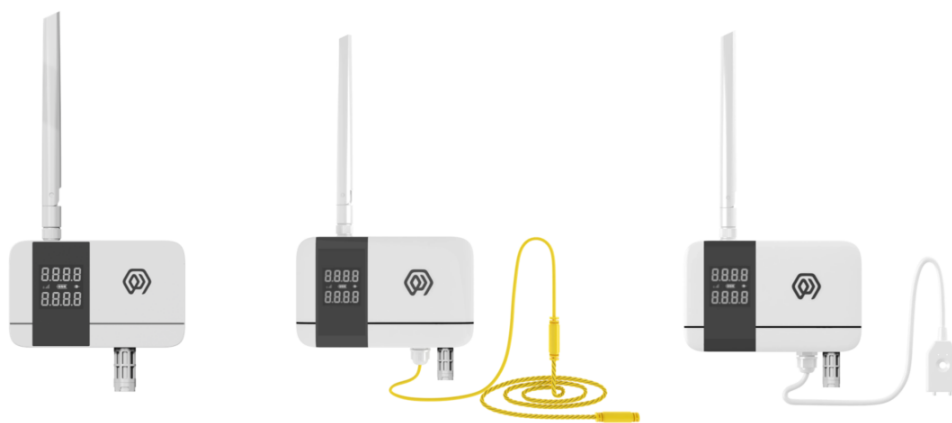


KS52

LoRaWAN Sensor

Standardized Device Manual



VERSION
当前版本

DOCUMENT
Device Manual

Product Introduction

KS52 is a LoRa-based digital temperature and humidity sensor of wireless technology uses high-precision sensing elements to collect environmental temperature and humidity data in real time, and through LoRaWAN protocol periodically reports measurements to the application platform.

The KS52's optional water leakage detection function enables real-time monitoring of water leakage incidents and triggers alarms to immediately notify management personnel, allowing prompt on-site response. This feature helps protect warehouses, storage facilities, factories, and similar environments, preventing loss or damage to goods and equipment caused by water intrusion.

Users can flexibly configure the sampling and reporting period through the management platform, and the default setting is to upload data every 15 minutes.

The product has 4 built-in 2700mAh high-capacity lithium sub-batteries. With low-power design, the battery life can reach more than 6 years in typical application scenarios.

Relying on LoRaWAN Standard protocol, KS52 has the advantages of long-distance transmission and low-power operation, and supports access to ManThink Technology and third-party LoRaWAN. The gateway is compatible with IoT platforms such as ThinkLink, ChirpStack, and The Things Network(TTN) to realize remote monitoring and intelligent management of environmental parameters.

KS52 with IP65 level of advanced protection, resistant to complex outdoor environment, widely applicable to intelligent industry, intelligent buildings, warehousing and logistics, agricultural monitoring and other scenarios, to meet the application requirements of all-weather environmental monitoring.

Features

- IP65
- Battery powered, 10800mA high performance lithium battery, battery life can reach more than 6 years
- COV
- Low power LCD display
- Temperature accuracy: $\pm 0.3\text{ }^{\circ}\text{C}$
- Humidity accuracy: $\pm 3\%\text{ RH}$
- Support ThinkLink/ChirpStack/TTN platform docking
- Support US902,AU915,AS923,EU868,EU433,CN470 LoRaWAN standards

Specifications

Parameter	Specification
Temperature/humidity sensor	IP65 waterproof sensor (SHT41 package)
Water-leak sensor	Point/rope type
Wire count	0
Display	Low-power segment LCD
Acquisition interval	5 seconds
Temperature accuracy	±0.3 °C
Humidity accuracy	±3%RH

Item	Value
WIRELESS PARAMETERS	
Protocol	standard LoRaWAN®Agreement
Regional Standards	CN470/EU433/EU868/AS923/AU915/Us902
Transmit power	maximum Support 22dBm (can be changed)
Receiving sensitivity	-142dBm(SF=12,BW=125kHz)
Working mode	OTAA/ABP Class A

