



LoRaWAN[®] Solenoid Valve Controller

UC51x Series

User Guide



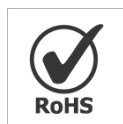
Safety Precautions

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 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.

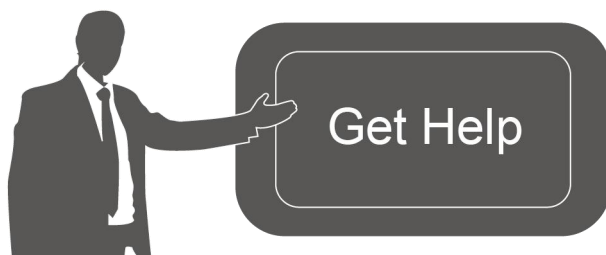
Declaration of Conformity

UC51x series is in conformity with the essential requirements and other relevant provisions of the CE, FCC, and RoHS.



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Revision History

Date	Doc Version	Description
Feb. 29, 2024	V 4.0	Initial version on hardware 4.x

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1. Product Introduction

1.1 Overview

UC51x series LoRaWAN® wireless solenoid valve controller is a device used to remotely control DC latching solenoids of the valve. It contains 2 solenoid interfaces and 2 GPIO interfaces, which can be easily controlled locally or remotely.

Besides ultra-low-power LoRaWAN® technology, UC51x series also provides both solar and built-in battery power supply for uninterrupted operation. For outdoor applications, it equips with IP67-rated enclosure and M12 connectors to protect from water and dust under harsh environments.

1.2 Features

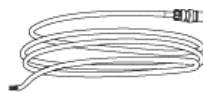
- Compatible with standard DC latching solenoids
- OPEN/CLOSE control by mobile App locally or commands remotely
- Two GPIO interfaces for flow monitoring or valve status monitoring
- Transmission distance up to 15 km with line of sight
- Waterproof design including IP67 case and M12 connectors
- Solar powered and built-in chargeable batteries
- Quick wireless configuration via NFC
- Time and flow control via Milesight IoT Cloud

2. Hardware Introduction

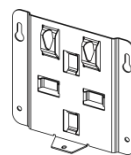
2.1 Packing List



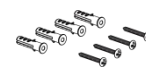
1 × UC51x
Device



2 × Data Cables
(1.5m)



1 × Mounting
Bracket



4 × Wall
Mounting Kits



2 × Hose Clamps



1 × Fixing Screw



1 × Quick Guide



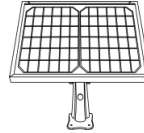
1 × Warranty Card



1 × LoRaWAN[®]
Magnetic Antenna
(EA Version Only)



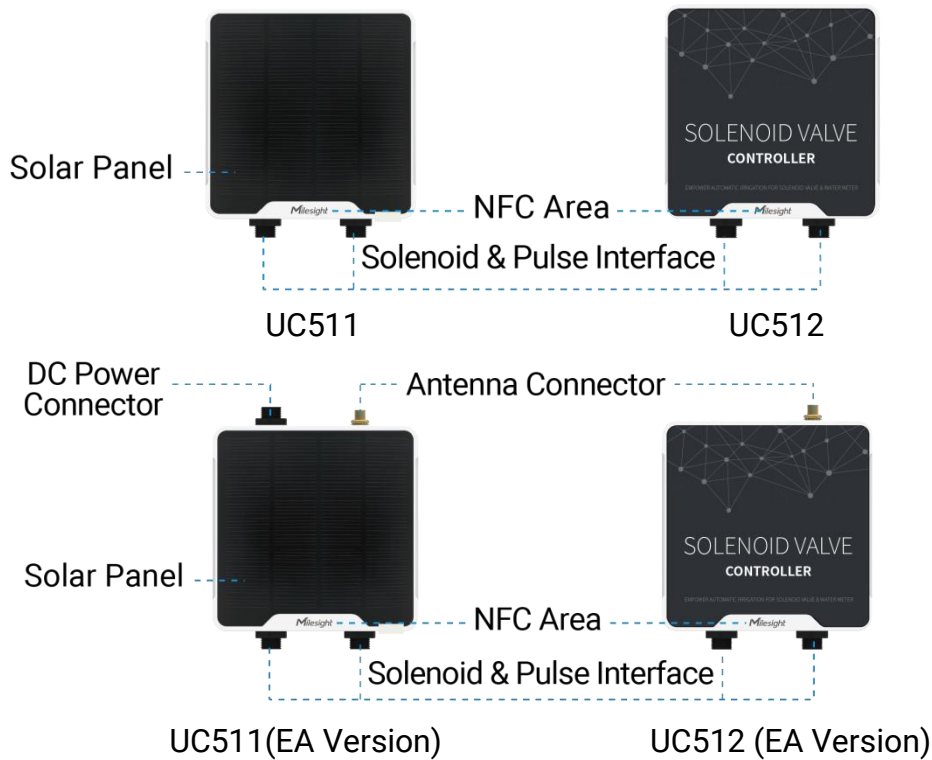
1 × Power Cable
(30cm)
(UC511 EA Optional)



