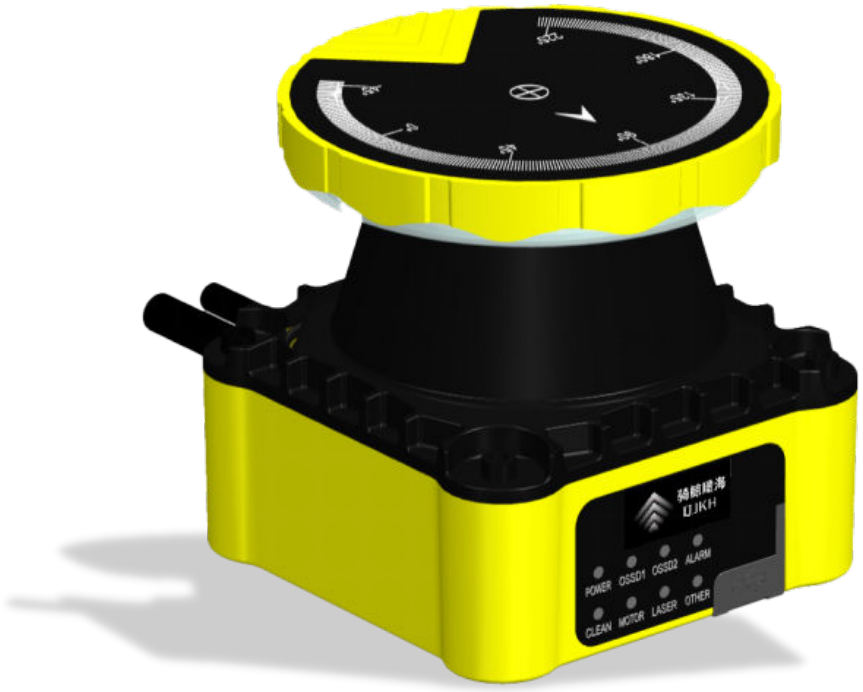
骑鲸瞰海
QJKH

SH27-05S
Safety Laser Scanner
Product Specification



CCH Technology & Intelligence Co., Ltd

Product Introduction

The SH series safety laser scanner is a high-performance single line lidar based on the direct time of flight (dTOF) ranging principle; Compliant with high-level safety requirements of Type 3 (IEC 61496), SIL2 (IEC 61508), Cat. 3 (ISO 13849-1), PL d (ISO 13849-1).

This product establishes a definable protection area through an invisible laser beam, which is used to protect hazardous areas and achieve protection of work hazardous points, passages, or material rack hazardous areas; Especially suitable for various application scenarios such as safe navigation and obstacle avoidance, regional security monitoring, etc.

Technical Parameters

Table 1 Technical Parameters Table

Detection Parameters	
Maximum Protection Radius	5 m @ 1.8% reflectivity
Detection Radius	40 m @ 70% reflectivity
Alarm Zone Radius	20 m
Measurement Range (Limit Value)	60m
Scanning Angle	276°
Angular Resolution	0.1°
Refresh Frequency	30 Hz
Tolerance Zone (TZ = Tolerance Range of Safety Laser Radar)	65 mm
Minimum Detectable Object (Object Resolution (Detection Capability)	70 mm @ Maximum Radius of Protection Zone
Electrical and Mechanical Parameters	
Operating Voltage	DC 24 V ±20%
Power-on Startup Time	Typical value 10 s
Refresh Frequency	30 Hz
Power Consumption	< 5 W (no load)
Configuration Interface	Type-C
Safety Output (OSSD)	PNP output (ON state: max IOUT = 100 mA, VOUT ≥ VCC-2 V; OFF state: IOUT < 1 mA, VOUT < 2 V), over current protection, capacitive

