EM300 Series

User Guide

Xiamen Milesight IoT Co., Ltd.

Applicability

This guide is applicable to EM300 series sensors shown as follows, except where otherwise indicated.

Model	Description
EM300-TH	Temperature and Humidity Sensor
EM300-MCS	Magnet Switch Sensor
EM300-SLD	Spot Leak Detection Sensor
EM300-ZLD	Zone Leak Detection Sensor

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 remodeled in any way.
- 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.
- 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.
- Make sure both batteries are newest when install, or battery life will be reduced.
- The device must never be subjected to shocks or impacts.

Declaration of Conformity

EM300 series is in conformity with the essential requirements and other relevant provisions of the CE, FCC, and RoHS.

For assistance, please contact
Milesight technical support:
Email: iot.support@milesight.com
Tel: 86-592-5085280
Fax: 86-592-5023065

Revision History

Date	Doc Version	Description
October 14, 2020	V 1.0	Initial version
October 21, 2020	V 1.1	Model name change and pictures replace
November 19, 2020	V 2.0	Layout replace

Contents

1. Product Introduction

1.1 Overview

EM300 series is a sensor mainly used for outdoor environment through wireless LoRa network. EM300 device is battery powered and designed for multiple mounting ways. It is equipped with NFC (Near Field Communication) and can easily be configured by a smartphone or a PC software.

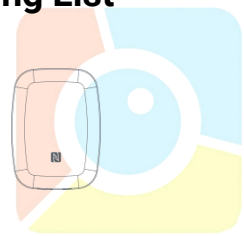
Sensor data are transmitted in real-time using standard LoRaWAN® protocol. LoRaWAN® enables encrypted radio transmissions over long distance while consuming very little power. The user can obtain sensor data and view the trend of data change through Milesight IoT Cloud or through the user's own Network Server.

1.2 Features

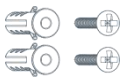
- Up to 11km communication range
- Easy configuration via NFC
- Standard LoRaWAN® support
- Milesight IoT Cloud compliant
- Low power consumption with 4000mAh replaceable battery

2. Hardware Introduction

2.1 Packing List



1 × EM300 Sensor



Wall Mounting Kits

1 × Warranty Card

1 × Quick Guide

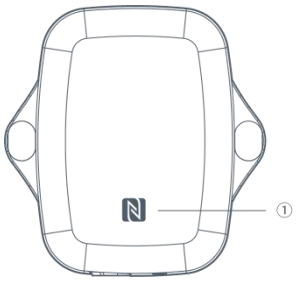
Double Sided Tape(for SLD or MCS sensor)

Mounting Screws (for SLD or MCS sensor)

1 × NFC Reader(Optional)

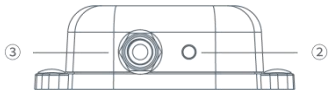
If any of the above items is missing or damaged, please contact your sales representative.

2.2 Product Overview



Front View:

①NFC Area

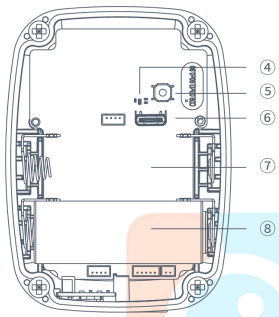


Bottom View:

② Vent

③ Waterproof Connectors

(For water leakage and magnet switch sensor)



Internal View:

④ LED

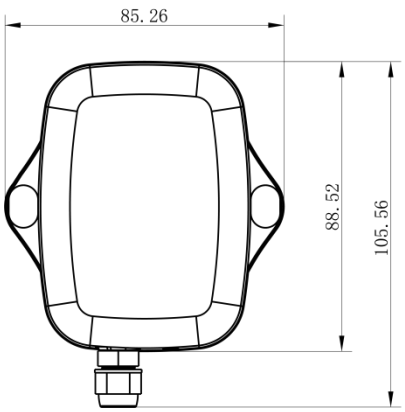
⑤ Power Button

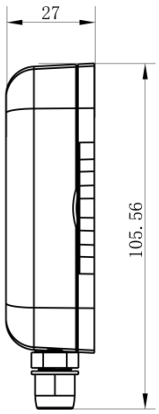
⑥ USB Type-C

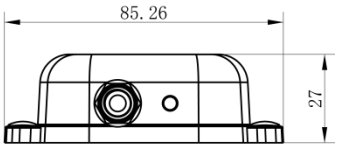
⑦ Expandable Battery Slot

⑧ Battery

2.3 Dimensions(mm)







2.4 Power Button

Note: The LED indicator and power button are inside the device. EM300 can also be turned on/off and reset via Mobile APP or Toolbox.

Function	Action	LED Indication
Turn On	Press and hold the button for more than 3 seconds.	Off → Static Green
Turn Off	Press and hold the button for more than 3 seconds.	Static Green -> Off
Reset	Press and hold the button for more than 10 seconds. **Note:** EM300 will automatically power on after reset.	Blink 3 times.
Check On/Off Status	Quickly press the power button.	Light On: Device is on. Light Off: Device is off.

