Temperature Sensor

Featuring LoRaWAN®

TS201

User Guide

Safety Precautions

Milesight will not shoulder responsibility for any loss or damage resulting from not following the instructions of this operating guide.

- The device must not be disassembled or remodeled in any way.
- To ensure the security of your device, please change the device password during the initial configuration. The default password is 123456.
- The device is not intended to be used as a reference sensor, and Milesight will not should responsibility for any damage which may result from inaccurate readings.
- Do not place the device close to objects with naked flames.
- Do not place the device where the temperature is below/above the operating range.
- Make sure electronic components do not drop out of the enclosure while opening.
- When installing the battery, please install it accurately, and do not install the inverse or wrong model.
- The device must never be subjected to shocks or impacts.

Declaration of Conformity

TS201 conforms with the essential requirements and other relevant provisions of the CE, FCC, and RoHS.

For assistance, please contact

Milesight technical support:

Email: iot.support@milesight.com

Support Portal: support.milesight-iot.com

Tel: 86-592-5085280

Fax: 86-592-5023065

Address: Building C09, Software Park III, Xiamen 361024, China

Revision History

Date	Doc Version	Description
May 30, 2024	V1.0	Initial version
Aug. 17, 2024	V1.1	Add DS18B20 probe ID report and enquiry command.
April 29, 2025	V1.2	Add TH Version.

Contents

1. Product Introduction

1.1 Overview

Milesight TS201 is a compact temperature and humidity sensor. It is equipped with high-precision sensors and an IP67 waterproof design, making it applicable for accurate temperature data detection in various harsh environments. With the low power consumption technology, TS201 can maintain a long operational life with its internal battery. Combining with Milesight LoRaWAN® gateway and Milesight Development Platform solution, users can manage all sensor data remotely and visually.

TS201 is widely used for temperature and humidity monitoring applications like food processing, cold chain storage of food or medicine, etc.

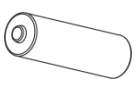
1.2 Features

- Equipped with a DS18B20 temperature probe or a TH (temperature - humidity) probe
- Detachable probe design for self-calibration
- IP67 waterproof with specialized battery compartment design , making it suitable for harsh environment
- Flexible design for various mounting options
- EN12830 certified for cold-chain applications
- Store historical records locally and support retransmission to prevent data loss
- Equipped with NFC for quick and easy configuration
- Function effectively with standard LoRaWAN® gateways and network servers
- Compatible with Milesight Development Platform
- Supports Milesight D2D protocol for ultra-low latency and direct control without gateways (TH Version Only)
- Support Firmware Update Over the Air (FUOTA) feature (TH Version Only)

2. Hardware Introduction

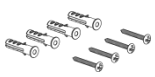
2.1 Packing List

1 × TS201 Device



1 x ER14505 Li-SOCl$_2$ Battery

1 x Temperature (Humidity) Probe



4 x Wall Screw Mounting Kits

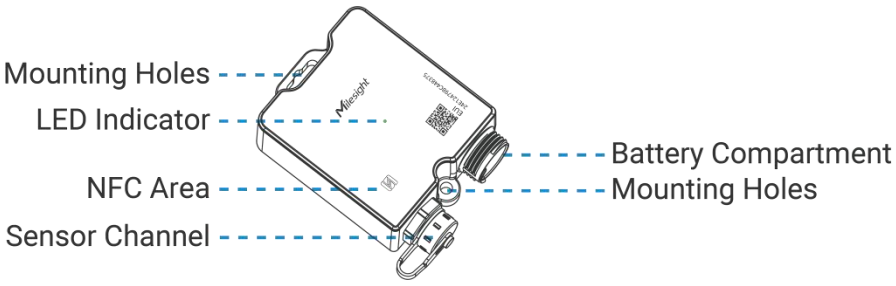
1 x Warranty Card

1 × Quick Start Guide

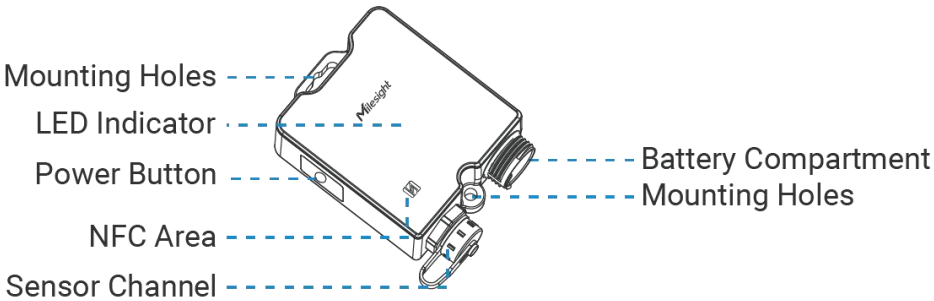
1 × Glass Bead Thermal Buffer Bottle Kit (Optional)

If any of the above items is missing or damaged, please contact your sales representative.

2.2 Hardware Overview



Temperature Version



TH Version

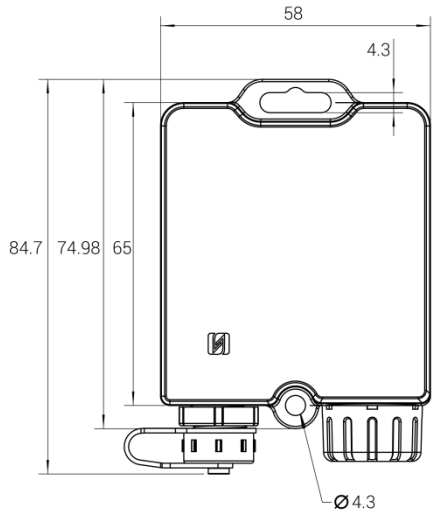
2.3 Power Button and LED Patterns (TH Version Only)

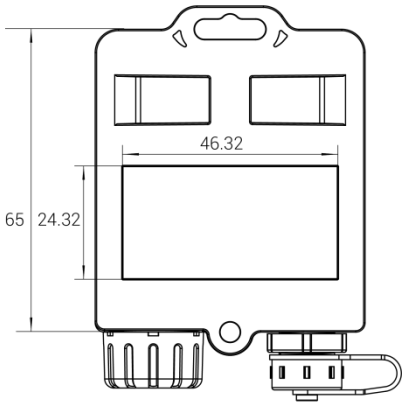
Function	Action	LED Indicator
Power On/Off	Press and hold the power button for 3s	Power On: Off → On
		Power Off: On → Off
Network Status	Quick press the power button once	De-activated: On Activated: On
Probe Connection Detection	Connect the temperature (humidity) probe while the device is off, then power it on after connection	Failure: Light stays on for 3s Success: Light stays on for 3s
Data Collection and Reporting	Quick press the power button twice	LoRaWAN® De-activated: Blinks twice LoRaWAN® Activated: Blinks twice
Threshold Alarm	Collected data exceeds the set threshold	Blinks Slowly

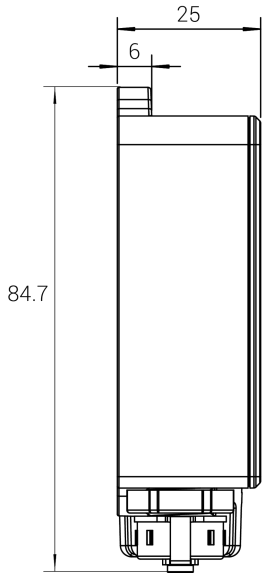
Reset to Factory Default	Create a short circuit with probe 5 and 3 for 10s	Blinks Quickly

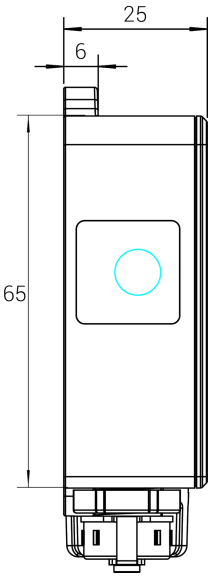
2.4 Dimensions (mm)

