SDKELI®

LSE Series Laser Lidar -
Measurement Type

OPERATION MANUAL

(March 2022)

Shandong Keli Opto-electronic Technology Co., Ltd.

■ Directives and standards

LSE series laser lidar (referred to as LSE) meets the following standards:

- European Union Directive EMC Directive 2014/30/EU
- International standard

  EMI: EN61326-1: 2013

  EN55011: 2009 + A1: 2010

  EMS: EN 61326-1: 2013

  EN 61000-4-2: 2009

  EN 61000-4-3: 2006 + A1: 2009 + A2: 2010

  EN 61000-4-4: 2004 + A1: 2010

  EN 61000-4-6: 2009

  EN 61000-4-8: 2010

  EN 61000-4-11: 2004
- GB standard

  GB 4028

■ Safety precautions

The following safety warning signs are used to warn potential personal injury hazards, please follow all safety information with this symbol to avoid possible injury.

⚠CAUTION

This is a key information prompting sign.
Sign contents are very important.
Operators must understand content requirements and implement the operations in strict accordance with the requirements, so as to avoid possible accidents.

⚠WARNING

This is a safety warning sign.
Sign contents are very important.
Operators must strictly enforce the safety information prompted on the sign, so as to avoid possible accidents.

■ Safety precautions for use

⚠CAUTION

- Before using LSE, please carefully read this manual carefully to understand the procedures and requirements of installation, operation and setting.
- LSE should be selected, installed, overhauled and maintained by professionals. Professionals refer to the people who have been professionally trained and accredited, or people who have a wealth of knowledge, training and experience and the ability to solve such problems.
- Do not drop LSE.
- LSE should be used in accordance with local relevant standards and laws and regulations.
- Users should establish rules and regulations for safe operation and management and implement them effectively.

■ Applications

The measurement LSE is applicable to the region detection and navigation of mobile robots and the typical application includes storage robots and service robots.

- The detection objects of LSE must meet the following conditions:

1) Be able to detect the objects within the scope of ability only.

2) LSE cannot detect transparent and semitransparent objects.

- Do not install LSE in the following environments:

3) Places outside the scope of environment parameters (temperature, humidity, interference light, impact vibration, etc.) specified in this Operation Instructions.

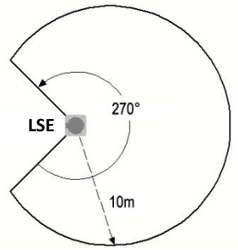
4) Places with flammable and explosive gas.

5) Places with dense smoke, particles, corrosive chemicals and other substances.

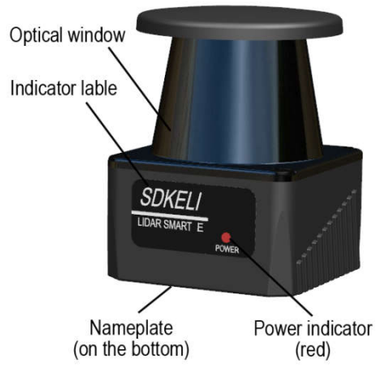
6) Places that may have strong light interference (e.g. direct light) with LSE.

1. Working principles

LSE is designed based on pulsed laser ranging principles to realize the two dimensional zone detection with an angle of 270° and radius of 10m through rotational scanning.



2. Appearance information



State of power indicator	Corresponding sate of lidar
Slow flashing	Starting state
Continuous on	Operating state
Fast flashing	Fault state

3. Specification

Series		Max. scan radius	Scan angle	Output form	Max. measurement error	Angle resolution	Installation code
LSE	—	□□	27	□□/	□	□□/	□□

Specification	Max. scan radius	Output form	Max. measurement error	Angle resolution
LSE-1027DE/H03	10m@70％ reflectance 4m@10％ reflectance	Ethernet output	±3cm@1sigma	0.33°
LSE-2027DE/H03	20m@70％ reflectance 8m@10％ reflectance		±3cm@1sigma	0.33°

Scanning angle: 270°

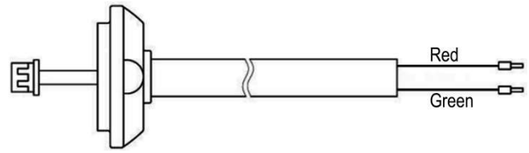
Installation code: SZ—Horizontal installation

4. Power cable

■ The network interface is an RJ45 standard connector, the cable length is 1m.

No.	Core color	Signal definition
1	White/Orange	TX+
2	Orange	TX−
3	White/Green	RX+
4	Green	RX−

■ The structure of power cable is shown below, and the standard length is 1 m.



