Wireless Outdoor PM2.5/Temperature/Humidity Sensor RA0716Y Datasheet

Wireless Sensor Network Based on LoRa Technology

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Wireless Outdoor PM2.5/Temperature/Humidity Sensor

Introduction

RA0716Y has a temperature and humidity sensor which can detect and send the data of environmental temperature and humidity. It is a wireless communication method and conforms to the LoRa protocol standard. RA0716Y with PM2.5 dust sensor can be used to measure the concentration of suspended particles in the air per unit volume.

Operating Principle

RA0716Y has built-in air temperature and humidity sensor and dust sensor. The air temperature and humidity sensor, SHT-30, communicates with the module through I2C. The dust sensor communicates with the LoRa module through the UART serial port.

Main Characteristic

- Temperature and humidity detection
- Detecting particle concentration of the air (PM2.5)
- Compatible with LoRaWAN^{TM} Class A
- Frequency hopping spread spectrum technology
- Configuring parameters and reading data via the third-party software platforms, and set alarms via SMS text and email (optional)
- Applicable to the third-party platforms: Actility/ ThingPark, TTN, MyDevices/Cayenne

Application

- Smart home
- Atmosphere detection
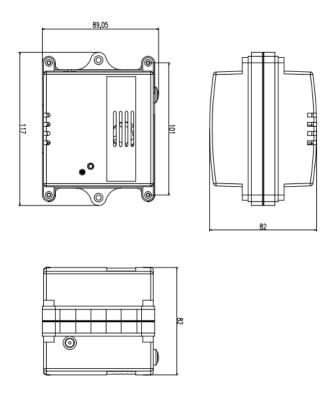- Temperature and humidity detection

Dimension

Fig. Host Body Dimension   (Unit: mm)

Electric

Power supply	DC adapter power supply, DC 12V/1A
Operating current 1	40mA (no RF signal emission)
Operating current 2	80mA (with RF signal emission)

Temperature and Humidity Sensor

Model	SHT-30
Operating Voltage	+3.3VDC
Temperature Measurement Range	-20°C－55°C
Temperature Measurement Accuracy	±1°C
Humidity Measurement Range	0%RH-100%RH
Humidity Measurement Range	±10%RH @25°C

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PM2.5 Particle Concentration Sensor

Operating Voltage	5VDC
Operating Current	100mA (typical value)
Particle Measurement Range	0.3 ~ 1.0 ; 1.0 ~ 2.5um
Particle Counting Efficiency	50%@0.3um，98%@≥0.5um
Particle Mass Concentration Effective Range (PM2.5 standard value)	$0{\sim}500\mu g/m^3$
Particle Mass Concentration Resolution	$1\mu g/m^3$
Particle Mass Concentration Consistency (PM2.5 standard value)	$\pm10\%@100\text{-}500ug/m^3$ $\pm10ug/m3@0\text{-}100ug/m^3$
Comprehensive Response Time	≤10 seconds
Lifetime and Product Consistency	The average time that PMS7003M PM2.5 particle concentration sensor has no faults is 3 years. If the concentration is greater than 300 ug/m^3 for more than 50% of the year, or the concentration exceeds $500ug/m^3$ for more than 20% of the year, the consistency of the sensor will decrease. The data may be high because of internal dust accumulation.

Frequency

Frequency Range	863MHz-928MHz 470MHz-510MHz
TX Power	US915　　20dbm AS923　　16dbm AU915　　20dbm CN470　　19.15dbm EU868　　16dbm KR920　　14dbm IN865　　 20dbm
Receive Sensitivity	-121dBm (FSK, Frequency deviation=5kHz, Bit Rate=1.2kbps) -136dBm (LoRa，Spreading Factor=12, Bit Rate=293bps)
Antenna Type	Built-in antenna
Communication Distance	10km (visible linear obstacle-free transmission distance, actual transmission distance depending on the environment)

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Data Transfer Rate	0.3kbps～50kbps
Modulation Method	LoRa/FSK (Note: choose one of them)
Supportable LoRaWAN Band	EU863-870, US902-928, AU915-928, KR920-923, AS923, CN470-510 (Note: The frequency band is optional and needs to be configured before shipment.)

Physical

Dimension	Mask Part: D 220mm*H 280mm Host body: 117mm x 89mm x 41mm
Ambient Temperature Range	-20°C ~ 55°C
Ambient Humidity Range	<90%RH (No condensation)
Storage Temperature Range	-40°C ~ 85°C