YUJIN ROBOT

YUJIN LiDAR
YRL Series Quick-Start Guide

YRL2-05 | YRL2-10 | YRL2-20 | YRL3-05 | YRL3-10 | YRL3-20

ROS KC CE

Important Safety Instructions

Safe and accurate use of the product can help prevent danger or damages. Follow the methods described in the instructions below.

⚠ Warning ⚠ Caution 🔊 Notice ✔ Important

Installation Safety Guide

⚠
• The product should only be used for the purpose indicated in the system introduction and may not be used as a weapon or for military purposes.
• This product is not a safety sensor. Do not use this product in a place where human injury, loss of life, or property damage may occur.
• Use within the specified voltage and power, otherwise fire or damage may occur to the product.
• Do not apply heat or pressure as it may cause a fire or damage the product.
• Do not disassemble during operation as it may cause a fire or damage the product.
• Do not use in areas where flammable, explosive, or corrosive gases are present or where there may be potential for damage.

✔
All information materials can be found at the following website : http://www.yujinrobot.com

Product Components

The product is packaged in individual boxes. Please check the components upon arrival.

🔊 **Please contact your dealer or YUJIN ROBOT if you have any questions.**

Power Cable (1m)   Ethernet Cable (1m)

YUJIN LiDAR   Quick Start Manual
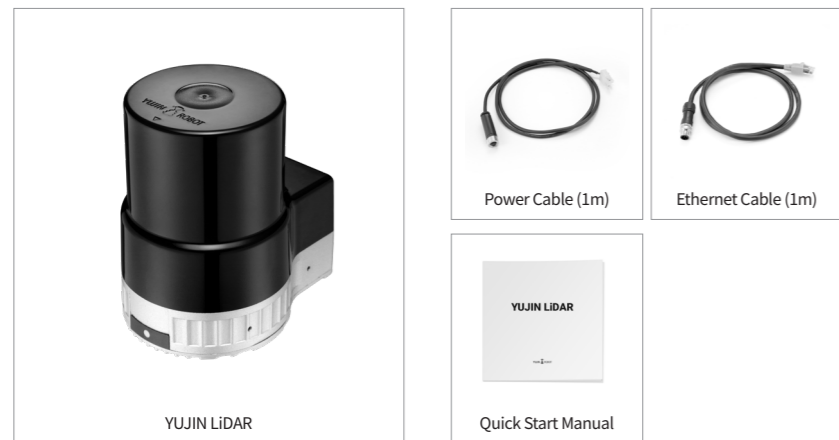
🔊 **The default network settings are shown as below. You can change the settings in the YUJIN LiDAR Viewer.**
• IP address : 192.168.1.250
• Port number : 1234

Operation Safety Guide

⚠
• Do not disassemble during operation as it may cause fire or damage to the product.
• Do not look at the product for a long time at close range during operation as it may cause damage to your eyes.
• The product may become hot if operated for a long time. Do not touch to avoid burns.

⚠
• Interference or contact between different laser light sources may cause abnormal operation of the sensor.
• Do not step on the unit or place heavy objects on it as it may cause abnormal operation of the sensor.
• Do not use in dusty or humid places or in direct sunlight.
• Fasten the product firmly in places where there is a lot of vibration.
• Do not drop objects on the product or shock it.
• Use of controls or adjustments orperformance of procedures other than those specified herein may result in hazardous radiation exposure.

