Wireless Thermocouple Interface for

T/K/R Type Thermocouple

R718CT2/CK2/CR2

User Manual

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1. Introduction

R718CK2 (nickel-chromium-nickel silicon thermocouple): its use temperature is -40 ~ +375℃, with good linearity, large thermoelectromotive force, high sensitivity, stability, can not be used directly at high temperature for sulfur, reducing or reducing It is not recommended for use in weak oxidizing atmospheres in oxidizing alternating atmospheres and in vacuum.

R718CT2 (copper-copper-nickel thermocouple): its use temperature is -40 ~ +125℃, it is used in the temperature range of -40~0℃, and the stability is better.

R718CR2 (precious metal thermocouple): Its temperature is 0 ~ +1100℃. The R type thermocouple has the highest accuracy, the best stability, wide temperature range and long service life in the thermocouple series. It has good physical and chemical properties, good thermoelectric potential stability and high oxidation resistance at high temperatures, and is suitable for oxidizing and inert atmospheres.

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

Fig.1　Appearance

3. Main Features

- Adopt SX1276 wireless communication module
- 2 ER14505 battery AA SIZE (3.6V / section) parallel power supply
- Body protection class IP65/IP67, external thermocouple sensor protection grade (T-type thermocouple IP67; K-type thermocouple IP60; N-type thermocouple IP60; R-type thermocouple IP60)
- The base is attached with a magnet that can be attached to a ferrous object
- 2-way thermocouple detection
- Compatible with LoRaWAN^{TM} Class A
- Frequency hopping spread spectrum
- Configuration parameters can be configured via a third-party software platform
- Applicable to third-party platforms: Actility / ThingPark, TTN, MyDevices /Cayenne
- Low power consumption, longer battery life support*:
  Battery life is determined by sensor reporting frequency and other variables,
  please refer to http://www.netvox.com.tw/electric/electric_calc.html
  On the website, users can find battery life of various models in different configurations.

4.Set up Instruction

On/Off

Power on	Insert batteries. (users may need a flat blade 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. 2. On/off interval is suggested to be about 10 seconds to avoid the interference of capacitor inductance and other energy storage components. 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 to join. The green indicator stays on for 5 seconds: success The green indicator remains off: fail
Had joined the network (Not at factory setting mode)	Turn on the device to search the previous network to join. 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)	First two mins: wake up every 15 seconds to send request. After two mins: enter sleeping mode and wake up every 15 minutes to send request. Note: Suggest to remove batteries if the device is not used to save power. 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 The green indicator flashes for 20 times: success The green indicator remains off: fail
Press once	The device is in the network: green indicator flashes once and sends a report 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. When the reportchange exceeds setting value or the state changes: send a data report according to Min Interval.
The device is on but not in the network	First two mins: wake up every 15 seconds to send request. After two mins: enter sleeping mode and wake up every 15 minutes to send request. Note: Suggest to remove batteries if the device is not used. Suggest to check device verification on gateway.

Low Voltage Warning

Low Voltage	3.2V

5. Data Report

The device will immediately send a version package report and a report data with temperature and humidity and voltage values. The device sends data in the default configuration before any configuration is done.

Maximum time: Max Interval (default 900 seconds)
Minimum time: Min Interval (default 900 seconds) (by default, the current voltage value is detected per Min Interval)
Default reportchange:
    Battery --- 0x01 (0.1V)
   TempChange----0x064 (10°C);

Note: The real data sending cycle will be programmed before shipment.
    The interval between two reports must be the minimum time

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 = 1 Hour, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange=0.1V**

4
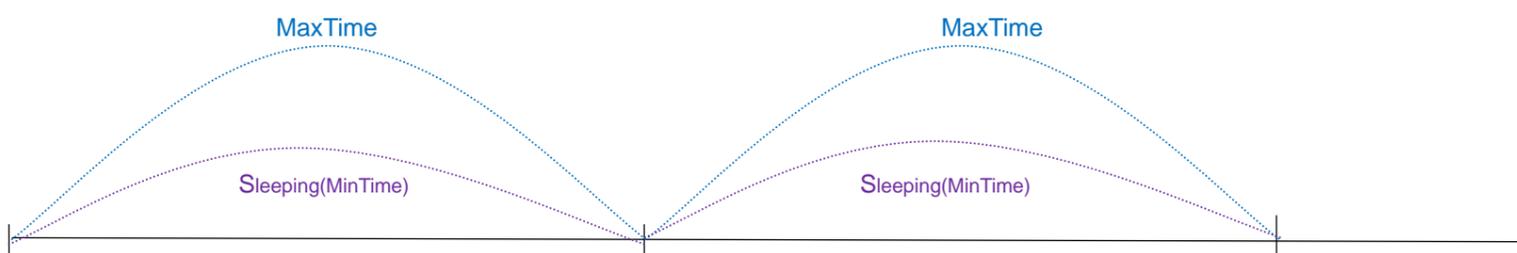
Note: MaxTime=MinTime. Data will only be report according to MaxTime (MinTime) duration regardless BtteryVoltageChange value.

