Milesight

AT101

Outdoor Asset Tracker

User Guide

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Chapter 1. Preface

Copyright Statement

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Safety Instruction

These instructions are intended to ensure that user can use the product correctly to avoid danger or property loss. Milesight will not shoulder responsibility for any loss or damage resulting from not following the instructions of this operating guide.

CAUTION:
Injury or equipment damage may be caused if any of these cautions are neglected.

- The device must not be disassembled or remodeled in any way.
- In order to protect the security of the device, please change the device password when first configuration. Default password is 123456.
- The device is not intended to be used as a reference sensor, and Milesight won't 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 in where the temperature is below/above the operating range.

Revision History

Release Date	Version	Description
June 19, 2023	V 1.0	Initial version

Chapter 2. Product Introduction

Overview

Milesight AT101 is an exceptional outdoor tracker that utilizes GNSS and Wi-Fi AP MAC Address Scanning to provide highly accurate positioning data. Additionally, it has tilt and temperature sensors for more extensive data collection and application in various scenarios. The device is designed with IP67 and IK09 ratings to cater to different environments.

AT101 collaborates with Milesight LoRaWAN® gateway and mainstream LoRaWAN® network servers with low power consumption, allowing it to operate for over 15 years with twice-daily reports. By integrating with Milesight LoRaWAN® gateway and Milesight IoT Cloud solution, users can remotely and visually manage all sensor data.

AT101 can be used in Patrol Cars in Community, Construction Site, Warehouses, Constructional Bin, Golf cart, Farm Animals, etc.

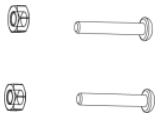
Features

- Equipped with high-accurate GNSS positioning and cooperate with Wi-Fi positioning
- Built-in 3-axis accelerometer sensor to monitor device tilt status and movement
- Equipped with NTC temperature sensor enabling environmental detection
- Support IP67 and IK09 rating protections for harsh environment application
- Built-in replaceable batteries and works for up to over 15 years without replacement
- Provide integrated structure and anti-theft design for wireless and safe deployment
- Incorporate UV protection to be suitable for outdoor environments
- Support Geofencing for targeted messaging to secure the assets and area
- Multiple and switchable modes provide motion tracking, periodic tracking, and timing tracking
- Store locally 1,000 historical records and support retransmission to prevent data loss
- Built-in NFC and Bluetooth for easy configuration
- Compliant with standard LoRaWAN® gateways and network servers
- Quick and easy management with Milesight IoT Cloud solution

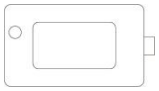
Chapter 3. Hardware Introduction

Packing List

1 × AT101 Device



2 × Mounting Kits



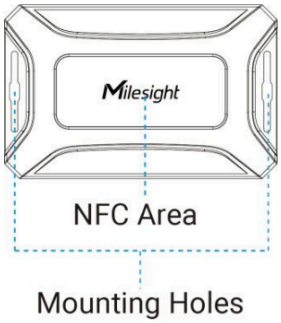
1 × 3M Tape

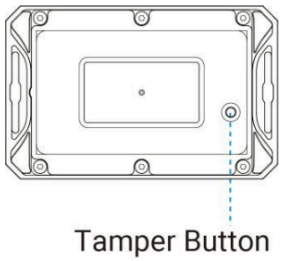
1 × Quick Guide

1 × Warranty Card

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

Hardware Overview





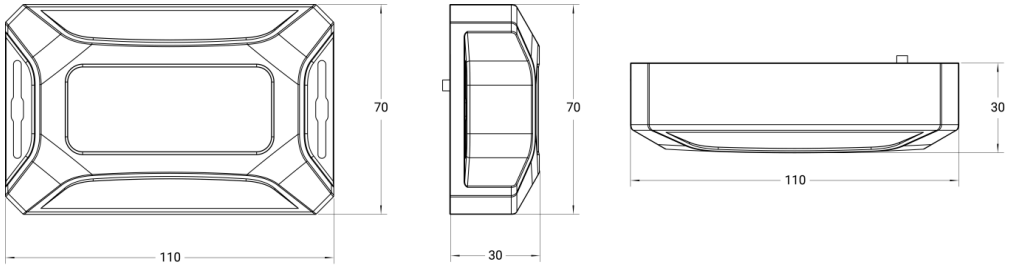
Button and LED Indicator

There is a LED indicator and a power button inside the device for emergency reboot or reset.

Function	Action	LED Indicator
Power On	Press and hold the button for more than 3 seconds.	Off → On
Power Off		On → Off

Function	Action	LED Indicator
Reset to Factory Default	Press and hold the button for more than 10 seconds.	Blinks quickly
Check On/Off Status	Quickly press the power button once.	Light On: device is on.
		Light Off: device is off.

Dimensions(mm)



Chapter 4. Quick Start

Access the Sensor via NFC

1. Download and install “Milesight ToolBox” App from Google Play or Apple Store on an NFC-supported smartphone.
2. Enable NFC function on the smartphone.
3. Launch Milesight ToolBox, and select the default mode as NFC.
4. Attach the smart phone with NFC area to the device and click to read device information. Basic information, data, and settings of the device will be shown on the Milesight ToolBox App if it’s recognized successfully.
5. Adjust the settings on the App, then attach the smartphone with NFC area to the device and click **Write** to write the settings. After writing, reread the device to check if the configuration is written well.

Note:

- Ensure the location of smartphone NFC area and it’s recommended to take off phone case.
- If the smart phone fails to read/write configurations via NFC, keep the phone away and back to try again.
- The default device password is 123456. Please change a new password for security.

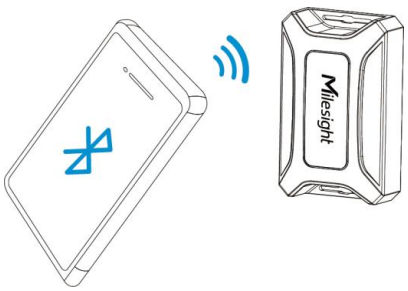
Access the Sensor via Bluetooth

1. Download and install “Milesight ToolBox” App from Google Play or Apple Store on an Bluetooth-supported smartphone.
2. Enable Bluetooth and location functions on the smartphone.
3. Launch Milesight ToolBox, and select the default mode as Bluetooth.

