Temperature Sensor

## Featuring LoRaWAN®

ATS30x

User Guide

Safety Precautions

Manufacturer 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 manufacturer will not be 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

ATS30x conforms with the essential requirements and other relevant provisions of the CE, FCC, and RoHS.
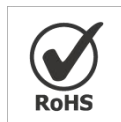
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Revision History

Date	Doc Version	Description
October 23, 2023	V1.0	Initial version

Contents

1. Product Introduction

1.1 Overview

ATS30x 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. ATS30x prioritizes security and reliability, ensuring traceable data and effortless data exports for seamless integration.

ATS30x is designed for measuring a wide range of temperature in harsh environments and transmitting data using LoRaWAN® technology. With this low power consumption technology, ATS30x can maintain a long operational life with its embedded batteries. Combining with LoRaWAN® gateway and IoT Cloud solution, users can manage all sensor data remotely and visually.

ATS30x is widely used for temperature monitoring applications like food processing, cold chain storage of food or medicine, etc.

1.2 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 environment.
- 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 IoT Cloud.

2. Hardware Introduction

2.1 Packing List
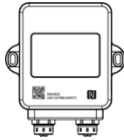
1 × TS30x Device

2 x Mounting Kits

2 x Screw Caps

1 x Type-C Cable &

Power Adapter (Optional)

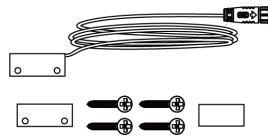1 × Quick Start Guide

1 × Warranty Card

Optional Sensor and Sensor Accessories:

PT100

Temperature Probe

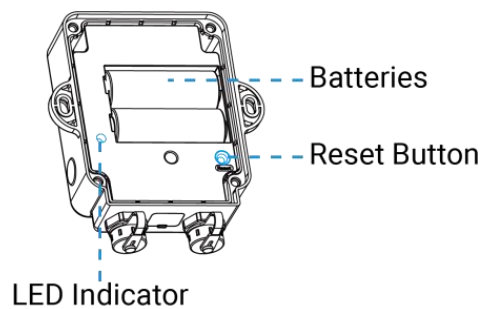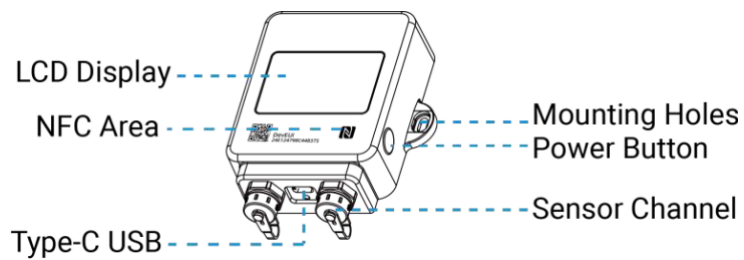Magnet Switch Sensor

(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.**

2.2 Hardware Overview

2.3 Button Descriptions

Power Button

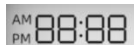| Function	Action	LCD Display
Power On/Off	Press and hold the power button for more than 3 seconds	Power On: All icons show 3s
		Power Off: Off
Update Temperature	Quick press the power button once	Refresh the latest temperature of the current channel
Switch Temperature Display (TS302 with both temperature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