- **Device**



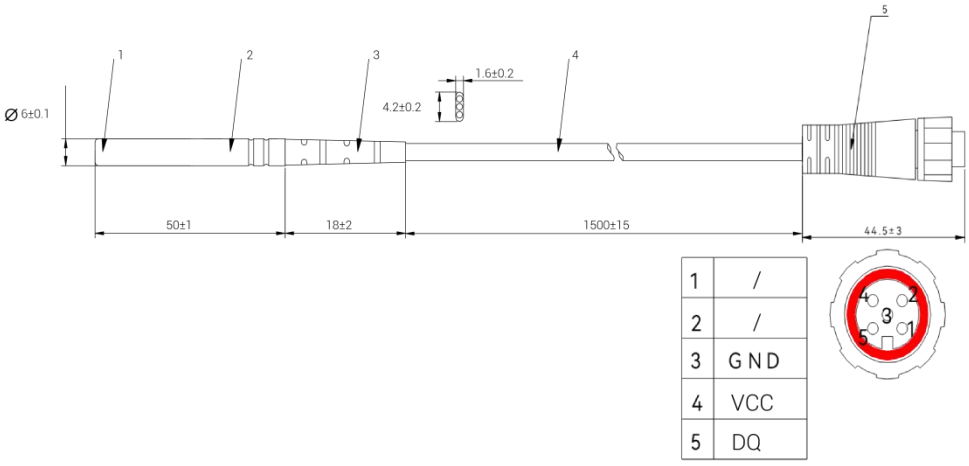




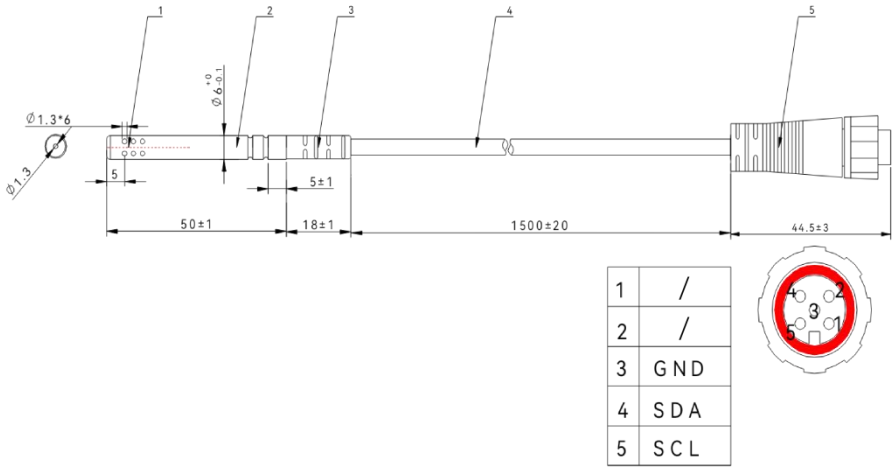


Temperature Version **TH Version**

- **Probe**



Temperature Version

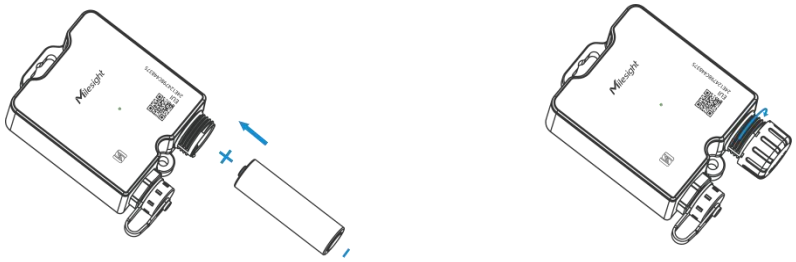


TH Version

3. Battery Installation

Step1: Install the temperature (humidity) probe to the device before inserting the battery.

Step2: Insert the battery and tighten the battery compartment cover.



Step3: For temperature version, the device will turn on automatically and the LED indicator will turn on for 3s; for TH version, please press and hold the side button for 3s to power on the device.

Note:

- The device can only be powered by Li-SoCl$_2$ battery. The alkaline battery is not supported.

- Ensure the replacing battery is newest; otherwise it may shorten the battery life or cause inaccurate power calculation.
- The battery should be removed from the device if it is not used for an expended period.

4. Access the Sensor

TS201 supports to be read and configured via NFC.

1. Download and install "Milesight ToolBox" App on an NFC-supported smart phone.

2. Open "Milesight ToolBox" App and attach the NFC area of the smart phone to the device. Click "NFC Read" to read the device and click "Write" to configure the device settings. It's suggested to change the default password for security reasons. (Default password: 123456).

Note:

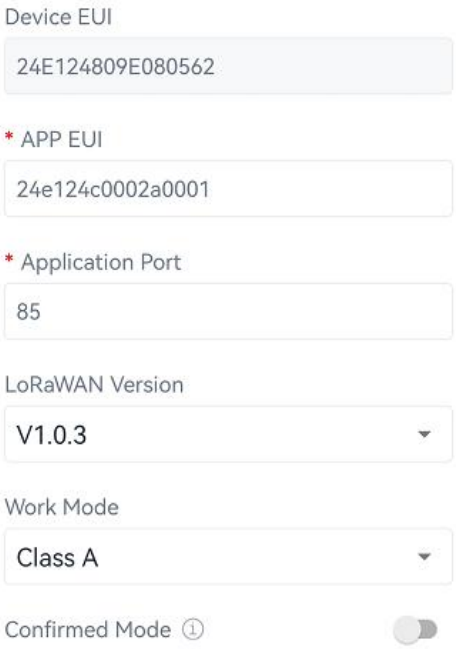
1) Ensure the location of the smartphone NFC area and it's recommended to take off the phone case.

2) If the smartphone fails to read/write configurations via NFC, move it away and try again later.

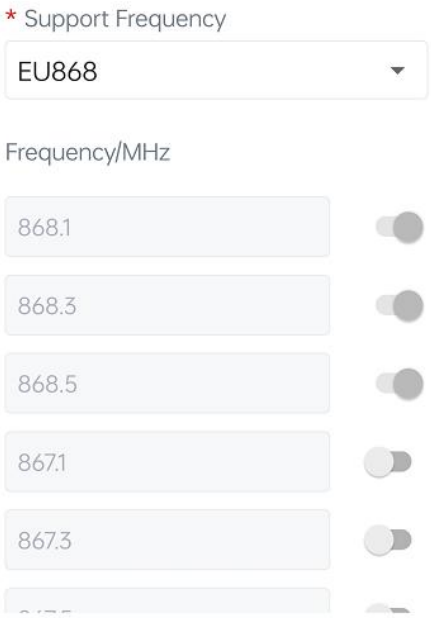
5. Operation Guide

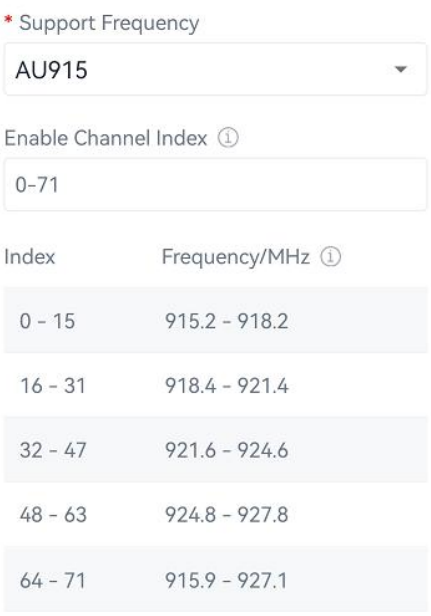
5.1 LoRaWAN Settings

Go to **Device > Settings > LoRaWAN® Settings** of ToolBox App to configure AppEUI, Join Type, Application Key and other information. You can also keep all settings by default.