4. Click to scan the devices around and select the target device to connect. The default Bluetooth name is `AT101 -XXXXXX` (5th to 11th of device SN) and the default device password is 123456. **If the device is off, please turn on the device via NFC first.**
5. After connected, the basic information, data, and settings of the device will be shown on the Milesight ToolBox App if it's recognized successfully.
6. Adjust the settings on the App, then click **Write** to write the settings. After writing, reread the device to check if the configuration is written well.

Note:

- If the Bluetooth password is entered for over 1 min, please re-enter the password.
- The waiting interval will be increased gradually if the failed password attempts reach for 5 times continuously.
- The Bluetooth connection will be terminated if there's no data interaction within 3 minutes. Please connect again.
- The device can connect to only one phone via Bluetooth. For example, if the device is connected to smart phone A via Bluetooth, the connection will be terminated after it is connected to smartphone B.
- The default device password is 123456. Please change a new password for security.



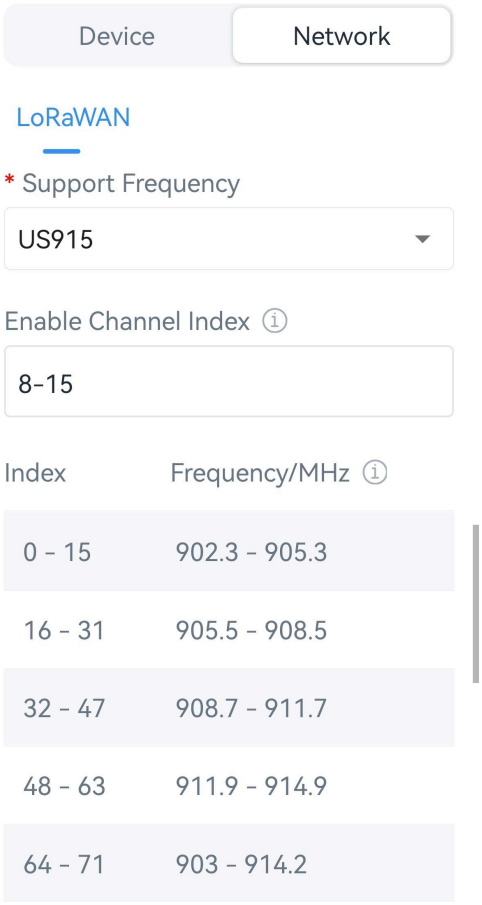
Configure the Network Setting

1. Go to **Network** settings page, select the join type as OTAA or ABP as required.

Note:
OTAA mode is required if you connect device to Milesight IoT Cloud.

2. Select supported frequency the same as LoRaWAN® gateway.

Note:
Set the channel index as 8-15 for US915 or AU915 if using default settings of Milesight gateways.



3. Keep other settings by default and click **Write** to save the settings.

Chapter 5. Operation Guide

LoRaWAN® Settings

Parameter	Description
Device EUI	Unique ID of the device which can be found on the device. **Note:** please contact sales for device EUI list if you have many units.
App EUI	The default App EUI (join EUI) is 24E124C0002A0001.
Application Port	The port used for sending and receiving data, the default port is 85.
LoRaWAN® Version	V1.0.2, V1.0.3, V1.0.4 are available.
Work Mode	It's fixed as Class A.
Confirmed Mode	If the device does not receive ACK packet from network server, it will resend data once.
Join Type	OTAA and ABP mode are available. **Note:** it's necessary to select OTAA mode if connecting device to Milesight IoT Cloud.
Application Key	Appkey for OTAA mode, default value: "Device EUI" + "Device EUI" (since Q4 of 2025). Example: 24e124123456789024e1241234567890

Parameter	Description
	Note: • The default value of earlier devices is 5572404C696E6B4C6F52613230313823. • Please contact sales before purchase if you require random App Keys.
Network Session Key	Nwkskey for ABP mode, the default is 5572404C696E6B4C6F52613230313823.
Application Session Key	Appskey for ABP mode, the default is 5572404C696E6B4C6F52613230313823.
Device Address	DevAddr for ABP mode, default is the 5th to 12th digits of SN.
Rejoin Mode	Reporting interval≤35 mins: the device will send a specific number of Link-CheckReq 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 Link-CheckReq 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:** 1. Only OTAA mode supports rejoin mode. 2. The actual sending number is **Set the number of packets sent** +1.
Supported Frequency	Enable or disable the frequency to send uplinks. If frequency is one of CN470/AU915/US915, enter the index of the channel to enable in the input box, making them separated by commas. **Examples:**

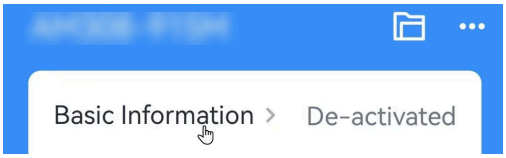
Parameter	Description
	1, 40: Enabling Channel 1 and Channel 40 1-40: Enabling Channel 1 to Channel 40 1-40, 60: Enabling Channel 1 to Channel 40 and Channel 60 All: Enabling all channels Null: Indicate that all channels are disabled
ADR Mode	Enable or disable network server to adjust Spreading Factor, Bandwidth an Tx Power to optimize data rates, airtime and energy consumption in the network.
Spreading Factor	If ADR mode is disabled, the device will send uplink data following this SF parameter. The higher the spreading factor, the longer the transmission distance, the slower the transmission speed and the more the consumption.
Tx Power	Tx power (transmit power) refers to the strength of the outgoing signal transmitted by the device. This is defined by LoRa alliance.
RX2 Data Rate	RX2 data rate to receive downlinks.
RX2 Frequency	RX2 frequency to receive downlinks. Unit: Hz

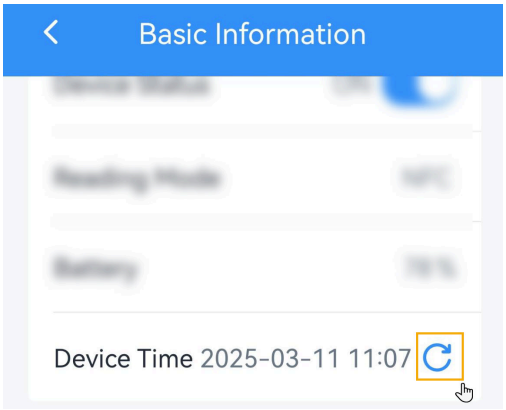
Time Synchronization

This section describes how to sync the time of the device.

