

Date:2005.7.21

MEASURING
DISTANCE TYPE
**Scanning laser range
finder**
URG-04LN

INSTRUCTION
MANUAL

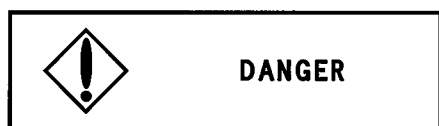
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Approved	Checked	Drawn	Designed	名 称	Scanning laser range finder	
					Sensor URG-04LN Series	Instruction
Mori	Mori	Maeda	Mori	図 番	C - 4 1 - 2 3 6 7	1/8

- NOTICE -

- Please keep this instruction manual on the side of operator and maintenance person.
- Be sure to read this instruction manual and relative documents carefully before installation, operation and maintenance. Operate correctly in accordance with the directions for use, information for safety and handling method of this device.
- Operate within the scope of specifications described on the specification manual and execute correct maintenance to prevent possible harm or malfunction.
- Don't remodel or disassemble the product. Disassembled products will not have the guarantee and may not be repaired.
- If you have incomprehensible items, questions and unclear points, please contact one of our branch offices referred on the last page.
- The contents of this instruction manual have intellectual property right. It may not, in whole or part be revealed to any third party without prior written consent from the publisher.
- The contents in this instruction manual is subjected to change without prior notice for the purpose of improvement of the device.
- In case of malfunction, please contact the nearest branch office with the following information.
 - ・The product name, model number, serial number, production date.
 - ・Abnormal condition(details including condition before and after the malfunction)
- Sensor can not be repaired at the site. Please return it to our branch office nearest to you or head office.

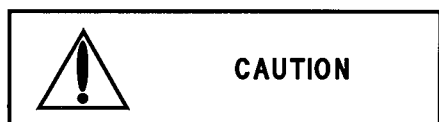
Notice of safety

Be sure to read this instruction manual and relative documents carefully before installation, operation and maintenance of this device to operate correctly. Operate this device only after acquainting all the knowledge of device, safety notice and caution items. The caution items are rank as [Danger], [Caution], [Prohibition] and [Enforcement].



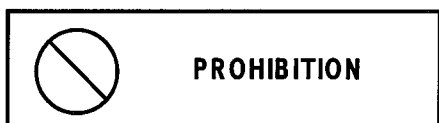
DANGER

Results in a dangerous situation if misused leading to critical injury or death



CAUTION

Results in a dangerous situation if misused leading to minor or slight injury or cause physical damage.



PROHIBITION

May cause a dangerous situation if misused. Device informs an action prohibited.



ENFORCEMENT

May cause a dangerous situation if misused. Device informs an action enforced.

Note:

If the product bears the mark **CAUTION**, it is possible to cause more serious result according to situation. Keep the above mentioned notice without fail since these are very important.

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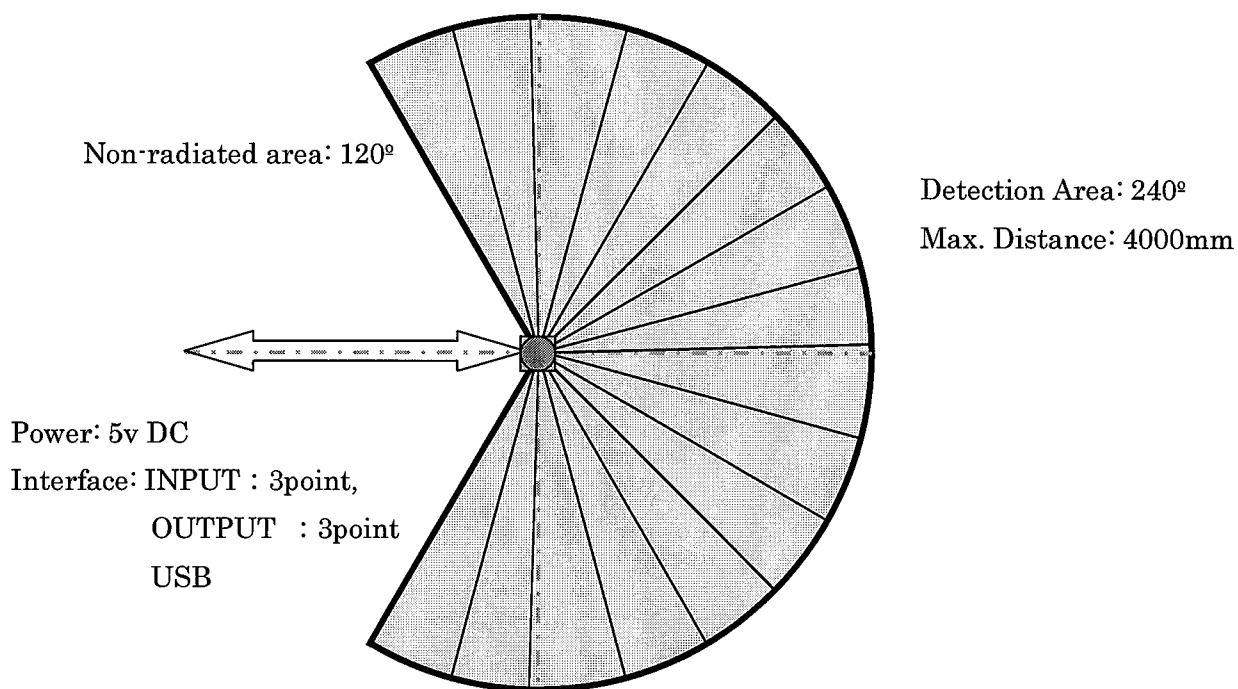
1. Outline

