

Date:2006.05.18

DISTANCE
MEASURING TYPE
Obstacle Detection
Sensor
UBG-05LN

Specifications

Symbol	Amended Reason			Page	Date	Corrector
Approved	Checked	Drawn	Designed	Title	Obstacle Detection Sensor UBG-05LN Specifications	
MORI	SUEKUNI	SANTOSH	MORI			

1. Outline

1. Operating Principle

UBG-05LN is an obstacle detection sensor with 785nm wavelength laser light source. It detects objects in the predefined area by scanning 180° semicircle and calculates the coordinates of the detected object by measuring its distance and angle. The product is laser class 1 safe.

2. Area Setting

31 different area patterns and their coordinate points can be set using application software and serial communication RS232C.

3-step outputs can be selected for each area.

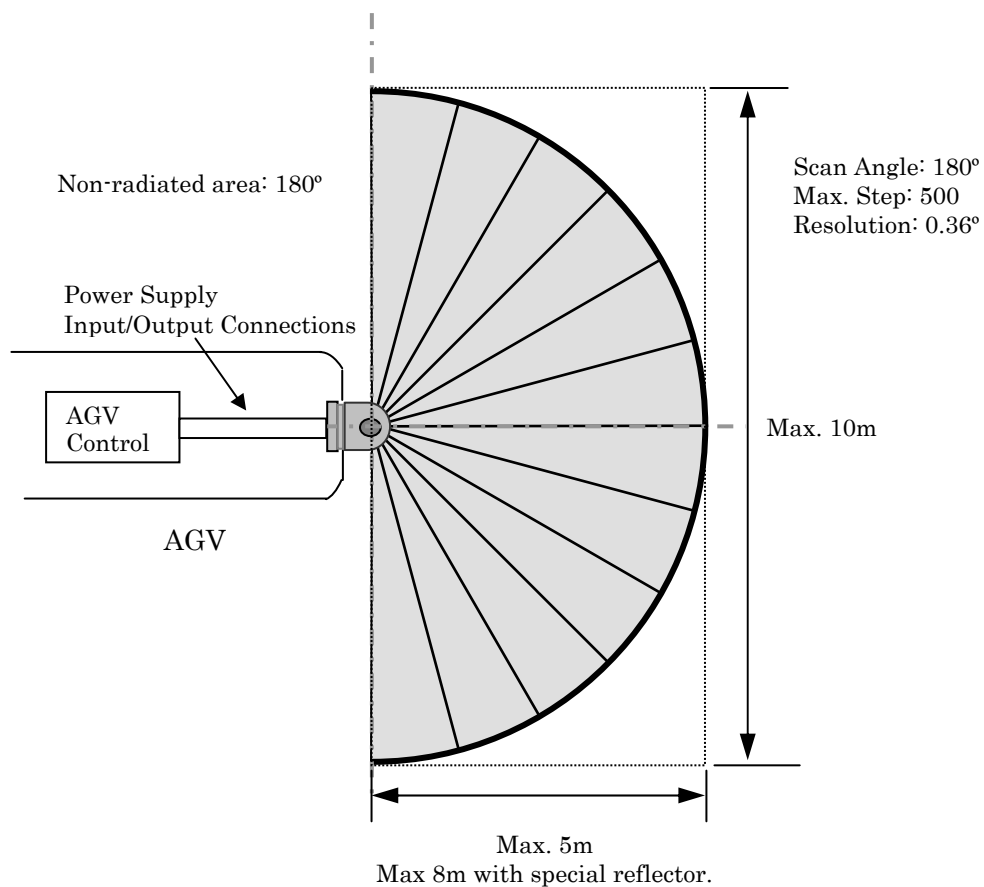
3. Area Switching

Bit input at terminal points switches the predefined area patterns.

4. Malfunction Output

Self-diagnostic functions continuously check laser radiation and motor rotation and supplies malfunction output upon error detection.