Item	Value
CONFIGURATION	
Test /Trigger mode	the magnet 2 seconds trigger heartbeat data > 6 seconds trigger joining
Parameter Configuration	by NS issue instruction

Item	Value
PHYSICAL CHARACTERISTICS	
Power supply mode	4*2700 mAh ER14505 lithium battery
Sleep current	<5uA (25 °C at room temperature)
Emission current	<110mA (22dBm transmit power)
Battery life	6 years (15-minute reporting cycle, 25 °C at room temperature)
Working Temperature	-40°C ~85°C
Relative humidity	≤ 95% (no condensation)
Protection level	IP65
Material & Color	ABS + PC, White

Item	Value
Dimensions	120mm * 72mm * 28mm
Installation method	Wall Hanging

Dimensions and Interfaces

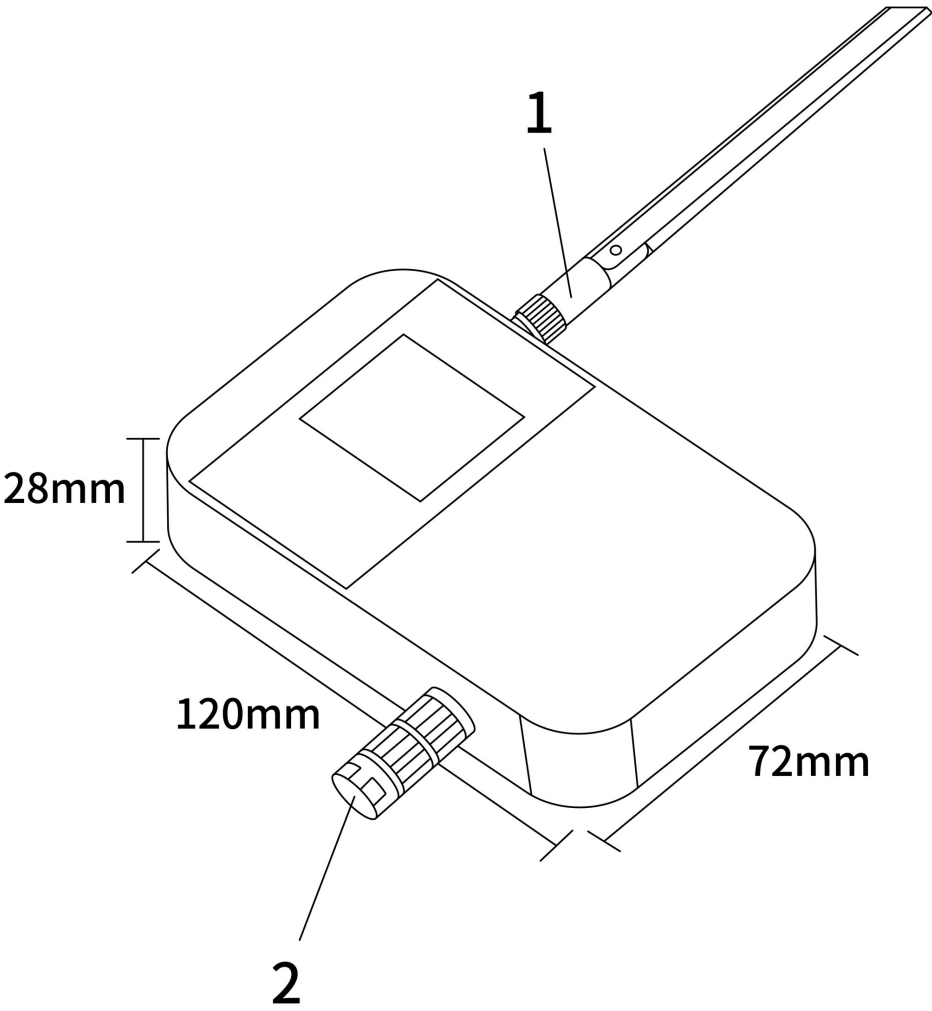


Figure Dimensions and Interfaces

No.	Interface
1	LoRa antenna interface
2	Sensor interface

Product Model

Model example

KS528-A1-AS923-N

Model component breakdown

- **KS528: product series and RF band.**
 - KS52 identifies a second-generation IP65 temperature and humidity sensor.
 - 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: sensor combination and power configuration.**
 - A identifies a temperature-and-humidity-only configuration.
 - Other sensor options: B adds point water-leak detection, while C adds rope water-leak detection.
 - 1 identifies a built-in 10800 mAh battery.
 - Other power options: 2 identifies external DC 5–24 V input, while 3 identifies an external 2.2–3.6 V battery.
- **-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: default version.**
 - N identifies the default version.
 - Other values are reserved for customized or special versions.

Complete model meaning

The complete meaning of KS528-A1-AS923-N is:

This is a second-generation IP65 temperature and humidity sensor in the 800 MHz-and-above RF class. It uses the temperature-and-humidity-only sensor configuration, includes a 10800 mAh battery, supports the LoRaWAN AS923 regional standard, and uses the default final version code N.

Instructions for use

Network topology

KS52 is a terminal device that conforms to the standard LoRaWAN protocol, and its normal operation depends on the complete LoRaWAN network support. The network needs to include LoRaWAN gateway and network server (NS), wherein the Gateway can choose the self-developed products of ManThink or the third-party compatible equipment, and NS must have the capability of protocol resolution and equipment management.

KS52 supports access to LoRaWAN Network platforms, including ThinkLink, ChirpStack, and The Things Network (TTN), to ensure flexible deployment and system integration. Users can use ThinkLink IoT platform to configure the object model, implement rich functions such as data parsing, business logic processing, and card view display, and quickly build application systems for actual scenarios.

A typical LoRaWAN network topology is as follows:

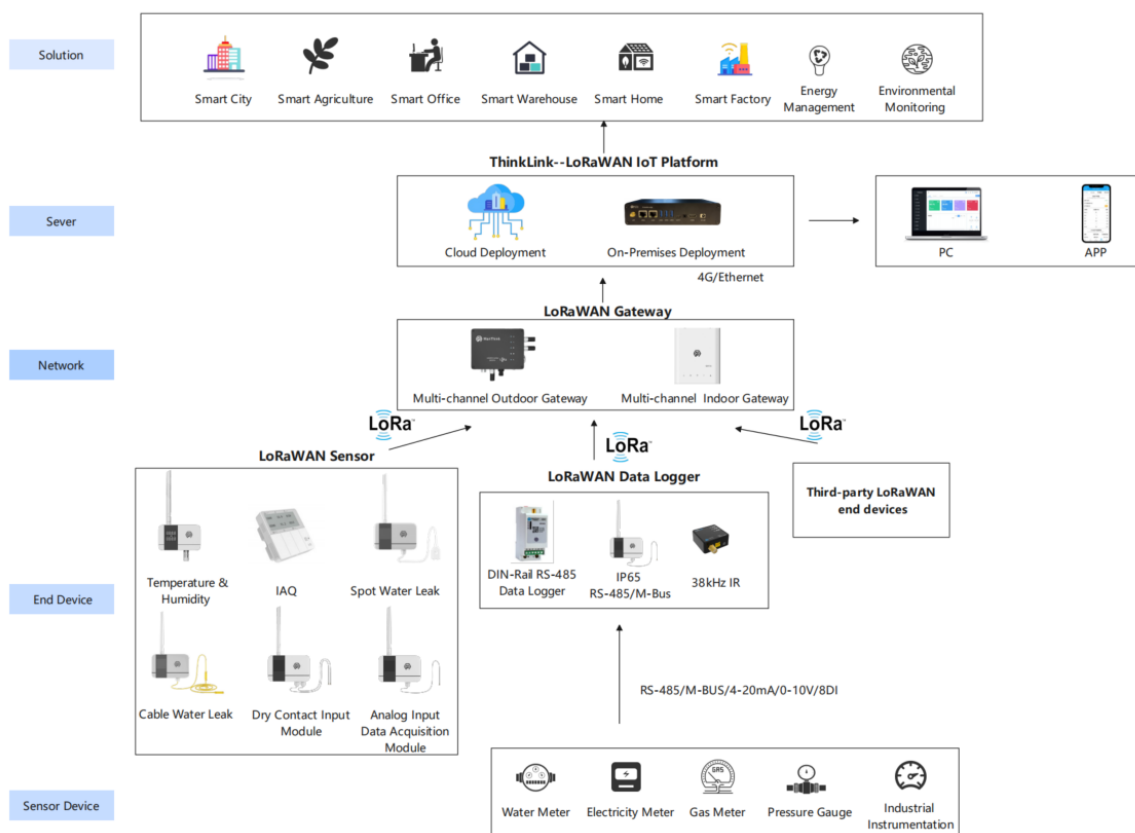


Figure Network topology

Working mode

Periodic collection and Upload

- KS52 collects temperature and humidity values every 5 seconds, and uploads the temperature and humidity values according to the set period. The Upload period can be set by NS delivery.
- KS52 continuously monitors the water leakage status,
- Upload alarm information after leakage event.
- After transmit the alarm information, enter the protection mechanism and no alarm will be given within 1 minute.
- 1 minute after the alarm, the detection probe level status will upload information again if there is no water leakage

NOTE It is impossible to detect the leakage state of non-conductive liquids, such as organic solvents, purified water, etc.

COV Upload

