Hokuyo UST-20LX

The Hokuyo UST-20LX scanning laser rangefinder is a small, accurate, high-speed device for obstacle detection and localization of autonomous robots and automated material handling systems. This model uses Ethernet interface for communication and can obtain measurement data in a wide field of view up to a distance of 20 meters with millimeter resolution. Due to its low power consumption, this scanner is able to be used on battery-operated platforms.

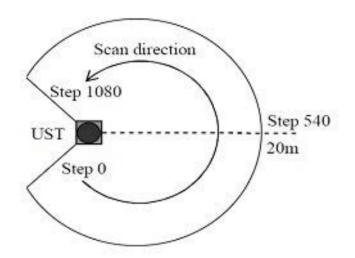


Features

- The smallest and the lightest of its kind, 130g
- Mid-detection range 10m/20m
- Wide detection angle 270
- Fast response 25msec
- High angular resolution 0.25°
- It is possible to detect size, position and the moving direction of objects

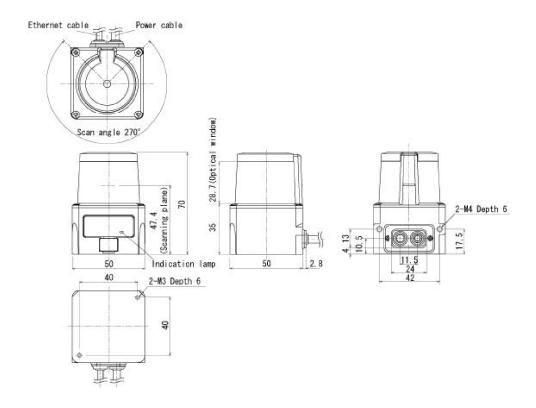
Laser scanning image

Measurement steps 1081
Detection angle 270°
Angular resolution 0.25°

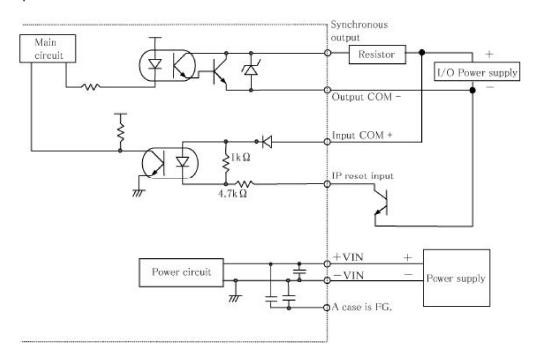




External dimensions



Output circuit





Connection

Power source I/O cable

Cable length: 1,000 mm flying lead cable (AWG28)

Color	Signal
Red	COM input+
Gray	COM output-
Light blue	IP reset input
Orange	Synchronous output
Brown	+VIN (12 VDC / 24 VDC)
Blue	-VIN

Ethernet cable

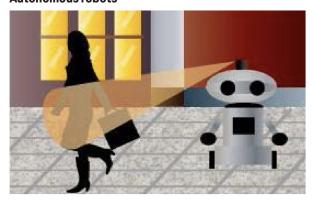
Cable length: 300 mm

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



Applications

Autonomous robots



Evironmental recognition

Air touch panel



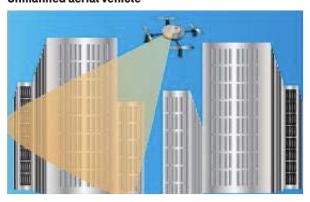
Projecting image linked with hands' motion

People counting



Counting the number of visitors at public facilities for marketing purposes $% \left(1\right) =\left(1\right) \left(1\right$

Unmanned aerial vehicle



Small and light enough to mount on UAVs for environmental recognition

Interactive exhibit



Interactive attraction

Analysis of human movement patterns



Adjusting air-conditioning and lighting depending on the density of people for energy saving $% \left(1\right) =\left(1\right) \left(1\right) \left($