1. About the Product

1.1. Product Description

The YUJIN LiDAR YRL Series is a laser sensor that scans horizontally and vertically to detect objects. The sensor uses a single laser (wavelength: 905 nm), and a mirror moves through the motor and detects the entire scan area. Distance measurement uses the time of flight (ToF) method. The ToF method calculates the distance to an object by measuring the time it takes for a LiDAR laser pulse to be reflected from the surface of the object back to the source.
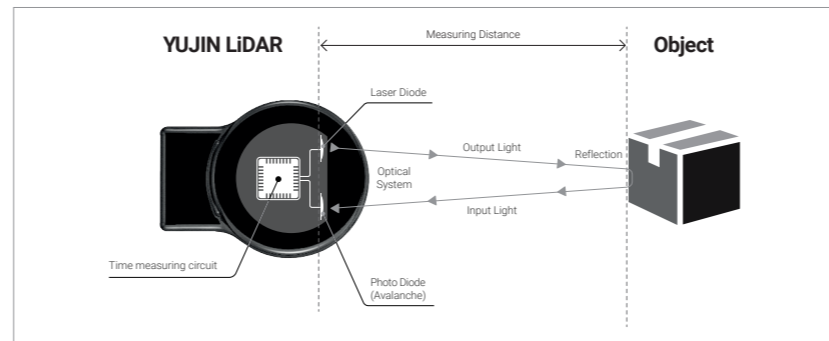
Measurement results are provided as distances, angles, and coordinate values for each point cloud. The YRL Series can only be operated indoors and cannot be used as a safety device. The YRL3 Series is a 3D scanning sensor that simultaneously scans horizontally and vertically.
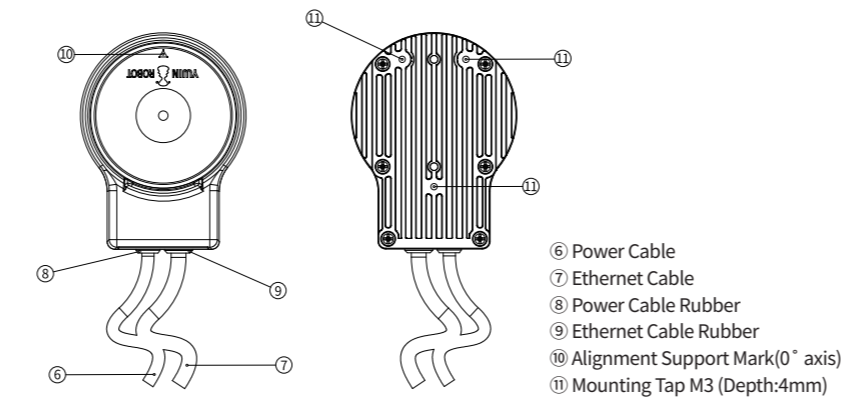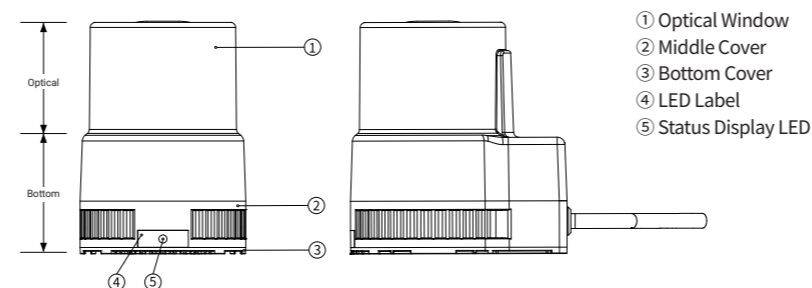
⚠ **Please do not look directly at the laser and do not disassemble it during operation.**

YRL Series – Model Classifications

	Model	Type	Measurement Range	Environment
YUJIN LiDAR	2D LiDAR	YRL2-05	5m	Indoor
		YRL2-10	10m	
		YRL2-20	20m	
	3D LiDAR	YRL3-05	5m	
		YRL3-10	10m	
		YRL3-20	20m	

1.2. Product Diagram

The product is divided into optical section and bottom. Please refer to the part names below for details.

① Optical Window
② Middle Cover
③ Bottom Cover
④ LED Label
⑤ Status Display LED

⑥ Power Cable
⑦ Ethernet Cable
⑧ Power Cable Rubber
⑨ Ethernet Cable Rubber
⑩ Alignment Support Mark(0˚ axis)
⑪ Mounting Tap M3 (Depth:4mm)

1.3. Features

The YRL Series is developed on the basis of YUJIN ROBOT's core technology. It holds a patent for the scanning type of driving method with extended application availability.

