Standard elongated hole, small type
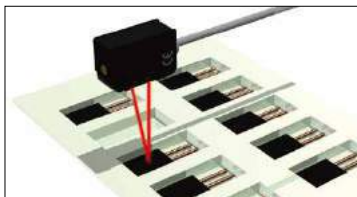
BGS-S series,
BGS-2S series

BGS-S

BGS-2S

CE

CE

Standard elongated hole type and small type BGS sensors

- **For locations with small mounting space**
- **For accurate detection of small workpieces**
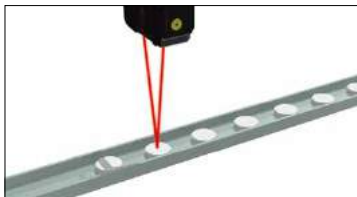- **High-speed response: 0.5 ms**

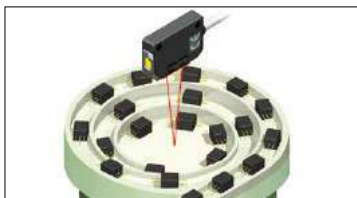| Related products	C-MOS laser **BGS-HL, BGS-HDL** ● P.310	Laser type **BGS-ZL** ● P.326	Stainless steel type **BGS-ZM** ● P.334

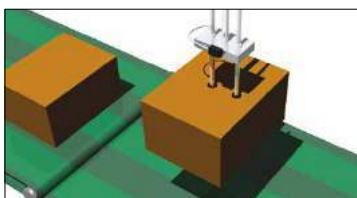**Detection of electronic parts in trays**

Detection of pills

Detection of remaining parts on parts feeder

Detection of objects held by manipulator

Selection table

Type	Shape	Sensing distance (Adjustable distance range shown in parentheses)	Model (Models in parentheses are connector types)	
			NPN type	**PNP type**
BGS		10 to 50 mm (10 to 30 mm)	**BGS-S03N**	**BGS-S03P**
		10 to 80 mm (10 to 80 mm)	**BGS-S08N** (BGS-S08CN)	**BGS-S08P** (BGS-S08CP)
		8 to 100 mm (20 to 100 mm)	**BGS-2S10N**	**BGS-2S10P**
		0 to 150 mm (50 to 150 mm)	**BGS-2S15N** (BGS-2S15CN)	**BGS-2S15P** (BGS-2S15CP)
		5 to 300 mm (25 to 300 mm)	**BGS-2S30N** (BGS-2S30CN)	**BGS-2S30P** (BGS-2S30CP)
		5 to 300 mm (25 to 300 mm)	**BGS-2S30NT**	**BGS-2S30PT**

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

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

Protective mounting bracket
For BGS-S03□, -S08□

LS-S01   LS-S02

Sensor stand
Sensor stand
(Image is for flat surface mounting)
PLN-1
Reflector mounting bracket for PLN-1
PLN-1M
PLN description
● P.242

For BGS-2S□□□

LS2-S01

OPTEX FA

Ramco National - Optex FA Sensors   www.Optex-Ramco.com   Got Questions? 1-800-280-6933

## Can be safely used in locations with small mounting space

Small type

BGS-S series is one of the smallest distance setting type photoelectric sensors.
BGS sensors can now be used in locations where only small-sized diffuse-reflective type photoelectric sensors could be used up to now.

For accurate detection of small workpieces

Small spot type (BGS-S03N)

BGS-S03N is equipped a very small light spot which helps to detect small objects like electronic components.
 (at distance of 30 mm)

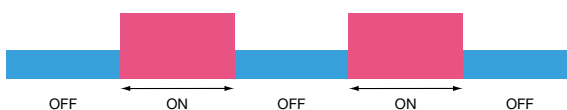ø1.5 mm

30 mm
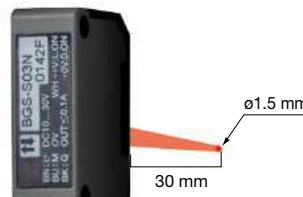
Prevention of chattering

Type with timer functions

The BGS-2S30NT is equipped with an OFF delay timer which can delay the time in which output is shut off by 0 to 100 ms. It is also effective when inputting to devices in which detecting signal slow.