1 × Solar Panel Kit
(UC511 EA
Optional)

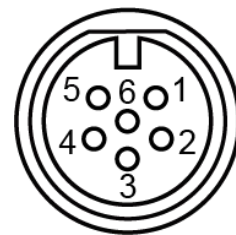
! If any of the above items is missing or damaged, please contact your sales Representative.

2.2 Hardware Overview



Data Interface 1&2:

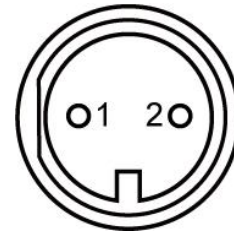
Pin	Description
1	DC+/OUT1 of Solenoid Valve
2	DC-/OUT2 of Solenoid Valve
3	GND
4	INSERT BOOT ¹
5	GND
6	GPIO Interface



¹ PIN3 and PIN4 do not need to connect, see "[Solenoid Valve Switch](#)" option.

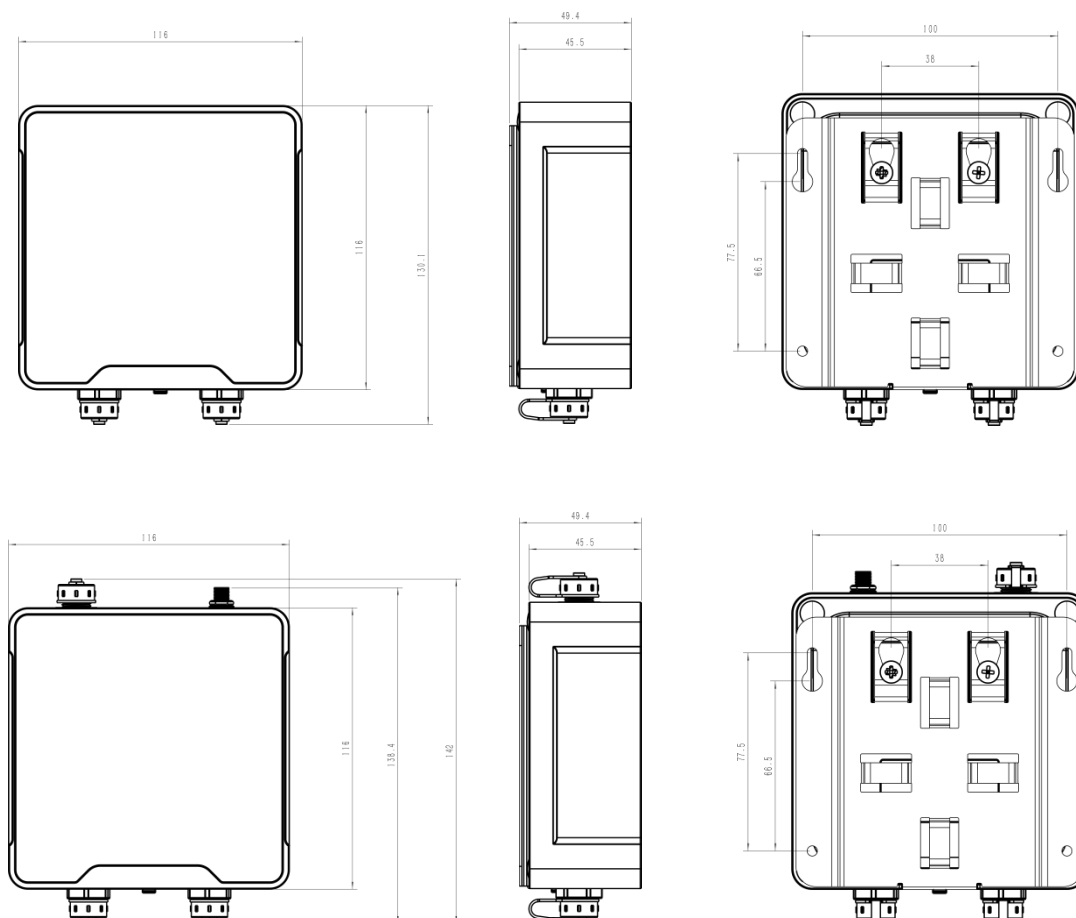
Power Interface (UC511-EA):

Pin	Description
1	VCC(5-24V)
2	GND

**2.3 Power Button and LED Indicator**

UC51X equips with a power button and a LED indicator inside for reboot/reset operation.