Sync via ToolBox App

After reading the device via Milesight ToolBox App, sync the device time with time zone from the smart phone.





Sync via Network Server

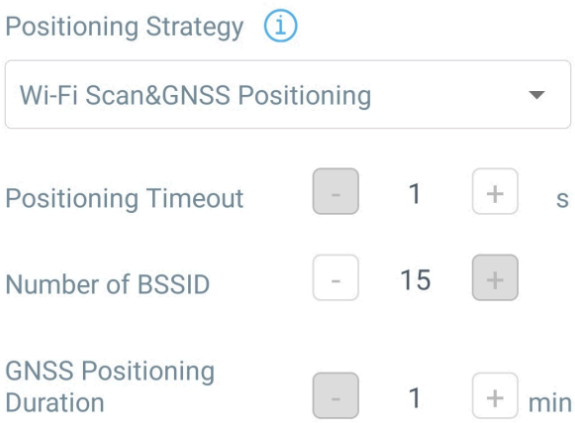
This requires to ensure the LoRaWAN® network server supports device time synchronization feature. Example: Milesight gateway embedded NS.

1. Set the LoRaWAN® version of the device to V1.0.3.
2. Connect the device to the network server. After joining the network, the device will send a DeviceTimeReq MAC command to enquire the time from network server.

Note:

- This only supports to get the time but not time zone. The time zone can be configured by ToolBox App or downlink command.
- The device will send the DeviceTimeReq command every 5 days since the last sync.

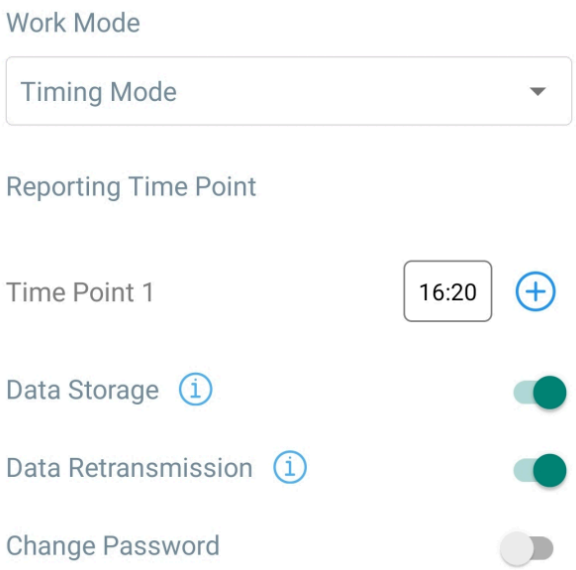
Positioning Settings



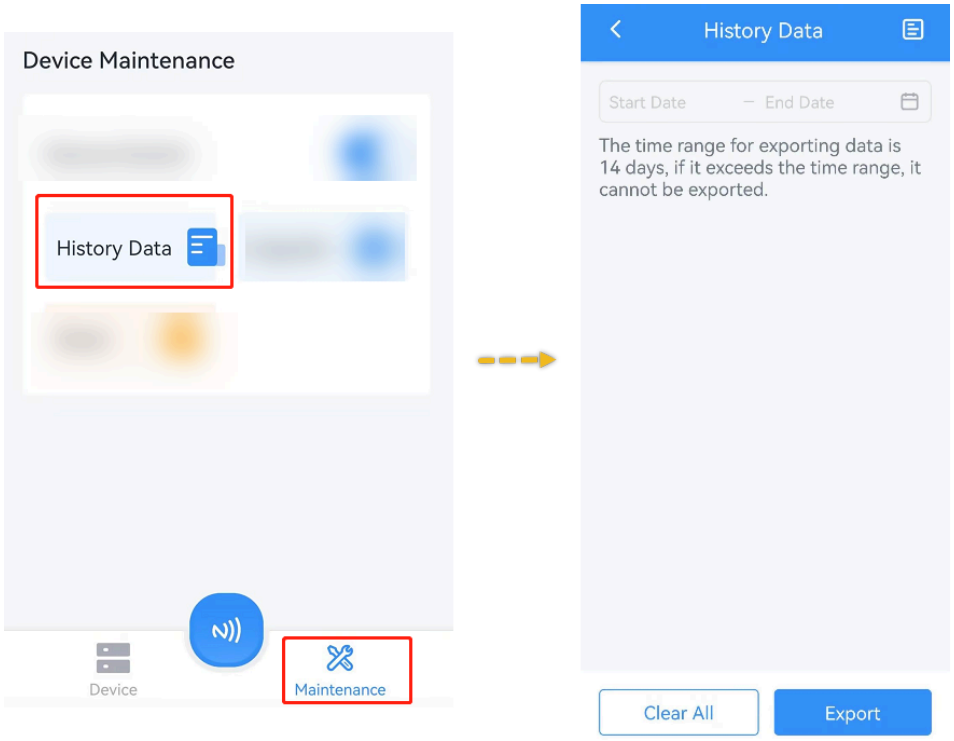
Parameters	Description
Positioning Strategy	Select the strategy for each time's positioning. **GNSS Positioning:** locate the device position via GNSS. This mode is used on outdoor open environment. **Wi-Fi Scan:** locate the device position via Wi-Fi scan. This mode is used on crowded streets or indoor environment. **Wi-Fi Scan&GNSS Positioning:** locate the device position via Wi-Fi scan first; if this failed, switch to GNSS to locate again. This mode will consume the most power. **Note:** When Wi-Fi scan is failed, the device will still upload the Wi-Fi scan results.
Positioning Timeout	When the device fails to scan for a sufficient numbers of Wi-Fi BSSID within this timeout, it will stop scanning.
Number of BSSID	The number of BSSID which the device needs to upload each positioning.
GNSS Positioning Duration	When the device fails to get location via GNSS within this duration, it will stop locating and a data packet of failed positioning will be reported. When report-

Parameters	Description
	ing the periodic data packets, it will try to obtain location data again. Default: 3 mins, range: 1~5 mins.

