Scanning Laser Range Finder
UTM-30LX/LN
Specification

Symbol	Amendment Details	Amendment	Date	Amended by	Number
⚠×2	Correction on synchronization output	2,4	2009.5.18	Takai	PR-5647
⚠×2	Changes in laser(λ:870n→ 905nm)	2,3	2009.4.14	Kamon	PR-5635
⚠×1	Correction	4	2008.8.18	Kamitani	PR-5503
⚠×1	Cautions were added	6	2008.5.1	Kamitani	PR-5466

Approved by	Checked by	Drawn by	Designed by	Title	UTM-30LX/LN	
	MORI	KAMITANI	HINO		Specification	
				Drawing No.	C-42-3615	1/6

1. Introduction

1.1 Operation principles   905nm ⚠3

UTM-30LX/LN use laser source (λ =~~870nm~~) to scan 270° semicircular field (Figure 1). It measures distance to objects in the range and co-ordinates of those point calculated using the step angle. Sensor's measurement data along with the angle are transmitted via communication channel. Laser safety class 1.
Sensor is divided into two types depending upon the type of output.

1.2 Type

1.2.1   U TM-30LX

Synchronous output signal is available. The timing chart of this signal is shown in section 6 (Figure 3). ⚠4 This synchronous signal can be obtain at each scan. These are mainly intended for robotic applications.

1.2.2   UTM-30LN

It outputs warning signal whenever there is any object in the preset area. These are mainly intended for area protection.

2. Structure (Laser range figure)

Detection Angle: 270°
Angular Resolution: 0.25°
Measurement Step: 1080
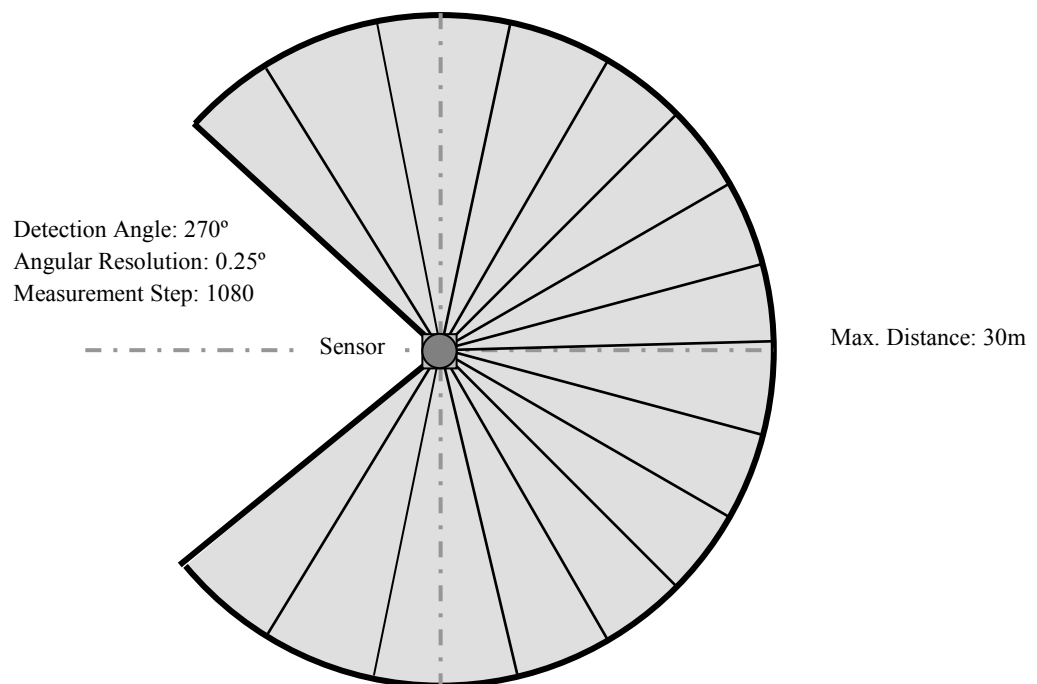
Sensor

Max. Distance: 30m

Figure 1

3. Important note

- This sensor is not a safety device/tool
- This sensor is not for use in military applications
- Read specifications carefully before use.

