Date : October 28, 2014

Scanning Laser Range Finder

UXM-30LX-EW
Specification

Symbol	Amended reason	Page	Date	Name	No.
2 × 1	Correction of disclaimers	2	Oct28'14	S.Yamamoto	RS-00492
1 × 4	Specification changes due to function improvement; Correcting wrong descriptions.	3	Jun01'12	Setoguchi	RS-0076

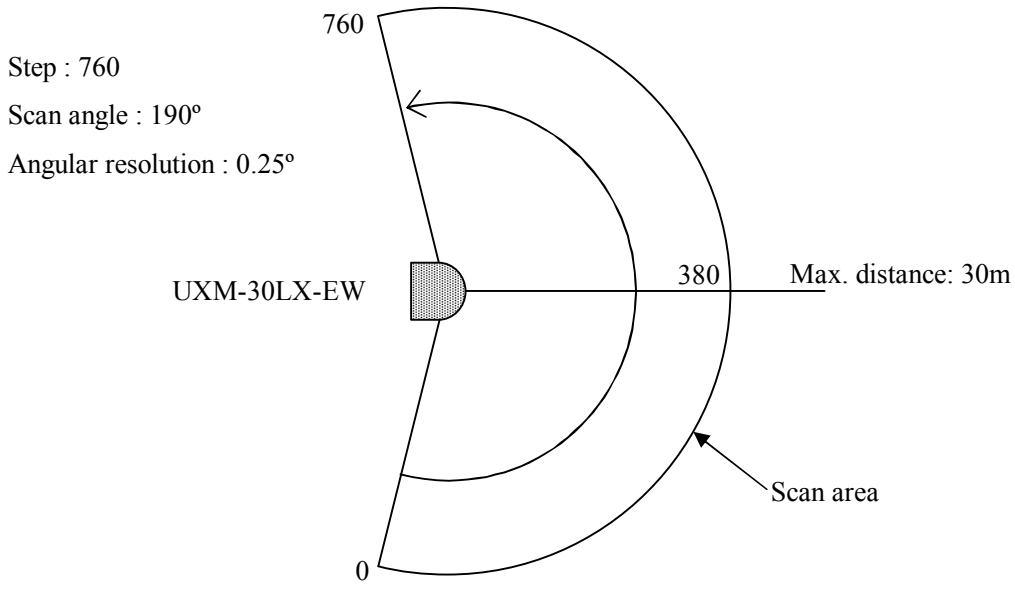
Approved	Checked	Drawn	Designed	Title	UXM-30LX-EW Specification	
TKamitani	M.Utsugi	S.Yamamoto	S.Yamamoto	Drawing No.	C-42-3796	1／7

1. Introduction

Operation principles

The UXM-30LX-EW uses a laser source (λ=905nm) to scan a semicircular field. The coordinates are calculated with the step angle and the distance data. The measurement data along with its angular step are transmitted via a communication channel. The laser safety level is class 1.

2. Structure (Laser range zone)



3. Important notes △2

- This sensor is not certified for the functional safety.
- This sensor cannot be used for human body detection as per the machinery directives.
- Sensor emits laser for measurement. Sensor's operation may become unstable under the influence of strong interference light or when emitted lights are not reflected back from the object.
- Sensor's operation may become unstable due to rain, snow and fog or due to dust pollution on the optical window.
- Rules and regulations related to safety should be strictly followed when operating the sensor.
- When there is a risk that this sensor is used for mass-destruction weapons, weapons and equipment aimed at killing human beings, and relevant technologies, etc., or when its usage for those purposes has become clear, sales may be prohibited in accordance with the Foreign Exchange and Foreign Trade Act, and the Export Trade Control Order (Japanese law). Moreover, regarding export of products, the formalities according to laws/Export Trade Control Order are implemented in order to maintain international peace and safety.
- Before using the sensor, please read this specification thoroughly.

