Agricultural Monitoring Starter Kit Quick Guide

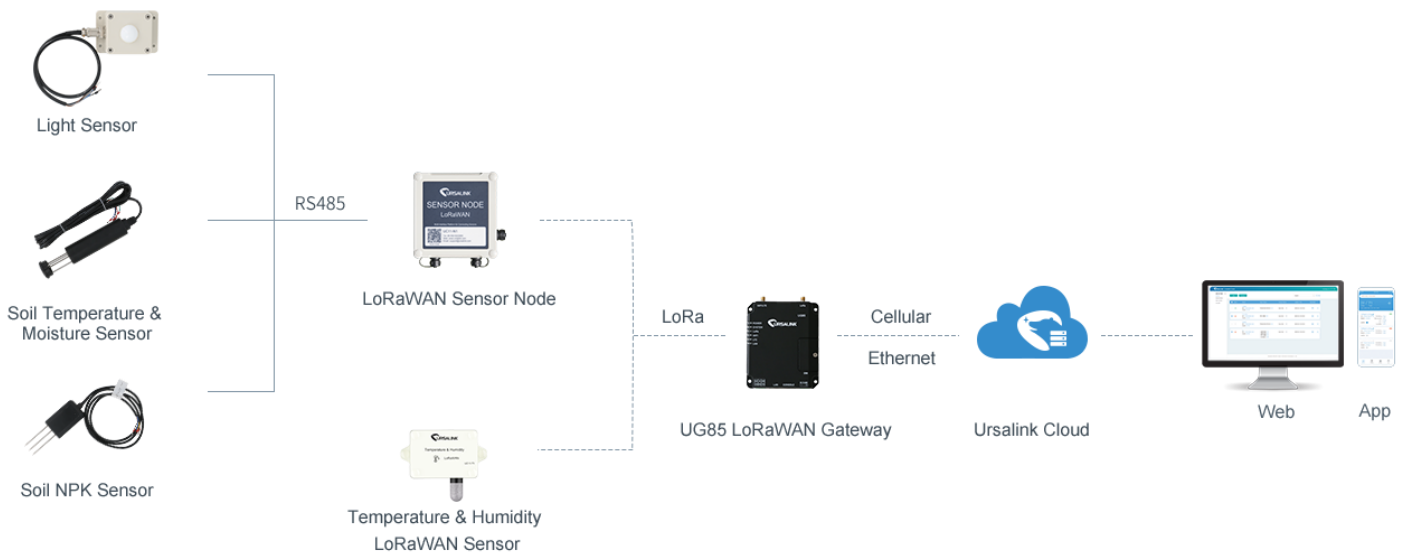
CONTENTS

Welcome

Thank you for choosing Ursalink LoRaWAN Agricultural Monitoring Node-to-App Starter Kit. This user guide will show you all the functions and features of the product. The kit is designed for agricultural applications. The product should be used under the guidance of this user guide, referring to parameters and technical specifications. This kit can offer LoRaWAN connectivity for remote access and easy management of sensors.

We bear no liability for property loss or physical injury arising from abnormal or incorrect usage of this product.

System Topology



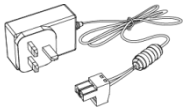
Product List

The kit, capable of data collection in the agricultural industry, contains a variety of sensors to measure light, NPK (nitrogen, phosphorus, and potassium), temperature & moisture in soil, and ambient temperature & humidity. Working together with LoRaWAN gateway, it can help users to collect data and monitor real-time environment change remotely as well as check visualized data on Ursalink Cloud anywhere and anytime.

Please note: third-party LoRaWAN sensors can be added based on the interface.

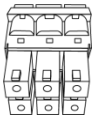
1 × UG85

1 × Ethernet Cable

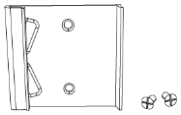


1 × Power Adapter

1 × Stubby LoRa Antenna

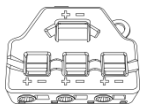


1 × 6-Pin Pluggable Terminal

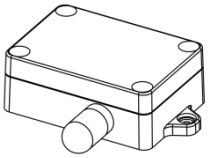


1 × DIN Rail Kit

4 × Setscrews



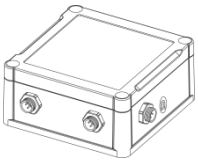
2 x Wire Connector



1 × UC11-T1

1 × Magnet

4 x Screw Set

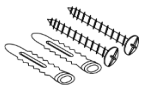


1 × UC11-N1

2 × Data Cable (for connection)

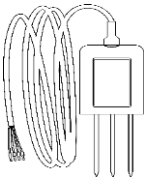
1 × USB Cable (for configuration)

1 × Magnet

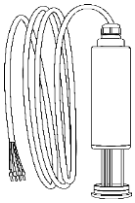


4 x Screw Set

1 × Light Sensor



1 x Soil NPK Sensor



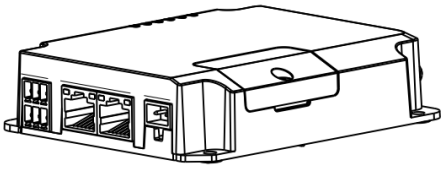
1 x Soil Temp & Moisture Sensor

Hardware Installation

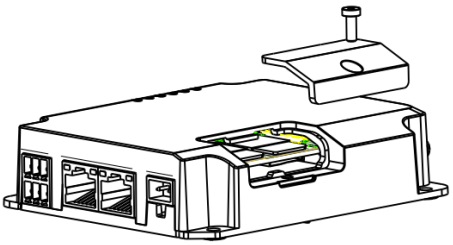
UG85 Installation

SIM Card Installation

A. Unscrew the cover of the SIM card and take it off.



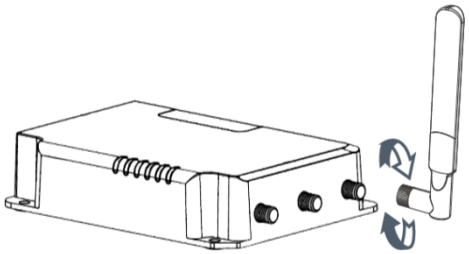
B. Put the SIM card into the slot and screw it up.



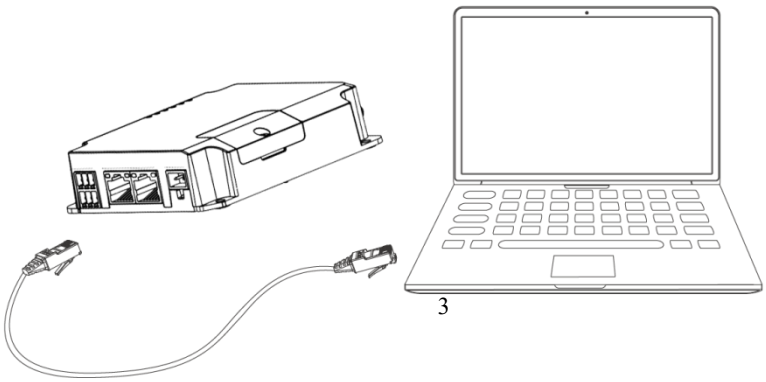
Antenna Installation

Rotate the antenna into the antenna connector accordingly.

Note: The external antenna should be installed vertically always on a site with a good cellular signal.