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4. Specifications

Product Name	Scanning Laser Range Finder	
Model	**UTM-30LX**	**UTM-30LN**
Light Source	Laser Semiconductor λ = ~~870nm~~ , 905nm ⚠️3 Laser Class 1	
Supply Voltage	12VDC ± 10%	
Supply Current	Max: 1A, Normal : 0.7A	
Power Consumption	Less than 8W	
Detection Range and Detection Object	Guaranteed Range: 0.1 ~ 30m (White Kent Sheet) Maximum Range : 0.1 ~ 60m Minimum detectable width at 10m : 130mm (Vary with distance)	
Accuracy	Under 3000lx : White Kent Sheet: ±30mm*[1] (0.1m to 10m) Under 100000lx : White Kent Sheet: ±50mm*[1] (0.1m to 10m)	
Measurement Resolution and Repeated Accuracy	1mm 0.1 – 10m : σ <10mm, 10 – 30m : σ <30mm (White Kent Sheet) Under 3000lx : σ = 10mm*[1] (White Kent Sheet up to 10m) Under 100000lx : σ = 30mm*[1] (White Kent Sheet up to 10m)	
Scan Angle	270º	
Angular Resolution	0.25º (360°/1440)	
Scan Speed	25ms（Motor speed : 2400rpm）	
Interface	USB Ver2.0 Full Speed (12Mbps)	
Output	Synchronous Output 1- Point	Warning Output 1- Point
Ambient Condition (Temperature, Humidity)	-10ºC ～ ＋50ºC Less than 85%RH (Without Dew, Frost)	
Storage Temperature	-25~75ºC	
Environmental Effect	Measured distance will be shorter than the actual distance under rain, snow and direct sunlight*[2].	
Vibration Resistance	10 ~ 55Hz Double amplitude 1.5mm in each X, Y, Z axis for 2hrs. 55 ~ 200Hz 98m/s^2 sweep of 2min in each X, Y, Z axis for 1hrs.	
Impact Resistance	196m/s^2 In each X, Y, Z axis 10 times.	
Protective Structure	Optics: IP64	
Insulation Resistance	10MΩ DC500V Megger	
Weight	210g (Without cable)	
Case	Polycarbonate	
External Dimension (W×D×H)	60mm×60mm×85mm MC-40-3127	

*[1] Under Standard Test Condition (Accuracy can not be guaranteed under direct sunlight.)

*[2] For sensor functions, please verify the in an indoor environment of 1000 lx or less. In avoiding unnecessary disturbance cause by the raindrops, perform necessary signal processing for LX type and switch OFF the delay function for LN type.

5.   Quality Reference Value

Vibration resistance during operation	10~150Hz 19.6m/s^2 Sweep of 2min in each X,Y,Z axis for 30min
Impact resistance during operation	49m/s^2 X, Y,Z axis 10 times
Angular Speed	2π/s (1Hz)
Angular Acceleration	π/2rad/ s^2
Life-span	5 Years (Varies with operating conditions)
Noise Level	Less than 25dB at 300 mm
Certification	FDA Approval (21 CFR part 1040.10 and 1040.11)

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6. Interface
6.1 Robot Cable 4 Pin

Color	Function
Brown	+12 V
Blue	0 V
Green	Synchronous Output/ Warning Output
White	COM Output (0V: Common to Power)

Note: 0 V of the power supply and Output is not internally connected. Connect it when it is necessary ⚠2

6.2 USB Connector
TYPE-A

Note:

SG for communication and GND are connected internally (Isolated with Input -VIN).
Isolate the device from any connection that generate electric noise.
This sensor is compatible with SCIP2.0 communication protocol standard.
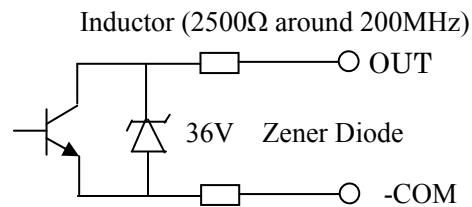
6.3 Output circuit diagram

Inductor (2500Ω around 200MHz)
○ OUT
36V   Zener Diode
○ -COM

Figure 2

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7. Control Signal
7.1 Synchronous Output (UTM-30LX)

1 pulse is approximately 1 ms. Output signal Synchronization timing chart is shown below. (Figure 3).
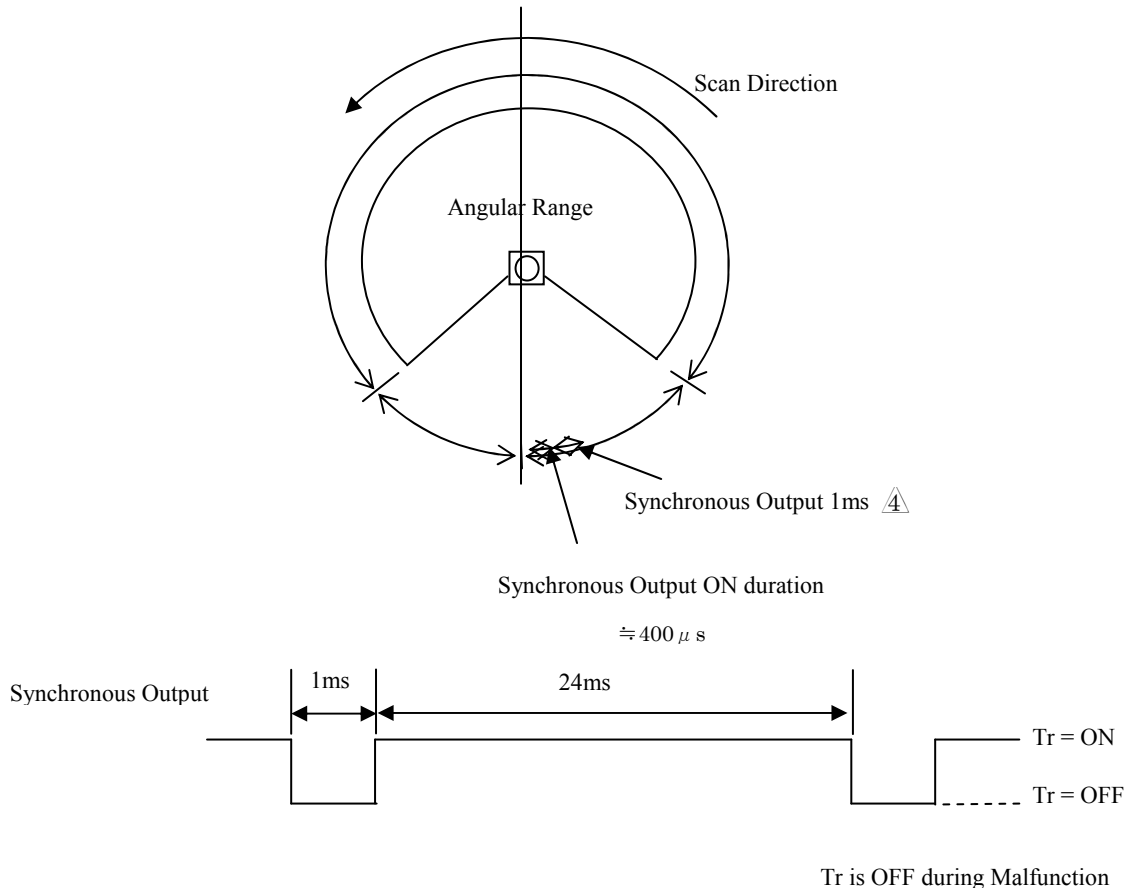
Scan Direction

