

**Smart-URG Mini**

# Scanning Laser Range Finder

## UST-20LX

The UST-20LX is a compact, lightweight 2D LIDAR sensor used for obstacle detection and localization on autonomous mobile robots (AMR) and automated guided vehicles and carts (AGV, AGC). Equipped with an Ethernet interface, it can obtain high-speed, accurate measurement data in a 270° field-of-view up to 20 meters. Due to its low power consumption, this scanner is suitable for battery-operated platforms.

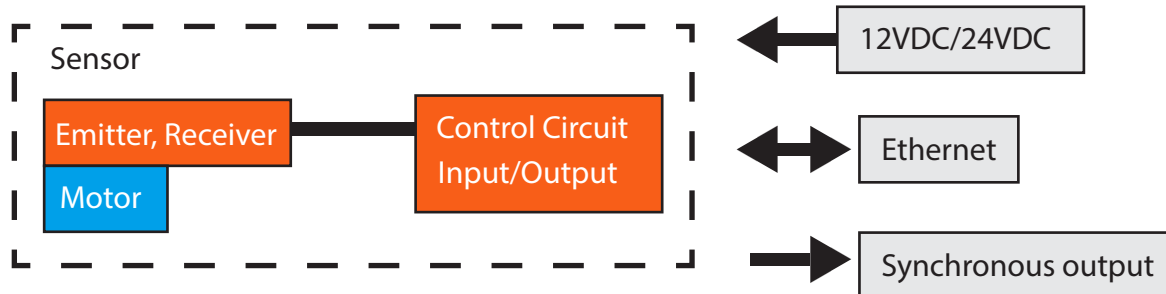


# COMPACT, LIGHTWEIGHT 2D LIDAR SENSOR

## 1. Overview

This sensor uses a laser source to scan 270° field of view. Positions of objects in the range are calculated with step angle and distance. Sensor outputs this data through communication channel.

## 2. Structure

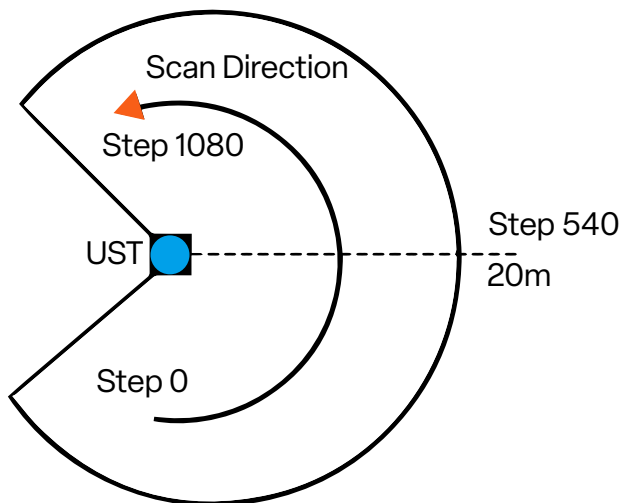


## 3. Laser Scanning Image

**Measuring Steps 1081**

**Detection Angle 270°**

**Angular Resolution 0.25°**



## Important Notes

(1) This sensor is not a safety device/tool.

(2) This sensor cannot be used for human body detection as per the machinery directives.

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UST-20LX

## 4. Product Specs

Product Name	Scanning Laser Range Finder
Model	UST-20LX
Supply voltage	12VDC/24VDC (Operation range 10 to 30V ripple within 10%)
Supply current	150mA or less (When using DC24V) (during start up 450mA is necessary.)
Light source	Laser semiconductor (905nm) Laser class 1 (IEC60825-1:2007)
Detection range	0.06m to 20m (white Kent sheet) 0.06m to 8m (diffuse reflectance 10%) Max. detection distance : 60m
Accuracy	±40mm (*1)
Repeated accuracy	$\sigma$ < 30mm (*1)
Scan angle	270°
Scan speed	25ms (Motor speed 2400rpm)
Angular resolution	0.25°
Start up time	Within 10 sec (start up time differs if malfunction is detected during start up)
Input	IP reset input, photo-coupler input (current 4mA at ON)
Output	Synchronous Output, photo coupler open collector output 30VDC 50mA MAX.
Interface	Ethernet 100BASE-TX
LED display	Power supply LED display (Blue): Blinks during start up and malfunction state.
Surrounding intensity	Less than 80,000lx Note : Avoid direct sunlight or other illumination sources as it may cause sensor malfunction
Ambient temperature and humidity	-10°C to +50°C, below 85%RH (without dew, frost)
Storage temperature and humidity	-30°C to +70°C, below 85%RH (without dew, frost)
Vibration resistance	10 to 55Hz double amplitude of 1.5mm for 2hrs in each X, Y, and Z direction 55 to 200Hz 98m / s <sup>2</sup> sweep of 2min for 1hr in each X,Y and Z direction
Vibration resistance (Operating)	55 to 150Hz 19.6m / s <sup>2</sup> sweep of 2min for 30min in each X,Y and Z direction
Shock resistance	196m/s <sup>2</sup> (20G) X,Y and Z direction 10 times.
EMC standards	(EMI) EN61326-1:2013 EN55011:2009 + A1:2010 (EMS) EN61326-1:2013 EN61000-4-2:2009 EN61000-4-3:2006 + A1:2008 + A2:2010 EN61000-4-4:2012 EN61000-4-6:2009 EN61000-4-8:2010
Protective Structure	IP65
Weight	130g (Excluding cable)
Material	Front case: Polycarbonate, Rear case: Aluminum
Dimensions (W×D×H)	50×50×70mm (sensor only)