Parameters	Description
Device EUI	The device's unique ID that can be found on the label.
App EUI	The default App EUI is 24E124C0002A0001.
Application Port	The port used for sending and receiving data, the default port is 85.
LoRaWAN® Version	V1.0.2 and V1.0.3 are available.
Work Mode	It is fixed as Class A.
Confirmed Mode	If the device does not receive an ACK packet from the network server, it will resend data once.
Join Type	OTAA and ABP modes are available.
Application Key	Appkey for OTAA mode, the default is: 5572404C696E6B4C6F52613230313823.
Rejoin Mode	Reporting interval ≤ 35 mins: the device will send a specific number of LinkCheckReq MAC packets to the network server every reporting interval or every double reporting interval to validate connectivity; If there is no response, the device will re-join the network. Reporting interval > 35 mins: the device will send a specific number of LinkCheckReq MAC packets to the network server every reporting interval to validate connectivity; If there is no response, the device will re-join the network. **Note:** Only OTAA mode supports rejoin mode.
Set the number	When rejoin mode is enabled, set the number of LinkCheckReq packets will

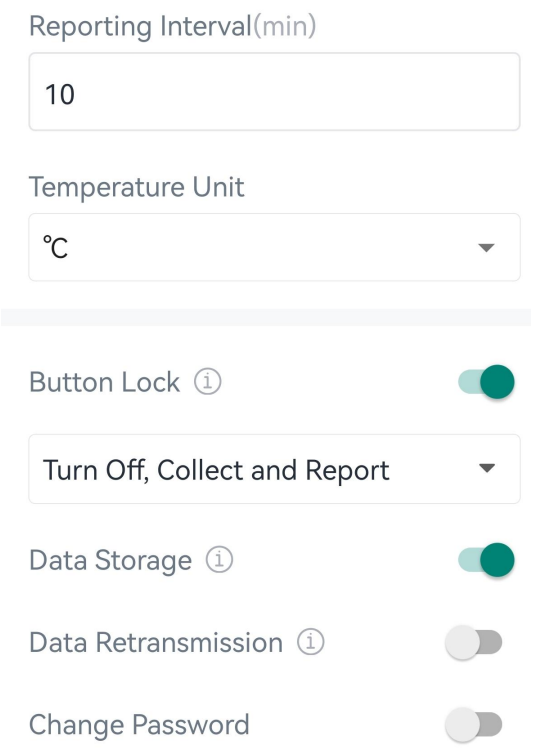
of packets sent	be sent. **Note:** The actual sending number is **Set the number of packet sent** + 1.
Device Address	DevAddr for ABP mode, default is the 5th to 12th digits of SN.
Network Session Key	Nwkskey for ABP mode, default is 5572404C696E6B4C6F52613230313823.
Application Session Key	Appskey for ABP mode, default is 5572404C696E6B4C6F52613230313823.
Supported Frequency	Select supported frequency to send uplinks.
Frequency/MHz	Enable or disable the frequency channels to send uplinks. **Note:** Make sure the channels match the LoRaWAN® gateway.  If frequency is set to CN470, AU915 or US915, you can enter the index of the channel you wish to enable in the input box, and separate them separated with commas. **Examples:** 1, 40: Enabling Channel 1 and Channel 40 1-40: Enabling Channel 1 to Channel 40 1-40, 60: Enabling Channel 1 to Channel 40 and Channel 60 All: Enabling all channels Null: Indicates that all channels are disabled

	
ADR Mode	Allow the network server to adjust data rate of the device. This only works with Standard Channel Mode.
Spread Factor	If ADR is disabled, the device will send data via this spread factor.
TXPower	Transmit power of the device.
RX2 Data Rate	RX2 data rate to receive downlinks or send D2D commands.
RX2 Frequency	RX2 frequency to receive downlinks or send D2D commands. Unit: Hz

Note:

1) Please contact sales for the device EUI list if there are many units.
2) Please contact sales if you need random App keys before purchase.
3) Select OTAA mode if you use Milesight IoT Cloud or Milesight Development Platform to manage devices.

5.2 General Settings



Parameters	Description
Reporting Interval	Reporting interval of transmitting data to the network server. Range: 1~1440min; Default: 10min
Temperature Unit	Change the temperature unit displayed on the ToolBox. **Note:** 1) The temperature reported by the device is mainly the value of °C. 2) After changing the temperature unit, it is necessary to modify the value of relevant threshold settings.
Button Lock (TH Version Only)	Enable to lock the power button feature: Turn Off, Collect and Report.
Data Storage	Start or stop reporting data storage locally.
Data Retransmission	Start or stop data retransmission.
Change Password	Change the password for ToolBox app to write this device.

5.3 Advanced Settings

5.3.1 Calibration Settings

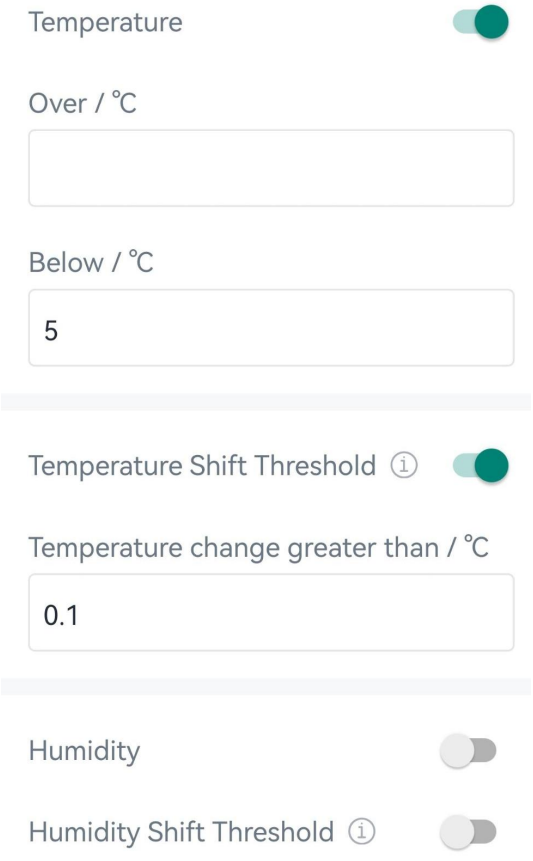
The device supports temperature and humidity numerical calibration.

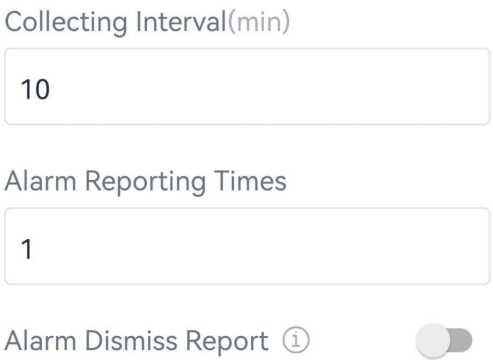
Temperature Calibration: set the calibration value, the device will add calibration value to the current temperature value and report the final value.

Humidity Calibration: set the calibration value, the device will add calibration value to the current humidity value and report the final value.

5.3.2 Threshold Settings

TS201 supports threshold alarms and shift threshold (change) alarms.





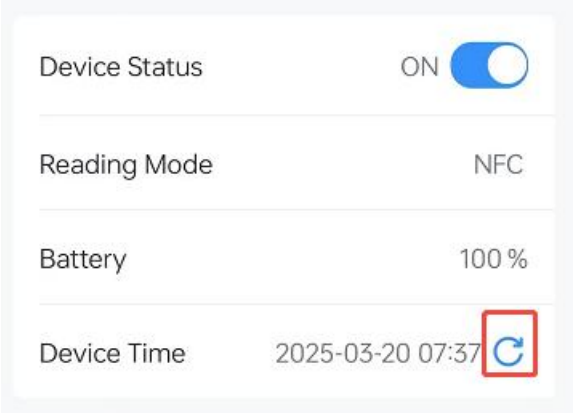
Parameters	Description
Temperature	When the temperature is over or below the threshold value, the device will report alarm packets. **Note:** When you change the temperature unit, please re-configure the threshold values.
Temperature Shift (Change) Threshold	When this function is enabled, the device will report an alarm packet when the absolute value of the difference between the two collected values exceeds the set threshold.
Humidity (TH Version Only)	When the humidity is over or below the threshold value, the device will report alarm packets.
Humidity Shift(Change) Threshold (TH Version Only)	When this function is enabled, the device will report an alarm packet if the absolute difference between two consecutive readings exceeds the set threshold.
Collecting Interval	Set the interval of collecting data, the default interval is 1min.
Alarm Reporting Times	Set the times of threshold alarm report, the default is 1.
Alarm Dismiss Report	After it is enabled, when the collected value changes from exceeding the threshold range to not exceeding the threshold range, an alarm dismiss packet will be reported.