3. Basic Configuration

EM300 sensor can be monitored and configured via one of the following methods:

- Mobile APP (NFC);
- Windows software (NFC or Type-C port).

In order to protect the security of sensor, password validation is required when configuring via unused phone . Default password is **123456**.

3.1 Configuration via Smartphone APP

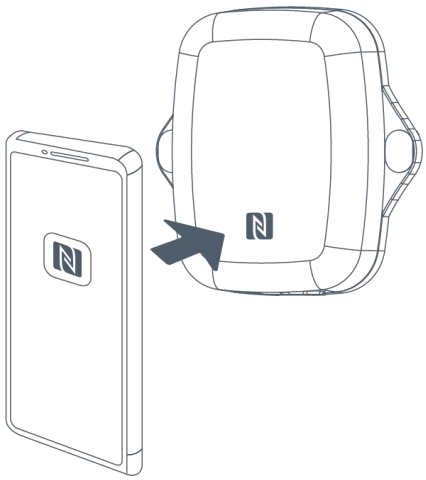
Preparation:

- Smartphone (NFC supported)
- Toolbox APP: download and install from Google Play or Apple Store.

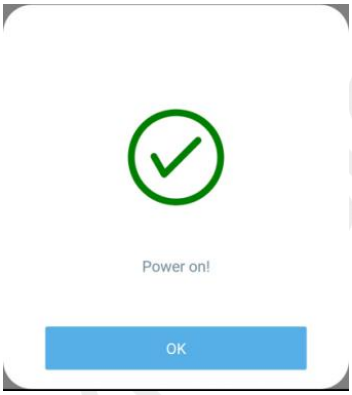
3.1.1 Read/Write Configuration via NFC

1. Enable NFC on the smartphone and open“Toolbox”APP.
2. Attach the smartphone with NFC area to the device to read basic information.

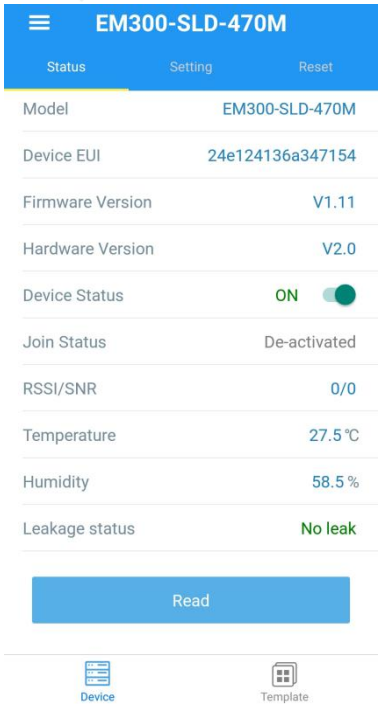
Note: Ensure your smartphone NFC area and it is recommended to take off phone case before using NFC.



3. Change the on/off status or parameters, then attach the smartphone with NFC area to the device until the APP shows a successful prompt.



4. Go to“Device > Status” to tap“Read”and attach the smartphone with NFC area to the device to read real-time data of sensor.

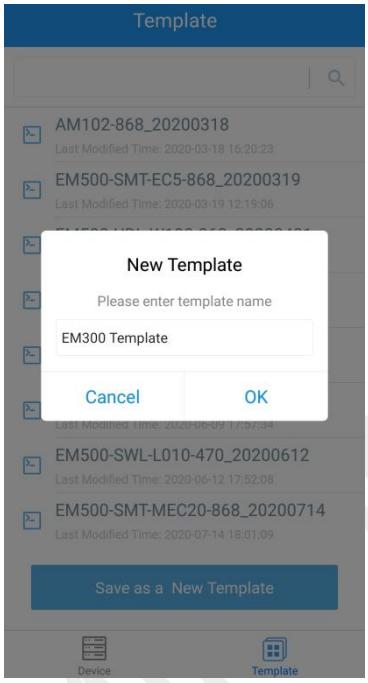


3.1.2 Template Configuration

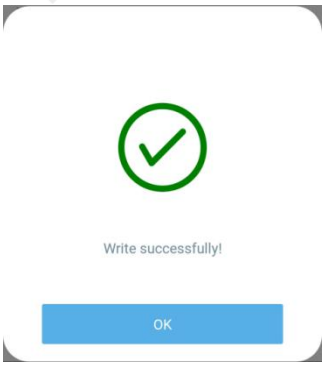
Template settings only work for easy and quick device configuration in bulk.

Note: Template function is allowed only for sensors with the same model and LoRa frequency band.

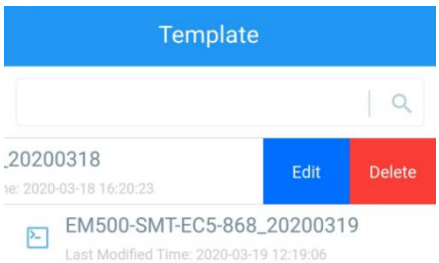
1. Go to “Template” page on the APP and save current settings as a template.



2. Attach the smartphone with NFC area to another device.
3. Select the template file from Toolbox APP and tap “Write”,keep the two devices close until the APP shows a successful prompt.



