Bathroom Occupancy Sensor

Featuring LoRaWAN®

VS330

User Guide



Safety Precautions

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

- The device must not be disassembled or remodeled in any way.
- In order to protect the security of the device, please change device password when first configuration. The default password is 123456.
- 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.
- 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.
- Make sure all batteries are newest when install, or battery life will be reduced.
- The device must never be subjected to shocks or impacts.

Declaration of Conformity

VS330 is in conformity with the essential requirements and other relevant provisions of the CE, FCC, and RoHS.

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For assistance, please contact

Milesight technical support:

Email: iot.support@milesight.com

Support portal: support.milesight-iot.com

Tel: 86-592-5085280

Fax: 86-592-5023065

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

Revision History

Date	Doc Version	Description
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Contents

1. Product Introduction 4
1.1 Overview 4
1.2 Features 4
2. Hardware Introduction 5
2.1 Packing List 5
2.2 Hardware Overview 5
2.3 Dimensions(mm) 5
3. Operation Guide 6
3.1 NFC Configuration 6
3.2 LoRaWAN Settings 7
3.3 Basic Settings 10
3.4 Maintenance 10
3.4.1 Upgrade 10
3.4.2 Backup 11
3.4.3 Reset to Factory Default 12
4. Installation 12
5. Milesight IoT Cloud Management 15
6. Device Payload 16
6.1 Basic Information 16
6.2 Sensor Data 17
6.3 Downlink Commands 17

1. Product Introduction

1.1 Overview

VS330 is a LoRaWAN® bathroom occupancy sensor providing a cost-effective solution for monitoring the occupancy status of the bathrooms and the cubicles of a public toilets in different scenarios. VS330 has combined dual technologies, Time-of-Flight (ToF) technology and Passive Infrared (PIR) sensor to identify the human body and motions with a smart logic and an industry-leading accuracy exceeding 99.5%. VS330 could easily adjust to different scenarios with 100% anonymity and low power consumption.

VS330 could be managed by integrated systems and it allows users to monitor the occupancy and to trigger other devices via a web browser or mobile App remotely. Damp-proof coating inside ensures it working well under various conditions.

1.2 Features

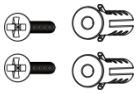
- 99.5% high detecting accuracy based on Time-of-Flight (ToF) technology and Passive Infrared (PIR) detection
- 100% anonymity and GDPR-compliant to detect space occupancy and human motion
- Real-time update and ultra-low power consumption
- Effective in static or motional application with low mistake rate
- Effective in low-light or completely dark environments
- Damp-proof coating inside the device to ensure the device works well in various conditions of bathrooms and other scenarios
- Adjustable sensor angle enables multi-mounting methods for various applications
- Built-in NFC for easy configuration
- Compatible with standard LoRaWAN® gateways and network servers
- Quick and easy management with Milesight IoT Cloud solution