	load ≤1uF. ON state when no object in protection zone; OFF state when object detected or fault occurs
Auxiliary Output	PNP output, max IOUT = 100 mA, VOUT ≥ VCC-2 V; OFF state: IOUT < 1 mA, VOUT < 2 V), over current protection
Overall Dimensions	80 mm × 80 mm × 79.5 mm
Weight (including end cap cable)	420 g
Housing Color	Yellow
Ambient Temperature	Operating: -10 °C – 50 °C (no frost or condensation)
	Storage: -40 °C – 70 °C
Ambient Humidity	Operating: 35% RH – 95% RH
	Storage: 35% RH – 95% RH
Light Interference Immunity (Incandescent Lamp)	3000 lux
Shock Resistance	Acceleration 10 g Pulse duration: 16 ms Collision count: three axes, 1000 ± 10 times per axis
	5M1 (IEC TR 60721-4-5) 50 m/s²; 11 ms
Vibration Resistance	Frequency 10 Hz – 55 Hz Amplitude: 0.35 ± 0.05 mm Sweep count: three axes, 20 times per axis
	5M1 (IEC TR 60721-4-5) Sine: 1.5 mm, 2–9 Hz Random: 0.3 m²/s³, 10–200 Hz
Protection Rating	IP65
Safety Standards	Type 3 (IEC 61496-3:2018)
	SIL 2 (IEC 61508:2010)
	Cat. 3 (ISO 13849-1:2023)
	PL d (ISO 13849-1:2023)
Electromagnetic Compatibility (EMC)	EN IEC 61326-1:2021
	EN 61000-4-2:2009
	EN 61000-4-3:2020
	EN 61000-4-4:2012
	EN 61000-4-6:2014
	EN 61000-4-8:2010
Configurable Functions	

Zone Configuration	Users can configure the SH zone into the desired shape via the configuration software
Response time	$t_R = n \times (m+1)$ • t_R = Response time • n = Set scanning period • m = Set number of scans The scanning period is determined by the motor speed, default is 30 Hz, corresponding to a scanning period of (1000/30) ms = 33.4 ms. Users can configure the response time by setting the number of scans. The setting range is 100 ms–567 ms, corresponding to 2–16 scans.
Zone Group Switching	Configure INPUT1–INPUT8 and General IO1–General IO4 to achieve static input switching of 64 monitoring instances and 64 zone groups; dynamic input switching of 256 monitoring instances and 64 zone groups

Working Principle and Protection Zone Configuration

The SH type safety laser radar is an electro-sensitive protective equipment (ESPE), based on the laser ranging principle, achieving two-dimensional area protection through rotational scanning;It uses invisible laser beams to establish a protection zone, mainly for protecting hazardous areas, ensuring protection of hazard points, access, and hazardous areas. Users can configure the number and shape of protection zones through the configuration software.