2.4 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

2.5 Dimensions (mm)
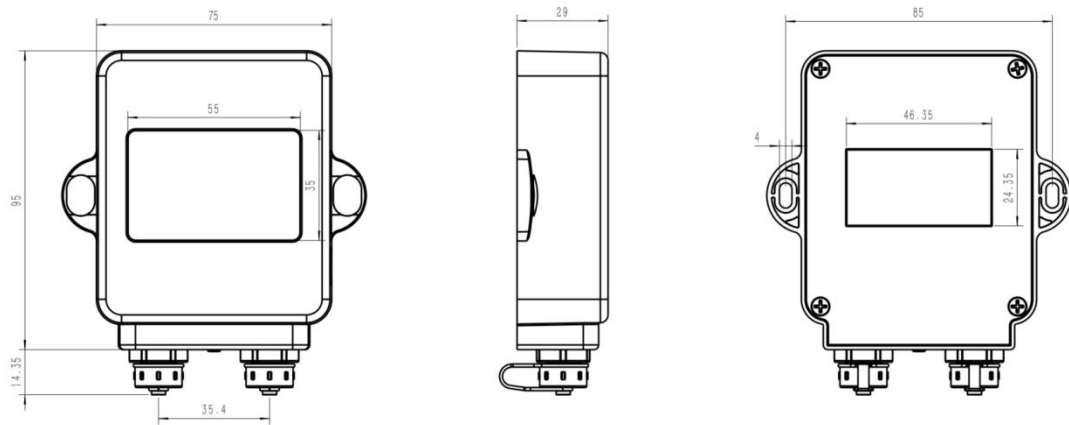
3. Operation Guide

3.1 Configuration

3.1.1 Configured By NFC

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

2. Open "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.

3.1.2 Configured by USB

1. Download ToolBox software from 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.
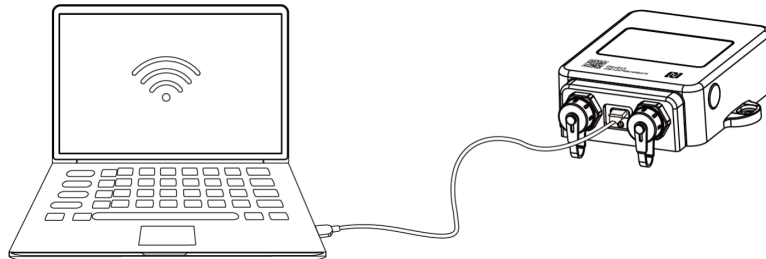
3.2 LoRaWAN Settings

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.

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 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.

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, seperating 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

3.3 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.

3.4 Basic Settings

General Settings	︿
Reporting Interval	− 10 + min
Data Storage ⓘ	◯
Temperature Unit ⓘ	
°C	⌄
Button Lock ⓘ	⬤
24-Hour Clock	⬤
Change Password	◯

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 Retransmission	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.

3.5 Advanced Settings

3.5.1 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.

3.5.2 Threshold Settings

TS30x can set temperature threshold alarms, temperature change alarms and so on. Enable the threshold settings and enter the threshold. ATS30x 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.

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.

3.5.3 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.
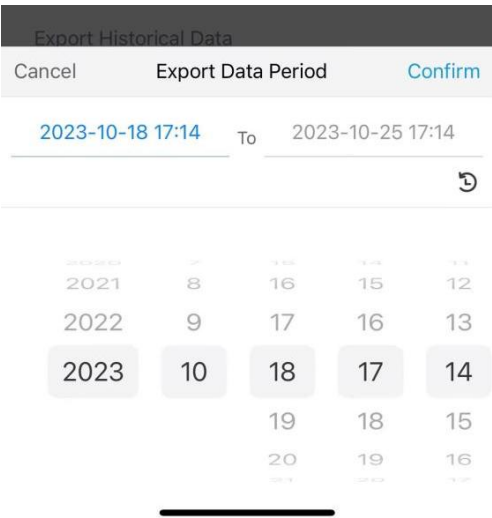
- **Export as PDF file**

