LiDAR For Material Level Detection Sensor

R718PE02 Data Sheet

Wireless Sensor Network Based on LoRa Technology

LiDAR For Material Level Detection Sensor

Introduction

R718PE02 is a wireless communication device that uses LiDAR radar for single-point ranging for the material level detection industry. Based on the ToF (Time of Flight) schematic, the R718PE02 provides stable, accurate, and reliable ranging performance by optimizing the optical system and built-in algorithms. It is not easily affected by the surface state of the detected object, and the ranging performance can reach up to 25m. The product is equipped with a unique dust-removal wiper structure. The radar-driven dust-removal wiper can complete the dust removal operation of the optical mirror, so it can maintain the accuracy of distance measurement in an environment with severe dust pollution and dust accumulation. The R718PE02 body and the LiDAR sensor communicate through the UART serial communication and transmit the detected data to other devices for display through the wireless network. It adopts a wireless communication method that conforms to the LoRa™ protocol standard.

Features

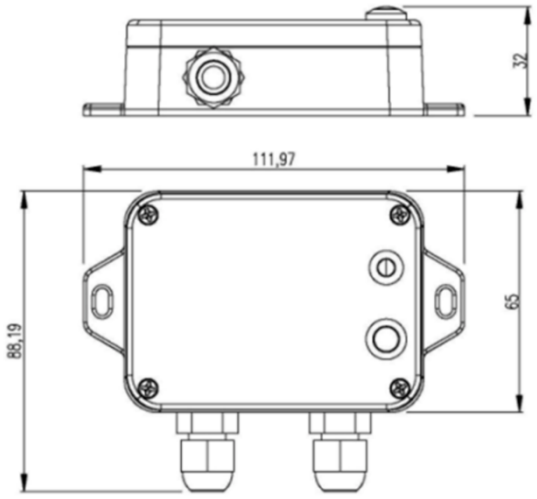
- SX1276 wireless communication module
- 8 Sections ER14505 batteries AA size (3.6V / section) in parallel power supply
- Main unit protection level IP65/IP67 (optional); sensor: IP5X
- UART serial communication
- Compatible with LoRaWAN™ Class A
- Frequency hopping spread spectrum technology
- Configuring parameters and reading data via third-party software platforms, and set alarms via SMS text and email (optional)
- Applicable to third-party platforms: Actility / ThingPark, TTN, MyDevices / Cayenne

Applications

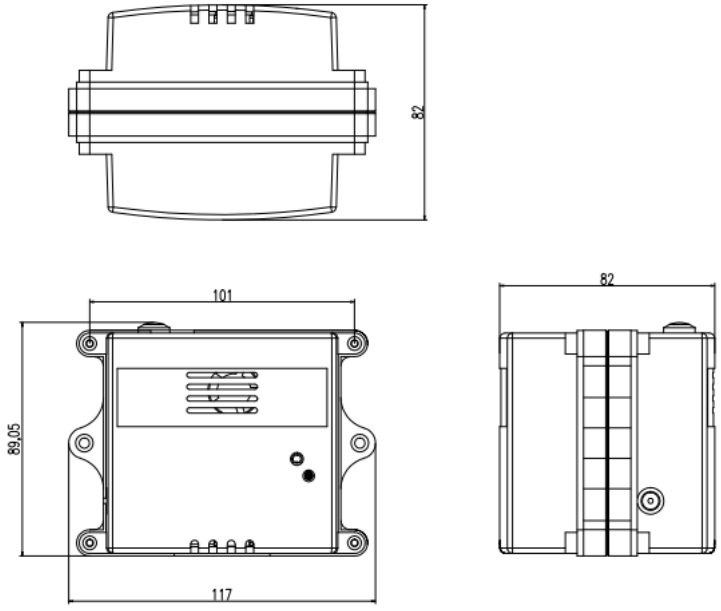
- Material level detection
- Other ranging occasions