5.3.3 Data Storage

TS201 sensor supports storing more than 2,800 (Temperature Version) or 4,000 (TH Version) data records locally and exporting data via ToolBox App. The device will record the data according to the reporting interval even not joining to network.

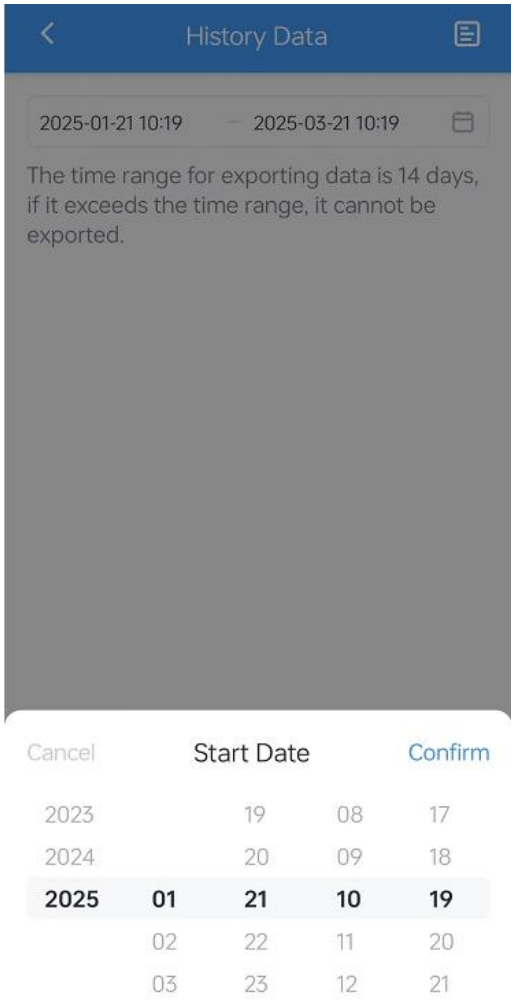
Here are the steps for storage:

1. Ensure the device time is correct, go to **Basic Information**, click to sync the time.



2. Enable **Data Storage** feature.

3. Go to **Maintenance** to click **History Data**, then select the data period and click **Export** to export data. The maximum export data period on ToolBox App is 14 days.



5.3.4 Data Retransmission

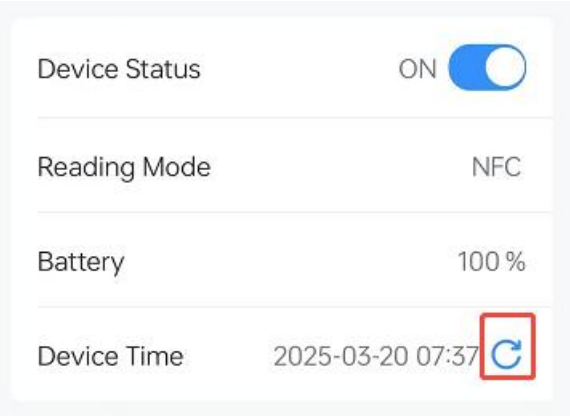
TS201 sensor supports data retransmission to ensure the network server can get all data even if

the network is down for some time. There are two ways to get the lost data:

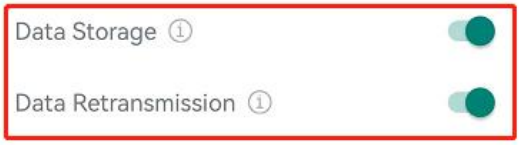
- Network server sends downlink commands to enquire the historical data for specifying time range, refer to section Historical Data Enquiry.
- When the network is down if no response from LinkCheckReq MAC packets for a period of time, the device will record the network disconnected time and re-transmit the lost data after the device re-connects the network.

Here are the steps for retransmission:

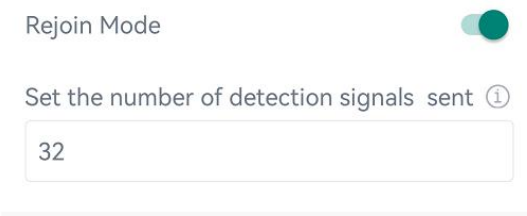
1. Ensure the device time is correct, go to **Basic Information,** click to sync the time.



2. Enable **Data Storage** and **Data Retransmission** feature.



3. Go to **Device > Setting > LoRaWAN Settings** to enable rejoin mode and set the number of packets sent. For example, the device will send LinkCheckReq MAC packets to the network server regularly to check any network disconnection; if there is no response for 32+1 times, the join status will change to de-activated and the device will record a data lost time point (the time it reconnected to the network).



4. After the network connection is restored, the device will send the lost data from the point in time when the data was lost according to the data retransmission interval (600s by default).

Note:

1) If the device is rebooted or re-powered when data retransmission is not completed, the interrupted retransmission data will be retransmitted first after the network is reconnected to the

network, and then the newly triggered retransmission data will be transmitted.

2) If the network is disconnected again during data retransmission, it will only send the latest disconnection data.

3) The retransmission data format is started with “20ce”, please refer to section Historical Data Enquiry.

4) Data retransmission will increase the uplinks and shorten the battery life.

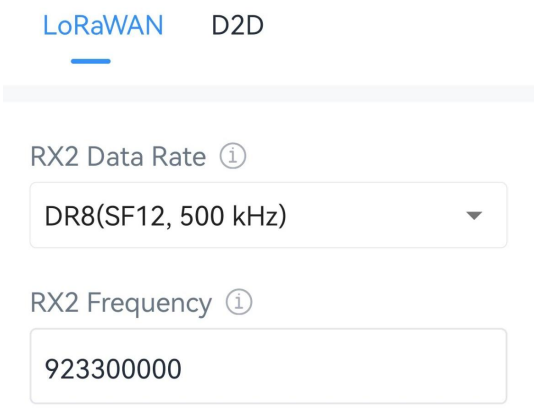
5.4 Milesight D2D Settings (TH Version Only)

Milesight D2D protocol is developed by Milesight to enable direct communication among Milesight devices without a gateway.

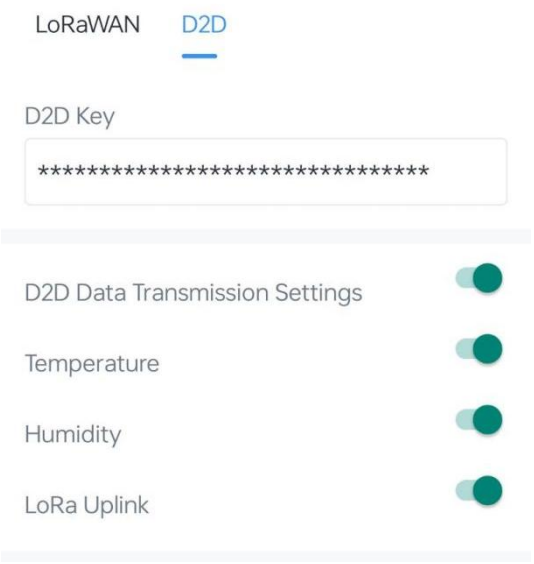
5.4.1 Sensor Data Transmission Settings

TS201 supports sending temperature and humidity sensor data to other Milesight devices directly.

