Milesight

VS34x

Desk & Seat Occupancy Sensor

User Guide

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Chapter 1. Preface

Copyright Statement

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 is not intended to be used as a reference sensor, and Milesight will not should responsibility for any damage which may result from inaccurate readings.
- The device must not be disassembled or remodeled in any way.
- 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 reverse or wrong model.
- The device must never be subjected to shocks or impacts.
- In order to protect the security of the device, please change device password when first configuration. The default password is 123456.

Revision History

Release Date	Version	Revision Content
July 20, 2023	V1.0	Initial version

Chapter 2. Product Introduction

Overview

VS34x is an occupancy sensor designed to detect whether desks or seats in a workspace are occupied, allowing for better management and optimization of space usage. The standard version of the sensor VS340 uses PIR technology for detection. The pro version VS341 applies additional Thermopile IR technology to provide more accurate and precise detection capabilities. VS34x features an adjustable field of view angle for greater flexibility in different scenarios.

With wireless detection and easy configuration, theVS34x offers reliable and convenient desk or seat arrangement optimization. It is compatible with Milesight LoRaWAN® gateway and Milesight Development Platform solution, enabling real-time monitoring of desks and seats' status for effective remote management.

VS34x can be used in workstations, libraries, etc.

Key Features

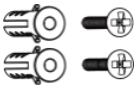
- Achieve up to 98% accuracy with a high-precision PIR sensor and an extra Thermopile IR Temperature sensor in the pro version
- Dual versions are available, standard and pro, to accommodate different latency requirements
- Provide different types of PIR covers for adjustable and flexible field angle and different detecting ranges
- Support Milesight D2D protocol to enable ultra-low latency and direct control without gateways
- V0 grade flame retardant material makes it adaptable to various scenarios, enhancing safetyand reliability
- Equipped with NFC for one touch configuration, support card emulation mode
- Function well with standard LoRaWAN® gateways and network servers
- Compatible with Milesight IoT Cloud and Milesight Development Platform