Direct output

OFF | ON | OFF | ON | OFF

OFF delay output

OFF | ON | OFF | ON | OFF

OFF delay timer ▶

High-speed response

0.5 ms high-speed response type

This photoelectric sensor with built-in amplifier features a top level response time of 0.5 ms or less. This feature makes its use on high speed production lines possible.

For accurate detection of substrates

Substrate detection type (BGS-2S10N)

Features of this type include stable detection even if the substrate type is changed, as well as high repeat accuracy, even among models in the series.
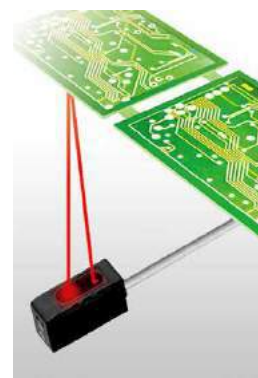
Water resistant structure

Degree of protection on IP67

All models in the BGS series conform to IP67 (protective resistance standard) and feature excellent dust and water resistance. It also conforms to CE standards and can be used in a wide range of locations.

Specialized Photoelectric Sensors

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)

OPTEX
F 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)

Standard elongated hole, small type BGS-S, BGS-2S series

Specifications

Type			Short-range (small spot)	Short-range
Model	NPN	Cable type	**BGS-S03N**	**BGS-S08N**
		Connector type	—	**BGS-S08CN**
	PNP	Cable type	**BGS-S03P**	**BGS-S08P**
		Connector type	—	**BGS-S08CP**
Sensing distance	White paper		10 to 50 mm	10 to 80 mm
	Gray paper		8 to 30 mm	10 to 80 mm
	Black paper		8 to 20 mm	10 to 70 mm
Light source			Red LED	
Response time			0.5 ms or less	
Repeat accuracy			Light axis direction: 0.1 mm Vertical direction: 0.3 mm	Light axis direction: 0.2 mm Vertical direction: 0.2 mm
Hysteresis			10% or less	
Distance adjustment			5-turn endless potentiometer	
Indicators			Output indicator (orange), Stability indicator (green)	
Control output			NPN/PNP type open collector Max. 100 mA/30 VDC	
Output mode			Light ON / Dark ON switched by wiring	
Connection type			Cable type: Length 2 m (ø3.5 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		20 mA or less	
Applicable regulations			EMC directive (2004/108/EC)	
Applicable standards			EN 60947-5-2	
Company standards			Noise resistance: Feilen Level 4 cleared	
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	
	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/s²), 3 times in each of the X, Y, and Z directions	
	Degree of protection		IEC standard, IP67	
Material			Housing: ABS (glass fiber filled, fire resistant), Front cover: Polycarbonate	
Weight without cable			Approx. 6 g	Approx. 9 g
Included accessories			Mounting bracket: BEF-W150-B	