KS52 supports COV mode, when the temperature or humidity changes exceed the threshold, you can trigger a packet of data upload. The Upload protocol format is the same as the periodic Upload format.

KS52 default COV temperature threshold is 1 °C, and default COV humidity threshold is 5% RH.

Communication Test

Use a magnet to stick the location of QR code on KS52 to trigger 2s-4S, which can trigger a packet of measurement data.

Network access

Use a magnet to stick the location of QR code on KS52 to trigger 6s-8s, which can trigger a packet of LoRaWAN join.

Installation

Wall Mount

- Fix back panel to wall (keep back panel Arrow Up)

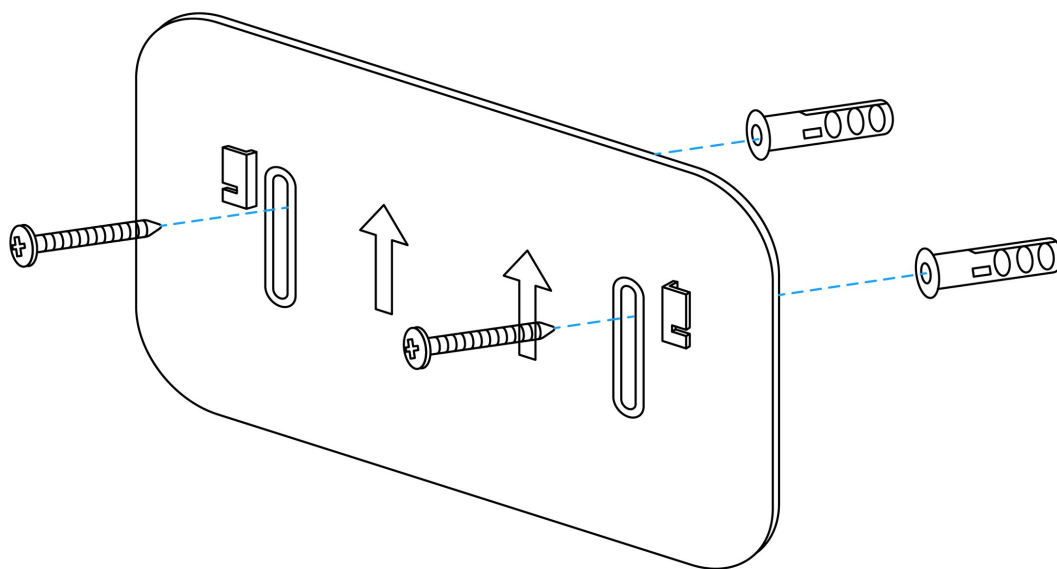


Figure Wall Mount

- Tighten the LoRa antenna to the antenna interface
- Hitch the temperature and humidity sensor on the back plate (after aligning the back groove of the sensor with the convex part of the back plate, slide it down)

