

High resolution BGS sensor

FASTUS BGS-HL Series

BGS-HL05T □
BGS-HL25T □□

Instruction manual

- Thank you for purchasing BGS-HL series. We hope you are satisfied with its performance.
- Please read this manual carefully and keep it for future reference.

Warning Indicates a possible hazard that may result in death, serious injury, WARNINGS or serious property damage if the product is used without observing the stated instructions.

Warning Mandatory Requirements

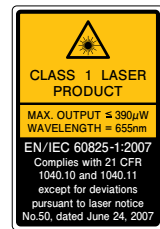
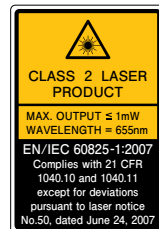
- The light source of this product applies the visible light semiconductor laser. Do not allow the laser beam to enter an eye, either directly or reflected from reflective object. If the laser beam enters an eye, it may cause blindness.
- This product is not an explosion proof construction. Do not use the product under flammable, explosive gas or liquid environment.
- Do not disassemble or modify the product since it is not designed to automatically stop the laser emission when open. Disassembling or modifying at customer's end it may cause personal injury, fire or electric shock.
- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Warning Safety Precautions

- It is dangerous to wire or attach/remove the connector while the power is on. Make sure to turn off the power before operation.
- Installing in the following places may result in malfunction:
 - A dusty or steamy place
 - A place generating corrosive gas
 - A place directly receiving scattering water or oil.
 - A place suffered from heavy vibration or impact.
- The product is not designed for outdoor use.
- Do not use the sensor in a transient state at power on (Approx. 2sec. Warm up period)
- Do not wire with the high voltage cable or the power lines. Failure to do this will cause malfunction by induction or damage.
- Do not use the product in water.
- Operate within the rated range.
- Wipe off dirt on the emitting/receiving parts to maintain correct detection. Also, avoid direct impact on the product.

Precautions for using laser

● Regulations in the USA
When exporting laser devices to the USA, the USA laser control, FDA (Food and Drug Administration) is applied. This product has been already reported to CDRH (Center for Devices and Radiological Health). For details, contact our customer service.



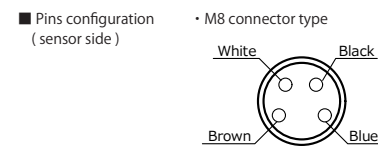
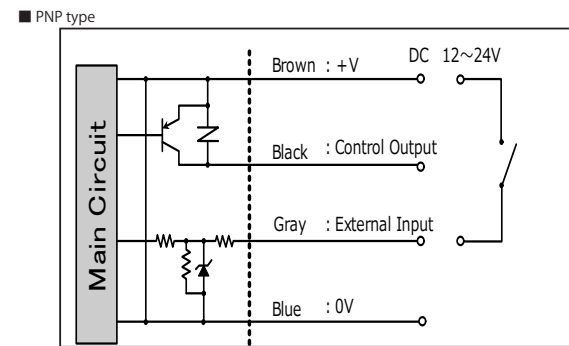
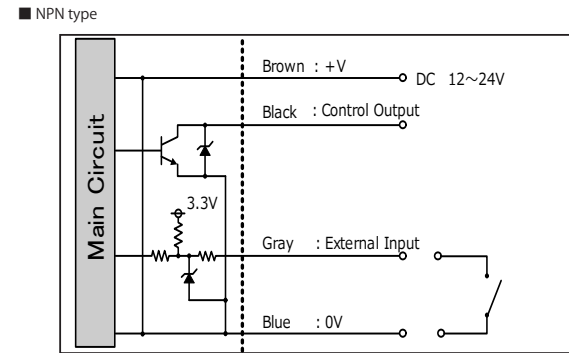
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No.50, dated June 24, 2007
OPTEX FA CO.,LTD.
37 Akihabara-cho, Chiyoda-ku, Tokyo 100-8515 JAPAN
Place of manufacture
OFFSHORE CO.,LTD.
Manufactured in

Bundled goods in the box

Please confirm following goods bundled in the box.