4. Slide the template item to the left to edit or delete the template.



3.2 Configuration via PC

Preparation:

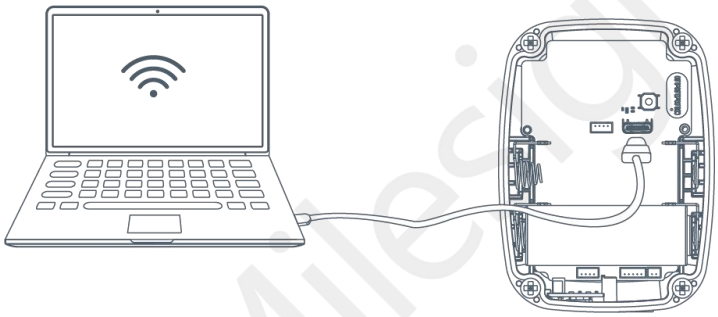
- Dedicated NFC Reader or Type-C USB cable
- PC (Windows 10 is recommended)
- Toolbox: https://www.milesight-iot.com/software-download/

3.2.1 Log in the Toolbox

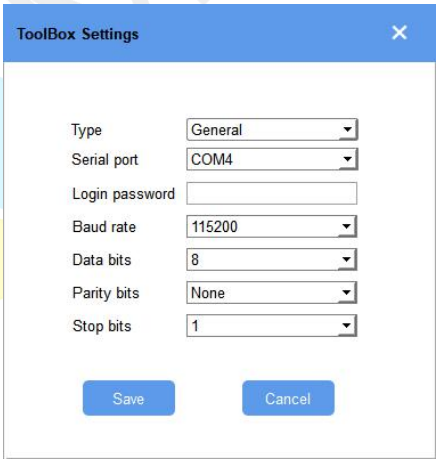
Make sure "Toolbox" is downloaded on your computer. Select one of the following methods to log in Toolbox.