Chapter 3. Hardware Introduction

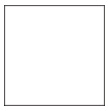
Packing List

1 × VS34x Device

4 × PIR Covers



2 × Mounting Kits



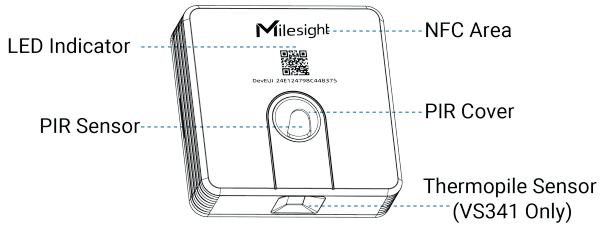
1 × 3M Tape

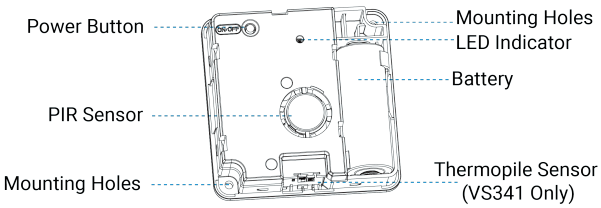
1 × Warranty Card

1 × Quick Start Guide

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

Hardware Overview



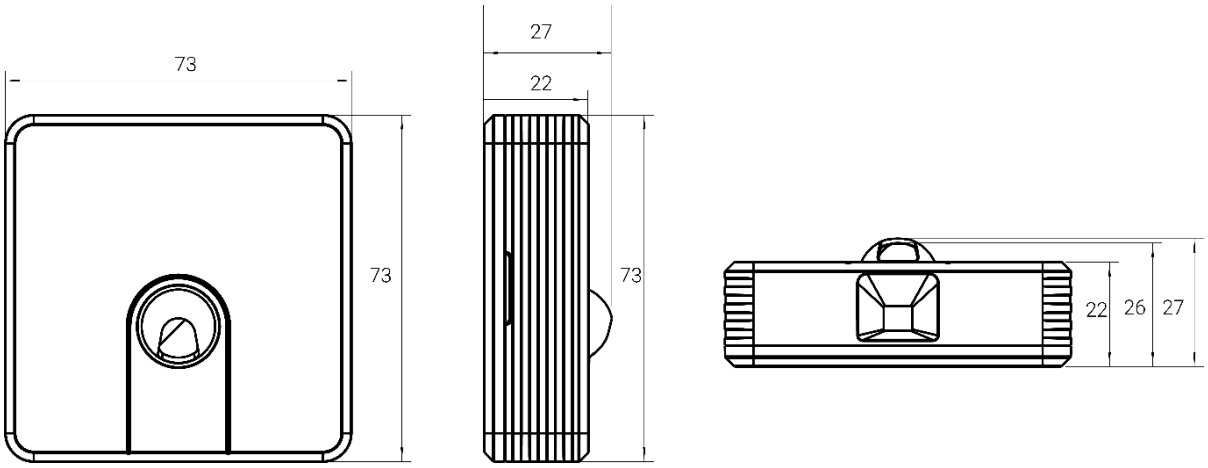


Power Button and LED Indicator

Function	Action	LED Indicator
Power On	Press and hold the power button for more than 3 seconds.	Off → On
Power Off		On → Off
Check On/Off Status	Quick press the power button once.	Green Light On: Device is on.
		Green Light Off: Device is off.

Function	Action	LED Indicator
Reset to Factory Default	Press and hold the power button for more than 10 seconds.	Green Light Blink quickly
Occupancy Status	Vacant → Occupied	Red Light Blinks twice
	Occupied → Vacant	Green Light Blinks twice

Dimensions (mm)



Chapter 4. Quick Start

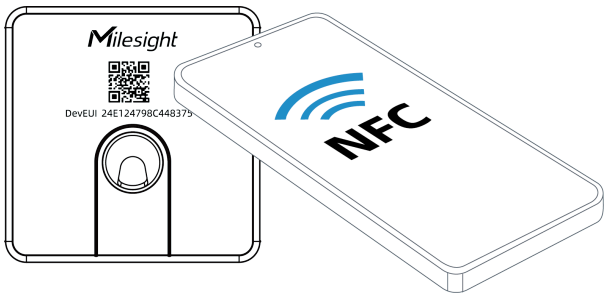
This chapter describe the steps to quickly configure this device to set up the connection with LoRaWAN® gateway and network server. If you requires more advanced settings, please refer to operation guide chapter.

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.



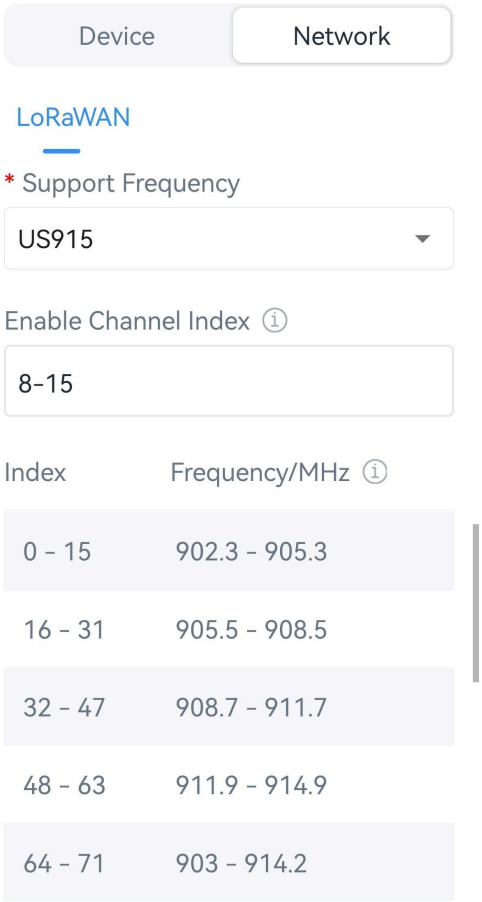
Configure the Network Setting

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 or Milesight Development Platform.

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.

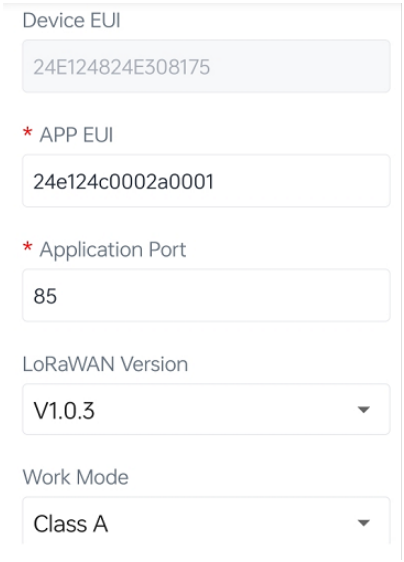


3. Keep other settings by default and click **Write** to save the settings.

Chapter 5. Operation Guide

LoRaWAN® Settings

Configure AppEUI, Join Type, Application Key, and other information. You can also keep all the default settings.