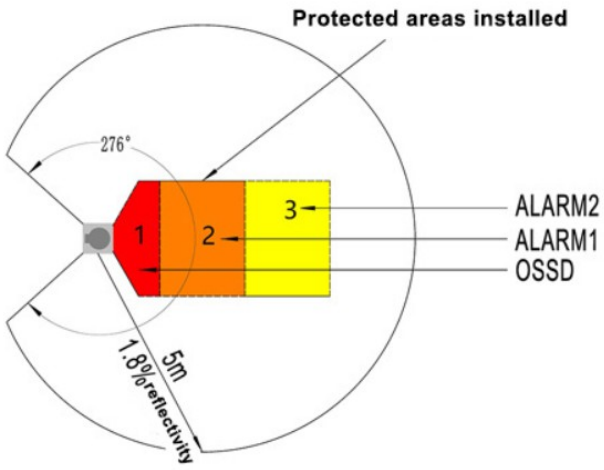


Figure 1 Protection Zone+Warning Zone mode

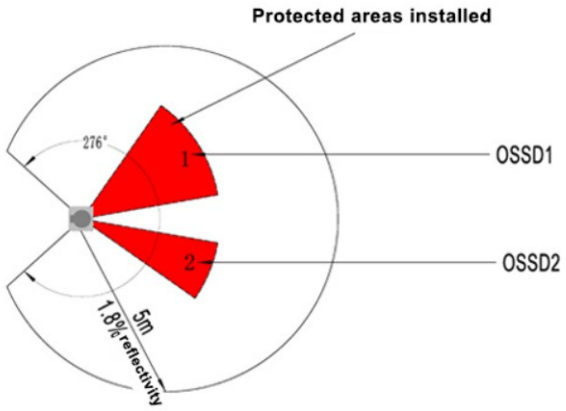


Figure 2 Dual Protection Zone mode

Symbol	Meaning	Symbol	Meaning
OSSD	Protection Zone	OSSD1	Protection Zone 1

ALARM1	Warning Zone 1	OSSD2	Protection Zone 2
ALARM2	Warning Zone 2	/	/

Appearance Information

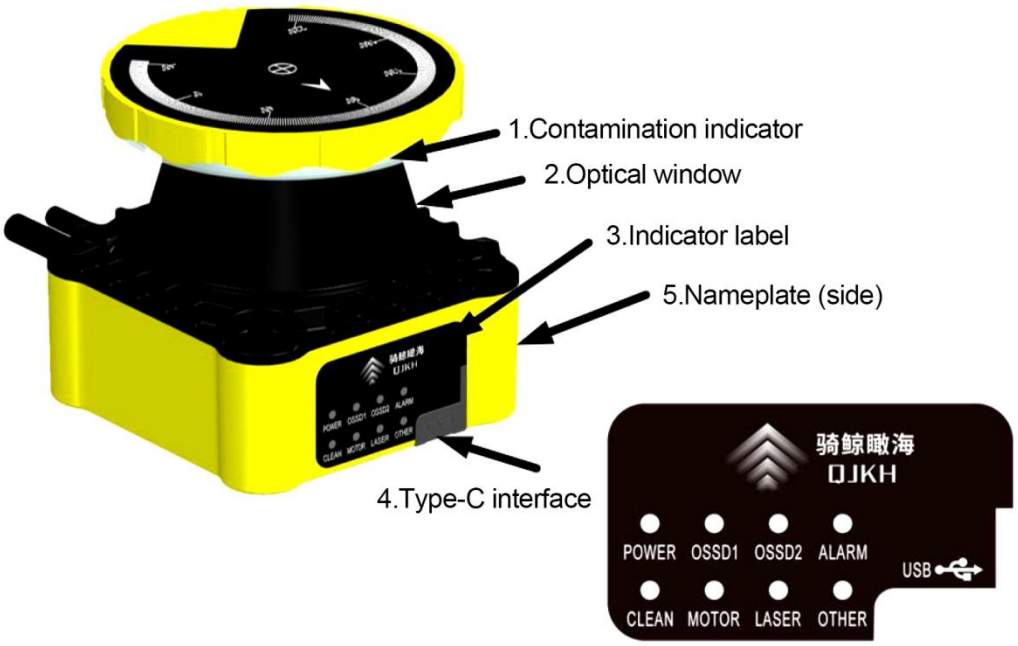


Figure 3 Indicator Lights

Table 2 Appearance Information Description

No.	Component Name	Description
1	Contamination Indicator	The top of the window contains a total of nine Indicator Lights
2	Optical Window	The SH detection beam is emitted outward through the optical window, with a detection angle of 276°
3	Indicator Label	Indicator Label contains eight Indicator Lights
4	Type-C Interface	The radar connects to the computer via the configuration cable through this interface
5	Nameplate	Indicates the technical parameters related to the SH

Table 3 Indicator Light Status

Indicator Symbol	Indicator Definition	Status	Description

POWER	Power Indicator	Green	Green light on after SH power-on successful
		Off	SH power-on failed
OSSD1	Safety Output 1 Indicator	Green	No object detected in Protection Zone 1, OSSD1 outputs ON state
		Red	Object detected in Protection Zone 1, OSSD1 outputs OFF state
OSSD2	Safety Output 2 Indicator	Green	Dual Protection Zone mode: no object detected in Protection Zone 2, OSSD2 outputs ON state
		Red	Dual Protection Zone mode: object detected in Protection Zone 2, OSSD2 outputs OFF state
		Off	Protection Zone + Warning Zone mode: off
ALARM	Warning Output Indicator	Green	Protection Zone + Warning Zone mode: no object detected in Warning Zone
		Red	Protection Zone + Warning Zone mode: object detected in Warning Zone
		Off	Undefined ALARM output: off
CLEAN	Optical Window Status Indicator	Green	Optical window is clean
		Red	Optical Window severely contaminated,cleaning required
MOTOR	Motor Status Indicator	Green	Radar motor is in normal working condition
		Red	Radar motor malfunction
LASER	Laser Measurement Status Indicator	Green	Radar laser measurement is in normal working condition
		Red	Radar laser measurement malfunction
OTHER	Other Status Indicator	Green	Radar is in normal working condition
		Red	Radar has other operational faults

Note: In the process of power on,power light stays on, all other indicator lights including contamination indicator enter a flowing light pattern, indicating that the device is starting up, which is a normal state. When the flowing light stops, the starting up completed.

I/O Interfaces

SH power/output interface is M12-17-pin male connector, cable length 0.3 m. Network connection interface is M12-4-pin female connector, cable length 0.3 m.