Type-C Connection

1. Open the case of EM300 and connect the EM300 to computer via type-C port.

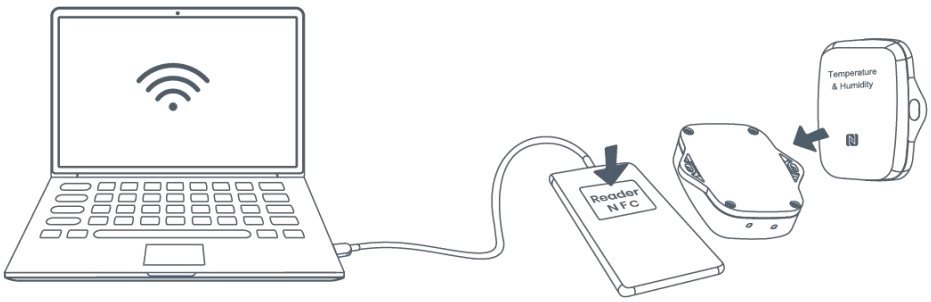


2. Select type as "General" and click password to log in Toolbox. (Default password: 123456)

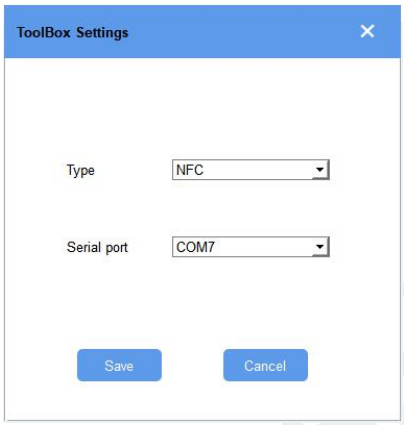


NFC Connection

1. Connect the NFC reader to computer, then attach the EM300 to NFC area of the reader.

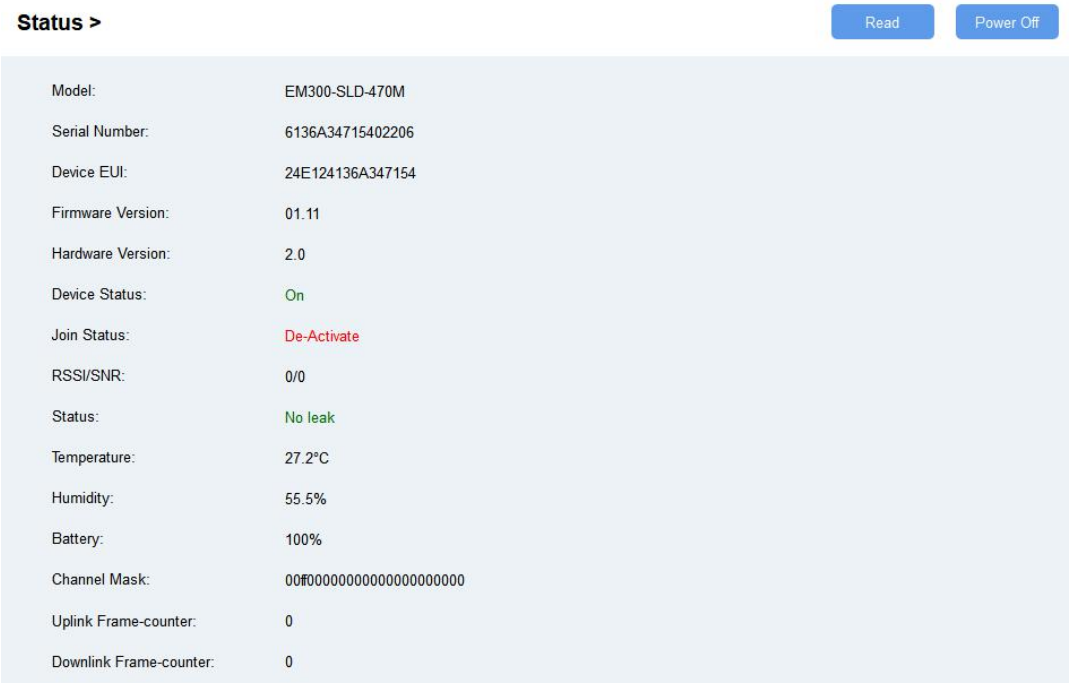


2. Select type as “NFC” and serial port as NFC reader port on Toolbox.



3.2.2 Basic Configuration

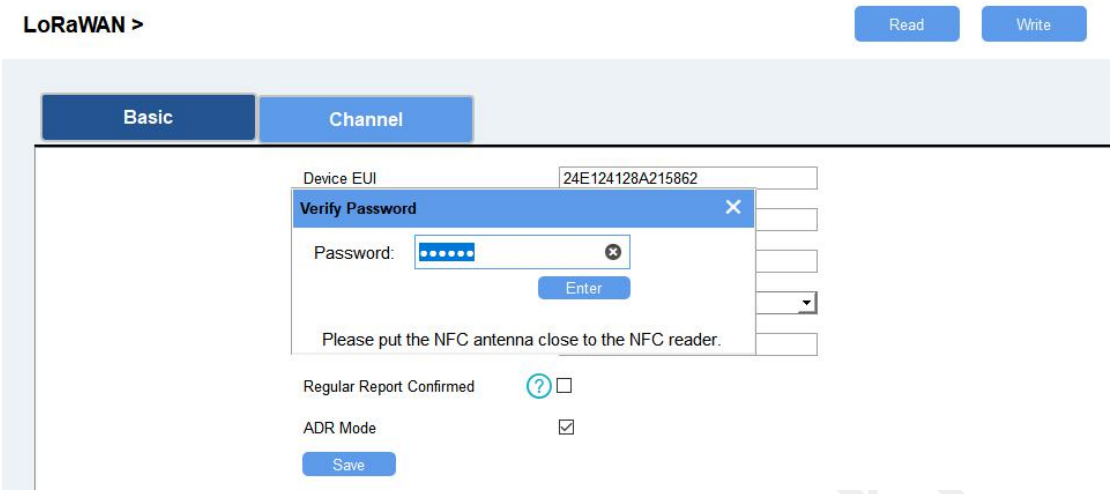
1. Click “Read” to read current data of the sensor.



2. When you perform one of the following operations, enter the password and wait a few seconds until toolbox shows a successful prompt. (Password is not need if you connect it via type-C port)

- Turn on/off the sensor
- Reset the sensor

- Click“Write”to change settings
- Upgrade



3.2.3 Template Settings

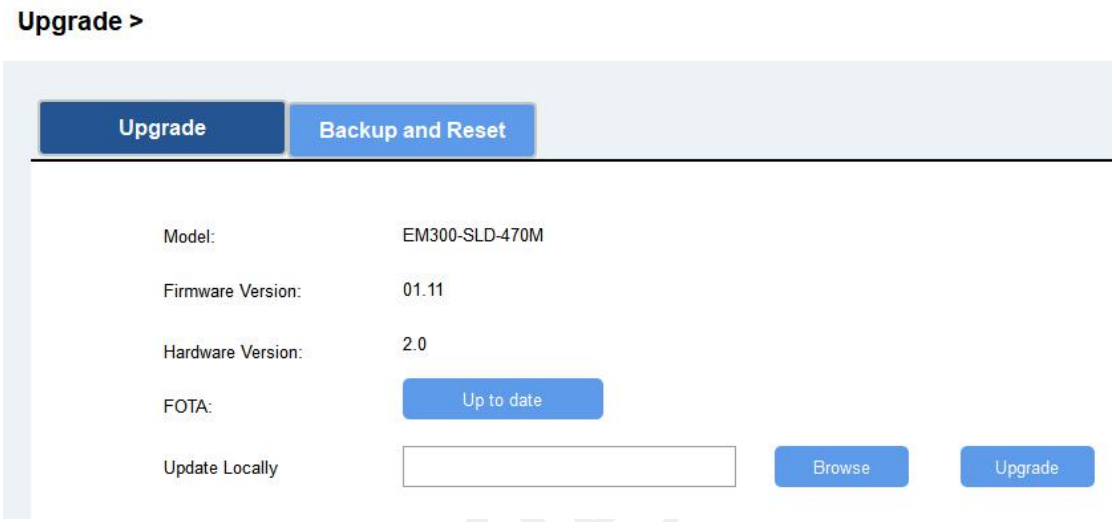
Note: Template function is allowed only for sensors with the same model and LoRa frequency band.