1. Configure the RX2 data rate and RX2 frequency in LoRaWAN® settings. It is suggested to change the default RX2 frequency to avoid conflicts with other D2D devices.



2. Enable D2D Data Transmission Settings and configure the settings.

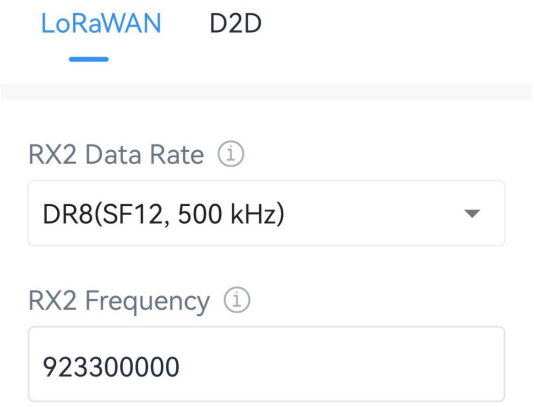


Parameters	Description
D2D Key	Define a unique D2D key which is the same as the setting in D2D Data Receiving devices. Default value: 5572404C696E6B4C6F52613230313823.
D2D Data Transmission Settings	Enable to send temperature or humidity data periodically to Milesight devices which have enabled D2D Data Receiving Settings.
LoRa Uplink	If disabled, the device will not send the temperature and humidity periodic packets to gateway.

5.4.2 Milesight D2D Controller

TS201 supports working as a Milesight D2D controller device to send commands to trigger Milesight D2D agent devices.

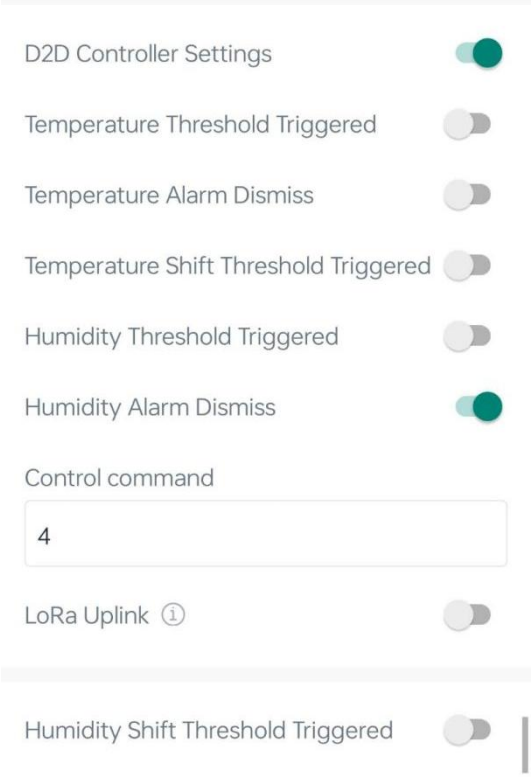
1. Configure RX2 datarate and RX2 frequency in LoRaWAN® settings. It is suggested to change the default RX2 frequency to avoid conflicts with other D2D devices.



2. Enable **D2D Controller Settings**, and define a unique D2D key that is the same as that of the D2D agent devices. (Default D2D Key: 5572404C696E6B4C6F52613230313823)

3. Enable the trigger conditions to define a 2-byte hexadecimal control command (0x0000 to 0xffff). When the TS201 encounters any of the defined situations, it will send the control command to the corresponding D2D agent devices.

Example: When humility threshold alarm is dismissed, TS201 will send a D2D command 0004 to Milesight D2D agent devices.



Parameters	Description
D2D Controller Settings	When the device detects one or more of the below statuses, it will send the control command to the corresponding Milesight D2D agent devices: ● Temperature Threshold Triggered ● Temperature Alarm Dismiss ● Temperature Shift Threshold Triggered ● Humidity Threshold Triggered ● Humidity Alarm Dismiss ● Humidity Shift Threshold Triggered
Control command	Define a 2-byte hexadecimal control command (0x0000 to 0xffff).
LoRa Uplink	If enabled, a LoRaWAN® uplink packet containing the alarm information will be sent to gateway after the Milesight D2D control command is sent.

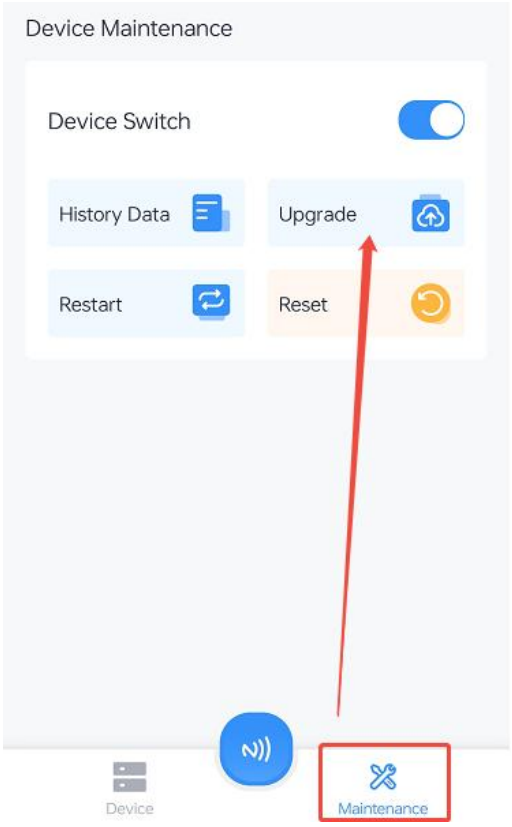
5.5 Maintenance

5.5.1 Upgrade

1. Download firmware from Milesight website to your smartphone.

2. Go to the **Maintenance** page of ToolBox App, and tap **Upgrade** to import firmware and upgrade the device.

Note: Operation on ToolBox is not supported during a firmware upgrade.