4. Specifications

Product name	Scanning Laser Range Finder
Model	UXM-30LX-EW
Light source	Laser diode (λ= 905 nm) Class 1 (FDA)
Supply Voltage	DC10 to 30V
Supply Current	Regular current: DC10V(<600mA), DC12V(<600mA), DC24V(<250mA) ⚠1 Start-up current: DC10V(<2A), DC12V(<1.5A), DC24V(<0.75A)
Power consumption	< 6W(regular)
Detection range & Detectable width	Assured detection: 0.1 to 30m*2, Max. detectable distance: 100m (limitation of data output) Black(diffuse reflectance 10%), 500 mm×500 mm Min. detectable width: 65mm (5m), 130mm(10m), 400mm(30m) ⚠1
Accuracy	Under 3,000lx : ±50mm*1 (Black diffuse reflectance 10% at 10m, White Kent Sheet at 30m) Under 100,000lx : ±100mm*1 (Black diffuse reflectance 10% at 10m, White Kent Sheet at 30m)
Measurement resolution & Repeated accuracy	1mm Under 3,000lx : σ<50mm (Black diffuse reflectance 10% up to 10m, White Kent Sheet up to 30m) Under 100,000lx : σ<100 mm (Black diffuse reflectance 10% up to 10m, White Kent Sheet up to 30m)
Scanning angle	190º
Angular resolution	0.25º(360°/1440)
Scanning speed	50 ms (Motor speed: 1200rpm)
Interface	Ethernet 100BASE-TX (Auto-negotiation)
Output signal	2 Output signal: Error output, Synchronous output
Start up time	In 30 seconds from power on (However it might beyond 30 seconds depending on the condition) ⚠1
Indication light	Power(Green), Operation/Error(Orange): Operating(ON), Error(blink)
Ambient condition (Temperature, Humidity)	Operating: -10ºC to +50ºC 85%RH (Without condensation and frost)
Environmental resistance	Measured distance will be shorter than actual distance under rain, snow and direct sunlight working environment*2
Vibration resistance	10 to 55Hz double amplitude of 1.5mm in X, Y, Z direction for 2 hrs. 55 to 200Hz 19.6m/s^2 sweep 2 min, ⚠1 in X, Y, Z direction , 1hr for each direction
Shock resistance	196m/s^2 10 times each in X, Y, Z directions
Protection structure	IP67
Insulation resistance	10MΩ
Weight	800g
Casing material	Front casing & optical window: Polycarbonate Rear casing: Aluminum
Dimensions(W×D×H)	124 mm×126 mm×150 mm（excluding connector）

Note *1 Measurement under direct interference light is not assured (Sunlight etc.).
*2 Please verify the actual performance of the sensor under the intended working environment conditions

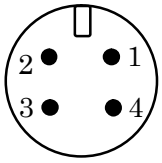
5. Wiring

5.1 Wire color and assigned functions

Power cable 8-pin (2 m)

Color	Function
Brown	+ V (10 – 30V)
Blue	-V (0V)
Green	Synchronous signal
Yellow	Error signal
Red	Output signal + COM
Black	Output signal – COM
White	NC
Purple	NC

5.2 Connector specification



Manufacturer : Binder
Model : 09-0431-87-04

Ethernet plug straight type (Binder, 99-0430-57-04)
Ethernet plug L-Shape type (Binder, 99-0430-69-04)

PIN	Function	Wire color(T568A)
1	TX+	White-Green
2	TX-	Green
3	RX+	White-Orange
4	RX-	Orange

RJ-45 module wiring chart

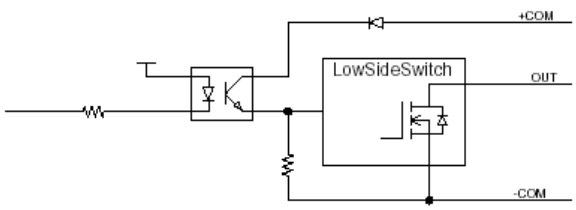
PIN	Color	
	Straight	Cross
1	White-Green	White-Orange
2	Green	Orange
3	White-Orange	White-Green
4	Blue	Blue
5	White-Blue	White-Blue
6	Orange	Green
7	White-Brown	White-Brown
8	Brown	Brown

Communication protocol used is SCIP 2.2

5.3 Output circuit

Nch open-drain operation (Low-side switch)

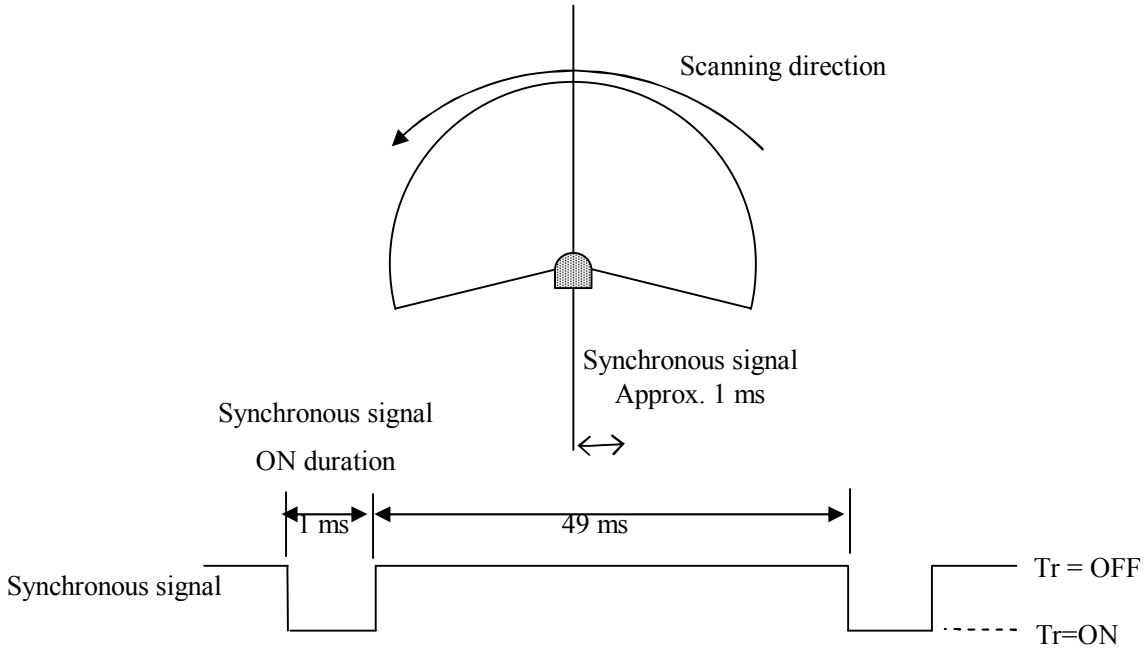
Item	Specification
Max. current	100mA
Max. excitation voltage	30 V
Residual voltage	< 1 V
+COM Power supply range	10 to 30 V