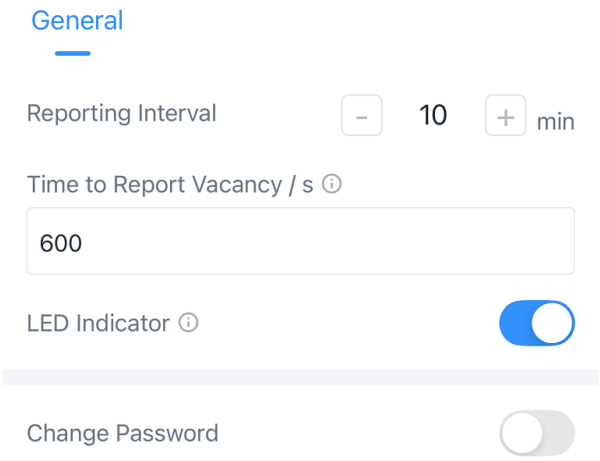


Parameters	Description
Device EUI	Unique ID of the device which can be found on the device. **Note:** please contact sales for device EUI list if you have many units.
App EUI	The default App EUI (join EUI) is 24E124C0002A0001.
Application Port	The port used for sending and receiving data, the default port is 85.
LoRaWAN® Version	V1.0.2 and V1.0.3 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.

Parameters	Description
	Note: it's necessary to select OTAA mode if connecting device to Milesight IoT Cloud or Milesight Development Platform.
Application Key	Appkey for OTAA mode, default value: "Device EUI" + "Device EUI" (since Q4 of 2025). Example: 24e124123456789024e1241234567890 **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 LinkCheck-Req 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 LinkCheck-Req MAC packets to the network server every reporting interval to validate connectivity; If there is no response, the device will re-join the network.

Parameters	Description
	Note: 1. Only OTAA mode supports rejoin mode. 2. The actual sending number is **Set the number of packets sent** +1.
Channel Mode	Select **Standard-Channel** mode or **Single-Channel** mode. When **Single-Channel** mode is enabled, only one channel can be selected to send uplinks.
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:** 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 or send D2D commands.
RX2 Frequency	RX2 frequency to receive downlinks or send D2D commands. Unit: Hz

General Settings



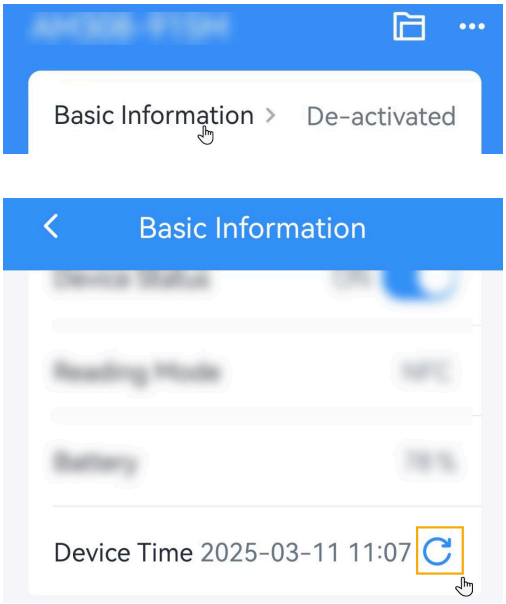
Parameters	Description
Reporting Interval	The interval of reporting occupancy status and battery level to network server. Default: 1440 mins, Range: 1 - 1440 mins **Note:** The device will also report “Occupied” status immediately when it detects motions.
Time to Report Vacancy/s	A “Vacant” status will be reported if the device does not detect motion within a certain period of time. VS340: Default: 5 min, Range: 1 - 30 min VS341: Default: 60 s, Range: 15 - 600 s
LED Indicator	Enable or disable the LED Indicator to indicate occupancy status.
Change Password	Change the password for ToolBox App to write this device.

