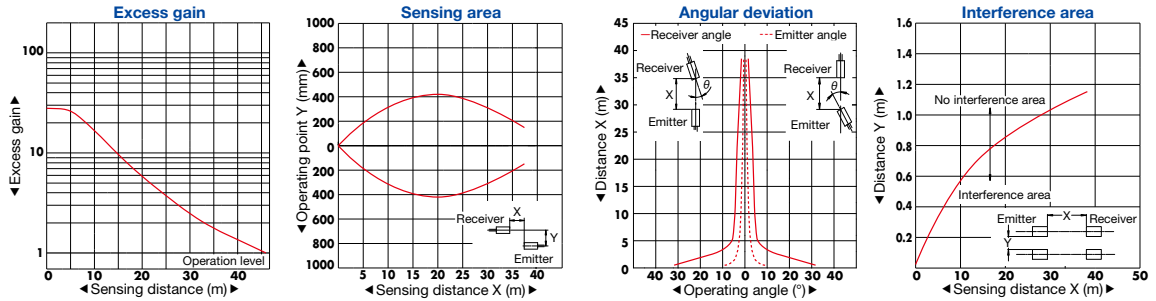
C-R

C2

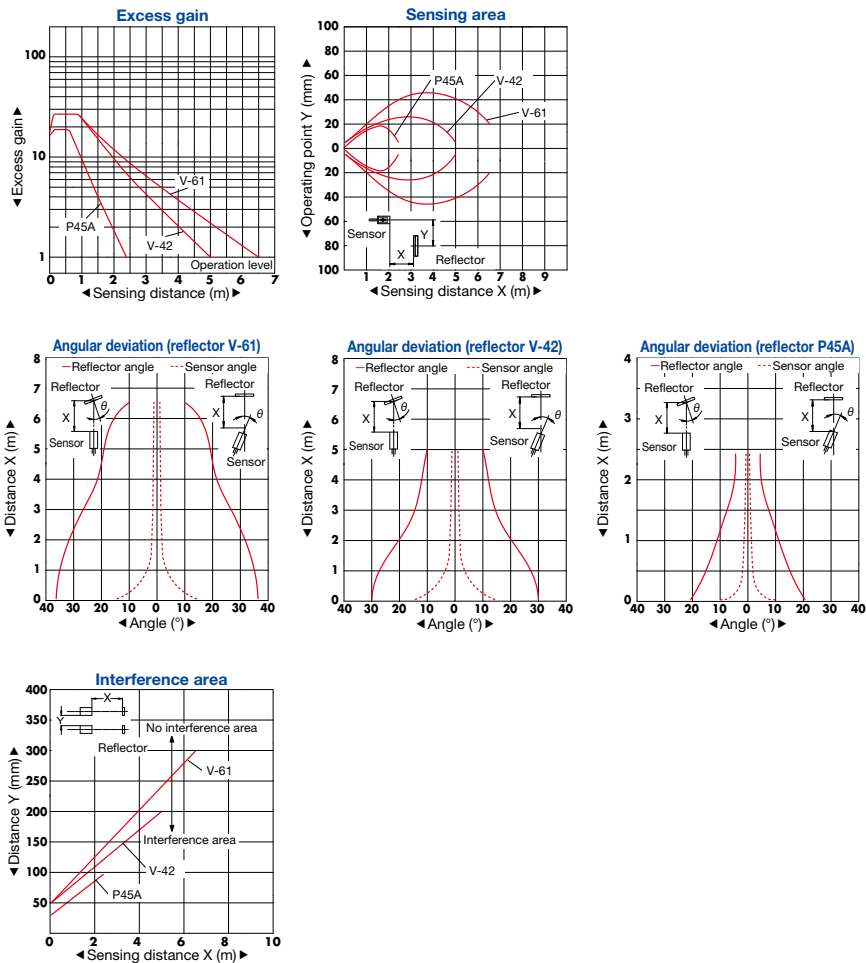
PLN

Typical characteristic data

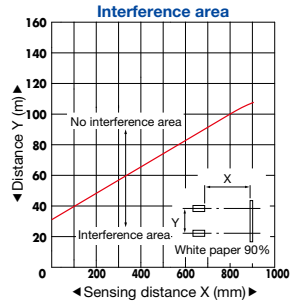
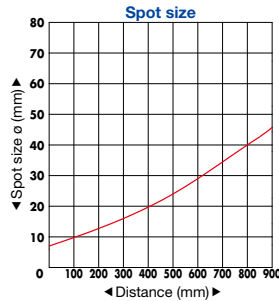
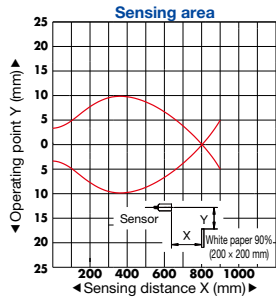
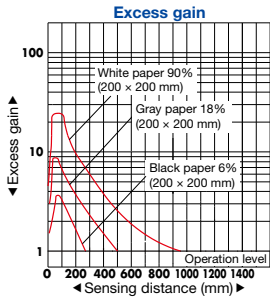
ZT-M3000



ZR-M550



ZD-M80



334

Stainless steel housing type
BGS-ZM series




**Excellent water resistance/
oil resistance!**
**Suitable for automobiles,
machine tools and food industry**

- | Equipped with a distance adjustment to enable distance setting
- | Employs a low deterioration 4 element red LED for the Light source
- | Degree of protection: IP69K (cable type), Equivalent to IP69g (connector type)

Related products


Through-beam/
diffuse reflective type
Z-M
● P.158




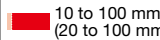

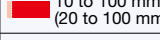

Laser type
BGS-ZL
● P.326



General-purpose type
Z3
● P.148



Selection table

Type	Shape	Sensing distance (Adjustable distance range shown in parentheses)	Degree of protection	Model	
				NPN type	PNP type
Cable type		 10 to 100 mm (20 to 100 mm)	IP67 IP69K	BGS-ZM10N	BGS-ZM10P
		 10 to 300 mm (20 to 300 mm)		BGS-ZM30N	BGS-ZM30P
Connector type		 10 to 100 mm (20 to 100 mm)	IP67 Equivalent to IP69g	BGS-ZM10CN4	BGS-ZM10CP4
		 10 to 300 mm (20 to 300 mm)		BGS-ZM30CN4	BGS-ZM30CP4

● For the connector type, please purchase an optional oil resistant connector cable.

