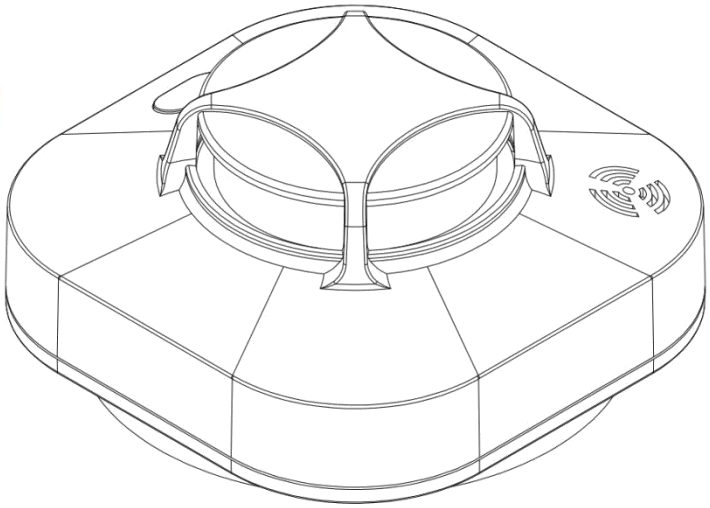
LoRaWAN Smoke&Heat Detector

User Manual



Model：HKT SD-300

Hunan HKT Technology Co., Ltd.

Guidelines for Safe Operation

◆ To protect the product and to ensure safe operation, please follow this instruction manual. We are not responsible if the product is used improperly or not in accordance with the manual.

◆ Do not disassemble or change the uplink interval or modify the product.

◆ Do not expose the device to strong shocks or vibrations.

◆ Do not use the product in an environment that does not meet the working temperature, humidity and other conditions, and keep it away from cold sources, heat sources and open flames.

◆ Please do not install the product's battery in the opposite way.

Declaration of Conformity

HKT SD-300 series meets the basic requirements of CE, FCC,CCC and RoHS and other related regulations.

Disclaimer and Copyright Notice

Document Revision Record

Date	Version	Description
2023.8.18	V 1.0	First Edition

Content

1. Products Introduction

1.1 Product Overview

HKT SD-300 smoke & fire detector is designed and developed by Hunan HKT Technology Co., Ltd. The device is in accordance with the GB4715-2005 fire standards, high accuracy, high responsive and has high stability.

It is ceiling-mounted easy installation with a simple test, able to detect fire from 360°, resist EMI, RFI interference.

This product adopts photoelectric type smoke alarm system, the sensor converts the light signal into electric signal and transmits it to the fire alarm system platform.

The product is based on the standard LoRaWAN communication protocol and with low-power consumption design with high-capacity battery which can be used continuously for more than 3 years without battery replacement.

HKT-SD300 is compact, elegant futuristic design, easy to installation with in-built antennas suitable for different materials of the mounting surface, suitable for office areas, living areas, residential areas, industrial environments and for many other environments.

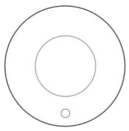
1.2 Product Highlights

- Long communication distance: Maximum communication distance up to 5Km in open environment
- Extra-long standby:Low power consumption, easy to replace, using high-capacity CR17450 battery(2400mAh), can be used continuously for more than 3 years
- Sensitive：Fast alarm response, maximum response time less than 12 seconds
- Multiple function: smoke alarm, high temperature alarm, self-test, low battery alarm and device dismantle alarm
- High anti-interference capability: resist EMI, RFI interference
- Fire safety certification: Comply with the GB4715-2005 fire standard

- Wireless: No wiring needed, battery powered, no need to damage the wall, easy installation
- Good compatibility: Compatible with standard LoRaWAN Communication protocol gateways and third-party web server platforms
- Management integration: Quickly interfaces with HKT LoRaWAN® gateways and cloud platforms with no additional configuration required