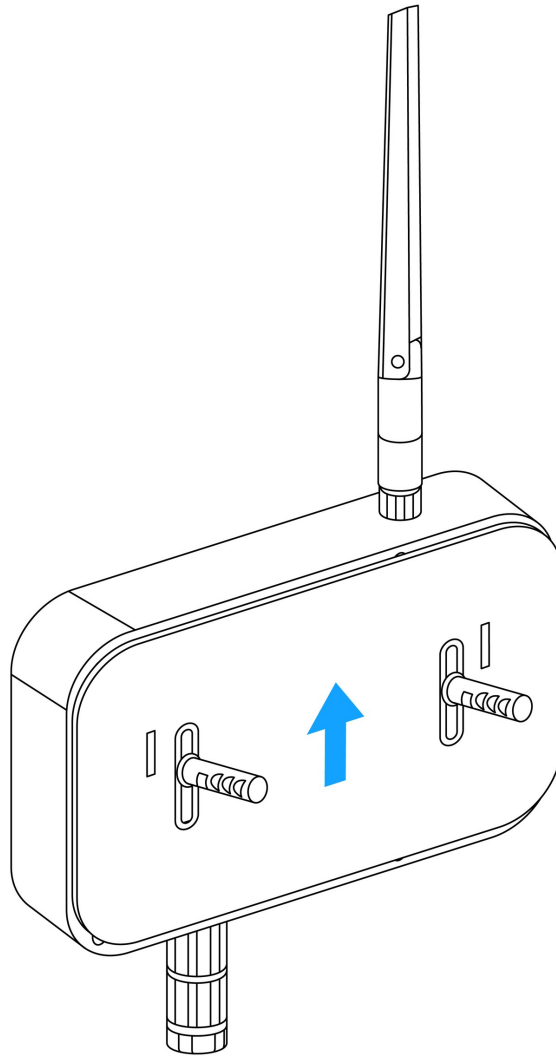


Figure Wall Mount

Single point type water immersion installation diagram

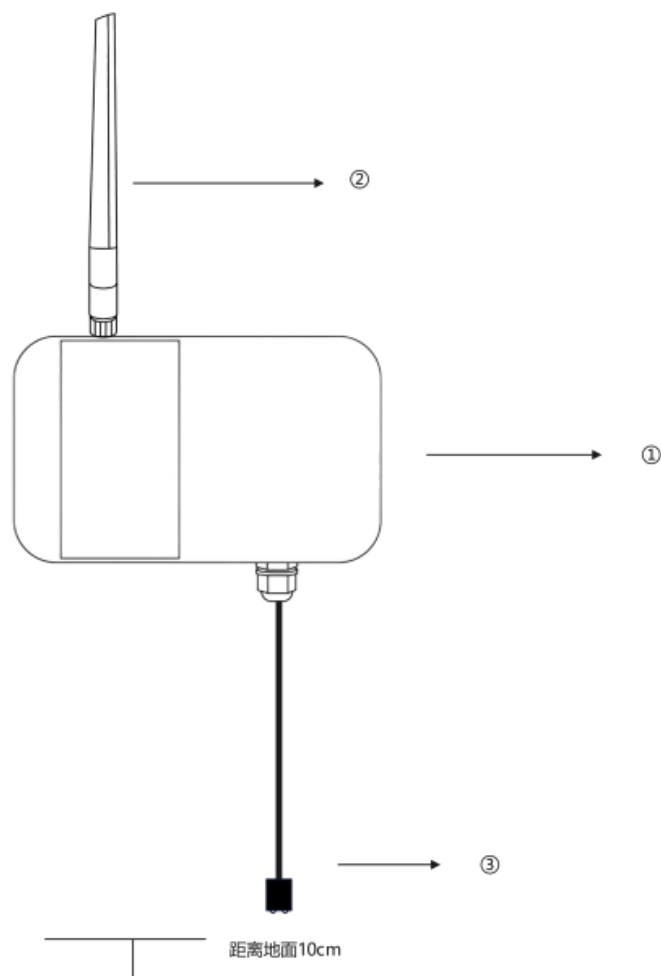


Figure Single point type water immersion installation diagram

- ① Hang the water detector sensor vertical wall on the wall, and the back of the water leakage sensor is installed with a back plate for fixing.
- ② Tighten the LoRa antenna
- ③ The root of the water immersion probe shall be closely attached to the wall surface with double-sided adhesive, and the height from the ground shall be 10cm.

NOTE Please ensure that the installation is covered by the Gateway when leakage

Rope type water immersion installation diagram