Specifications

Supply current 150 mA or less (during start up 450 mA is necessary) Light source Laser semiconductor (905 nm), laser class 1 (EC60825-1:2007) Detection range 0.06 m to 10 m (white Kent sheet) 0.06 m to 20 m (white Kent sheet) 0.06 m to 4 m (diffuse reflectance 10%) Max. detection distance: 60 m Accuracy 2.40 mm *1 Repeated accuracy or < 30 mm *1 Scan angle 270° Scan speed 25 ms (motor speed 2,400 rpm) 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 4 m/a at 0N) Output Synchronous output, photo-coupler input (current 4 m/a at 0N) Output Synchronous output, photo coupler open collector output 30 VDC 50 mA MAX Interface Ethernet 100BASE-TX Power supply LED display (blue): Blinks during start up and malfunction state Surrounding intensity Less than 15,000 k 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 Vibration resistance 10 to 55 ft 2 double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction 56 to 200 Hz 98 m/s² sweep of 2 min for 30 min in each X, Y and Z direction Shock resistance (EM) ENSI326-1:2003 ENSI326-1:2009 ENSI326-1:	Product name	Scanning	Scanning Laser Range Finder		
Supply current 150 mA or less (during start up 450 mA is necessary) Light source Laser semiconductor (905 nm), laser class 1 (EC60825-1:2007) Detection range 0.06 m to 10 m (white Kent sheet) 0.06 m to 20 m (white Kent sheet) 0.06 m to 4 m (diffuse reflectance 10%) Max. detection distance: 60 m Accuracy 2.40 mm *1 Repeated accuracy or < 30 mm *1 Scan angle 270° Scan speed 25 ms (motor speed 2,400 rpm) 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 4 m/a at 0N) Output Synchronous output, photo-coupler input (current 4 m/a at 0N) Output Synchronous output, photo coupler open collector output 30 VDC 50 mA MAX Interface Ethernet 100BASE-TX Power supply LED display (blue): Blinks during start up and malfunction state Surrounding intensity Less than 15,000 k 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 Vibration resistance 10 to 55 ft 2 double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction 56 to 200 Hz 98 m/s² sweep of 2 min for 30 min in each X, Y and Z direction Shock resistance (EM) ENSI326-1:2003 ENSI326-1:2009 ENSI326-1:	Model	UST-10LX	UTS-20LX		
Light source Laser semiconductor (905 mm), laser class 1 (IEC60825-1-2007) Detection range 0.06 m to 10 m (white Kent sheet) 0.06 m to 30 m (white Kent sheet) 0.06 m to 40 m	Supply voltage	DC 12V / DC 24V (operation range 10 to 30 V ripple within 10%)			
Detection range 0.06 m to 10 m (white Kent sheet) 0.06 m to 20 m (white Kent sheet) 0.06 m to 4 m (diffuse reflectance 10%) Max. detection distance: 30 m Accuracy ± 40 mm *1 Repeated accuracy σ 30 mm *1 Scan angle 270° Scan speed 25 ms (motor speed 2,400 rpm) 0.25° Start up time Within 10 sec (start up time differs if malfunction is detected during start up) Input Ipreset input, photo-coupler input (current 4 mA at ON) Output Synchronous output, photo coupler open collector output 30 VDC 50 mA MAX Interface Ethernet 100BASE-TX LED display Power supply LED display (blue): Blinks during start up and malfunction state Less than 15,000 lx 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) Vibration resistance 10 to 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 150 Hz 19.6 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction 55 to 150 Hz 19.6 m/s² sweep of 2 min for 30 min in each X, Y and Z direction EMC standards EMC standards EMC standards EMC standards EMC standards FMS 1326-1:2013 ENG 1000-4-8:2009 E	Supply current	150 mA or less (during start up 450 mA is necessa	ry)		
Detection range 0.06 m to 4 m (diffuse reflectance 10%) Max. detection distance: 30 m Max. detection distance: 60 m M	Light source	Laser semiconductor (905 nm), laser class 1 (IEC60825-1:2007)			
Repeated accuracy Scan angle 270° Scan speed 25 ms (motor speed 2,400 rpm) 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 4 mA at 0N) Output Synchronous output, photo coupler open collector output 30 VDC 50 mA MAX Interface Ethernet 100BASE-TX LED display Power supply LED display (blue): Blinks during start up and malfunction state Less than 15,000 lx 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 55 hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 2 min for 30 min in each X, Y and Z direction Shock resistance 196 m/s² (200) X, Y and Z direction 10 times (EMI) EN61326-1: 2013 EN61326-1: 2013 EN61000-4-2:2009 EN61000-4-2:2009 EN61000-4-2:2009 EN61000-4-2:2009 EN61000-4-2:2009 EN61000-4-2:2010 EN6100	Detection range	0.06 m to 4 m (diffuse reflectance 10%)	0.06 m to 8 m (diffuse reflectance 10%)		