Ethernet Connection



UC11-N1 & UC11-T1 Installation

UC11-N1 Wiring

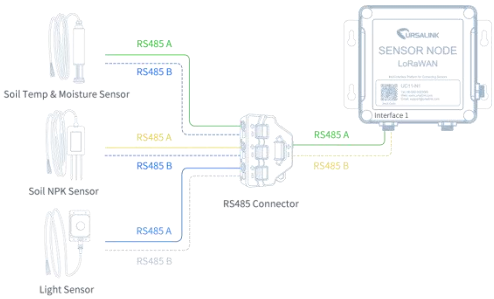


Figure 1 RS485 Wiring

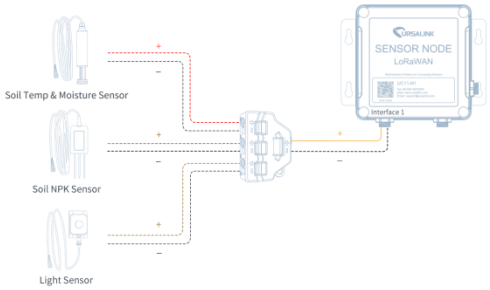
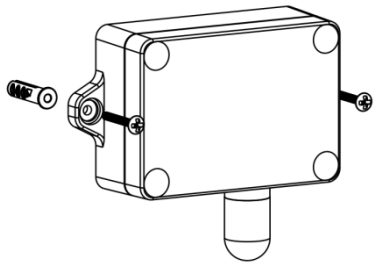


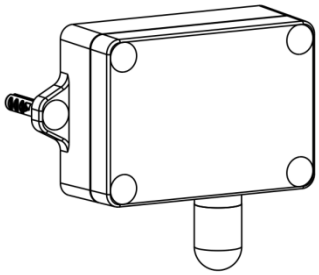
Figure 2 Power Wiring

UC11-T1 Mounting

A. Use 2 flat head Phillips screws to fix the UC11-T1 onto the wall mounting.

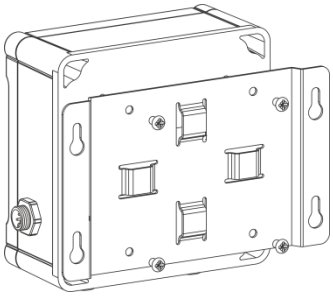


B. Cover the screws with two screw caps.

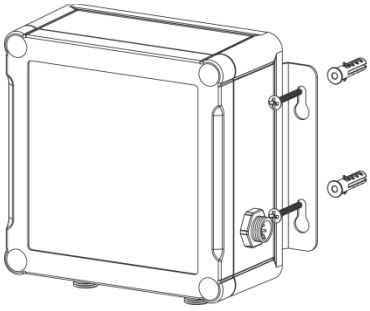


UC11-N1 Mounting

A. Mount the enclosure to the mounting bracket with screws.



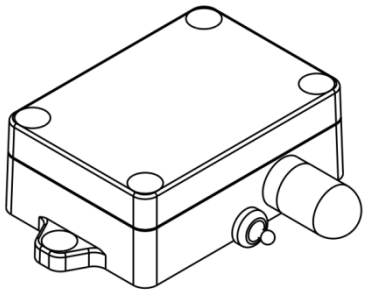
B. Mount the mounting bracket horizontally to the wall by fixing the screws into the wall plugs.



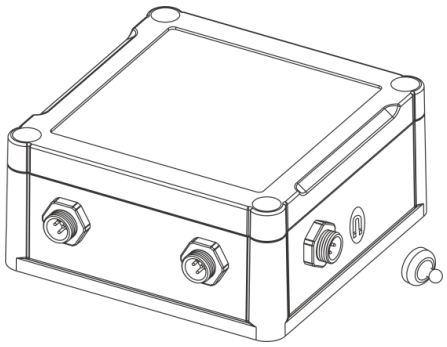
Turn ON/OFF UC11-N1 & UC11-T1

Place the magnet on the sign ‘U’ to turn on/off UC11-N1.

Power ON: Beep for 2 seconds



Power OFF: Beep for 6 seconds



Sensor Installation

Soil Temp & Moisture Sensor

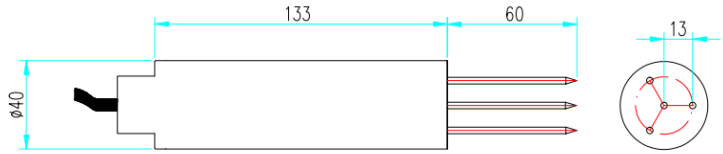
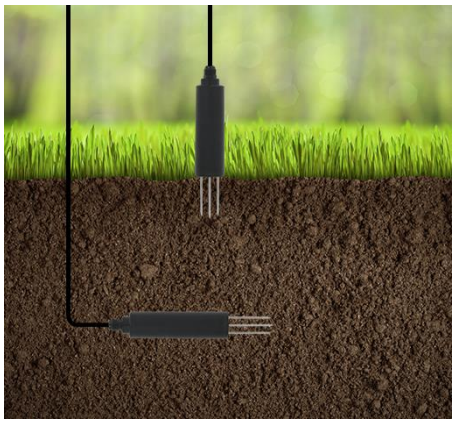


Figure 3

Remove the round top cover. In order to avoid damaging the probe, insert the probe into the soil where the density is even.

Example:



Quick Test: Choose a suitable measurement place, and avoid rocks or other hard objects. Insert the sensor vertically into the soil. Do not rock the probe while inserting it. This method can only make a small range of measurements and needs multiple measurements to get the average value as calibration value.

Underground Test: Dig a pit of a certain depth vertically, and insert the sensor horizontally into the measured position, after that fill the pit. This method can measure and record value for a long time.

Soil NPK Sensor

Quick Test: Choose a suitable measurement place, and avoid rocks or other hard objects. Insert the sensor vertically into the soil. Do not rock the probe while inserting it. This method can only make a small range of measurements and needs multiple measurements to get the average value as calibration value.

Underground Test: Dig a pit of a certain depth vertically, and insert the sensor horizontally into the measured position, after that fill the pit. This method can measure and record value for a long time.

NOTE: Keep the Soil Temp & Moisture Sensor and Soil NPK Sensor at a distance of about 80cm while in working mode. Make sure no metal is around the sensor.

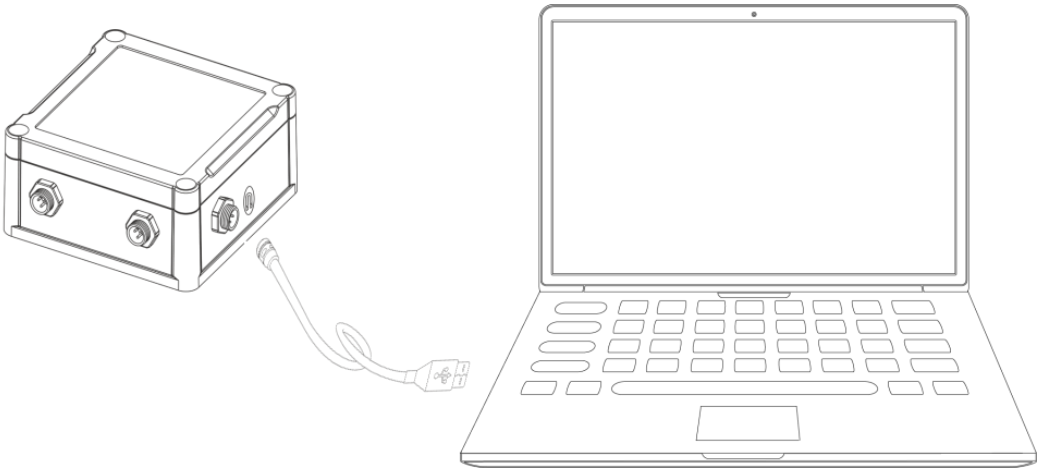
Light Sensor

Be sure to place the round sensor always on top and always towards the sun while using it.

