# netvox R718B2 Wireless 2-Gang Temperature Sensor User Manual



**18B2 Wireless 2-Gang Temperature Sensor**
**User Manual**

Contents



## Wireless 2-Gang Temperature Sensor

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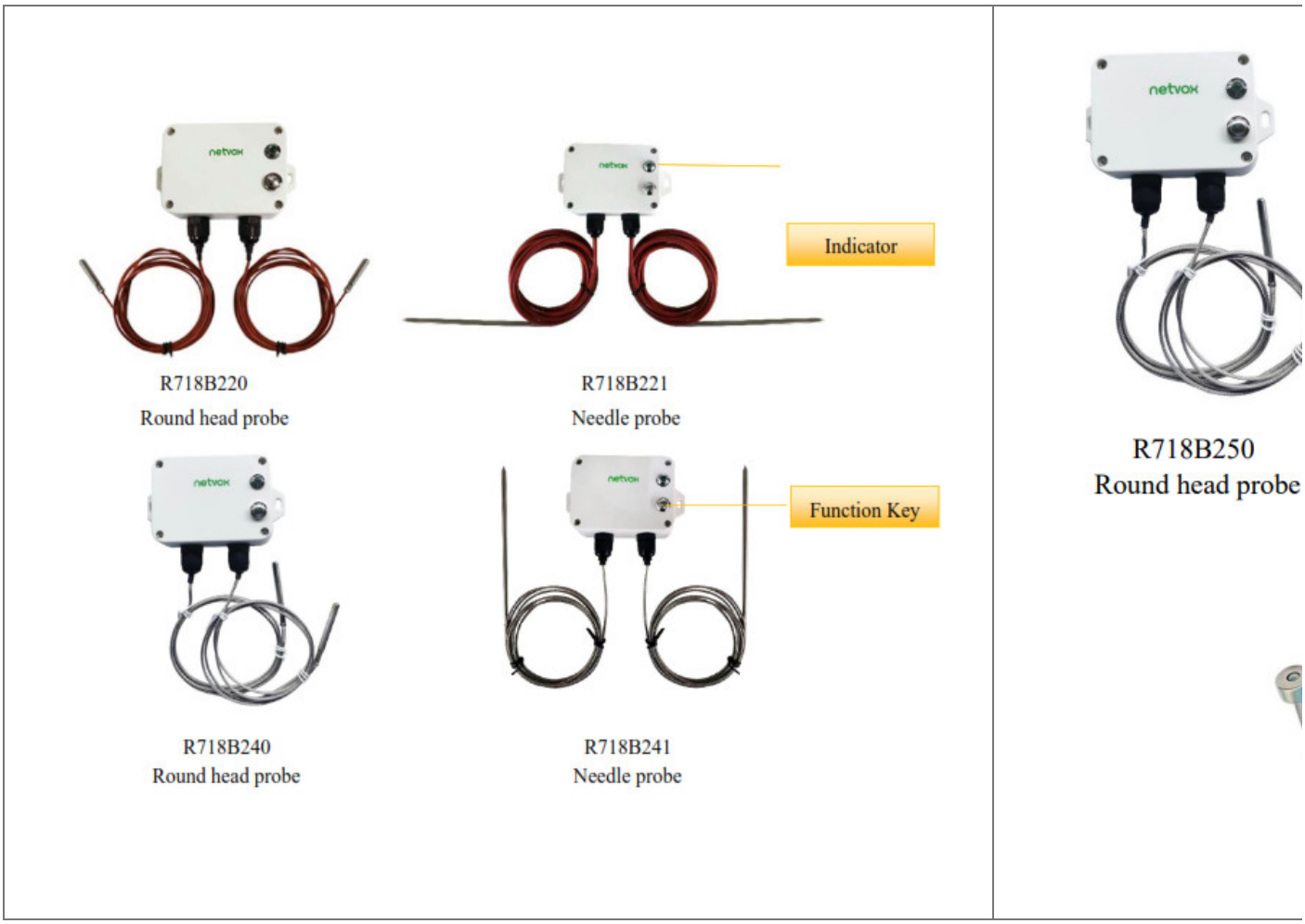
## Introduction

R718B2 is a Wireless 2-Gang Resistance Temperature Detector for Netvox ClassA type devices based on the LoRaWAN open protocol and is compatible with the LoRaWAN protocol. R718B2 connects two external resistance temperature detectors (PT1000) to measures the temperature.