No.	Core color	Signal definition	Signal description
1	Red	24V	Working power supply
2	Green	0V	

5. Technical parameters

Optical properties			
Laser light source	Wavelength: 905nm; Class A laser product		
Max. scanning radius	10m@70％ reflectance 4m@10％ reflectance	20m@70％ reflectance 8m@10％ reflectance	
Scanning angle	270°	Angle resolution	0.33°
Pitch angle	±1.0°		
Response time	36ms/1 scan		
Max. measurement error	Typical ±3cm		
Electrical / mechanical parameters			
Supply voltage	DC9V to DC30V		
Power-on time	Typical 8s		
Power consumption	Typical 3W		
Output	Ethernet UDP protocol output		
Dimensions	64mm×62mm×83mm		
Cable length	Standard length 1m		
Environmental properties			
Ambient temperature	Work: -10℃ to 50℃ (no frost or condensate fog) Storage: -40℃ to 70℃		
Ambient humidity	Work: 35%RH to 85%RH Storage: 35%RH to 95%RH		

Ambient light immunity	15000Lux	
Enclosure rating	IP65	
Shock resistance	Acceleration: 10g; pulse duration: 16ms; Number of collision times: three axes, 1000 ± 10 times per axis	
Vibration resistance	Frequency 10Hz ~ 55Hz; amplitude: 0.35 ± 0.05mm; Number of scans: three axes, 20 times per axis	
Electromagnetic compatibility (EMC)	EMI	EN61326-1：2013 EN55011：2009+A1:2010
	EMS	EN61326-1：2013 EN61000-4-2：2009 EN61000-4-3：2006+A1:2008+A2:2010 EN61000-4-4：2004+A1:2010 EN61000-4-6：2009 EN61000-4-8：2010 EN61000-4-11：2004

6. Measurement data

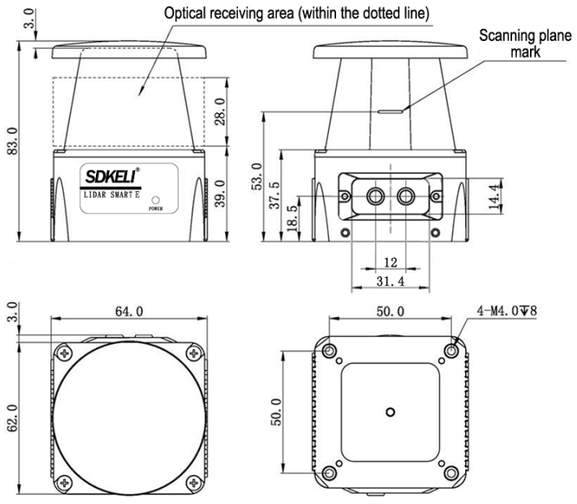
Measurement value (X)	Meaning
X=1	System failure
1＜X≤50000	Normal measurement value (cm)
X＞50000	The target does not exist or the object reflectivity is low

7. Ethernet configuration

Default IP address: 192.168.0.10

Port number: 2112

8. Dimensions

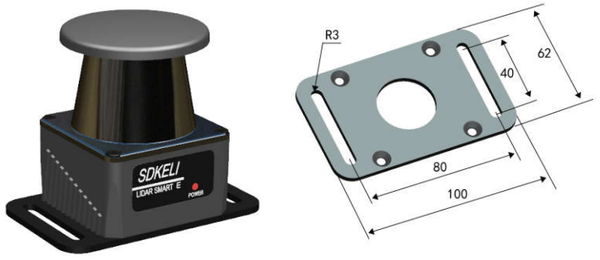


CAUTION

In the scanning area set by the user, when the scanning optical axis is at any angle, it must be ensured that there is no obstacles in the optical receiving area.

9. Installation

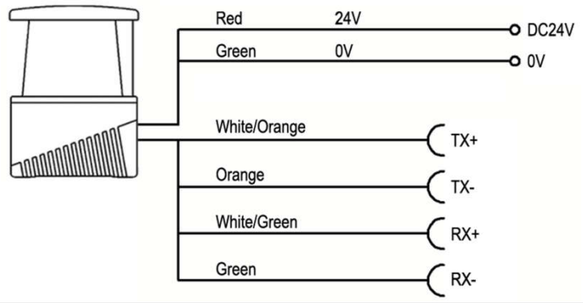
■ **Horizontal installation (SZ)**



CAUTION

- To prevent the light from being projected to the ground, the installation height of LS should not be smaller than 200mm.
- Try to keep LSE away from the vibration area during installation.
- During installation, there should be no obstacles in the optical receiving area shown in the following below.

10. Wiring



WARNING

- Please read this manual carefully before wiring.
- Wiring must be conducted when the power is cut off.
- Double insulation or reinforced insulation must be used between all input and output interfaces and dangerous voltage. Otherwise, electric shock may be caused.
- The cable of LSE must be kept away from high-voltage wires and power lines.
- It is strictly forbidden for users to replace the cable without permission.
- Conduct correct wiring after defining the signal meanings of all terminals.