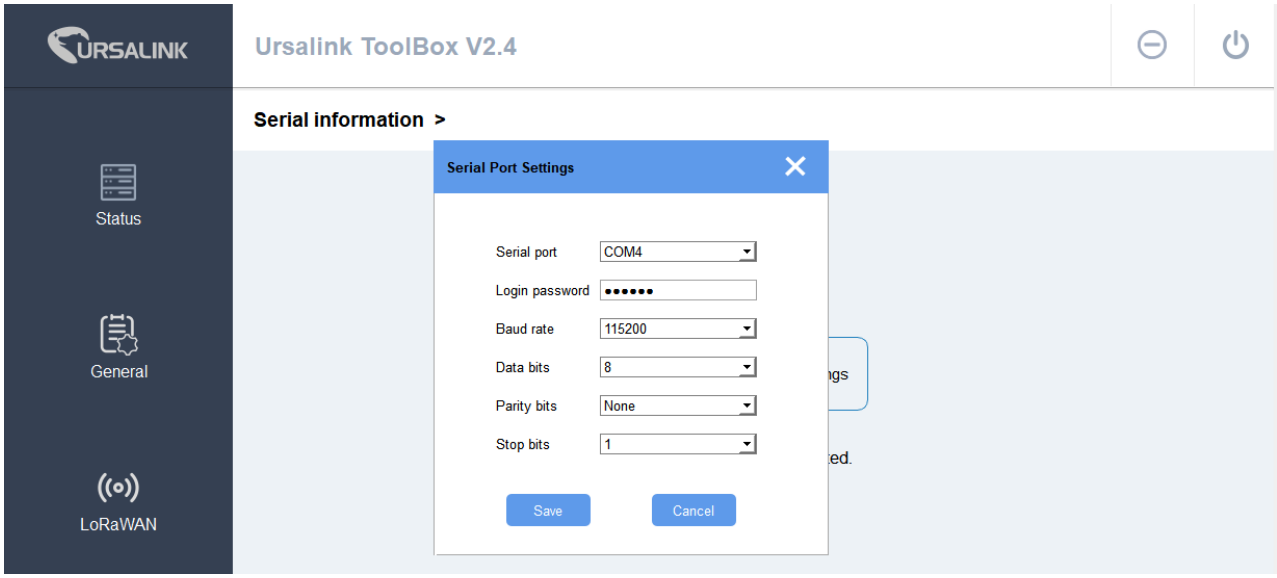
Device Configuration

UC11-N1 Configuration

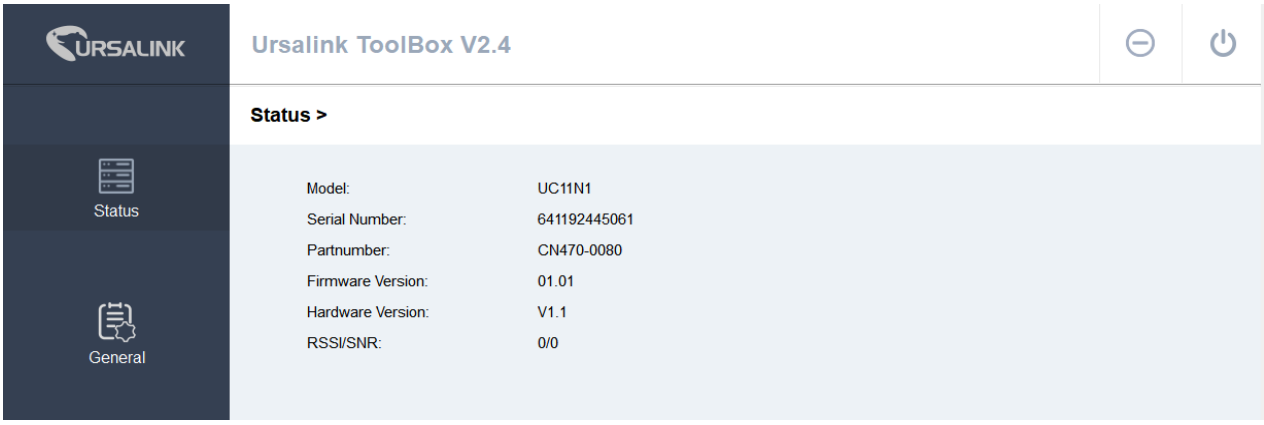
Please connect PC and UC11-N1 directly via USB ports and open the Toolbox.



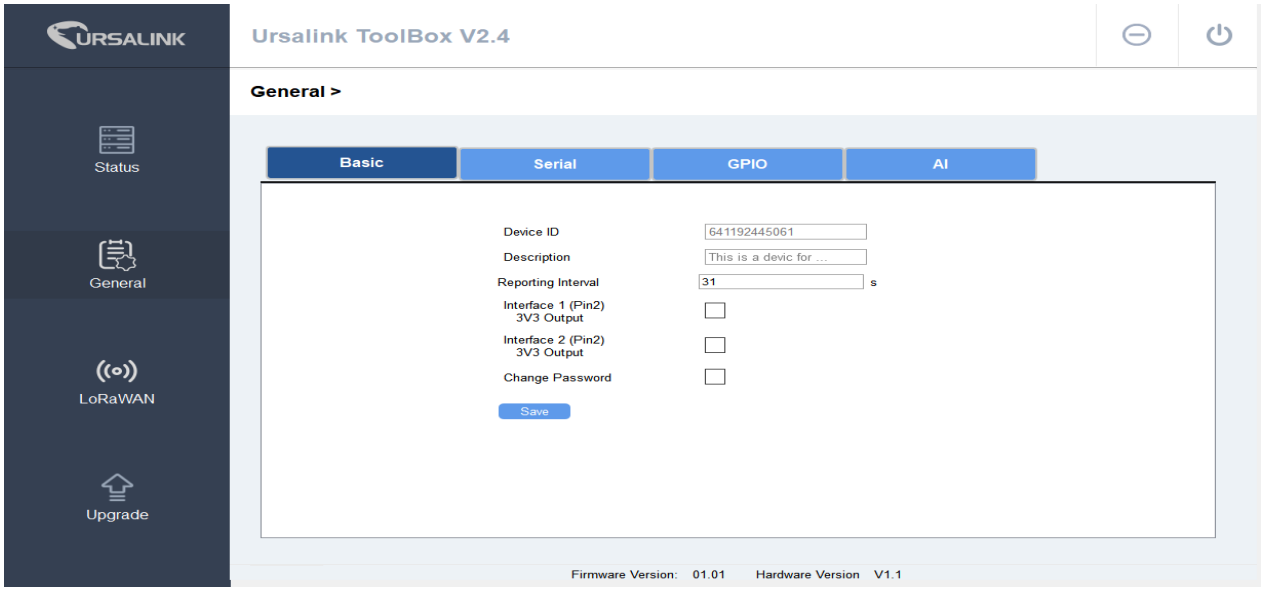
① Select serial port and fill in the default login password: ‘123456’, and then click ‘Save’.