2. Product Structure Introduction

2.1 Package list



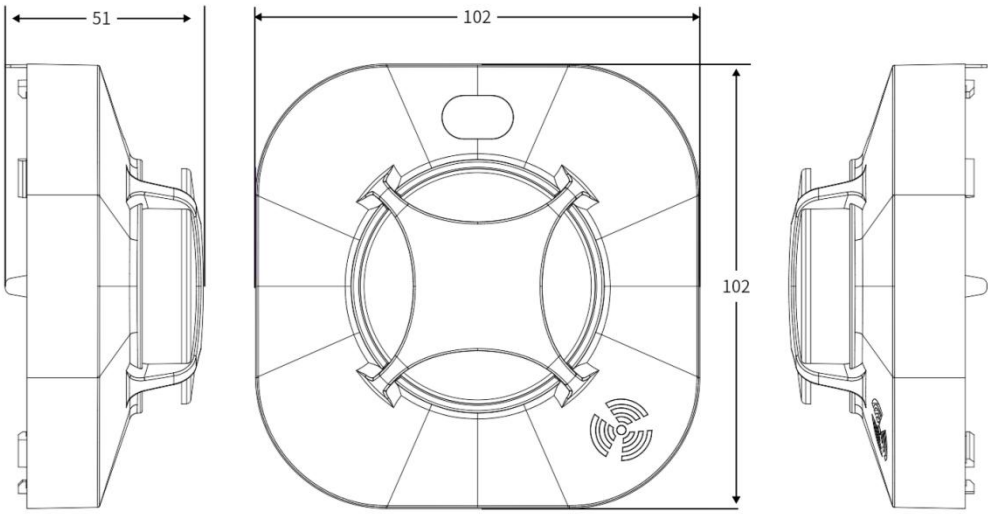
1 ×
HKT SD-300

1 ×
Certification

1 ×
Retaining Screw Kit

⚠ If any of the above items are damaged or missing, please contact your agent or sales representative promptly.

2.2 Product dimension



3. Function Description

3.1 Button & LED & buzzer indication

function	operation/events	status
Self-test	press test button in standby mode	continuous beeping with red LED flashing
mute	press the mute button in the alarm state	device stop beeping and the red LED keeps flashing.
smoke alarm	excessive concentrations of smoke in the environment	cyclic beeping and red LED flashing
high temperature alarm	ambient temperature over 60 degrees Celsius	report alarms immediately
low battery alert	Battery lower 2.6V	Red LED blinks 50 seconds for 2 times and beeps 1 time

3.2 Function description

◆ **Normal status**

■ The device automatically detects the concentration of smoke in the surrounding environment every 8 seconds.;

■ Red indicator light blinks every 50 seconds;

◆ **Smoke detecting**

■ After powering up the device, it will wait for 30 seconds to stabilize before starting to read and detecting the smoke concentration;

■ Equipment every 8 seconds for a smoke concentration, when the smoke concentration exceeds the set threshold, will produce a smoke alarm, at this time the red LED flashes and cyclic playback of the alarm sound, and instantly report the smoke alarm information to the cloud platform; when the smoke concentration is lower than the set threshold, the smoke alarm will automatically stop;

◆ **Temperature detecting**

■ The device carries out a temperature detection every 8 seconds, and when the temperature is detected over 60 degrees Celsius, a high temperature alarm will be generated and the current temperature status will be immediately reported to the cloud

platform;

◆ **Test Button**

- The device has a single button with both self-test and mute functions;
- When the device is in non-alarm state, pressing the key will continue to beep and LED will flash;
- When the device is in the alarm state, pressing the test button device will stop broadcasting the alarm, after about 85 seconds will automatically exit the alarm state, if there is still smoke at this time, the alarm will start the alarm again;
- Red LED will keep blinking during the alarm status;

◆ **Low voltage alarm**

- When the device is powered on, it will start to detect the battery power information, when the battery voltage is detected to be lower than 2.6v, it will generate a low voltage alarm, at this time, the red LED will blink twice every 50 seconds, and beep once;
- When the alarm reminds of low voltage, the battery should be replaced in time, otherwise it will affect the normal operation of the alarm;

◆ **Access network**

- The device will enter the network when it is powered on, if it tries to enter the network more than 3 times or fails (3 minutes), it will automatically enter the sleep mode and wait for a period of time before initiating the network request again;

◆ **Data reporting**

- The device establishes a connection with the platform based on LoRaWAN communication and reports the collected data, with a default reporting interval of 24 hours (the reporting interval can be configured via the platform);

◆ **Working frequency**

- The device supports following LoRaWAN frequencies CN470\IN865\EU868\US915\AU915\AS923 (Please contact the supplier if you need customized frequencies.).