2. Structure (Scan Image)



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3. Specifications

Model	UBG-05LN
Light source	Semiconductor laser diode ($\lambda=785\text{nm}$) Laser safety Class 1 (FDA) Laser power:0.8mW or less(Scanning satisfies the laser Class 1 safety.)
Power source	24V DC $\pm 10\%$ (Startup voltage range 18~30V)
Current consumption	150mA or less (Rush current 300mA)
Detection distance	100mm ~ 5000mm* (White sheet 125×125 mm or more) 100mm ~ 8000mm* (Specific reflector 250×250 mm or more)
Accuracy	Distance 100 ~ 1000mm: $\pm 20\text{mm}^*$ Distance 1000 ~ 4000mm: $\pm 2\%$ of measurement* Repeatability $\pm 10\text{mm}^*$
Hysteresis	Values specified while setting area patterns (Default: 6.25%) 6.25% of detection distance (not less than 60 mm) 3.17% of detection distance (not less than 30 mm)
Outputs	Photo coupler open collector output (DC 30V, 50mA max.) Output 1: Turns OFF during object detection inside area. Output 2: Turns OFF during object detection inside area. Output 3: Turns OFF during object detection inside area. Malfunction Output: Always ON during normal operation. (Note: All the outputs turn OFF during malfunction)
Scan Angle	180° (Resolution 0.36°)
Scan Time	100msec/scan
Output Response Time	Less than 210 msec (Note: Additional delay of max. 100 msec (1 scan time) will occur during area switching)
Start up Time	Within 10 sec after power supply. (Varies with startup conditions)
Light Display	Power supply (Green): Flashes during startup or sensor malfunction Output 1 (Orange): Switches on during object detection inside area Output 2 (Orange): Switches on during object detection inside area. Output 3 (Orange): Switches on during object detection inside area.
Connection	Flying lead cable (1m)
Ambient Light Resistance	Halogen/Mercury light: 10000Lx or less Fluorescent Light: 6000 Lx (max.) (Note: Direct sunlight or strong light source may cause misdetections)
Ambient Conditions Temperature: Humidity:	-10 ~ 50°C 85% or less (non-condensing)
Storage temperature	-25 ~ 75°C
Vibration Resistance	Double amplitude 1.5mm 10 ~ 55Hz, 2 hours XYZ direction, and 98m/s ² 55Hz ~ 200Hz in 2 minutes sweep, 1 hours in XYZ directions
Impact Resistance	196 m/s ² (10G), 10 times in XYZ directions
Weight	Approx. 185g (260g with cable)
Protection Class	IP64
Case	Front: Polycarbonate / Back: ABS
External dimension	60 W×60 H×75 D mm

*Under standard test conditions.

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3. Specifications (continue)

