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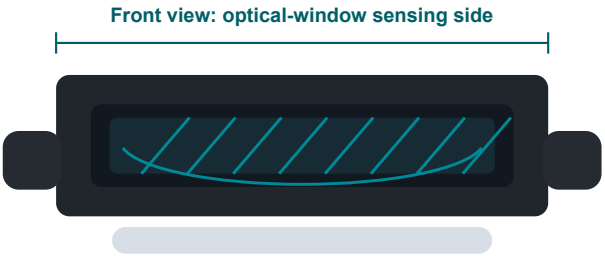
S1 LiDAR

192-Line Semi-Solid-State Product Specification & Integration Guide

192 lines Semi-solid-state platform	**120° × 25°** Horizontal × vertical FOV
300 m Maximum range	**IP67 / IP6K9K** Environmental protection

S1 product silhouette



Engineering line rendering redrawn from supplied product references

Document	English Product Specification
Product	S1 Semi-Solid-State LiDAR
Revision	1.0
Release Date	June 5, 2026
Document Status	Preliminary customer download edition
Company Header	www.rogersense.com

This document summarizes S1 product specifications, interfaces, software support, installation notes, and maintenance guidance based on the supplied product and software manuals. Preliminary notice: specifications, dimensions, interfaces, diagrams, software functions, and release schedule are subject to change before mass production. Rogersense reserves the right to modify this document and the product configuration at any time without prior notice.

Product Snapshot

S1 is a compact, high-performance semi-solid-state LiDAR platform designed for perception, mapping, localization, recognition, and obstacle avoidance in vehicle and robotic applications.

192	1.536M	10 / 20 Hz	9-32 VDC
Laser lines	Points per second	Frame rate	Power input

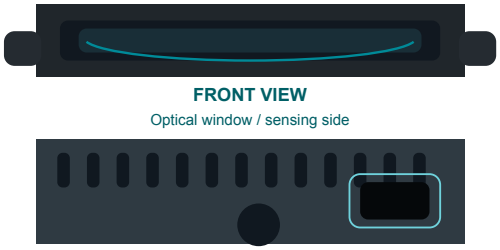
Target Applications

- High-level assisted driving and autonomous vehicle perception.
- Logistics robots, industrial robots, construction machinery, and mobile platforms.
- 3D mapping, localization, object recognition, and obstacle avoidance.

Key Product Characteristics

- Direct Time of Flight measurement using single-photon technology.
- Coaxial transmit/receive optical path with wide horizontal coverage.
- Single or dual return output options for different perception pipelines.
- Web-based configuration, status monitoring, firmware update, and DTC/log access.

Product orientation



FRONT VIEW
Optical window / sensing side

REAR VIEW
Connector / cooling-fin side

Orientation redrawn from supplied manual and product photos

Typical Industry Applications

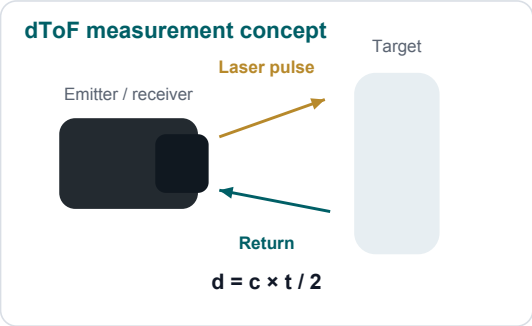
S1 is positioned for perception, mapping, localization, recognition, and obstacle-avoidance workflows across vehicle, robotics, industrial, and infrastructure systems. Final suitability depends on the customer system design, installation, and validation.

