

KC21

LoRaWAN EB Collector

Standardized Device Manual



VERSION
1.0

DOCUMENT
Device Manual

Revision History

Version	Change Description
1.0	Current published version

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1. Product Description

KC21 is a high-performance, low-power, battery-powered LoRaWAN data transmission unit (DTU) independently developed by ManThink, with highly flexible configuration capabilities. The product integrates high-performance MCU and LoRa RF chips and connects to external devices through standard RS-485 interfaces, using LoRaWAN®The protocol stably uploads business data to the IoT application platform.

Based on advanced LoRa®Wireless communication technology, KC21 support standard LoRaWAN®It has the advantages of long-distance transmission, ultra-low power consumption and strong anti-interference ability. The device has 4 built-in 14505 lithium sub-batteries, which can ensure long-term stable operation in harsh environments and is suitable for remote monitoring scenarios where wiring is difficult or power supply is limited.

KC21 is compatible with ManThink and The third-party LoRaWAN gateway, and supports access to IOT platforms such as ThinkLink, ChirpStack, The Things Network(TTN), etc. to realize data collection and remote control of various RS-485 interface devices.

In addition, KC21 supports external power supply function, can provide stable 15V output voltage for external sensors, simplify field deployment, and is especially suitable for meter reading systems such as water meters and gas meters.

The product innovation is equipped with Edge-Bus(EB) virtual machine, which supports firmware generation through EB compilation environment and remote update to devices via FUOTA (Firmware Over-the-air upgrade). With the help of EB virtual machine, users can quickly adapt a variety of serial port protocols (such as Modbus, DL/T645, CJ/T188, etc.), and locally implement core business logic processing such as COV (change reporting), alarm triggering, data reorganization, etc., significantly improving system response efficiency and communication reliability.

With its powerful edge computing capability, flexible Protocol Adaptation and excellent low-power design, KC21 is widely used in the Internet of Things fields such as smart water, energy management, and industrial monitoring. It is an intelligent and maintenance-free sensor network. Ideal choice.

2. Application areas

- Industrial field, RS-485 interface equipment
- Water meter/Heat Meter metering meter reading
- Hydrometeorological monitoring
- Water quality sensor, PT100 sensor power supply plus meter reading

3. main features

- Support RS-485 interface
- 4× 2700 mAh ER14505 lithium sub-batteries, 10800mAh of electricity
- Support power supply to sensor devices
- Support for EB virtual machines
- Support remote upgrade via LoRaWAN communication
- Support ThinkLink/ChirpStack/TTN platform docking
- Support US902,AU915,AS923,EU868,EU433,CN470 LoRaWAN standards
- **Compatible with all RS-485-based communication protocols**

4. Parameters

Item	Value
INTERFACE	
Connector type	Battery version: 1 × PG7 connector; DC 5–24 V version: 1 × PG7 connector plus 1 × M10 connector
Wiring quantity	4 wires (VCC,GND,485A,485B)
VCC and GND function	Battery version: power output for an external device; DC 5–24 V version: power input for the KC21
Display	None

Item	Value
WIRELESS PARAMETERS	
Protocol	Standard LoRaWAN
Regional Standards	CN470/EU433/EU868/AS923/AU915/Us902
Transmit power	Maximum Support 22dBm (can be changed)
Receiving sensitivity	-142dBm(SF=12,BW=125kHz)
Join / operating mode	OTAA/ABP; Class A for the battery version and Class C for the DC 5–24 V version

Item	Value
CONFIGURATION	
Test /Trigger mode	Magnet trigger 2 seconds trigger heartbeat data 6 seconds trigger network
Parameter Configuration	By NS issue instruction

Item	Value
PHYSICAL CHARACTERISTICS	
Power supply mode	Built-in 10800 mAh battery or continuous DC 5–24 V input
Sleep current	<5uA
Emission current	<110mA (22dBm transmit power)
Working Temperature	-40°C ~85°C
Relative humidity	≤95% (no condensation)
Protection level	IP65
Material & Color	ABS + PC, White
Dimensions	120mm 72mm 28mm
Installation method	Wall Hanging