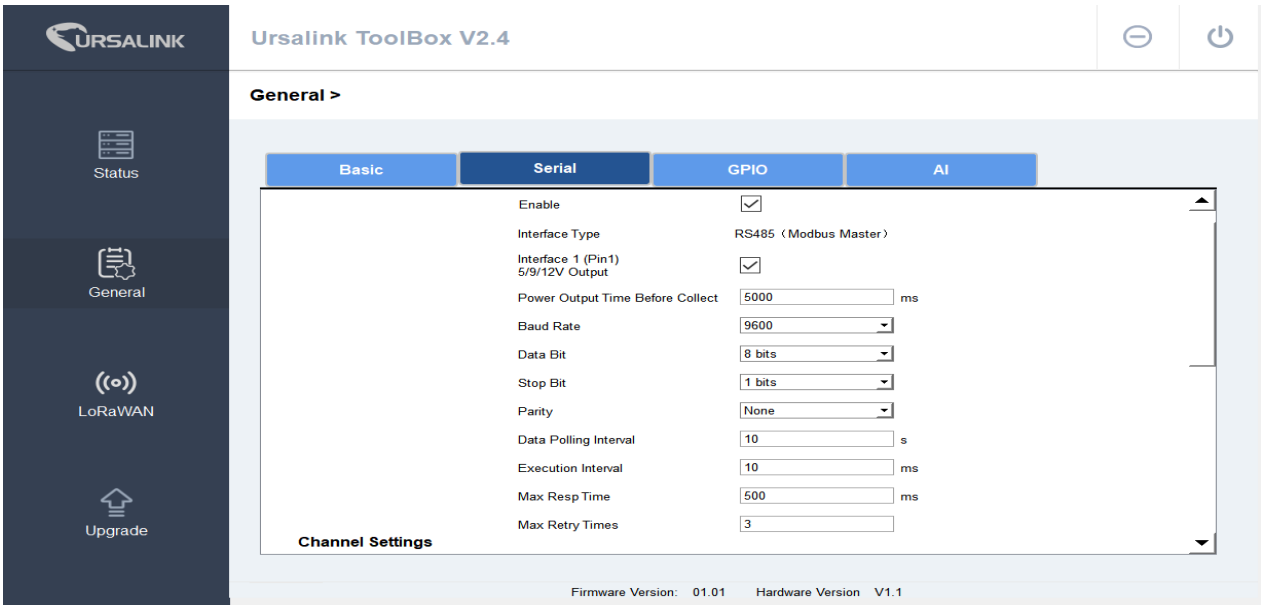
② Click ‘Status’ to check property of the device.



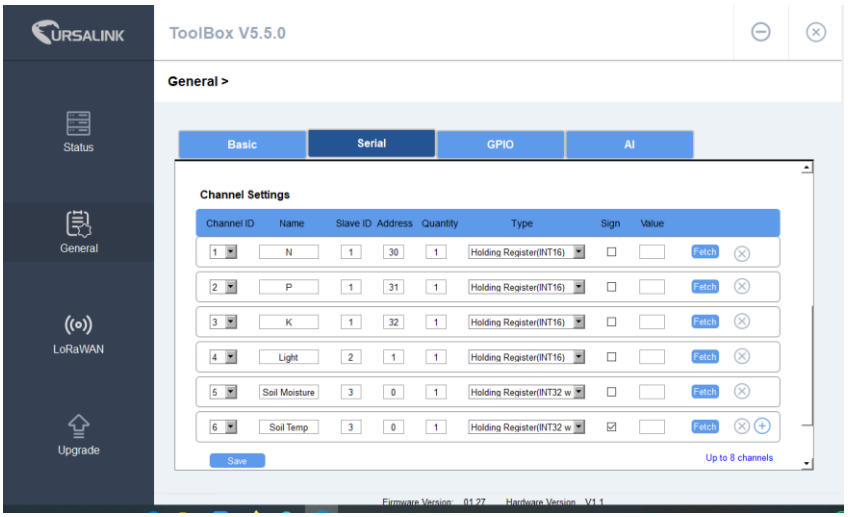
③ Click ‘General/Basic’ to configure the ‘Reporting Interval’.



④ Click ‘General/Serial’ to configure RS485 property and channel. If you want to make N1 as a power supply source, please make sure that the Interface Output is enabled. (The suggested ‘Power Output Time Before Collect’ is 5000ms) .



⑤ You could click ⊕ to add a channel or click ⊗ to delete a channel. Fill in the corresponding item as the following figure.



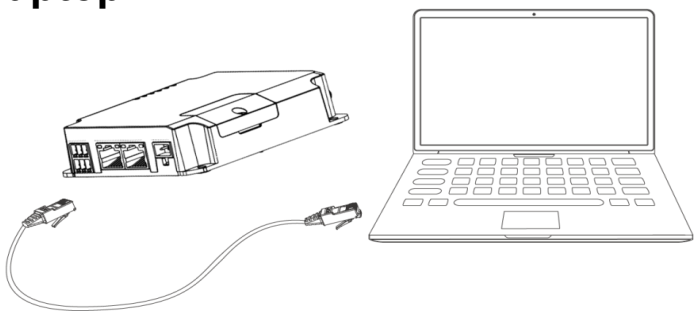
If the value is obtained after clicking the button ‘fetch’, it means that N1 can fetch data from the sensor normally.

UC11-N1 Default Setting

Channel ID	Name	Slave ID	Address	Quantity	Type	Sign
1	N	1	30	1	Holding Register (INT16)	
2	P	1	31	1	Holding Register (INT16)	
3	K	1	32	1	Holding Register (INT16)	
4	Light	2	1	1	Holding Register (INT16)	
5	Soil Moisture	3	0	1	Holding Register (INT32 with upper 16bits)	
6	Soil Temp	3	0	1	Holding Register (INT32 with lower 16bits)	

Gateway Configuration

Connect to Laptop



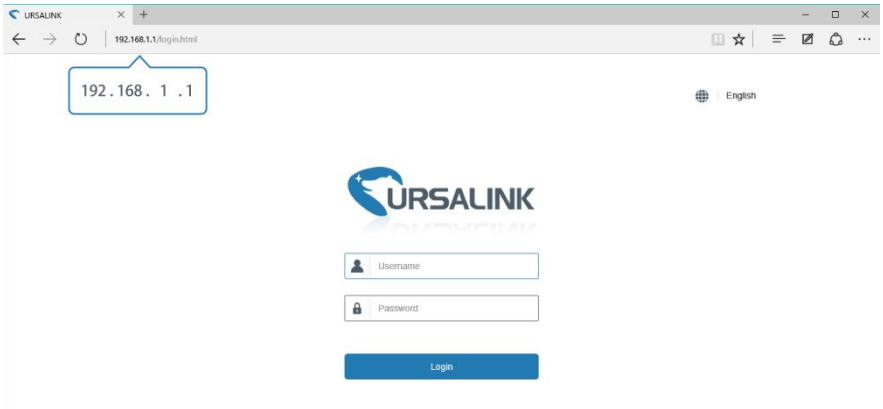
A. Open a web browser on your PC (Chrome and IE are recommended), type in the IP address, and press Enter on your keyboard.