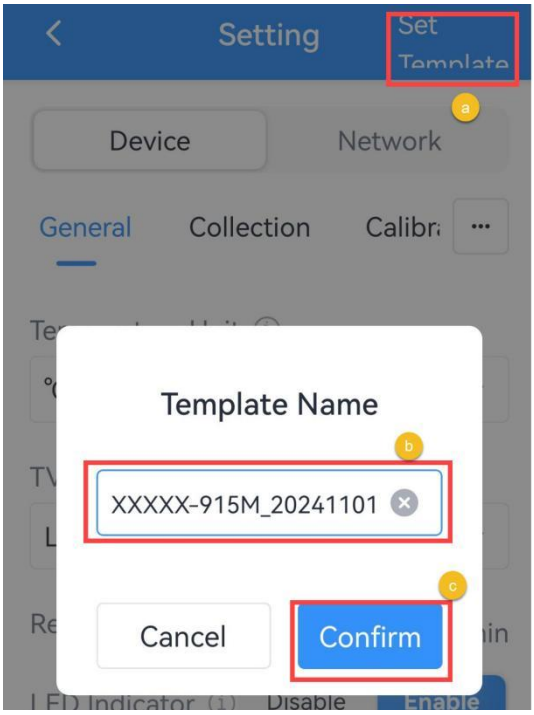


5.5.2 Backup

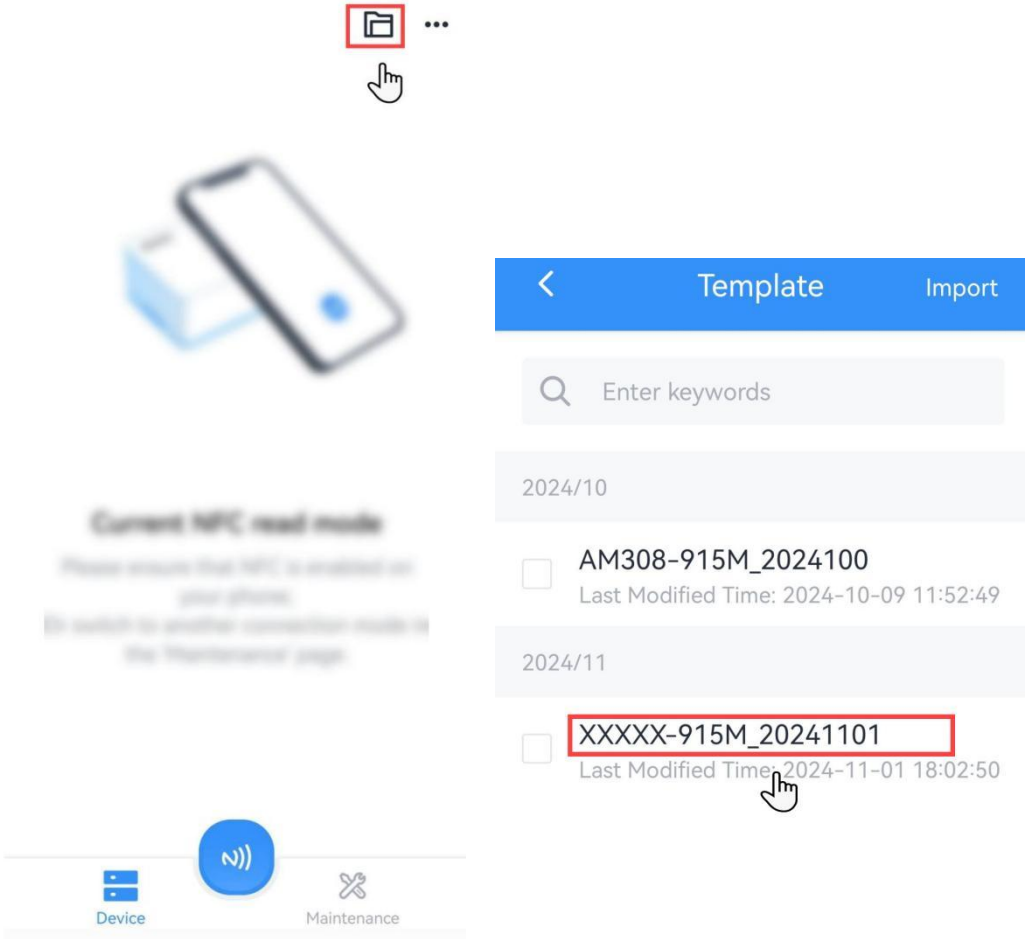
TS201 supports configuring backup setting for easy and quick device configuration in bulk. Backup is allowed only for devices with the same model and LoRaWAN® frequency band.

1. Attach the NFC area of smartphone to the device to read the device.

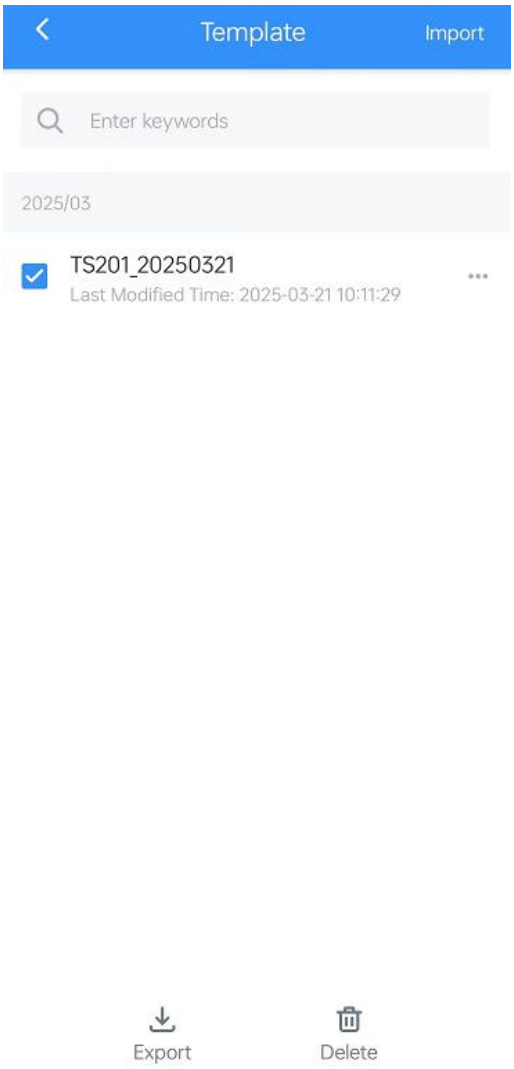
2. Go to **Settings** page on the App to edit the configuration as required, click **Set Template** to save current configuration as the template in the ToolBox App.



3. Go to **Template** page, select and click the target template, then click **Write** and attach the NFC area of smartphone to the target device to import the configuration.



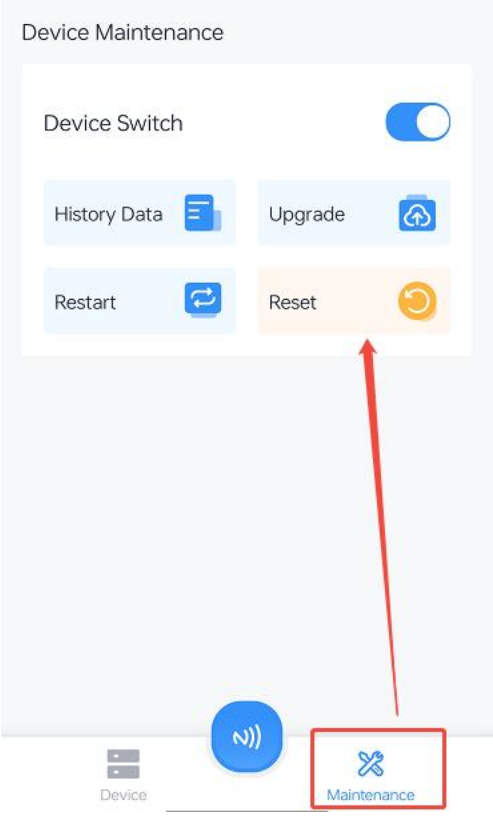
Note: Check the box of target template to delete it, or export this template as JSON format file and save it to the smartphone.



5.5.3 Reset

Go to **Maintenance** to click **Reset** button, then attach the smartphone with NFC area to the device to complete the reset.

Note: Reset operation will not clean the stored data, please go to **History Data,** click **Clear All** to clear data if necessary.

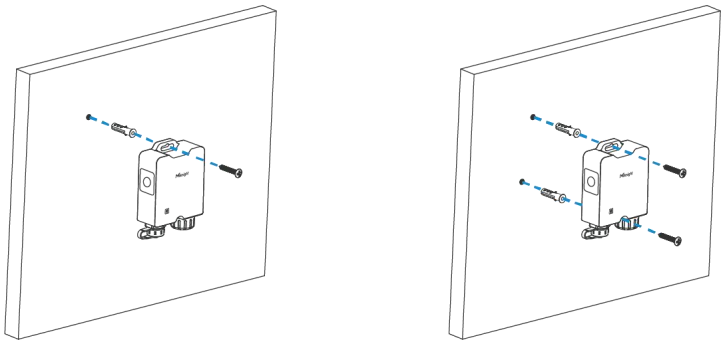


6. Installation

6.1 Device Installation

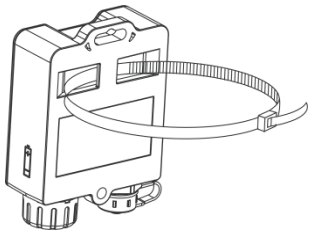
- **Wall Screw Mounting:**

1. Fix the wall plugs to a flat surface according to the device mounting holes, then secure the device to the wall plugs using screws.
2. Cover the screws with cover caps.