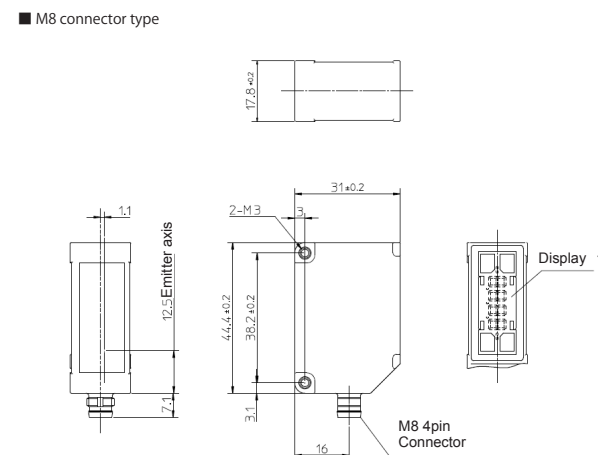
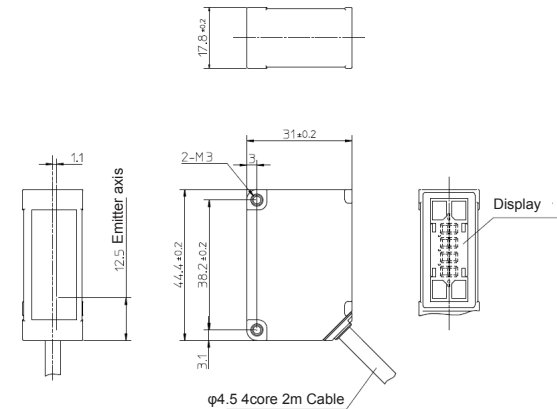
- BGS-HL□□□□
- This instruction manual
- Screws M3 × 15...2
- Bracket

Connection diagram



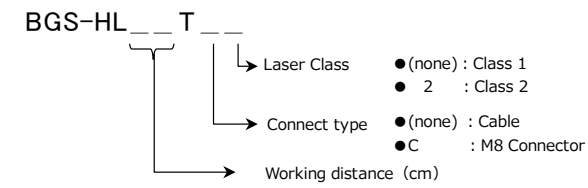
Dimensions

■ Cable type [mm]



Specifications

● Part number legend



● Specifications

Part number	Cable type	BGS-HL05T	BGS-HL25T2
Connector type		BGS-HL05TC	BGS-HL25TC2
Sensing range *1		20 ~ 50mm (Display: 0.00 ~ 30.00)	50 ~ 250mm (Display: 0.0 ~ 200.0)
Light source		Red laser Diode (wave length 655nm)	
		390μW	1mW
Laser class	IEC/JIS	CLASS 1	CLASS 2
Spot size *2		φ 0.8 mm @ 50mm	φ 1 mm @ 250mm
Repeat accuracy		10μm	100μm *3
Sampling period		500μs / 1000μs / 2000μs / 4000μs / AUTO	
Response time		1.5ms max. (1.5~7ms/default)	1.5ms max. (3~14ms/default)
Hysteresis		0 ~ 22.49 (default: 0.15)	0 ~ 149.9 (default: 1.0)
Display		7-segment 4-digit LED display	
Indicator		Laser indicator: Green, Output indicator: Orange, Mode indicator: Red	
Control Output		NPN/PNP selectable	
		100mA max./DC24V (Residual voltage 1.8 V max.)	
External Input		Laser OFF, Teaching, Sample Hold, One shot hold	
Timer function		OFF/On delay/Off delay/One shot	
		1msec increment : 0 ~ 9999ms	
Supply voltage		12 ~ 24VDC including 10% ripple	
Current consumption		40mA max. / 24VDC excluding the current of Control Output	
Protection circuit		Reverse connection protection, Over current protection	
Protection category		IP67	
Operating Temp./Humid.		-10 ~ 50°C / 35 ~ 85% RH without frosting or condensation	
Storage Temp./Humid.		-20 ~ 60°C / 35 ~ 85%RH	
Ambient illuminance		Incandescent lamp: 3,000 lx max.	
Vibration resistance		10 ~ 55Hz, Double amplitude 1.5mm, X,Y,Z for 2 hours	
Shock resistance		500m/s ² (approx. 50G) X,Y,Z 3 times each	
Material		Case: Aluminum, Front lens: PPSU, Display: PET	
Weight		Cable type : Approx. 90g (including cable) Connector type : Approx. 30g	