**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.

## Appearance




## Main Features

- Adopt SX1276 LoRa wireless communication module
- 2 ER14505 battery AA size (3.6V / section) parallel power supply
- PT1000 Platinum resistance temperature sensor detection
- The base is attached with a magnet that can be attached to a ferromagnetic material object
- Main body IP rating: IP65/IP67 (optional)
- R718B220, R718B221 temperature range: -70°C to 200°C, Sensor IP rating: IP67
- R718B222 temperature range: -50°C to 180°C, Sensor IP rating: IP67

- R718B240, R718B241 temperature range: -40°C to 375°C, Sensor IP rating: IP50
- R718B250, R718B251 temperature range: -40°C to 500°C, Sensor IP rating: IP50
- Compatible with LoRaWAN Class A
- Frequency hopping spread spectrum
- Configuration parameters can be configured via a third-party software platform, data can be read and alerts can be set via SMS text and email (optional)
- Applicable to third-party platforms: Actility/ThingPark, TTN, MyDevices/Cayenne
- Low power consumption and long battery life
- **Battery Life:**
  Please refer to web: **http://www.netvox.com.tw/electric/electric_calc.html**
  At this website, users can find battery life time for variety models at different configurations.

## Set up Instruction

### On/Off

| | |
|---|---|
| Power on | Insert batteries. (users may need a screwdriver to open) |
| Turn on | Press and hold the function key for 3 seconds till the green indicator flashes once. |
| Turn off (Restore to factory setting) | Press and hold the function key for 5 seconds till green indicator flashes for 20 times. |
| Power off | Remove Batteries. |
| Note: | 1. Remove and insert the battery; the device is at off state by default. Press and hold the function key for 3 seconds till the green indicator flashes once to turn on the device.<br>2. On/off interval is suggested to be about 10 seconds to avoid the interference of capacitor inductance and other energy storage components.<br>3. At 1st -5th second after power on, the device will be in engineering test mode. |

### Network Joining

| | |
|---|---|
| Never joined the network | Turn on the device to search the network.<br>The green indicator stays on for 5 seconds: success<br>The green indicator remains off: fail |
| Had joined the network (not at factory setting mode) | Turn on the device to search the previous network.<br>The green indicator stays on for 5 seconds: success.The green indicator remains off: fail |
| Fail to join the network (when the device is on) | Suggest to check the device verification information on the gateway or consult your platform server provider. |

### Function Key

| | |
|---|---|
| Press and hold for 5 seconds | Restore to factory setting / Turn off.<br>The green indicator flashes for 20 times: success.The green indicator r emains off: fail |
| Press once | The device is in the network: green indicator flashes once and sends a report.<br>The device is not in the network: green indicator remains off |

**Sleeping Mode**

| | |
|---|---|
| The device is on and in the network | Sleeping period: Min Interval.<br>When the report change exceeds setting value or the state changes: s end a data report according to Min Interval. |
| **Low Voltage Warning** | |
| Low Voltage | 3.2V |

## Data Report

The device will immediately send a version packet report along with an uplink packet including temperature1, temperature2 and battery voltage.
The device sends data in the default configuration before any configuration is done.

