Manuals+ — User Manuals Simplified.

**TS30x
Lorawan
Temperature
Sensor**

Milesight TS30x Lorawan Temperature Sensor User Guide

Contents

Milesight TS30x Lorawan Temperature Sensor

Product Usage Instructions

Safety Precautions

Follow these safety precautions to ensure proper and safe usage of the Temperature Sensor TS30x:

- Avoid contact with the sharp point of the temperature probe.
- Do not disassemble or modify the device.
- Change the default password (123456) during initial configuration for security.
- Avoid placing the device near naked flames or outside the operating temperature range.
- Handle electronic components carefully to prevent damage.
- Ensure correct installation of the battery.
- Avoid subjecting the device to shocks or impacts.

Installation

Follow these steps for installing the Temperature Sensor TS30x:

1. Check the packing list to ensure all components are included.
2. Mount the sensor using the provided kits and screws.
3. Connect any optional sensor accessories as needed.

Device Payload

The device supports automated temperature monitoring and data recording with anti-tamper features. Ensure proper setup and configuration for accurate readings.

Safety Precautions

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

- The PT100 temperature probe has a sharp point. Please be careful and keep the edges and points away from human body.
- 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 be responsible for any damage that 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

TS30x conforms with the essential requirements and other relevant provisions of the CE, FCC, and RoHS.
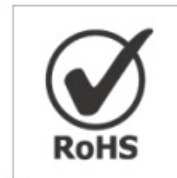
For assistance, please contact

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
October 23, 2023	V1.0	Initial version

Product Introduction

Overview

Milesight TS30x is an advanced resistance temperature sensor with a visualized data display. It features extendable connecting lines and a diverse range of detecting probes, including A-class, B-class, and A-class food-grade temperature probes. Moreover, it provides the option for a magnetic contact switch sensor. TS30x prioritizes security and reliability, ensuring traceable data and effortless data exports for seamless integration.

TS30x is designed for measuring a wide range of temperature in harsh environments and transmitting data using LoRaWAN® technology. With this low power consumption technology,

TS30x can maintain a long operational life with its embedded batteries. Combining with Milesight LoRaWAN® gateway and Milesight IoT Cloud solution, users can manage all sensor data remotely and visually.

TS30x is widely used for temperature monitoring applications like food processing, cold chain storage of food or medicine, etc.

Features

- Provide optional three types of high-accuracy PT100 temperature probes and one magnetic\contact switch sensor.
- IP65 waterproof enclosure with dust plug, suitable for harsh environments.
- Support automated temperature monitoring and record data with anti-tamper features to meet HACCP (Hazard Analysis and Critical Control Points) requirements, as well as the authenticity requirements of 21 CFR Part 11B electronic record.
- Provide simplified PDF data export for easy documentation without complex paperwork.
- Built-in two large-capacity replaceable batteries, ensuring an extended battery life.
- Features low-consumption LCD display, enabling intuitive data reading.
- Store up to 10,000 historical records locally and supports data retrieval and retransmission to prevent data loss.
- Equipped with NFC and Type-C USB for quick and easy configuration.
- Function effectively with standard LoRaWAN® gateways and network servers.
- Compatible with Milesight IoT Cloud.

Hardware Introduction

Packing List

1 × TS30x Device

2 x Mounting Kits

2 x Screw Caps

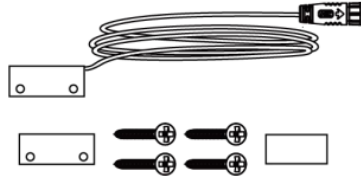1 x Type-C Cable & Power Adapter (Optional)

1 × Quick Start Guide

1 × Warranty Card
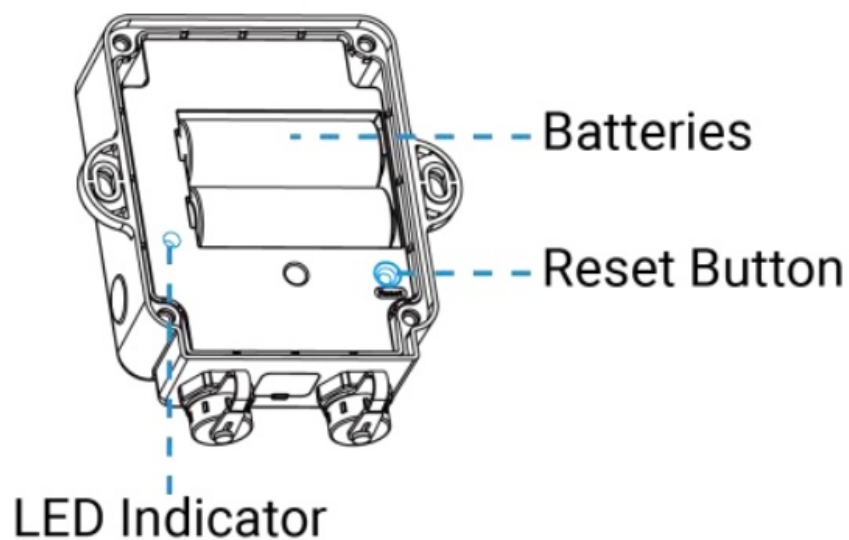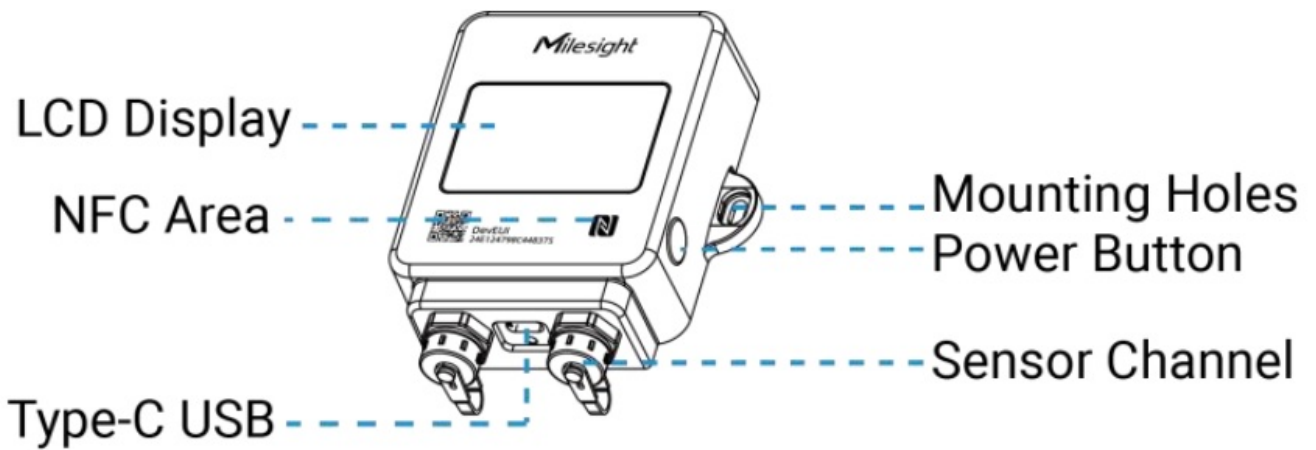
PT100
Temperature Probe

