SDKELI®

LSPD mini Safety Laser Scanner

Operation Manual

(March 2018)



Shandong Keli Photoelectric Technology Co., Ltd.

■ Directives and Standards

LSPD mini safety laser scanner(referred to as LSPD mini) meets the following standards:

➢ European Union Directive

Machinery Directive 2006/42/EC
EMC Directive 2014/30/EU

➢ European Standards

EN61496-1(Type3)
EN61496-3(Type3)
EN60825-1(class 1 laser product)
EN13849-1(PL d)

➢ International Standards

EN61496-1(Type3)
EN61496-3(Type3)
EN13849-1(PL d)

➢ National Standards

GB/T19436.1
GB19436.3
GB4208(IP65)

■ 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.

⚠ Note

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 Precaution

⚠ Note

➢ To prevent the light from being projected to the ground, the installation height of LSPD mini should not be smaller than 200mm. Try to keep LSPD mini away from the vibration area during installation.
➢ When the USB interface is opened, water vapor and dust should be prevented from entering the LSPD mini. In order to achieve the IP65 protection grade in use, please close the black seal cover on the USB interface.
➢ Do not drop LSPD mini。
➢ LSPD mini 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

LSPD mini is mainly used in industrial site. The typical application contains protection for fixed danger area and guidance and Anti-collision for automated guided vehicle (AGV) .

➢ The protection object of LSPD mini must meet the following conditions:

1) Only protect the objects that go into the protected area.
2) LSPD mini can not detect transparent or translucent objects.
3) Size of objects that invade that invade the protective area must greater than or equal to the detection capability.

➢ Do not install LSPD mini in the following types of environment:

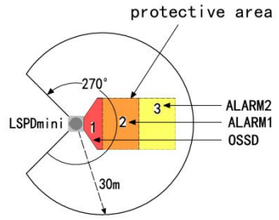
1) Places outside the range of environment specified in the Operation Instructions (temperature, humidity, interference light, impact and vibration).
2) Places with flammable or explosive gas.
3) Places with smoke, particles, corrosive chemicals and other substances.
4) Places that may generate strong light interference (such as direct light) on the LSPD mini.

1. Working Principles and Protection Zone

Configuration

LSPD mini is designed based on pulsed laser ranging principles to realize the two dimensional zone detection with an angle of 270° and radius of 30m through rotational scanning.

Users can configure the quantity and shape of protecti zone through the configuration software.



Introduction to the configuration of obstacle avoidance protection zone of mobile robot

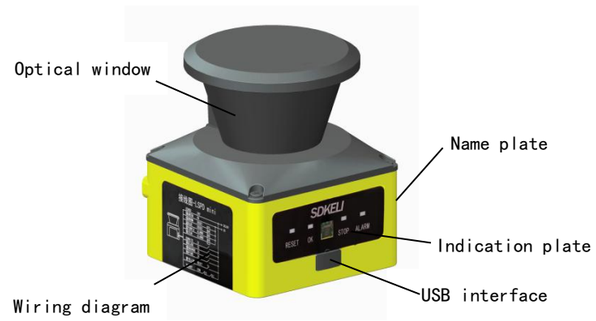
Identification	Meaning	Description
3	Warning zone 2	ALARM2 will enter OFF state when any obstacle is detected
2	Warning zone 1	ALARM1 will enter OFF state when any obstacle is detected
1	Protection zone	OSSD1/OSSD2will enter OFF state when any obstacle is detected

2. System Composition

The LSPD mini system is composed of one laser scanner, one configuration cable and configuration software. The user can use the configuration cable to connect the laser scanner with the computer, and set the relevant parameters such as the protection zone through the configuration software.