Options/Accessories

Oil resistant connector cables

Straight



DOL-0804-G02MC
Cable length: 2 m
DOL-0804-G05MC
Cable length: 5 m
DOL-0804-G10MC
Cable length: 10 m

L-shaped



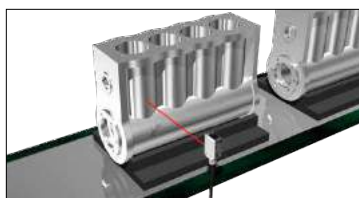
DOL-0804-W02MC
Cable length: 2 m
DOL-0804-W05MC
Cable length: 5 m
DOL-0804-W10MC
Cable length: 10 m

Protective mounting bracket

● Durable 2 mm thick stainless steel type
LK series



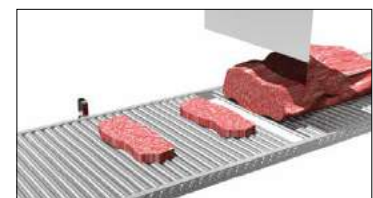
Engine block detection



Drill breakage on NC machine



For meat/fresh food lines (cable 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)

Features

Tough against oil and coolant! Cost effective sensor with excellent oil resistance



Connector type features oil resistance of equivalent to IP69g

Only in industry

PPSU is used for the front window!

*Excluding the retro-reflective type

The through-beam type and diffuse-reflective type are the only in the industry in which a PPSU (polyphenylsulfone resin) material is used. This material has superior oil resistant properties to the PMMA (acrylic resin) materials often used in the industry.

Connector cable: PUR (polyurethane)

A PUR (polyurethane) material with excellent oil resistance is used for the connector type cable. A PVC (polyvinyl chloride) material with excellent chemical resistance is used for the cable type cable.



Top cover: PES (polyether sulfone)

Excellent resistance against oil and cleaning solutions.