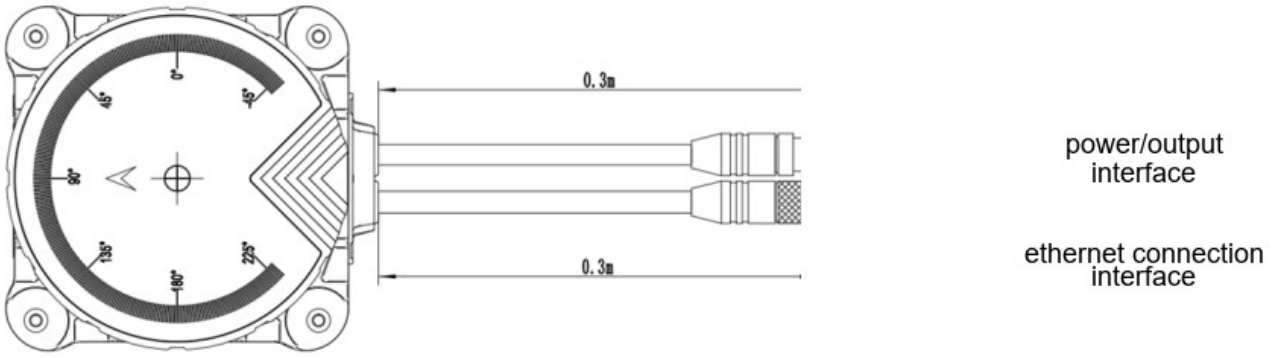


Figure 4 SH Connection Cables

The standard cable length for the power/control interface extension cable is 1 m. Wire core colors and corresponding interface assignments are shown in the table.