Function	Action	LED Indication
Turn On	Press and hold the button for more than 3s.	Off → On
Turn Off	Press and hold the button for more than 3s.	On → Off
Reset	Press and hold the button for more than 10s.	Blinks.
Check On/Off Status	Quickly press the power button.	Light On: Device is on.
		Light Off: Device is off.

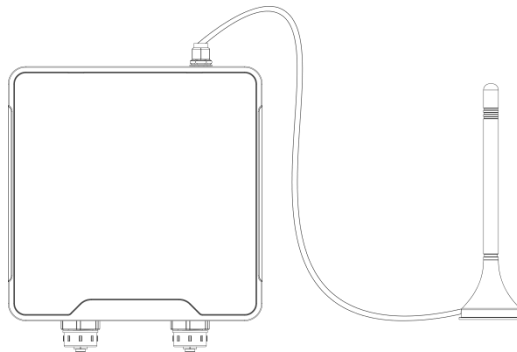
2.4 Dimensions (mm)

3. Hardware Adjustment

3.1 Antenna Installation (External Antenna Version Only)

Rotate the antenna into the antenna connector accordingly. To ensure a good signal, it is suggested to follow below instructions:

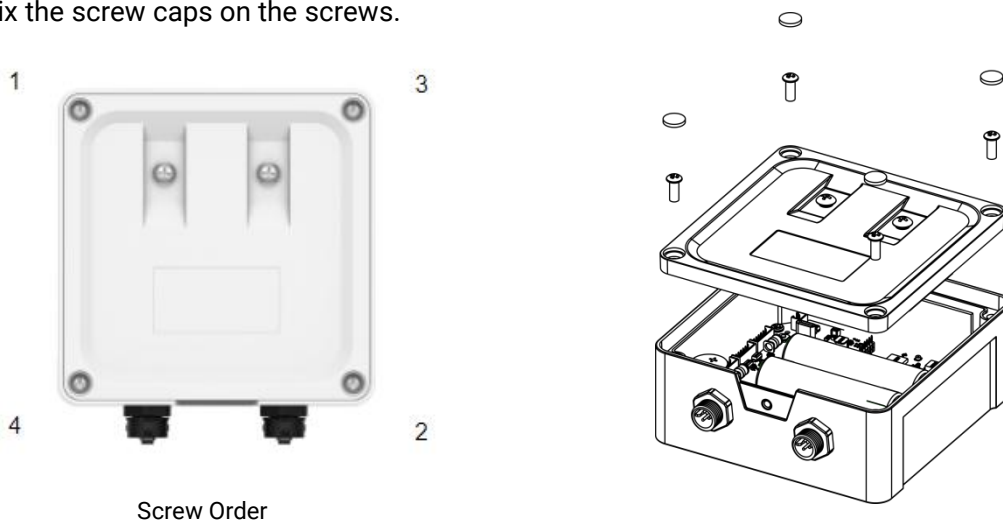
- 1) The antenna should be installed vertically, with the magnetic base attached to a metal surface.
- 2) Keep the antenna away from walls and ensure there are no obstacles around it. It is suggested to place the antenna near windows when used indoors.
- 3) Maintain a distance of more than 50cm between antennas.
- 4) For better coverage, it is suggested to position the antenna higher.



3.2 Back Cover Restore

Please follow the instructions below to screw the back cover to ensure the waterproof of the device.

1. Ensure the sealing ring is properly installed around the device, free from stains or foreign matters.
2. Put the back cover onto the device with correct direction and fix the 4 screws with the order of cross (recommended torsion: 4.5~5 kgf). When fixing the screws, initially tighten each to 80 to 90% of their full depth, and then fully tighten them all.
3. Fix the screw caps on the screws.



4. Operation Guide

4.1 Log in the ToolBox

UC51x series can be monitored and configured via ToolBox App or ToolBox software. Please select one of them to complete configuration.

