

# INSTALLATION GUIDE

## Laser Sensor Series LAH-G1

For further information please see the data sheet at  
[www.waycon.biz/products/laser-sensors/](http://www.waycon.biz/products/laser-sensors/)

### INTRODUCTION

Thank you very much for purchasing WayCon Positionsmesstechnik GmbH products. Please read this installation guide carefully and thoroughly for the correct and optimum use of this product. Kindly keep this guide in a convenient place for quick reference.

Attention!

- This product is for the sensing (determination and measurement) of objects. Do not use this product to secure safety, such as accident prevention which may affect human life and property.
- Do not stare directly into the laser beam, or through observation optical equipment, such as lenses or etc. as it is dangerous.

### CE-MARKING

This product complies with the following standards and regulations:

For the EU: EMC-Directive (2014/30/EU)

Contact for CE-Marking:

WayCon Positionsmesstechnik GmbH

Mehlbeerenstr. 4, 82024 Taufkirchen, Germany

**CE**

### CONFIRMATION OF PACKED CONTENT

- |                                     |                           |
|-------------------------------------|---------------------------|
| • Sensor                            | 1 piece                   |
| • Laser warning label (GB Standard) | 1 set (already on sensor) |
| • Installation Guide                | 1 piece                   |

### SAFE USE OF LASER PRODUCT

For the purpose of preventing any injury which may occur to the user by the use of the laser product in advance, the following standards have been established by the IEC Standards, JIS Standards and FDA Standards.

IEC: IEC 60825-1-2007 (EN 60825-1-2007)

JIS: JIS C 6802-2011

FDA: PART 1040 (Performance standards for light-emitting products)

These standards classifies laser products according to the level of hazard and provide the safety measures for respective classes.

## OVERVIEW

This product is a compact laser displacement sensor, incorporating a digital display and controller functions.

- The standard type has three digital outputs and one analog output for current or voltage.
- One out of four measurement distances can be selected for each type that support both NPN and PNP outputs.

## INSTALLATION AND OPERATION

- Install the product so that the laser beam is above or below eye level.
- Do not look into the beam directly during operation. A safe distance from the laser (Nominal Ocular Hazard Distance: NOHD) is approx. 0.4 m.
- The laser beam must be terminated at the end of its path by a diffuse reflector or an absorber.
- Please contact Panasonic Electric Works SUNX Co., Ltd. if the system breaks down. It is not equipped with a function that stops laser radiation automatically when the sensor head is being disassembled.
- Do not use the system in any other manner than specified in this instruction manual.

## WIRING INSTRUCTIONS

### **WARNING**

Turn OFF the power supply before connecting or disconnecting the connectors or performing wiring.

#### **Connections:**

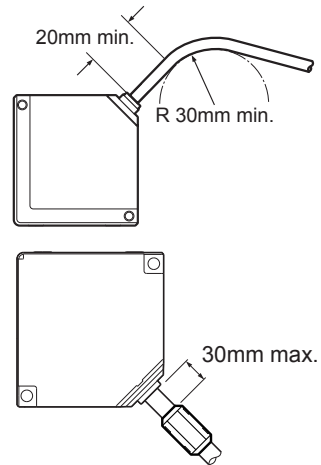
- When connecting or disconnecting the connectors, hold the connector area so that no extra force is applied to the cable.
- Do not touch the terminals or to let foreign objects get into the connectors after disconnecting them.
- Do not apply force around the connector of the sensor head cable or the extension cable. Do not bend the cables near the connectors because the cables will be disconnected.
- When moving the sensor head during operation, install the cables in such a way that they do not bend while the sensor head is moving.

#### **Wiring:**

- Do not roll up the sensor cable (bundle in parallel) with other wiring. Keep it at least 100 mm away from other wires. Cables should be separated from high voltage and power circuit lines. If this is not possible, shield the cable by running it through conductive material such as grounded electrical conduit.
- Install the product as far away as possible from noise sources such as high-voltage lines, high-voltage devices, power lines, power device, machines which generate a large high-voltage ON/OFF surge, welding machines and inverter motors.