◆ **Anti-dropout mechanism**

- The device will detect whether the packet is successfully delivered according to the reporting interval, and will re-enter the network after a certain number of sending failures.

4. Specification

Model		HKT-SD300
Hardware Parameters	LED	1 LED light（Red）
	speaker	1
	button	1 self-test button
Function performance	effective range	30m³
	alarm volume	≥80dB（3 meters directly in front）
	alarm delay	<12 seconds
	alarm method	audible and visual alarm
Wireless parameters	communication	standard LoRaWAN®1.0.2 protocol
	frequency	EU868（optional CN470\IN865\US915\AU915\AS923）
	output power	18.5±1dBm(max)
	ultra-high reception sensitivity	-135±1dBm @SF=12
	activation mode	OTAA/ABP Class A
configure	configuration	server
	software function	smoke/low pressure/high temperature alarm
Physical features	power supply	1 CR17450 2400mAh battery
	battery life*	>3 years（3 data reports/day）
	working temperature	-20°C ~60°C
	working humidity	≤90%（non vapour saturated）
	size	102*102*51mm
	installation	screw-in mounting
	installation suggestion	Install indoors away from dust

*： Test data are from laboratory conditions and may vary during actual use depending on objective environmental changes.

Notice:

(1) Please contact Hunan HKT to obtain the equipment configuration keys.

(2) If you need a random App Key, please contact Hunan HKT before purchasing.

(3) If you use cloud management for HKT SD-300 series devices, please use OTAA to access the network.

(4) The LoRa frequency band used to send data must generally match the frequency band used

by the LoRaWAN gateway.

(5) Frequent false alarms: There is too much dust in the sensor, use a vacuum cleaner to clean the maze (outer black plastic part)

(6) If you encounter any malfunction during use, please contact the supplier as soon as possible and do not disassemble and repair without consultations.

(7) If the device is not used for a long time, the alarm must be removed, the battery must be taken out, put into the packaging box, and stored in a ventilated and dry place.

(8) Transport and store in accordance with the provisions of GB/T15464-1995 "General Technical Conditions for Packaging of Instruments.

(9) During transportation and storage, the original packaging and seals of the manufacturer must be kept intact, and the product must not be subject to severe impact.

(10) Drastic changes in ambient temperature should be avoided.

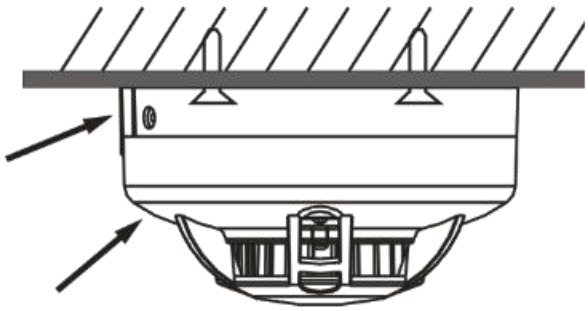
(11) The stacking height after packing shall not exceed 6 layers, and the stacking height of a single unit after unpacking shall not exceed 5 layers.

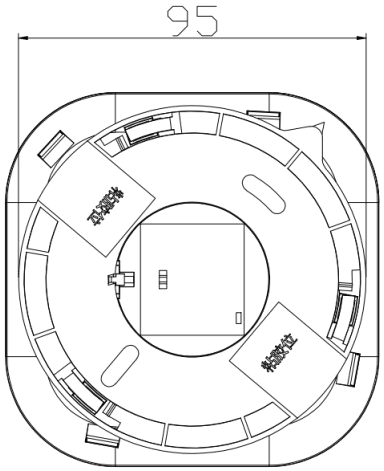
5. Installation and commissioning

Installation environment: For general places, when the height of the space is less than 6m, the protection area of the detector is 60m^2. The detector should be mounted on the ceiling. The specific parameters shall be subject to the "Code for Design of Automatic Fire Alarm System"(GB50116). Make sure to keep a distance of at least 30 cm from lamps.

Installation method:

1. Drill two installation holes on the ceiling 68mm~83mm apart, and use expansion plugs and self-tapping screws to fix the base of the alarm.
2. Insert 3V battery into the battery compartment correctly according to the marked direction. Note: if the battery is connected in the opposite direction, the alarm will not work.
3. Press and hold the self-test button, the alarm indicator light will light up and an alarm sound will sound, indicating that the alarm is working normally. If it is abnormal, you should check whether the battery is installed correctly or the voltage is too low (less than 2.6V).
4. After the alarm is tested, insert the alarm into the base according to the installation mark on the base. Rotate the device clockwise to install it firmly with its base.





