

Indoor Multi-function Environment Sensor

User Manual

Firmware:V1.1
Hardware:V0.4

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1. Introduction

RA07 is a ClassA type device based on the LoRaWAN open protocol of Netvox and is compatible with the LoRaWAN protocol.

RA07 is unmasked for indoor inspection. RA07 can be connected to a variety of sensors. A variety of sensor combinations are required. As detectors for PM2.5, temperature and humidity, CO, NO, liquid level, and soil, the values collected by the sensor are reported to the corresponding gateway.

LoRa Wireless Technology:

LoRa is a wireless communication technology dedicated to long distance and low power consumption. Compared with other communication methods, LoRa spread spectrum modulation method greatly increases to expand the communication distance. Widely used in long-distance, low-data wireless communications. For example, automatic meter reading, building automation equipment, wireless security systems, industrial monitoring. Main features include small size, low power consumption, transmission distance, anti-interference ability and so on.

LoRaWAN:

LoRaWAN uses LoRa technology to define end-to-end standard specifications to ensure interoperability between devices and gateways from different manufacturers.

2. Appearance



Figure 1
RA0701 renderings
(subject to the actual object)



Figure2
RA0711 renderings
(subject to the actual object)

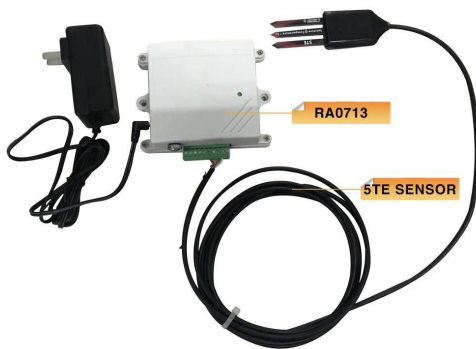


Figure 3
RA0713 external 5TE-SENSOR
(subject to the actual object)

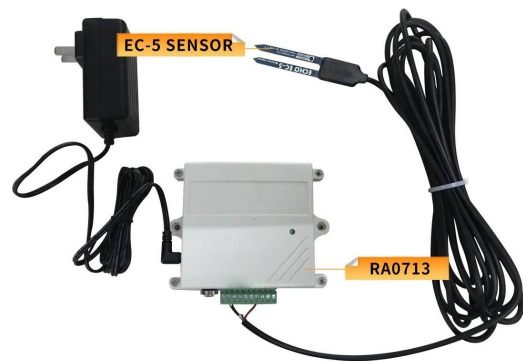


Figure 4
RA0713 external EC-5 SENSOR
(subject to the actual object)



Figure 5
RA0715 is connected to CO2 and temperature and humidity Sensor (subject to the actual object)



Figure 6
RA0716 internal dust and temperature and humidity Sensor (subject to the actual object)



Figure 7
RA0723 internal dust and temperature and humidity sensor, external noise Sensor (subject to the actual object)

Fig. RA07 Appearance

3. Main Features

- Compatible with LoRaWAN
- DC 12V Adapter Power Supply
- Easy set up and installation

4. Set up Instruction

4.1 Join Into Lora Network

RA07 is powered by the DV 12V adapter and can communicate with the gateway. RA07 needs to be added to the gateway network first.

Operations are as follows:

- (1) After power-on, the un-networked device will automatically scan the network. After scanning the network that can be joined, the green indicator light of the device will be on for 5 seconds, and the network will succeed. Otherwise, the indicator light will not work.
- (2) For devices that have been added to the network, the green indicator light is on for 5 seconds after power-off, indicating that it is already in the network.

4.2 Function Key

- (1) Press the button to activate, the LED flashes slowly once; at the same time, the report data will be sent to the gateway.
- (2) Press the button for 5 seconds to restore the factory settings. After the factory reset is successful, the green LED flashes 20 times.

4.3 Activation

Press the button to activate the device; the activation is successful. LED flashes slowly once to show it is in the network.

4.4 Supported Frequency

The currently supported network bands are: AS923, US915_HYBRID, EU868, AU915, CN470 and KR920.

4.5 Data Report

After the device is powered on, it will send a version package immediately. The version packet sending frequency is 24 hours/time. The RA07 device will send a power-on report after 10 seconds after powering on (PM value and air temperature and humidity value).

The default report configuration of the device is as follows:

ReportMaxTime: 180s;

ReportMinTime: 30s;

ReportChange: 0;

Note: ReportMaxTime time can be programmed by CustomData with NLPP, specifying the default value of the factory ReportMaxTime (default factory setting is: 3min = 180s).