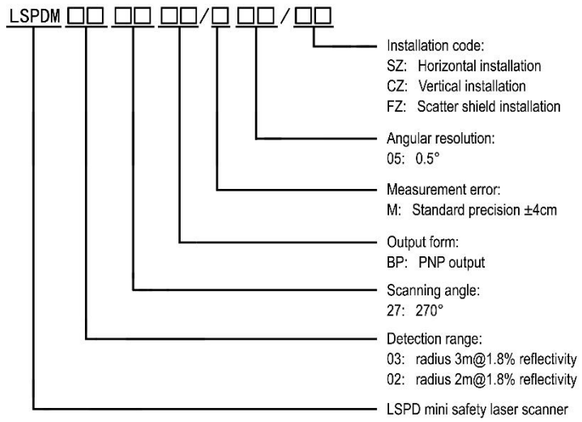
3. Appearance



⚠ Note

Be sure to press the black sealing cover on the USB interface tightly to prevent moisture, dust, etc. from entering the LSPD mini, so as not to affect the use and life of the scanner.

4. Specifications

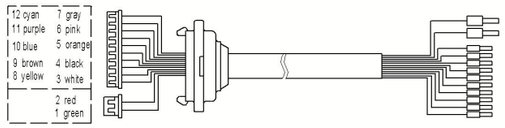


5. Transmission cable

The configuration cable is a standard micro USB data cable, one end of which is micro USB interface and the other end of which is USB interface. The cable is 1.5 m long.

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

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No.	Color	Signal definition	Signal description
1	Green	0V	Working power supply
2	Red	24V	
3	White	Z1	Zone group selection signal. Switching among multiple protection zones can be achieved through the changes in Z1, Z2, Z3 and Z4 input signals.
4	Black	Z2	
5	Orange	Z3	
6	Pink	Z4	
7	Gray	EDM	External contact monitor input signal. When OSSD is ON, EDM=0V; when OSSD is OFF, EDM=24V
8	Yellow	RESET	When manual rest, input reset signal to release output lock to start again.
9	Brown	OSSD1	2 independent NPN output, ON, maximum Iout = 200mA, Vout≥Vcc-2V OFF, Iout ＜ 1mA, Vout ＜ 2V
10	Blue	OSSD2	
11	Purple	ALARM1	2 independent NPN output, ON, maximum Iout = 200mA, Vout≥Vcc-2V OFF, Iout ＜ 1mA, Vout ＜ 2V
12	Cyan	ALARM2	