**Default setting:**
MaxTime : Max Interval = 15 min = 900s
MinTime : Min Interval = 15 min = 900s
BatteryChange: 0x01 (0.1V)
TemperatureChange:0x0064 (10°C)
Note:
The device report interval will be programmed based on the default firmware which may vary. The interval between two reports must be the minimum time.
Please refer Netvox LoRaWAN Application Command document and Netvox Lora Command Resolver **http://www.netvox.com.cn:8888/page/index** to resolve uplink data.
**Data report configuration and sending period are as following:**

| Min Interval (Unit:se cond) | Max Interval (Unit:s econd) | Reportable Change | Current Change≥ Re portable Change | Current Change Re portable Change |
|---|---|---|---|---|
| Any number betwee n<br>1~65535 | Any number betwee n<br>1~65535 | Can not be 0 | Report per Min Inter val | Report per Max Inte rval |

**5.1 Example of ReportDataCmd**
FPort 0x06

| Bytes | 1 | 1 | 1 | Var(Fix=8 Bytes) |
|---|---|---|---|---|
| | Version | DeviceTyp e | ReportTyp e | Netvox PayLoad Data |

Version– 1 byte –0x01——the Version of Netvox LoRaWAN Application Command Version

Device Type– 1 byte – Device Type of Device
The device type is listed in Netvox LoRaWAN Application Devicetype doc
Report Type – 1 byte –the presentation of the NetvoxPayLoadData according the devicetype
Netvox PayLoad Data– Fixed bytes (Fixed =8bytes)

| **Device** | **Device Type** | **Report Type** | **Netvox PayLoad Data** | | | |
|---|---|---|---|---|---|---|
| R718B2 series | 0x14 | 0x01 | Battery (1Byte, unit:0.1V) | Temperature 1 (Signed2Bytes,unit:0.1°C) | Temperature 2 (Signed2Bytes,unit:0.1°C) | Reserved (5Bytes,fixed 0x00) |

Example 1 of Uplink: 011401240109010200000 0
1st byte (01): Version
2nd byte (14): DeviceType 0x14 R718B2 series
3rd byte (01): ReportType
4th byte (24): Battery 3.6V, 24(HEX)=36(DEC),36*0.1v=3.6v
5th6th byte (0109): Temperature 26.5 °C , 0109(HEX)=265(DEC),265*0.1°C =26.5°C
7th8th byte (0102): Temperature 25.8 °C , 0102(HEX)=258(DEC),258*0.1°C =25.8°C
11th byte (0000000): Reserved
**Example 2 of Uplink: 011401A0FF39FF36000000**
1st byte (01): Version
2nd byte (14): DeviceType 0x14 R718B2 series
3rd byte (01): ReportType
4th byte (A0): Battery 3.2V (Low battery), A0(HEX)=32(DEC),32*0.1v=3.2v //The bit7 is 1,represent low battery
5th6th byte (FF39): Temperature -19.9ºC , 0x10000-0xFF39=0xC7 (HEX), 0xC7 (HEX)=199(DEC) , -199×0.1°C= -19.9°C
7th8th byte (FF36): Temperature -20.2 °C ,0x10000-0xFF36=0xCA (HEX), 0Xca (HEX)= 202(DEC),-202*0.1°C = -20.2°C
9th-11th byte (0000000): Reserved

**5.2 Example of Report configuration**
FPort 0x07

| Bytes | 1 | 1 | Var(Fix =9 Bytes) |
|---|---|---|---|
| | CmdID | DeviceType | Netvox PayLoad Data |