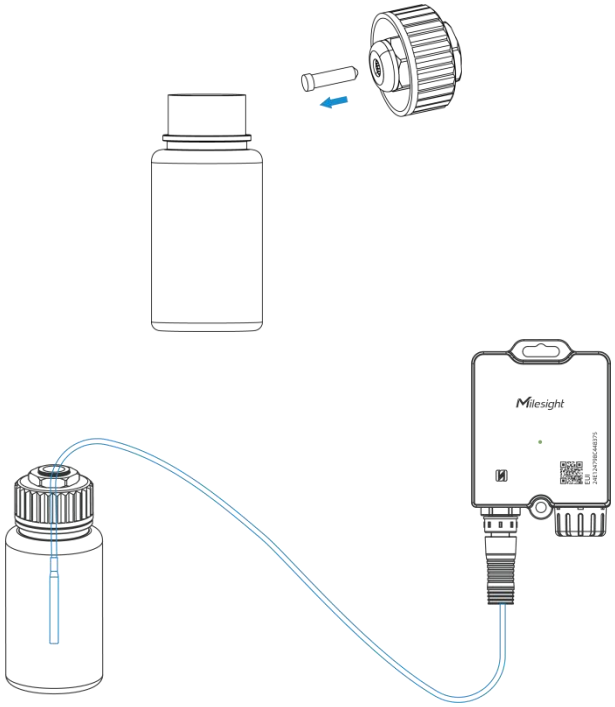
- **Cable-tie Mounting:**

Pass a cable tie through the gap behind the device and wrap it to the pole.



6.2 Thermal Buffer Bottle

It is necessary to unplug the stopper inside the bottle cap, then restore the cap and insert the temperature probe into the bottle. When using, it can be placed to places like freezers and refrigerators to ensure more accurate temperature measurement.



7. Communication Protocol

All data are based on the following format (HEX), the Data field should follow little-endian:

Channel1	Type1	Data1	Channel2	Type2	Data2	Channel 3	...
1 Byte	1 Byte	N Bytes	1 Byte	1 Byte	M Bytes	1 Byte	...

For decoder examples please find files on https://github.com/Milesight-IoT/SensorDecoders.

7.1 Basic Information

TS201reports basic information about the sensor every time it joins the network.

Item	Channel	Type	Byte	Value
Power On	ff	0b	1	ff
Protocol Version		01	1	11 => V1.1

TSL Version		ff	2	0101 => V1.1
Reset Report		fe	1	ff, report after reset to factory default
Device SN		16	8	16 digits
Hardware Version		09	2	0110 => V1.1
Firmware Version		0a	2	0101 => V1.1
Device Type		0f	1	00: Class A
Probe ID		a0	9	Temp. Version: 11+DS18B20 Probe ID TH Version: 1200000000+Probe ID **Note:** When probe ID is reported as all "F", it means acquisition failure.

Example:

ff0bff ff0101 ffff0101 fffeff ff166809e08056200001 ff090100 ff0a0102 ff0f00 ffa0112883c2b50f000043					
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	0b (Power On)	ff (Reserved)	ff	01 (Protocol Version)	01 (V1)
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	ff (TSL Version)	0100 (V1.0)	ff	fe (Reset Report)	ff
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	16 (Device SN)	6809e08056200001	ff	09 (Hardware Version)	0100 (V1.0)
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	0a (Firmware Version)	0101 (V1.1)	ff	0f (Device Type)	00 (Class A)
Channel	**Type**	**Value**			
ff	a0 (Probe ID)	11284fa8b50f00000d			

7.2 Sensor Data

Item	Channel	Type	Byte	Description
Battery Level	01	75	1	UINT8, Unit: %, [1-100]
Temperature	03	67	2	INT16*0.1, Unit: °C
Relative Humidity	04	68	1	UINT8*0.5, Unit: %RH
Temperature Abnormal Report	b3	67	1	00 - Abnormal collection report 01-Temperature overrange report
Humidity Abnormal	b4	68	1	00 - Abnormal collection report

Report				01-Humidity overrange report
Temperature Threshold Alarm	83	67	3	● Byte 1-2: Temperature, INT16*0.1, Unit: °C ● Byte 3: Alarm Status, 00 -Alarm dismiss, 01 -Alarm
Temperature Shift Threshold (Change) Alarm	93	67	5	● Byte 1-2: Temperature, INT16*0.1, Unit: °C ● Byte 3-4:Temperature_change, INT16*0.1, Unit: °C ● Byte 5: 02
Humidity Threshold Alarm	84	68	2	● Byte 1: Relative Humidity, UINT8*0.5, Unit: %RH ● Byte 2: Alarm Status, 00 -Alarm dismiss, 01 -Alarm
Humidity Shift Threshold(Change) Alarm	94	68	3	● Byte 1: Relative Humidity, UINT8*0.5, Unit: %RH ● Byte 2: Relative Humidity_change, UINT8*0.5, Unit: %RH ● Byte 3: 02
Probe ID	ff	a0	9	Temperature version: ● Byte 1: 11 ● Byte 2-9: DS18B20 Probe ID **Note:** 11FFFFFFFFFFFFFF means ID acquisition failure.
				TH version: ● Byte 1: 12 ● Byte 2-5: 00000000 ● Byte 6-9: TH Probe ID **Note:** 1200000000FFFFFFFF means ID acquisition failure.

Example:

1. Periodic Packet

017564 03671101 046850					
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
01	75 (Battery)	64 => 100%	03	67 (Temperature)	1101 => 0111 =>273*0.1 =27.3°C
04	68(Relative Humidity)	50=80*0.5= 40%			

2. Temperature Abnormal Report Packet

b367 01		
Channel	**Type**	**Value**
b3	67	01 => Temperature overrange

3. Threshold Alarm Packet

8367 340101 8468 4e01		
Channel	**Type**	**Value**
83	67	34 01 => 01 34 => 308*0.1 = 30.8°C 01 => Temperature Threshold Alarm
84	68	4e=>78*0.5=39% 01 => Relative Humidity Threshold Alarm

4. Temperature Shift Threshold (Change) Alarm Packet

93d7 fa00 0700 02		
Channel	**Type**	**Value**
93	67	Temperature: fa 00 => 00 fa => 250*0.1= 25°C Temperature_change: 07 00 => 00 07 => 7*0.1=0.7°C 02 => Temperature_change Alarm

5. Temperature Probe ID: report once when the probe is removed or changed.

ffa0 11 284fa8b50f00000d		
Channel	**Type**	**Value**
ff	a0	284fa8b50f00000d = DS18B20 Probe ID

7.3 Downlink Commands

TS201 supports downlink commands to configure the device. The application port is 85 by default.

Item	Channel	Type	Byte	Description
Reboot	ff	10	1	ff
Reporting Interval		8e	3	• Byte 1: 00 • Byte 2-3: reporting interval, INT16, Unit:

				min
Collecting Interval		02	2	Unit: s
UTC Time Zone		bd	2	INT16/60
Alarm Reporting Times		f2	2	range: 1~1000
Alarm Dismiss Report		f5	1	01-enable; 00-disable
Calibration		ea	3	● Byte 1: 80-Temperature enable 00-Temperature disable 81-Humudity enable 01-Humudity disable ● Byte 2-3: Temperature calibration value, INT16*0.1, Unit: °C, Range: -200~1000 (or Humidity calibration value, INT16*0.5, Unit: %RH, Range: -100~100)
Data Storage		68	1	01-enable; 00-disable
Data Retransmission	f9	0d	3	● Byte 1: 01-enable; 00-disable ● Byte 2-3: interval time, Unit:s, Range: 30~1200s (600s by default)
Threshold Alarm		0b	7	● Byte 1: 01-Temperature, 03-Humidity ● Byte 2: 01 - below; 02 - over; 03 - within; 04 - below or over ● Byte 3-4: Max. Temperature, INT16*0.1, Unit: °C (or Max. Humidity, UINT16*0.5, Unit: %RH) ● Byte 5-6: Min. Temperature, INT16*0.1, Unit: °C (or Min. Humidity, UINT16*0.5, Unit: %RH) ● Byte 7: 01-enable; 00-disable
Shift Threshold(Change)		0c	4	● Byte 1: 02-Temperature, 04-Humidity

Alarm				• Byte 2-3: Max. Temperature, INT16*0.1, Unit: °C, range: 0.1 ~ 100 (or Max. Humidity, UINT8*0.5, Unit: %RH) • Byte 4: 01-enable; 00-disable
Enquiry Probe ID		31	1	00
ACK Packet Resend Times		32	3	• Byte 1-2: 0000 • Byte 3: Resend Times, Range:0 ~ 10, Default: 1 **Note:** If a periodic packet is combined with a probe ID packet, the ACK packet resend times will be determined according to this downlink command; however, if a periodic packet is not combined with a probe ID packet, the ACK packet will be resent only once.