ATS30x 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.
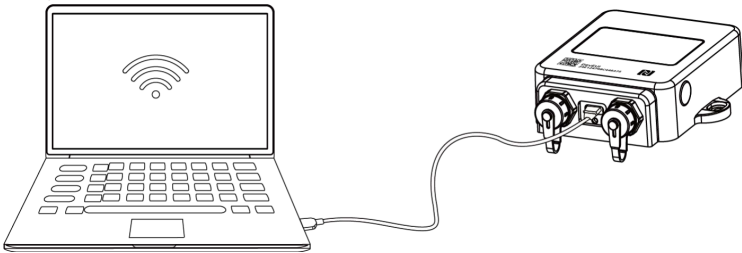
2. Copy the PDF file to your PC's another disk folder to get the data.
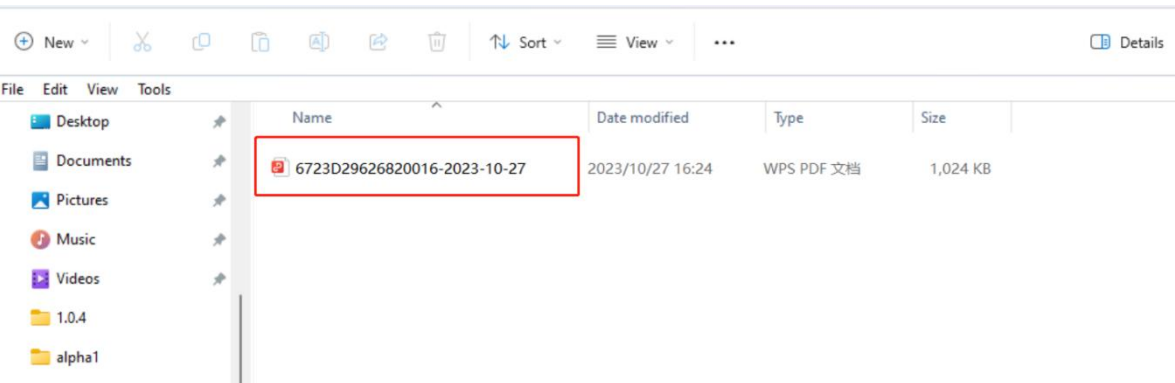
Note:

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.
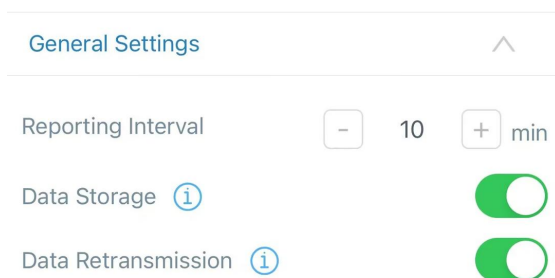
3.5.4 Data Retransmission

ATS30x 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.
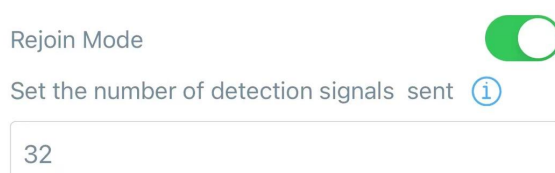
Here are the steps for retransmission:

1. Ensure the device time is correct, please refer Time Synchronization to sync the time.

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

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).

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.

3.6 Maintenance

3.6.1 Upgrade

1. Download firmware from website to your smartphone or computer.

2. 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 ToolBox App supports the upgrade feature.

Firmware Version	V1.1
Hardware Version	V1.0
Manual Upgrade	

Browse

3.6.2 Backup

ATS30x 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.