6. Control signal

6.1 Synchronous signal

One synchronous signal of approximately 1 ms is transmitted at each scan. The timing chart is shown in figure below



Tr is OFF during Malfunction

6.2 Error signal

(1) Laser error: When laser is not transmitting and laser class exceeds class 1
(2) Motor error: When the motor speed is differ from the default speed of 1200 rpm

Output signals will be turned OFF when these malfunctions are detected. The motor and laser will also stop. The details of error can be obtained via communication.

The cause of an error can be acquired from a "STAT" line of the "II" command response of the SCIP communications protocol. An error code and a solution acquired from a "STAT" line are as follows.

ID	Message	Meaning	Solution
000	no error	Normal	No action is required
050	internal chip access failed	Abnormal sensor processing system	Sensor has failed and needs to be repaired
100	Internal chip access failed	Abnormal sensor processing system	
150	internal chip access failed	Abnormal sensor processing system	
151	internal chip initialize failed	Sensor processing system failed to initialize	
200	encoder error.	Encoder error	
250	motor startup failed	Abnormality of the motor	
251	motor rotation error	Motor rotation is not stable	Reduce the vibration and noise to the sensor
300	laser too high	Abnormality of the laser light	Reduce the ambient light and noise to the sensor
301	laser too low	Abnormality of the laser light	
302	laser no echo	Abnormality of the laser light	
303	measurement error	The control process for measuring distance failed	Reduce the vibration and ambient light and noise to the sensor

[The meaning of the distance value]
The meaning of "x" distance value of each step is as follows.

Distance value "x"	Meaning
x ＜ 23	Measurement error. The distance cannot be measured due to light interference or noise.
23 ≦ x ＜ 100,000	Valid distance value [mm]
100,000 ＜ x	Object does not exist or the object has low reflectivity.

6.3 Relations between error indication LED and outputs

Status of Sensor	LED (Orange)	Synchronous output (Tr=)	Error output (Tr=)
Operation	ON	ON	ON
Start-up	Blinking (once every 2 seconds)	Indeterminate	OFF
Malfunction	Blinking (once every second)	OFF	OFF
Motor stopped (Sleep)	Blinking (once every 4 seconds)	OFF	ON
IP initialization	Pushing the IP initialization button more than 2 seconds Blinking 2 times → ON When the IP initialization is finished Blinking 4 times → ON (Sensor will be restarted)	ON	ON

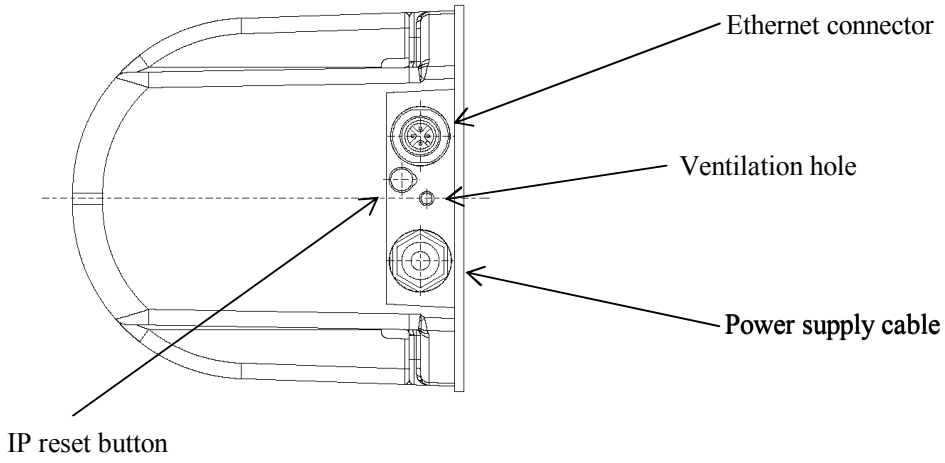
7. Ethernet configuration

7.1 Initial value

IP address: 192.168.0.10
Port number: 10940

7.2 IP initialization

Remove the rubber cap located at the side of the bottom cover of the sensor. Press and hold the switch inside this hole for more than two seconds in order to start the IP initialization process. Release the switch after the LED blinks in orange color. This indicates the restart of the sensor. Finally, please insert the rubber cap to its original position.


Ethernet connector
Ventilation hole
Power supply cable
IP reset button

UXM bottom