2. Hardware Introduction

2.1 Packing List



1 × VS330 Sensor



2 × Wall Mounting Kits



1 × Mirror Cleaning Cloth



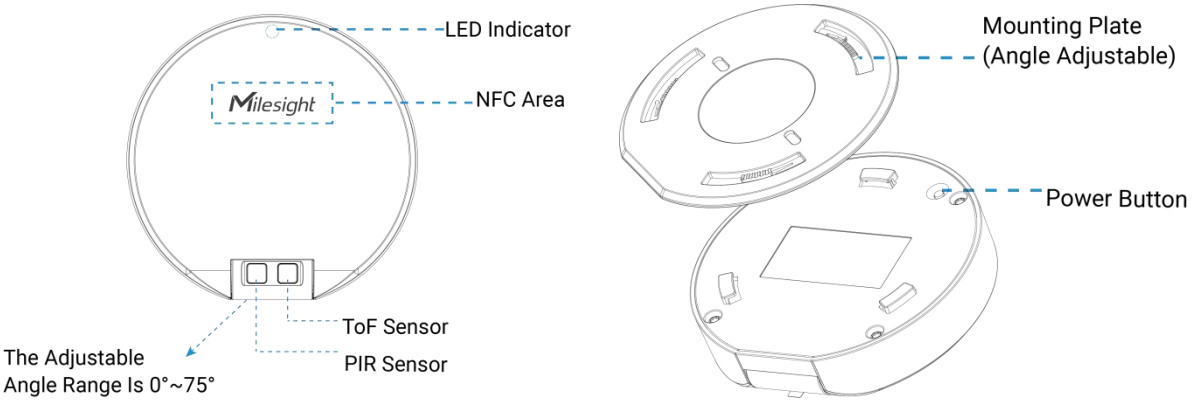
1 × Quick Start Guide



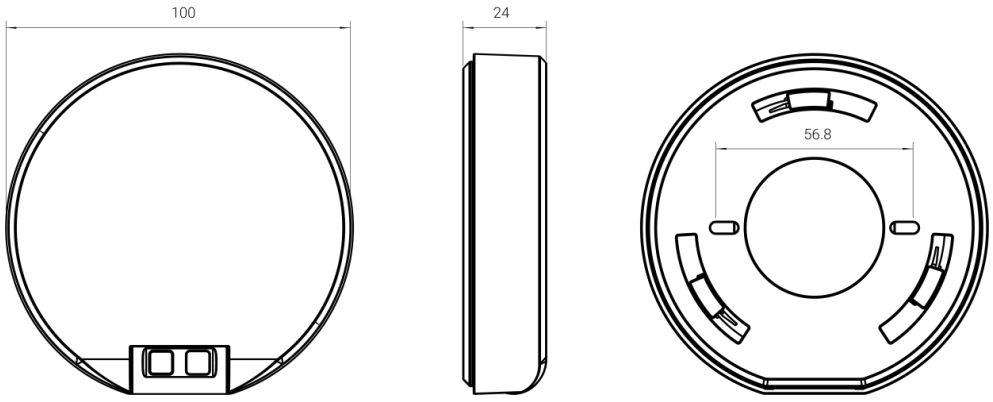
1 × Warranty Card

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

2.2 Hardware Overview



2.3 Dimensions(mm)



2.4 Button and LED Patterns

Function	Action	LED (Enabled)
Power ON/OFF	Press and hold the power button for more than 3 seconds.	Power On: Off → On
		Power Off: On → Off
Check On/Off Status	Quick press the power button.	Light On: Device is on

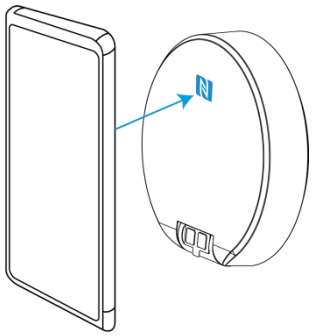
		Light Off: Device is off
Reset	Press and hold the power button for more than 10 seconds.	Blinks quickly
Enable Test Mode	Quick press the power button.	Off → On
Test Mode	Face the sensor to object.	Occupied → Vacant: Blink twice Vacant →Occupied: Blinks twice

3. Operation Guide

3.1 NFC Configuration

VS330 sensor can be monitored and configured via NFC. Please refer the following steps to complete configuration.

1. Download and install "Milesight ToolBox" App from Google Play or Apple App Store.
2. Enable NFC on the smartphone and launch Milesight ToolBox.
3. Attach the NFC area of smartphone to the device to read device information. Basic information and settings of the device will be shown on ToolBox App if it's recognized successfully. You can read and configure the device by tapping the Read/Write device on the App. In order to protect the security of the device, please change password when first configuration. The default password is **123456**.



