

Wireless Multi-Sensor Device (DC-Powered)

Wireless Sensor Network Based on LoRa Technology



RA08DxxS



RA08Dxx

RA08Dxx(S) Series Data Sheet

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Wireless Multi-Sensor Device (DC-Powered)

Introduction

RA08Dxx(S) series is a multi-sensor device that helps users monitor air quality. With temperature + humidity, TVOC, illuminance, air pressure, PIR, CO₂, NH₃ + H₂S, O₃, HCHO, PM2.5, CO sensors equipped in one device. In addition to RA08Dxx, we also have the RA08DxxS series. With an e-paper display, users can enjoy better and more convenient experiences through an easy and quick data check.

RA08Dxx(S) series could transmit data to the server and connect to the programmable alarm system based on the LoRa long-distance transmission technology. Looking for a device with multiple functions, accurate measurement results, and a user-friendly E-ink display RA08Dxx(S) series can satisfy all your needs.

RA08Dxx(S) Series

| Sensor Model | Temperature + Humidity | TVOC | Light | Air Pressure | PIR | CO ₂ | NH ₃ + H ₂ S | O ₃ | HCHO | PM2.5 | CO (RS485) |
|-----------------|------------------------------|------|-------|-----------------|-----|-----------------|--|----------------|------|-------|---------------|
| RA08D01(S) | ● | ● | ● | ● | ● | ● | | | | | |
| RA08D02(S) | ● | ● | ● | ● | ● | ● | | | | | ● |
| RA08D03(S) | ● | ● | ● | ● | ● | ● | | ● | | | |
| RA08D04(S) | ● | ● | ● | ● | ● | ● | | | ● | | |
| RA08D05(S) | ● | ● | ● | ● | ● | | | | | ● | |
| RA08D06(S) | ● | ● | ● | ● | ● | ● | | ● | | | ● |
| RA08D07(S) | ● | ● | ● | ● | ● | ● | | | ● | | ● |
| RA08D08(S) | ● | ● | ● | ● | ● | | | | | ● | ● |
| RA08D09(S) | ● | ● | ● | ● | ● | ● | ● | | | | |
| RA08D10(S) | ● | ● | ● | ● | ● | ● | ● | | | | ● |

Wireless Multi-Sensor Device (DC-Powered)

Features

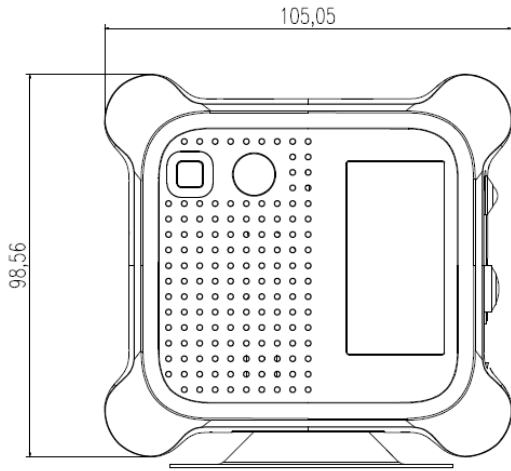
- Powered by DC 12V adapter.
- SX1262 wireless communication module
- Compatible with LoRaWAN™ Class A device
- Frequency hopping spread spectrum
- Support third-party platforms: Actility/ThingPark, TTN, MyDevices/Cayenne