5. Dimensions and Interfaces

Number	Interface Description	Specific details
1	LoRa Antenna interface	Inner hole outer screw, according to different LoRaWAN standard match
2	Wiring port	PG7 waterproof connector with VCC, GND, RS-485A and RS-485B wires. VCC and GND provide an output on the battery version and power the KC21 on the DC 5–24 V version
3	M10 connector	Included only with the DC 5–24 V version

6. Model List

6.1 Model example

KC218–A1–AS923–N

6.2 Model component breakdown

- **KC218: product series and RF band.**
 - KC21 identifies a second-generation IP65 DTU.
 - 8 identifies the 800 MHz-and-above RF version for EU868, AS923, AU915 and US902.
 - Other band option: 4 identifies the 400 MHz RF version for EU433 and CN470.
- **-A1: functional interface and power configuration.**

- A identifies an RS-485 interface with a 15 V output for an external device.
- Other interface option: B identifies an RS-485 interface with a 5.9 V output.
- 1 identifies a built-in 10800 mAh battery.
- Other power option: 2 identifies external DC 5–24 V input without a power output for another device.
- **-AS923: LoRaWAN regional standard.**
 - AS923 means that the device supports the LoRaWAN AS923 regional parameters.
 - Other regional codes are CN470, EU433, EU868, AU915 and US902; US902 denotes the LoRaWAN US915 (902–928 MHz) regional parameters.
- **-N: antenna configuration.**
 - N identifies an external antenna with an SMA connector.
 - Other antenna option: S identifies an internal antenna.

6.3 Complete model meaning

The complete meaning of KC218–A1–AS923–N is:

This is a second-generation IP65 DTU in the 800 MHz-and-above RF class. It provides an RS-485 interface and a 15 V output, includes a 10800 mAh battery, supports the LoRaWAN AS923 regional standard, and uses an external antenna with an SMA connector.

7. Network topology

KC21 is a standard LoRaWAN device. LoRaWAN network support is required for KC21 to work properly. You can use the LoRaWAN gateway of ManThink or a third-party LoRaWAN gateway, and it needs the support of LoRaWAN NS. KC21 supports access to standard LoRaWAN networks such as ThinkLink, Chirp stack, and TTN. You can use the ThinkLink configuration model to implement business functions, card view presentation, and other business logic.

The LoRaWAN network topology is as follows:

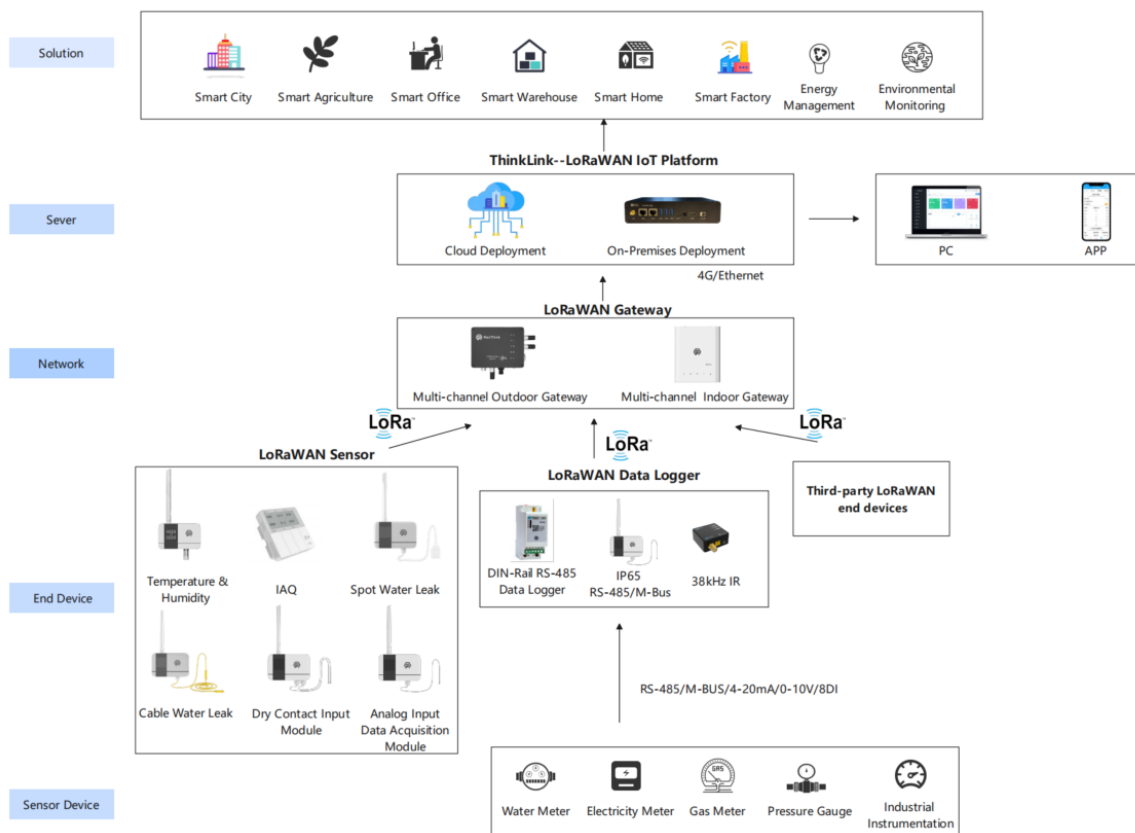


Figure 7. Network topology

8. Working mode

8.1 EB configure collection and upload tasks

KC21 has a built-in EB virtual machine, which can implement various business logic of meter reading by calling SDK and TS code. EB instructions for use:

EB-compiler compilation instructions

8.2 Communication Test

Magnet trigger, contact 2s -4s, you can trigger a packet of upstream measurement data

8.3 Network access

Magnet trigger, contact 6s-8s, you can trigger a packet of join.

9. Installation

- Use the drill to fix the back plate to the Wall (keep the back plate Arrow Up)

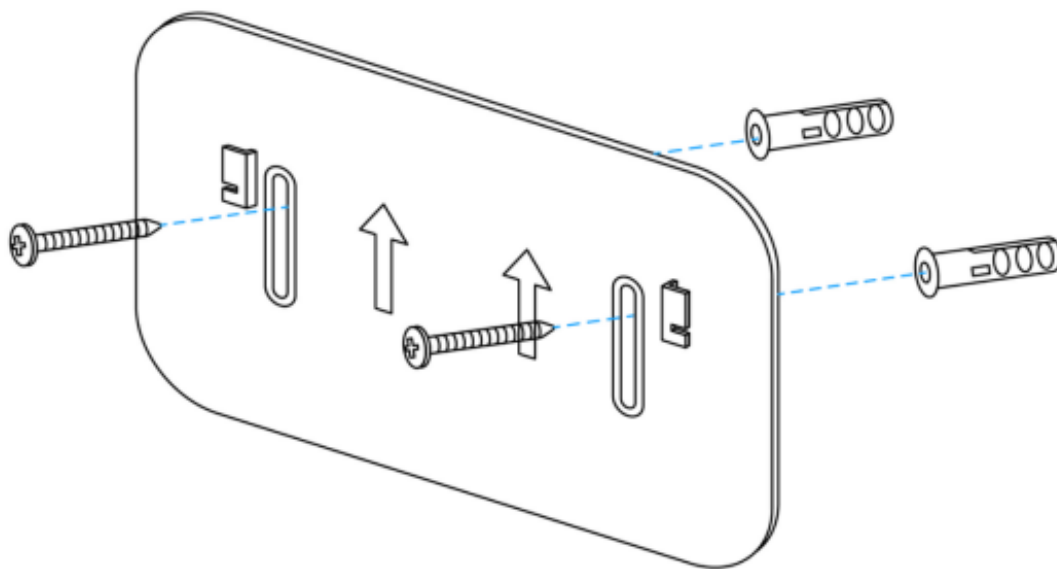


Figure 9. Installation

- Hatch the product on the back plate (slide down after aligning the groove on the back of the sensor with the convex part of the back plate)