Note:

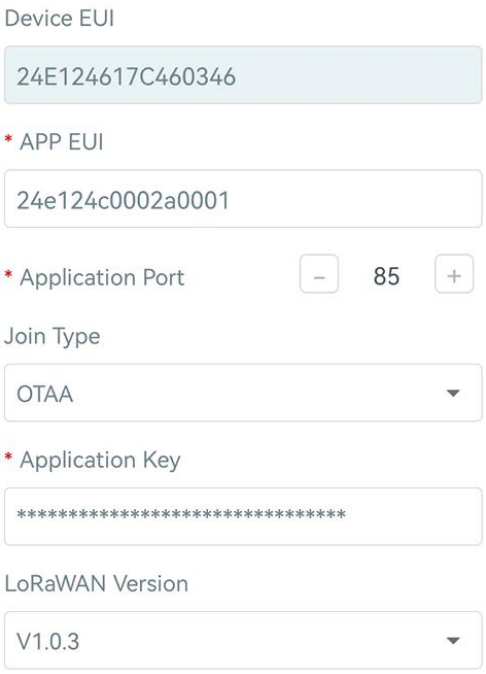
1) Ensure the NFC area of smartphone and it's recommended to take off phone case.

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

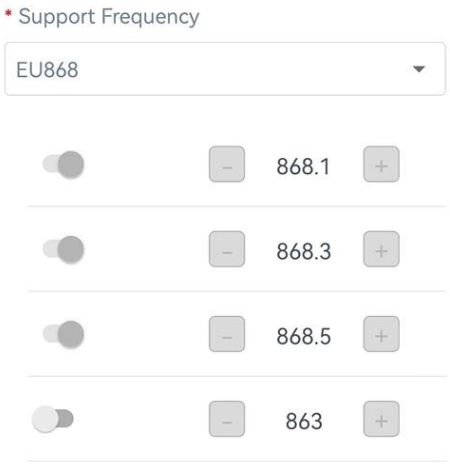
3) VS330 sensor can also be configured by dedicated NFC reader, which can be purchased from Milesight IoT.

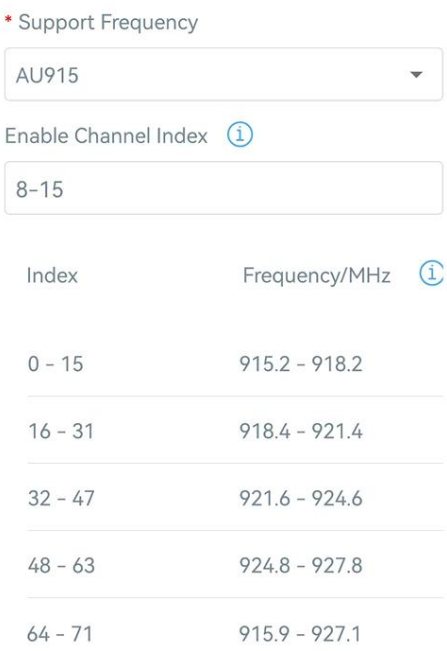
3.2 LoRaWAN Settings

Go to **Device > Settings > LoRaWAN Settings** of ToolBox App to configure join type, App EUI, App Key and other information. You can also keep all settings by default.



Parameters	Description
Device EUI	Unique ID of the device which can also be found on the label.
App EUI	Default App EUI is 24E124C0002A0001.
Application Port	The port is used for sending and receiving data, default port is 85.
Join Type	OTAA and ABP mode are available.
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.
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, 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
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. Please enable Single-Channel mode if you connect device to DS7610.
Channel	Enable or disable the frequency to send uplinks.  If frequency is one of CN470/AU915/US915, enter the index of the channel that you want to enable and make 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

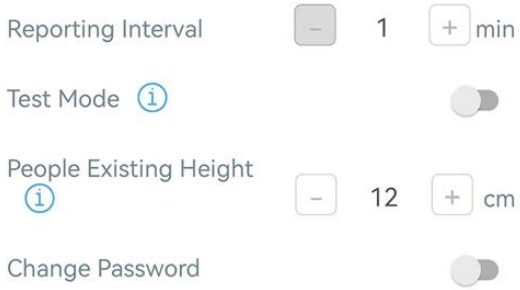
	
Spread Factor	If ADR is disabled, the device will send data via this spread factor.
Rejoin Mode	Reporting interval ≤ 30 mins: the device will send a specific number of LinkCheckReq MAC packets to the network server every 30 mins to validate connectivity; If there is no response, the device will re-join the network. Reporting interval > 30 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.
Confirmed Mode	If the device does not receive ACK packet from network server, it will resend data once.
Set the number of packets sent	When rejoin mode is enabled, set the number of LinkCheckReq packets sent.
ADR Mode	Allow network server to adjust data rate of the device.
Tx Power	Transmit power of the device.