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

Type			Short-range	Mid-range	Mid-range	Mid-range (with timer function)
Model	NPN	Cable type	BGS-2S10N	BGS-2S15N	BGS-2S30N	BGS-2S30NT
		Connector type	—	BGS-2S15CN	BGS-2S30CN	–
	PNP	Cable type	BGS-2S10P	BGS-2S15P	BGS-2S30P	BGS-2S30PT
		Connector type	—	BGS-2S15CP	BGS-2S30CP	–
Sensing distance	White paper		3 to 100 mm	0 to 150 mm	5 to 300 mm	5 to 300 mm
	Gray paper		8 to 100 mm	25 to 150 mm	10 to 300 mm	10 to 300 mm
	Black paper		15 to 90 mm	25 to 80 mm	15 to 200 mm	15 to 200 mm
Light source			Red LED			
Response time			0.5 ms or less			
Repeat accuracy			Light axis direction: 0.1 mm Vertical direction: 0.3 mm		Light axis direction: 2.5 mm Vertical direction: 0.6 mm	
Hysteresis			10% or less			
Distance adjustment			6-turn endless potentiometer			5-turn endless potentiometer
Timer function			—			OFF delay timer 0 to 100 ms (variable)
Indicators			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			Light ON / Dark ON switched by wiring
Connection type			Cable type: Cable length: 2 m ø3.8 mm Connector type: M8, 4-pin			Cable type: Length: 2 m ø3.5 mm
Insulation resistance			20 MΩ or more (with 500 VDC)			
Rating	Supply voltage		10 to 30 VDC, including 10% ripple (p-p)			
	Current consumption		30 mA or less			20 mA or less
Applicable regulations			EMC directive (2004/108/EC)			
Applicable standards			EN 60947-5-2			
Company standards			Noise resistance: Feilen Level 3 cleared			Noise resistance: Feilen Level 4 cleared
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			
	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/s²), 3 times in each of the X, Y, and Z directions			
	Degree of protection		IEC standard, IP67			
Material			Housing: ABS (glass fiber filled, fire resistant), Front cover: Polycarbonate			Housing: ABS (glass fiber filled, heat resistant) Front cover: Polycarbonate
Weight without cable			Approx. 6 g			Approx. 9 g
Included accessories			Mounting bracket: BEF-W140-B			

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

Standard elongated hole, small type **BGS-S, BGS-2S** series

Distance adjustment

Order	Diagram	Potentiometer	Light receiving indicator	Adjustment procedure
BGS				
1		A / SENS	ON	Set the object in the detection position and gradually raise the distance adjustment from the minimum to position A where the indicator will light up.
2		B / SENS	OFF	Remove the object and gradually lower the distance adjustment from the maximum to position B where the indicator will turn on.
3		A C B / SENS	ON	**Position C between positions A and B** is the optimal position for threshold. Positions A and B may be reversed depending on the model and the detection conditions. Place the workpiece in a fixed position and perform an operational check.

I/O circuit diagram

■ **NPN output type**

Brown: ①   10 to 30 VDC

Load

White: ②

Output mode input

Black: ④

Control output

Main circuit

Protection circuit

Blue: ③   0 V
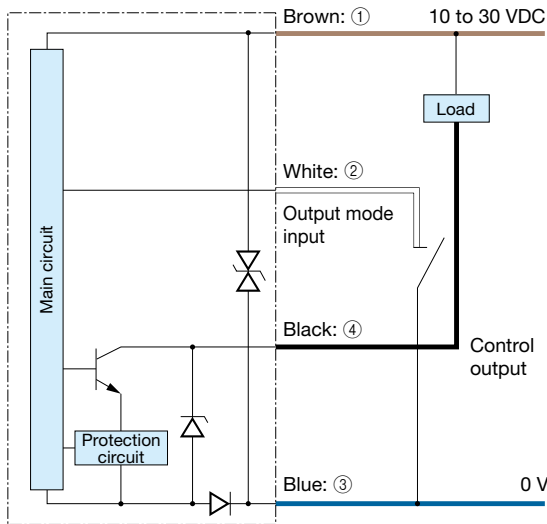
*White lead wire: ② is only equipped to BGS-S03☐, -S08☐, -2S30☐T

■ **PNP output type**

Brown: ①   10 to 30 VDC

Protection circuit

Black: ④

Control output

White: ②

Output mode input

Main circuit

Load

Blue: ③   0 V
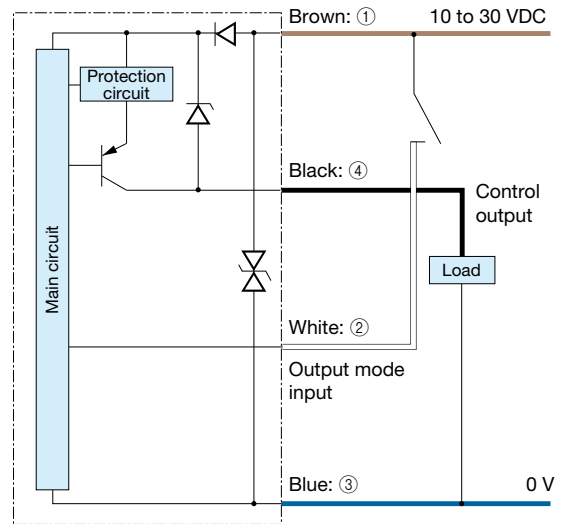
■ **Connector type**

(Pin configuration)