URG-04LN is a laser sensor for area scanning. The sensor's light source is infrared laser of wavelength 785nm. Scan area is 240° semicircle with pitch angle 0.36° . The sensor's maximum measurement is up to 4000mm with white Kent sheet of 100 mm* width. At 4000mm, the laser beam diameter is 40mm.

The principle of the distance measurement is based on calculation of the phase difference, due to which it is possible to obtain stable measurement with minimum influence from object's color and surface gloss.

URG-04LN is designed under JISC 8201-5-2 and IEC 60947-5-2 standards for the industrial applications such as obstacle detection.

2. Structure



Attention:

The above figure shows the detectable area by the sensor for white Kent sheet. Detection distance may vary with objects.

2. Important Notice

URG-04LN is a research prototype. Specification may change with the version.

Do not use the prototype as a part of system or product as the production of sensor with exactly the same specification may stop.

Do not use as a safety device.

Do not use in military applications or military related research.

URG-04LX is for indoor use only.

Read this instruction carefully before use.

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3. Specifications



CAUTION

• Don't look into laser beam or view directly with optical instruments.
It is possible to cause impediment on eyes.(Class 1 products)



CAUTION

• Caution—use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Product Name	Laser sensor for area scanning
Model	URG-04LN
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	5V DC $\pm 5\%$
Current consumption	500mA or less (Rush current 800mA)
Detection distance	50mm ~ 4000mm* (White sheet of 100mm width or more) (Refer the data provided with the sensor for the max. detection distance.)
Accuracy	Distance 20 ~ 1000mm: $\pm 20\text{mm}^*$ Distance 1000 ~ 4000mm: $\pm 2\%$ of measurement* (White sheet of 100mm width or more)
Precision	1 mm
Scan Angle	240°
Angular Resolution	0.36°
Scan Time	100msec/scan
Interface	USB Version 2.0 FS mode (12Mbps):for area setting IN 3point(Pattern selection) OUT 3point(Output selection)
Ambient Conditions Temperature: Humidity:	-10 ~ 50°C 85% or less (without dew and frost)
Preservation temperature	-25 ~ 75°C
Ambient Light Resistance	10000Lx or less
Vibration Resistance	Double amplitude 1.5mm 10 ~ 55Hz, 2 hours each in X, Y and Z direction, and 98m/s ² 55Hz ~ 150Hz in 2 minutes sweep, 1 hours each in X, Y and Z direction
Impact Resistance	196 m/s ² , 10 times each in X, Y and Z direction
Protective Structure	Optics : IP64 Case : IP40
Insulation Resistance	10M Ω for DC 500Vmegger
Weight	Approx. 160 g
Case	Polycarbonate
External dimension	50×50×70mm C-40-3362

*Under standard test conditions.

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4. Quality reference value

Vibration resistance at the time of use	19.6m/s ² 10Hz ~ 150Hz in 5 minutes sweep, 0.5 hours each for X, Y and Z direction
Impact resistance at the time of use	49 m/s ² , 10 times each for X, Y and Z direction
Turn corner speed	360 deg/s
Turn acceleration	$\pi/2$ rad/s ²
Life	5 years (Varies depending upon the operating conditions)
Sound level	25db or less (at 300mm)

Attention:

GND and 0V are connected inside the sensor

A standard unit consists of power supply cable include INPUT/OUTPUT.

