

SP Level

Wireless multizone fill-level scanner

A 64-zone map of every shelf

SP Level — Wireless multizone fill-level scanner

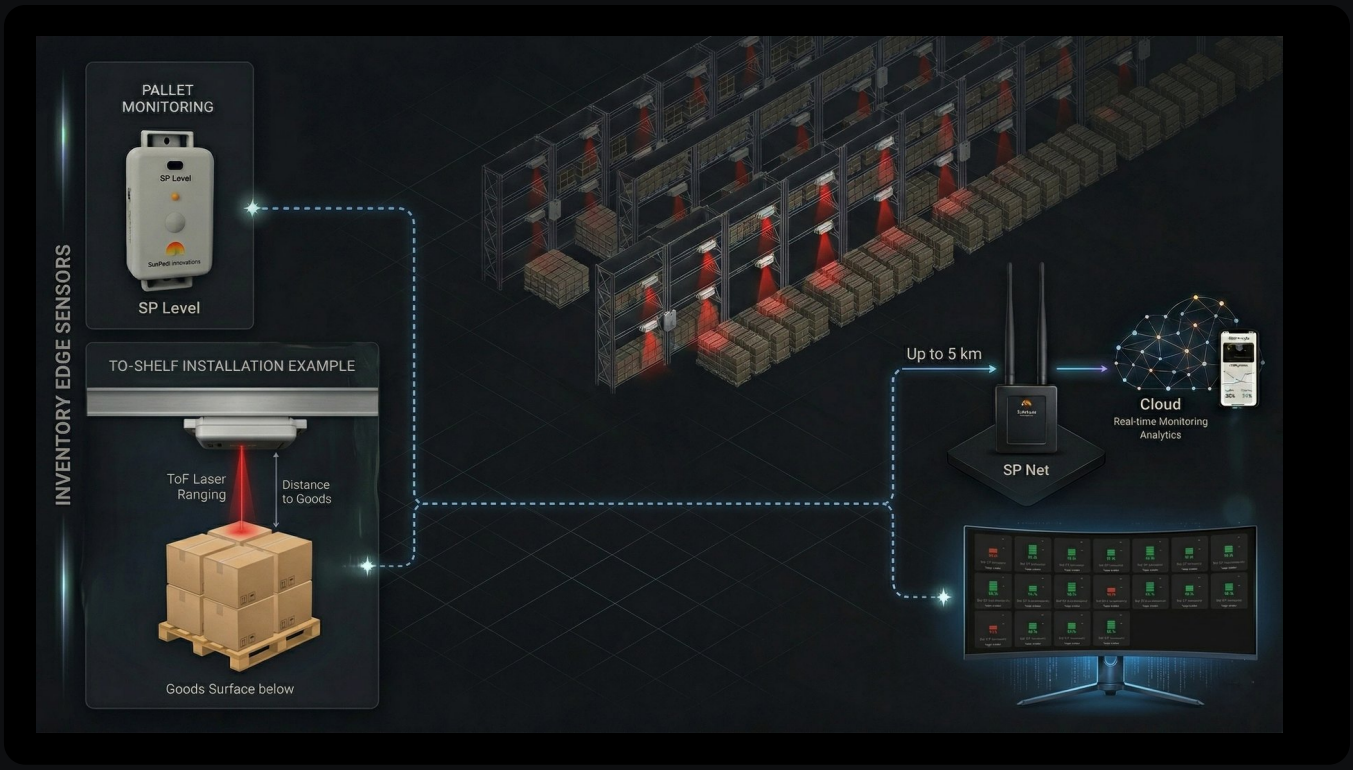
Automate stock control with a wireless multizone ToF scanner. SP Level sees the whole shelf as a 64-zone map, reports every change within minutes and lets SmartCloud turn the map into fill level, pieces and replenishment alerts — without a single wire.

Key features

- 64-zone laser ToF map (8×8, 60° field of view)
- Shelf, pallet-rack and bin fill monitoring with a digital twin
- Reports changes within minutes, up to 5 years on one battery
- Finds its network itself: SP Net gateway or LoRaWAN, up to 5 km
- Sealed compact IP65 enclosure
- Set-up by phone over NFC, ERP integration via API

- Worldwide Helium Network compatibility
- Ready to work out of the box
- 3 years warranty period

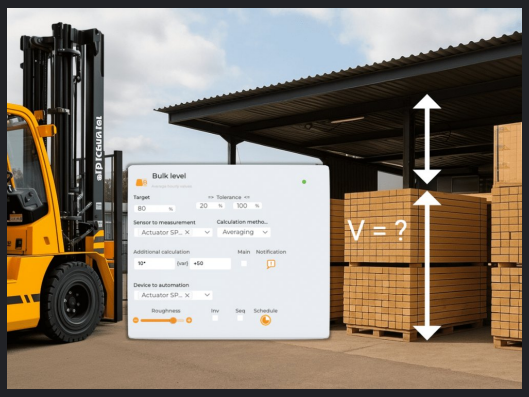
How it works


INVENTORY EDGE SENSORS
PALLET MONITORING
SP Level
SP Level
TO-SHELF INSTALLATION EXAMPLE
ToF Laser Ranging
Distance to Goods
Goods Surface below
Up to 5 km
SP Net
Cloud
Real-time Monitoring
Analytics

Use Cases

Smart Retail

SP Level is mounted under the shelf above and looks down at the goods. Its 64-zone map shows not only that the shelf is emptying but where: which facing is gone and which part is still full. A confirmed change reaches SmartCloud within minutes; the planogram and the «empty shelf» calibration are kept in the cloud, so the sensor needs no on-site setup.