Sensor side   Connector cable side

② ④   ④ ②
① ③   ③ ①

① 10 to 30 VDC
② Not connected/+V: Light ON (NPN)
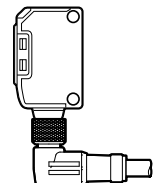   0 V: Dark ON
③ 0 V
④ Control output

*Pin No. ② is not used for BGS-2S10☐, -2S15☐, -2S30☐.

Connecting

■ Turns to Light ON mode when the white wire is connected to +V or not connected and to Dark ON mode when connected to 0 V (for NPN). To use without connecting, disconnect and wrap individually with insulating tape, etc. Do not connect it to any other terminal.

■ 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 (BGS-S03□, -S08□) (Unit: mm)

■ **Cable type**

Output indicator (orange)
Stability indicator (green)
Distance adjustment
7.5

10
8.3
ø5
Optical axis of receiver
3.3
3.3
10.7
Optical axis of emitter
ø3.5, 4-wire × 0.15 mm²
Cable length: 2 m

a
17.4
14.4
2.6
2-ø3.2
Tightening torque: 0.5 N·m or less
2.5
28
23
2.5
8

■ **Connector type**

Output indicator (orange)
Stability indicator (green)
Distance adjustment
7.5

10
8.3
ø5
Optical axis
of receiver
3.3
3.3
10.7
Optical axis
of emitter
10.2
M8, 4-pin connector

a
17.4
14.4
2.6
2-ø3.2
Tightening torque: 0.5 N·m or less
2.5
28
23
3.5
2.5
M8, 4-pin connector

	BGS-S08□	BGS-S03□
a	1	2.4

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)

Standard elongated hole, small type BGS-S, BGS-2S series

Dimensions

Mounting bracket (BGS-S03□, -S08□)   (Unit: mm)
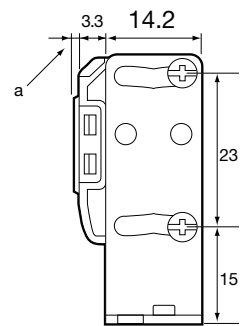
■ Cable type (when using included BEF-W150-B)

■ Connector type (when using optional BEF-W150-A)

	BGS-S08□	BGS-S03□
a	1	2.4

Sensor (BGS-2S□□□)

■ Cable type

(Unit: mm)

Output indicator (orange LED)

Light ON / Dark ON selection switch
(timer time adjustment potentiometer
in the case of models with a timer)

Stability indicator (green LED)

Distance adjustment

11

31

8.6

20

2.9

3

25.4

23

2.7

1

2.5

Mounting hole for M3 screw

ø3.8, 3-wire × 0.18 mm²
BGS-2S30NT only ø3.8, 4-wire × 0.18 mm²
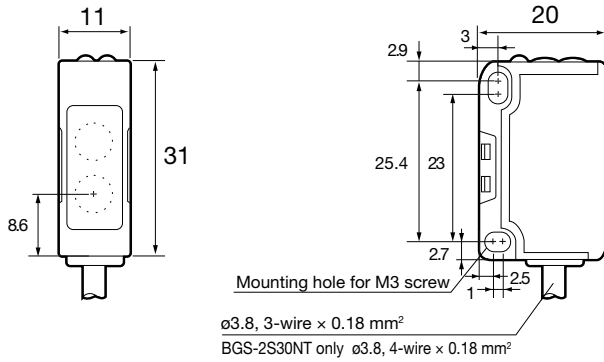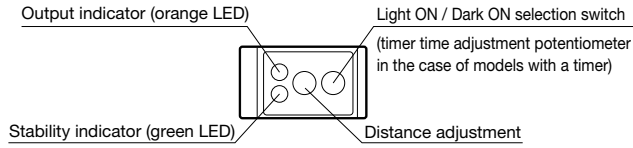
Mounting bracket (BGS-2S□□□)

