

2D Laser Scanners

LSE Series

INSTRUCTION MANUAL

TCD210013AD

Autonics

Thank you for choosing our Autonics product.

Read and understand the instruction manual and manual thoroughly before using the product.

For your safety, read and follow the below safety considerations before using.

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

Keep this instruction manual in a place where you can find easily.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Follow Autonics website for the latest information.

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow instructions may result in serious injury or death.

01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime / disaster prevention devices, etc.)

Failure to follow this instruction may result in economic loss, personal injury or fire.

02. Do not use the unit in the place where flammable / explosive / corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.

Failure to follow this instruction may result in fire or explosion.

03. This product is not safety sensor and does not observe any domestic nor international safety standard.

Do not use this product with the purpose of injury prevention or life protection, as well as in the place where economic loss maybe expected.

04. Do not connect, repair, or inspect the unit while connected to a power source.

Failure to follow this instruction may result in fire.

05. Check connections and connect cables.

Failure to follow this instruction may result in fire.

06. Do not disassemble or modify the unit.

Failure to follow this instruction may result in fire.

⚠ Caution Failure to follow instructions may result in injury or product damage.

01. Do not stare at the laser emitter.

Failure to follow this instruction may result in eye damage.

02. Use the unit within the rated specifications.

Failure to follow this instruction may result in fire or product damage.

03. Use dry cloth to clean the unit. Do not use water or organic solvent when cleaning the unit.

Failure to follow this instruction may result in fire.

04. Do not apply high pressure to the laser scanner to clean it.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- Power supply should be insulated and limited voltage / current or Class 2, SELV power supply device.
- After supplying power, the sensor performs self-check for about 10 sec. When self-checking, error occurrence, remote control setting, and teaching, the laser scanner outputs the same as it sensed obstacle.
- Mutual optical interference between laser scanners and photoelectric sensors may result in malfunction.
- Mutual optical interference between laser scanners may result in malfunction.
- Objects cannot be scanned when covering the front cover of the laser scanner.
- When the laser scanner is moved to another position, use it after re-teaching (Teach-in).
- Do not drop the unit. It may cause malfunction.
- Installing the laser scanner in the place where smoke, fog, dust, or corrosion is heavy may result in malfunction.
- When installing the laser scanner outdoors, take protective measures. Otherwise, it may result in product damage.
- Keep away from high voltage lines or power lines to prevent inductive noise. In case of installing power line and input signal line closely, use line filter or varistor at power line and shield wire at input signal line.
- Do not use the laser scanner near the equipment which generates strong magnetic force or high frequency noise.

- Cover with shields, hoods, or etc. to prevent direct incidence of strong light (direct rays of sunlight, incandescent) into the laser scanner beam spread angle.
- When fastening the laser scanner with the bracket, align with the mark line.
- When mounting the bracket onto an external object, remove the wire fixture so that the wire of the laser scanner is not pressed.
- Fix the laser scanner in position with the fixing screw. Vibration may result in malfunction.
- When IP address of the laser scanner and wireless router is same, the communication does not connected. Set the wireless network (Wifi) to "Disable" in the network settings of the Windows operating system.
- This unit may be used in the following environments.
 - Indoors / Outdoors (in the environment condition rated in 'Specifications')
 - Altitude max. 2,000 m
 - Pollution degree 2
 - Installation category II

Product Components

- Product
- 3 mm allen wrench × 1
- M2.6 × L6 Tapping screw × 2
- Instruction manual
- Bracket × 1

Software

Download the installation file and the manuals from the Autonics website.

■ atLiDAR

atLiDAR is the management program for laser scanner installation, parameter settings, status information and monitoring data, etc.

This program communicates with the laser scanner via Ethernet communication.

Manual

For proper use of the product, refer to the manuals and be sure to follow the safety considerations in the manuals.

Download the manuals from the Autonics website.

Sold Separately

- Remote control: RMC-LS

Network Setting

The laser scanner must be set identical with PC Network setting.