Switch & potentiometer: PEEK (polyether ether ketone)

Features excellent shock resistance, wear resistance, and chemical resistance and is ideal for cutting, etc.

Housing: SUS316L

Excellent resistance to corrosion caused by chemicals.

Equipped with distance adjustment Long-distance measurement is possible

Equipped with a distance adjustment, unusual for an oil-resistant/IP69K compliant BGS sensor. Because distance adjustments are performed using a potentiometer and not the sensor mounting position, time can be saved and designs can be made more flexible.



Equipped with 8-turn endless potentiometer to enable detailed distance settings

Employs a newly developed high-brightness 4 element LED High detection stability

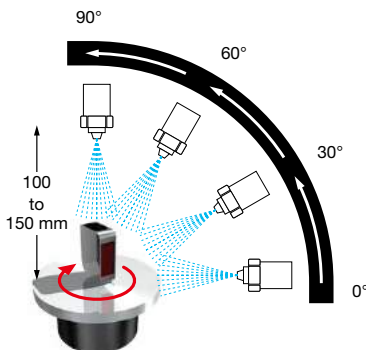
Equipped with a newly developed 4 element red LED Light source. In addition to minimizing the decreases in emitted light that occur over time, it is also tolerant against dust and fine particles.

High brightness 4 element red LED



Cable type features a degree of protection on IP69K

Achieved an IP69K degree of protection that is tough against humidity, water, steam cleaning, etc. Sensor features a tough design that doesn't break even when exposed to high-pressure washing on food processing machinery or when used in severe environments. Of course, it has also cleared IP67.



What is IP69K?

IP69K is a protection rating stipulated by German standard DIN40050 Part 9.

Test details:

Sensors are placed on a turntable and rotated 5 times per minute while being sprayed with water under the following conditions.

Water pressure:	80 to 100 bar
Flow rate:	14 to 16 l/m
Water temperature:	+80°C / -5°C
Distance from spray nozzle:	100 to 150 mm
Spray angle:	0°, 30°, 60°, 90°
Spray time:	30 seconds at each angle

*IP69K does not guarantee operation under the above conditions. Water or oil that adhere to the optical surface could cause light to refract and prevent detection from being performed correctly.

*Excluding connector type and reflector.

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)Stainless steel housing type **BGS-ZM** series

Specifications

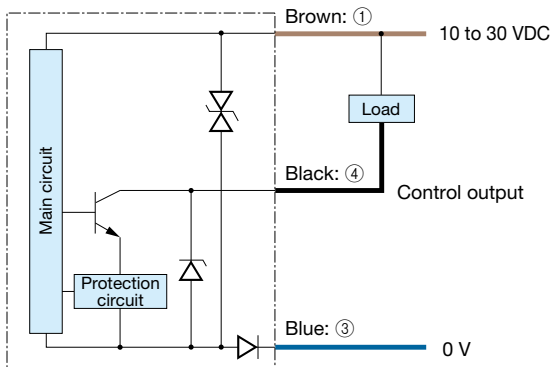
Type		BGS sensor			
		Cable type		Connector type	
Model	NPN type	BGS-ZM10N	BGS-ZM30N	BGS-ZM10CN4	BGS-ZM30CN4
	PNP type	BGS-ZM10P	BGS-ZM30P	BGS-ZM10CP4	BGS-ZM30CP4
Sensing distance*		10 to 100 mm	10 to 300 mm	10 to 100 mm	10 to 300 mm
Adjustable distance range†		20 to 100 mm	20 to 300 mm	20 to 100 mm	20 to 300 mm
Light source		4 element red LED			
Spot size (typical value)		Approx. ø6 mm (at a distance of 80 mm)	Approx. ø19 mm (at a distance of 250 mm)	Approx. ø6 mm (at a distance of 80 mm)	Approx. ø19 mm (at a distance of 250 mm)
Response time		500 µs or less			
Hysteresis (typical value)		3% or less	5% or less	3% or less	5% or less
Distance adjustment		8-turn endless potentiometer			
Indicators		Output indicator: orange LED, Stability indicator: green LED			
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 (ø4)		Connector type: M8, 4-pin	
Rating	Supply voltage	10 to 30 VDC, including 10% ripple (p-p)			
	Current consumption	28 mA or less			
Applicable regulations		EMC directive (2004/108/EC)			
Applicable standards		EN 60947-5-2			
Environmental resistance	Ambient temperature/humidity	-25 to +55°C (no freezing) / 35 to 85% RH (no condensation)			
	Ambient illuminance	Sunlight: 10,000 lx Incandescent lamp: 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. 100 G (1000 m/s ²); 3 times in each of the X, Y, and Z directions			
Degree of protection		IP67 DIN standard: IP69K		IP67 Company standards: Oil resistance (JEM standard: Equivalent to IP67g)	
		Housing: SUS316L Top cover: PES Front window: PPSU Switch, potentiometer: PEEK Cable: PVC Gasket: FKM		Housing: SUS316L Top cover: PES Front window: PPSU Switch, potentiometer: PEEK Gasket: FKM	
Weight without cable		Approx. 20 g			
Included accessories		Mounting bracket: BEF-W100-B		Mounting bracket: BEF-W100-A	