■ Cable type
(when using included BEF-W140-B)

■ Connector type
(when using optional BEF-W140-A)
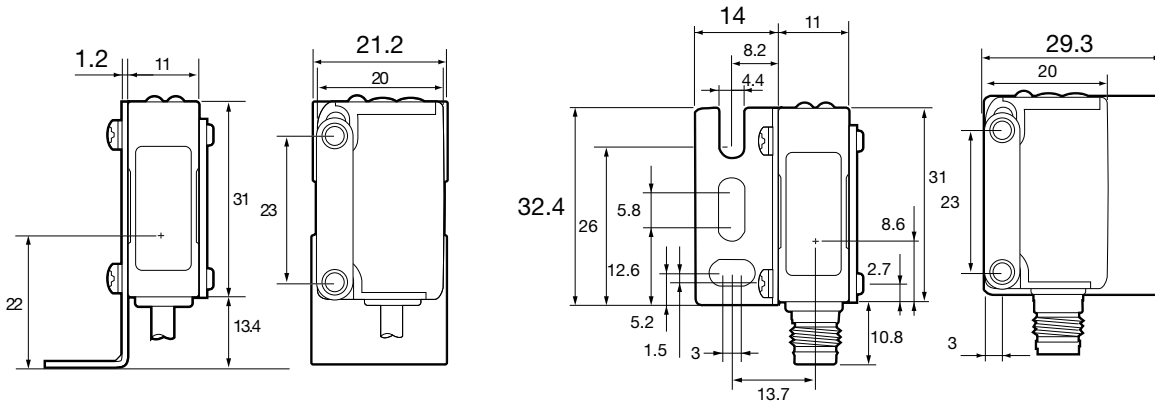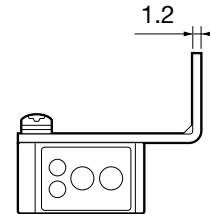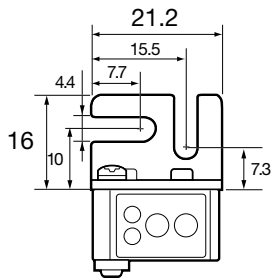
21.2

15.5

7.7

4.4

16

10

7.3

1.2

1.2

11

21.2

20

31

23

22

13.4

14

11

8.2

4.4

32.4

26

5.8

12.6
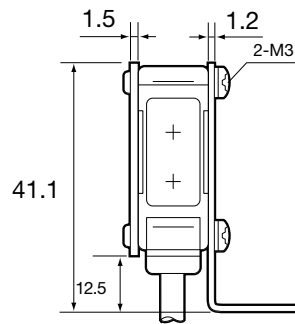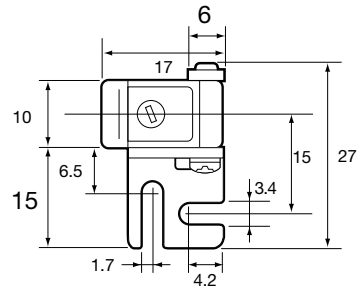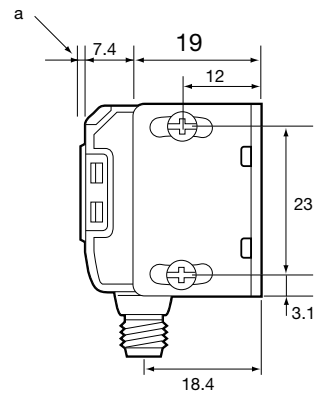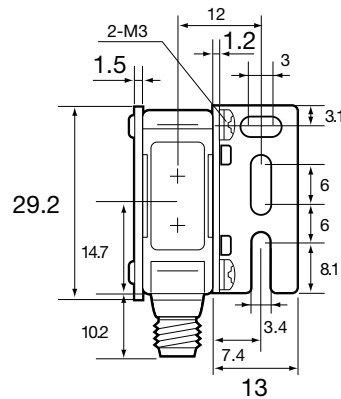
5.2