- CN2 USB-mini (5 Pin)

Cable is not included. Use commercially available compatible unit.

- Refer specifications number C-42-3320 for communication protocol.

6. Interface

- CN1 (8p)

	URG-04LN	Color
8	DC 5V	Brown
7	0V	Blue
6	IN1	Green
5	IN2	Yellow
4	IN3	Purple
3	OUT 1	Black
2	OUT2	White
1	OUT3	Red

Note) Common of IN/OUT is common with the power supply.

- CN2 USB-min

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7. INPUT

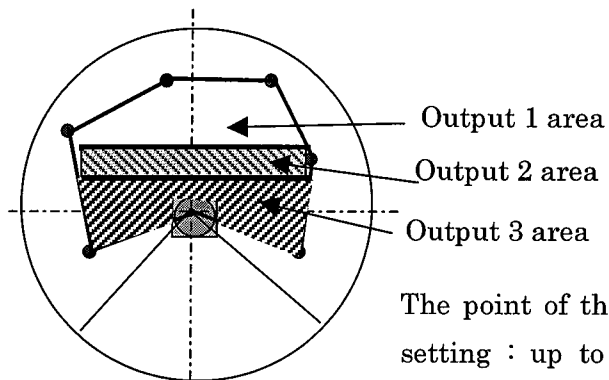
(1) IN

IN1	IN2	IN3	
L	L	L	Laser radiation stop
H	L	L	Select area1
L	H	L	Select area2
H	H	L	Select area3
L	L	H	Select area4
H	L	H	Select area5
L	H	H	Select area6
H	H	H	Select area7

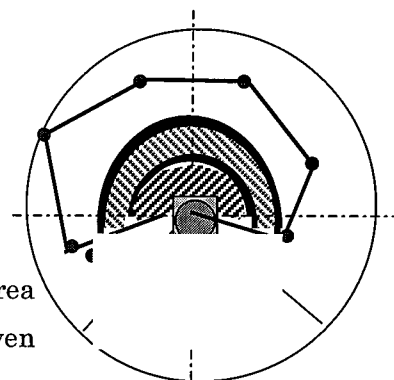
L : 0V(Output ON), H : 5V or Open(Output OFF)

The following three patterns can be set to the area.

①Setting of straight line

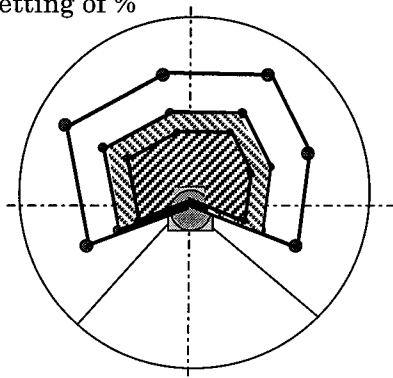


②Setting of fan



The point of the area setting : up to seven points or less.

③Setting of %



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(2) OUTPUT

Output 1 area	Output 2 area	Output 3 area	OUT 1	OUT2	OUT3
No detection	No detection	No detection	ON	ON	ON
Detection	No detection	No detection	OFF	ON	ON
Detection	Detection	No detection	ON	OFF	ON
Detection	Detection	Detection	OFF	OFF	ON
Breakdown			OFF	OFF	OFF

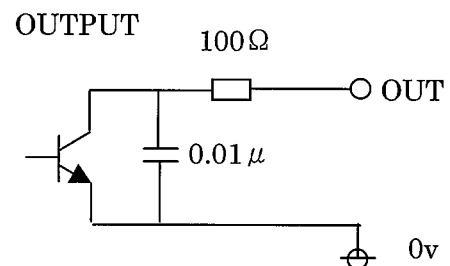
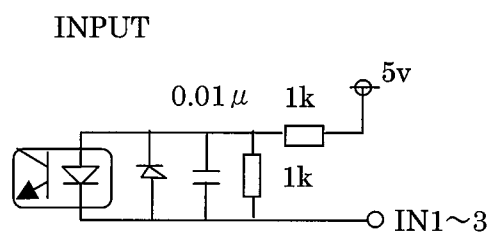
NOTE) OUT1,OUT2 and OUT3 will be switched to off mode when sensor breaks down.

①Laser malfunction

②The motor rotation is abnormal.

Also when sensor detects any malfunction with its self diagnostic droperty.

Input/Output Circuit:



Transistor Rated Value 50V,30mA

7. Notice:

Supply voltage is DC 5v. Sensor will damage permanently if high voltage is supplied.