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

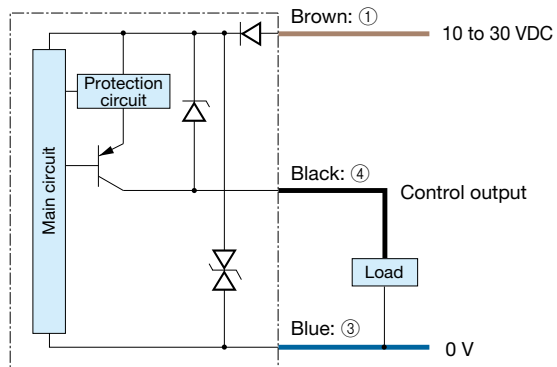
● Specifications are subject to change without prior notice for product improvement purposes.

Output circuit diagram

NPN output type

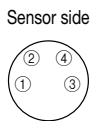


PNP output type



Connector type

(Pin configuration)



Connector cable side



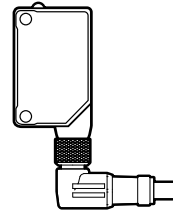
- ① 10 to 30 VDC
- ② —
- ③ 0 V
- ④ Control output

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.
- 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 below when you use L-shaped connector cable. Be aware that rotation is not possible.

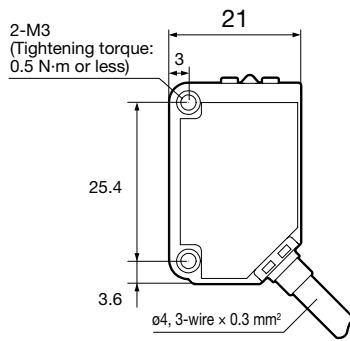
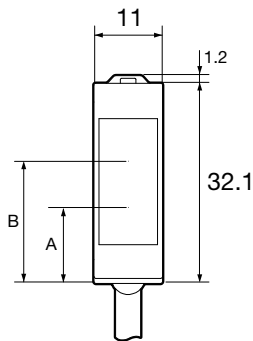
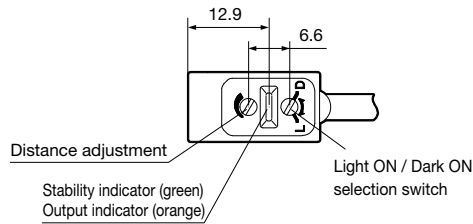


Stainless steel housing type **BGS-ZM** series

Dimensions

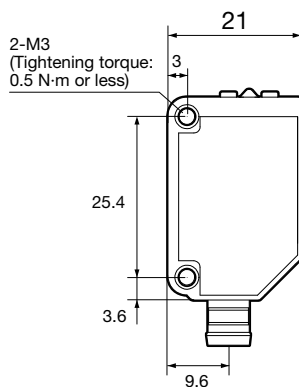
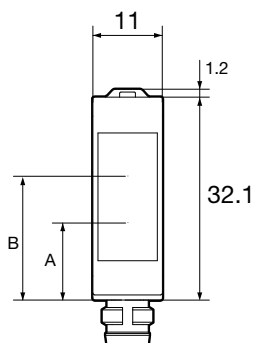
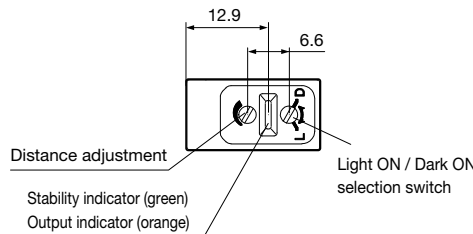
Cable type