Logistics: Warehouse Inventory

Mounted above a storage location, SP Level measures the height of the remaining goods over the whole cell, not at a single point. SmartCloud converts the map into fill percentage, pieces or pallets by the object profile and shows the cell in the warehouse digital twin.

Waste Management

Fixed to the inside of the lid, SP Level maps the surface of the contents: uneven heaps and voids no longer fool a single-point reading. SmartCloud suggests when the container is worth collecting and builds the route from real fill levels.

Hoppers, Bins and Tanks

Over a hopper or an opaque liquid, the multizone map averages the surface and tracks level dynamics over time. Transparent or mirror-like surfaces are outside the laser method's scope.

Mount the scanner above the surface, register it in SmartCloud and press “Shelf is empty” — the cloud derives the shelf geometry from the first map; no on-site setup.

MSW and Container Management

Fixed to the inside of the lid, SP Level maps the surface of the contents: uneven heaps and voids no longer fool a single-point reading. SmartCloud suggests when the container is worth collecting and builds the route from real fill levels.

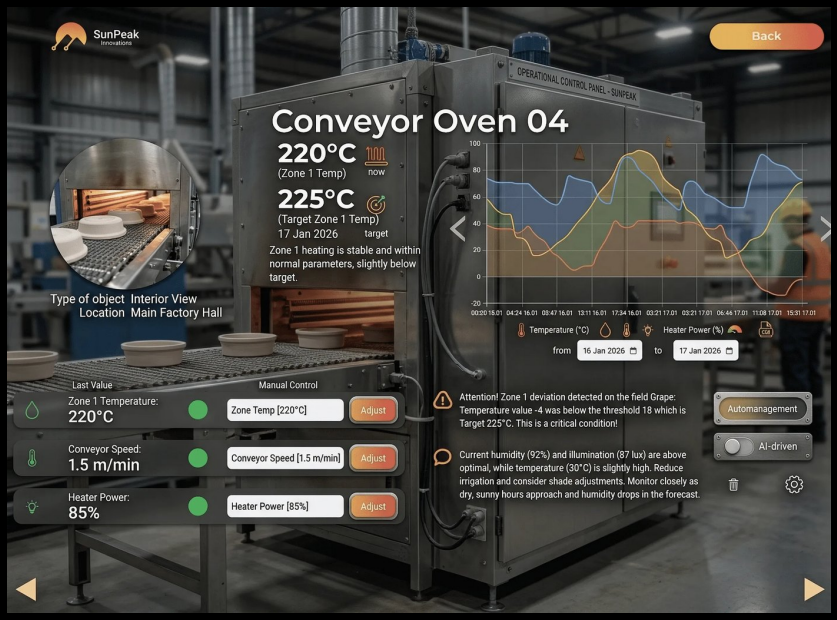
Technical specifications

The warranty period is 3 years from the production date.

Device main parameters

Parameter	Value
Measurement method	Multizone laser Time-of-Flight, 8×8 = 64 zones, 60°×60° field of view (Class 1, 940 nm)
Distance range	0.02…2.0 m full 8×8 map (up to 3.5 m 4×4 overview); indoor lighting
Accuracy per zone	±1 cm up to 0.2 m, ±5 % of reading beyond (sensor datasheet, white matt target); 2 cm steps in the radio frame
Reporting	Change events within minutes (confirmed by repeated probing), full map on demand, heartbeat every 6 h (configurable)
Radio standard	LoRaWAN 1.0.4 Class A (OTAA/ABP), EU868, or SP Net single-channel (two-way); automatic network selection — SP Net first, LoRaWAN as fallback
Communication range	up to 5 km (line-of-sight)
Configuration	NFC (SunPeak Setup app, Android/iOS); over the air via SP Net and LoRaWAN networks, signed
Power source	3.6 V 2400 mAh ER14505 Li-SOCl
Battery life	up to 5 years (depends on the probing and reporting profile)
Operating temperature	−20…+60 °C
Enclosure and mounting	IP65 / cable ties or M4 screws, lens facing the surface, 0.3…2 m above it
Dimensions	100 × 50 × 20 mm

SmartCloud Ecosystem



Cloud Ready

Plug & Play activation: register the device, mount it, press «Shelf is empty» — SmartCloud derives the shelf plane and zone mask from the first map.