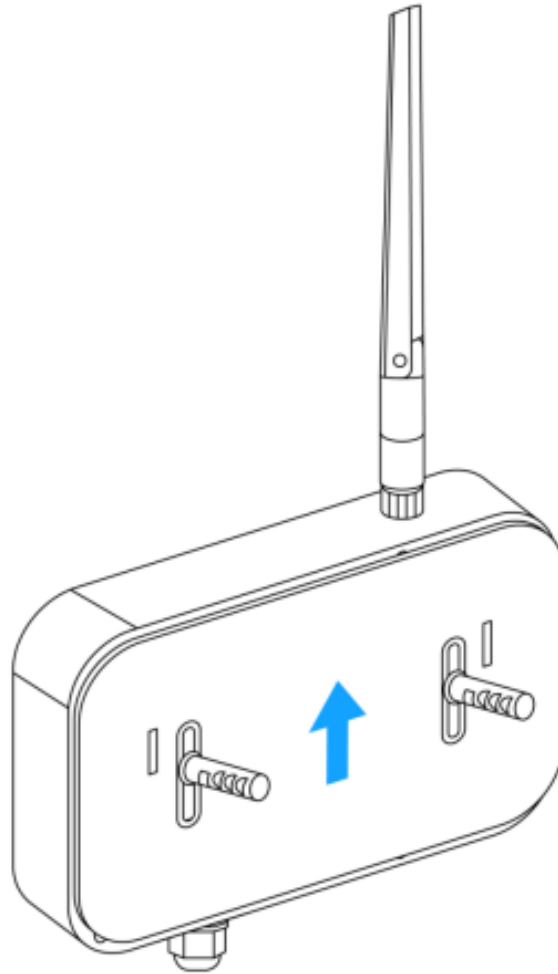


Figure 9. Installation

- If external power supply is required, connect the power supply VCC and GND to the VCC and GND of the docking device, and pay attention to the voltage matching. The voltage value needs to be confirmed before the section is aligned. The KC21 provides an external voltage output only during meter reading.
- RS-485A and RS-485B that connect RS-485A and RS-485B to connected devices

10. Standard

The format of the communication protocol is customized through EB Compilation. We recommend that you use the protocol format standard recommended by ManThink.

Reference: PTL-D01 ManThink Technology IoT Terminal Application Layer General Protocol V1.5

11. Parameter Modification

Refer to Chapter 5 of *PTL-D01 ManThink Technology IoT Terminal Application Layer General Protocol V1.5*. Parameter changes are delivered through port 214.

11.1 Configuration Parameter Address Table

[AN-25100106 EdgeBus App Parameter Manual](#)

12. ThinkLink Thing Model

Sign in to [ThinkLink](#).

12.1 Device Template

Battery powered KC21 should use the template of MT-EB-BATTERY and DC powered KC21 should use the template of MT-EB-POWER. The models already mounted as follows:

- Thing Model: MT-EB
- RPC:

\[MT ACT] action: Used to execute operations such as reset, join, redo, and reading parameters

\[MT ACT] transparent: Transparent RPC; hexadecimal data can be sent via port 51, which will be forwarded to sub-devices through the RS485 interface, and responses from the sub-device will be returned

\[MT SET] app para: Set EB parameters

\[MT ACT] debug modbus: Online Modbus debugging by entering information such as 485 address and Modbus function code

ALARM: Used for alarm functionality; trigger rules must be configured to enable full alarm features

13. Contact Us

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