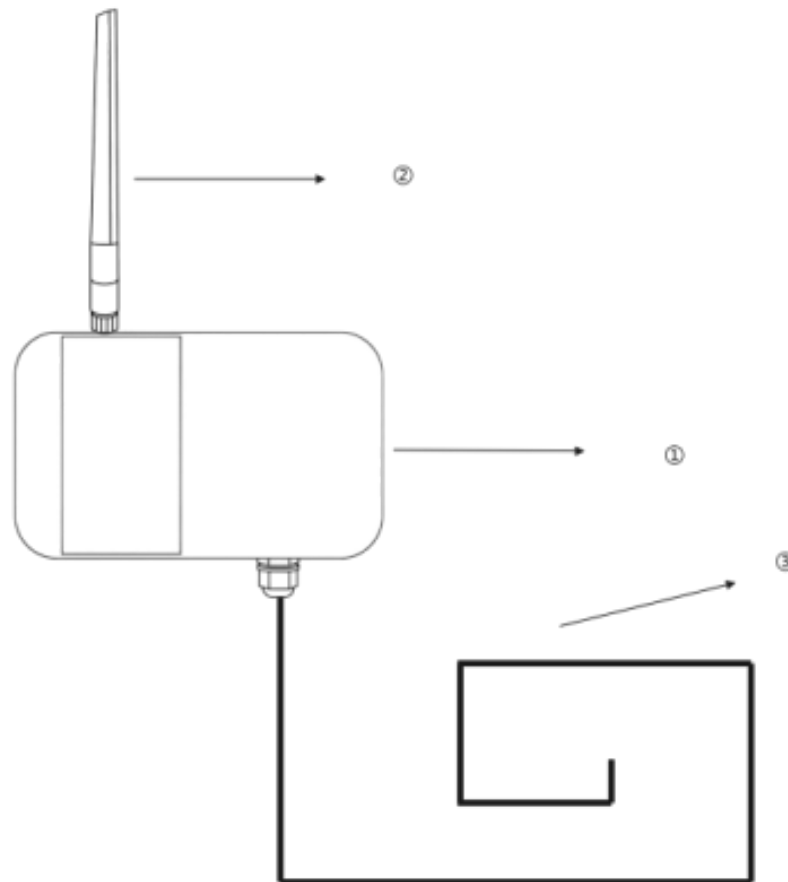


Figure Rope type water immersion installation diagram

- ① Hang the water leakage vertical wall on the wall, and the back of the water leakage sensor is equipped with a back plate for fixing.
- ② Tighten the LoRa antenna
- ③ Water leakage detection extension rope

preparation tools: Impact drill, drill bit, Phillips screwdriver, Buckle

use an electric drill to drill holes in the installation position in advance. The left and right sides of the water leakage detector will be equipped with installation holes, which will be fixed by screws. Then connect the extension cord, and use the buckle to fix the extension cord at the position where the water leakage needs to be monitored.