(Unit: mm)



Model	A: optical axis of emitter	B: optical axis of receiver
BGS-ZM10	10.7	18.5 to 20.2
BGS-ZM30		18.5 to 20.5

Connector type



Model	A: optical axis of emitter	B: optical axis of receiver
BGS-ZM10	10.7	18.5 to 20.2
BGS-ZM30		18.5 to 20.5

Stainless steel housing type **BGS-ZM** series

(Unit: 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

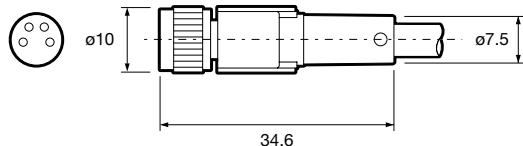
BGS

BGS-DL (potentiometer type)

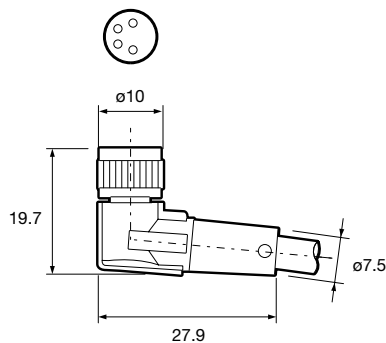
Dimensions

Connector cables

- DOL-0804-G02MC
- DOL-0804-G05MC
- DOL-0804-G10MC

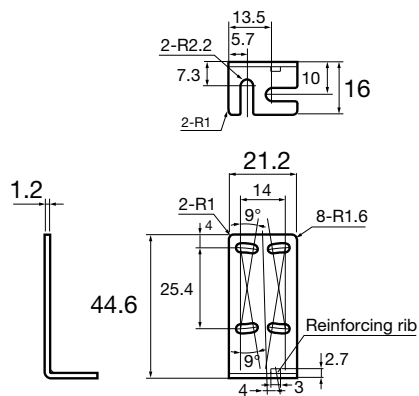


- DOL-0804-W02MC
- DOL-0804-W05MC
- DOL-0804-W10MC

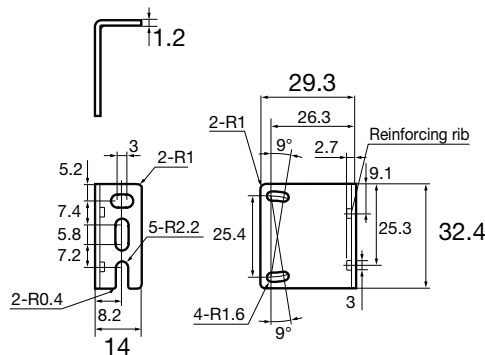


Mounting bracket

- BEF-W100-B (included with cable type)

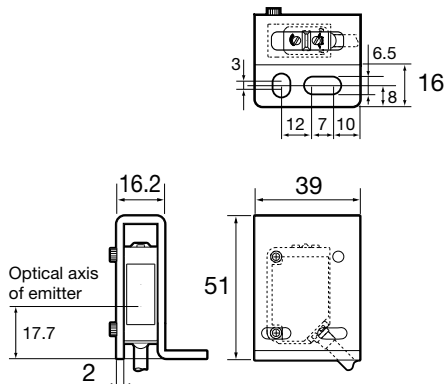


- BEF-W100-A (included with connector type)