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:

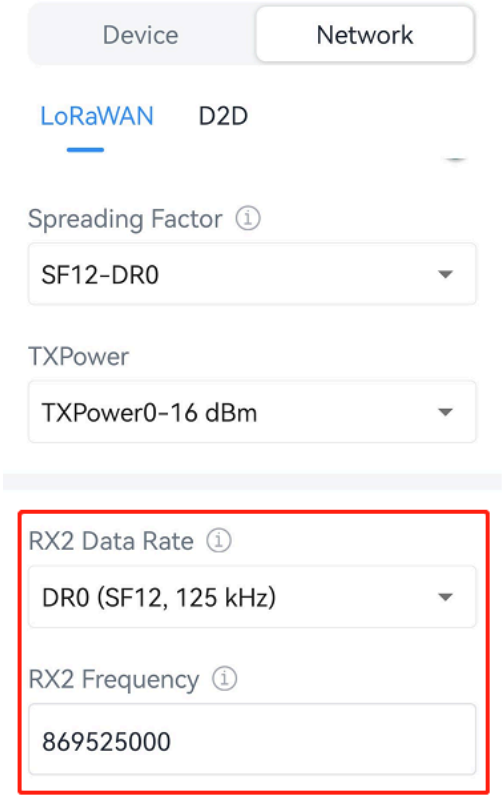
- This only supports to get the time but not time zone. The time zone can be configured by ToolBox App or downlink command.
- The device will send the DeviceTimeReq command every 5 days since the last sync.

Milesight D2D Settings

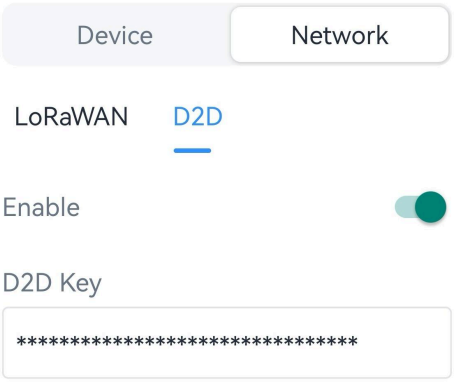
Milesight D2D protocol is developed by Milesight and used for setting up transmission among Milesight devices without gateway. When the Milesight D2D settings is enabled, the device can work as a D2D controller to send control commands to trigger Milesight D2D agent devices.

1. Configure the RX2 datarate and RX2 frequency.

Note:
It is suggested to change the default values if there are many LoRaWAN® devices around.



2. Enable Milesight D2D feature and define a unique D2D key that is the same as Milesight D2D agent devices. (Default D2D key: 5572404C696E6B4C6F52613230313823)



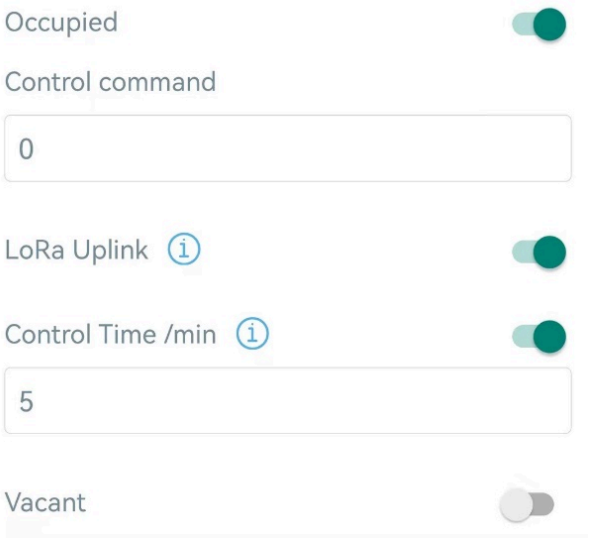
3. Enable one of statuses and configure 2-byte hexadecimal Milesight D2D command.

Note:

- If you enable **LoRa Uplink**, a LoRaWAN® uplink packet that contains corresponding alarm status will be sent to gateway after the Milesight D2D command packet. Otherwise, the alarm packet will not send to LoRaWAN® gateway.
- If you enable the control time setting, Milesight D2D agent devices will take corresponding actions within this duration after receiving commands from Milesight D2D controller. This feature is currently under development for Milesight D2D agent devices.

Example

When the device detects the "Occupied" status, it sends D2D command 0000 to Milesight D2D agent devices, which perform the corresponding action for 5 minutes.