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

MaxTime

Sleeping(MinTime)   sleeping   sleeping   sleeping

0H   15th M   30th M   45th M   1H   2H

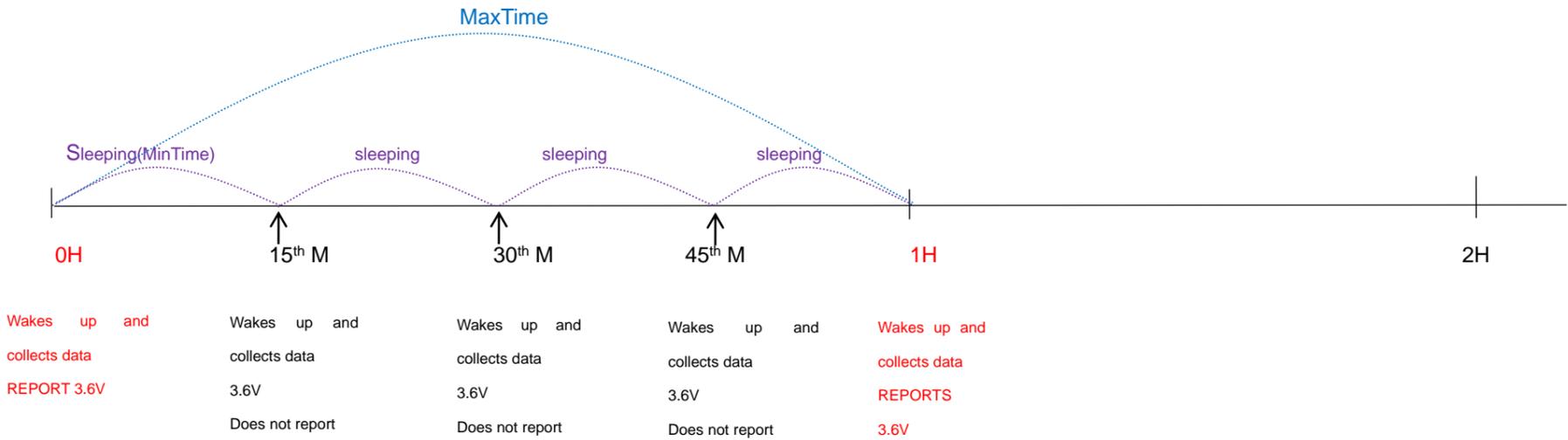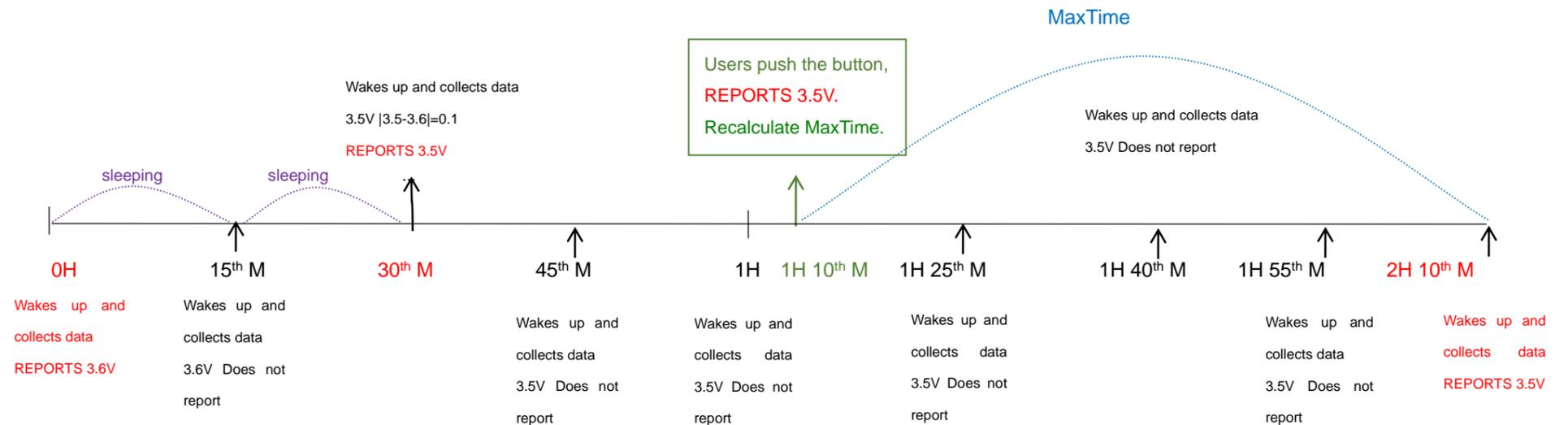| Wakes up and collects data REPORT 3.6V	Wakes up and collects data 3.6V Does not report	Wakes up and collects data 3.6V Does not report	Wakes up and collects data 3.6V Does not report	Wakes up and collects data REPORTS 3.6V

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

MaxTime

Wakes up and collects data

3.5V |3.5-3.6|=0.1

REPORTS 3.5V

Users push the button,
REPORTS 3.5V.
Recalculate MaxTime.

Wakes up and collects data

3.5V Does not report

sleeping   sleeping

0H   15th M   30th M   45th M   1H   1H 10th M   1H 25th M   1H 40th M   1H 55th M   2H 10th M

Wakes up and collects data REPORTS 3.6V	Wakes up and collects data 3.6V Does not report		Wakes up and collects data 3.5V Does not report	Wakes up and collects data 3.5V Does not report	Wakes up and collects data 3.5V Does not report		Wakes up and collects data 3.5V Does not report	Wakes up and collects data REPORTS 3.5V

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. Installation

Thermocouples have positive and negative poles, with the + mark on the bare device as the direction, the second and third holes as a group, the 4th and 5th holes as a group, the 2nd and 4th holes connect to the positive (red line) of the thermocouple, the third and fifth holes connect to the negative (black line) of thermocouples. This product comes with a waterproof function. When using it, you can attach the back side to the iron surface, or use screws to fix both ends to the wall.

Note: To install the battery, use a tool such as a screwdriver to open the battery cover.

7. 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.