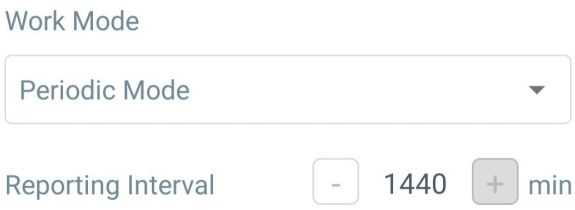
General Settings



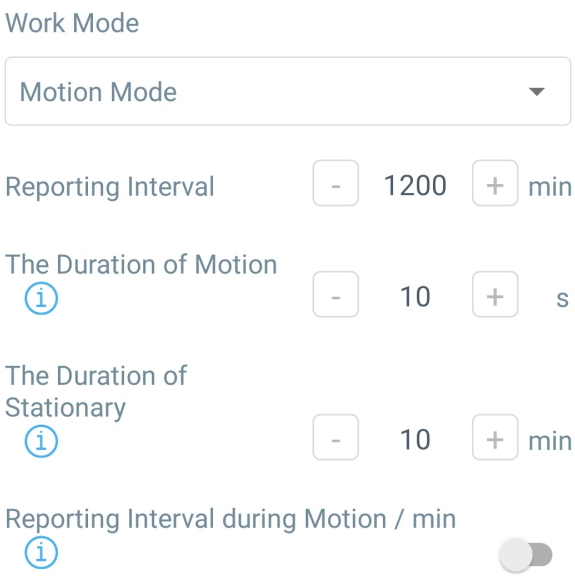
Parameters	Description
Work Mode	Select the work mode to report location data to network server. The device supports the following operating modes: Periodic Mode: report data periodically. Motion Mode: report data according to device motion status. Timing Mode: report data as scheduled.
Data Storage	Disable or enable to store **periodic report** data locally. The stored data can be exported as CSV format file and saved to smartphone via ToolBox.

Parameters	Description
	 **Note:** 1. It is necessary to sync the time to ensure the data is stored in correct time. 2. The device will still store the data even the network status is de-activated. 3. ToolBox App can only export the last 14 days' data at most.
Data Retransmission	Disable or enable data retransmssion. When the device detects the network status is de-activated via Rejoin Mode, the device will record a data lost time point and re-transmit the lost data after device re-connects to the network.

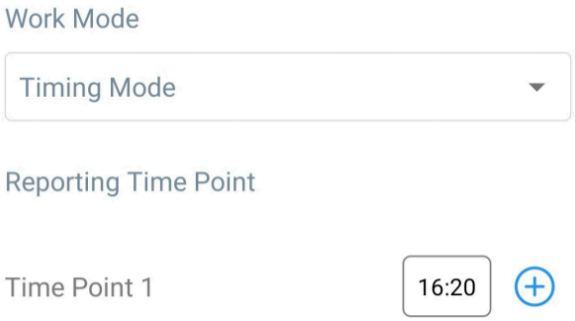
Parameters	Description
	Note: 1. This setting only takes effect when Data Storage is enabled. 2. If the device is rebooted or re-power when data retransmission is not completed, the device will re-send all retransmission data again after device is reconnected to the network. 3. If the network is disconnected again during data retransmission, it will only send the latest disconnected data. 4. The default report data retransmission interval is 600s, this can be changed via downlink command. 5. The reported format of retransmission data will include time-stamps and is different from periodic report data. 6. This setting will increase the uplink frequencies and shorten the battery life.
Change Password	Change the password for ToolBox App to write the device via NFC or login the device via Bluetooth.



Parameters	Description
Work Mode	**Periodic Mode**: report data periodically.
Reporting Interval	The interval to locate the device position. After located, the device will report the data to network server. Default: 1440 mins, range: 1~1440 mins



Parameters	Description
Work Mode	**Motion Mode**: report data according to device motion status.
Reporting Interval	The interval to locate the device position when device is in stationary. After located, the device will report the data to network server. Default: 1440 mins, range: 1~1440 mins
The duration of Motion	When device is detected to move beyond this duration, it will locate the device position and upload a location data packet.
The duration of stationary	When device is detected to stop moving beyond this duration, it will locate the device position and upload a location data packet.
Report Interval during Motion/Min	The interval to locate the device position when device is in motion. After located, the device will report the data to network server.



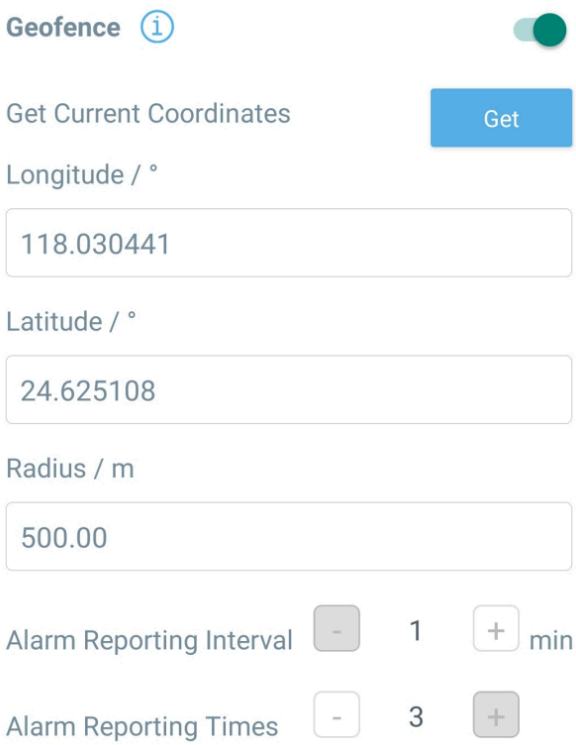
Parameters	Description
Work Mode	**Timing Mode**: report data as scheduled. Ensure the device time is synced via ToolBox before switching to this mode.
Reporting Time Point	One device can set at most 5 time points of every day to report data on Timing Mode.