- Go to "Start > Control Panel > Network and Sharing Center > Change adapter settings > Ethernet > Properties".
Double click "Internet Protocol Version 4 (TCP/IPv4) > Properties".
- [Advanced] > Click the [Add] button of IP Address and add the laser scanner IP address.

IP address	192.168.0.3 to 192.168.0.254
Subnet mask	255.255.255.0

Order of Installation

For more information, refer to the atLiDAR software manual.

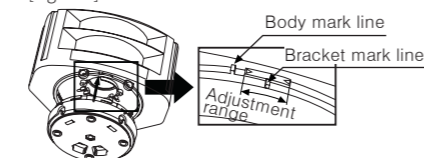
01. Install the laser scanner.

- Fix the bracket to the installation position using 4 hex socket bolts of above 5 mm.
- Pass the power, I / O and Ethernet cable through the holes in the bracket.
- After aligning one of the three indicator lines between the wrench holes on the side of the bracket with the indicator line on the main body, turn CW direction to be fixed. Rotate only within the adjustment range (-5 to 5°).

Refer to [Figure 1].

- Fix the hole in the bottom front of the main body to the bracket using M2.6 × L6 Tapping screw and screw driver.
- Adjust the bracket thilt angle (-3 to 3°) depending on the situation with a hexagon wrench in the wrench hole on the side of the bracket.

[Figure 1]



02. Install the laser scanner program, atLiDAR, to PC.

Download the software provided by Autonics website.

03. Connect the laser scanner and the PC, and set the network.

Refer to the Network Setting.

04. Laser scanner function setting

Use atLiDAR or remote controller, set each function to adequate the installation environment of the laser scanner and the obstacles to be detected.

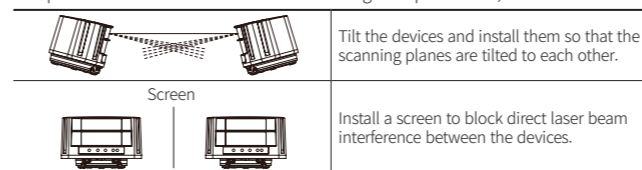
Cautions for Installation

- Install the unit correctly with the usage environment, location, and the designated specifications.
- Impact with hard objects or excessive bending of the wire lead-out may result in damage on the waterproof function.
- Please use after testing. Check if the indicator is working properly depending on whether the obstacle exists.
- In case of insufficient space between the cable and the mounting surface, excessive force may be applied on the cable.

The part **A** may require to be cut if necessary.

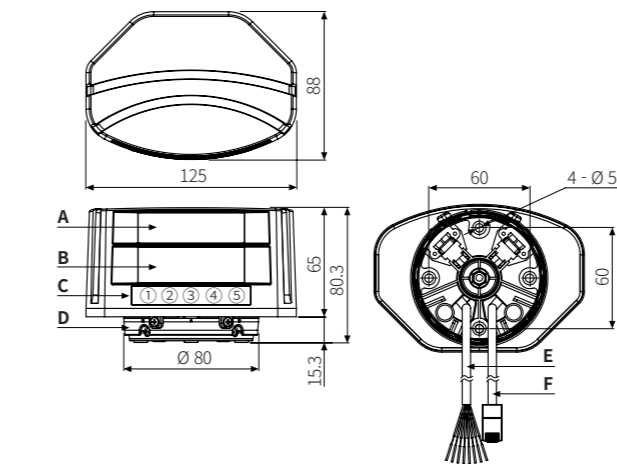
⚠ Caution: When using the tools, be careful not to be wounded.

- To prevent mutual interference when installing multiple devices, refer to the below.



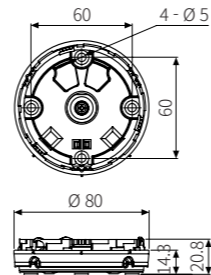
Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.