Applications

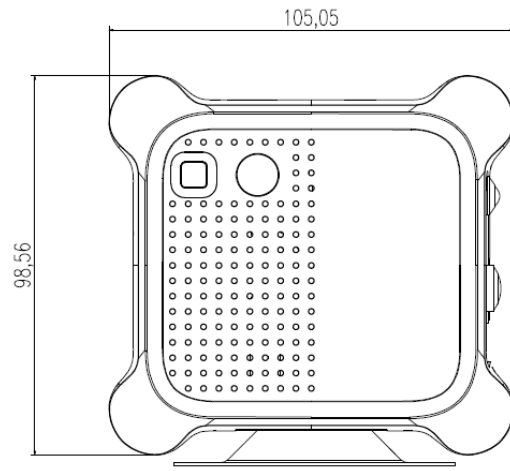
- Mansion and office building
 - Hotel and apartment
 - School, mall, and supermarket
 - Smoking room, process plant, and museum
- ▼ For NH₃ and H₂S sensor only
- Smart toilet
 - Odor detection
 - Wastewater treatment and waste incineration
 - Device integration for Smart odor eliminator
- ▼ For HCHO sensor only
- New ventilation system and air purifier
- ▼ For O₃ sensor only
- Wastewater treatment, swimming pool, and chemistry industry

Wireless Multi-Sensor Device (DC-Powered)

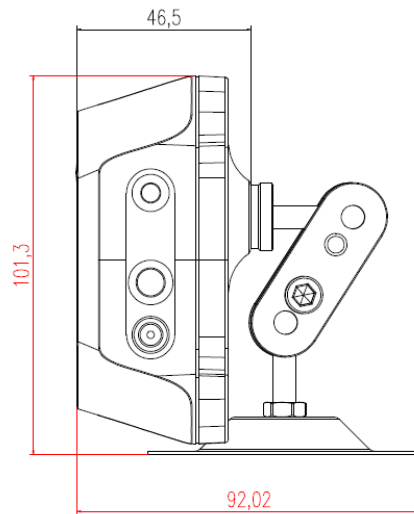
Dimensions



RA08DxxS
(with e-paper display)



RA08Dxx



Dimensions: 105.05 mm * 98.56 mm * 46.5 mm

Electrical Specifications

| | |
|-------------------|---------------------------|
| Rated Current | Powered by DC 12V adapter |
| Operating Current | <150mA |

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

Wireless Multi-Sensor Device (DC-Powered)

Temperature/Humidity Sensor

| | |
|-------------------------------|----------------|
| Temperature Measurement Range | 0°C to 50°C |
| Humidity Measurement Range | 0%RH to 100%RH |

TVOC Sensor

| | |
|------------------------|------------------|
| TVOC Range | 0 to 1000000 ppb |
| Communication Protocol | I ² C |

Illuminance Sensor

| | |
|------------------------|----------------------|
| Illuminance Range | 0.01 Lux to 157 Klux |
| Communication Protocol | I ² C |

Air Pressure Sensor

| | |
|-------------------|-------------------|
| Measurement Range | 300hPa to 1100hPa |
|-------------------|-------------------|

PIR sensor

| | |
|--------------------|----------------------------------|
| Standby Current | 10uA |
| Detection Angle | 80° horizontally; 90° vertically |
| Detection Distance | 0m to 2.5m |

Wireless Multi-Sensor Device (DC-Powered)
CO₂ Sensor (optional)

| | |
|------------------------|--|
| Operating Current | Sleeping mode < 30uA; Peak Current < 80mA |
| Range & Accuracy | 400 to 5000 ppm ±(50ppm ±3% of reading) 5001 to 10000ppm ± 10% of reading |
| Communication Protocol | UART / I ² C |
| Operating Temperature | 0 to 50°C |
| Operating Humidity | 0%RH to 85%RH (No condensation) |

NH₃ and H₂S Sensor (optional)

| | |
|------------------------|---|
| Dimensions | 26mm x 26mm x 9.7mm |
| Operating Current | 9.5mA@5VDC |
| Operating Voltage | 3.3 to 5.5V DC |
| Range | NH ₃ : 0 to 10ppm; H ₂ S : 0 to 5ppm |
| Resolution | NH ₃ : 0.01ppm; H ₂ S: 0.01ppm |
| Accuracy | ± 5% F.S |
| Standby Current | 0.85mA@5VDC |
| Communication Protocol | UART / I ² C |
| Operating Temperature | -20 to 50°C Note: Sensor works better in the range of 0 to 30°C. Operating below or over 0 to 30°C may have slight errors while detection. |
| Operating Humidity | 15%RH to 85%RH (No condensation) |
| Lifespan | 3 years |