B. Enter the username and password, click “Login”.

IP Address: 192.168.1.1

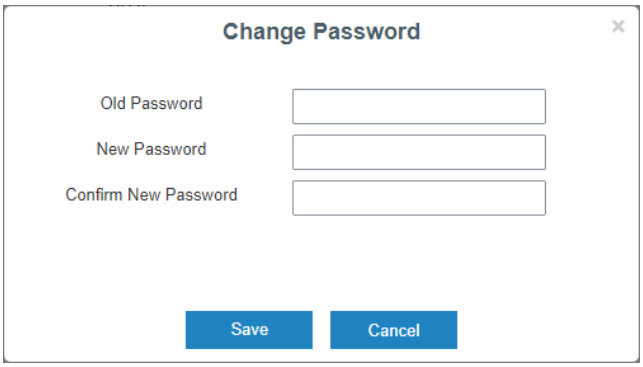
Username: admin

Password: password

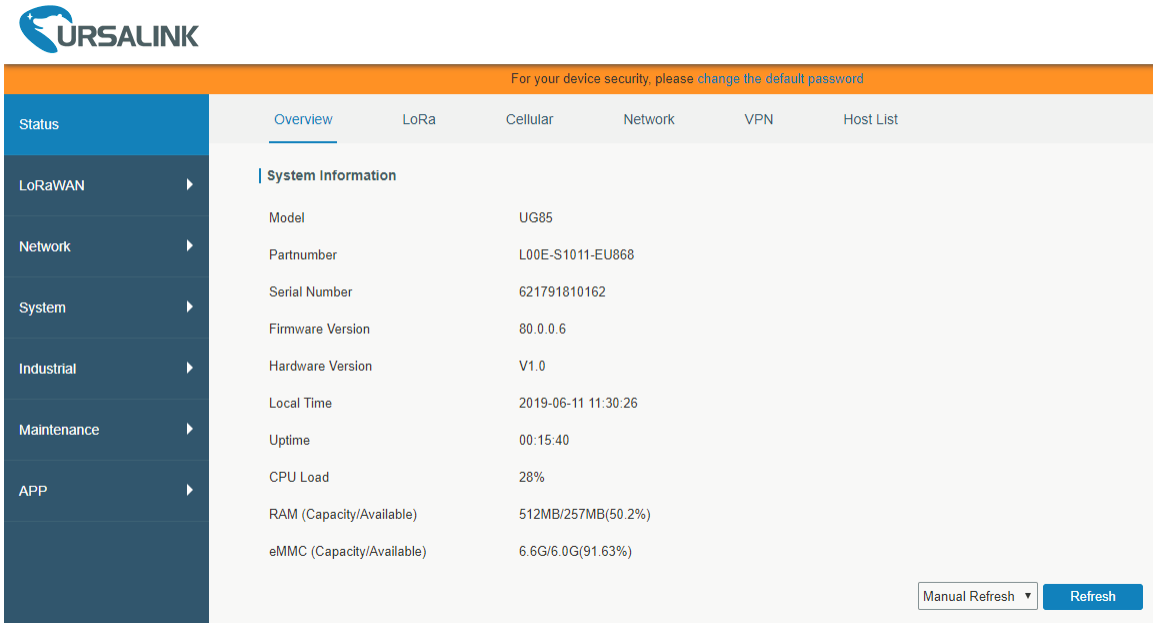


If you enter the username or password incorrectly more than 5 times, the login page will be locked for 10 minutes.

B. When you log in with the default username and password, you will be asked to modify the password. It's suggested that you change the password for the sake of security. Click the 'Cancel' button if you want to modify it later.



D. After you log into the Web GUI, you can view system information and adjust the configuration of the gateway.



Network Access

Connecting via cellular

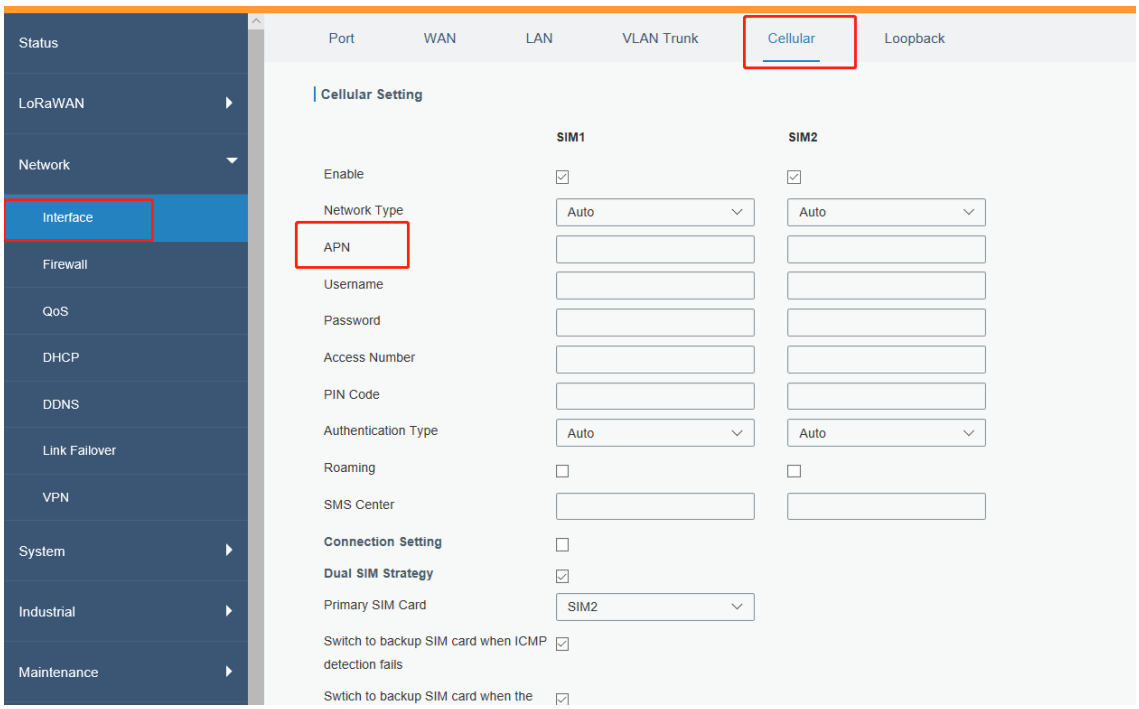
Take inserting SIM card into SIM1 slot as an example; please refer to the following detailed operations.