(\*1) Under the factory standard testing conditions using white Kent sheet.

## 5. Measurement Data

Distance Value (x)	Meaning
$x < 21$	Output numerical number "4" as Measurement error
$21 \leq x \leq 60000$	Valid distance [mm]
$x > 60000$	Output numerical number "65533" as Measurement error (object does not exist or object has low reflectivity)

## 6. Connection

### 6-1. Power source, I/O cable

Cable length: 1000mm Flying lead cable (AWG28)

Color	Signal
Red	COM Input +
Gray	COM Output -
Light Blue	IP Reset Input
Orange	Synchronous Output
Brown	+VIN (12VDC/24VDC)
Blue	-VIN

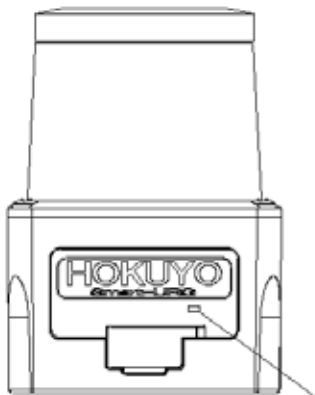
**Note:** Direction of Inputs and Outputs are mentioned from the sensor's side.

### 6-2. Ethernet cable

Cable length: 300mm

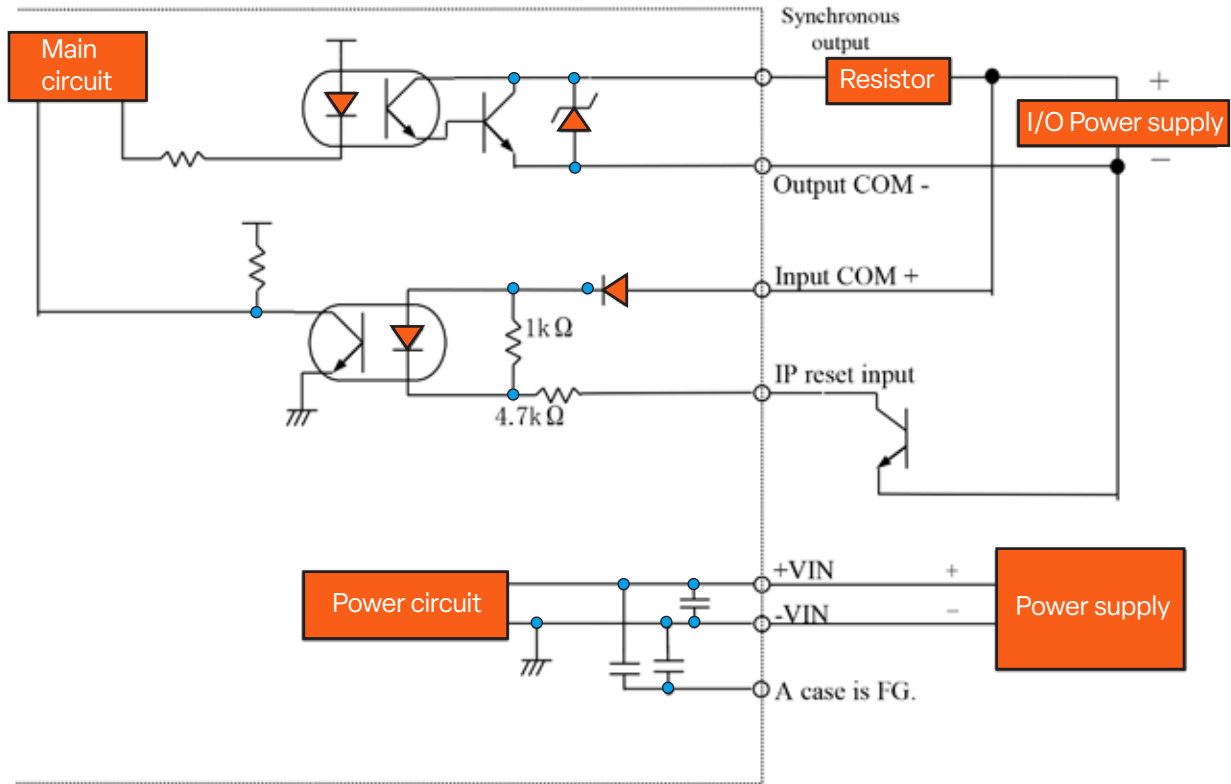
Color	Signal
Blue	TX+
White	TX-
Orange	RX+
Yellow	RX-