Industry	Typical Use Cases	How S1 Fits
Advanced driving & autonomous vehicles	High-level ADAS perception, obstacle detection, mapping, localization, and object recognition.	Long-range 3D point-cloud output, 120° × 25° FOV, 10/20 Hz frame rate, PTP/gPTP timing support, and ASIL-B listed in the source manual.
Logistics robots & AMR/AGV platforms	Warehouse navigation, pallet/aisle perception, dock alignment, people/object avoidance, and route mapping.	Compact body, 1.536M points/s output, short blind zone, and LeeminentView/SDK support for integration and debugging.
Industrial robotics & automation	3D scene awareness, work-zone monitoring, robot safety perception, localization, and material-flow sensing.	High point rate, selectable single/dual return output, web-based device configuration, and robust operating temperature range.
Construction machinery & off-road equipment	Machine perception, terrain awareness, obstacle avoidance, localization, and site mapping.	IP67/IP6K9K protection, -40°C to +85°C operation, 9-32 VDC input, and long measurement range support outdoor integration.
Smart infrastructure & traffic systems	Roadside perception, object counting/classification workflows, map building, and traffic scene monitoring.	Ethernet data output, time synchronization support, status monitoring, and SDK/ROS workflows support multi-sensor development.
Research, mapping & validation	Point-cloud capture, PCAP recording/playback, algorithm development, calibration validation, and dataset collection.	LeeminentView supports live viewing, recording, playback, cropping, point selection, and export to CSV, PLY, PCD, LAS, or VTK.

Application examples are based on the supplied product manual and common LiDAR integration workflows. They do not replace system-level safety, regulatory, or performance validation for a specific customer product.

Operating Principle

S1 measures distance using direct Time of Flight. The transmitter emits ultra-short laser pulses; reflected light from the target is received by the sensor; the product calculates distance from the measured flight time using d = c × t / 2.



Optical Architecture

- Eight-line VCSEL arrangement forms a line spot after collimation.
- Transmit and receive paths use a coaxial optical arrangement.
- Nominal horizontal coverage is 120°, with approximately 25° vertical field of view.
- Low-speed rotating mirror architecture supports a compact semi-solid-state package.

Integration Note	Guidance
Laser safety	Do not stare into the LiDAR window. Observe the product label and the final system's applicable laser safety requirements.
Thermal safety	The housing may become hot during operation. Power off and allow at least 30 minutes of cooling before direct handling when required.
Manual distribution	If S1 is integrated into another product, provide this specification or an equivalent user-facing manual to the intended user.

Technical Specifications

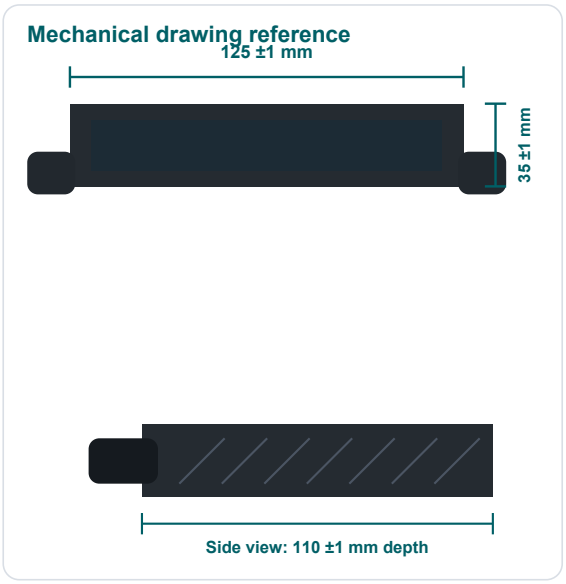
Parameter	Specification
Platform	192-line semi-solid-state LiDAR based on single-photon technology
Measurement principle	Direct Time of Flight (dToF)
Dimensions	125 mm (L) × 110 mm (W) × 35 mm (H) [1]
Weight	808 g [2]
Field of view	120° (H) × 25° (V)
Angular resolution	0.15° × 0.13° @ 10 Hz
Measurement range	300 m maximum; 200 m at 10% reflectivity under 100 kLux sunlight [3]
Blind zone	1 m
Point rate	1,536,000 points/s
Accuracy (1 sigma)	< 3 cm [4]
Frame rate	10 / 20 Hz
Interference resistance	Supported
Returns	Single return or dual return selectable
ASIL level	ASIL-B
Eye safety	Class 1B
Time synchronization	1588v2 PTP, 802.1AS gPTP, and PTP Master supported
Operating temperature	-40°C to +85°C
Storage temperature	-40°C to +95°C
Ingress protection	IP67, IP6K9K
Supply voltage	DC 9-32 V
Power consumption	10 W
Connector	TE Connectivity 2387351

Notes: [1] body dimensions exclude connector, screw holes, and mounting ears; [2] body weight excludes cable; [3] range condition references 100 kLux sunlight and 10% reflectivity in the source manual; [4] accuracy target is a Lambertian 10% reflector located at 20 m.