3.6.3 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.
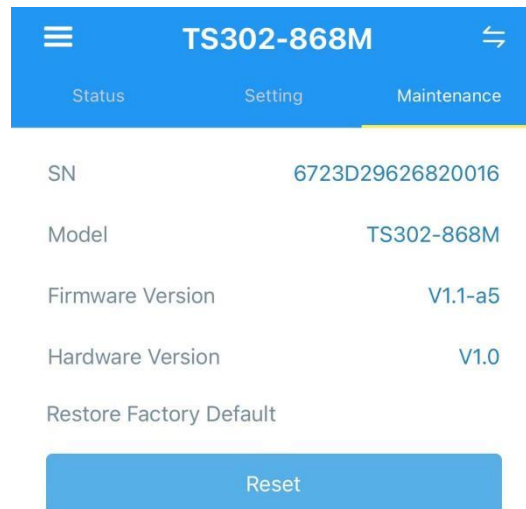
Reset via ToolBox Software: Go to **Maintenance > Backup and Reset** to click **Reset** button.
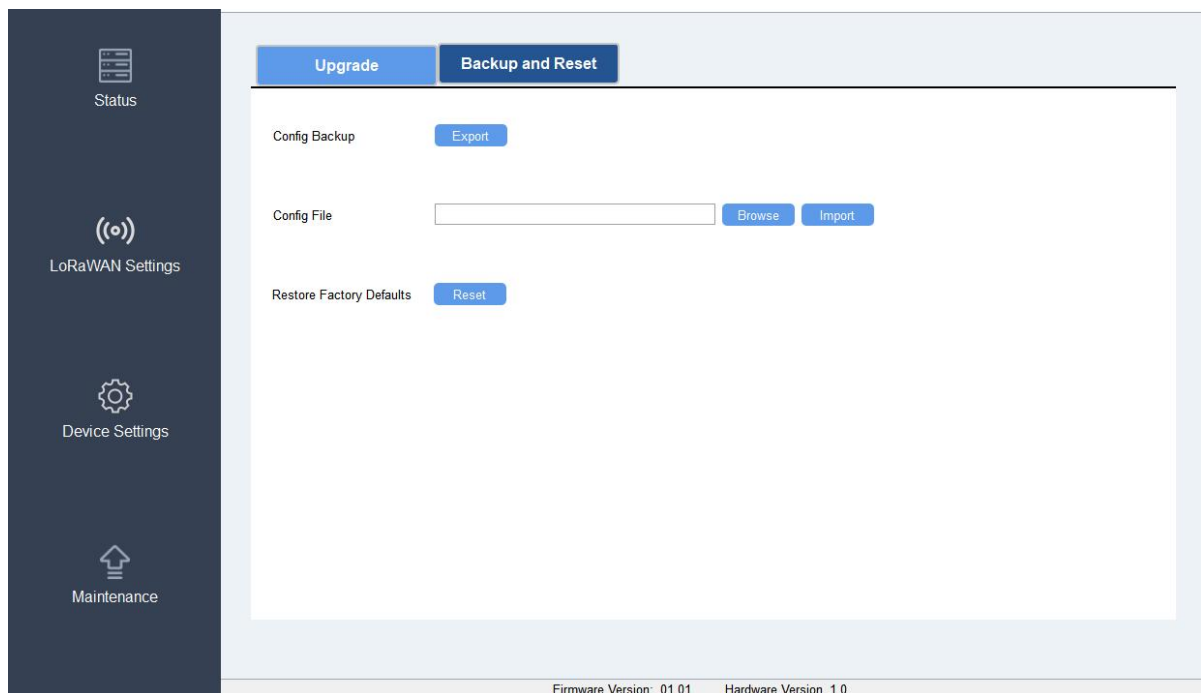
Note: Reset operation will not clean the stored data, please click Data Cleaning or Clear button to clear data if necessary.
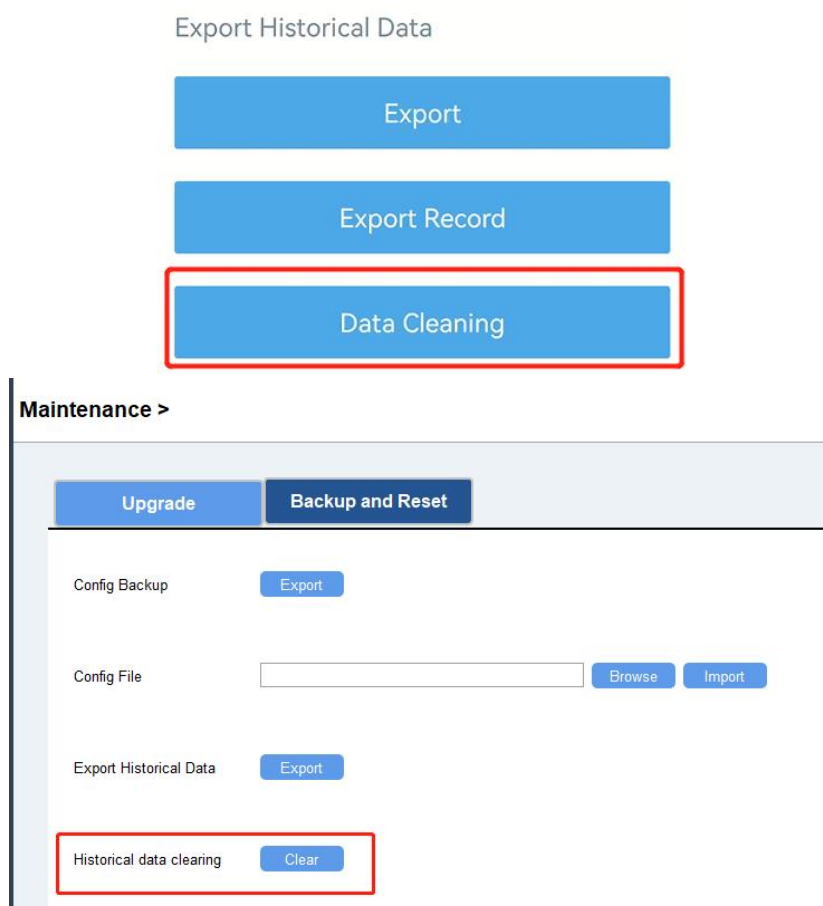
4. Installation