• Time of Flight (ToF) Single Channel LiDAR
• Compact Size and Lower Cost
• ROS (Robot Operating System) Compatible
• Quick and Scalable Software Support
• Wider Field of View
• Class 1 laser product

1.4. Specifications

| Environment	Indoor					
Type	2D LiDAR			3D LiDAR		
Model Name	YRL2-05	YRL2-10	YRL2-20	YRL3-05	YRL3-10	YRL3-20
Measurement Range	0.1~5m	0.1~10m	0.1~20m	0.1~5m	0.1~10m	0.1~20m
Collection Angle — Horizontal	270°					
Collection Angle — Vertical	-			90° (-45° ~ +45°)		
Laser Class	Class 1, eye safety (IEC 60820-1:2014)					
Laser Wavelength	905nm					
Scanning Frequency — Horizontal	20Hz					
Scanning Frequency — Vertical	-			0.57Hz (1scan 1.76sec. If vertical 90°)		
Range Resolution	<10mm					
Angular Resolution — Horizontal	0.55°					
Angular Resolution — Vertical	-			0.35° (257 steps)		
Sampling Rate	130,000					
Data Packet Rate	9,750					
Response Time	>50ms			>50ms per layer		
Communication Interface	100Mbps Ethernet					
Optical Indicators	1 x LED (Green : Available, Red: Error)					
Output Data	Horizontal Angle, Range, Intensity, Cartesian coordinates (x,y)			Horizontal Angle, Vertical Angle, Range, Intensity, Cartesian Coordinates (x,y,z)		
Electrical Connection	1 x M8 for Power, 1 x M12 for Data					
Supply Voltage	DC 12V					
Power Consumption	5W			6W		
Material	Top Window Cover (PC), Bottom Cover (AL)					
Enclosure Rating (IP)	IP 67					
Weight	400g					
Dimension DxWxH	65mm x 85mm x 91.40mm					

Notice
1) Objects can be detected at a distance of less than 30cm, but the distance accuracy is not guaranteed.
2) Sensor requires a warm-up duration of about 60 seconds after power ON.
   (When operating after storing the sensor at sub-zero temperatures, the sensor's warm-up duration goes up to about 15 minutes after power ON.)

2. Use of the Product

2.1. Installing the Viewer

The viewer can be installed after downloading YUJIN LiDAR Driver and Viewer according to the OS of the computer where you want to install the viewer. The YUJIN LiDAR Driver and Viewer can be downloaded from GitHub.
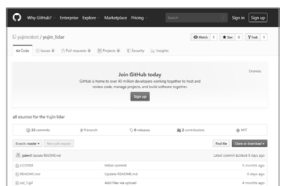
🔊 **The GitHub download address is given below: https://github.com/yujinrobot/yujin_lidar**

1) Download the product from GitHub that matches your computer.
2) Proceed with installing the LiDAR after the required product is downloaded.
3) Run the program as an administrator.

✔ **Run the program where the related software is installed after the qt5 is installed.**
Install) sudo apt-get install qt5-default
Run) sudo ./Yujin_Lidar_Viewer

2.2. Connection and Use

1) Connect the power of the YRL.
2) Connect the communication cable (Ethernet cable) of YRL to the computer.
3) Set the IP address of the computer network to 192.168.1.12.
   (The basic setting of the LiDAR IP is 192.168.1.250)
4) Run the YUJIN LiDAR Viewer.
5) Connect LiDAR through the connection button of the YUJIN LiDAR Viewer.

🔊 **If the connection is successful, the status value changes to "Connected" and you can verify the serial number and hardware version.**

✔ **If the connection is unsuccessful, please check the LiDAR power, data (Ethernet) cable, LiDAR IP address and computer IP address.**

2.3. Using the program

YUJIN LiDAR data appear on the viewer automatically when the connection is made successfully.

You can also get a visualized data you want by changing configuration values of the viewer.