Note:

1) Please contact sales for device EUI list if there are many units.
2) Please contact sales if you need random App keys before purchase.
3) Select OTAA mode if you use Milesight IoT cloud to manage devices.
4) Only OTAA mode supports rejoin mode.

3.3 Basic Settings

Go to **Device > Settings > General Settings** of ToolBox App to change the reporting interval, etc.



Parameters	Description
Reporting Interval	Reporting interval of transmitting current sensor values to network server. Default: 1080 mins, Range: 1-1080 mins
Test Mode	Enable or disable test mode to calibrate the occupancy status. The device will stay at test mode within 10 minutes.
People Existing Height	The trigger condition to judge whether there exists person. Default value: 12cm; Range: 10~50 cm.
Change Password	Change the password for ToolBox App or software to read/write this device.

3.4 Maintenance

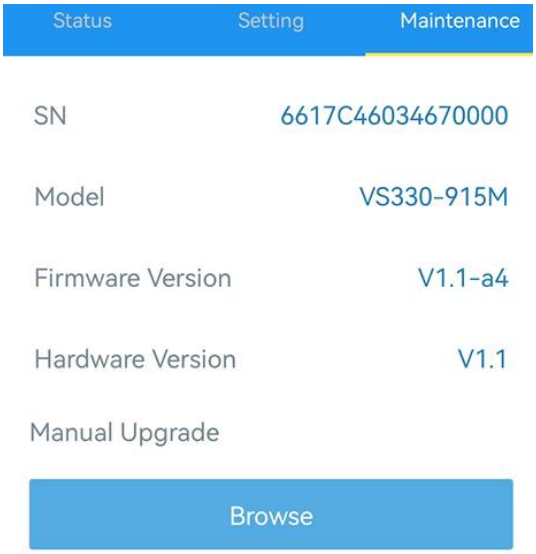
3.4.1 Upgrade

ToolBox App:

1. Download firmware from Milesight official website to your smartphone.
2. Open ToolBox App and click **Browse** to import firmware and upgrade the device.

Note:

1) Operation on ToolBox is not supported during the upgrade.
2) Only Android version ToolBox supports the upgrade feature.