1. Go to “Maintenance -> Template and Reset” page in Toolbox.
2. Click “Export” to save the current settings as a template.
3. Click “Browse” to select the correct template from computer.
4. Click “Import” to import the template to the device.

3.2.4 Upgrade

1. Download firmware on your computer.
2. Go to “Maintenance -> Upgrade”page in Toolbox.
3. Click“Browse”and select the firmware from computer.
4. Click“Upgrade”to upgrade the device.

Note: If NFC connection is selected, please keep the two devices close and don’t move them in order to get the best connectivity as possible when upgrading.



3.3 Configuration Examples

3.3.1 LoRa Channel Settings

The configuration of LoRaWAN® channel of EM300 must match the gateway’s. Refer to Appendix to check default channel settings of EM300.

Mobile APP Configuration:

Open Toolbox APP and go to “Device ->Setting -> LoRaWAN Settings” to change the frequency and channels.

Software Configuration:

Log in Toolbox and go to“LoRaWAN Settings -> Channel”to change frequency and channels.

Note: If frequency is one of CN470/AU915/US915, you can enter the index of the channel that you want to enable in the input box, making them separated by commas.

Examples:

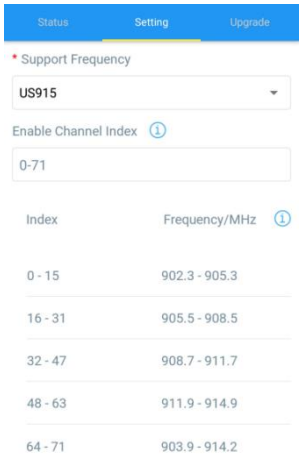
1, 40: Enabling Channel 1 and Channel 40

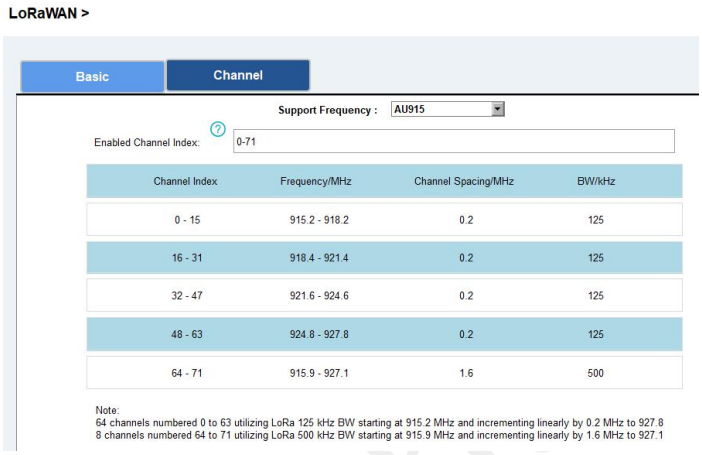
1-40: Enabling Channel 1 to Channel 40

1-40, 60: Enabling Channel 1 to Channel 40 and Channel 60

All: Enabling all channels

Null: Indicates that all channels are disabled



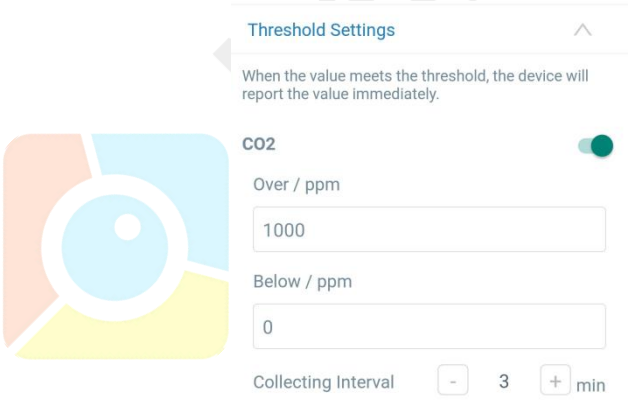


3.3.2 Alarm Settings

When water leakage sensor or magnet switch sensor is triggered, it will send alarm message once by default. Toolbox allows users to change the alarm reporting interval and reporting times.

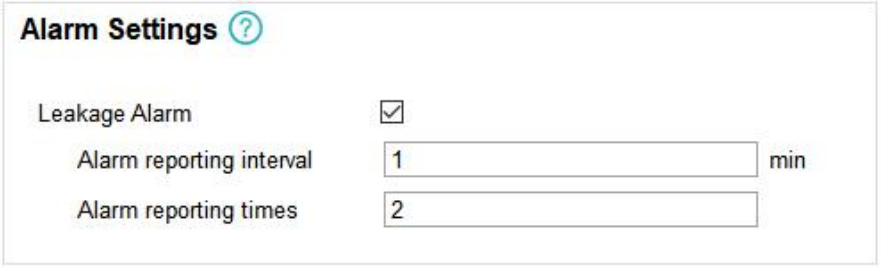
Mobile APP Configuration:

Open Toolbox APP and go to“Device -> Setting -> Threshold Settings”to enable the threshold settings and input the threshold.



