netvox™

Wireless-CO/Temperature Sensor

Wireless CO/Temperature Sensor

RA02C

User Manual

Table of Content

1. Statement

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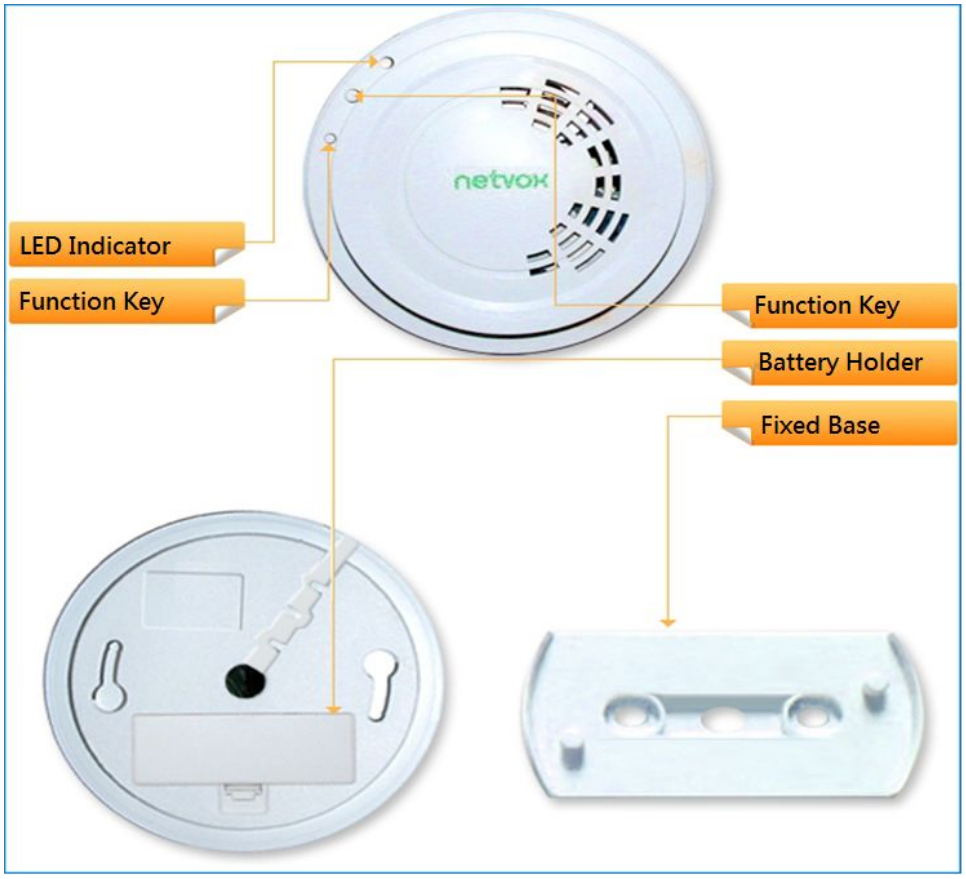
2. Appearance



3. Introduction

RA02C is a CO / temperature detector for Netvox Class-A devices based on the LoRaWAN open protocol and is compatible with the LoRaWAN protocol.

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 defines an end-to-end standard specification that uses LoRa technology to ensure interoperability between devices and gateways from different manufacturers.

4. Main Features

Compatible with LoRaWAN

Two 1.5V alkaline batteries connected in series

Simple operation and setting

5. Setting Instruction

5.1 Power on / Turn on / Turn off

Power on:
Firstly, insert the battery on the device. Operation method: Open the battery back cover. Use a tool like a screwdriver to assist in opening the battery cover. Take two alkaline batteries, put the batteries in the correct direction, and cover the back cover.

Turn on：
After the batteries are inserted (without networking), the device is at turned off mode by default. Press any function key to turn on the device. After releasing the key, the red and green indicators will flash at the same time to indicate that it turns on successfully.

Power off while the device is on:
Unload the batteries and wait till the capacitor is discharged (10 seconds); insert the batteries back to the device. At this time, the device is at turned on mode by default (has been turned on and there is no need to press any key to turn on the device). The red and green indicators both turn on and off once.