4.1.1 NFC 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 smartphone with NFC area to the device to read basic information.
4. Basic information and settings of devices will be shown on ToolBox if it's recognized successfully. You can read and configure the device by tapping the button on the App. In order to protect the security of devices, password validation is required when first configuration. Default password is **123456**.

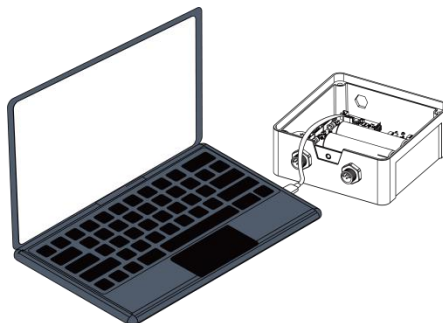


Note:

- 1) Ensure the location of smartphone NFC area and it's recommended to take off phone case.
- 2) If the smartphone fails to read/write configurations via NFC, keep the phone away and back to try again.

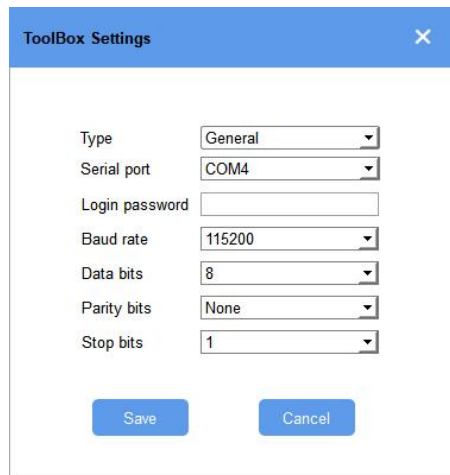
4.1.2 USB Configuration

1. Download ToolBox from Milesight website.
2. Open the case of UC51x and connect the UC51x to computer via type-C port.



3. Open the ToolBox and select type as “General”, then click password to log in ToolBox.

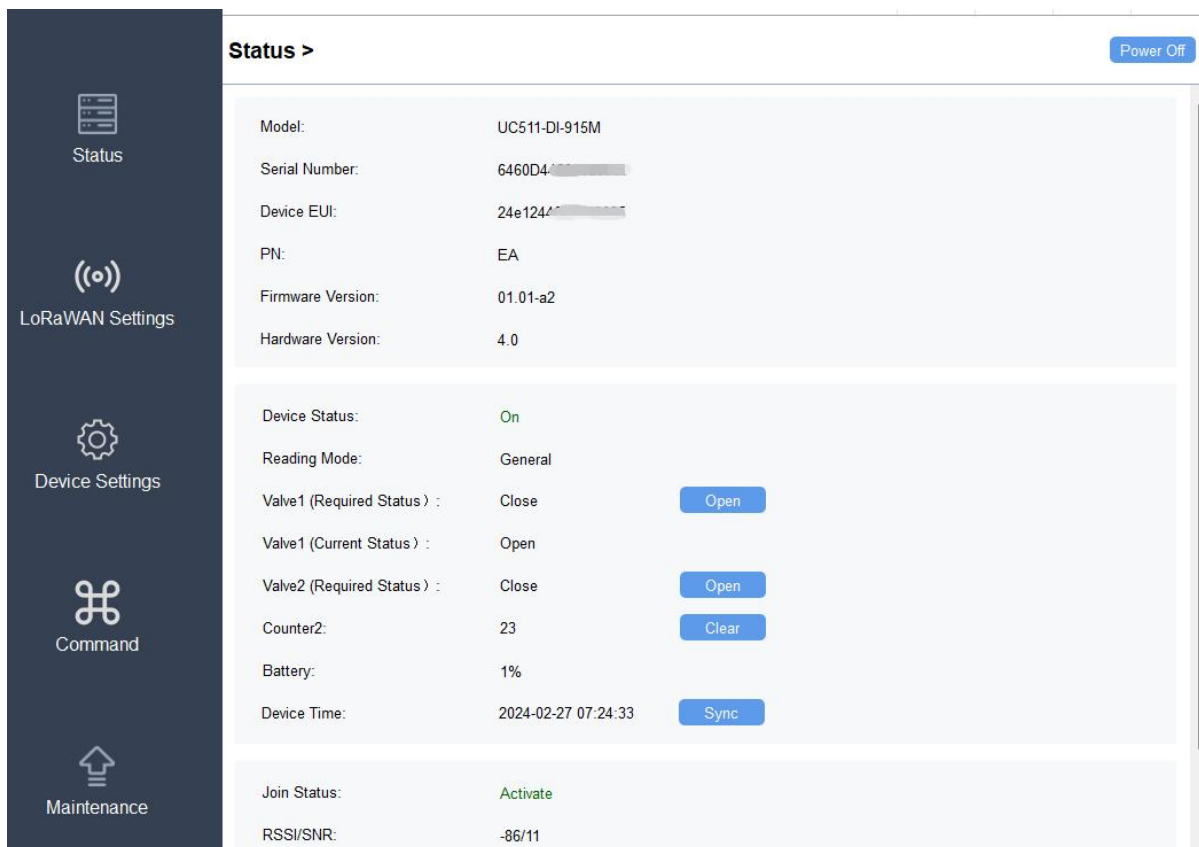
(Default password: **123456**)