Area Setting	Output1 setting: Area with maximum 7 points form 0 to 5000mm Output2 setting: Straight : Fan Shape : Percentage of Output1 area points Output3 setting: Same as Output2																																																																																																																																																																																																						
Inputs and Area Selection	Photo coupler input (Anode common, supply current to switch on the inputs = 4mA) Area Switching: Set area numbers with [Input1][Input2] [Input3][Input4][Input5] Laser radiation stops with all inputs ON. High: OFF Low: ON <table border="1" data-bbox="564 640 1401 1630"> <thead> <tr> <th>[Input1]</th> <th>[Input2]</th> <th>[Input3]</th> <th>[Input4]</th> <th>[Input5]</th> <th>Area Patterns</th> </tr> </thead> <tbody> <tr><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>Laser OFF</td></tr> <tr><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>Area 1</td></tr> <tr><td>ON</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>Area 2</td></tr> <tr><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>Area 3</td></tr> <tr><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>ON</td><td>Area 4</td></tr> <tr><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>ON</td><td>Area 5</td></tr> <tr><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>Area 6</td></tr> <tr><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>Area 7</td></tr> <tr><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>Area 8</td></tr> <tr><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>Area 9</td></tr> <tr><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>Area 10</td></tr> <tr><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>Area 11</td></tr> <tr><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>Area 12</td></tr> <tr><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>Area 13</td></tr> <tr><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>Area 14</td></tr> <tr><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>Area 15</td></tr> <tr><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>Area 16</td></tr> <tr><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>Area 17</td></tr> <tr><td>ON</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>Area 18</td></tr> <tr><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>Area 19</td></tr> <tr><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>Area 20</td></tr> <tr><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>Area 21</td></tr> <tr><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>Area 22</td></tr> <tr><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>Area 23</td></tr> <tr><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>Area 24</td></tr> <tr><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>Area 25</td></tr> <tr><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>Area 26</td></tr> <tr><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>Area 27</td></tr> <tr><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>Area 28</td></tr> <tr><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>Area 29</td></tr> <tr><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>Area 30</td></tr> <tr><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>Area 31</td></tr> </tbody> </table>	[Input1]	[Input2]	[Input3]	[Input4]	[Input5]	Area Patterns	ON	ON	ON	ON	ON	Laser OFF	OFF	ON	ON	ON	ON	Area 1	ON	OFF	ON	ON	ON	Area 2	OFF	OFF	ON	ON	ON	Area 3	ON	ON	OFF	ON	ON	Area 4	OFF	ON	OFF	ON	ON	Area 5	ON	OFF	OFF	ON	ON	Area 6	OFF	OFF	OFF	ON	ON	Area 7	ON	ON	ON	OFF	ON	Area 8	OFF	ON	ON	OFF	ON	Area 9	ON	OFF	ON	OFF	ON	Area 10	OFF	OFF	ON	OFF	ON	Area 11	ON	ON	OFF	OFF	ON	Area 12	OFF	ON	OFF	OFF	ON	Area 13	ON	OFF	OFF	OFF	ON	Area 14	OFF	OFF	OFF	OFF	ON	Area 15	ON	ON	ON	ON	OFF	Area 16	OFF	ON	ON	ON	OFF	Area 17	ON	OFF	ON	ON	OFF	Area 18	OFF	OFF	ON	ON	OFF	Area 19	ON	ON	OFF	ON	OFF	Area 20	OFF	ON	OFF	ON	OFF	Area 21	ON	OFF	OFF	ON	OFF	Area 22	OFF	OFF	OFF	ON	OFF	Area 23	ON	ON	ON	OFF	OFF	Area 24	OFF	ON	ON	OFF	OFF	Area 25	ON	OFF	ON	OFF	OFF	Area 26	OFF	OFF	ON	OFF	OFF	Area 27	ON	ON	OFF	OFF	OFF	Area 28	OFF	ON	OFF	OFF	OFF	Area 29	ON	OFF	OFF	OFF	OFF	Area 30	OFF	OFF	OFF	OFF	OFF	Area 31
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Input Response Time	Input reading frequency: 1 scan time (100msec) (Note: Input reading frequency is 1msec when Laser is switched off externally)																																																																																																																																																																																																						

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4. Lead cable color and signals

Color	Signal
Black	Output1
White	Output2
White (Blue)	Output3
Orange	Malfunction Output
Gray	Output common minus
Red	Input common plus
Green	Input1
Yellow	Input2
Purple	Input3
White (Yellow)	Input4
White (Purple)	Input5
Brown	+V IN
Blue	-V IN
Yellow (Red)	Serial Input (RXD)
Yellow (Green)	Serial Output (TXD)
Yellow (Black)	Serial Ground (GND)

- Note:
1. Leave the unused input terminals open or connect to input common plus (red).
 2. Leave the unused output terminals open or connect to input common minus (gray).
 3. Colors inside () suggest wires with colored lines on either sides.

