

Wireless Top-Mounted Ultrasonic Level Sensor

R718PE DataSheet

Wireless Sensor Network Based on LoRa Technology



R718PE

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1. Introduction

R718PE is a wireless communication device that uses ultrasonic wave to measure distance. The propagation medium of the R718PE ultrasonic sensor is air, so the measured object can be any liquid or solid object with an even surface. The device can be used for liquid level and material level measurement. The detection angle of R718PE is about 15°, which is suitable for distance measurement in a small space. The main body and the ultrasonic sensor communicate through the UART serial port and transmit the detected data to other devices through the wireless network for display. It adopts a wireless communication method that conforms to the LoRa™ protocol standard.

2. Operating Principle

Module R100H (R100L) and ultrasonic sensor communicate through UART serial port. The principle of ultrasonic ranging is based on sending out ultrasonic waves from an ultrasonic transmitter device, and the time difference that the receiver receives the ultrasonic waves. The ultrasonic transmitter emits ultrasonic waves in a certain direction and starts timing at the same time. The ultrasonic waves propagate in the air and return immediately when encountering obstacles on the way. The ultrasonic receiver immediately stops timing when it receives the reflected waves.

Note: The speed of ultrasound in the air: 340m/s; Time: t (seconds); s: distance between the launch point and the obstacle. s could be calculated by following the formula, $s = 340t/2$.

3. Features

- SX1276 wireless communication module
- 2 ER14505 batteries AA size (3.6V / section) in parallel
- Main body: IP65/IP67 (optional); Ultrasonic probe: IP67
- UART serial communication
- Magnetic base

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- 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

4. Applications

- Water level of water tank monitoring
- Water level of water well monitoring
- Horizontal distance detecting
- The level of material detecting

5. Dimensions

Fig. Main Body Dimensions

(Unit: mm)

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6. Electrical Specifications

| | |
|------------------------------|--|
| Power Supply | 2 ER14505 3.6V AA 2400mAh batteries in parallel |
| Battery Life | About 3 years (conditions: ambient temperature 25 °C, 15 mins report once, TX power = 20dBm, LoRa spreading factor SF = 10) |
| Standby Current | 20uA |
| Wakeup Current | 0.8mA to 20mA (when Lora not transmitting and receiving data) |
| Low Voltage Threshold | 3.2V |
| Battery Measurement Accuracy | ±0.1V |

7. Module R100H

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

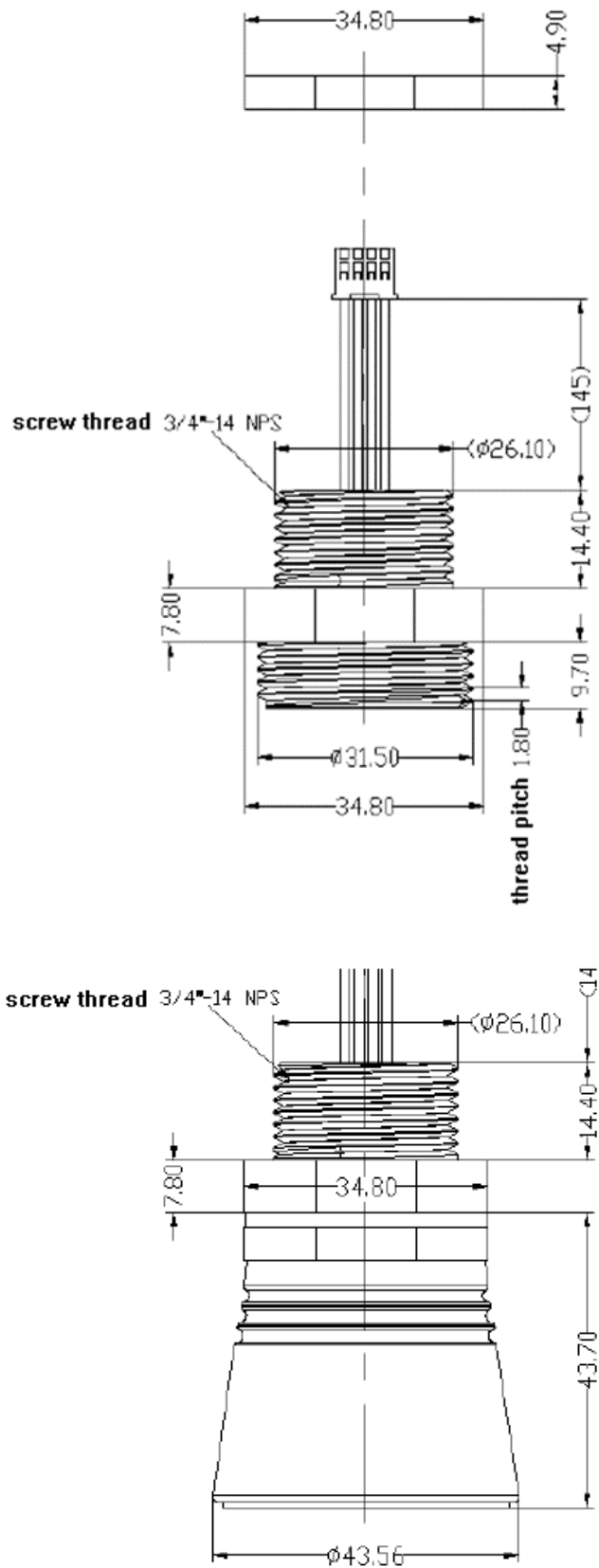
Note: Electrical specifications may vary depending on the power supply voltage.