Threshold Settings

Geofence

When GNSS positioning is enabled, AT101 supports to set a round geofence range. AT101 will detect whether the location is within the radius range of preset coordinates. If the device is out of the range, it will upload threshold alarm packets; if it returns back to the range, it will upload a threshold alarm dismiss packet.

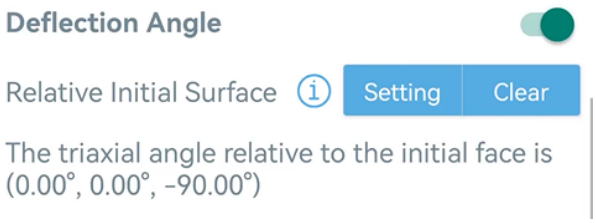
Note:
after Geofence is enabled, it only works after next positioning.



Parameters	Description
Get Current Coordinates	Get current device coordinates for reference.
Radius/m	The geofence radius based on the coordinates. **Note:** The alarm is activated when the device is located 10 meters further than the set radius value; the alarm is dismiss when the device is located 10 meters closer than the set radius value.
Alarm Reporting Interval	After the threshold is triggered, the device will locate according to this reporting interval to detect if the threshold is still triggered.
Alarm Reporting Times	Alarm packet reporting times if the threshold is still triggered.

Tilt Threshold

When the offset angle of any axis is more than 20° based on initial surface, the device will upload a tilt alarm packet; when offset angle of all 3 axis is within 20° based on initial surface, the device will upload an alarm dismiss packet.



Parameters	Description
Deflection Angle	Enable or disable to upload tilt alarm and alarm dismiss packets.
Setting	Click to set current position of device as initial position.
Clear	Change the initial position back to (0.00°, 0.00°, -90.00°)

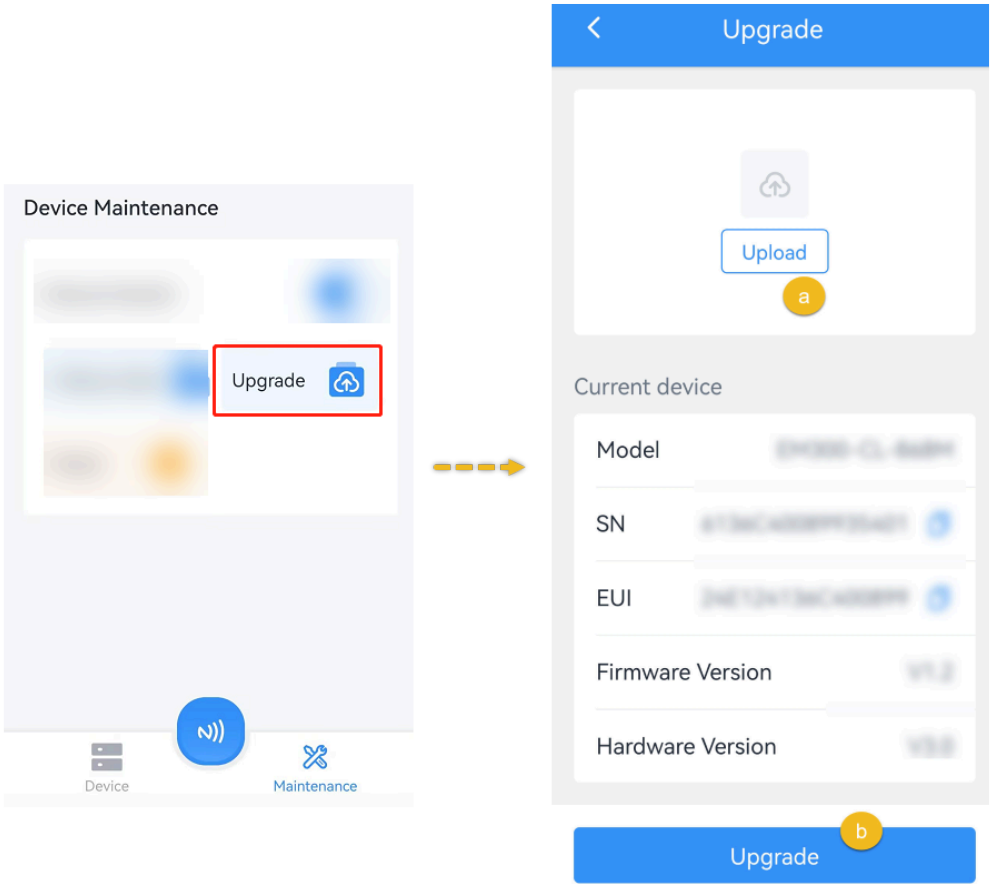
Maintenance

Upgrade

This chapter describes the steps to upgrade the device via ToolBox App.

1. Download firmware from Milesight official website to your smartphone.
2. Read the target device via ToolBox App, click **Upgrade** to upload the firmware file.
3. Click **Upgrade** to upgrade the device.

> **Note:**
> Operation on ToolBox is not supported during an upgrade.



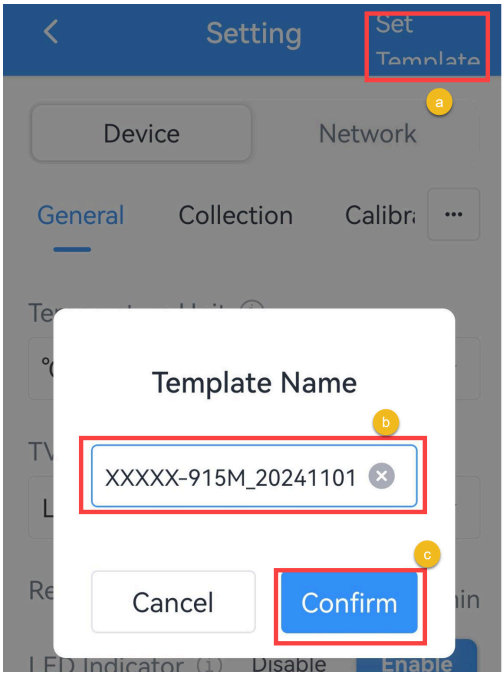
Backup and Restore

This device supports configuration backup for easy and quick device configuration in bulks. Backup and restore is allowed only for devices with the same model and frequency band.