Maintenance

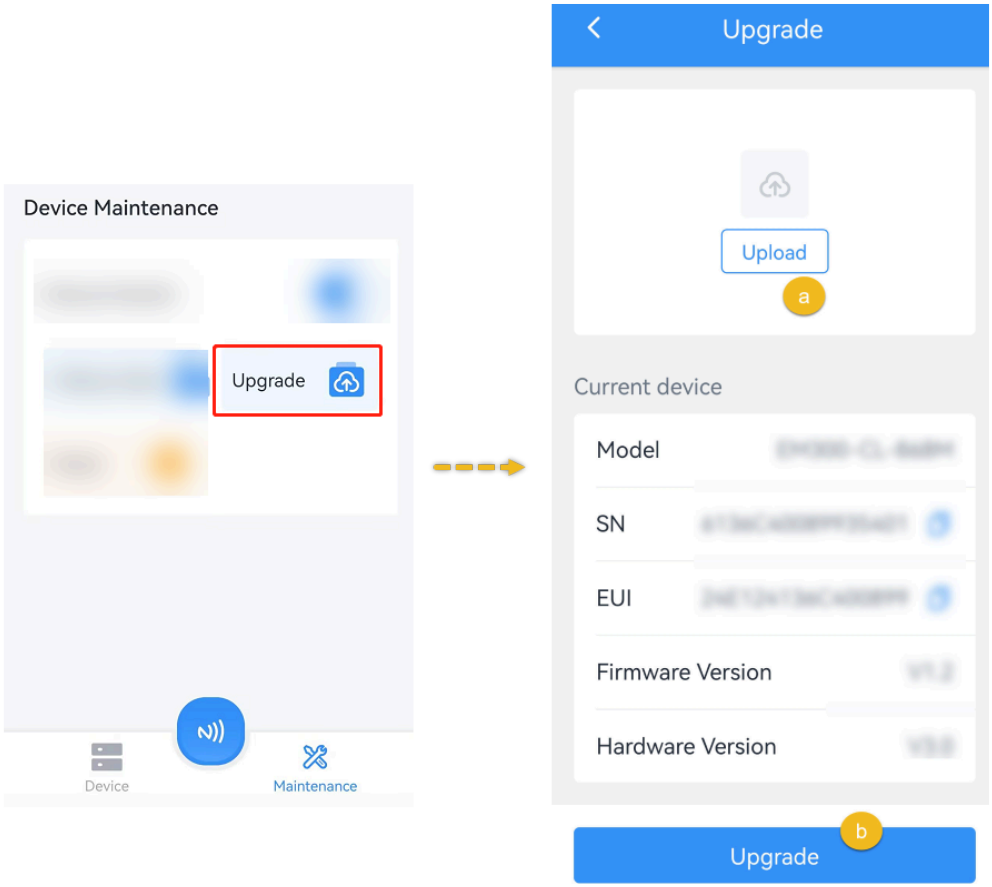
Upgrade

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.
- Only Android version ToolBox supports the upgrade feature.



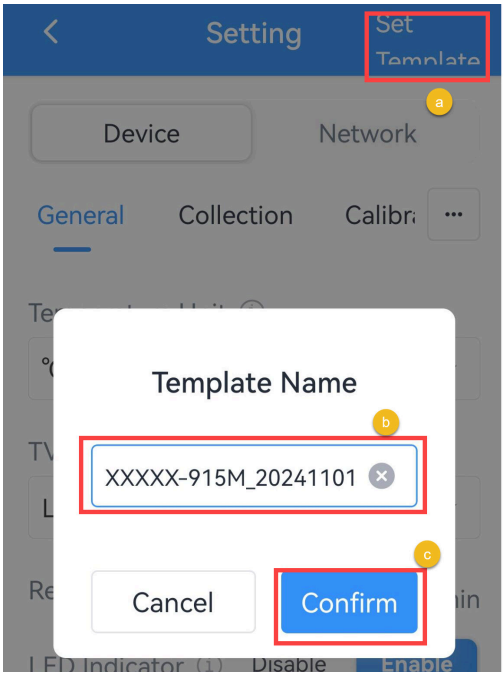
Backup and Restore

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.

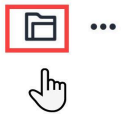
Backup and Restore

1. Launch ToolBox App, attach the NFC area of smartphone to the device to read the configuration.

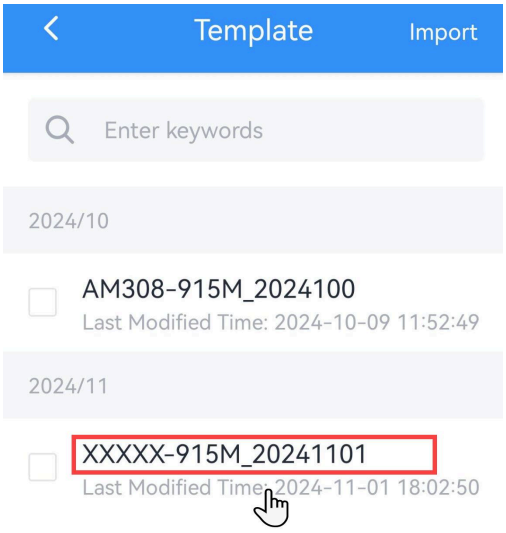
2. Edit the configuration as required, click **Set Template** to save current configuration as a template to the ToolBox App.