A. Click “Network” → “Interface” → “Cellular” → “Cellular Setting” to configure the cellular info.

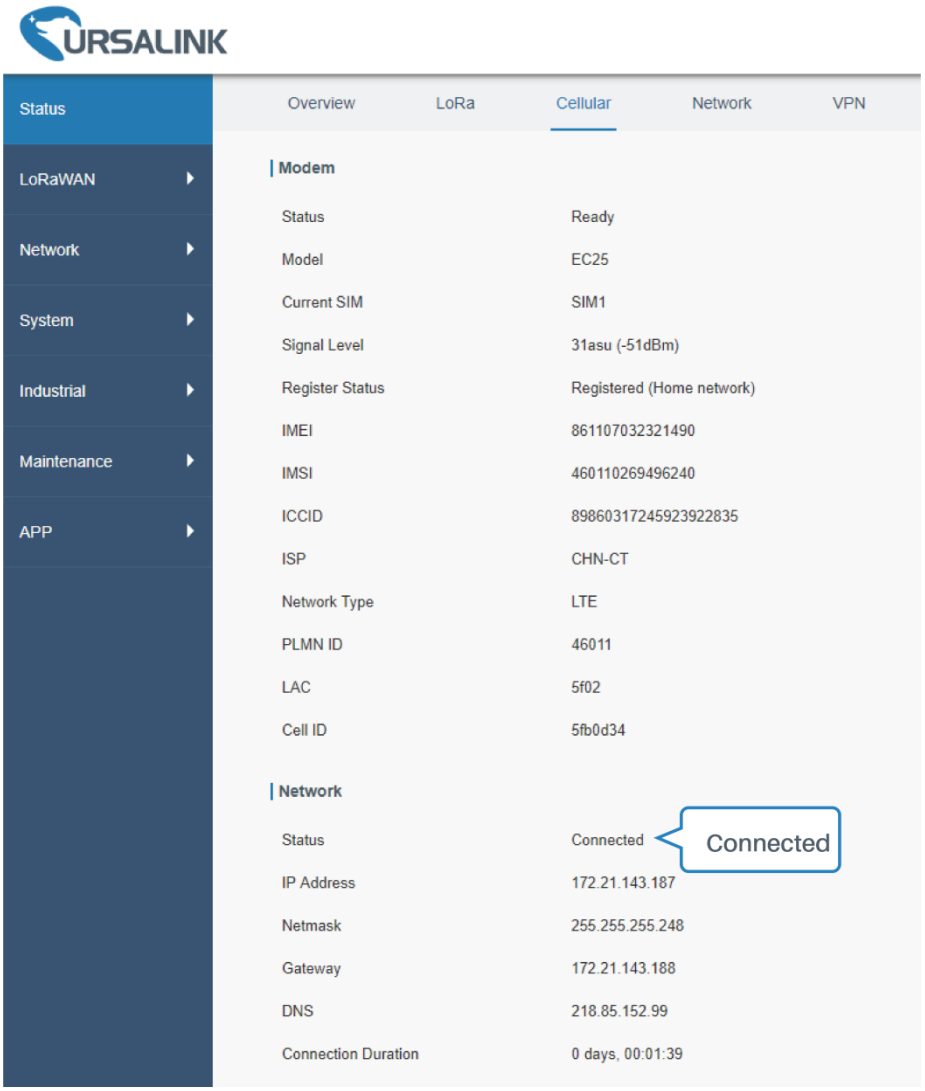
B. Enable SIM1.

C. Choose network type as “Auto”, and then set the right APN.

D. Click “Save” and “Apply” for configuration to take effect.

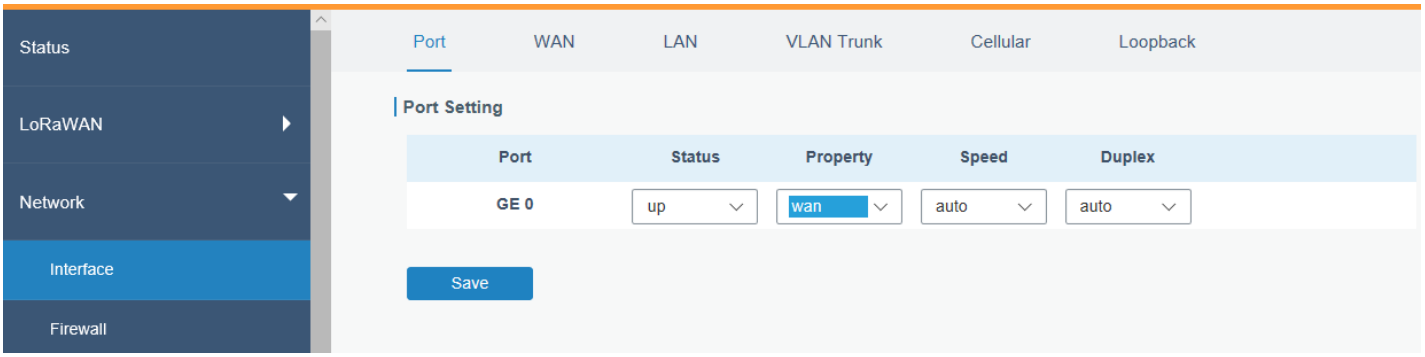


E. Click “Status” → “Cellular” to view the status of the cellular connection. If it shows “Connected”, it means SIM1 has dialed up successfully.