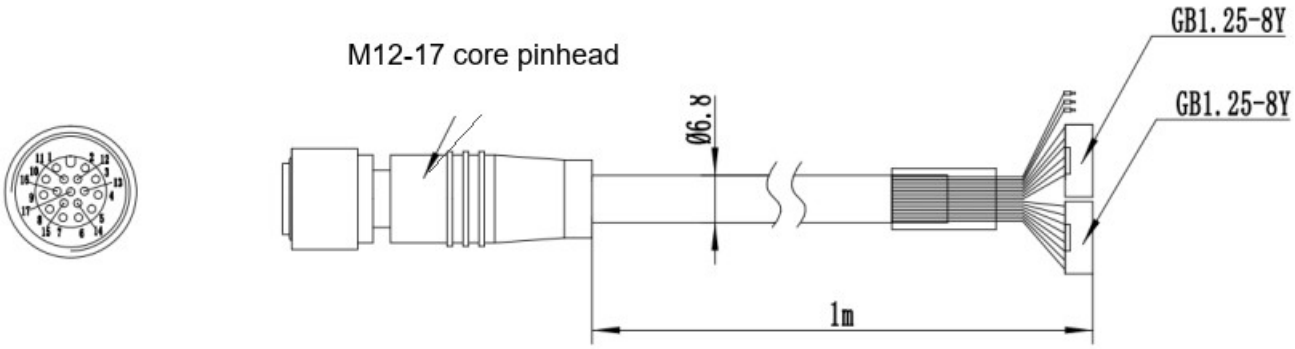


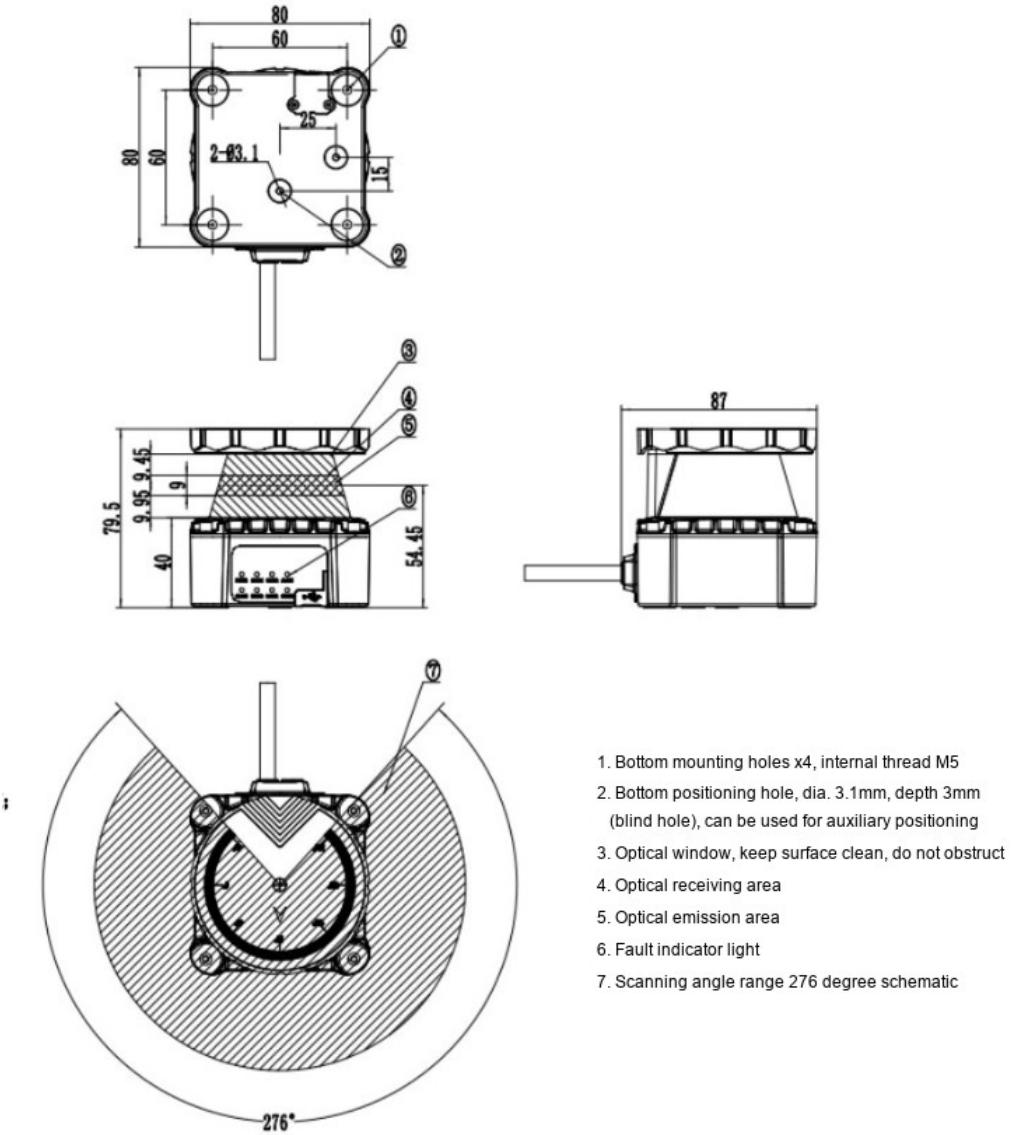
Figure 5 Power Interface extension cable

Table 4 Cable color signal correspondence table

Pin	Wire Color	Signal Definition	Function
1	Brown	24 V	Operating Voltage (+24 V DC)
2	Blue	0 V	Operating Voltage (0 V DC)
3	White	OSSD1.A	First pair of OSSD, OSSD1.A
4	Green	OSSD1.B	First pair of OSSD, OSSD1.B
5	Pink	General I/O 1	Configurable: Static control input: B1 General output: Warning Output 1 / Warning Output 2
6	Yellow	General I/O 2	Configurable: Static control input: A1 General output: Warning Output 1 / Warning Output 2 / Second pair of OSSD,OSSD2.A

7	Black	General I/O 3	Configurable: Static control input: A2 General output: Warning Output 1 / Warning Output 2 / Second pair of OSSD,OSSD2.B
8	Grey	General I/O 4	Configurable: Static control input: B2 General output: Warning Output 1 / Warning Output 2
9	Red	Input 1	Configurable: Static control input: C1 Dynamic control input: Encoder 1a (0°)
10	Purple	Input 2	Configurable: Static control input: C2 Dynamic control input: Encoder 1b (90°)
11	Grey-Pink	Input 3	Configurable: Static control input: D1 Dynamic control input: Encoder 2a (0°)
12	Red-Blue	Input 4	Configurable: Static control input: D2 Dynamic control input: Encoder 2b (90°)
13	White-Green	Input 5	Configurable: Static control input: E1 Dynamic control input: Encoder 3a (0°)
14	Brown-Green	Input 6	Configurable: Static control input: E2 Dynamic control input: Encoder 3b (90°)
15	White-Yellow	Input 7	Configurable: Static control input: F1 Dynamic control input: Encoder 4a (0°)
16	Yellow-Brown	Input 8	Configurable: Static control input: F2 Dynamic control input: Encoder 4b (90°)
17	White-Grey	/	/

Mechanical Dimensions



1. Bottom mounting holes x4, internal thread M5
2. Bottom positioning hole, dia. 3.1mm, depth 3mm (blind hole), can be used for auxiliary positioning
3. Optical window, keep surface clean, do not obstruct
4. Optical receiving area
5. Optical emission area
6. Fault indicator light
7. Scanning angle range 276 degree schematic

Figure 7 Overall Dimensions Figure

Figure 8 Scanning range Schematic Figure