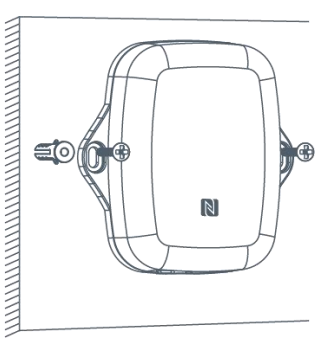
Software Configuration:

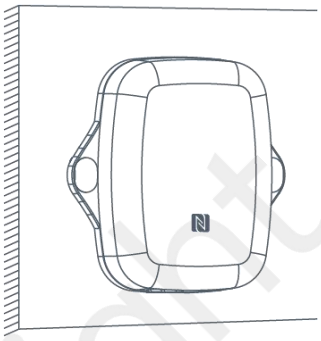
Log in Toolbox and go to“Device Settings -> Basic -> Threshold Settings”to enable the calibration and input the calibration value.



4. Installation

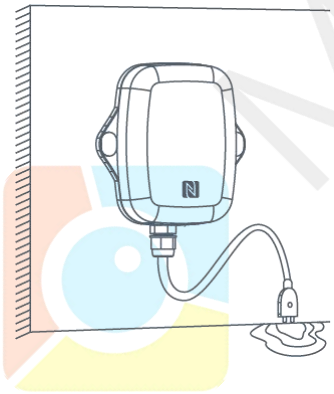
1. Attach EM300 to the wall and mark the two holes on the wall. The connecting line of two holes must be a horizontal line.
2. Drill the holes according to the marks and screw the wall plugs into the wall.
3. Mount the EM300 to the wall via mounting screws.
4. Cover the mounting screws with screw caps.

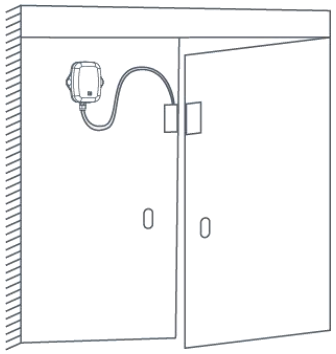




5. For leak detection senor, install the probe/cable to the place where liquid may leak. For magnet switch sensor, install the magnet beside the door/window.

Note: For SLD sensor, please ensure the metal pins of the probe are flat on the floor; for ZLD sensor, the cable can't be twined or accumulated together. The probe or cable of water leakage sensor should be placed in an area of concern where water from a leak would likely accumulate.





5. Milesight IoT Cloud Management

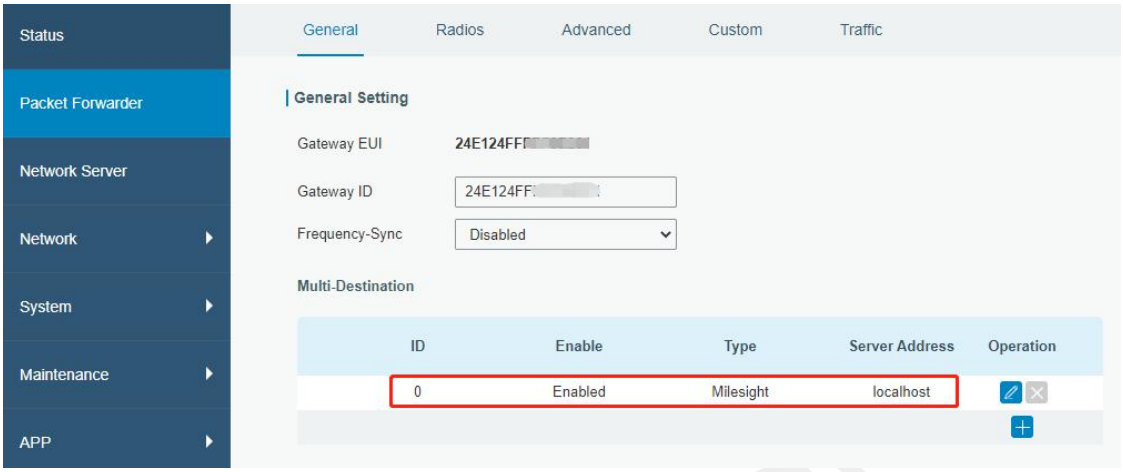
EM300 sensors can be managed by Milesight IoT Cloud platform. Milesight IoT cloud is a comprehensive platform that provides multiple services including device remote management and data visualization with the easiest operation procedures. Please register a Milesight IoT Cloud account before operating following steps.