Type	General
Serial port	COM4
Login password	
Baud rate	115200
Data bits	8
Parity bits	None
Stop bits	1

Save Cancel

4. After logging in the ToolBox, you can click “Power On” or “Power Off” to turn on/off device and change other settings.



Status > Power Off

Model:	UC511-DI-915M
Serial Number:	6460D4...
Device EUI:	24e124...
PN:	EA
Firmware Version:	01.01-a2
Hardware Version:	4.0

Device Status:	On	
Reading Mode:	General	
Valve1 (Required Status) :	Close	Open
Valve1 (Current Status) :	Open	
Valve2 (Required Status) :	Close	Open
Counter2:	23	Clear
Battery:	1%	
Device Time:	2024-02-27 07:24:33	Sync

Join Status:	Activate
RSSI/SNR:	-86/11

4.2 Time Synchronization

ToolBox Sync:

Go to **Device > Status** of ToolBox App to click **Sync** to sync the time, or go to **Status** page of ToolBox software to sync the time.

Status	Setting	Maintenance
Device Status	ON	<input checked="" type="checkbox"/>
Reading Mode	NFC	
Battery	100%	
Valve1(Required Status)	Off	<input type="checkbox"/>
Valve2(Required Status)	On	<input checked="" type="checkbox"/>
Counter 2	16	<input type="button" value="Clear"/>
Device Time	2024-02-28 20:26	<input type="button" value="Sync"/>

Status

LoRaWAN Settings

Device Settings

Status >

Device ID: 240124700044000

PN: EA

Firmware Version: 01.01-a2

Hardware Version: 4.0

Device Status: On

Reading Mode: General

Valve1 (Required Status) : Close

Valve1 (Current Status) : Open

Valve2 (Required Status) : Open

Counter2: 16

Battery: 100%

Device Time: 2024-02-29 11:43:45

Network Server Sync:

Go to **LoRaWAN Settings > Basic** of ToolBox software or **Device > Settings > LoRaWAN Settings** of ToolBox App to change device LoRaWAN[®] version as 1.0.3, then the device will send MAC commands to enquire the time from network server every time it joins the network. This should ensure the network server supports this feature.

4.3 LoRaWAN Settings

LoRaWAN settings is used for configuring the transmission parameters in LoRaWAN[®] network.

4.3.1 Basic Settings

UC51x supports basic configurations like join type, App EUI, App Key and other information. You can also keep all settings by default.

Device EUI

* APP EUI

* Application Port

LoRaWAN Version

Work Mode

Confirmed Mode ⓘ

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 used for sending and receiving data, default port is 85.
LoRaWAN Version	V1.0.2 and V1.0.3 are available.
Join Type	OTAA and ABP mode are available.
Application Key	Appkey for OTAA mode, default is 5572404C696E6B4C6F52613230313823.
Device Address	DevAddr for ABP mode, default is the 5 th to 12 th digits of SN.
Network Session Key	Nwkskey for ABP mode, default is 5572404C696E6B4C6F52613230313823.
Application Session Key	Appskey for ABP mode, default is 5572404C696E6B4C6F52613230313823.
Rejoin Mode	Reporting interval ≤ 35 mins: the device will send a specific number of LinkCheckReq 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 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.
Set the number of	When rejoin mode is enabled, set the number of LinkCheckReq packets sent.