Dimensions

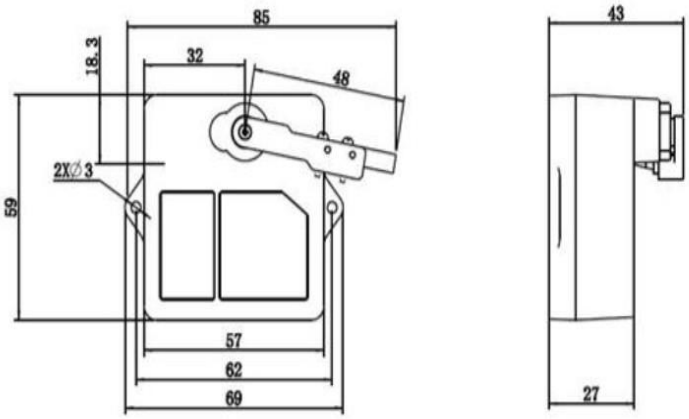
R718



Battery Box



LiDAR Sensor



Electrical Specifications

Power Supply	8 * ER14505 lithium batteries in parallel (3.6V, 2400mAh / section)
Battery Life	3 years (conditions: ambient temperature 25 °C, 60 min report once, TX power = 20dBm, LoRa spreading factor SF = 10)
Standby Current	≤ 20uA
Wakeup Current	Range: 0.8mA – 20mA (when no LoRa transmits and receives data)
Low Voltage Threshold	3.2V
Battery Measurement Accuracy	±0.1V

Module R100H

Wake-up Current	(0.8mA – 8mA) @3.3V
RF Receiving Current	11mA @3.3V
RF Transmitting Current	120mA @3.3V

Note: The electrical specifications may vary due to the power supply voltage.

LiDAR Sensor Parameters

Operating Current	≤ 400mA, Peak current 1A	
Measurement Range	90%Reflectivity, 0K lux	0.1m – 25m
	10%Reflectivity, 0K lux	0.1m – 12m
	90%Reflectivity, 100K lux	0.1m – 25m
	10%Reflectivity, 100K lux	0.1m – 12m
Blind Zone	0 – 0.1m	
Range Resolution	1cm	
Detection Angle	3°	
Measurement Accuracy	±6 cm (0.1 – 6m); ±1% (6 – 25m)	

Operating Temperature	-20℃– 60℃
Storage Temperature	-30℃– 80℃
Storage Humidity	<60%RH
Line Length	120 cm

Frequency

Frequency Range	863MHz-928MHz 470MHz-510MHz
Power Output	US915 20dbm AS923 16dbm AU915 20dbm CN470 19.15dbm EU868 16dbm KR920 14dbm IN865 20dbm
Receiving Sensitivity	-136 dBm (LoRa, Spreading Factor = 12, Bit Rate = 293bps) -121 dBm (FSK, Frequency deviation= 5kHz, Bit Rate= 1.2kbps)
Antenna Type	Built-in antenna
Communication Distance	10 km (line of sight) Note: The distance may vary due to the environment.
Data Transfer Rate	0.3 kbps – 50 kbps (LoRaWAN) 1.2 kbps – 300 kbps (FSK)
Modulation System Mode	LoRa / FSK Note: One modulation is required.
Supportable LoRaWAN Band	EU863-870, US902-928, AU915-928, KR920-923, AS923-1, AS923-2, AS923-3, IN865-867, CN470-510 Note: optional, to be done in the factory configuration

Physical Properties

Dimensions	L: 112 mm x W: 88.19 mm x H: 32 mm
Battery Box Dimensions	117mm x 89.05mm x 82mm
LiDAR Sensor Dimensions	85mm x 59mm x 43mm
Battery Box Line Length	About 25cm
Ambient Temperature Range	-15°C – 55°C
Ambient Humidity Range	< 60% RH (no condensation)
Storage Temperature Range	-25°C – 70°C

Comparison between R718PE & R718PE01& R718PE02

Model	R718PE	R718PE01	R718PE02
Sensor type	Ultrasonic Level Sensor	Ultrasonic Level Sensor	LiDAR Material Level Detection Sensor
Measurement range	0.25–8m	0.25–8m	90% Reflectivity 0Klux, 0.1–25m
			10% Reflectivity 0Klux, 0.1–12m
			90% Reflectivity 100Klux, 0.1–25m
			10% Reflectivity 0Klux, 0.1–12m
Measurement dead zone	0–0.25m	0–0.25m	0–0.1m
Detect angle	about 15°	about 20°	3º
Sensor probe waterproof level	IP67	IP67	IP5X Not waterproof
Application	Liquid-level detection	Plane and material level detection.	Material level detection.
Note	It is not suitable for scenarios where the liquid level fluctuates greatly or the measured object is uneven, nor is it suitable for high temperature, high pressure, and vacuum environments, and its performance is susceptible to electromagnetic interference and crosstalk.		Advantages: Accurate measurement, not affected by the surface state of the detected object, and can be used for slope measurement. Disadvantages: Susceptible to dust, and steam. Unable to measure transparent liquids.