Magnet Switch Sensor
(With 3M Tapes and
Mounting Screws)

Glass Bead Thermal
Buffer Bottle

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

Hardware Overview

LCD Display

NFC Area

Type-C USB

Mounting Holes
Power Button

Sensor Channel

Batteries

Reset Button

LED Indicator

Button Descriptions

Power Button

Function	Action	LCD Display
Power On/Off	Press and hold the power button for more than 3 seconds	Power On: All icons show 3s
		Power Off: Off
Update Temperature	Quick press the power button once	Refresh the latest temperature of the current channel
Switch Temperature Display (TS302 with both temperature sensors only)	Quick press the power button twice	Display another channel's latest temperature

Reset Button

Function	Action	LED Indicator
Reset to Factory Default	Press and hold the reset button for more than 10 seconds	Blinks quickly

Screen Description

Note:

- The screen is only displayed when the temperature sensor is connected to the TS30x, and the screen is turned off when no sensor is connected or only when connected to the magnet switch sensor.
- The screen can be enabled/disabled by downlink commands.

Device	OSD	Description
	AM PM 88:88	Time.
	⚠	Temperature Threshold Trigger Alarm
	▯◘	Door Opening/Closing Alarm
	🔋	Battery Level
	📶	LoRaWAN® Network is Activated
	8888 CH1 CH2	Temperature of Channel 1/Channel 2

Dimensions (mm)
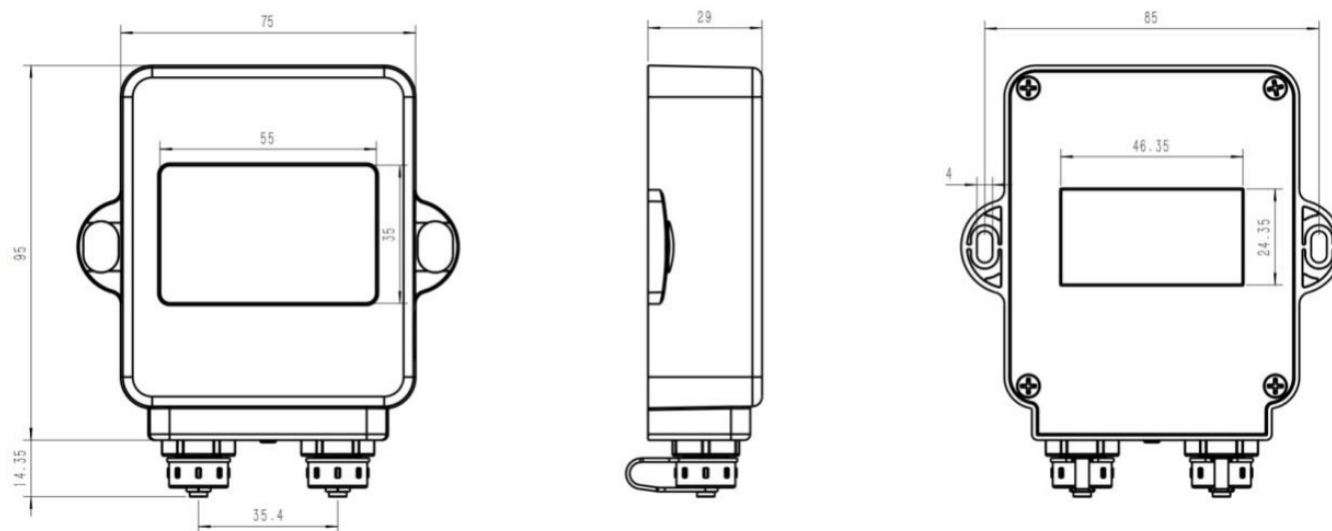
Operation Guide

Configuration

Configured By NFC

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

Configured by USB

1. Download ToolBox software from Milesight's official website.
2. Remove the USB waterproof plug from the bottom of the device, and connect it to the computer via a type-C USB cable. After connecting, the PDF file can be exported directly from the USB drive folder
3. Open ToolBox software, select type as "General" and select the serial port as USB port, then \type the login password (Default password: 123456) to log in in to the device to check or configuring the device. It's suggested to change the default password for security reasons
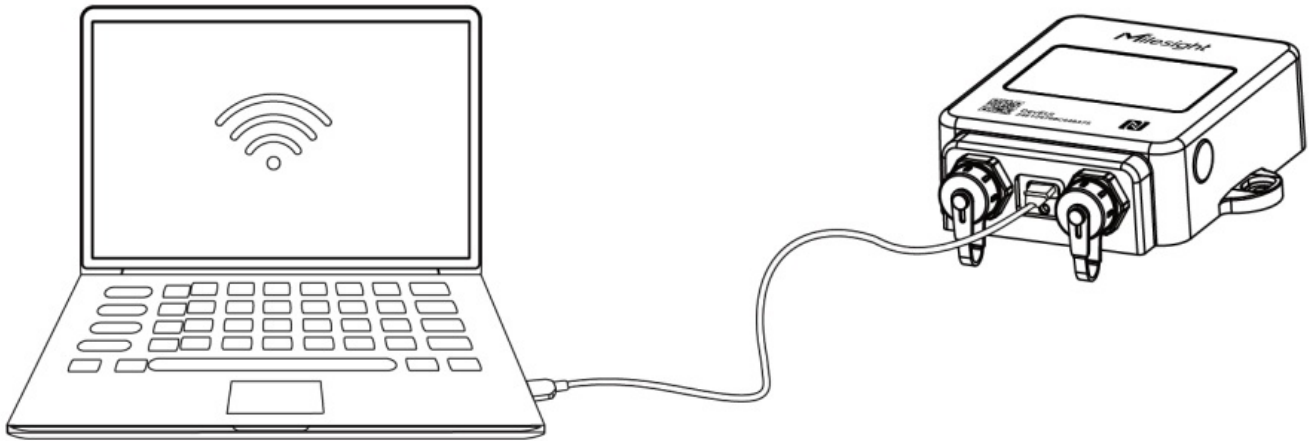
LoRaWAN Settings

LoRaWAN settings is used for configuring the transmission parameters in LoRaWAN® network.

Basic LoRaWAN Settings:

Configure join type, App EUI, App Key and other information. You can also keep all settings by default.