TH Version Only:

Item	Channel	Type	Byte	Description
Button Lock	f9	69	1	00-Disable button lock 01-Enable Turn Off lock 02-Enable Collect and Report lock 03-Enable both lock
LED Threshold Alarm Indicator		6a	1	01-enable; 00-disable
D2D Sensor Data Transmission Setting		63	4	• Byte 1: 01-enable, 00-disable • Byte 2: 01-enable LoRa Uplink, 00-disable LoRa Uplink • Byte 3: 00-Temperature and humidity disable 01-Temperature enable 02-Humidity enable 03-Temperature and humidity disable • Byte 4: 00
Milesight D2D Controller		66	1	01-enable, 00-disable
Milesight D2D Key	ff	35	8	First 16 digits, last 16 digits are fixed as 0

D2D Controller Settings		96	8	● Byte 1: 01-Temperature Threshold Triggered 02-Temperature Alarm Dismiss 03-Temperature Shift Threshold Triggered 04-Humidity Threshold Triggered 05-Humidity Alarm Dismiss 06-Humidity Shift Threshold Triggered ● Byte 2: 01-enable, 00-disable ● Byte 3: 01-enable LoRa Uplink, 00-disable LoRa Uplink ● Byte 4-5: D2D control command ● Byte 6-8: 00000000
Temperature Unit		eb	1	00-°C, 01-°F **Note:** the reported unit is fixed as °C.

Example:

1. Set reporting interval as 5 minutes.

ff8e 00 0500		
Channel	**Type**	**Value**
ff	8e (Reporting Interval)	00 => Reserved 05 00 => 00 05 = 5 minutes

2. Set the calibration.

ffea 80 6400		
Channel	**Type**	**Value**
ff	ea (Calibration)	80 => enable temperature calibration 6400 => 00 64 => 100*0.1 = 10°C

3. Set a temperature threshold alarm as above 37°C.

f90b 01 02 7201 0000 01		
Channel	**Type**	**Value**
f9	0b (Threshold Alarm)	01 => set threshold alarm 02 => above 72 01=> 01 72 => 370*0.1=37°C 01 => enable threshold alarm

4. Set data retransmission interval as 100s.

f90d 01 6400

Channel	Type	Value
f9	0d (Set Data Retransmission)	01 => enable Data Retransmission 6400 => 00 64 => 100s

5. Get Probe ID.

f931 00		
Channel	**Type**	**Value**
f9	31 (Get Probe ID)	00 => Get Probe ID

6. Set time zone.

ffbd10ff		
Channel	**Type**	**Value**
ff	bd	10 ff => ff 10 = -240/60=-4 the time zone is UTC-4

7.4 Device Configuration Enquiry (TH Version Only)

The device supports enquiring the device configuration via f96f command. The device will send the replies with the same format as downlink commands.

Channel	Type	Byte	Description
f9	6f	1	01-Temperature Unit
			02-Button Lock
			03-Milesight D2D Data Transmission
			04-Milesight D2D Controller
			05-D2D Controller: Temperature Alarm
			06-D2D Controller: Temperature Alarm Dismiss
			07-D2D Controller: Temperature Shift Alarm Dismiss
			08-D2D Controller: Humidity Threshold Triggered
			09-D2D Controller: Humidity Alarm Dismiss
			0a-D2D Controller: Humidity Shift Threshold Triggered
			0b-Temperature Calibration
			0c-Humidity Calibration
			0d-Temperature Threshold
			0e-Temperature Shift Threshold
			0f-Humidity Threshold
			10-Humidity Shift Threshold
			11-LED Threshold Alarm Indicator
			12-Collecting Interval

			13-Reporting Interval
			14-Alarm Dismiss Report
			15-Alarm Reporting Times
			16-Data Retransmission
			17-Data Storage
			18-Data Retrievability
			19-ACK Packet Resend Times

Example:

1. Query the current humidity threshold setting.

f9 6f 0f

Reply:

f9 0b 03 02 1e00 0000 01		
Channel	**Type**	**Value**
f9	0b	03=>Humidity 02=>over 1e00=> 001e=>30*0.5=15% 01=>enable Threshold Alarm

2. Query the current report interval.

f9 6f 13

Reply:

ff 8e 00 0100		
Channel	**Type**	**Value**
ff	8e (Report Interval)	0100=>0001=1 min

7.5 Historical Data Enquiry

TS201 supports sending downlink commands to enquire historical data for specified time point or within a certain time range. Before utilizing this feature, it is import to make sure the device time is correct and data storage feature was enable to store the data.

Command format:

Channel	Type	Byte	Description
fd	6b (Enquire data in time point)	4	unix timestamp
	6c (Enquire data in time range)	8	● Byte 1-4: Start time, unix timestamp

			● Byte 5-8: End time, unix timestamp
	6d (Stop query data report)	1	ff
f9	0e(Report Interval)	2	Unit: s, range: 30~1200s (60s by default)

Reply format:

Channel	Type	Byte	Description
fc	6b/6c	1	00: data enquiry success; 01: time point or time range invalid; 02: no data in this time or time range.
20	ce (Historical Data)	7 (Temperature Version)	● Byte 1-4: Data time stamp ● Byte 5: ➢ Bit3~Bit0: 0001: Periodic report 0010: Alarm report 0011: Alarm dismiss report ➢ Bit7~Bit4: 0000:Normal 0001: Collection abnormal 0010: Overrange report ● Byte 6-7: Data
		9 (TH Version)	● Byte 1-4: Data time stamp ● Byte 5: 02 ● Byte 6-7: Temperature, INT16*0.1, Unit: °C ● Byte 8: Relative Humidity, UINT8*0.5, Unit: % ● Byte 9: ➢ Bit3~Bit0: Abnormal Type 0001: Periodic report 0010: Temperature Alarm report 0011: Temperature Alarm dismiss report 0100: Humidity Alarm report 0101: Humidity Alarm dismiss report 0110: Collect and report immediately

			➢ Bit5~Bit4: 00: Normal 01: Humidity Collection abnormal 10: Humidity Overrange report ➢ Bit7~Bit6: 00:Normal 01: Temperature Collection abnormal 10: Temperature Overrange report

Note:

1. The device only uploads no more than 300 data records per range jnquiry.
2. When enquiring about the data in time point, it will upload the data that is the closest to the search point within the reporting interval range. For example, if the device's reporting interval is 10 minutes and users send a command to search for 17:00's data, if the device finds there is data stored in 17:00, it will upload these data. If not, it will search for data between 16:50 to 17:10 and upload the data which is the closest to 17:00.

Example:

1. Enquire historical data of temperature version device between 2024/5/15 10:20:22 to 2024-5-20 10:20:22.

fd6c e61b4466 66b34a66		
Channel	**Type**	**Value**
fd	6c (Enquire data in time range)	Start time: e61b4466 => 66441be6 = 1715739622s =2024/5/15 10:20:22 End time: 66b34a66 => 664ab366 = 1716171622s =2024-5-20 10:20:22

Reply:

fc6c00		
Channel	**Type**	**Value**
fc	6c (Enquire data in time range)	00: data enquiry success

20ce e81b4466 01 0a01			
Channel	**Type**	**Time Stamp**	**Value**
20	ce (Historical Data)	e81b4466 => 6644b1e8 = 1715778024s = 2024-5-15 21:00:24	01 => 0000 0001 = Normal +Periodic Report 0a01 => 01 0a => 266*0.1=26.6°C

--------END---------