5. Installation Notice

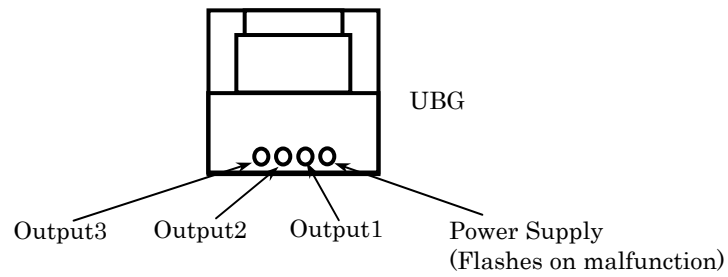
When mounting the device make sure to provide sufficient space for light window. Sensor will not operate normally if its view is blocked leading to serious injuries or property damage.

Note For Long Term Use:

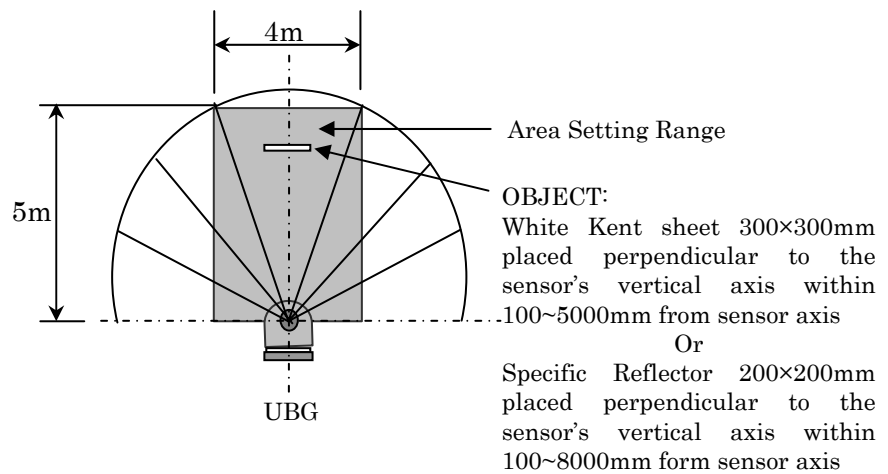
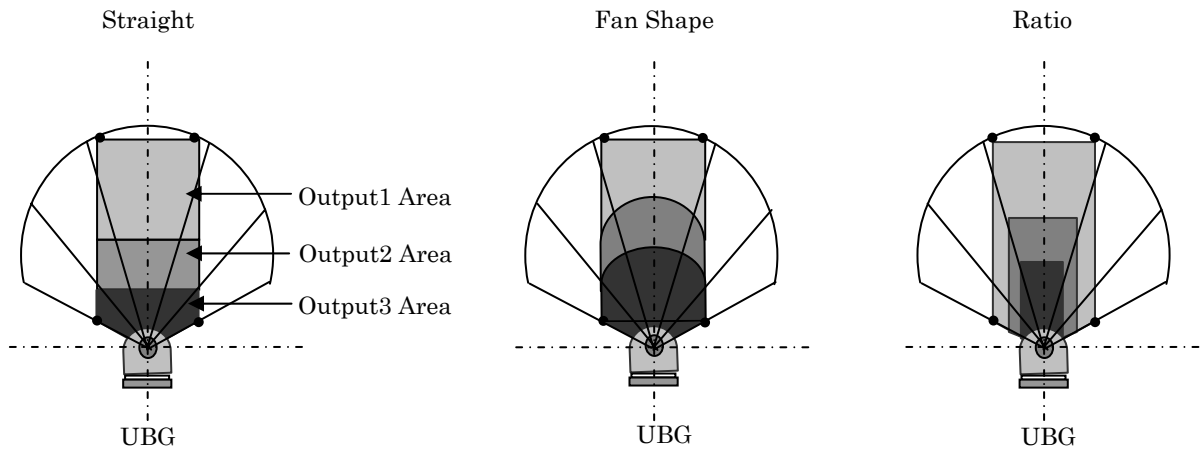
It is necessary to readjust/reset sensors operating for more than one year to maintain the absolute accuracy.