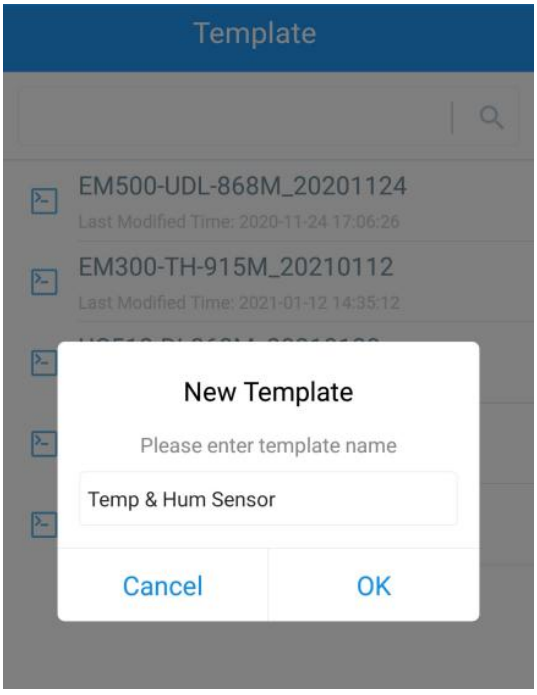


3.4.2 Backup

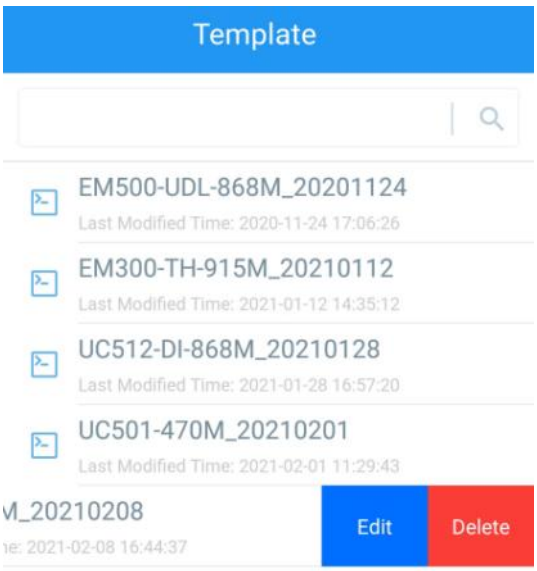
VS330 sensor supports configuration backup for easy and quick device configuration in bulk. Backup is allowed only for devices with the same model and LoRaWAN® frequency band.

ToolBox App:

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



Note: Slide the template item to the left to edit or delete it. Click the template to edit the configurations.

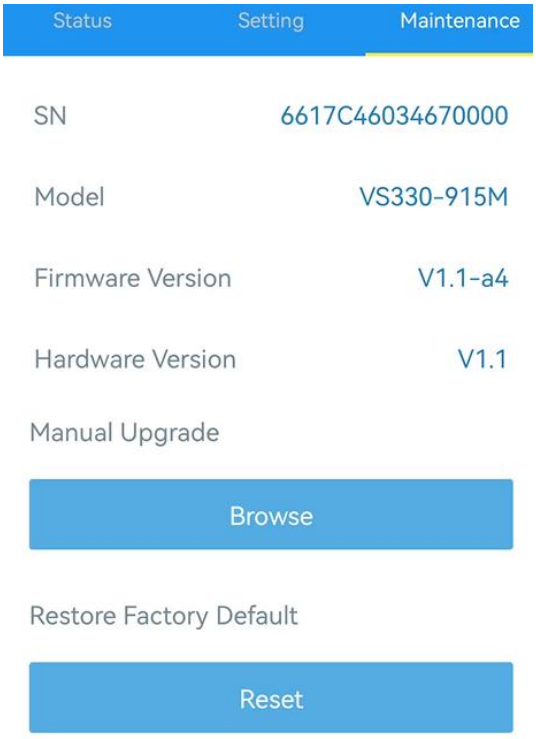


3.4.3 Reset to Factory Default

Please select one of following methods to reset device:

Via Hardware: Hold on reset button inside the device more than 10s.

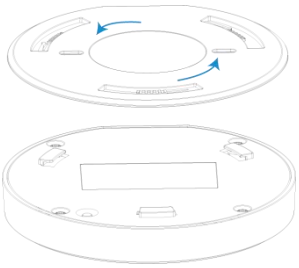
Via ToolBox App: Go to **Device > Maintenance** to click **Reset**, then attach smart phone with NFC area to device to complete reset.

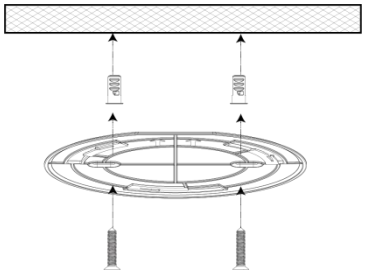


4. Installation

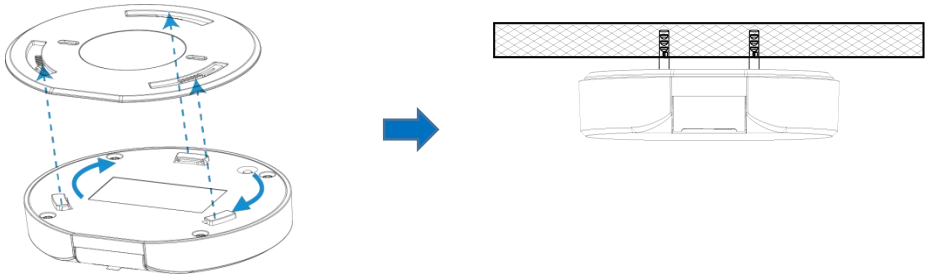
Ceiling Mount:

1. Take off the mounting plate on the back of the device, drill 2 holes on the ceiling according to the mounting plate, then fix the wall plugs into the ceiling and fix the mounting plate to the wall plugs with screws. The mounting plate can also be fixed by 3M tapes.