LoRaWAN Settings ∧

Device EUI

24E124723D296268

* APP EUI

24e124c0002a0001

* Application Port   [−] 85 [+]

Join Type

OTAA ∨

* Application Key

****

LoRaWAN Version

V1.0.3 ∨

Work Mode

Class A ⌄

RX2 Data Rate

DR0 (SF12, 125 kHz) ⌄

RX2 Frequency

869525000

* Support Frequency

EU868 ⌄

	–	868.1	+
	–	868.3	+
	–	868.5	+

Confirmed Mode ⓘ

Rejoin Mode

Set the number of detection signals sent ⓘ

```
32
```

ADR Mode ⓘ

Spreading Factor ⓘ

```
SF10-DR2                          ⌄
```

TXPower

```
TXPower0-16 dBm                   ⌄
```

Parameters	Description
Device EUI	The device's unique ID can also 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.
Join Type	OTAA and ABP modes are available.
Application Key	Appkey for OTAA mode, the default is: 5572404C696E6B4C6F52613230313823.
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.
LoRaWAN Version	V1.0.2 and V1.0.3 are available.
Work Mode	It's fixed as Class A.
RX2 Data Rate	RX2 data rate to receive downlinks.
RX2 Frequency	RX2 frequency to receive downlinks. Unit: Hz
Spread Factor	If ADR is disabled, the device will send data via this spread factor.
Confirmed Mode	If the device does not receive an ACK packet from the network server, it will resend data once.
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.
Set the number of packets sent	When rejoin mode is enabled, set the number of LinkCheckReq packets sent.
ADR Mode	Allow the network server to adjust datarate of the device. This only works with Standard Channel Mode.
TXPower	Transmit power of the device.

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 to manage devices.
4. Only OTAA mode supports rejoin mode.

LoRaWAN Frequency Settings: Select supported frequency and select channels to send uplinks. Make sure the channels match the LoRaWAN® gateway.

* Support Frequency

EU868 ⌄

⬤ (on)	−	868.1	+
⬤ (on)	−	868.3	+
⬤ (on)	−	868.5	+
⬤ (on)	−	0	+
○ (off)	−	0	+
○ (off)	−	0	+
○ (off)	−	0	+

If the frequency is set to CN470, AU915 or US915, you can enter the index of the channel, you wish to enable in the input box, separating 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

Support Frequency

AU915 ▼

Enable Channel Index ⓘ

0-71

Index	Frequency/MHz ⓘ
0 - 15	915.2 - 918.2
16 - 31	918.4 - 921.4
32 - 47	921.6 - 924.6
48 - 63	924.8 - 927.8

Time Synchronization

ToolBox Sync:

Click Sync to sync the time via ToolBox App or ToolBox Software

Hardware Version	V1.0
Device Status	ON
Join Status	De-activated
Reading Mode	NFC
RSSI/SNR	-53/6
Device Time	2023-10-25 15:07 Sync
Temperature(CH1)	25.5 °C

Network Server Sync:

Change device LoRaWAN® Version as 1.0.3, the device will ask the network server for the time \everytime it joins the network.

Note:

1. This function is only applicable to network server using LoRaWAN® 1.0.3 version or later.
2. By default, the network server synchronizes time in the UTC+0 timezone. It's suggested to sync the timezone via ToolBox to change the timezone.

Basic Settings

General Settings

Reporting Interval	– 10 + min
Data Storage ⓘ	(off)
Temperature Unit ⓘ	
°C ⌄	
Button Lock ⓘ	(on)
24-Hour Clock	(on)
Change Password	(off)

Parameters	Description
Reporting Interval	Reporting interval of transmitting data to the network server. Range:

	1~1440min; Default: 10min
Data Storage	Start or Stop reporting data storage locally.
Data <u>Retransmission</u>	Star or stop data retransmission. Record the network disconnection time point after startup, and retransmit the periodic report data between the disconnection time point and the networking time point after reconnecting networking.
Temperature Unit	Change the temperature unit displayed on the screen and ToolBox. **Note:** 1) The temperature reported by the device is mainly the value of ℃. 2) After changing the temperature unit, it is necessary to modify the value of relevant threshold settings.
Button Lock	After it is enabled, the device cannot be turned off by pressing the external power button.
24-Hour Clock	Click to change the time displayed on the screen and ToolBox switches to the 24-hour clock from 12-hour clock. **Note:** The data storage time is not affected and remains at 24-hour clock.
Change Password	Change the password for ToolBox app or software to read/write this device.

Advanced Settings

Calibration Settings

ToolBox supports temperature calibration. Type the calibration value and save, the device will add the calibration to raw value, then display and report the final value.

Calibration Settings

Temperature(CH1)

Numerical Calibration

Current Value: 26.1 °C

Calibration Value

0.0 °C

Final Value: 26.1 °C

Threshold Settings

TS30x can set temperature threshold alarms, temperature change alarms and so on. Enable the\threshold settings and enter the threshold. TS30x sensor will upload the current data instantly\ when the alarm is triggered. Note that when you change the temperature unit, please re-configure the threshold.

Threshold Settings

Temperature(CH1)

Over / °C

Below / °C

Alarm Dismiss Report ⓘ

Alarm Reporting Interval [−] 1 [+] min

Alarm Reporting Times [−] 1 [+]

Temperature change greater than / °C ⓘ

Parameters	Description
Temperature Threshold	When the temperature is over or below the threshold value, the device will report an alarm packet.
Alarm Dismiss Report	After it is enabled, when the collected value changes from exceeding the threshold range to not exceeding the threshold range, a threshold packet will be reported to release the threshold.
Alarm Reporting Interval	Set the interval of the alarm report, the default interval is 1min.
Alarm Reporting Times	Set the times of alarm report, the default is 1 time.
Temperature change greater than	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.

Data Storage

TS30x sensor supports storing more than 10,000 data records locally and exporting data via ToolBox. The device will record the data according to the reporting interval even not joining to network.

Export as csv file

Click Export, then select the data period and click Confirm to export data. The maximum export \data period on ToolBox App is 14 days.


Export as PDF file

TS30x sensor supports data plug-and-play by USB port, which exports encrypted & anti-tampering PDF data.