Live fill map

Every zone of the shelf is shown as fill percentage in the digital twin; events update the map within minutes, history is kept per zone.

Virtual Shelves

The cloud turns millimetres into business metrics: pieces on a shelf, volume in litres or mass in kilograms by the object profile.

Inventory Analytics

Track consumption dynamics, forecast the depletion date and optimise logistics chains.

Control and indication

All timings, thresholds and the distance offset are configured from SmartCloud (by phone over NFC or over the air via SP Net or LoRaWAN); the empty-shelf calibration is done in SmartCloud.

Magnet gestures

Control is by touching the marked spot with a magnet; a series of touches ends with a 2 s pause.

Magnet touches	Function	Indication
1×	Send the current map now and collect pending settings	green flash
4×	Sleep (sensor off; any touch wakes)	green blinking
6×	Test mode 3 min: a map and a frame every 15 s	white beacon every 0.5 s; on each measurement green = no change, blue = change, red = sensor error
8×	Reboot	red blinking
12×	Network mode selection (each further touch cycles the mode; saved 10 s after the last touch): AUTO — automatic, default ABP OTAA SP Net	mode colour: AUTO yellow, ABP pink, OTAA blue, SP Net white
Power-on	joining the network; in AUTO — SP Net first, then LoRaWAN	mode colour blinking, 3× on success; 2× green — the network answered (≈ 1.5 min on SP Net)

Integration and support

Integration with standard LoRaWAN systems
The logger is fully compatible with any standard networks. DevEUI and AppKey can be found on the device enclosure.

Payload description

Uplink on FPort 2, frame format v2 (FW 2.00 and later): a 7-byte header followed by data blocks. Header: bytes 1–2 — device ID 700 (little-endian), 3 — firmware ID, 4 — frame ID (0 scheduled, 1 change, 2 magnet, 3 start, 5 test mode), 5–6 — battery 0…254 (254 = full), 7 — format 0x20. Each block: a tag byte (high nibble — type, low nibble — parameter), an age byte (minutes before transmission) and data. Zone value is one byte = distance / 20 mm (0xFE — no target, 0xFF — invalid); zone index = 8·row + column. Block types: 0x10 KEY4 — 4×4 overview (16 B); 0x20 KEY8 — full 8×8 map (64 B); 0x3q QUAD — quarter q of the 8×8 map (16 B); 0x4n DELTA — n changed zones as (zone, value) pairs; 0x50 DELTAB — 64-bit zone mask + values; 0x60 SAME — no change since the last probe; 0x7k FAIL — k failed measurements; 0xA1 STATE — firmware version, configuration CRC, layout; 0xA2 ENERGY — battery ledger (FW 2.22). The cloud keeps the shelf map and applies events in time order; every event is repeated in the next frame. Decoding is built into SmartCloud; for a custom integration use the full specification (SunPeak Devices README, «SP Level on VL53L7CX») or the SmartCloud API.

Byte number	Value	Description
Payload example	BC02 03 00 FE00 20 6005 A1 02 16 2177 21	15 bytes: header, SAME, STATE
1–2	BC02	Device ID 700 (SP Level), little-endian
3	03	Firmware ID
4	00	Frame ID: scheduled frame
5–6	FE00	Battery 254 = full
7	20	Format v2
8–9	60 05	SAME: probe 5 min ago confirmed no change
10–15	A1 02 16 2177 21	STATE: firmware 2.22, configuration CRC 0x7721, layout 0x21
Change frame	BC02 03 01 FE00 20 4203 1B2A 1C2B 1003 …	Frame ID 1; DELTA (0x42): 2 zones, 3 min ago — zone 27 = 0x2A 840 mm, zone 28 = 0x2B 860 mm; then KEY4 (0x10): 4×4 overview, 16 B

Metrological characteristics

Channel	Range	MPE	Resolution	Status
Distance to surface (64-zone map, fill level) — multizone laser time-of-flight sensor, 8×8 zones, 60°×60° field of view, Class 1, 940 nm	0.02…2.0 m full 8×8 map; up to 3.5 m 4×4 overview (indoor lighting)	±5 % of reading, not less than ±2 cm, per zone against a white matt target (VL53L7CX DS13865 Table 19, 8×8, 2.7σ; radio frame resolution 2 cm)	0.1 cm	Calibratable

Recommended calibration interval: 24 months; the owner sets the final interval based on their own risk analysis. MPE — maximum permissible error. Calibration is performed against reference standards traceable to accredited laboratories; each measuring device is delivered with a calibration certificate in the ISO/IEC 17025 form.

Quality documents

Every SP Level passes visual inspection, a functional test and a metrological test before it ships. For each serial number the product passport with the final inspection report, the calibration certificate and the technical specification are available at the verification page — scan the QR code on the device passport or enter the serial number.

Verify by serial number

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