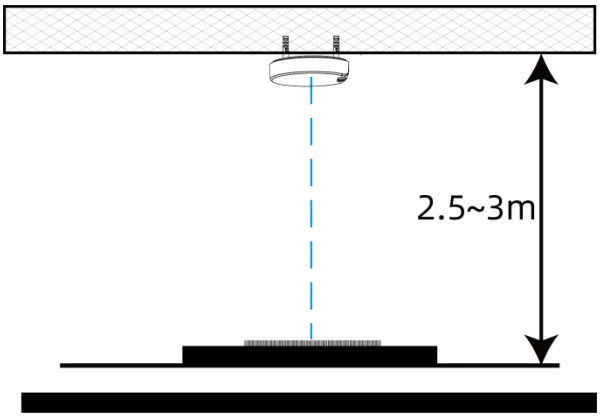


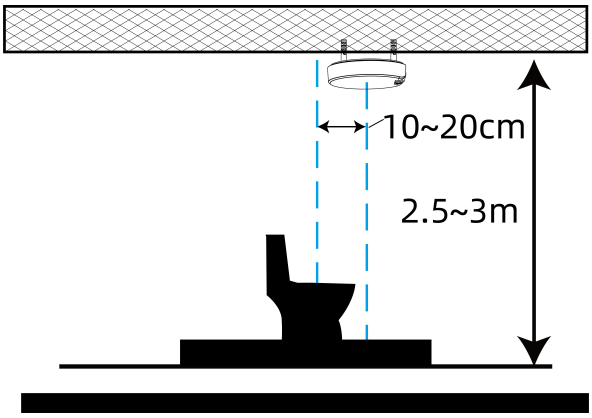
2. Turn the device clocking to lock it to the mounting plate. The angle of rotation can be adjusted according to your requirements (at maximum of 15°).



Installation Location:

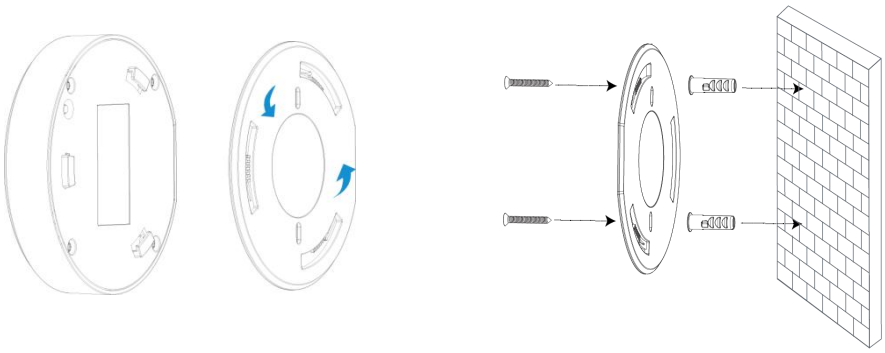
- The installation height should be 2.5m to 3m.
- The sensor part should face the front of toilet and the sensor should be installed horizontally to the ceiling, sensor angle is set to 0°.
- Keep the center of device 10 to 20 cm away from the center of toilet.
- It is suggested to enable test mode to check if opening and closing door will affect the detection results and then adjust the mounting location accordingly.



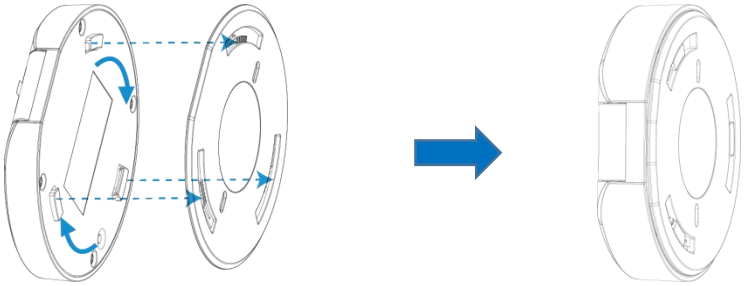


Wall Mount:

1. Take off the mounting plate on the back of the device, drill 2 holes on the wall according to the mounting plate, then fix the wall plugs into the wall and fix the mounting plate to the wall plugs with screws. The mounting plate can also be fixed by 3M tapes.