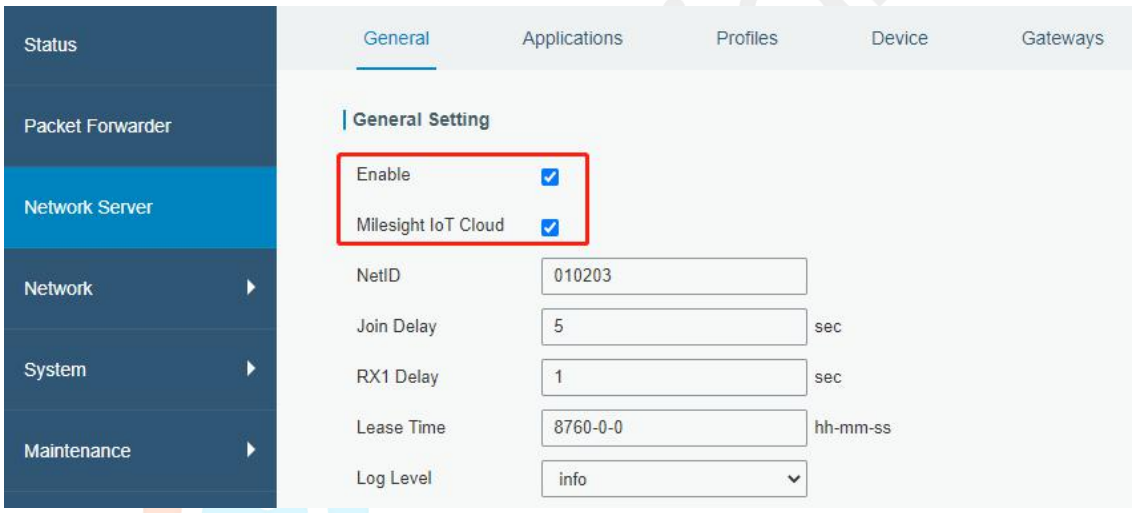
Milesight IoT Cloud URL: cloud.milesight-iot.com

5.1 Add a Milesight Gateway

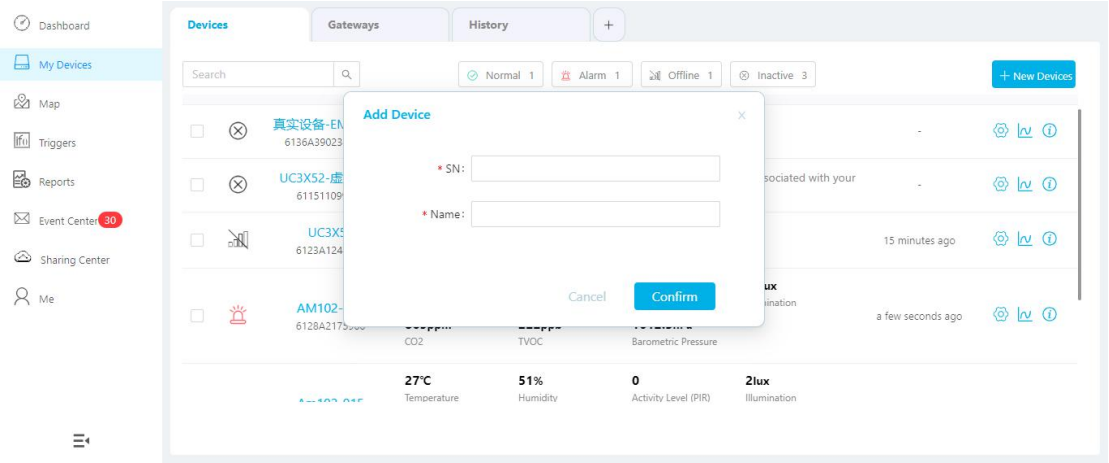
1. Enable “Milesight” type network server and “Milesight IoT Cloud” mode in gateway web GUI.

Note: Ensure gateway has accessed the Internet.

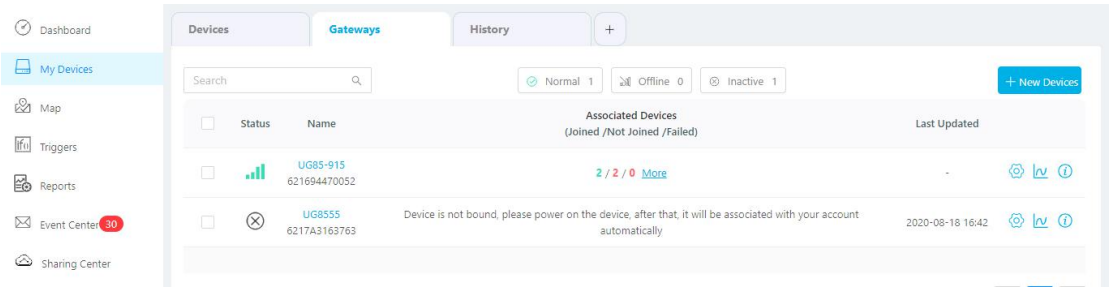




2. Go to “My Devices” page and click “+New Devices” to add gateway to Milesight IoT Cloud via SN. Gateway will be added under “Gateways” menu.