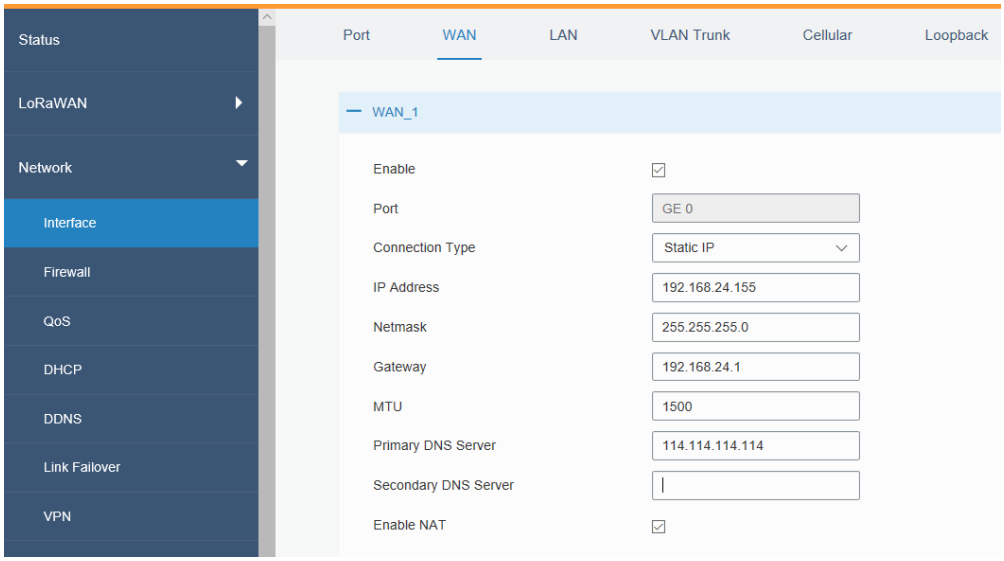


Connecting via WAN

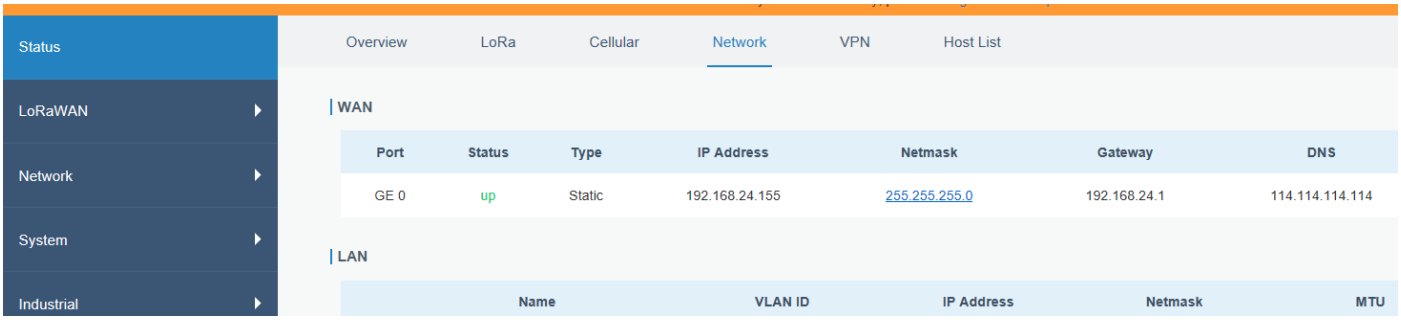
A. Click “Network” → “Interface” → “Port” to configure Property as WAN, and then click save and apply.



B. Click “WAN” to configure corresponding items and save

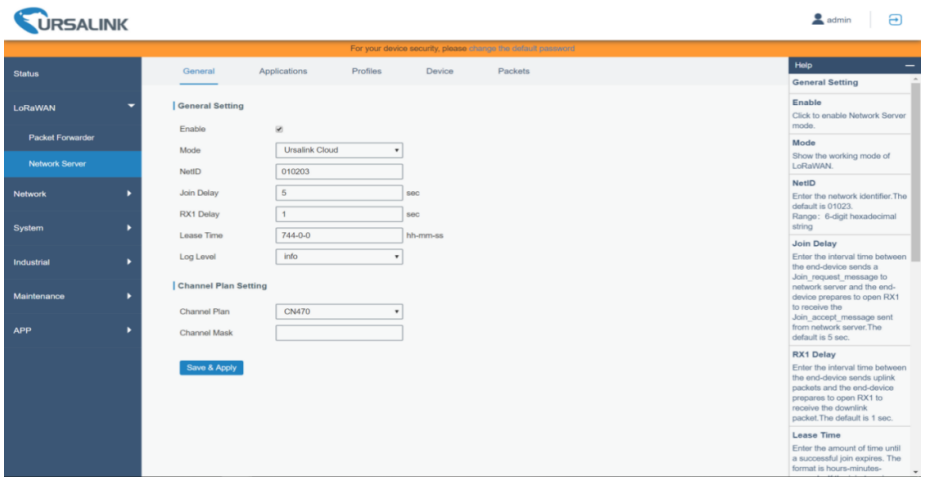


C. Click “Status” → “Network” to view the status of the WAN connection.



Network Server Configuration

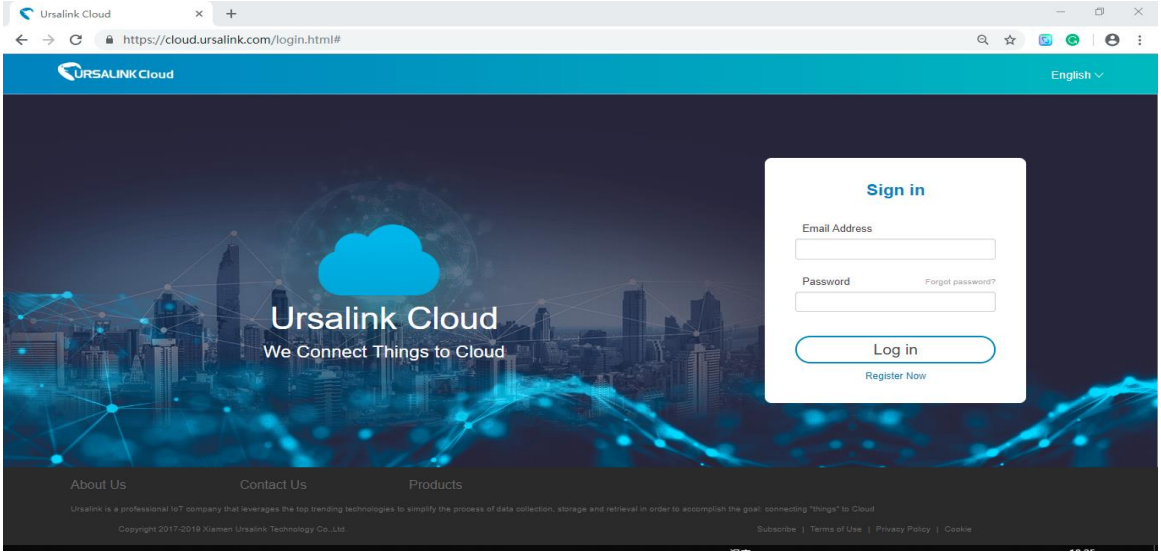
A. Click “LoRaWAN” → “Network Server” → “General” to configure the general setting. Configure the mode as Ursalink Cloud



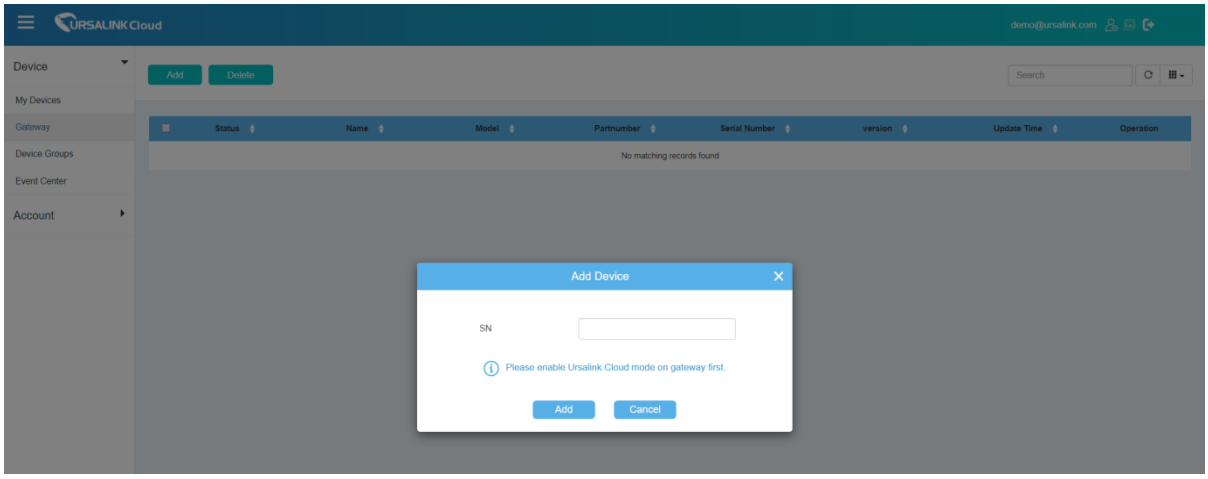
Ursalink Cloud Configuration

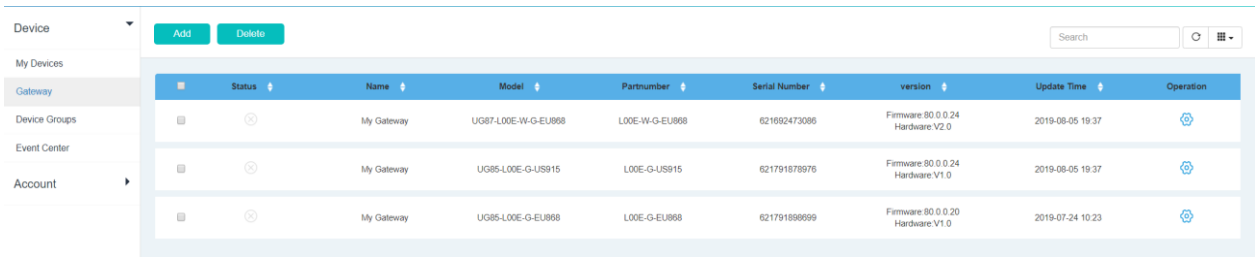
Register an Ursalink Cloud account.