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6. Light Display Position

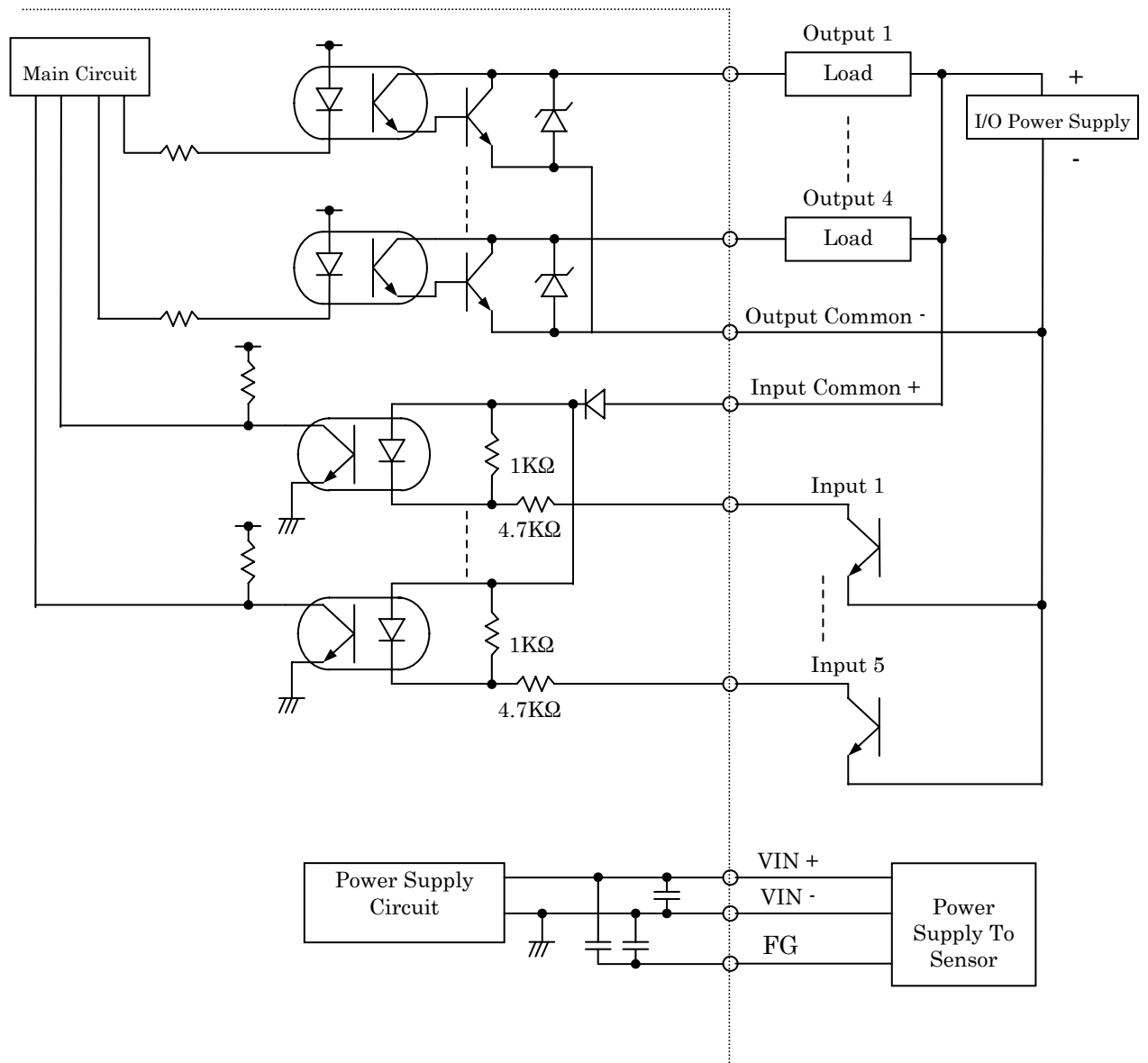


7. Area Setting Range and Shape



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8. Input/Output Circuit



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