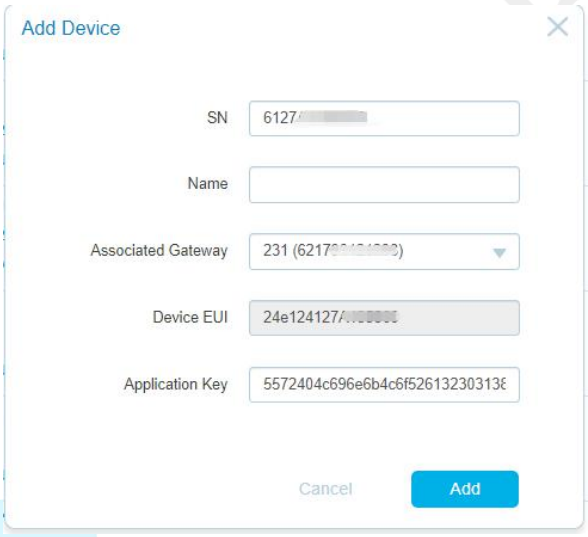


3.Check if gateway is online in Milesight IoT Cloud.

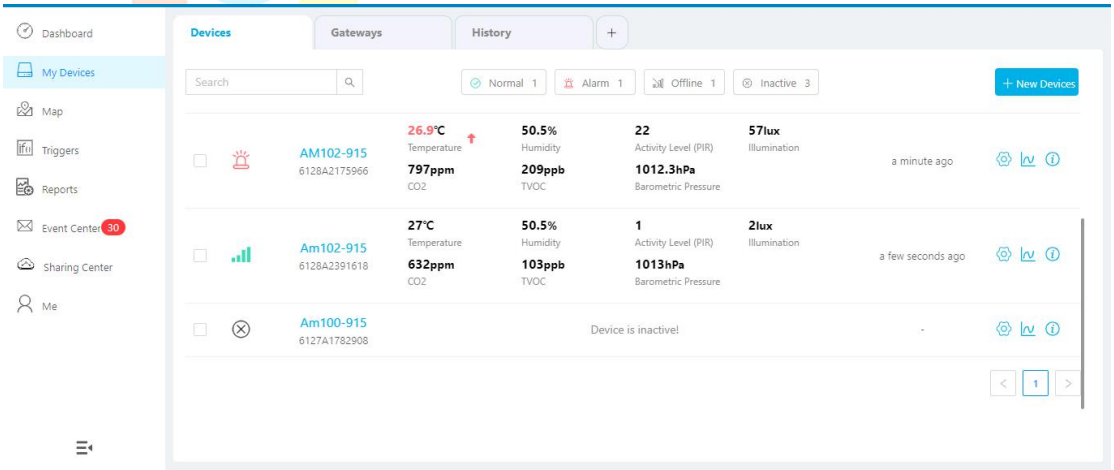


5.2 Add EM300 to Milesight IoT Cloud

1. Go to “My Devices” page and click “+New Devices”. Fill in the SN of EM300 and select associated gateway.



2. After EM300 is connected to Milesight IoT Cloud, you could check the device information and data and create dashboard for it.



6. Sensor Payload

All data are based on following format:

Channel1	Type1	Data1	Channel2	Type2	Data2	Channel 3	...
1 Byte	1 Byte	N Bytes	1 Byte	1 Byte	M Bytes	1 Byte	...

Uplink Packet(HEX)

Channel	Type	Data Example	Description
01	75(Battery Level)	64	64=>100 Battery level =100%
03	67 (Temperature)	10 01	10 01 => 01 10 = 272 Temp=272*0.1=27.2°C
04	68(Humidity)	71	71=>113 Hum=113*0.5=56.5%
05	00	00	Not water leakage
		01	Water leakage
06	00	00	Magnet switch closed
		01	Magnet switch open
ff	01(Milesight Protocol Version)	01	V1
	08 (Device SN)	64 10 90 82 43 75 00 01	Device SN is 6410908243750001
	09 (Hardware Version)	01 40	V1.4
	0a(Software Version)	01 14	V1.14
	0f(Device Type)	00	Class A

Downlink Packet(HEX)

Channel	Type	Data Example	Description
ff	03(Set Reporting Interval)	b0 04	b0 04 => 04 b0 = 1200s

Appendix

Default LoRaWAN Parameters

DevEUI	24E124 + 2nd to 11th digits of SN e.g. SN = 61 26 A1 01 84 96 00 41 Then Device EUI = 24E124126A101849
AppEUI	24E124C0002A0001
Appport	0x55
NetID	0x010203
DevAddr	The 5th to 12th digits of SN e.g. SN = 61 26 A1 01 84 96 00 41 Then DevAddr = A1018496
AppKey	5572404C696E6B4C6F52613230313823
NwkSKey	5572404C696E6B4C6F52613230313823
AppSKey	5572404C696E6B4C6F52613230313823

Default Uplink Channels

Model	Channel Plan	Channel Settings/MHz
EM300-470M	CN470	470.3~489.3(All 95 channels)
EM300-868M	EU868	868.1, 868.3, 868.5
	RU864	868.9, 869.1
	IN865	865.0625, 865.4025, 865.6025
EM300-915M	AU915	915.2~927.1 (All 72 channels)
	US915	902.3~914.2 (All 72 channels)
	KR920	922.1, 922.3, 922.5
	AS923	923.2, 923.4

-END-