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.
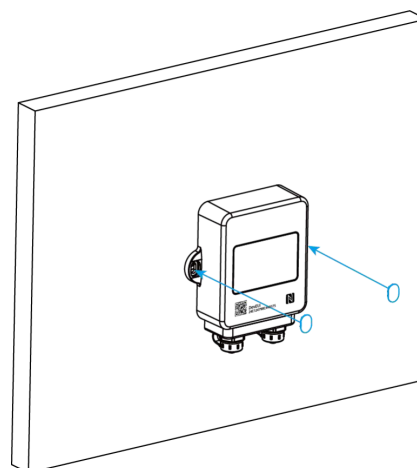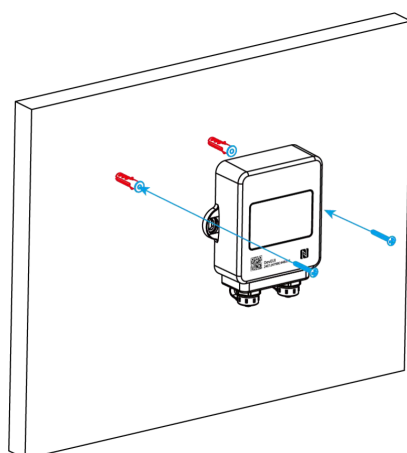
● **Magnetic Mounting (Optional):**

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.
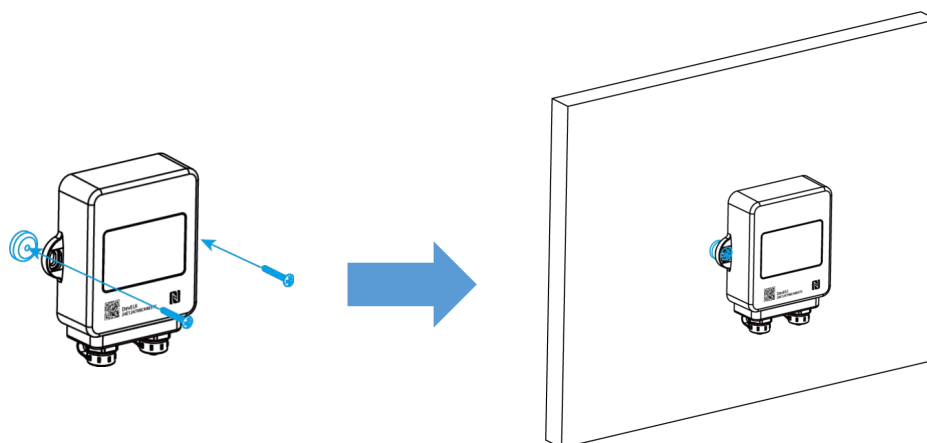
Magnet Switch Installation