The specifications are based on the condition unless otherwise designated: Ambient temperature: 23°C, Supply voltage: 24VDC, Sampling period: 500μs, Averaging: 512, Measuring distance: Center of the range, Testing object: White ceramic

*1 When [Shift] in Extension mode is ON, the display shows 0000 at the Teaching point. The range that the display can show is as follows.

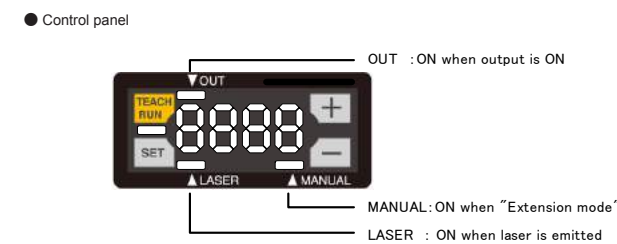
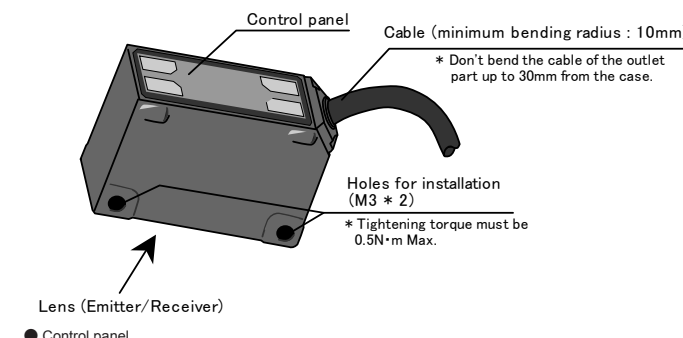
BGS-HL05 -7.50 ~ 37.50
BGS-HL25 -50.0 ~ 250.5

*2 When the distance exceeds this range in Sensing range, the display shows FFFF. Although, the sensor works while the distance is in Sensing range. The display shows 9999 when the distance is out of range.

*3 Defined by light strength within 1/e²(13.5%) of spot center. There may be leak light at outside of the specified spot size. The sensor may be affected when there is a highly reflective object at that leak light area.

*3 Sampling period : 1000μs.

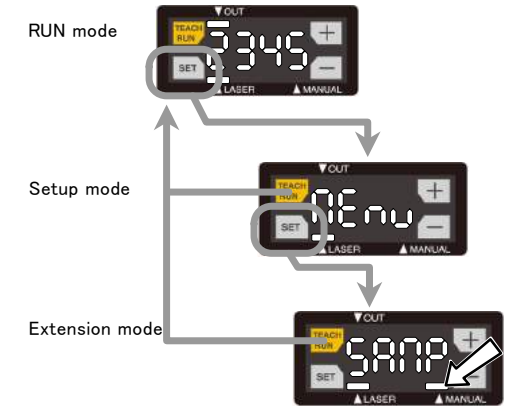
Functions of components



Setup

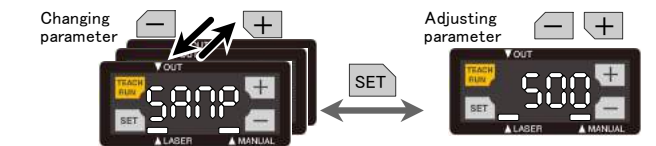
● Changing mode

While it's "Setup mode" or "Extension mode", you can change the mode to "RUN mode" by clicking "TEACH/RUN" button. While it's "Extension mode", the LED "MANUAL" is lit.