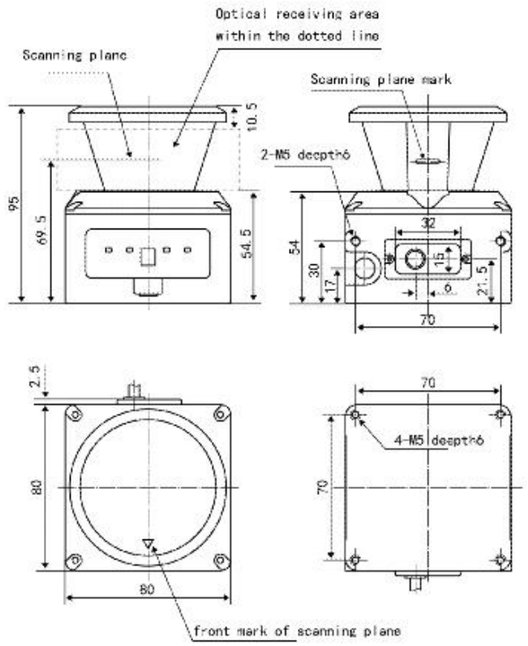
6. Technical Parameters

Safety category	Type 3 (IEC61496), PL d (ISO13849)
Executive standard	2006/42/EC (Machinery Directive), 2014/30/EU (EMC Directive), IEC61496-1, IEC61496-3, ISO13849-1
Reference standard	GB/T19436.1, GB19436.3, GB4208(IP65), EN60825-1(class 1 laser product)
Optical properties	
Laser light source	Wavelength: 905nm; Class 1 laser product
Maximum detection range	Radius 3m@1.8% reflectivity
Scanning angle range	270°	Angular resolution	0.5°
Measurement error	±4cm		
Electrical / mechanical parameters			
Working voltage	DC9V～DC30V	Consumption	＜5W (No load on the output end))
Response time	40ms/r (adjustable)		
Power-on time	Typical value 8s		
Safety output (OSSD)	PNP×2 (ON condition: Maximum I_{OUT}=200mA, V_{OUT} ≥V_{CC}-2V, OFF condition: I_{OUT}＜1mA, V_{OUT}＜2V。). Overcurrent protection, capacitive load ≤60nF. ON when there is no object in protection area and OFF condition when there is object in protection area		
Alarm output(ALARM)	PNP×2 (ON condition: Maximum I_{OUT}=200mA, V_{OUT} ≥V_{CC}-2V, OFF condition: I_{OUT}＜1mA, V_{OUT}＜2V。). Overcurrent protection, capacitive load ≤60nF. ON when there is no object in warning area and OFF condition when there is object in warning area		
dimension	80mm×80mm×95mm	Cable length	≤30m
Environmental properties			
Ambient temperature	Work: -10～55℃, storage: -40～70 ℃, no frost or condensate fog		
Ambient humidity	Work: 35%RH～85%RH, storage: 35%RH ～95%RH		
Anti-light interference	15000Lux		
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		
Protection grade	IP65		
Configurable functions			
Defense zone configuration	User can configure the defense zone of LSPD mini to the desired shape by configuring the software.		
Response time	80ms (2 scanning cycles) ～640ms (16 scanning cycles), 80ms by default		
Reset function	Automatic reset or manual reset available, default automatic reset		
External device monitor (EDM)	When external relay or contactor is loaded, monitor condition of load normal closed contact. Default EDM is forbidden.
Area group change	Switch of 16 different area groups can be realized by 4 group of external input singal(Z1, Z2, Z3, Z4). Default setting is area group 1 work when Z1, Z2, Z3, Z4 is not be connected

7. Indicator identification

Identification	Indicator	Color	Description
RESET	reset	red	Under the manual reset mode, the light is on when an object has been detected in the protective area. Reset indicator will flicker one time when window calibration is being carried out.
OK	normal	green	The light is on when no object detected in protection area, OSSD output ON, the controlled machine is allowed to work.
STOP	stop	red	The light is on when object detected in protection area, OSSD output OFF, the controlled is not allowed to work.
ALARM	warning	red	The light is on when object detected in warning area, ALARM output ON

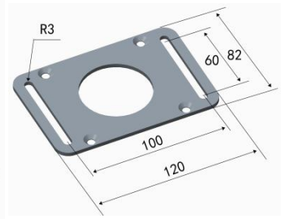
8. Dimensions



9. Installation

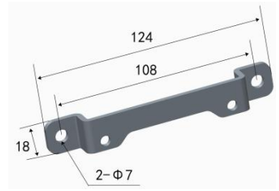
■ **Horizotnal installation (SZ)**





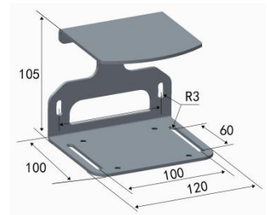
■ **Vertical installation way (CZ)**



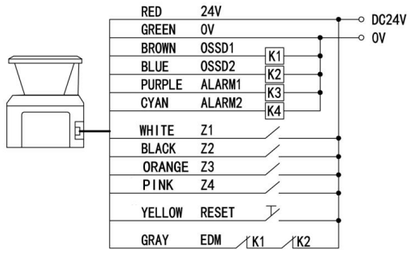


■ **Protective cover installation (FZ)**





10. Wiring



Warning

- Wiring must be conducted after the power is cut off
- Double insulation or reinforced insulation must be used between all input and output interfaces and dangerous voltages.
- Cable of LSPD mini must be kept away from high-voltage cable and power cable
- Users should not replace the cable without permission

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