## WIRING INSTRUCTIONS

- Do not pull the cable with a force more than 29.4 N when wiring the cable when the sensor head is fixed. The cable may be bent with a radius of 30 mm or more. However, do not bend the cable within 20 mm of the sensor head (see upper image).
- Make sure that the length of signal and power lines connected to the product is less than 30 m in order to meet the CE marking requirements (see lower image).
- Attach a ferrite core to the head cable as shown.



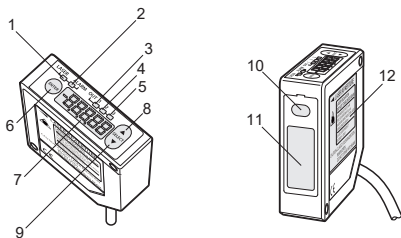
### Warming Up:

- Allow the product to warm up for at least 30 minutes after turning on the power to ensure good performance.

### Environment:

- Mount the sensor head on an aluminium or steel plate with a minimum surface area of 200 cm<sup>2</sup> if the ambient temperature is 40 °C or higher. When installing two or more sensor heads in parallel, mount each sensor head on an aluminium or steel plate with a minimum surface area of 200 cm<sup>2</sup> and make sure that the ambient temperature does not exceed 40 °C.
- The life of the semiconductor laser depends on the ambient temperature during use. When using the product near a heat source, take measures to keep the ambient temperature of the sensor head as low as possible. Mount the sensor on a device that allows heat to dissipate because the sensor itself also generates heat.
- Keep the emitter surface and the receiver surface clean. Prevent light refractors such as water, oil and fingerprints, and light blockers such as dust and dirt from contaminating the surface. When cleaning these parts, wipe them off using a soft lint-free cloth or lens cleaning paper.
- Install the sensor head at a location where external light (such as sunlight or light which has the same wavelength as the laser beam) do not enter the receiver. If high accuracy is required, install a light shield plate or something similar around the sensor head.
- Do not use the product underwater or in the rain. Although the sensor head has an IP67 degree of protection, the connectors are not dustproof, waterproof, or corrosion-resistant.
- Do not use the product in dusty places or in places that are exposed to flammable or corrosive gases, droplets, direct sunlight, severe vibration or impacts.

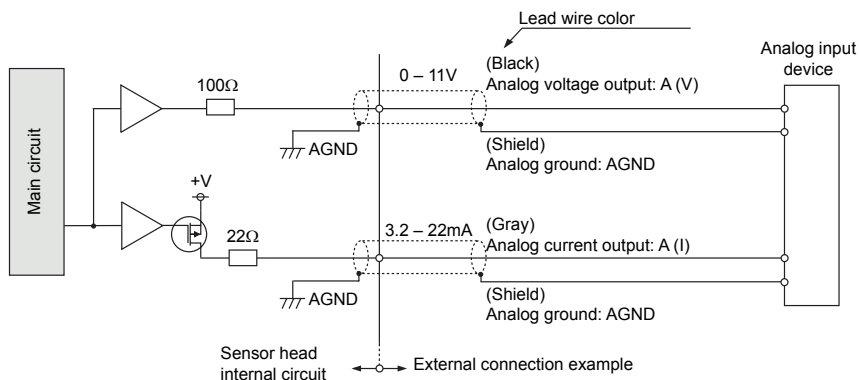
# PART DESCRIPTION



1.	Laser Indicator (LASER)	7.	Digital Display
2.	Alarm Indicator (ALARM)	8.	[UP] Key
3.	OUT1 Indicator (OUT1)	9.	[DOWN] Key
4.	OUT2 Indicator (OUT2)	10.	Emitter
5.	OUT3 Indicator (OUT3)	11.	Receiver
6.	[ENTER] Key	12.	Warning Label