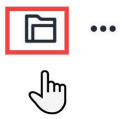
Backup and Restore

Step 1: Launch ToolBox App, access the device via NFC or bluetooth to read the configuration.

Step 2: Edit the configuration as required, click **Set Template** to save current configuration as a template to the ToolBox App.



Step 3: Go to **Device >Template** page.

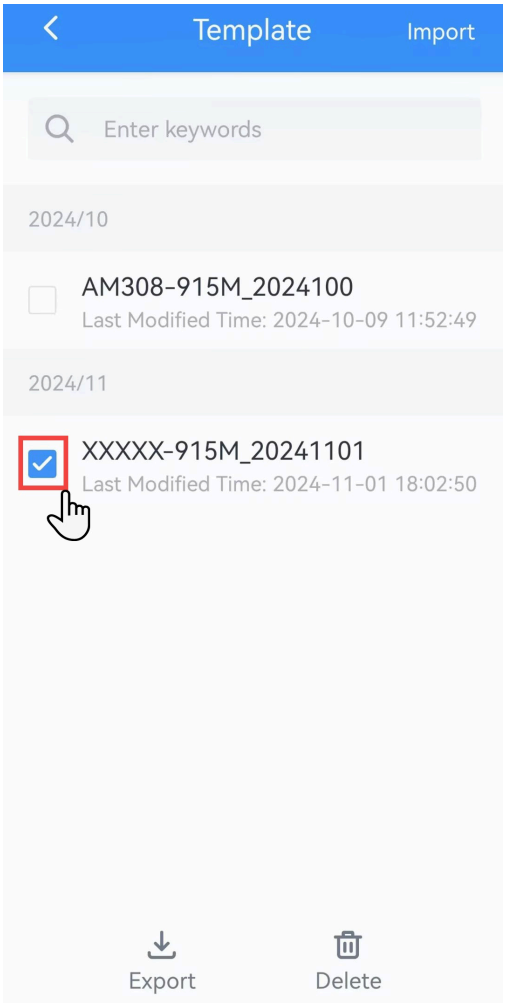


Step 4: Select and click the target template, click **Write** to import the configuration to target devices.

Export and Delete Template

1. Check the box of the target template.

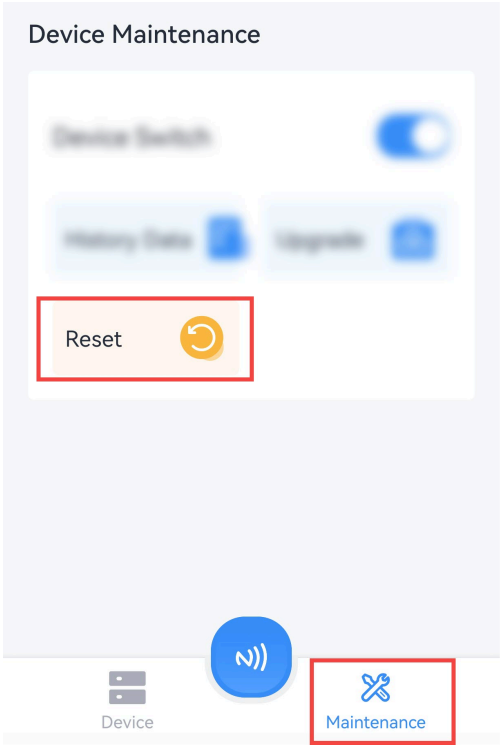
2. Click **Export** to export this template as JSON format file and save it to the smartphone, click **Delete** to delete this template from your ToolBox App.



Reset to Factory Default

Via Hardware: Hold on the reset button for more than 10s until the LED indicator quickly blinks.

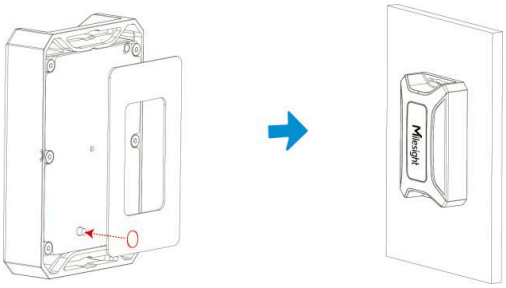
Via ToolBox App: Click **Reset** and attach the smartphone to device to reset the device.


Device Maintenance
Reset
Device
Maintenance

Chapter 6. Installation

Fixed by 3M Tape

Paste 3M tape to the back of device, tear the other side and attach it to the measured object. (Align the hole with the tamper button when pasting)



Note:

1. Please ensure the object surface is dry, smooth, and grease-free.
2. Before installation, it is recommended to wipe the object surface with a clean cloth.
3. After adhering the device to the measured object, press firmly to ensure it is fully adhered.
4. If the conditions do not meet the above requirements, choose an alternative installation method, such as screw fixation.

Fixed by Mounting Kits

Step 1: Drill two holes on the measured object according to the location of device mounting holes.

Step 2: Put the device on the object, fix it to the object with two mounting screws and and screw the bolts into the mounting screws from the other side of the object.

Chapter 7. Uplink and Downlink

Overview

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

Channel1	Type1	Data1	Channel2	Type2	Data2	Channel3	...
1 Byte	1 Byte	N Bytes	1 Byte	1 Byte	N Bytes	1 Byte	...

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

Uplink Data

This chapter describes the reported data of the device.