Communication Protocol

Data Items and Identifiers

- LoRaWAN port number = 11

KS52 supports only one data format and sends data periodically according to the set period. When a COV event occurs, it triggers one frame of uplink data.

Example (hex): 21 07 03 0C 6E A005 00 F604 8C03 DB 00 00

Number	Data Item	Example	Start Address	Length	Description
1	Version number	0x21	0	1 byte	Fixed at 0x21
2	Control word	0x07	1	1 byte	Fixed at 0x07
3	Identifier	0x03	2	1 byte	Fixed at 0x03
4	Hardware version	0x0C	3	1 byte	Decimal 10 represents V1.0, and so on
5	Software version	0x6E	4	1 byte	Decimal 100 represents V1.00, and so on
6	Reserved bytes	A0 05	5	2 bytes	Reserved; do not use for application parsing
7	Device status	0x00	7	1 byte	See the bit0, bit1, bit2, and bit4 definitions below
8	Temperature	0x04F6	8	2 bytes	Unsigned 16-bit little-endian integer; actual temperature = (raw value - 1000) / 10 °C
9	Humidity	0x038C	10	2 bytes	Unsigned 16-bit little-endian integer; actual humidity = raw value × 0.1 %RH
10	Battery voltage	0xDB	12	1 byte	Actual value = sample × 1.6 / 254 + 2 V
11	RSSI	0x00	13	1 byte	Actual value = reported value - 160 dBm
12	SNR	0x00	14	1 byte	Actual value, unit: dB

Device status bit mapping

Bit	Status item	0	1
bit0	Sensor status	Normal	Fault
bit1	LoRaWAN mode	Class A	Class C
bit2	Display status	Normal	Fault
bit4	Water-leak status	Dry	Water detected

ThinkLink reference model

Sign in to [ThinkLink](#), search for KS52 in the model menu, and add the device with the MT-KS52 template.

Parameter modification

KS52 supports remote parameter configuration by sending downlink commands through a LoRaWAN Network Server (NS).

Parameter modification uses the ManThink Technology application-layer general protocol. All parameter configuration commands are transmitted via LoRaWAN port **214**.

- **Communication port:** 214
- **Function code:** 0xCF (Modify service parameters)
- **Multi-byte parameters:** Little-endian format
- **Successful parameter configuration response:**

```
6F 01 00
```

Parameter Configuration Address Table

Index	data Item	default Value	start Address	length	description
1	data period	900	40	4 bytes	upload cycle, in seconds
2	measure period	5	142	2 bytes	little Endian mode, in seconds
3	temperature COV	10	144	1 byte	magnification 0.1, unit °C
4	humidity COV	20	145	1 byte	magnification 0.1, unit: RH%

Parameter Modification Examples

Modify Upload Interval (Single Command)

Example: Set the upload interval to **900 seconds**

- **Hex representation:** 0x00000384
- **Little-endian format:** 84 03 00 00

Command:

```
CF 06 28 04 84 03 00 00
```

Modify Collection Interval and COV Parameters (Continuous Addresses, Single Command)

Example parameter settings:

Parameter	Target Value	Written Value
Collection interval	5 seconds	05 00
Temperature COV	1.0 °C	0A
Humidity COV	2.0 %RH	14

- **Start address:** 142 (0x8E)
- **Continuous length:** 4 bytes (142–145)

Command:

```
CF 06 8E 04 05 00 0A 14
```

Example of Concatenated Downlink Commands

On the NS platform, multiple parameter modification commands can be concatenated into a single downlink payload. The device will parse and execute them sequentially.

```
CF 06 28 04 84 03 00 00 CF 06 8E 04 05 00 0A 14
```

Notes

- All parameter configurations must use **LoRaWAN port 214**
- KS52 is a **Class A** device and can only receive downlink parameter configurations after an uplink transmission
- If no response is received after parameter configuration, please check the device online status and gateway coverage

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