Wireless 2-Gang Thermocouple Interface For T/K/R Type Thermocouple

R730CT2/CK2/CR2

User Manual

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1. Introduction

R730CK2 (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.

R730CT2 (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.

R730CR2 (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

3. Main Features

- Apply SX1276 wireless communication module
- 2-cell rechargeable NiMH batteries AA SIZE (1.2V / section) in series power supply
- Main body protection grade IP67

  External thermocouple sensor protection grade:

  Type T thermocouple: IP65;

  Type K thermocouple: IP60;

  Type R thermocouple IP60
- 2-way thermocouple detection
- Compatible with LoRaWAN™ 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 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. Five seconds 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. The green indicator stays on for 5 seconds: success The green indicator remains off: fail
Had joined the network	Turn on the device to search the previous network. 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 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.

Low Voltage Warning

Low Voltage	2.3V

5. Data Report

The device will immediately send a version package report and a report data with two temperature 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)

Temperature Change----0x064 (10°C);

Note: The real data sending cycle will be programmed before shipment.

The interval between two reports must be the minimum time

Please refer Netvox LoRaWAN Application Command document and Netvox Lora Command Resolver

http://cmddoc.netvoxcloud.com/cmddoc to resolve uplink data.

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 of Report configuration

FPort：0x07

Bytes	1	1	Var(Fix =9 Bytes)
	CmdID	DeviceType	NetvoxPayLoadData

CmdID– 1 byte

DeviceType– 1 byte – Device Type of Device

NetvoxPayLoadData– var bytes (Max=9bytes)

Description	Device	Cmd ID	Device Type	NetvoxPayLoadData				
ConfigReport Req	R730CK2 R730CT2 R730CR2	0x01	0x79 0x7A 0x7B	MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	BatteryChange (1byte Unit:0.1v)	TemperatureChange (2byte Unit:0.1℃)	Reserved (2Bytes,Fixed 0x00)
ConfigReport Rsp		0x81		Status (0x00_success)		Reserved (8Bytes,Fixed 0x00)		
ReadConfig ReportReq		0x02		Reserved (9Bytes,Fixed 0x00)				
ReadConfig ReportRsp		0x82		MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	BatteryChange (1byte Unit:0.1v)	TemperatureChange (2byte Unit:0.1℃)	Reserved (2Bytes,Fixed 0x00)

(1) Configure R730CK2 report parameters:

MinTime = 1min、MaxTime = 1min、BatteryChange = 0.1v、TemperatureChange = 0.1°C

Downlink： 0179003C003C0100010000

Response：

817900000000000000000 (Configuration success)

817901000000000000000 (Configuration failure)

(2) Read Configuration:

Downlink： 027900000000000000000

Response：

8279003C003C0100010000 (Current configuration)

Example of Temperature calibration

Port:0x0E

Description	CmdID	SensorType	PayLoad(Fix =9 Bytes)				
SetGlobal CalibrateReq	0x01	0x01 0x36 0x37	Channel(1Byte) 0_Channel1, 1_Channel2,etc	Multiplier (2bytes,Unsigned)	Divisor (2bytes,Unsigned)	DeltValue (2bytes,Signed)	Reserved (2Bytes,Fixed 0x00)
SetGlobal CalibrateRsp	0x81		Channel(1Byte) 0_Channel1, 1_Channel2,etc	Status (1Byte,0x00_success)		Reserved (7Bytes,Fixed 0x00)	
GetGlobal CalibrateReq	0x02		Channel (1Byte,0_Channel1,1_Channel2,etc)		Reserved (8Bytes,Fixed 0x00)		
GetGlobal CalibrateRsp	0x82		Channel(1Byte) 0_Channel1, 1_Channel2,etc	Multiplier (2bytes,Unsigned)	Divisor (2bytes,Unsigned)	DeltValue (2bytes,Signed)	Reserved (2Bytes,Fixed 0x00)
ClearGlobal CalibrateReq	0x03	Reserved (10Bytes,Fixed 0x00)					
ClearGlobal CalibrateRsp	0x83	Status (1Byte,0x00_success)		Reserved (9Bytes,Fixed 0x00)			

SensorType

Temperature 0x01

(1) Set the **temperature** calibration:

If the temperature the R730CK2 detects is 16° and the actual temperature is 26°, it means the calibration we want to make is +10°.

SensorType =0x01 ,Channel 1= 00, Multiplier = 0001, Divisor = 0001, DeltValue=0064 (100°*0.1°=10°)