Alarm installation diagram

To ensure that the product can correctly monitor the environment, please follow the following precautions:

- It is recommended that the equipment be installed at a distance of >1.5m from the ground;
- Do not install the device in an environment beyond the operating temperature range or in an environment with large temperature changes;
- Do not install the device in a location where the air flow changes rapidly.
- It is not recommended to install the device near a door or window. If it is installed near a window, please close the curtains as much as possible;
- It is recommended to install the device in a location where there are no large obstacles within the infrared sensing range.

6. Data Communication Protocol

6.1 Communication Protocol Data Structure

All data are expressed in HEX format

Sync Head 3 bytes	Special Type 1bytes	Package Serial Number 1 bytes	Type of Data 1bytes	Data n bytes	N（Data Type+Data） 1+n+1+n+...

6.2 Communication Protocol Analysis

Protocol Field Name	Description
sync head	The synchronization header is a fixed 3 bytes of data (0x68 0x6B 0x74) taken from "HKT".
Special type	The special type is a fixed 1 bytes length of data with BIT bits representing the specific function; BIT0: Used to inform the device or server if an answer or acknowledgement packet is required (0: no answer required 1: answer required); BIT1~BT17: function to be determined.
Data serial number	The data serial number is a fixed length of 1 bytes, which is used to identify the data serial number.
Data type	The data type is fixed 1 bytes length data, which is mainly used to identify different functional types of data of the device.
Data	The data is n bytes variable length data, and the length of the data content is confirmed according to different data types.

6.3 Data Type Table

Data type	Function	Note
0x01	Device software and hardware version	The data length is fixed at 2 bytes, and the uplink is automatically synchronized when the power is turned on again. Only uplink is supported. The first 1 byte represents the hardware version, and the last 1 byte represents the software version Example: Sync hardware version 1, software version 5: 68 6B 74 00 01 01 01 05

0x09	Temperature	The data length is fixed at 3 bytes and only supports uplink. Unit: Celsius, data magnification 1000 times uploaded When the data is a negative value, the highest bit is 1 Example: Upload temperature: !25.23 degrees Celsius: 68 6B 74 00 01 09 00 62 8E Upload temperature: -25.23 degrees Celsius: 68 6B 74 00 01 09 80 62 8E
0x27	Smoke alarm status	The data length is fixed at bytes and only supports uplink. 0 = Alarm recovery 1 = triggers smoke alarm Example: Trigger smoke alarm: 68 6B 74 00 01 27 01
0x28	Heat alarm	The data length is fixed at 1 bytes and only supports uplink. 0= Alarm recovery l = trigger heat alarm Example : Trigger smoke alarm: 68 6B 74 00 01 28 01
0x80	Synchronize system time	Uplink data bits are invalid, downlink time format: year, month, day, hour, minute, second When the device goes up through this command, it is a request command. At this time, the server should downlink the correct time to the device. Example: Request server to synchronize system time: 68 6B 74 01 01 80 Server downlink synchronization system time(2022/03/28/12:00): 68 6B 74 00 08 80 16 02 1C 0C 00
0x85	Resume factory settings	Downlink command, uplink is invalid 1 = Resume device to factory settings Example: Downlink the server to resume the device to factory settings: 68 6B 74 00 0A 85 01

0x86	Data Synchronization Period	Synchronize the device status to the server interval, the data length is fixed at 2 bytes, and supports uplink and downlink Unit: minute Value range: 10-1440 (10 minutes to 24 hours), the default is 24 hours, when set to 0, the data will not be actively synchronized. Example: Set the data synchronization interval to 1440 minutes: 68 6B 74 00 01 86 05 A0
0x89	Battery status	The data length is fixed at 1 bytes and only supportsuplink. 0 Under voltage alarm 1 The battery is normal Example: The device reports normal power information: 68 6B 7400 01 89 01

6.4 Example

Device synchronization software and hardware version information

68 6B 74 00 01 01				
Sync head	**Special type**	**Data serial number**	**Data type**	**Data**
68 6B 74 (sync head)	00 (No need to confirm the data packet)	01	01	01 05 (hardware version 1 software 5)