CmdID– 1 byte
DeviceType– 1 byte – Device Type of Device
Netvox PayLoad Data– var bytes (Max=9bytes)

| Description | Device | CmdID | Device Type | | | Netvox PayLoad Data | | |
|---|---|---|---|---|---|---|---|---|
| Config Report Req | R718B2 | 0x01 | 0x14 | MinTime (2bytes Unit:s) | MaxTime (2bytes Unit:s) | Battery Change (1byte Unit:0.1v) | Temperature Change (2byte Unit:0.1℃) | Reserved (Bytes,Fixed 0x00) |
| Config Report Rsp | | 0x81 | | | Status (0x00_success) | | Reserved (8Bytes,Fixed 0x00) | |
| ReadConfigReportReq | | 0x02 | | | | Reserved (9Bytes,Fixed 0x00) | | |
| ReadConfigReportRsp | | 0x82 | | MinTime(2bytes Unit:s) | MaxTime(2bytes Unit:s) | Battery Change (byte Unit:0.1v) | Temperature Change (2byte Unit:0.1℃) | Reserved (2Bytes,Fixed 0x00) |

1. Configure device parameters MinTime = 1min, MaxTime = 1min, Battery Change = 0.1v, Temperature change = 10℃

   Downlink: 0114003C003C0100640000

   **Device returns:**

   81140000000000000000 (configuration successful)

   81140100000000000000 (configuration failed)

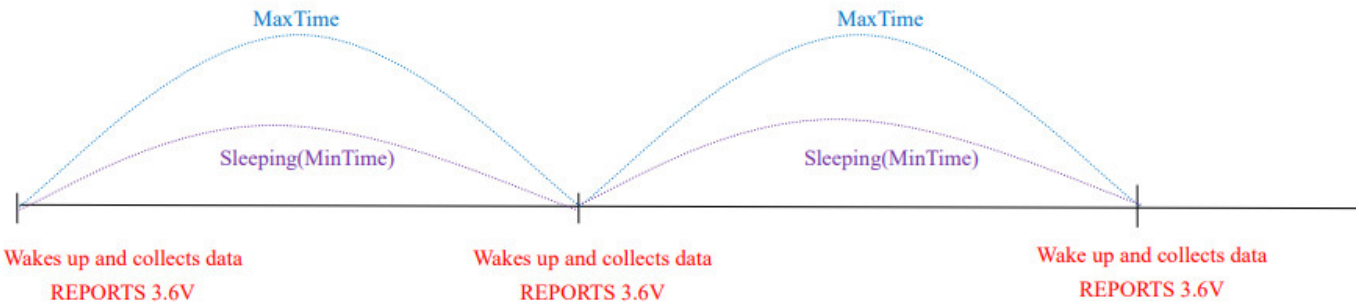
2. Read device parameters

   Downlink: 021400000000000000000

   **Device returns:** 8214003C003C0100640000 (current device configuration parameters)

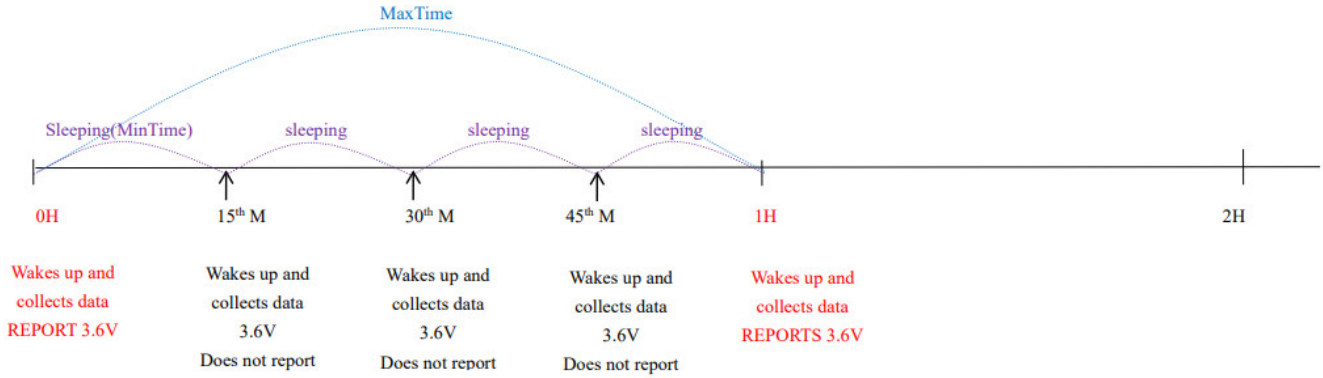
**5.3 Example for MinTime/MaxTime logic**