Angular Range

Synchronous Output 1ms ⚠4

Synchronous Output ON duration

$\fallingdotseq 400\,\mu\,s$

Synchronous Output

1ms

24ms

Tr = ON

Tr = OFF

Tr is OFF during Malfunction

Figure 3

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7.2 Warning Signal (UTM-30LN)

Warning signal can be obtain by switching ON the signal through the application software. When the output signal is set fro warning signal, output signal switch OFF when obstacles exist inside the warning area. (Output signal is ON when obstacle does not exist.

Area can be set using 3~7 co-ordinate points.

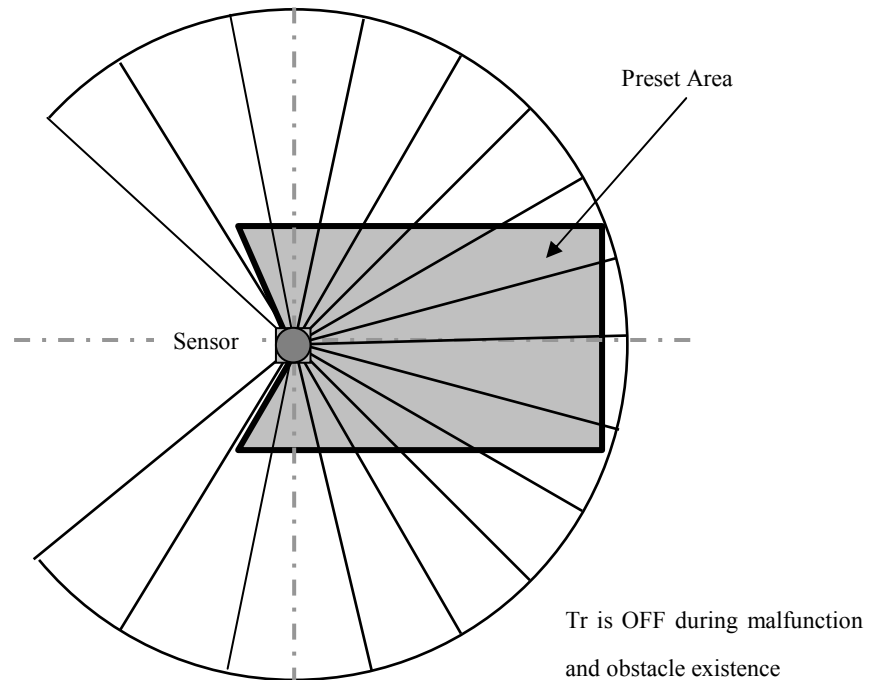Maximum of the output delay is 128 times (3.2 sec)

Example

Preset Area

Sensor

Tr is OFF during malfunction

and obstacle existence

Figure 4

8. Malfunction Output:

1. Laser malfunction : When laser does not radiate or exceeds safety class 1.
2. Motor malfunction : When rotation speed is differ from the default value (> 25 m/s).

Synchronous/Warning signal will be turned OFF when these malfunctions are detected. Error details can be obtain via communication.

9. Cautions ⚠

Heat is generated as the sensor runs at a very high speed. The heat generated is concentrated at the bottom of the sensor. Please mount heatsinks or any appropriate component to release the generated heat. An aluminum plate (200 x 200 x 2) is recommended as the heatsinks.

Error could happen when 2 or more identical sensor is mounted at the same detection plane. This is because the sensor could not identify the origin of the received laser pulses. When this error occur, it will cause 1 -2 step difference, performing data filtering could overcome this problem.

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