Mechanical & Environmental Integration

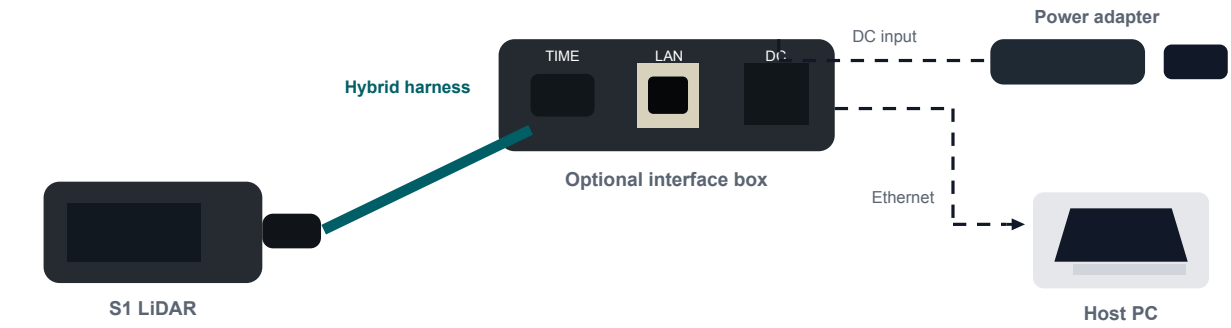
Mechanical Envelope

Item	Value
Body size	125 × 110 × 35 mm
Body weight	808 g without cable
Mounting	Use the mechanical mounting features shown in the source manual; custom requirements should be confirmed before production.
Cable outer diameter	ø 4.10 ± 0.2 mm
Minimum cable bend radius	5 × cable outer diameter



Environmental Rating

Operating temperature	-40°C to +85°C
Storage temperature	-40°C to +95°C
Ingress protection	IP67, IP6K9K



Connector handling: power off before mating or separating connectors. Align the male and female housing latches before insertion; press the latch and pull outward to separate. Do not pull the cable forcefully or twist the connector housing.

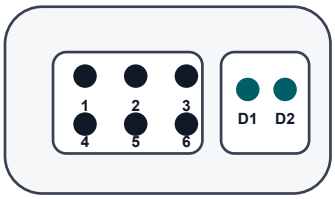
Electrical & Connector Interface

Connector Summary

The default LiDAR connector uses TE Connectivity part number 2387351 on the radar side. Avoid touching reserved interfaces or exposed pins directly.

Pin	Signal / Function
1	VCC / power input; operate within product supply range DC 9-32 V
2	WAKEUP input
3	GPSRMC, 3.3 V CMOS
4	Power GND
5	Signal GND
6	PPS, 3.3 V CMOS
D1	1000BASE-T1 P
D2	1000BASE-T1 N

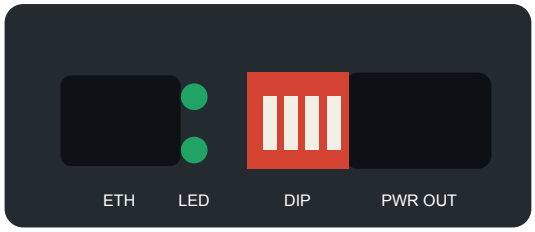
Radar connector pinout



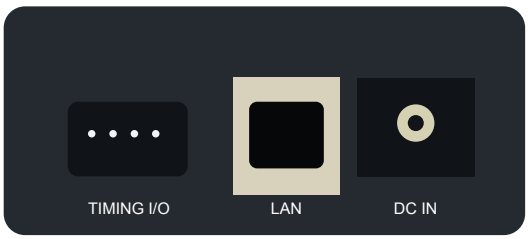
TE-2387351 radar-side connector pinout

Interface	Specification / Notes
Ethernet	1000BASE-T1 differential pair on D1/D2; rear interface box provides ETH 100/1000BASE-T1 labeling.
Power	Product operating supply: DC 9-32 V; typical power consumption: 10 W.
Timing inputs	PPS and GPSRMC are available as 3.3 V CMOS signals.
Wake function	WAKEUP input available; optional interface box includes Wake On/Off DIP labeling.