Turn off:
Press and hold both keys for 5 seconds till the green indicator flashes and then release; LED flashes quickly 20 times.

Note:
1. The interval between turning on/off or powering off/on is suggested to be about 10 seconds to avoid the interference of capacitor inductance and other energy storage components.
2. Do not press function key and insert batteries in the same time, otherwise, it will enter engineer testing mode.

5.2 Join Into Lora Network

To join the device into LoRa network to communicate with LoRa gateway. The network operation is as following:
(1) If the device had never joined any network, turn on the device; it will search an available LoRa network to join. The green indicator will stay on for 5 seconds to show it joins into the network, otherwise, the green indicator will be off.
(2) If the device had been joined into a LoRa network, remove and insert the batteries; it will repeat step (1).

5.3 Function Key

(1) Press both keys for 5 seconds at the same time to restore to factory settings. The green LED flashes 20 times to show that it restores to factory setting successfully.
(2) Test key to test alarm (in LoRa network). Press test key shortly; the device will send a series of data (CO bit is 1). Red indicator flashes 5 times, and buzzer rings for 5 seconds, and then send a series of data after the alarm is over (restore real alarm state).
(3) Test key to test alarm (not in LoRa network). Press test key shortly; red indicator flashes 5 times, and buzzer rings for 5 seconds but there is no report data sent.
(4) Press the function key briefly (in LoRa network), the green indicator light flashes once and sends a data.
(5) Press the function key briefly (not in LoRa network), it does not response.

5.4 Data Report

After the device is powered on, a version package and an attribute report data are sent immediately.

Before any configuration is done, the device defaults to send data:
Maximum time: 3600s
Minimum time: 3600s (Detect current voltage value every 3600 seconds by default)
Default reportchange: Battery - 0x01 (0.1V)

Remarks:
The real configuration depends on individual order requirement.
The interval between two reports must be the minimum time.
The maximum and minimum time is not recommended to be set too short. It is recommended to apply default report time.

Trigger CO detector:
The CO concentration is sampled 30 seconds after the device is powered up, when the concentration is higher than 110 ppm. The red indicator light flashes, the buzzer alarms and immediately sends a report (CO alarm bit is 1). If the alarm continues, the report will be sent every 30 seconds. When the concentration drops below 110ppm, the flashing end alarm will be stopped and an alarm will be sent to restore the report.

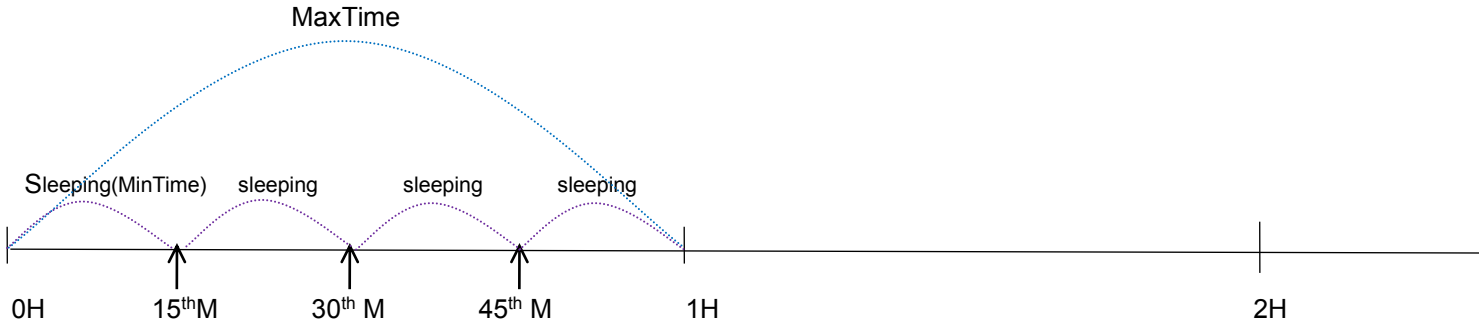
High temperature alarm:
The device will sample the temperature once a minute after the device joins into network. When the temperature is higher than 60 degrees, the buzzer will alarm and immediately send a report (fire alarm bit is 1). If the alarm persists, it will be reported every 60 seconds. When the temperature drops below 60 degrees, the alarm ends and the device will send a report.