Example#1 based on MinTime = 1 Hour, MaxTime= 1 Hour, Reportable Change i.e. Battery Voltage Change=0.1V

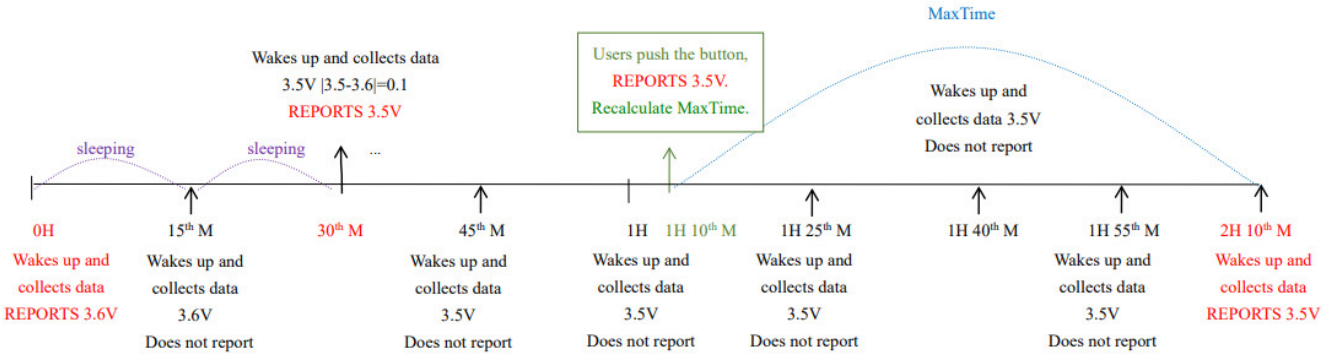



**Note:** MaxTime=MinTime. Data will only be report according to MaxTime (MinTime) duration regardless Battery Voltage Change value.

Example#2 based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. Battery Voltage Change= 0.1V.




Example#3 based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. Battery Voltage Change= 0.1V.




**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 Reportable Change 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 Maxime interval.

3) We do not recommend to set the Intime Interval value too low. If the Intime Interval is too low, the device wakes up frequently and the battery will be drained soon.

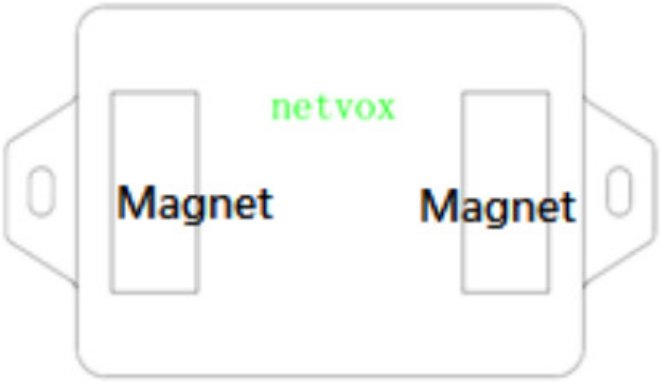
4) Whenever the device sends a report, no matter resulting from data variation, button pushed or MaxTime interval, another cycle of MinTime/MaxTime calculation is started.

## Installation

This product comes with waterproof function. When using it, the back of it can be adsorbed on the iron surface, or the two ends can be fixed to the wall with screws.

1. The Wireless 2-Gang Temperature Sensor (R718B2) has a built-in magnet (see Figure 1 below). When installed, it can be attached to the surface of an object with iron which is convenient and quick. To make the installation more secure, use screws (purchased) to secure the unit to a wall or other surface (see Figure 2 below).