Optional interface box - front panel



Optional interface box - rear panel



Network Configuration & Web Control

After power-on, S1 starts operating and automatically transmits data once connected to a computer through Ethernet. Product parameters, device status, and firmware updates are available through the embedded web control interface.

Item	Default / Function
Device IP	192.168.101.101
Default target IP	192.168.101.255 broadcast address; configurable through the web interface
Recommended PC IP	192.168.101.200
Subnet mask	255.255.255.0
Web access	http://192.168.101.101

Web Control Functions

Page	Customer Function
Information	Displays product module name, serial number, and version information.
Setting	Configures return strategy, operating status, network IP/port, mirror speed/direction, and PTP/PPS synchronization options.
Status & Monitor	Reports operating voltage, temperature, humidity, port statistics, and abnormal operating events.
Update	Supports factory reset interface and firmware upgrade.
Log & DTC Fault Message	Reports diagnostic trouble codes according to ISO 15031 and displays related logs.
Diagnostic	Internal-use page for authorized engineering diagnostics and optimization only.

Point Cloud Data & Time Synchronization

The product can provide ROS or ROS2 Rosbag point-cloud packages for debugging. The default packet header and typical block format are summarized below for integration planning.

Field	Description	Length
Header	Message identifier @ 0xA255	2 bytes
Lidar Type	Product technology type identifier	2 bytes
Protocol Version	VersionMajor 4 bits; VersionMinor 4 bits	1 byte
Block Num	Number of data blocks in the packet	1 byte
Channel Num	Laser channels per block	2 bytes
LiDAR Flag	Additional product information	2 bytes
Points Number	Valid point-cloud count in the complete frame	4 bytes
Payload Length	Payload length	2 bytes
Frame ID	Point-cloud frame ID, starting at 0 and incrementing per complete frame	2 bytes
Packet Seq	Ethernet packet sequence ID within the frame	2 bytes
Timestamps	System time: year, month, day, hour, minute, second, and microseconds	10 bytes
Reserved	Reserved field	2 bytes
Pointcloud Data	Point-cloud payload; see block definition	Variable

Typical Point Data Block

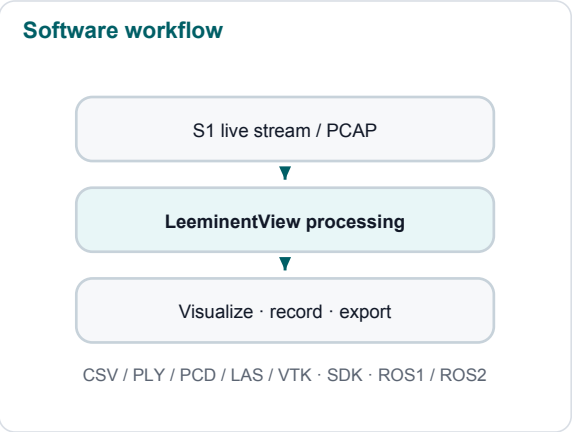
Block Element	Content	Length
Block Header	Time Offset: 2 bytes; Azimuth: 2 bytes	4 bytes
Channel Data #1 to #M	Distance: 2 bytes; reflectivity: 1 byte; confidence: 1 byte	4 bytes each

PTP Application States

State	Timing Basis	Description
Free Run	Internal RTC simulated value	Counts from a configured start time and increments using the local RTC.
Locked	External clock source	After handshaking with the PTP Master, the product locks to the received source time.
Frozen	Internal RTC count	Used after losing interaction with the PTP Master; local RTC continues time counting.

LeeminentView & SDK Support

LeeminentView is a LiDAR point-cloud display application for real-time capture, visualization, recording, playback, and analysis. It provides live mode and playback mode for customer development and validation workflows.



LeeminentView Core Functions

- Display live sensor streams or recorded PCAP files.
- Visualize timestamped 3D LiDAR returns and LiDAR attributes such as timestamp, azimuth, and laser ID.
- Record offline PCAP data and export CSV, PLY, PCD, LAS, or VTK files.
- Use grid, ruler, cropping, point selection, color mapping, point size, frame aggregation, and 3D view controls.
- Real-time SLAM and HPC AI functions are described as not yet open in the supplied manual.