1. USB data export without driver installation. After plugging into the USB interface, the PC will \display a disk folder from device to display the stored data which is automatically exported as \an encrypted document in PDF format (to prevent tampering – FDA CFR 21B regulatory requirements)

   Note: The PDF file only stores temperature data, not door sensor switch data
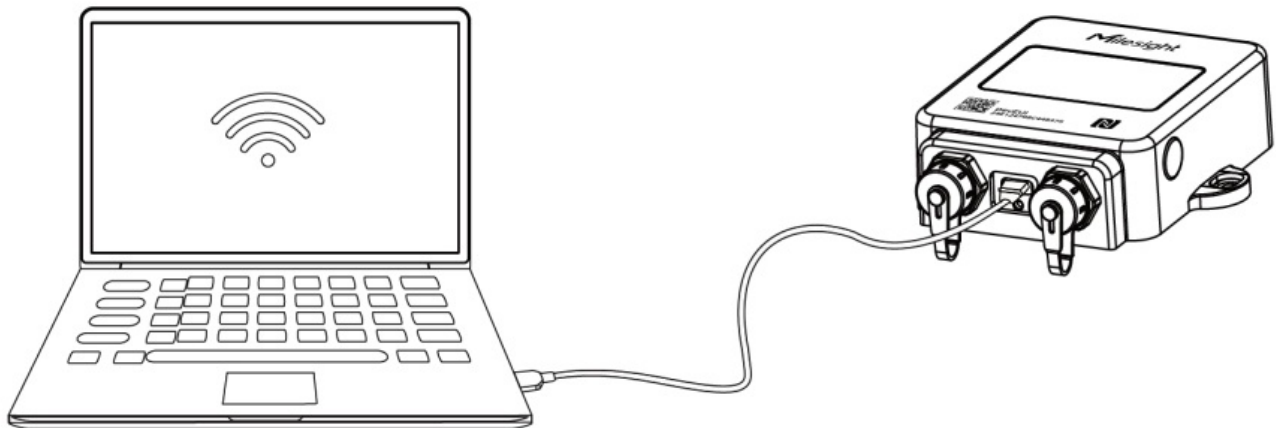
2. Copy the PDF file to your PC's another disk folder to get the data.
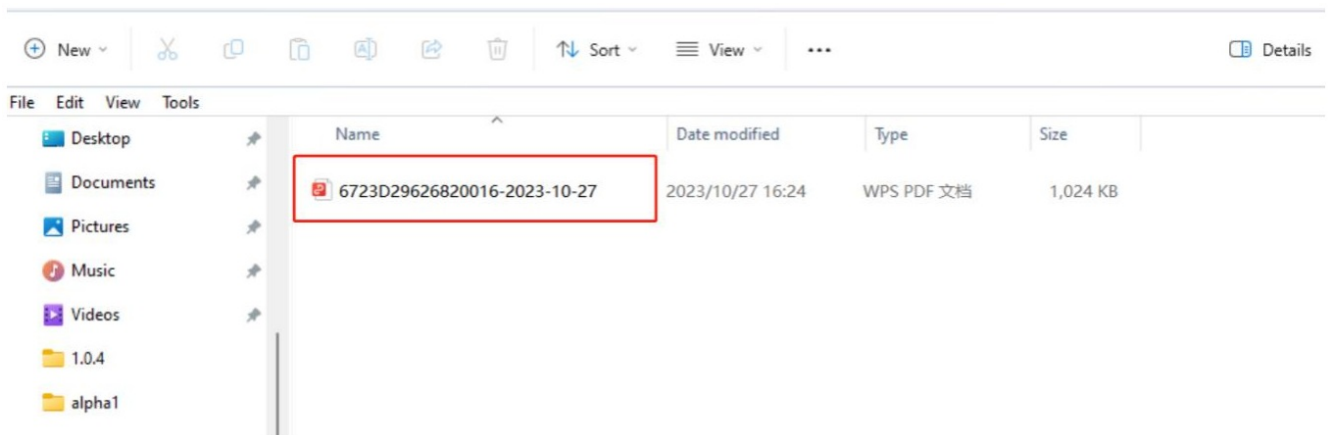
Note:

1. The PDF file is not allowed to be edited to prevent tampering.
2. When the device is configured by the ToolBox software on the PC, the disk folder from device will disappear. You can export PDF files again by unplugging and reinserting the USB port.
3. The disk folder from device is only used to export PDF file and is not allowed to put other \files.

Data Retransmission

TS30x 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, please refer Time Synchronization to sync the time.
2. Enable Data Storage and Data Retransmission feature.

General Settings

Reporting Interval	− 10 + min
Data Storage ⓘ	🟢
Data Retransmission ⓘ	🟢

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-active and the device will record a data lost time point (the time it\ reconnected to the network).

Rejoin Mode	🟢
Set the number of detection signals sent ⓘ	
32	

3. 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.
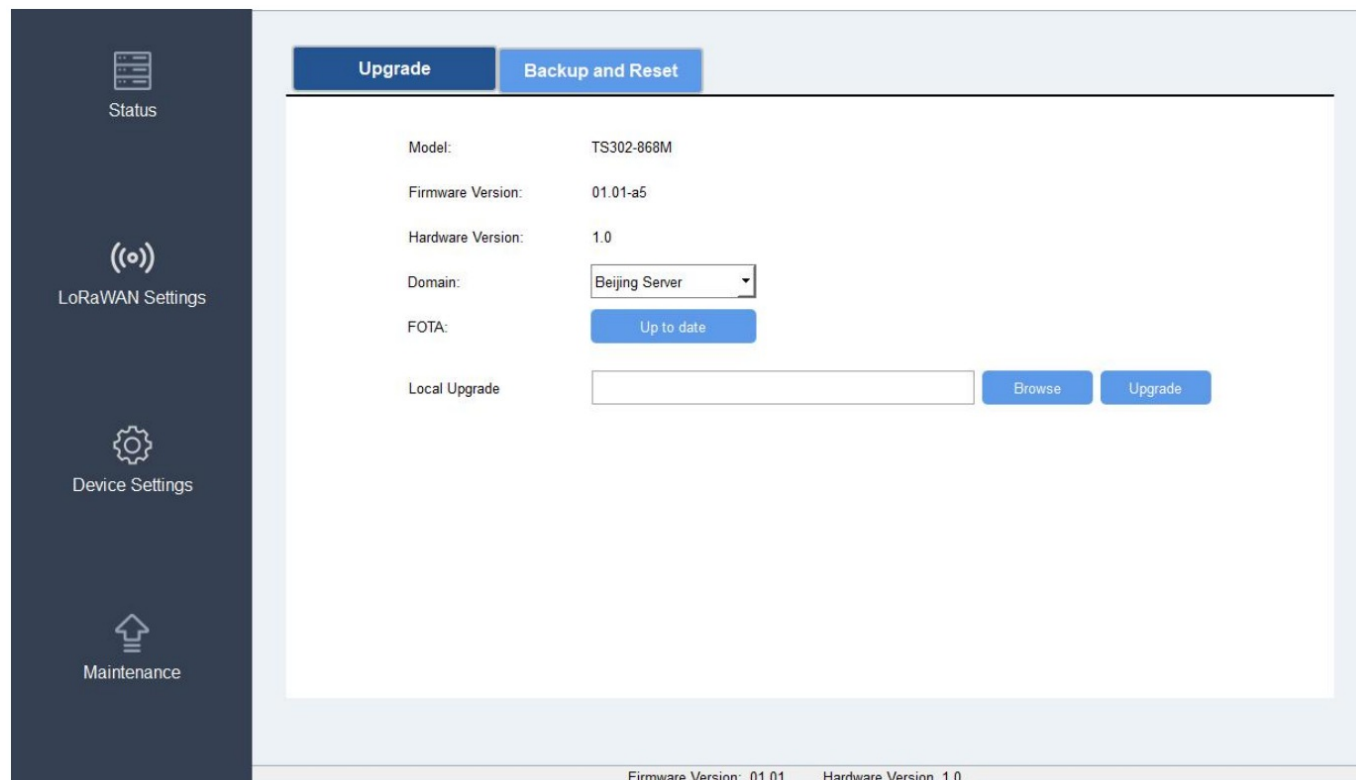4. Data retransmission will increase the uplinks and shorten the battery life.