   **Note:** Do not install the device in a metal shielded box or in an environment with other electrical equipment around it to avoid affecting the wireless transmission of the device.

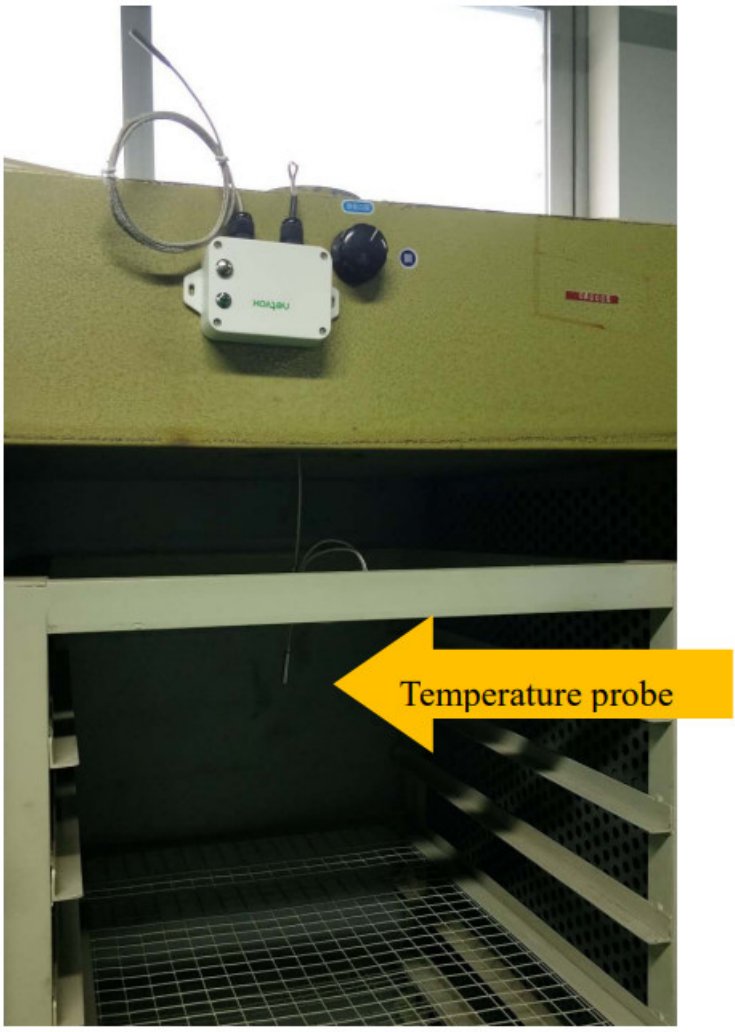




2. When R718B2 is compared with the last reported values, the temperature change is exceeded 0.1°C (default),it will report values at the Intime interval; If does not exceeded 0.1°C (default) ,it will report values at the Maxime interval;

   R718B2 is suitable below scenarios:

   • Oven
   • Industrial control equipment
   • Semiconductor industry




**Note:**
Please do not disassemble the device unless it is required to replace the batteries.
Do not touch the waterproof gasket, LED indicator light, function keys when replacing the batteries. Please use suitable screwdriver to tighten the screws (if using an electric screwdriver, it is recommended to set the torque as 4kgf) to ensure the 9 device is impermeable.