The RA07 device does not support the ReportChange function, that is, the configuration is invalid. The sent report data string is always sent according to the ReportMaxTime cycle. The ReportMinTime is the RA07 device refers to the interval interval of the report data string (since the RA07 device needs to send multiple samples at a time. Report data, so use ReportMinTime to do the separation).

RA07 series data report type:

RA0701: The data of the device Report is: CO gas, ReportType count = 1;

RA0711: The data of the device Report is: the height of the liquid, ReportType count = 1;

RA0713: The data of the device Report is: soil temperature, soil moisture and soil conductivity, ReportType count = 1;

RA0715: The data of the device Report is: air temperature and humidity and CO2 (MH-14), ReportType count = 2;

RA0716: The data of the device Report is: air temperature and humidity and dust (PM2.5), ReportType count = 1 (integrated into one);

RA0723: The data of the device Report is: air temperature and humidity, dust (PM2.5) and noise, ReportType count = 3;

RA0724: The data of the device Report is: air temperature and humidity and noise, ReportType count = 2;

Note:

1. The value of ReportMaxTime is greater than (ReportType count * ReportMinTime + 10 units: second).
2. Since the dust sensor/CO2 (MH-14) works stably, it requires about 60 seconds after powering on. Therefore, the device model that uses the dust sensor/CO2 (MH-14) will send report data after 60 seconds after powering on.
3. Soil moisture sampling supports calibration function, which can be calibrated by the gateway issuing commands; the sampled soil types support minerals, potting soil and rock wool.

The RA07 device also supports Cayenne's TxPeriod cycle configuration instructions. Therefore, RA07 can also perform the report according to the cycle time of the TxPeriod value; and at a certain time, the report period is ReportMaxTime or TxPeriod, depending on which cycle time is configured last time.

5. Restore to Factory Setting

RA07 has a power-down save network information memory function. This feature is turned off by default. That is, it will be re-joined to the network every time when it is powered back on.

To enable it by using the ResumeNetOnOff command, each time the power is rewritten, the last joining information will be recorded (including saving the network address information assigned to it, etc., if users want to join a new network, you need to perform a factory reset first. The set operation) will not be re-joined.

Operation method:

1. Press and hold the binding button for 5 seconds to release (the binding button is released when the LED flashes), and the LED flashes 20 times;
2. RA07 automatically restarts to start re-joining to the network.

Note: Restore factory settings, ACK is off by default; ADR is enabled by default.

6. Installation

This product does not have a waterproof function. After the network joining is completed, please place it indoor.

PM 2.5 sensor has an average time between failures of 3 years, a concentration of more than 300 ug/m³ for more than 50% time of the year, or a concentration of more than 500 ug/m³ for more than 20% time of the year. The consistency of the sensor may decrease, possibly due to internal dust accumulation. The data is too high.

7. Important Maintenance Instruction

- This device is NOT truly waterproof/ resistant and is for indoor use.
- Please keep the device in a dry place. Precipitation, humidity, and all types of liquids or moisture can contain minerals that corrode electronic circuits. In cases of accidental liquid spills to a device, please leave the device dry properly before storing or using.
- Do not use or store the device in dusty or dirty areas.
- Do not use or store the device in extremely hot temperatures. High temperatures may damage the device or battery.
- Do not use or store the device in extremely cold temperatures. When the device warms to its normal temperature, moisture can form inside the device and damage the device or battery.
- Do not drop, knock, or shake the device. Rough handling would break it.
- Do not use strong chemicals or washing to clean the device.
- Do not paint the device. Paint would cause improper operation.

Handle your device, battery, and accessories with care. The suggestions above help you keep your device operational. For damaged device, please contact the authorized service center in your area.

8. FCC Statement

The OEM integrator has to be aware of not to providing information to end users regarding how to install or remove this RF module in the user manual of the end product. The user manual which is provided by OEM integrators for end users must

Include the following information in a prominent location.

“ To comply with FCC RF exposure compliance requirement, the antenna user for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter .”

Label for the end product must include “Contains FCC ID :NRH-ZB-Z100B”or “A RF transmitter inside,FCC ID :NRH-ZB-Z100B”.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is to the following two conditions:(1)this device may not cause harmful interference and (2)this device must accept any interference received, including interference that may cause undesired operation.

FCC RF Radiation Exposure Statement:

1 This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.