Maintenance

Upgrade

1. Download firmware from the Milesight website to your smartphone or computer.
   Click Browse to import firmware and upgrade the device.

Note:

1. Operation on ToolBox is not supported during a firmware upgrade.
2. Only the Android version of the ToolBox App supports the upgrade feature.

Backup

TS30x 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. Go to Template page on the App and save the current settings as a template. You can also edit the template file.
2. Select one template file saved in the smartphone and click Write, then attach the smartphone to another device

to write the configuration.
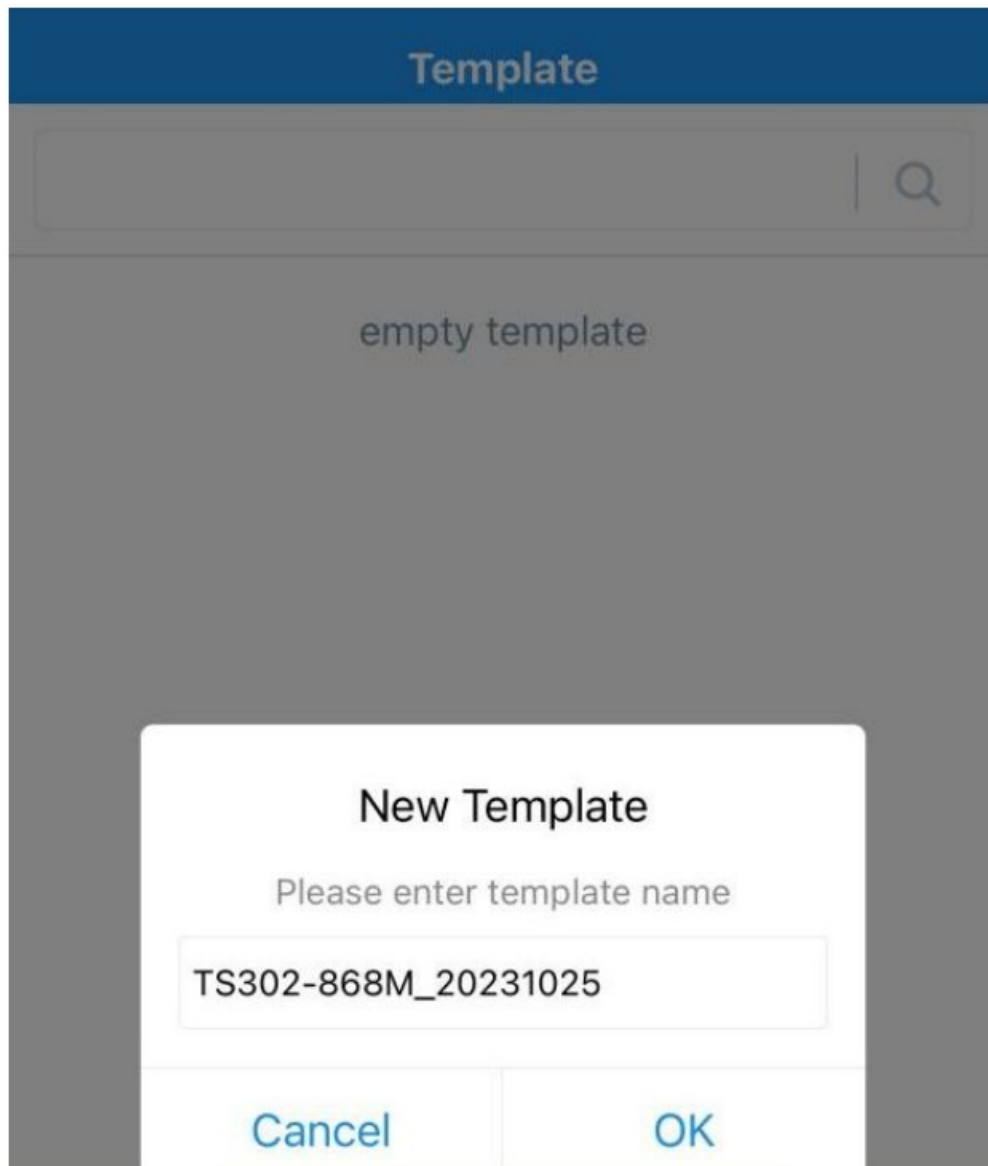
Note: Slide the template item left to edit or delete the template. Click the template to edit the configurations.
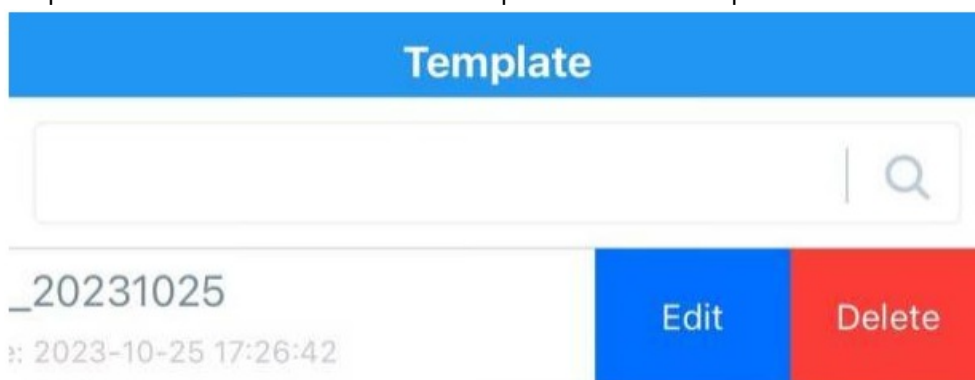
Reset to Factory Default

Please select one of the following methods to reset the device: \Reset Via Hardware: Hold on the reset button (internal) for more than 10s. \Reset Via ToolBox App: Go to Device > Maintenance to click Reset button, then attach the smartphone with NFC area to the device to complete the reset.