A	Laser emitter	C	Indicators	E	Power, I / O cable
B	Laser receiver	D	Bracket	F	Ethernet cable

■ Bracket



Connections

■ Power, I / O cable

Color	Signal	Function
Brown	+V	+V
Blue	GND	GND
Yellow	OUT1_A	Obstacle detection output
Green	OUT1_B	Obstacle detection output
Red	OUT2_A	Error status output
Gray	OUT2_B	Error status output
Black	IN_A	Output test mode
White	IN_B	

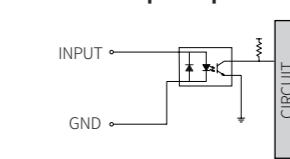
■ Ethernet cable

Pin	Signal
1	TX+
2	TX-
3	RX+
4	-
5	-
6	RX-
7	-
8	-

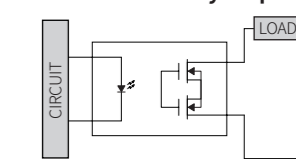
- The input / output signals can operate in both direction regardless of the polarity.
- When the photocoupler input is not used, do not wire both end of input terminal, or supply power under 3 VDC=.

Circuit

■ Photocoupler input



■ PhotoMOS relay output



Specifications

Model	LSE-4A5R2
Emitting property	Infrared laser
Laser class	CLASS 1
Wave length band	905 nm
Max. pulse output power	75 W
Response time	Typ. 20 to 80 ms + monitoring time
Scanning mode	Motion and presence
Monitoring zone	0.3 × 0.3 m to 5.6 × 5.6 m ⁽⁰¹⁾
Front contamination	Normal operation with max. 30 % contamination of one material
Min. size of the scanning target⁽⁰²⁾	At detection distance of 3 m: ≈ W 2.1 × H 2.1 × L 2.1 cm At detection distance of 5 m: ≈ W 3.5 × H 3.5 × L 3.5 cm
Angular resolution	0.4°
Aperture angle	90°
Object reflectivity	≥ 2 %
Laser scanner angle	-45°, 0°, 45°
Bracket rotation angle⁽⁰³⁾	-5 to 5°
Bracket tilt angle	-3 to 3°
Life expectancy	≤ 6.8 years
Approval	CE
Korean Railway Standards	KRS SG 0068
Unit weight (package)	≈ 0.58 kg (≈ 0.96 kg)

01) At object reflectivity: 10 %

02) At object reflectivity: 90 % (Kodak Gray card R-27, White)

03) Indicates the laser scanner adjustment range.

Power supply	24 VDC= ± 20 %
Power consumption	≤ 8 W
Communication interface	Ethernet (TCP/IP) 10BASE-T
Input	Photocoupler input H ⁽⁰¹⁾ : ≥ 8 - 30 VDC=, L: ≤ 3 VDC=
Output	PhotoMOS relay output Galvanic isolation, non-polarity Resistive load: 30 VDC= / 24 VAC~, ≤ 80 mA Output resistance: 30 Ω Switching time: t _{ON} = 5 ms, t _{OFF} = 5 ms
Insulation resistance	≥ 5 MΩ (500 VDC= megger)
Dielectric strength	500 VAC ~ 50 / 60 Hz for 1 minute
Vibration	≤ 2 G (18.7 m/s ²)
Shock	30 G / 18 ms
Ambient illuminance	Sunlight: ≤ 100,000 lx
Ambient temperature⁽⁰²⁾	-30 to 60 °C (no freezing or condensation)
Ambient humidity	0 to 95 %RH, storage: 0 to 95 %RH (no freezing or condensation)
Protection structure	IP67 (IEC standard)
Cable spec.	Power, I / O cable: Ø 5 mm, 8-wire, 5 m Ethernet cable: Ø 5 mm, 4-wire, 3 m, shield cable, RJ45 connector
Wire spec.	AWG26 (0.16 mm, 7-core), insulator outer diameter: Ø 1 mm
Material	PC

01) Operates as output test mode and outputs obstacle detection output and error status output.

02) Ambient temperature in power supplied status is -30 to 60°C and in power cut status is -10 to 60°C.

Control Input / Output Status

Output Input	OUT1 (obstacle detection output)	OUT2 (error status output)
ON	ON	ON
OFF	ON	ON
OFF	OFF	OFF