Data report configuration and sending period are as following:

Min Interval (Unit:second)	Max Interval (Unit:second)	Reportable Change	Current Change≥ Reportable Change	Current Change < Reportable Change
Any number between 1~65535	Any number between 1~65535	Can not be 0.	Report per Min Interval	Report per Max Interval

Example#1

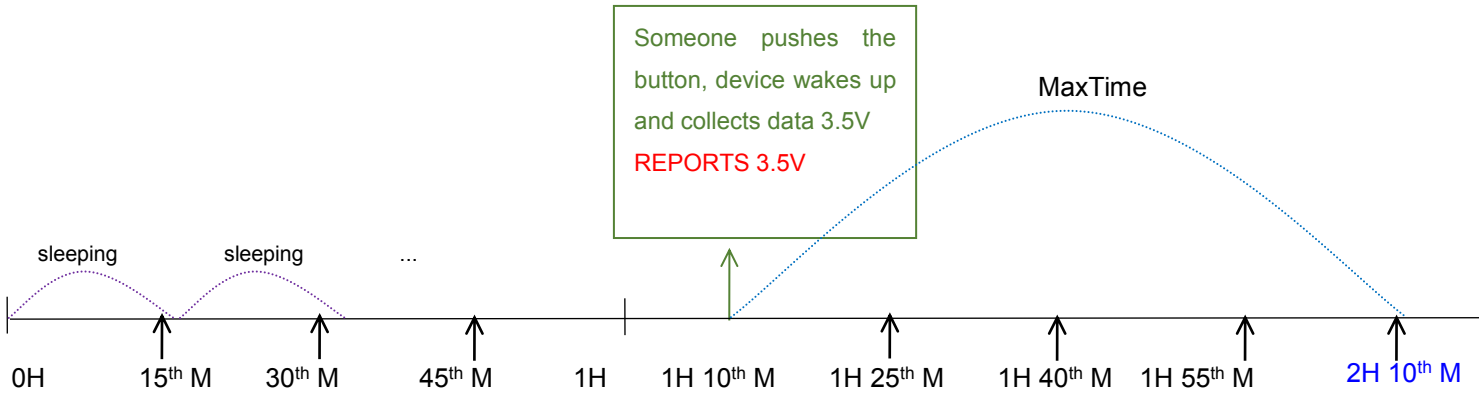
based on MinTime = 15 Minutes, MaxTime= 1 Hour, battery voltage Reportable Change = 0.1V



Wakes up and collects data REPORTS 3.6	Wakes up and collects data 3.6V |3.6-3.6|=0<0.1 Does not report	Wakes up and collects data 3.6 |3.6-3.6|=0<0.1 Does not report	Wakes up and collects data 3.6 |3.6-3.6|=0<0.1 Does not report	Wakes up and collects data REPORTS3.6

Example#2

based on MinTime = 15 Minutes, MaxTime= 1 Hour, battery voltage Reportable Change = 0.1V



Wakes up and collects data REPORTS 3.6	Wakes up and collects data 3.6 |3.6-3.6|=0<0.1 Does not report	Wakes up and collects data 3.5 |3.6-3.5|=0.1=0.1 REPORTS 3.5	Wakes up and collects data 3.5 |3.5-3.5|=0<0.1 Does not report	Wakes up and collects data 3.5 |3.5-3.5|=0<0.1 Does not report	Wakes up and collects data 3.5 |3.5-3.5|=0<0.1 Does not report	Wakes up and collects data 3.5 |3.5-3.5|=0<0.1 Does not report	Wakes up and collects data 3.5 |3.5-3.5|=0<0.1 Does not report	Wakes up collects data REPORTS 3.5

Notes :

1) The device only wakes up and performs data sampling according to MinTime Interval. When it is sleeping, it does not collect data.

2) The data collected is compared with the last data reported. If the data variation is greater than the ReportableChange value, the device reports according to MinTime interval. If the data variation is not greater than the last data reported, the device reports according to MaxTime interval.
3) We do not recommend to set the MinTime Interval value too low. If the MinTime Interval is too low, the device wakes up frequently and the battery will be drained soon.
4) Whenever the device sends a report, no matter resulting from data variation, button pushed or MaxTime interval, another cycle of MinTime/MaxTime calculation is started.