Ursalink Cloud Address: https://cloud.ursalink.com/login/register.html

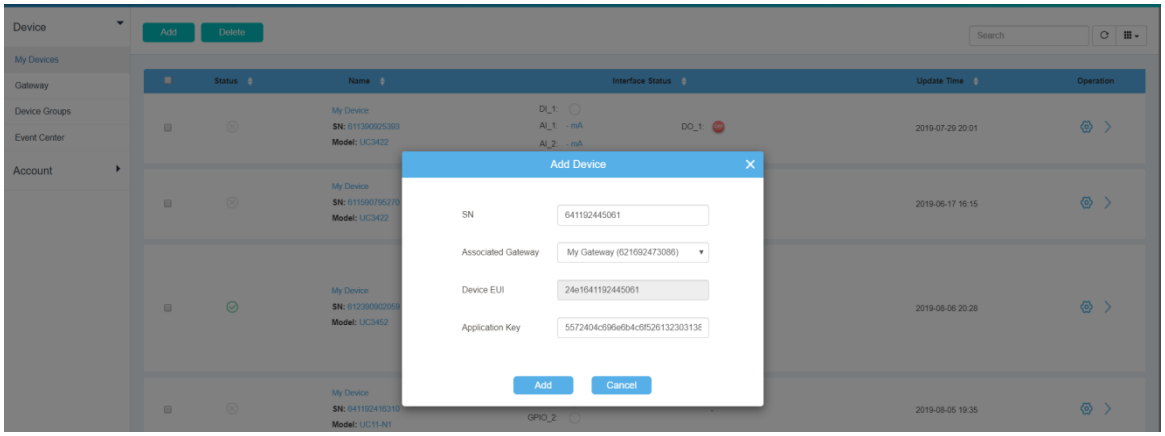


Log in Ursalink Cloud and go to “Gateway/Add” to fill in the gateway SN and click “add”.





Go to “My Devices” and click “add”. Fill in the SN of the UC11-N1 and select corresponding gateway.

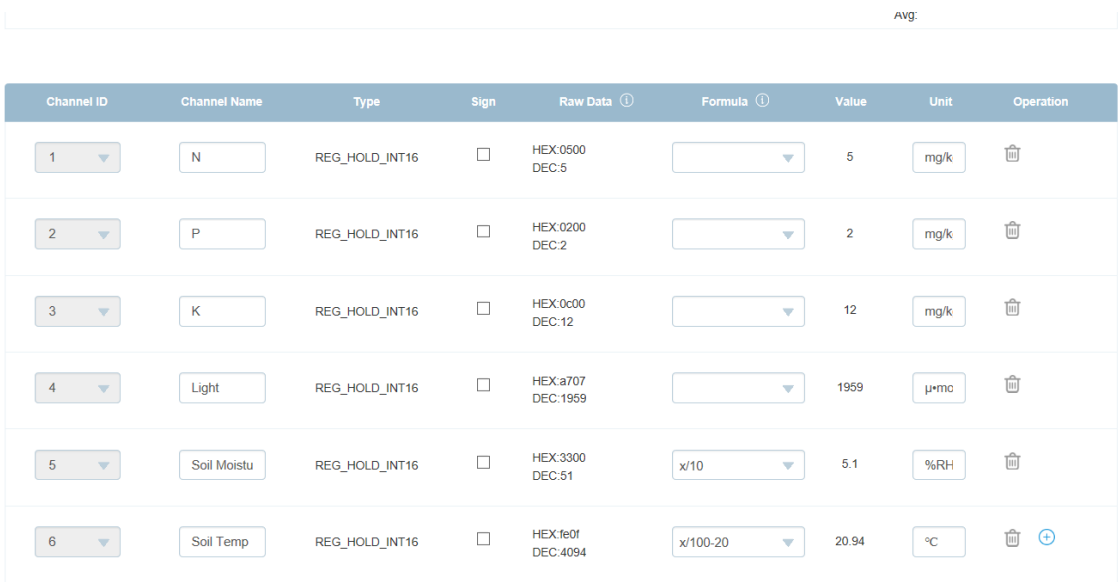


Click  to configure the UC11-N1 from Ursalink Cloud and add channels to obtain data.

Note: Channel ID and its name should be as same as the one set in UC11-N1.You can configure as the following picture, fill the ‘formula’ and ‘unit’.

Formula: Soil Moisture: x/10

Soil Temp: x/100-20



Check "Data” that connects with UC11-N1.

Appendix

Environmental Requirements

Gateway UG85

- Power Input: 9-48 VDC
- Power Consumption: Typical 3.3W (Max 6.4 W)
- Operating Temperature: -40°C to 70°C (-40°F -158°F)
- Relative Humidity: 0% to 95% (non-condensing) at 25°C/77°F

UC11-T1

- Power Input: 8000 mAh replaceable Li-SOCL2 battery
- Operating Temperature: -40°C to +70°C
- Relative Humidity: 0% to 100% (non-condensing)

UC11-N1

- Power Input:
    1. 5-24 VDC with 4900 mhA battery backup
    2. Solar-powered with 4900 mAh Battery
- Operating Temperature: -20°C to +70°C

Light Sensor

- Power Input: 7 to 24 VDC
- Operating Temperature: -40°C to +65°C

Soil NPK Sensor

- Power Input: 12 to 24 VDC

- Power Consumption: Max 0.2W

- Operating Temperature: 5°C to +45°C

Soil Temp & Moisture Sensor

- Power Input: 12 to 24 VDC

- Power Consumption: Max 0.6W

- Operating Temperature: -20°C to 80°C

Related Information

UG85 LoRaWAN Gateway:

https://www.ursalink.com/en/ug85-lorawan-gateway/

UC11-N1 LoRaWAN Sensor Node:

https://www.ursalink.com/en/n1-lorawan-sensor-node/

UC11-T1 Temperature and Humidity Sensor:

https://www.ursalink.com/en/t1-temperature-humidity-lorawan-sensor/

Related Document Download:

https://www.ursalink.com/en/documents-download/

UC11-N1 Payload Structure Download:
https://www.ursalink.com/en/download/n1_payload_structure.pdf

UC11-T1Payload Structure Download:
https://www.ursalink.com/en/download/t1_payload_structure.pdf

Sensor Payload Structure Download:

http://image.ursalink.com/Ursalink/Sensors%20Payload/Other%20Sensors%20Payload%20(Light).pdf