# ANALOG OUTPUT

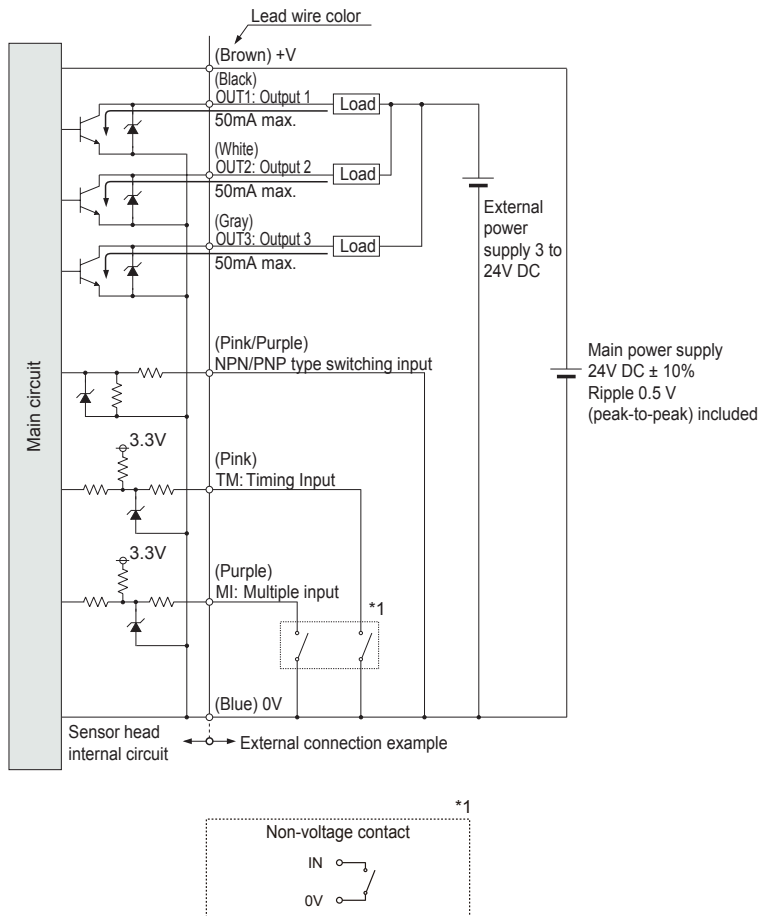
Name	Function	Cable color	
A (V)	Analog voltage output	Shield single conductor	Black
AGND	Analog ground		
A (I)	Analog current output	Shield single conductor	Gray
AGND	Analog ground		



# I/O CIRCUIT DIAGRAMS

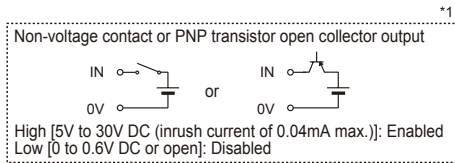
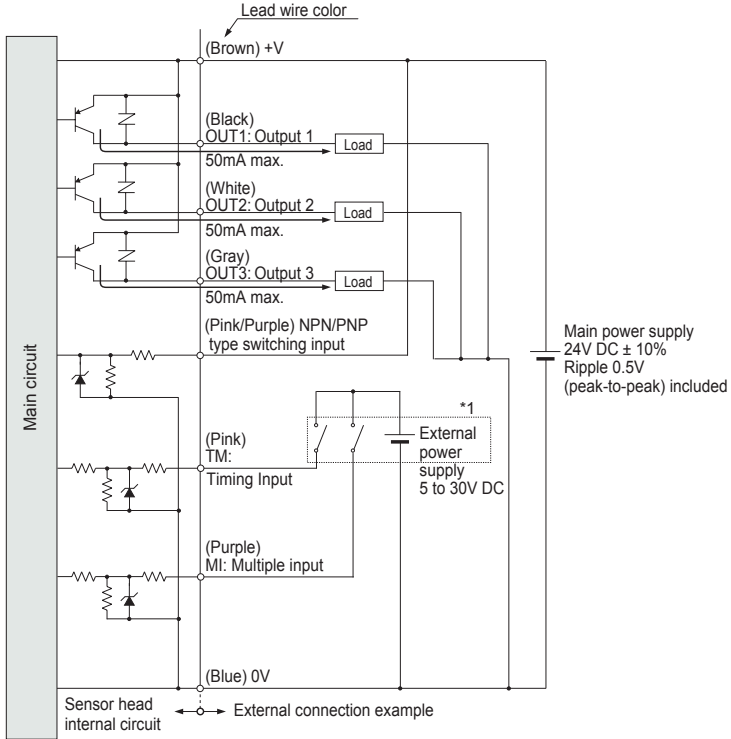
Name	Function	Cable color
OUT1	Judgment output 1	Black
OUT2	Judgment output 2	White
OUT3	Judgment output 3 or alarm output	Gray
TM	Timing input	Pink
MI	Zero-set, Reset, Memory change, Teaching, Save, Laser control inputs	Violet
NP	NPN / PNP type switching input	Pink/Violet
+V	24 VDC input for power supply	Brown
0V	Power supply ground	Blue