Downlink：010100000100010064 0000

Response：

810100000000000000000（Configuration success）

(2) Check whether the setting in (1) calibration

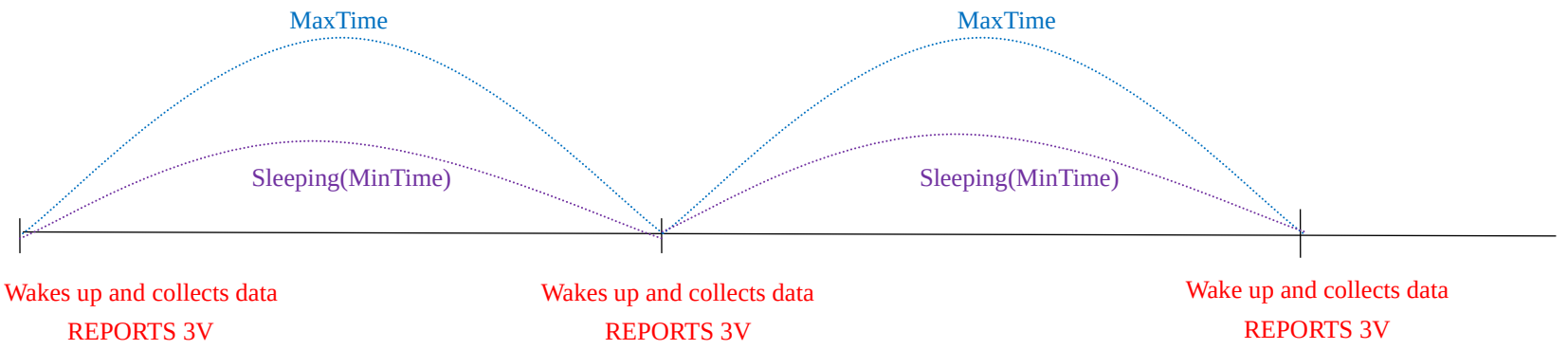
Downlink：020100000000000000000

Response：

820100000100010064 0000（Current configuration）

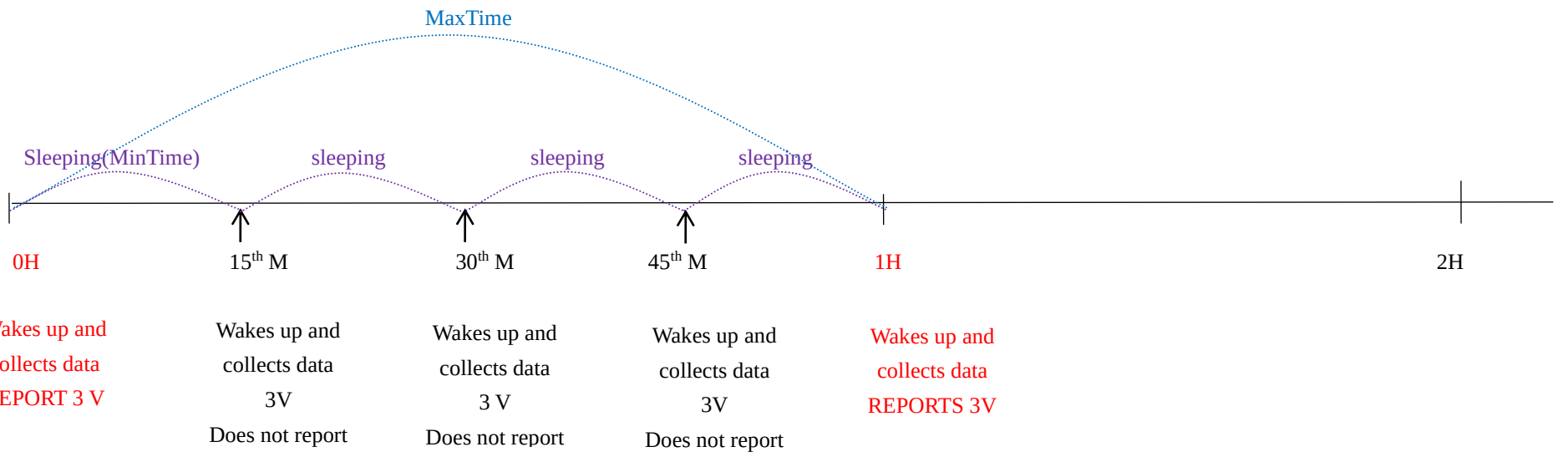
Example for MinTime/MaxTime logic:

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

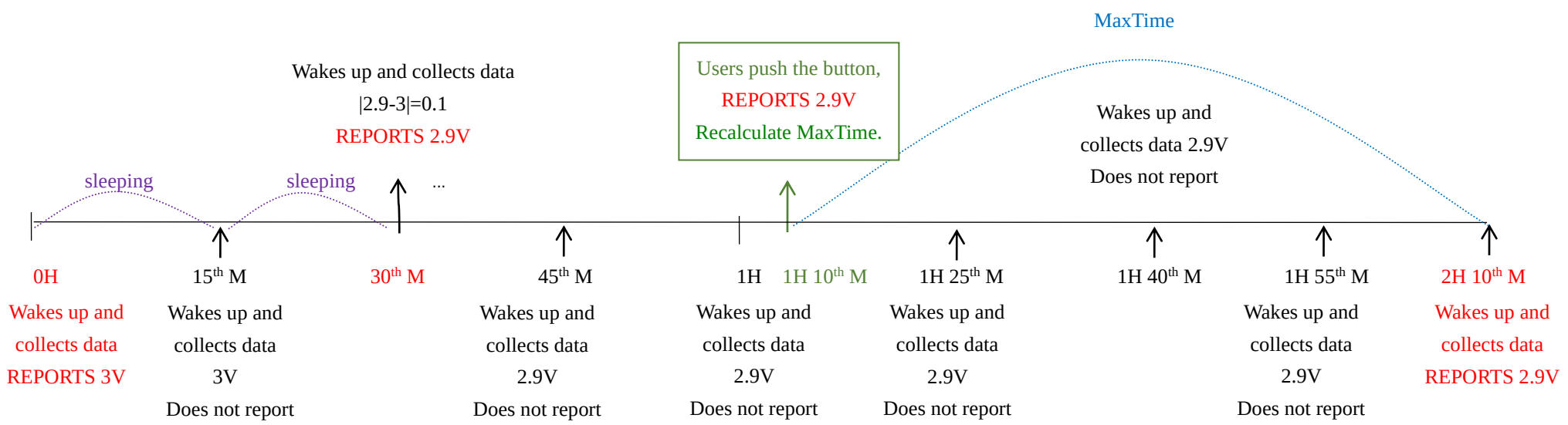


Note: MaxTime=MinTime. Data will only be report according to MaxTime (MinTime) duration regardless BatteryVoltageChange value.

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



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