6. Restore to Factory Setting

The device saves data including network key information, configuration information, etc. To restore to factory setting, users need to execute below operations.
1. Press and hold both keys for 5 seconds till the green indicator flashes and then release; LED flashes quickly 20 times.
2. The device will enter off mode by default setting after restoring to factory setting. Press function key to turn on and join a new LoRa network.

Note: The device operation of turning off is the same as the device restore factory settings.

7. Sleeping Mode

The device is designed to enter sleeping mode for power-saving in some situations:

(A) While the device is in the network → the sleeping period is one hour. (During this period, if the reportchange is larger than setting value, it will wake up and send a data report).
(B) When it is not in the network → The device will enter sleeping mode and wake up every 15 seconds to search a network to join in the first two minutes. After two minutes, it will wake up every 15 minutes to request to join the network.

If it's at (B) status, to prevent this unwanted power consumption, we recommend that users remove the batteries to power off the device.

Note:
Min Interval for the following single programming is subject to real order.

8. Low Voltage Alarming

The operating voltage threshold is 2.4V. If the voltage is lower than 2.4 V, RA02C will send a low-power report to the Lora network.

9. Installation and Precautions

This product does not have a waterproof function. After the network joining is completed, please place it indoors. This product is not suitable for places where there is a large amount of dust and water mist; it is not suitable for places where steam and oil mist may be generated; it is not suitable for places where smoke is normally retained.

The carbon monoxide sensor (RA02A) is suitable for the following scenarios:

- Kitchen, restaurant or cafeteria
- bathroom
- Basement, underground pipeline, mine
- Biogas pool
- Boiler room or coal stove room

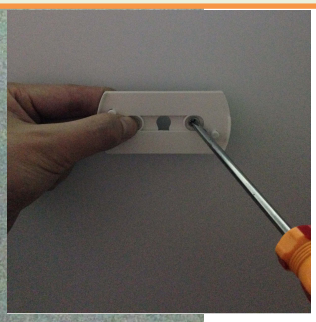
Not applicable to the following scenarios:

- A place with a large amount of dust, powder, and large amount of water mist
- a place where steam and oil mist may be generated
- Like a kitchen and a place where smoke is normally trapped
- a place where the temperature is too high and the humidity is too humid.

1. Fix the base of carbon monoxide sensor to the wall with screws (should be purchased) (recommended 0.3~0.6m from the floor), as shown below.

Note:

Do not install the device in a metal shielded box or other electrical equipment around it to avoid affecting the wireless transmission of the device.



2. Align the mounting tab on the bottom of the sensor (red circle in the figure below) with the base assembly post (red circle in the figure below) into the base, then gently rotate the sensor counterclockwise into place.

3. When the carbon monoxide sensor detects a CO concentration exceeding 110 ppm or the temperature exceeds 60 °C, the device will send an "alarm" message.

When the CO concentration is lower than the set value and the periodic reporting time is reached, the device returns to the “normal” state and sends “normal” status information.

10. Important Maintenance Instruction

Your device is a product of superior design and craftsmanship and should be used with care. The following suggestions will help you use the warranty service effectively.

• Keep the equipment dry. Rain, moisture, and various liquids or moisture may contain minerals that can corrode electronic circuits. In case the device is wet, please dry it completely.

• Do not use or store in dusty or dirty areas. This can damage its detachable parts and electronic components.

• Do not store in excessive heat. High temperatures can shorten the life of electronic devices, destroy batteries, and deform or melt some plastic parts.

• Do not store in a cold place. Otherwise, when the temperature rises to normal temperature, moisture will form inside, which will destroy the board.

• Do not throw, knock or shake the device. Rough handling of equipment can destroy internal circuit boards and delicate structures.

• Do not wash with strong chemicals, detergents or strong detergents.

• Do not apply with paint. Smudges can block debris in detachable parts and affect normal operation.

• Do not throw the battery into a fire to prevent the battery from exploding. Damaged batteries may also explode.

All of the above suggestions apply equally to your device, battery and accessories. If any device is not working properly.

Please take it to the nearest authorized service facility for repair.