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



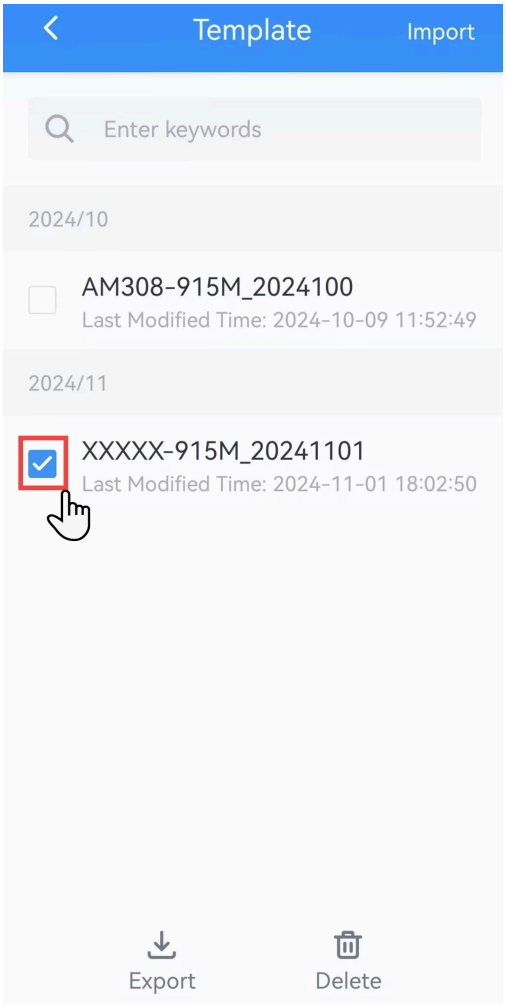
4. Select and click the target template, click **Write** to import the configuration to target devices.



Export and Delete Template

1. Check the box of the target template.

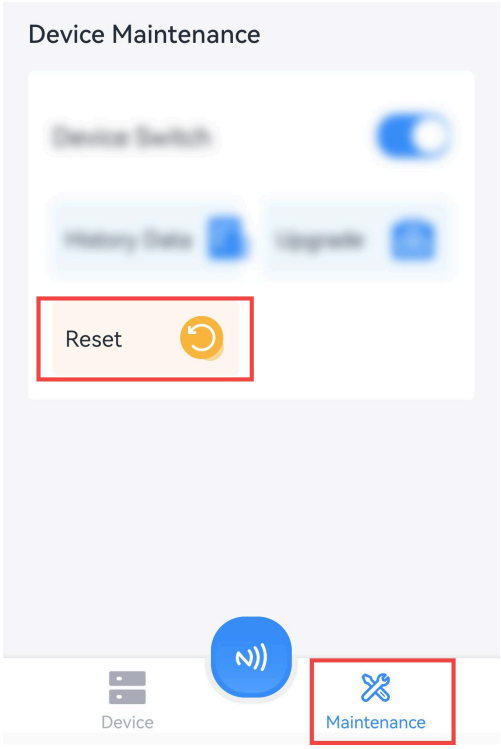
2. Click **Export** to export this template as JSON format file and save it to the smartphone, click **Delete** to delete this template from your ToolBox App.



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

Installation Location

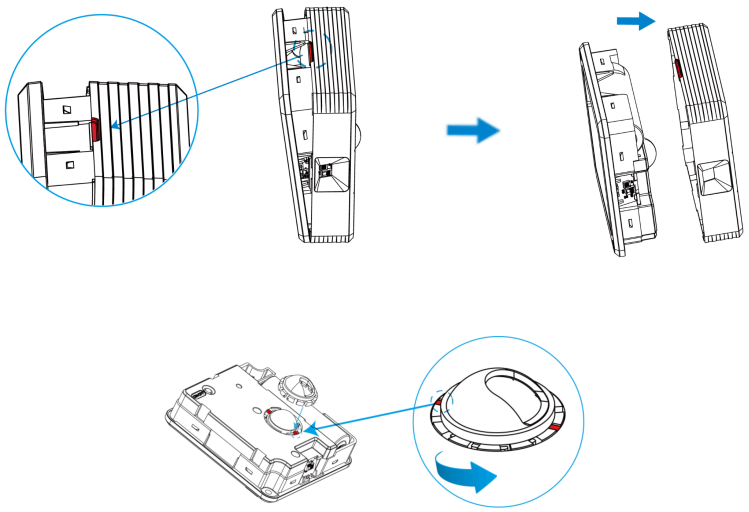
- The recommended installation distance of VS340 is 0 to 50 cm away from the table edge.
- The recommended installation distance of VS341 is 0 to 40 cm away from the table edge. Besides, the best distance is 20 to 40 cm.