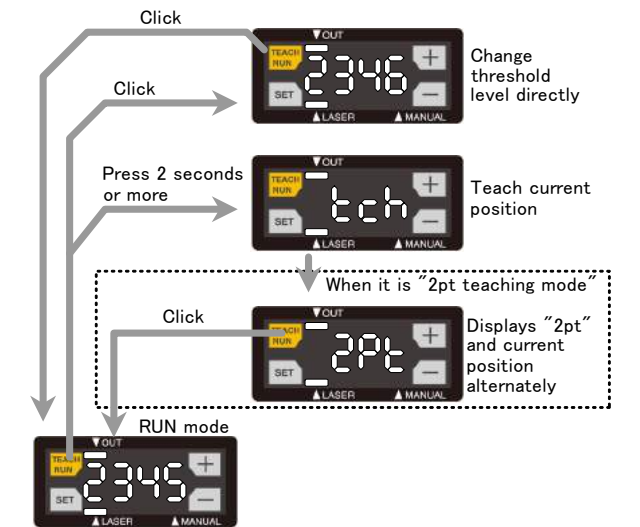
● Changing parameters

You can choose and adjust the parameters by clicking "+" and "-" buttons. The mode will be changed to "RUN mode" by clicking "TEACH/RUN" button.



Teach function

You can change threshold level directly by "+" and "-" buttons after clicking "TEACH/RUN" button from "RUN mode". By pressing "TEACH/RUN" button for 2 seconds or more, it gets to "Teaching mode". It has 3 "Teaching mode" that you can choose one in "Setup mode". Please refer "Teaching mode" and "Setup mode" on next page.



Teaching mode

BGS-HL series has 3 Teaching mode.

Please choose a Teaching mode at [Teach mode **tch**] in [Setup mode] before Teaching.

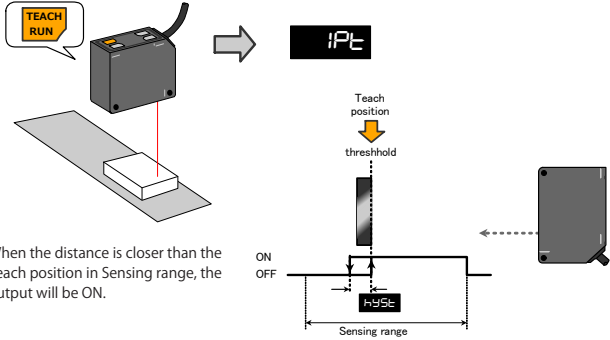
Output polarity can be reversed by [Light ON/Dark ON **Ldon**].

Following output shows its ON/OFF status as [Light ON **L on**].

1 point Teaching

Teaching is done at a position on the object to detect. When the distance is closer than that position, the output will be ON.

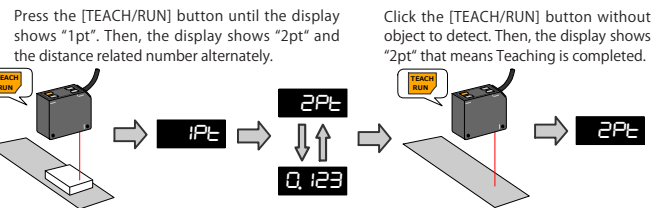
Press the [TEACH/RUN] button until the display shows "1pt". Teaching is completed after releasing button.



When the distance is closer than the Teach position in Sensing range, the output will be ON.

2 point Teaching

Teaching is done at two different positions on the object to detect. Teach position will be set at center of these two positions. When the distance is closer than the Teach position, the output will be ON. When the distance between these two positions is too close, the display will show "Err" that means error. Then, please try again.