8. Ultrasonic Ranging Sensor

| | |
|----------------------|--|
| Operating Current | Less than 15mA |
| Power Supply | DC 3.5V to 5V |
| Measurement Range | 0.25m to 8m |
| Blind Distance | 0m to 0.25m |
| Detection Angle | About 15° |
| Measurement Accuracy | ±(1+S*0.3%) cm, S refers to the detected distance between the device and the detected object. (The surface of the object should be even and still.) |

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Dimensions



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| | |
|-----------------------|---------------|
| Operating Temperature | -15°C to 55°C |
| Operating Humidity | <80% RH |
| Sensor Cable Length | About 40 cm |
| Installation | Top mounted |

9. 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 | -136dBm (LoRa, Spreading Factor=12, Bit Rate = 293bps) -121dBm (FSK, Frequency deviation=5kHz, Bit Rate=1.2kbps) |
| Antenna Type | Built-in antenna |
| Communication Distance | 10km (line of sight) Note: The actual distance depends on the environment.) |
| Data Transfer Rate | 0.3kbps to 50kbps (LoRa) 1.2kbps to 300kbps (FSK) |
| Modulation | LoRa / FSK (Note: Please choose one modulation method.) |
| 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) |

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10. Physical Properties

| | |
|---------------------------|---------------------------------------|
| Dimensions | 112 mm (L) x 88.19 mm (W) x 32 mm (H) |
| Weight | 0.24kg (with batteries) |
| Ambient Temperature Range | -15°C to 55°C |
| Ambient Humidity Range | < 90% RH (no condensation) |
| Storage Temperature Range | -25°C to 70°C |

11. Differences between R718PE & R718PE02

| Model | R718PE | R718PE02 |
|-------------------------------|---|--|
| Sensor Type | Ultrasonic Level Sensor | LiDAR Material Level Detection Sensor |
| Measurement Range | 0.25 to 8m | 90% Reflectivity 0Klux, 0.1 to 25m |
| | | 10% Reflectivity 0Klux, 0.1 to 12m |
| | | 90% Reflectivity 100Klux, 0.1 to 25m |
| | | 10% Reflectivity 0Klux, 0.1 to 12m |
| Measurement Dead Zone | 0 to 0.25m | 0 to 0.1m |
| Detect Angle | about 15° | 3° |
| Sensor Probe Waterproof Level | IP67 | IP5X Not waterproof |
| Application | Liquid-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. | <p><u>Advantages:</u> Accurate measurement, not affected by the surface state of the detected object and can be used for slope measurement.</p> <p><u>Disadvantages:</u> Susceptible to dust and steam. Unable to measure transparent liquids.</p> |