1.5

3

13.7

8.6

2.7

10.8

29.3

20

31

23

3

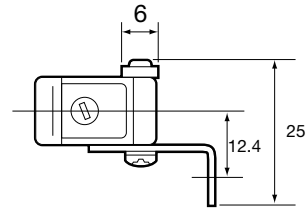## Standard elongated hole, small type **BGS-S, BGS-2S** series

| Dimensions

Connector cable (optional)

(Unit: mm)

■ **JCN-S, JCN-5S, JCN-10S**

■ **JCN-L, JCN-5L, JCN-10L**
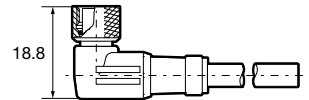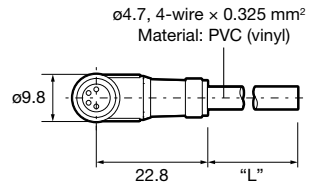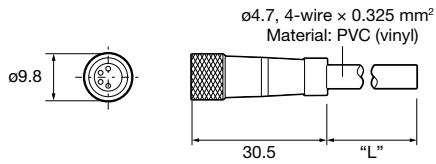
ø9.8

ø4.7, 4-wire × 0.325 mm²
Material: PVC (vinyl)

30.5   "L"

ø9.8

ø4.7, 4-wire × 0.325 mm²
Material: PVC (vinyl)

22.8   "L"

18.8

Typical characteristic data

* Please contact a sales representative for any other characteristic data that may be required.

BGS-S03☐, BGS-S08☐

— BGS-S03☐   — BGS-S08☐

Sensing area

Set distance 40 mm
Set distance 60 mm
Set distance 80 mm
Set distance 20 mm

◀Distance X (mm)▶
▲Sensing area Y (mm)

Interference area

No interference area
Interference area

◀Sensing distance X (mm)▶
▲Distance Y (mm)

Spot size

BGS-S03☐
ø4 mm ø2.5 mm ø1.5 mm ø1 mm ø1.5 mm

BGS-S08☐
ø3 mm ø4 mm ø6 mm ø8 mm   ø5 mm

◀Distance X (mm)▶
▼Optical plane

Hysteresis

White paper (reflection rate 90%)
Gray paper (reflection rate 18%)
Black paper (reflection rate 6%)

◀Sensing distance X (mm)▶
▲Hysteresis (%)

Color response (BGS-S03☐)

Set distance 30 mm
Set distance 20 mm
Set distance 10 mm

White Green Red Orange Brown Blue Yellow Black
▼Sensing distance (mm)

Color response (BGS-S08☐)

Set distance 80 mm
Set distance 60 mm
Set distance 40 mm
Set distance 20 mm
Set distance 10 mm

White Green Red Orange Brown Blue Yellow Black
▼Sensing distance (mm)

Material response (BGS-S03☐)

Set distance 30 mm
Set distance 20 mm
Set distance 10 mm

White paper Black paper Veneer board Cardboard Black rubber Black sponge rubber
▲Sensing distance (mm)

Material response (BGS-S08☐)

Set distance 80 mm
Set distance 60 mm
Set distance 40 mm
Set distance 20 mm
Set distance 10 mm

White paper Black paper Veneer board Cardboard Black rubber Black sponge rubber
▲Sensing distance (mm)

BGS-2S15☐, BGS-2S30☐

— BGS-2S15☐   — BGS-2S30☐

Sensing area

Set distance 150 mm
Set distance 250 mm
Set distance 100 mm
Set distance 200 mm
Set distance 300 mm
Set distance 20 mm
Set distance 150 mm
Set distance 150 mm
Set distance 150 mm

◀Distance X (mm)▶
▲Sensing area Y (mm)

Interference area

No interference area
Interference area
No interference area
Interference area

◀Sensing distance X (mm)▶
▲Distance Y (mm)