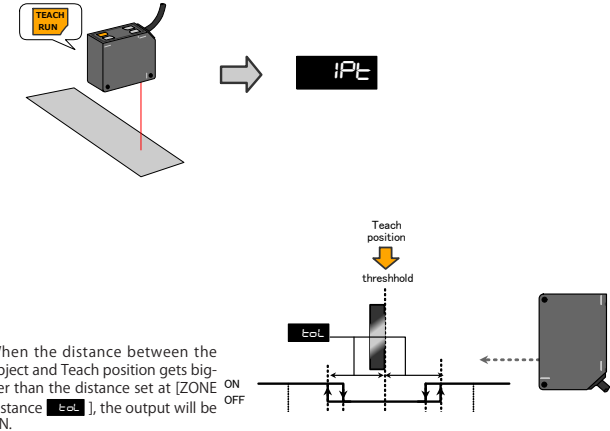


When the distance is closer than the Teach position in Sensing range, the output will be ON.

ZONE Teaching

Teaching is done without object to detect. Teach position will be set at this position. When the distance between the object and Teach position gets bigger than the distance set at [ZONE distance **tol**] in [Setup mode], the output will be ON.

Press the [TEACH/RUN] button until the display shows "1pt". Teaching is completed after releasing button.



When the distance between the object and Teach position gets bigger than the distance set at [ZONE distance **tol**], the output will be ON.

Setup mode

You can get to [Setup mode] by clicking "SET" button from [RUN mode]. (* means default value)

1:Teaching mode

1pt	1 point teaching	
2pt	ZONE teaching	
2Pt	2 point teaching	*

2:Extension mode

To Extension mode

3:External input

off	OFF : Disable external input	*
LSr	Laser OFF : Kill laser power when input is ON	
tch	Teaching : Set current value as threshold	
Sh	Sample hold : Keep the level when input is ON	
one	One shot hold : Hold the value as input turns ON	

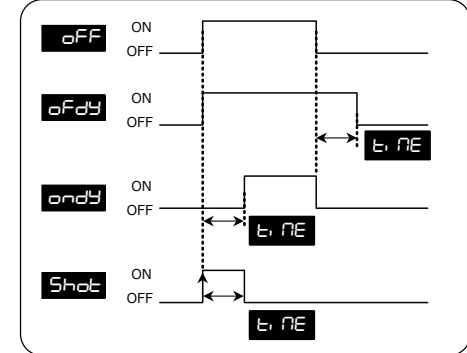
4:Delay time

td **NE** Set the value (unit : ms)

5:Output delay

off	OFF : Disable output delay	*
ofdy	Off delay	
ondy	On delay	
shot	One shot	

How each mode works



6:ZONE distance

tol Set the value (Default: BGS-HL05□□ 03.00 BGS-HL25□□ 020.0)

7:Light ON/Dark ON selection

L on	Light ON: When the distance is closer than Threshold, the output will be ON. (ZONE Teach mode: When the distance is outside of ZONE distance, the output will be ON.) While it's out of range, the output will be OFF.	*
d on	Dark ON: When the distance is farther than Threshold, the output will be ON. (ZONE Teach mode: When the distance is inside of ZONE distance, the output will be ON.) While it's out of range, the output will be ON.	

1:Teaching mode (Loop)

Extension mode

You can get to [Extension mode] from [2:Extension mode] in [Setup mode]. (* means default value)

1:Display setting

d.SP	Activate the display	*
off	Disable the display while "Key lock"	

2:Reset (Initializing)

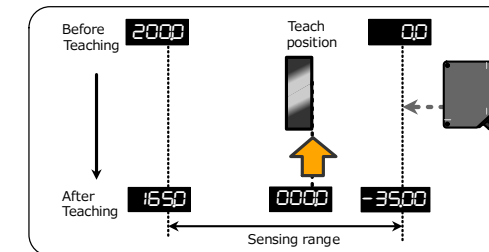
RESET	Initializing will be done when the mode gets to RUN mode.	
YES	Initialize the parameters to default setting	
no	Do nothing	

3:Shift function

Sh.F	Activate (Set teach position as "0000")	*
off	Not use	

Set the display "0000" at the Teach position (threshold) when Teaching is done. When it's 2 point Teaching, set the display "0000" at near side position of 2 positions of Teaching.