Item	Channel	Type	Byte	Description
Power On	ff	0b	1	Device is on
Protocol Version	ff	01	1	Example: 01=V1
Hardware Version	ff	09	2	Example: 03 10 = V3.1
Software Version	ff	0a	2	Example: 03 01 = V3.1
Device Type	ff	0f	1	00: Class A, 01: Class B, 02: Class C, 03: Class C to B
Serial Number	ff	16	8	16 digits
Battery Level	01	75	1	UINT8, Unit: %
Temperature	03	67	2	INT16/10, Unit: °C
GNSS Location	04	88	9	**Byte 1-4:** latitude/1000000 **Byte 5-8:** longitude/1000000 **Byte 9:** Geofence + motion status Bit 7-4: Geofence • 0=within geofence • 1=out of geofence

Item	Channel	Type	Byte	Description
				• 2=geofence disabled • 3=unknown Bit 3-0: Motion status • 0=unknown • 1=start moving • 2=in motion • 3=stop moving
Device Position	05	00	1	00: Normal (Offset angle < 20°) 01: Tilt (Offset angle ≥ 20°)
Wi-Fi Location	06	d9	9	**Byte 1:** id (00~FF), it will plus one every scan **Byte 2-7:** Wi-Fi BSSID (MAC address) **Byte 8:** RSSI, unit: dBm, INT8 **Byte 9:** Motion status • 00=unknown • 01=start moving • 02=in motion • 03=stop moving **Note:** If the device fails to get scan results, it will upload all as ff.
Tamper Status	07	00	1	00: Device installed (Tamper button pressed) 01: Device un-installed (Tamper button released)

Item	Channel	Type	Byte	Description
				Note: tamper status packet is fixed as confirmed packet.
Temperature	83	67	3	Temperature (2 Bytes) + Alarm Status(1 Byte) Temperature: INT16/10, Unit: °C Alarm Status: • 00 -Alarm dismiss • 01 -Alarm
GNSS Location	84	88	9	**Byte 1-4:** latitude/1000000 **Byte 5-8:** longitude/1000000 **Byte 9:** Geofence + motion status Bit 7-4: Geofence • 0=within geofence • 1=out of geofence • 2=geofence disabled • 3=unknown Bit 3-0: Motion status • 0=unknown • 1=start moving • 2=in motion • 3=stop moving **Note:** If the device fails to get GNSS data, the latitude or longitude will show ffffffff.

Item	Channel	Type	Byte	Description
Historical Data	20	ce	12	Data time stamp (4 Bytes) + Longitude (4 Bytes)+ Latitude (4 Bytes)

Basic Information

The device will report a basic information packet whenever joining the network.

Example:

ff0bff ff0101 ff166745d19027970000 ff090110 ff0a0101 ff0f00		
Channel	**Type**	**Value**
ff	0b	Power On: ff
ff	01	Protocol Version: 01=V1
ff	16	Serial Number: 6745d19027970000
ff	09	Hardware: 0110=V1.1
ff	0a	Software: 0101=V1.1
ff	0f	00: Class A

Periodic Report

The device supports reporting the sensor data according to reporting interval.

Example:

1. GNSS uplink: report when position strategy is GNSS positioning.

017564 03670a01 050001 0488debc770108ff080720		
Channel	**Type**	**Value**
01	75	Battery: 64 => 100%
03	67	Temperature: f8 00 => 00 f8 = 248 * 0.1 =24.8 °C
05	00	01=Tilt
04	88	Latitude: debc7701 => 01 77 bc de =24624350/1000000=24.624350

017564 03670a01 050001 0488debc770108ff080720		
Channel	**Type**	**Value**
		Longitude: 08ff0807 => 07 08 ff 08 =118030088/1000000=118.030088 20=Geofence disable, motion unknown

2. Wi-Fi scan uplink: report when position strategy is Wi-Fi scan.

017564 03671201 050001 06d90024e124f5b797b300 06d90024e124ff0004c800 06d90024e124f319a8c100 06d9000650c20eaa8dc500 06d90024e124f721c4b900		
Channel	**Type**	**Value**
01	75	Battery: 64 => 100%
03	67	Temperature: 12 01 => 01 12= 274 * 0.1 =27.4 °C
05	00	01=Tilt
06	d9	ID:00, BSSID: 24e124f5b797, Signal: b3=-77 dBm, 00=unknown
06	d9	ID:00, BSSID: 24e124ff0004, Signal: c8=-56 dBm, 00=unknown
06	d9	ID:00, BSSID: 24e124f319a8, Signal: c1=-63 dBm, 00=unknown
06	d9	ID:00, BSSID: 0650c20eaa8d, Signal: c5=-59 dBm, 00=unknown
06	d9	ID:00, BSSID: 24e124f721c4, Signal: b9=-71 dBm, 00=unknown

Alarm Report

The device supports to report below types of alarm report packets.

Example:

1. Tilt threshold alarm: report when deflection angle is enabled and device position changes.

050001		
Channel	**Type**	**Value**
05	00	01=Tilt

2. Tamper alarm: report tamper status and last location when tamper status changes. The location information are GNSS coordinates or Wi-Fi scan results depending on positioning strategy.

070001 0488ffffffffffffffff30		
Channel	**Type**	**Value**
07	00	01= unistalled
04	88	Latitude/longitude: FFFFFFFF 30=unknown

3. Temperature threshold alarm: report temperature and last location when the abrupt change of temperature is greater than 5 °C. The location information are GNSS coordinates or Wi-Fi scan results depending on positioning strategy.

8367220101 0488ffffffffffffffff30		
Channel	**Type**	**Value**
83	67	Temperature: 22 01 =>01 22 = 290 * 0.1 = 29°C Alarm Status: 01= Alarm
04	88	Latitude/longitude: FFFFFFFF 30=unknown

4. Geofencing threshold alarm: when geofence is enabled, report when device goes out of geofence or goes into geofence.

84887dbe7701e600090711		
Channel	**Type**	**Value**
84	88	Latitude: 7dbe7701=>01 77 be 7d =24624765/1000000=24.624765 Longitude: e6000907=>07 09 0 e6 =118030566/1000000=118.030566 11=Out of Geofence, start moving

Historical Data

The device will report retransmission data or stored data.

Example:

20ce 0d755b63 e6000907 7dbe7701			
Channel	**Type**	**Time Stamp**	**Value**
20	ce	0d 75 5b 63 => 63 5b 75 0d=1666938125s	Longitude: e6000907=>07 09 00 e6 =118030566/1000000=118.030566 Latitude: 7dbe7701=>01 77 be 7d =24624765/1000000=24.624765

Downlink Command

This device supports downlink commands for configuration and control. The downlink application port is 85 by default.