Reset via ToolBox Software: Go to Maintenance > Backup and Reset to click Reset button.

Note: Reset operation will not clean the stored data, please click Data Cleaning or Clear button to clear data if necessary.

Export Historical Data

Export

Export Record

Data Cleaning

Maintenance >

Upgrade | **Backup and Reset**

Config Backup   Export

Config File   [   ]   Browse   Import

Export Historical Data   Export

Historical data clearing   Clear

Installation

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 (screw torsion: ≤ 3kgf·cm). When installing, please ensure \the LCD display is positioned vertically on the ground below eye level for clear visibility of the \content.
2. Cover the screws with cover caps

Magnetic Mounting (Optional):

1. Insert the screw through the device and secure it to the magnetic nut. Afterward affix the entire assembly to the flat surface. When installing, please ensure the LCD display is positioned vertically on the ground below eye level for clear visibility of the content.
2. Cover the screws with cover caps.
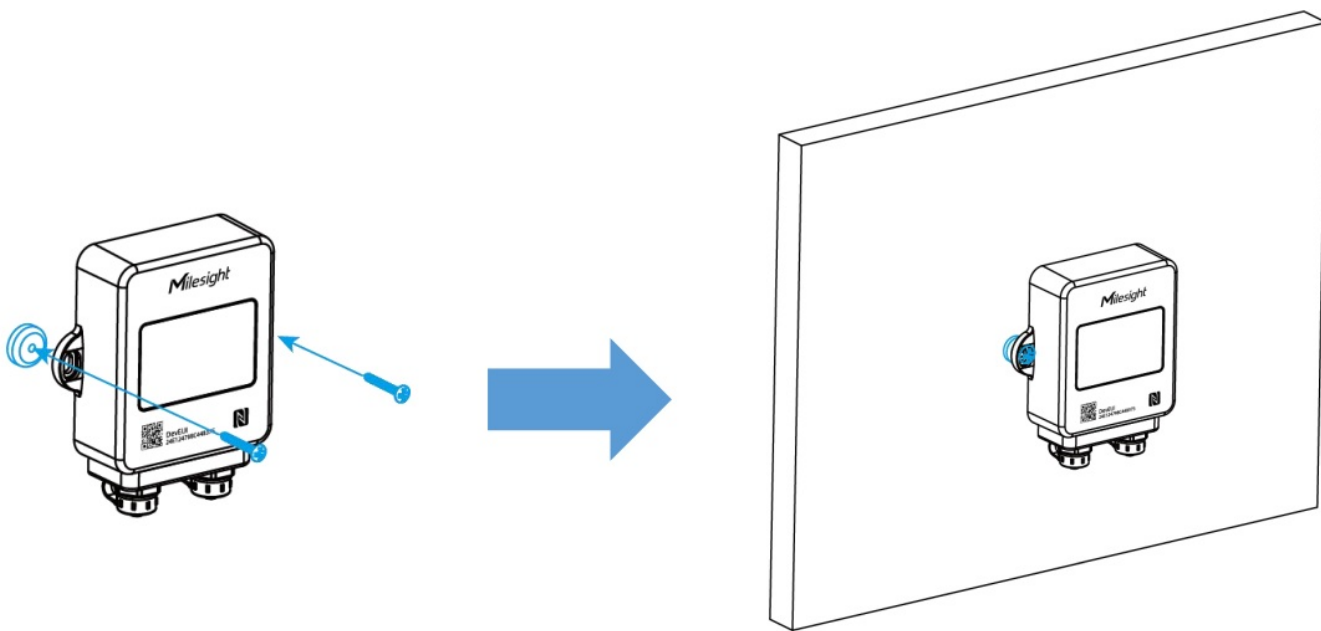
Magnet Switch Installation

Fix the two magnet parts with 3M tape or screws, the two parts should be aligned
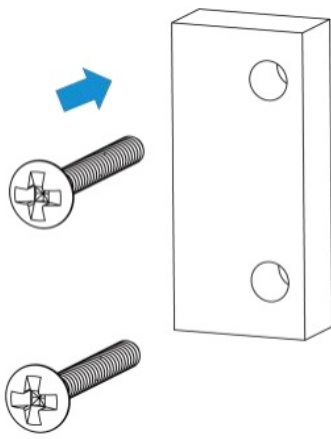
Fixed by Screws
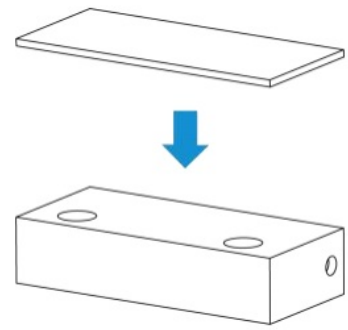
Fixed by 3M Tape
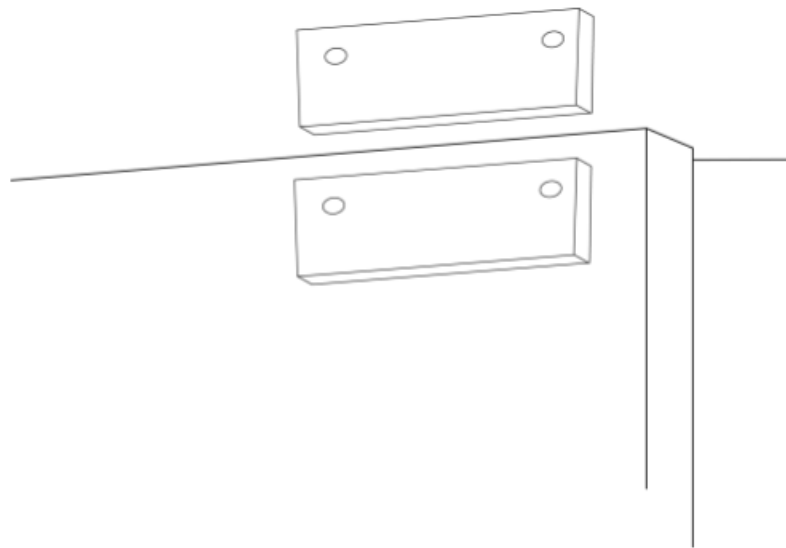
Installation Example