## 7. LED Display



Power supply display  
(Blinks during start up and malfunction state)

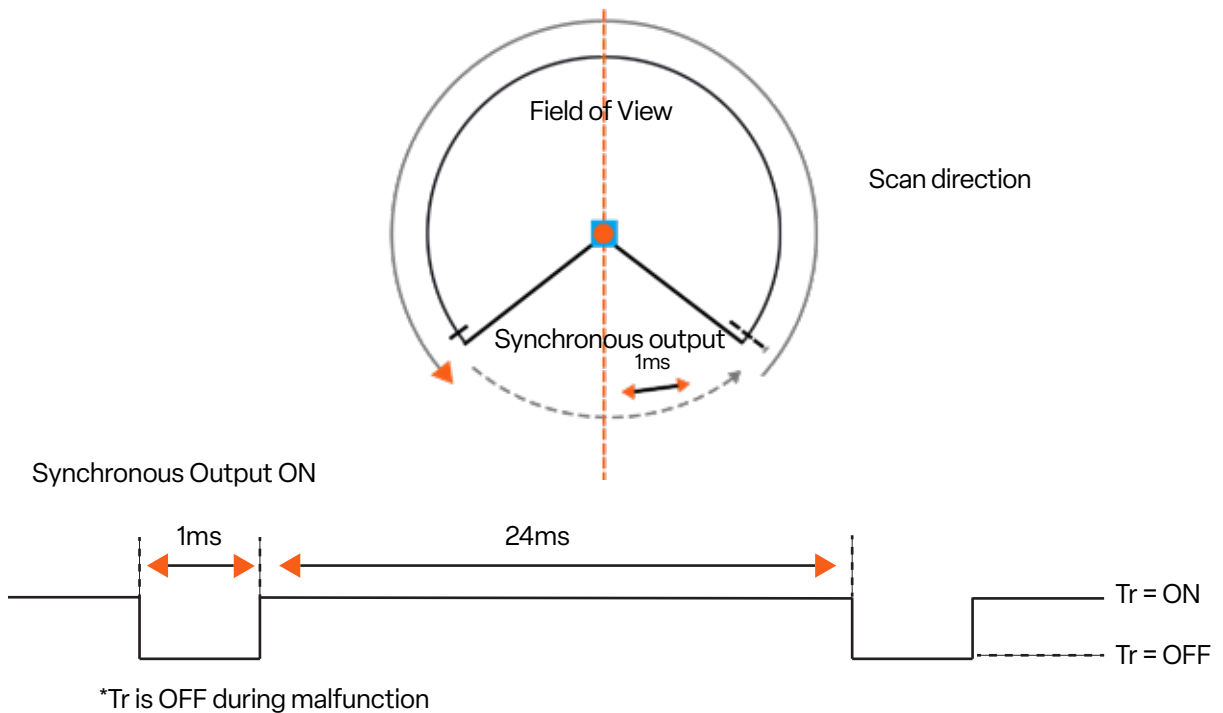
## 8. Input Circuit



## 9. Control signal

### 9-1. Synchronous output

1 pulse is approximately 1ms. Output signal synchronization timing chart is shown as below.



## 10. Ethernet Setting

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### 1. The setting value is as below:

IP Initial value :192.168.0.10

Port number :10940

### 2. About Initialization of IP address

To reset IP address to the factory default value, please provide power to input circuit (see Section 8) and connect IP RESET LINE to COM- for more than 2 sec.

After IP RESET LINE is disconnected from COM- or opened, the sensor LED blinks and the sensor starts to reboot.

## 11. Cautions For Operation

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This sensor uses high speed processing components that generate heat during operation.

The heat is concentrated at the bottom of the unit. When mounting, please attach the bottom of the unit to a good heat sink. A 200mm x 200mm x 2mm aluminum plate is recommended as a heat sink.

If multiple sensors are installed side by side, a sensor might mistake the laser pulses of other units as its own and the detection error occurs. When it happens, usually the error lasts for one or two steps of measurement. Please use software filters to handle this type of error.



ISO14001 Certified  
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ISO9001 Certified  
JQA-1742

- Read instruction manual carefully before use.
- Products published in this brochure are intended to be used under specific conditions.
- For product related questions or technical issues, please contact our offices.



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