Note:
Ensure the detection area is not blocked by curtains or barriers.

Installation Steps

PIR Cover Installation

Take off the front cover of the device, then select the PIR cover as required and put it on the PIR sensor with groove alignment. The adjustable angle of every groove is 30°.



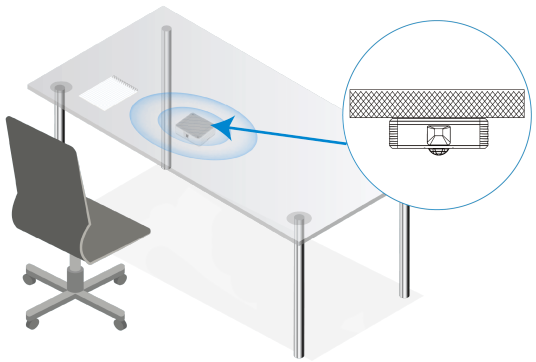
PIR cover reference guidance (installation height=70cm):

PIR Cover	Detection Area	Usage Scenario
	70 ° Horizontal, 60 ° Vertical, 1 m × 0.9 m	Single Person Desk

PIR Cover	Detection Area	Usage Scenario
	70 ° Horizontal, 107 ° Vertical, 1 m × 1.8 m	Face to Face Desk
	107 ° Horizontal, 53.5 ° Vertical, 1.8 m × 0.9 m	Bar Table
	107 ° Horizontal, 107 ° Vertical, 1.8 m × 1.8 m	Round Table
	N/A	Support to be tai- lored as required

Fixed by 3M Tape

Attach 3M tape to the back of sensor, then tear the other side and place it under the working desk. Please adjust the installation direction according to the detection area and ensure that the thermopile sensor should be placed toward the seat.

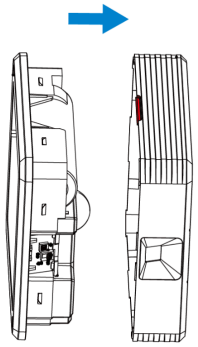


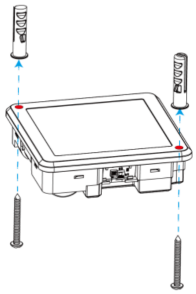
Note:

1. Since the default 3M tape has a high viscosity, please tear the device down via screwdriver.
2. If it is necessary to tear the device down easily, please divide the 3M tape as several parts and only tear one part to device.

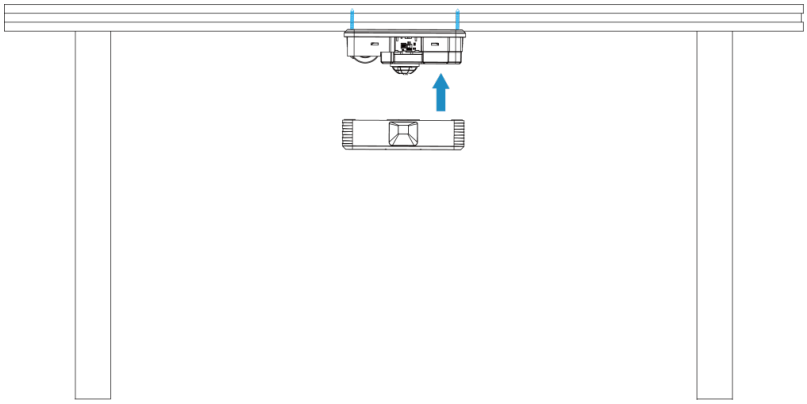
Fixed by Mounting Kits

Step 1: Take off the front cover of the device, then fix the wall plugs under the desk according to the device mounting holes, and fix the device to the wall plugs with screws. Please adjust the installation direction according to the detection area and ensure that the thermopile sensor should be pointed to the seat.





Step 2: Restore the front cover back to the device.



Factors Affecting Accuracy

VS340

- Person remains seated and motionless in a chair for 5 minutes, as it may cause false releases.
- Person is seated and lightly shaking their legs or shaking their legs vertically up and down, as it may cause false releases.
- No chair obstructing the seat, someone passes by closely, or a cleaner mops the floor, as it may cause false occupancy.