Spot size

BGS-2S15N
ø4 mm ø9 mm ø15 mm

BGS-2S30NT
ø4 mm ø7 mm ø12 mm ø9.5 mm ø14.5 mm ø17 mm
3°

◀Distance X (mm)▶
▼Optical plane

Hysteresis

White paper (reflection rate 90%)
Gray paper (reflection rate 18%)
Black paper (reflection rate 6%)

◀Sensing distance X (mm)▶
▲Hysteresis (%)

Color response (BGS-2S15☐)

Set distance 150 mm
Set distance 100 mm
Set distance 50 mm

White Green Red Orange Brown Blue Yellow Black
▼Sensing distance (mm)

Color response (BGS-2S30☐)

Set distance 300 mm
Set distance 250 mm
Set distance 200 mm
Set distance 150 mm
Set distance 100 mm
Set distance 50 mm

White Green Red Orange Brown Blue Yellow Black
▼Sensing distance (mm)

Material response (BGS-2S15☐)

Set distance 150 mm
Set distance 100 mm
Set distance 50 mm

White paper Black paper Veneer board Cardboard Black rubber Black sponge rubber
▲Sensing distance (mm)

Material response (BGS-2S30☐)

Set distance 300 mm
Set distance 250 mm
Set distance 200 mm
Set distance 150 mm
Set distance 100 mm
Set distance 50 mm

White paper Black paper Veneer board Cardboard Black rubber Black sponge rubber
▲Sensing distance (mm)

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

BGS Sensors

BGS-HL, BGS-HDL

BGS-DL

BGS-ZL, BGS-Z

BGS-ZM
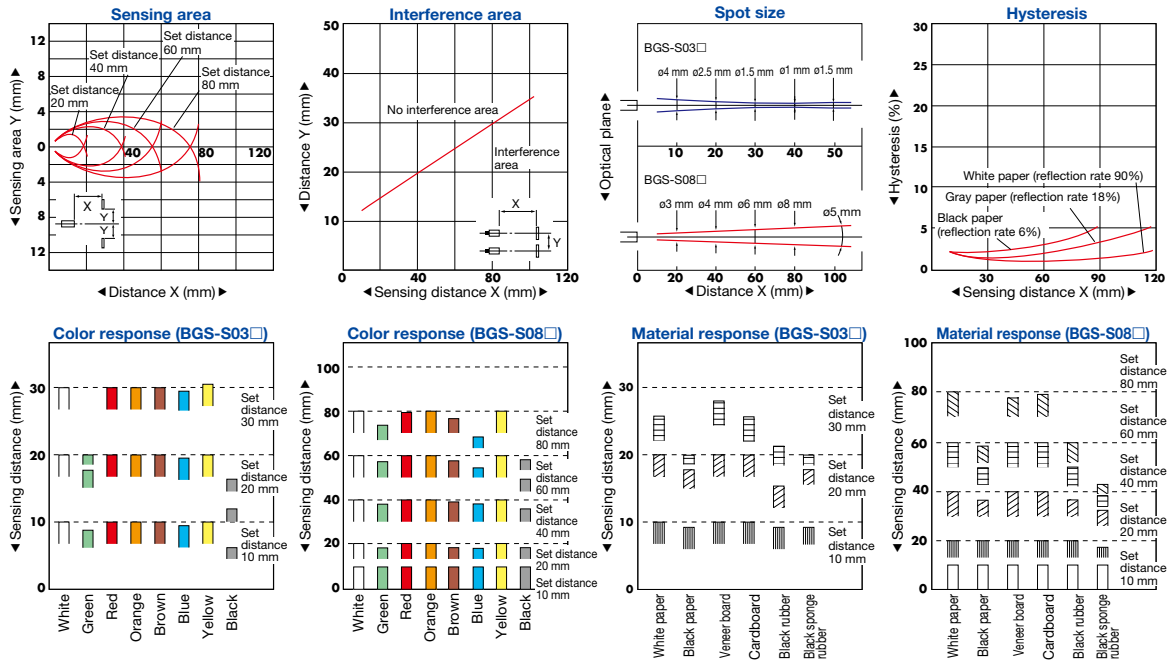
BGS-S, BGS-2S

BGS

BGS-DL (potentiometer type)