2. Turn on the device clockwise to lock it to the mounting plate. The angle of rotation can be adjusted according to your requirements (at maximum of 15°).



Installation Location:

- **Locate the device exactly on the wall and at the back of the flush toilet, and the sensor part should face downwards.**
- Do not make the sensor face to door directly or cover the door into detection area when adjusting the sensor angle.
- The installation height should be higher than the height of standing toilet lid to avoid potential influence on the detection accuracy.
- It is suggested to enable test mode to check if opening and closing door will affect the detection results and then adjust the mounting location accordingly.

Installation Note:

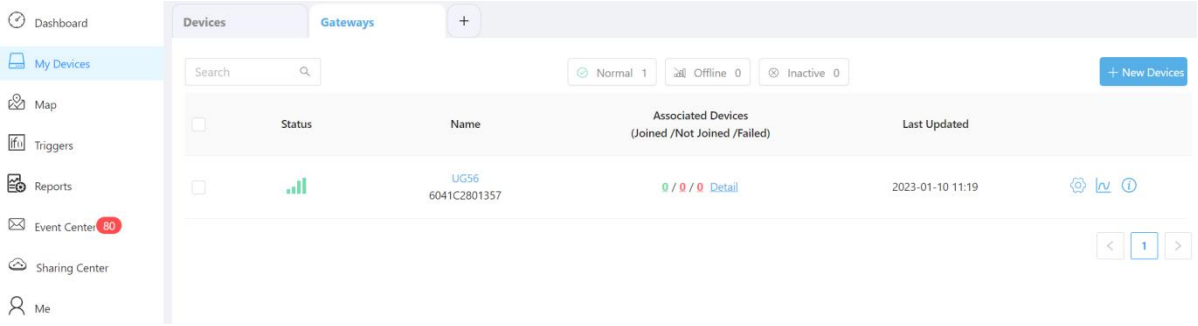
- Avoid strong light, like direct sunlight or IR LED, in the detection area.
- Do not install the device close to glass or mirror.
- After installation and adjustment, please remove the protective film.
- Do not touch the lens of sensors directly to avoid leaving the fingerprint on it.
- The detecting performance will be affected if there's dust on the lens. Please use the mirror cleaning cloth to clean the lens regularly.

- Keep the device away from the water or other liquids to prevent damage to the device.
- Do not modify, disassemble, strike or crush the device.
- Keep the device out of children's reach.

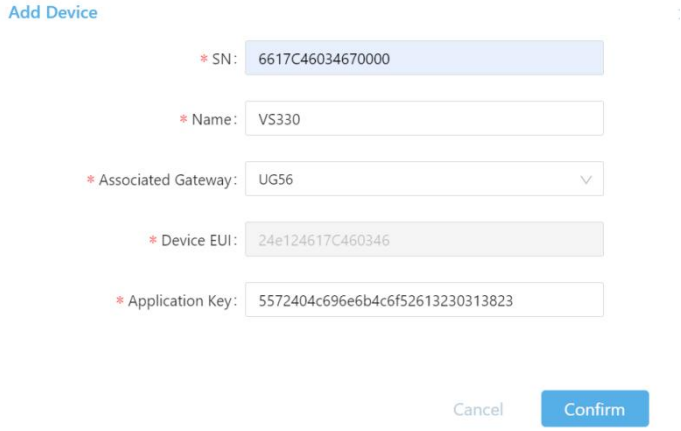
5. Milesight IoT Cloud Management

VS330 sensor can be managed by Milesight IoT Cloud platform. Milesight IoT Cloud is a comprehensive platform that provides multiple services including device remote management and data visualization with the easiest operation procedure. Please register a Milesight IoT Cloud account before operating following steps.