Scan angle 270° Scan speed 25 ms (motor speed 2,400 rpm) O.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 4 mA at ON) Output Synchronous output, photo coupler open collector output 30 VDC 50 mA MAX Interface Ethernet 100BASE-TX LED display Power supply LED display (blue): Blinks during start up and malfunction state Less than 15,000 lx 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 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction Shock resistance (operating) 55 to 150 Hz 19.6 m/s² sweep of 2 min for 30 min in each X, Y and Z direction Wibration resistance (operating)	Accuracy	± 40 mm *1			
Scan speed 25 ms (motor speed 2,400 rpm) 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 4 mA at 0N) Output Synchronous output, photo coupler open collector output 30 VDC 50 mA MAX Interface Ethernet 100BASE-TX LED display Power supply LED display (blue): Blinks during start up and malfunction state Surrounding intensity Less than 15,000 lx 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 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 2 min for 3 min in each X, Y and Z direction Shock resistance 196 m/s² (20G) X, Y and Z direction 10 times (EMI) ENGISSA-1: 2013 ENGISSA-1: 2013 ENGISSA-1: 2010 (EMS) PNGISSA-1: 2010 ENGISSA-1: 2010	Repeated accuracy	σ < 30 mm *1			
Angular resolution O.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 4 mA at 0N) Output Synchronous output, photo coupler open collector output 30 VDC 50 mA MAX Interface Ethernet 100BASE-TX LED display Power supply LED display (blue): Blinks during start up and malfunction state Surrounding intensity Less than 15,000 lx 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) Vibration resistance 10 to 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction Shock resistance 196 m/s² (20G) X, Y and Z direction 10 times (EMI) ENG1326-1: 2013 EN5301: 2009 + A1: 2010 (EMS) EN5301: 2009 + A1: 2010 (EMS) EN5301: 2009 + A1: 2010 (EMS) EN5300-4-2: 2009 EN61000-4-2: 2009 EN6100	Scan angle	270°			
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 4 mA at 0N) Output Synchronous output, photo coupler open collector output 30 VDC 50 mA MAX Interface Ethernet 100BASE-TX LED display Power supply LED display (blue): Blinks during start up and malfunction state Surrounding intensity Less than 15,000 lx 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 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction Shock resistance (EM) EMC standards EMC standards (EMI) EMS126-1: 2013 ENS1000 - 4-2: 2010 ENS1200 + 41: 2010 (EMS) ENS126-1: 2013 ENS1000 - 4-2: 2009	Scan speed	25 ms (motor speed 2,400 rpm)			
Input IP reset input, photo-coupler input (current 4 mA at 0N) Output Synchronous output, photo coupler open collector output 30 VDC 50 mA MAX Interface Ethernet 100BASE-TX LED display Power supply LED display (blue): Blinks during start up and malfunction state Less than 15,000 lx 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 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction Vibration resistance (operating) 55 to 150 Hz 19.6 m/s² sweep of 2 min for 30 min in each X, Y and Z direction Shock resistance (EMI) ENG 326-1: 2013 ENS5011: 2009 + A1: 2010 (EMS) ENG 1326-1: 2013 ENG 1000-4-2: 2009 ENG 1000-4-3: 2006 + A1: 2008 + A2: 2010 ENG 1000-4-3: 2009 ENG 1000-4-3: 2001 EN	Angular resolution	0.25°			
Output Synchronous output, photo coupler open collector output 30 VDC 50 mA MAX Interface Ethernet 100BASE-TX LED display Power supply LED display (blue): Blinks during start up and malfunction state Less than 15,000 lx 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 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction Vibration resistance (operating) 55 to 150 Hz 19.6 m/s² sweep of 2 min for 30 min in each X, Y and Z direction Shock resistance 196 m/s² (20G) X, Y and Z direction 10 times (EMI) ENG 326-1: 2013 ENS5011: 2009 + A1: 2010 (EMS) ENG 1326-1: 2013 ENG 1000-4-2: 2009 ENG 1000-4-2: 2009 ENG 1000-4-3: 2006 + A1: 2008 + A2: 2010 ENG 1000-4-3: 2009 ENG 1000-4-3: 2010 ENG 1000-4-3:	Start up time	Within 10 sec (start up time differs if malfunction is detected during start up)			