Sensor will not operate with USB bus power. Use stable power supply with more than 1.5A.

The maximum data step is 683 points. The sensor's angular resolution is 0.3515625° ($360^\circ / 1024$) and angular range is 239.765625° $((683-1) \times 360 / 1024)$

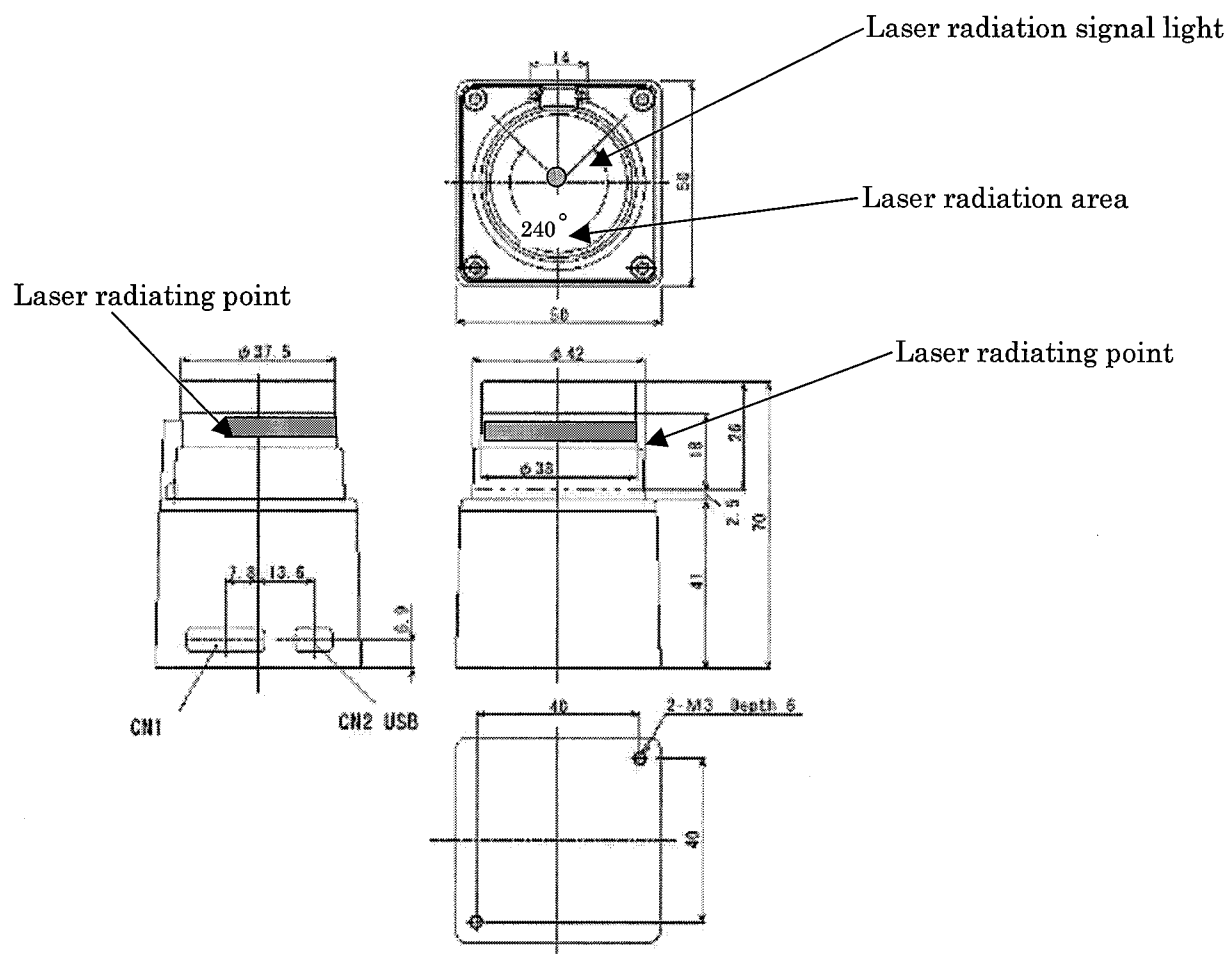
Area selection and resolution settings are available to suite different requirements. Read the communication protocol specification for details.

Direction of motor rotation is counter clockwise viewed from top.

USB driver is communication device class (CDC) supported by standard OS. The device is connected as a COM port with the same utility. Plug and play function is not supported.

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8.External Design and Sensor Dimension



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