Thermal Buffer Bottle

It is necessary to unplug the stopper inside the bottle cap, then restore the cap and insert the PT100 probe into the bottle. This setup allows for more accurate temperature measurements and makes it suitable for placement in location such as freezers and refrigerators.
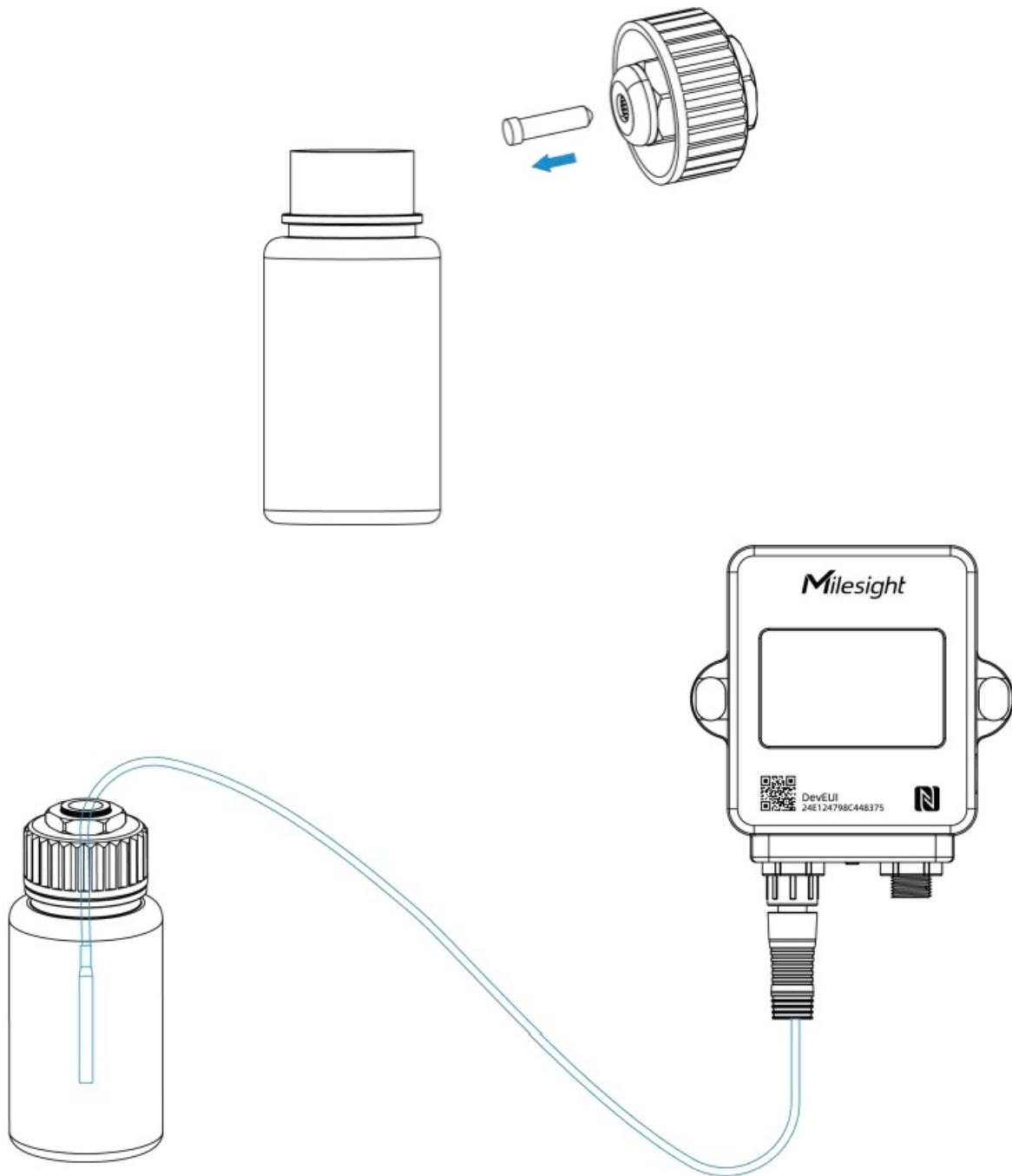
Device Payload

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**.

Basic Information

TS30x reports basic information about the sensor every time it joins the network

Channel	Type	Description
ff	01(Protocol Version)	01=>V1
	09 (Hardware Version)	01 00 => V1.0
	0a (Software Version)	01 01 => V1.1
	0b (Power On)	Device is on
	0f (Device Type)	00: Class A, 01: Class B, 02: Class C
	16 (Device SN)	16 digits

Example:

ff0bff ff0101 ff16 6723d29626820016 ff090100 ff0a0101 ff0f00					
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	0b	ff	ff	01	01 (V1)

	(Power On)	(Reserved)		(Protocol Version)	
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	16 (Device SN)	6723d29626 820016	ff	09 (Hardware version)	0100 (V1.0)
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	0a (Software version)	0101 (V1.1)	ff	0f (Device Type)	00 (Class A)

Sensor Data

TS30x reports sensor data according to reporting interval (10 min by default).
Note: CH1=Left channel of TS301/TS302, CH2=Right channel of TS302.

Item	Channel	Type	Description
Battery Level	01	75	UINT8, Unit: %, [1-100]
Temperature (CH1)	03	67	INT16/10, Unit: °C
Magnet Switch (CH1)	03	00	UINT8, 00: closed, 01: open
Temperature (CH2)	04	67	INT16/10, Unit: °C
Magnet Switch (CH2)	04	00	UINT8, 00: closed, 01: open
Threshold Alarm (CH1)	83	67	3 Bytes, Temperature(2B) + Alarm Status (1B) Temperature: INT16/10, Unit: °C Alarm Status: 00 -Alarm dismiss, 01 -Alarm
Threshold Alarm (CH2)	84	67	3 Bytes, Temperature(2B) + Alarm Status (1B) Temperature: INT16/10, Unit: °C Alarm Status: 00 -Alarm dismiss, 01 -Alarm
Temperature_chan ge Alarm (CH1)	93	d7	5 Bytes, Temperature(2B) + Temperature_change(2B) + 02 Temperature: INT16/10, Unit: °C Temperature_change: INT16/100, Unit: °C
Temperature_chan ge Alarm (CH2)	94	d7	5 Bytes, Temperature(2B) + Temperature_change(2B) + 02 Temperature: INT16/10, Unit: °C Temperature_change: INT16/100, Unit: °C

Periodic Packet

017564 0367f900 040001					
Channel	Type	Value	Channel	Type	Value
01	75 (Battery)	64 => 100%	03	67 (Temperature of Left Channel)	f9 00 => 00 f9 =>249/ 10 =24.9°C

Channel		Type	Value
04		00(Magnet Switch of CH2)	01 => open

Note: When the channel does not connect any sensor, it will report periodic packet as 030001 (CH1 no sensor) or 040001 (CH2 no sensor).