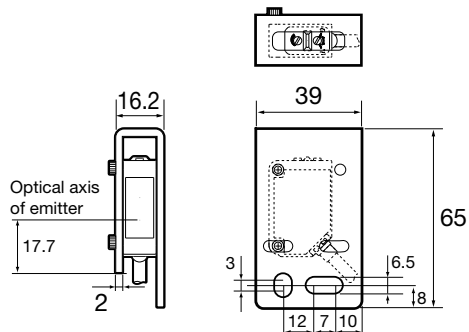


Protective mounting bracket

- LK-S01

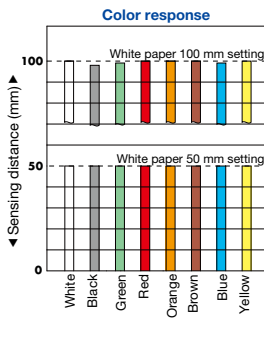
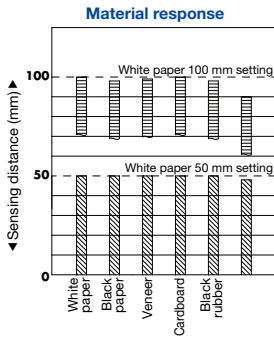
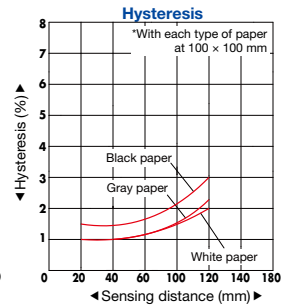
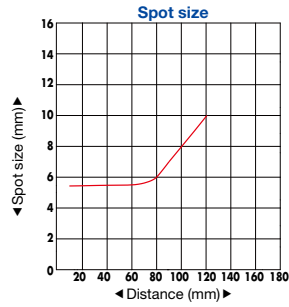
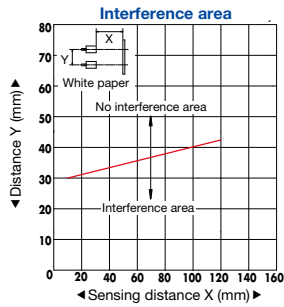
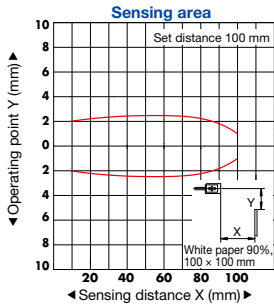


- LK-S02



Typical characteristic data

BGS-ZM10 □



Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

BGS Sensors

BGS-HL, BGS-HDL

BGS-DL

BGS-ZL, BGS-Z

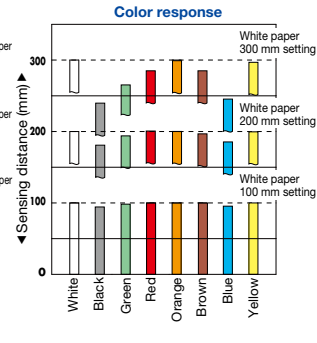
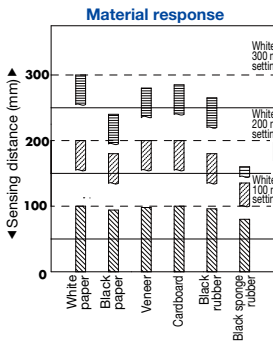
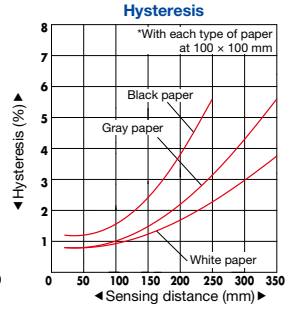
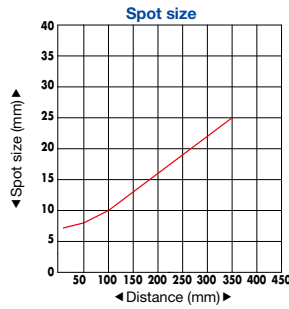
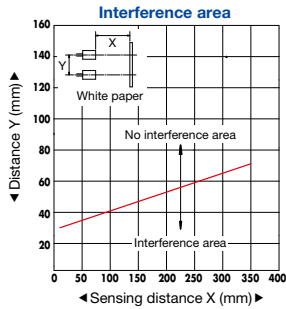
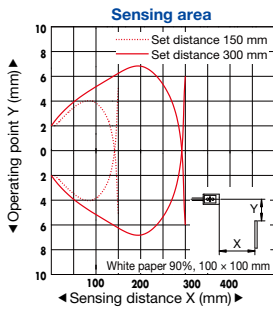
BGS-ZM

BGS-S, BGS-2S

BGS

BGS-DL (potentiometer type)

BGS-ZM30



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)