Ethernet 100BASE-TX LED display Power supply LED display (blue): Blinks during start up and malfunction state Less than 15,000 lx 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 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction Vibration resistance (operating) Shock resistance 196 m/s² (200g) X, Y and Z direction 10 times (EMI) EN61326-1: 2013 EN61300-4-2: 2009 EN61000-4-2: 2009 EN61000-4-2: 2009 EN61000-4-2: 2000 EN61000-4-2: 2000 EN61000-4-2: 2000 EN61000-4-2: 2010 EN61	Input	IP reset input, photo-coupler input (current 4 mA at ON)			
LED display Power supply LED display (blue): Blinks during start up and malfunction state Less than 15,000 lx 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 Vibration resistance 10 to 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction Stock resistance (operating) Sto 150 Hz 19.6 m/s² sweep of 2 min for 30 min in each X, Y and Z direction (EMI) ENG1326-1: 2013 ENS5011: 2009 + A1: 2010 (EMS) ENG326-1: 2013 ENG1000-4-2: 2009 ENG1000-4-2: 2009 ENG1000-4-2: 2009 ENG1000-4-2: 2009 ENG1000-4-8: 2010 E	Output	Synchronous output, photo coupler open collector output 30 VDC 50 mA MAX			
Surrounding intensity Less than 15,000 lx 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) -30° C to +70° C, below 85% RH (without dew, frost) 10 to 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction Vibration resistance (operating) 55 to 150 Hz 19.6 m/s² sweep of 2 min for 30 min in each X, Y and Z direction Shock resistance 196 m/s² (20G) X, Y and Z direction 10 times (EMI) EN61326-1: 2013 EN55011: 2009 + A1: 2010 (EMS) EN61326-1:2013 EN61000-4-3:2009 EN61000-4-3:2009 EN61000-4-3:2006 + A1: 2008 + A2: 2010 EN61000-4-8:2012 EN61000-4-8:2010 EN610	Interface	Ethernet 100BASE-TX			
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) -30° C to +70° C, below 85% RH (without dew, frost) 10 to 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction Shock resistance (operating) 55 to 150 Hz 19.6 m/s² sweep of 2 min for 30 min in each X, Y and Z direction [EMI] EN61326-1: 2013 EN55011: 2009 + A1: 2010 (EMS) EN61326-1:2013 EN61000-4-2:2009 EN61000-4-2:2009 EN61000-4-3:2006 + A1: 2008 + A2: 2010 EN61000-4-3:2009 EN61000-4-8:2010 Protective structure IP65 Weight 130 g (excluding cable) Front case: polycarbonate; Rear case: aluminum	LED display	Power supply LED display (blue): Blinks during start up and malfunction state			
Storage temperature and humidity -30° C to +70° C, below 85% RH (without dew, frost) 10 to 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction 55 to 150 Hz 19.6 m/s² sweep of 2 min for 30 min in each X, Y and Z direction Shock resistance 196 m/s² (20G) X, Y and Z direction 10 times (EMI) EN61326-1: 2013 EN65011: 2009 + A1: 2010 (EMS) EN61326-1:2013 EN61000-4-2:22009 EN61000-4-2:22009 EN61000-4-4-3:2006 + A1: 2008 + A2: 2010 EN61000-4-4:2012 EN61000-4-8:2010 Protective structure 1P65 Weight 130 g (excluding cable) Front case: polycarbonate; Rear case: aluminum	Surrounding intensity				
10 to 55 Hz double amplitude of 1.5 mm for 2 hrs in each X, Y and Z direction 55 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction	Ambient temperature and humidity	-10° C to +50° C, below 85% RH (without dew, frost)			
S5 to 200 Hz 98 m/s² sweep of 4 min for 1 hr in each X, Y and Z direction	Storage temperature and humidity	-30° C to +70° C, below 85% RH (without dew, frost)			
Shock resistance	Vibration resistance				
(EMI)	Vibration resistance (operating)	55 to 150 Hz 19.6 m/s² sweep of 2 min for 30 min in each X, Y and Z direction			
EMC standards EM5011: 2013 EN55011: 2009 + A1: 2010 (EMS) EN61326-1:2013 EN61000-4-2:2009 EN61000-4-2:2009 EN61000-4-3:2006 + A1: 2008 + A2: 2010 EN61000-4-4:2012 EN61000-4-8:2010 Protective structure IP65 Weight 130 g (excluding cable) Material Front case: polycarbonate; Rear case: aluminum	Shock resistance				
Weight 130 g (excluding cable) Material Front case: polycarbonate; Rear case: aluminum	EMC standards	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 EN61000-4-6:2019			
Material Front case: polycarbonate; Rear case: aluminum	Protective structure	IP65			
	Weight	130 g (excluding cable)			
Dimensions (W x D x H) 50 x 50 x 70 mm (sensor only)	Material	Front case: polycarbonate; Rear case: aluminum			
Simulation (Track Track	Dimensions (W \times D \times H)	$50 \times 50 \times 70$ mm (sensor only)			

 $[\]ensuremath{^{\star 1}}\xspace$. Under the factory standard testing conditions using white Kent sheet