## Information about Battery Passivation

Many of Netvox devices are powered by 3.6V ER14505 Li-SOCl2 (lithium-thionyl chloride) batteries that offer many advantages including low self-discharge rate and high energy density.
However, primary lithium batteries like Li-SOCl2 batteries will form a passivation layer as a reaction between the lithium anode and thionyl chloride if they are in storage for a long time or if the storage temperature is too high. This lithium chloride layer prevents rapid self-discharge caused by continuous reaction between lithium and thionyl chloride, but battery passivation may also lead to voltage delay when the batteries are put into operation, and our devices may not work correctly in this situation.
As a result, please make sure to source batteries from reliable vendors, and it is suggested that if the storage period is more than one month from the date of battery production, all the batteries should be activated.
If encountering the situation of battery passivation, users can activate the battery to eliminate the battery hysteresis.
**ER14505 Battery Passivation:**
**7.1 To determine whether a battery requires activation**
Connect a new ER14505 battery to a resistor in parallel, and check the voltage of the circuit. If the voltage is below 3.3V, it means the battery requires activation.
**7.2 How to activate the battery**
a. Connect a battery to a resistor in parallel
b. Keep the connection for 5~8 minutes
c. The voltage of the circuit should be ≧3.3, indicating successful activation.

| Brand | Load Resistance | Activation Time | Activation Current |
|---|---|---|---|
| NHTONE | 165 Ω | 5 minutes | 20mA |
| RAMWAY | 67 Ω | 8 minutes | 50mA |
| EVE | 67 Ω | 8 minutes | 50mA |
| SAFT | 67 Ω | 8 minutes | 50mA |

**Note:** If you buy batteries from other than the above four manufacturers, then the battery activation time, activation current, and required load resistance shall be mainly subject to the announcement of each manufacturer.

### Relevant Products

| Model | | Temperature Range | Wire Material | Wire Length | Probe Type | Probe Material | Probe Dimension | Probe IP Rating |
|---|---|---|---|---|---|---|---|---|
| R718B120 | One-gang | -70° to 200°C | PTFE + silicone | 2m | Round head | 316 stainless steel | Ø5mm*30mm | IP67 |
| R718B220 | Two-gang | | | | | | | |
| R718B121 | One-gang | | | | Needle | | Ø5mm*150mm | |
| R718B221 | Two-gang | | | | | | | |
| R718B122 | One-gang | -50° to 180°C | | | Absorption | NdFeB magnet +stainless steel spring | Ø15mm | |
| R718B222 | Two-gang | | | | | | | |
| R718B140 | One-gang | -40° to 375°C | Braided Fiberglass | | Round head | 316 stainless steel | Ø5mm*30mm | IP50 |
| R718B240 | Two-gang | | | | | | | |
| R718B141 | One-gang | | | | Needle | | Ø5mm*150mm | |
| R718B241 | Two-gang | | | | | | | |
| R718B150 | One-gang | -40° to 500°C | | | Round head | | Ø5mm*30mm | |
| R718B250 | Two-gang | | | | | | | |
| R718B151 | One-gang | | | | Needle | | Ø5mm*150mm | |
| R718B251 | Two-gang | | | | | | | |

**Important Maintenance Instruction**
Kindly pay attention to the following in order to achieve the best maintenance of the product:

- Keep the device dry. Rain, moisture, or any liquid, might contain minerals and thus corrode electronic circuits. If the device gets wet, please dry it completely.
- Do not use or store the device in dusty or dirty environment. It might damage its detachable parts and electronic components.
- Do not store the device under excessive heat condition. High temperature can shorten the life of electronic devices, destroy batteries, and deform or melt some plastic parts.
- Do not store the device in places that are too cold. 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 clean the device with strong chemicals, detergents or strong detergents.
- Do not apply the device with paint. Smudges might block in the device and affect the operation.
- Do not throw the battery into the fire, or the battery will explode. Damaged batteries may also explode. All of the above applies to your device, battery and accessories. If any device is not working properly, please take it to the nearest authorized service facility for repair.

## Documents / Resources

| | |
|---|---|
|  | netvox R718B2 Wireless 2-Gang Temperature Sensor [pdf] User Manual<br>R718B2 Wireless 2-Gang Temperature Sensor, R718B2, Wireless 2-Gang Temperature Sensor, 2-Gang Temperature Sensor, Temperature Sensor, Sensor |

## References

- Lora Command Resolver
- ÉÔºò¡£¡£¡£

Manuals+,