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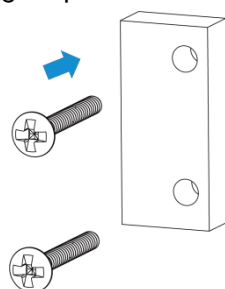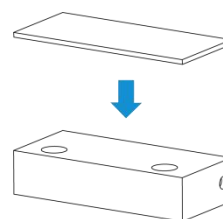
Fixed by Screws   Fixed by 3M Tape
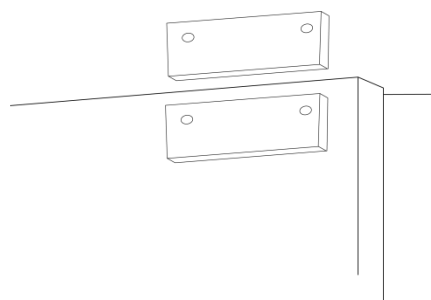
Installation Example

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.
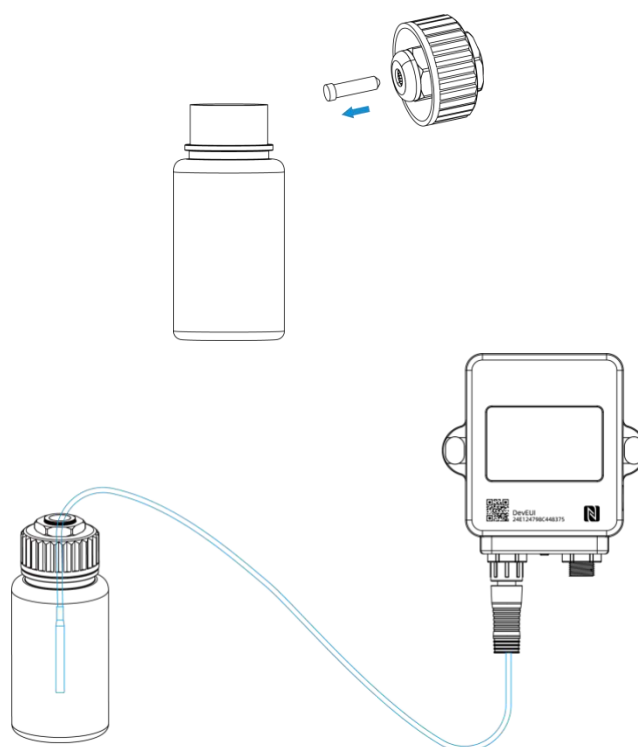
5. Device Payload

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.

5.1 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)	6723d29626820016	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)

5.2 Sensor Data

ATS30x reports sensor data according to reporting interval (10 min by default)

Note: CH1=Left channel of ATS301/ATS302, CH2=Right channel of ATS302.

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_change Alarm (CH1)	93	d7	5 Bytes, Temperature(2B) + Temperature_change(2B) + 02 Temperature: INT16/10, Unit: °C Temperature_change: INT16/100, Unit: °C
Temperature_change Alarm (CH2)	94	d7	5 Bytes, Temperature(2B) + Temperature_change(2B) + 02 Temperature: INT16/10, Unit: °C Temperature_change: INT16/100, Unit: °C

Example:

1. 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).

2. 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

3. 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

4. Magnet Switch Status Change Alarm Packet

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

5.3 Downlink Commands

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

Note: CH1=Left channel of ATS301/ATS302, CH2=Right channel of ATS302.

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
	06 (Threshold Alarm)	9 Bytes, **Temperature threshold:** CTRL(1B)+Min(2B)+Max(2B)+Alarm Reporting Times(2B)+Alarm Reporting Interval(2B) ● 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 ● Min/Max: UNIT16/10, unit: °C ● Alarm Reporting Interval: UINT16, unit: min **Temperature_change threshold:**

		CTRL(1B)+0000+Change_value(2B)+00000000 (4B)
		• 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
		• 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

5.4 Historical Data Enquiry

ATS30x 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 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 between 2023/10/19 15:30:00 to 2023-10-26 15:30:00.

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

Reply:

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

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

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