## NPN-Type



# I/O CIRCUIT DIAGRAMS

## PNP-Type



# TROUBLESHOOTING

If an error occurs during operation or you suspect a system failure, identify the possible cause and carry out the corresponding remedy.

Problems can be classified into 5 types:

Type	Description
1	Problem with the sensor head settings
2	Problem with the communication control
3	Problem with the the measurement method or display of measurement values
4	Problem with the alarm or error LED indication
5	Problem with the laser emission

Type	Problem	Possible cause	Remedy
1	The sensorhead indicator does not light up.  The sensorhead does not operate.	The connecting cable is not connected properly.	Check the connection between the sensor head and connection cable.
		The connecting cable is disconnected.	Check the wiring between the connection cable and connector.
		Power is not supplied to the controller.	Check the connection between the 24V DC external power supply and the sensor head.
		The operation of the sensor head is stopped.	Turn the sensor head ON again.
		The eco mode is set to "Eco-FULL".	The LED will be lit by operating any switch. Change the eco-mode settings, if necessary.
		The laser control setting has been turned OFF and this setting has been saved.	Set the laser control setting to ON and save the setting, otherwise the system will start with the laser beam turned OFF.
3	There is a difference between the actual distance to the measurement object and measurement value.	The measurement object is fluctuating or vibrating.	Stop the fluctuation or vibration of the measurement object.
		The measurement object is tilted.	Place the measurement object as perpendicularly as possible.
		The received light waveform is saturated or insufficient.	Adjust the received light intensity using the shutter time.
3	The correct measurement value is not displayed.	The measurement object is out of the measuring range.	Check the measuring range of the sensor head used.
		The scaling setting is not correct.	Set the correct scaling.
		The light emitter/receiver is dirty.	Remove the dirt on the light emitter/receiver.



## TROUBLESHOOTING

Type	Problem	Possible cause	Remedy
3	Measurement values vary.	The moving average is small.	Increase the number of moving average.
		The light emitter/receiver is dirty.	Remove the dirt on the light emitter/receiver.
		The mounting direction of the sensor head is incorrect.	Check the mounting direction of sensor head.
		The sensor head or measurement object is tilted.	Check the mounting of the sensor head and the setting position of the measurement object.
3, 4	The alarm indicator lights up and measurement is no longer possible.	The reflected beam from the beam emitter is blocked.	Move the position of the beam projection spot or change the mounting direction of the sensor head so the reflected beam should not be blocked.
		The laser beam spot is applied to the R portion (curved surface) of the measurement object.	Apply the beam projection spot to the top of R portion or adjust the beam diameter so it comes larger by moving the measurement object back and forth within the measuring range.
		The reflected beam has directionality because the surface of the object is hairline-finished.	Check the mounting direction of the sensor head.
		The received light intensity is insufficient because the sampling cycle is too short.	Set a longer sampling cycle or shutter time (when shutter time is set to a fixed value).
		The sampling cycle is too long and the received light intensity is too strong.	Set a shorter sampling cycle and reduce the received light intensity by setting a shorter shutter time.