Example of 1 point Teaching (BGS-HL25)



4:Averaging

AUC	1 Once	*
	8 8 times	
	64 64 times	
	512 512 times	

5:Threshold

thrE	BASE : Set threshold to lowest level	*
	P400 : Set threshold to upper level	
	P200 : Set threshold to middle level	
	P100 : Set threshold to lower level	

Set threshold level to detect rising part and falling part of light strength wave. You can change the threshold level especially when the sensor receives external light as noise so to get stable detection. Basically, you don't have to change the threshold.

6:Sensitivity

SENS	Auto : Adjust sensitivity automatically	*
	n_6 6 : Maximum sensitivity	
	n_1 1 : Minimum sensitivity	

7:Sampling period

SAMP	500 500μs (2kHz)	*
	1000 1000μs (1kHz)	*
	2000 2000μs (500Hz)	
	4000 4000μs (250Hz)	
	Auto AUTO	

Default: 500μs (BGS-HL05)
1000μs (BGS-HL25)
Auto: The sensor optimize sampling period automatically.

8:Hysteresis

hyst	0.123 Set the value (Default: BGS-HL05□□ 0.15 BGS-HL25□□ 1.0)	
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9:NPN/PNP selection

n_p	n_pn Set input/output as NPN	*
	p_np Set input/output as PNP	

This parameter won't be changed by [Reset]

1:Display setting (Loop)

Miscellaneous function

Key lock function

Activate Key lock

While it's RUN mode, press **+** **-** at a time for 1 second.

Then, **Loc** will be shown.

While Key lock is activated, any access except "Release Key lock" will be neglected.

Release Key lock

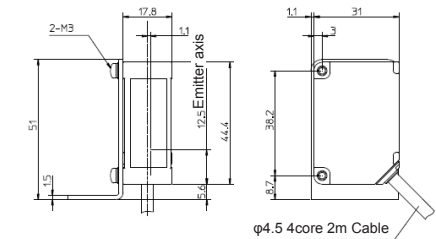
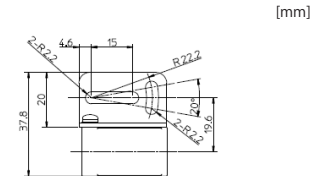
While Key lock is activated, it will be released by pressing

+ **-** at a time for 3 seconds. Then, **uLoc** will be shown.

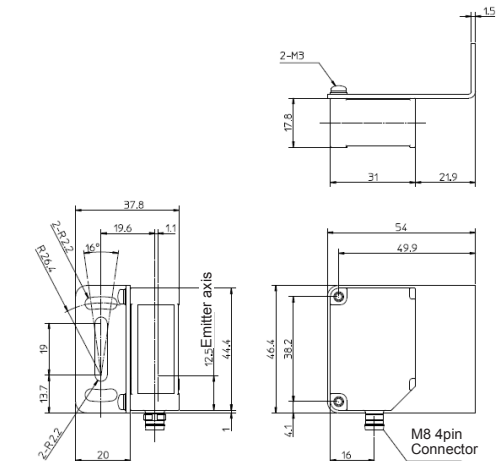
After this process, every access will be accepted.


Dimensions with bracket

Cable type with standard bracket BGS-HL-B



Connector type with standard bracket BGS-HL-A



Attention: Not to be Used for Personnel Protection.  Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death. These sensors do not include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Please consult our distributors about safety products which meet OSHA, ANSI and IEC standards for personnel protection.

Specifications and equipment are subject to change without any obligations on the part of manufacture.

For more information, questions and comments regarding products, please contact us below.

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