VS341

- The recommended operating temperature of thermopile sensor is 10~30°C. Exceeding this range may affect detection accuracy.
- Person suddenly covers themselves with a blanket while seated, as it may cause false release.
- In environments with fans or air conditioning, a person remains seated for a long time, the target temperature gradually approaches the ambient temperature, and remains motionless for 1 minute, as it may cause false release.
- Person remains seated for a long time on a chair made of non-breathable materials (e.g., leather chairs), causing residual warmth for an extended period, as it may cause delayed release.
- Person stands up and moves away from the device, causing the temperature difference to reach a critical point, as it may cause possible false release.

Chapter 7. Uplink Packets and Downlink Commands

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 Packets

Basic Information

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

Item	Channel	Type	Byte	Description
Power On	ff	0b	1	Device is on
Protocol Version	ff	01	1	Example: 01=V1
Serial Number	ff	16	6	16 digits
Hardware Version	ff	09	2	Example: 03 10 = V3.1
Software Version	ff	0a	2	01 14 => V1.14
Device Type	ff	0f	1	00: Class A, 01: Class B, 02: Class C, 03: Class C to B

Example:

ff0bff ff0101 ff166787d18008970013 ff090100 ff0a0101 ff0f00		
Channel	**Type**	**Value**
ff	0b	Power On: ff
ff	01	Protocol Version: 01(V1)
ff	16	SN: 6787d18008970013

ff0bff ff0101 ff166787d18008970013 ff090100 ff0a0101 ff0f00		
Channel	**Type**	**Value**
ff	09	Hardware Version: 0100 (V1.0)
ff	0a	Software Version: 0101(V1.1)
ff	0f	Device Type: 00(Class A)

Periodic Report

The device supports the sensor data according to reporting interval.

Item	Channel	Type	Byte	Description
Battery Level	01	75	1	UINT8, Unit: %
Occupancy Status	03	00	1	01: Occupied, 00: Vacant

Example:

Report as reporting interval.

017562 030001		
Channel	**Type**	**Value**
01	75	Battery Level: 62=>98%
03	00	Occupancy Status: 01=> Occupied

Trigger Report

The device supports report when occupancy status changes.

Item	Channel	Type	Byte	Description
Occupancy Status	03	00	1	01: Occupied, 00: Vacant

Example:

Report when occupancy status changes.

030001		
Channel	**Type**	**Value**
03	00	Occupancy Status: 01=> Occupied

Downlink Commands

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

General Setting

Item	Channel	Type	Byte	Description
Reboot	ff	10	1	ff
Report Interval	ff	8e	3	**Byte 1**: 00 **Byte 2-3**: UINT16, Unit: minute
LED Indicator	ff	2f	1	00: disable; 01: enable
Time to report vacancy	ff	95	2	Unit: s, Range: 1~120

Example:

1. Reboot the device.

ff10ff

2. Set report interval as 20 minutes.

ff8e001400		
Channel	**Type**	**Value**
ff	8e	1400=>0014=20minutes

Milesight D2D Setting

Item	Channel	Type	Byte	Description
D2D Feature	ff	84	1	00: disable; 01: enable

Item	Channel	Type	Byte	Description
D2D Key	ff	35	8	The first 16 digits of D2D key, and the last 16 digits are fixed as 0.
D2D Settings	ff	96	8	Byte 1: 00-Occupied; 01-Vacant Byte 2: 00-disable, 01-enable Byte 3: 00-disable LoRa Uplink, 01-enable LoRa Uplink Byte 4-5: D2D control command Byte 6-7: control time, unit: min Byte 8: 00-disable control time, 01-enable control time

Example

1. Set D2D Key as 12345678123456780000000000000000.

ff35 1234567812345678		
Channel	**Type**	**Value**
ff	35	1234567812345678

2. Set D2D settings.

ff96 00 01 01 04e0 0500 01		
Channel	**Type**	**Value**
ff	96	00=>Occupied; 01=>Enable; 01=>Enable LoRa Uplink; 04 e0=>e0 04, Control Command is e0 04;

ff96 00 01 01 04e0 0500 01		
Channel	**Type**	**Value**
		05 00=>00 05, Control time is 5 mins; 01=>Enable Control Time

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.

Technical Support Mailbox: iot.support@milesight.com

Online Support Portal: https://support.milesight-iot.com

Resource Download Center: https://www.milesight.com/iot/resources/download-center/

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