Wireless Multi-Sensor Device (DC-Powered)

O₃ Sensor (optional)

| | |
|------------------------|---|
| Dimensions | 23mm x 25.5mm x 10.2mm |
| Operating Current | <5mA |
| Operating Voltage | 3.3 to 5.5V DC |
| Range | 0 to 50ppm |
| Resolution | 0.1ppm |
| Accuracy | ± 5% F.S |
| Communication Protocol | UART |
| Operating Temperature | 0 to 40°C (for indoor uses) Note: Operating in the range of -40°C to 55°C may need temperature compensation. |
| Operating Humidity | 15%RH to 95%RH (No condensation) |
| Lifespan | 3 years |

HCHO Sensor (optional)

| | |
|------------------------|--|
| Dimensions | 23mm x 25.5mm x 10.7mm |
| Operating Voltage | 5 to 7V |
| Range | 0 to 2000ppb |
| Accuracy | ± 10% Note: The accuracy of the sensor was tested under a pure -formaldehyde environment. |
| Communication Protocol | UART |
| Operating Temperature | -20 to 50°C |
| Operating Humidity | 10%RH to 90%RH (No condensation) |
| Lifespan | 5 years |

Wireless Multi-Sensor Device (DC-Powered)

PM2.5 Sensor (optional)

| | |
|---|---|
| Operating Current | 100mA (typical value) |
| PM2.5 Measurement Range | 0.3 to 1.0um; 1.0 to 2.5um |
| Particle Counting Efficiency | 50% @0.3um 98% @≥0.5um |
| Particle Mass Concentration Effective Range (PM2.5 standard value) | 0 to 500µg/m3 |
| Particle Mass Concentration Resolution | 1µg/m ³ |
| Particle Mass Concentration Consistency (PM2.5 standard value) | ±10% @ 100–500µg/m3 ±10µg/m3 @ 0–100µg/m3 |
| Comprehensive Response Time | ≤10 seconds |
| Lifetime and Product Consistency | The average time that PMS7003M PM2.5 particle concentration sensor with no faults is 3 years. If the concentration is greater than 300 ug/m3 for more than 50% of the year, or the concentration exceeds 500ug/m3 for more than 20% of the year, the consistency of the sensor will decrease. The data may be higher because of internal dust accumulation. |

CO Sensor (optional, connect RA0BD through RS485)

| | |
|-----------------------------|---------------|
| Power Supply | 10–30VDC |
| Range | 0 to 1000ppm |
| Resolution | 1ppm |
| Accuracy | ±5ppm or ±10% |
| Comprehensive Response Time | ≤30 seconds |
| Operating Pressure | 90–110kpa |

Wireless Multi-Sensor Device (DC-Powered)

Frequency

| | |
|-----------------------------------|--|
| Frequency Range | 863MHz-928MHz 470MHz-510MHz |
| Tx Power | US915 20dbm AS923 16dbm AU915 20dbm CN470 19.15dbm EU868 16dbm KR920 14dbm IN865 20dbm |
| Rx Sensitivity | -123dBm (Frequency deviation=5kHz, Bit Rate=1.2kb/s) |
| Antenna Type | Helical antenna |
| Communication Range | 10km (line of sight) Note: The actual communication distance may vary depending on the environment. |
| Data Transfer Rate | 0.3kbps to 50kbps (LoRawan); 0.6 to 300kbps (FSK) |
| Modulation Method | LoRa / FSK |
| Available LoRaWAN Frequency Plans | 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

| | |
|---------------------------------|--------------------------|
| Main Body Operating Temperature | 0°C to 50°C |
| Environment Humidity Range | <90%RH (No condensation) |
| Storage Temperature | -40°C to 85°C |