Driver & SDK

Package	Functions
LiDAR Driver SDK	Query and set sensor configuration; reliably read and buffer sensor UDP streams; record/read PCAP; convert raw data into depth and reflectivity images; provide IMU motion compensation and point-cloud visualization.
LiDAR ROS SDK	ROS1 and ROS2 driver package based on the Driver SDK; supports viewing point clouds through RViz and integration into customer ROS/ROS2 projects.

Operation, Maintenance & Troubleshooting

Basic Operation

- Before use, read the manual and confirm the supply voltage and cable connections.
- Place and mount the device on a reliable surface or structure before operation.
- Disconnect power before cleaning, long storage, or connector service.
- Do not open the device housing; service should be performed by authorized personnel.

Cleaning Guidance

- For light dust on the metal housing or window, use dry air or a lint-free cloth.
- For water, oil, or mud contamination, use room-temperature cleaning solution and a soft sponge or lint-free cloth. Avoid spraying liquid directly into connectors.
- Do not wipe the optical window aggressively; protect the coating and replace contaminated cloths promptly.

Safety Warnings

Laser	Do not stare into the LiDAR optical window.
Hot surface	Housing may be hot; power off and cool before contact.
Liquids	Prevent liquid ingress to avoid short circuit or fire risk.
Drop / impact	Do not use if the unit is dropped, damaged, or shows abnormal operation.

Troubleshooting Summary

Issue	Primary Checks
Interface box LED off	Check cable appearance, connector seating, power adapter output, required input voltage/current, and enclosure condition; power-cycle if needed.
Ethernet LED abnormal	Confirm a gigabit network adapter, Cat6 or higher cable, PC IP 192.168.101.x, reachable sensor IP, and normal input power.
No LeeminentView data / no Wireshark packets	Verify scanner operation, cable category, power, sensor ping response, network adapter state, antivirus interference, and then power-cycle.
Scanner abnormal	Do not look into the emission window. Use an IR-sensitive camera/card to confirm emission, check for abnormal noise or loose parts, and confirm scanner status in Web Control.
Point-cloud distortion	Use the matching calibration file, confirm input power, check for abnormal mechanical sounds, and power-cycle.

Regulatory & Compliance Notice

This product specification is provided for customer evaluation, download, and integration planning. It is not a Declaration of Conformity, type approval certificate, safety certificate, or regulatory test report.

Topic	Notice
Certification status	Market-specific approvals such as CE, FCC, UKCA, KC, RCM, RoHS, REACH, or other national/regional requirements must be verified against the final product label, official certificate, test report, purchase specification, or written Rogersense confirmation.
Preliminary product status	This customer download edition is issued before mass production for evaluation and integration planning. Rogersense reserves the right to modify product design, specifications, dimensions, interfaces, software functions, documentation, and release schedule at any time without prior notice.
Laser safety	The supplied source manual lists eye safety as Class 1B. Do not stare into the LiDAR optical window. Final product labeling, end-user warnings, and market-specific laser safety documentation must be confirmed for the delivered configuration.
Functional safety	The supplied source manual lists ASIL-B. Vehicle or machine system integrators remain responsible for the system-level safety concept, hazard analysis, validation, and any ISO 26262 or application-specific safety case.
EMC and installation	Cable routing, grounding, shielding, power supply quality, enclosure design, and host-system installation may affect EMC and electrical safety performance. The final installed system should be tested in its intended configuration.
Environmental protection	IP67 and IP6K9K are stated in the supplied product manual. The rating applies only when the product and mating connectors are correctly installed and sealed according to the approved configuration.
Integrator responsibility	If S1 is integrated into another product, the integrator is responsible for providing appropriate user instructions, warnings, labels, service procedures, and regulatory information to the final user.

For official compliance documentation, certificates, or market-specific declarations, contact Rogersense through www.rogersense.com before customer release or product import.

Notices & Revision Record

Revision	Date	Description
1.0	June 5, 2026	English customer-facing specification prepared from supplied S1 product manual and LeeminentView user manual.

The information in this document is provided for product evaluation and integration planning before mass production. Final specifications, options, certifications, firmware behavior, dimensions, interface definitions, diagrams, software functions, and release schedule may vary by production configuration or customer-specific version. Rogersense reserves the right to revise this document and modify the product configuration at any time without prior notice.

For the latest product information, firmware support, SDK package, or application-specific configuration, contact Rogersense technical support via www.rogersense.com.