Temperature Threshold Alarm Packet

8367 5201 01		
Channel	Type	Value
83	67 (Temperature)	52 01 => 01 52 => 338/10 = 33.8°C 01 => Temperature Threshold Alarm

Temperature_change Alarm Packet

94d7 4e01 c602 02		
Channel	Type	Value
94	d7	Temperature: 4e 01 => 01 4e => 334/10 = 33.4°C Temperature_change: c6 02 => 02 c6 => 710/100=7.1°C 02 => Temperature_change Alarm

Magnet Switch Status Change Alarm Packet

040001		
Channel	Type	Value
04	00(Magnet Switch of CH2)	01 => open

Downlink Commands

TS30x supports downlink commands to configure the device. The application port is 85 by default.

Note: CH1=Left channel of TS301/TS302, CH2=Right channel of TS302.

Channel	Type	Description
ff	10 (Reboot)	ff (Reserved)
	8e (Reporting Interval)	3 Bytes,

		Byte 1: 00 Byte 2-3: interval time, UNIT16, unit: min, [1-1440]
	02 (Collecting Interval)	2 Bytes, UINT16, unit: s
	17 (UTC Time Zone)	2 Bytes, INT16/10
	25 (Button Lock)	2 Bytes, 0000: disable, 0100: enable
	e9 (Time Type)	1 Byte, 00: 12-hours clock, 01: 24-hours clock
	2d (Screen)	1 Byte, 00: disable, 01: enable, ff: enable when temperature sensor is connected (default)
	ea (Temperature Calibration)	3 Bytes, Byte 1: 00-diable CH1, 80-enable CH1; 01-disable CH2, 81-enable CH2 Byte 2-3: calibration value, INT16/10, unit: °C
	eb (Temperature Unit)	1 Byte, 00: °C, 01: °F

		9 Bytes,
		Temperature threshold: CTRL(1B)+Min(2B)+Max(2B)+Alarm Reporting Times(2B)+Alarm Reporting Interval(2B)
		l CTRL:
		Bit2~Bit0:
		000=disable 001=below 010=above 011=within 100=below or above Bit5~Bit3:
		001=Temperature Threshold of CH1 010=Temperature Threshold of CH2 Bit6: 1=Alarm Enabled, 0=Alarm Disabled
		Bit7: 1=Alarm Dismiss Report Enabled, 0=Alarm Dismiss Report Disabled
		l Min/Max: UNIT16/10, unit: °C
		l Alarm Reporting Interval: UINT16, unit: min
	06 (Threshold Alarm)	**Temperature_change threshold:**

		CTRL(1B)+0000+Change_value(2B)+00000000 (4B)
		l CTRL:
		58=Temperature_change Threshold of CH1 Enabled 18=Temperature_change Threshold of CH1 Disabled 60=Temperature_change Threshold of CH2 Enabled 20=Temperature_change Threshold of CH2 Disabled
		l Change value: UNIT16/10, unit: °C
	68 (Data Storage)	00: disable, 01: enable
	69 (Data Retransmission)	00: disable, 01: enable
	6a (Data Retransmission Interval)	3 Bytes Byte 1: 00 Byte 2-3: interval time, unit:s range: 30~1200s (600s by default)

Example:

1. Set reporting interval as 20 minutes

ff8e001400		
Channel	**Type**	**Value**
ff	8e (Reporting Interval)	14 00 => 00 14 = 20 minutes

2. Reboot the device.

ff10ff		
Channel	**Type**	**Value**
ff	10 (Reboot)	ff (Reserved)

3. Set time zone.

ff17ecff		
Channel	**Type**	**Value**
ff	17	ec ff => ff ec = -20/10=-2 the time zone is UTC-2

4. Enable temperature threshold and set the threshold value as over 30°C.

ff06 ca 0000 2c01 01000200		
Channel	**Type**	**Value**
ff	06 (Threshold Alarm)	CTRL: ca =11 001 010 010 = above 001 =CH1 Temperature Threshold 1 = enable the Threshold Alarm, 1=Alarm Dismiss Report Enabled Max: 2c 01 => 01 2c => 300/10 = 30°C
		Alarm Reporting Times: 01 00=>00 01=1 Alarm Reporting Interval: 02 00=>00 02=2 mins

Historical Data Enquiry

TS30x 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	Description
fd	6b (Enquire data in time point)	4 Bytes, unix timestamp
	6c (Enquire data in time range)	Start time (4 bytes) + End time (4 bytes), Unix timestamp
	6d (Stop query data report)	ff
ff	6a (Report Interval)	3 Bytes, Byte 1: 01 Byte 2: interval time, unit: s, range: 30~1200s (60s by default)

Reply format:

Channel	Type	Description
fc	6b/6c	00: data enquiry success 01: time point or time range invalid 02: no data in this time or time range
20	ce (Historical Data)	9 Bytes Data time stamp (4 B) + Chn_mask (1 B)+CH1 Data(2B) + CH2 Data (2B)

Chn_mask:

Bit	7-4	3-0
	CH1 (Left Channel)	CH2 (Right Channel)
	0000=No 0001=Temperature Threshold Alarm 0010=Temperature Threshold Alarm Dismiss 0011=Temperature_change Threshold Alarm 0100=Temperature Periodic Report	

- 0101=Magnet Alarm
- 0110=Magnet Periodic 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 isdata stored in 17:00, it will upload these data. If not, it will search for data between 16:50 to17:10 and upload the data which is the closest to 17:00.

Example:

1. Enquire historical data between 2023/10/19 15:30:00 to 2023-10-26 15:30:00

Reply:

fd6c f8da3065 78153a65		
Channel	**Type**	**Value**
fd	6c (Enquire data in time range)	Start time: f8da3065=> 6530daf8 = 1697700600s =2023/10/19 15:30:00 End time: 78153a65 => 653a1578 = 1698305400s =2023-10-26 15:30:00

20ce 78153a65 6401000501			
Channel	**Type**	**Time Stamp**	**Value**
			Chn_mask: 64=>0110 0100 =CH1 is
	ce	78153a65 => 653a1578 =	Magnet Periodic Report, CH2 is
20	(Historical	1698305400s	Temperature Periodic Report
	Data)	= 2023-10-26 15:30:00	CH1: 0100 => Magnet switch open
			CH2: 0501=>0105= 261/10= 26.1 °C

FAQ

- **Q: What should I do if any hardware item is missing or \damaged?**
  - A: Contact your sales representative for assistance in replacing or repairing any missing or damaged hardware items.

Documents / Resources

[Milesight TS30x Lorawan Temperature Sensor](#) [pdf] User Guide
TS301, TS302, TS30x Lorawan Temperature Sensor, TS30x, Lorawan Temperature Sensor, Temperature Sensor

References

- **Ⓜ [Support : IoT Support](#)**
- **Ⓞ [GitHub - Milesight-IoT/SensorDecoders: Payload Codec for Milesight Sensors](#)**
- **[User Manual](#)**