General Settings

Item	Channel	Type	Byte	Description
Reboot	ff	10	1	ff

Item	Channel	Type	Byte	Description
Work Mode	ff	66	1	00: Periodic Mode 01: Motion Mode 02: Timing Mode
Report Interval	ff	8e	3	**Byte 1:** 00=Periodic mode reporting interval, 01= Motion mode reporting interval **Byte 2-3:** reporting interval time, unit: min
Report Interval during Motion	ff	13	3	**Byte 1:** 00 = Disable; 01 = Enable **Byte 2-3:** report interval, unit: min
Reporting Time Point	ff	8a	3	**Byte 1:** time point from 00~04 **Byte 2-3:** minute
UTC Time Zone	ff	17	2	INT16/10
Duration of Motion and Stationary	ff	58	4	**Byte 1:** 00=motion, 01=stationary **Byte 2:** 05 **Byte 3-4:** duration, unit: s
Data Storage	ff	68	1	00: Disable, 01: Enable
Data Retransmission	ff	69	1	00: Disable, 01: Enable
Data Retransmission Interval	ff	6a	3	**Byte 1**: 00 **Byte 2-3**: UINT16, Unit: s, Range: 30~1200, Default: 600

Item	Channel	Type	Byte	Description
Bluetooth	ff	8f	1	00 = Disable; 01 = Enable
Tamper Alarm	ff	87	1	00 = Disable; 01 = Enable

Example:

1. Reboot the device.

ff10ff

2. Set time zone as UTC-2.

ff17ecff		
Channel	**Type**	**Value**
ff	17	ecff=>ff ec=-20/10=-2

3. Set periodic report interval as 20 minutes.

ff8e001400		
Channel	**Type**	**Value**
ff	8e	00=Periodic mode reporting interval 1400=>0014=20minutes

4. Set report time point as 20:00.

ff8a04b004		
Channel	**Type**	**Value**
ff	8a	Time point: 04 b0 04=>04 b0=1200 minutes=20:00

Positioning Settings

Item	Channel	Type	Byte	Description
Positioning Strategy	ff	71	1	00: GNSS Positioning 01: Wi-Fi Scan 02: Wi-Fi Scan&GNSS Positioning
GNSS Positioning Duration	ff	3c	1	Unit: min
Wi-Fi Scan	ff	2d	3	**Byte 1:** 00 **Byte 2:** Number of BSSID **Byte 3:** Positioning Timeout , unit:s
Duration of Motion and Stationary	ff	58	4	**Byte 1:** 00=motion, 01=stationary **Byte 2:** 05 **Byte 3-4:** duration, unit: s

Example:

Set position strategy as GNSS positioning.

ff7100		
Channel	**Type**	**Value**
ff	71	00: GNSS Positioning

Threshold Settings

Item	Channel	Type	Byte	Description
Set Initial Position	ff	62	1	ff: set current position as initial position

Item	Channel	Type	Byte	Description
				fe: set the initial position to (0.00°, 0.00°, -90.00°)
Geofence Setting	ff	72	4	**Byte 1:** 00=disable, 01=enable **Byte 2-3:** Alarm reporting interval, unit: min **Byte 4:** Alarm reporting times
Geofence Coordinates	ff	88	8	Byte 1-4: latitude/1000000 Byte 5-8: longitude/1000000
Geofence Radius	ff	89	4	Radius*100, unit: m

Example:

Set the geofence coordinates.

ff88 7dbe7701e6000907		
Channel	**Type**	**Value**
ff	88	Latitude: 7dbe7701=>01 77 be 7d =24624765/1000000=24.624765 Longitude: e6000907=>07 09 00 e6 =118030566/1000000=118.030566

Historical Data Enquiry

The device supports data retrievability feature to send downlink command to enquire the historical data stored in the device. Before that, ensure the device time is correct and data storage feature was enabled to store data.

Command Format:

Item	Channel	Type	Byte	Description
Enquire Data in Time Point	fd	6b	4	Unix timestamp, Unit: s
Enquire Data in Time Range	fd	6c	8	Byte 1-4: Start timestamp, Unit: s Byte 5-8: End timestamp, Unit: s
Stop Query Data Report	fd	6d	1	ff
Data Retrievability Interval	ff	6a	3	Byte 1: 01 Byte 2-3: UINT16, Unit: s, Range: 30~1200, Default: 60

Reply Format:

Item	Channel	Type	Byte	Description
Enquiry Result	fc	6b/6c	1	00: Enquiry success. The device will report the historical data according to data retrievability interval. 01: Time point or time range invalid 02: No data in this time or time range

Note:

1. Use Unix Timestamp Converter to calculate the time.
2. The device only uploads no more than 300 data records per range enquiry.
3. When enquiring the data in time point, it will upload the data which is closest to the search point within the reporting interval range. For example, if the device's reporting interval is 10 minutes and users send command to search for 17:00's data, if the device find there is data stored in 17:00, it will upload this data; if not, it will search for data between 16:50 to 17:10 and upload the data which is closest to 17:00.

Example:

Enquire the historical data in a time range.

fd6c 64735b63 7c885b63		
Channel	**Type**	**Value**
fd	6c	Start time: 64 73 5b 63 => 63 5b 73 64 = 1666937700s End time: 7c 88 5b 63 => 63 5b 88 7c = 1666943100s

Reply:

fc6c00		
Channel	**Type**	**Value**
fc	6c	00: Enquiry success

20ce 0d755b63 e6000907 7dbe7701			
Channel	**Type**	**Time Stamp**	**Value**
20	ce	0d 75 5b 63 => 63 5b 75 0d=1666938125s	Longitude: e6000907=>07 09 00 e6 =118030566/1000000=118.030566 Latitude: 7dbe7701=>01 77 be 7d =24624765/1000000=24.624765

Chapter 8. Services

Milesight provides customers with timely and comprehensive technical support services. End-users can contact your local dealer to obtain technical support. Distributors and resellers can contact directly with Milesight for technical support.

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