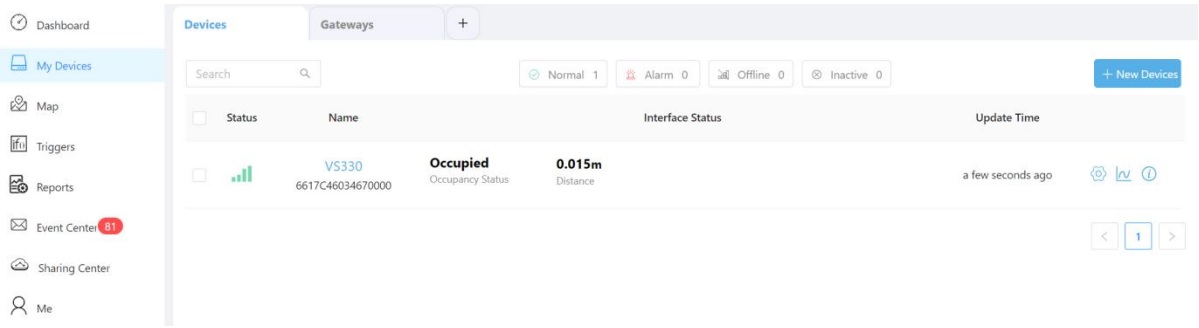
1. Ensure Milesight LoRaWAN® gateway is online in Milesight IoT Cloud. For more info about connecting gateway to cloud please refer to gateway's user guide.



2. Go to **My Device** page and click **+ New Device**. Fill in the SN of device and select associated gateway.



3. After the device is online in Milesight IoT Cloud, you can check the date via webpage or mobile App and create dashboard for it.



6. Device Payload

All data are based on 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.

6.1 Basic Information

VS330 sensors report basic information of sensor whenever joining the network.

Channel	Type	Description
ff	01(Protocol Version)	01=>V1
	09 (Hardware Version)	01 40 => V1.4
	0a (Software Version)	01 14 => V1.14
	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 ff166617c46034670000 ff090110 ff0a0101 ff0f00					
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	0b (Power On)	ff (Reserved)	ff	01 (Hardware version)	01(V1)
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	16 (Device SN)	6617c46034670000	ff	09 (Hardware version)	0110 (V1.1)
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	0a (Software version)	0101 (V1.1)	ff	0f (Device Type)	00 (Class A)

6.2 Sensor Data

VS330 sensors report data according to reporting interval (1080 mins by default) or when occupancy status changes.

Item	Channel	Type	Description
Battery Level	01	75	UINT8, Unit: %
Distance	02	82	The distance between sensor and person. INT16, Unit: mm, Resolution: 1 mm
Occupancy Status	03	8e	00: Vacant; 01: Occupied
Calibration	04	8e	Update the result when test mode is completed. 00: Failure; 01: Success

Example:

017564 02820f00 038e01					
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
01	75 (Battery Level)	64=>100%	02	82(Distance)	0f 00=>00 0f=>15 Distance=15 mm
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
03	8e (Occupancy Status)	01=> Occupied			

6.3 Downlink Commands

VS330 sensors support downlink commands to configure the device. The application port is 85 by default.

Channel	Type	Description
ff	02(Set Collecting Interval)	2 Bytes, unit: s
	03(Set Reporting Interval)	2 Bytes, unit: s
	10 (Reboot)	ff (Reserved)
	70 (Set People Existing Height)	2 Bytes, unit: mm
	71 (Set Test Mode)	1 Byte, 00: Disable; 01:Enable

Example:

1. Set reporting interval as 20 minutes.

ff03b004		
Channel	**Type**	**Value**

ff	03 (Set Reporting Interval)	b0 04=>04 b0=1200s =20 minutes

2. Reboot the device.

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

3. Set people existing height as 12cm.

ff707800		
Channel	**Type**	**Value**
ff	70 (Set People Existing Height)	78 00=>00 78=>120mm =12cm

4. Enable test mode.

ff7101		
Channel	**Type**	**Value**
ff	71 (Set Test Mode)	01=>Enable

-END-