packets sent													
Support Frequency	<p>Select the channel plan and the frequency to send uplinks.</p> <p>* Support Frequency</p> <div data-bbox="453 338 858 389"> <input type="text" value="EU868"/> </div> <div data-bbox="475 434 817 472"> <input type="checkbox"/> <input type="button" value="-"/> 868.1 <input type="button" value="+"/> </div> <hr/> <div data-bbox="475 512 817 551"> <input type="checkbox"/> <input type="button" value="-"/> 868.3 <input type="button" value="+"/> </div> <hr/> <div data-bbox="475 591 817 629"> <input type="checkbox"/> <input type="button" value="-"/> 868.5 <input type="button" value="+"/> </div> <hr/> <div data-bbox="475 669 817 707"> <input type="checkbox"/> <input type="button" value="-"/> 863 <input type="button" value="+"/> </div> <hr/> <p>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.</p> <p>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</p> <p>* Support Frequency</p> <div data-bbox="453 1128 858 1180"> <input type="text" value="AU915"/> </div> <p>Enable Channel Index ?</p> <div data-bbox="453 1229 858 1281"> <input type="text" value="8-15"/> </div> <table border="1" data-bbox="453 1317 858 1675"> <thead> <tr> <th>Index</th> <th>Frequency/MHz ?</th> </tr> </thead> <tbody> <tr> <td>0 - 15</td> <td>915.2 - 918.2</td> </tr> <tr> <td>16 - 31</td> <td>918.4 - 921.4</td> </tr> <tr> <td>32 - 47</td> <td>921.6 - 924.6</td> </tr> <tr> <td>48 - 63</td> <td>924.8 - 927.8</td> </tr> <tr> <td>64 - 71</td> <td>915.9 - 927.1</td> </tr> </tbody> </table>	Index	Frequency/MHz ?	0 - 15	915.2 - 918.2	16 - 31	918.4 - 921.4	32 - 47	921.6 - 924.6	48 - 63	924.8 - 927.8	64 - 71	915.9 - 927.1
Index	Frequency/MHz ?												
0 - 15	915.2 - 918.2												
16 - 31	918.4 - 921.4												
32 - 47	921.6 - 924.6												
48 - 63	924.8 - 927.8												
64 - 71	915.9 - 927.1												
ADR Mode	Allow network server to adjust datarate of the device.												
Spread Factor	If ADR is disabled, the device will send data via this spread factor.												
Tx Power	Tx power of the device.												
RX2 Data Rate	RX2 data rate to receive downlinks or Milesight D2D commands.												
RX2 Frequency	RX2 frequency to receive downlinks or Milesight D2D commands. Unit: Hz												
Confirmed Mode	If the device does not receive ACK packet from network server, it will resend												

data once.

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.

4.3.2 Multicast Settings

UC51x supports setting up several multicast groups to receive multicast commands from network servers and users can use this feature to control devices in bulks.

1. Ensure the work mode is Class C, Class B or Class C to B.
2. Enable Multicast Group and set a unique multicast address and keys to distinguish other groups. You can also keep these settings by default.

Multicast Group1

Multicast Address [i](#)

11111111

McNetSKey

McAppSKey

Multicast Group2

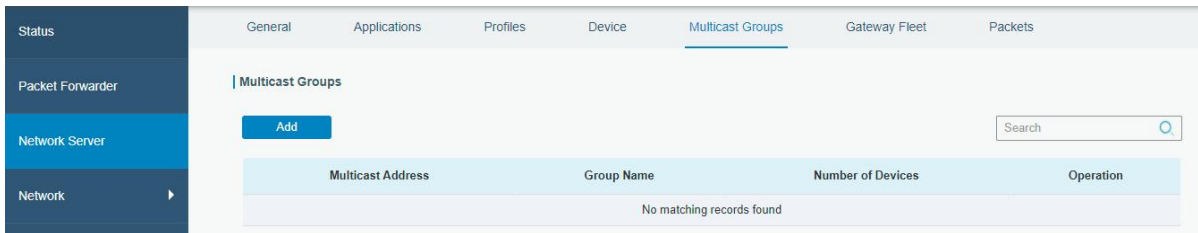
Multicast Group3

Multicast Group4

Parameters	Description
Multicast Address	Unique 8-digit address to distinguish different multicast groups.
Multicast McAppSKey	32-digit key. Default values: Multicast Group 1: 5572404C696E6B4C6F52613230313823 Multicast Group 2: 5572404C696E6B4C6F52613230313824 Multicast Group 3: 5572404C696E6B4C6F52613230313825 Multicast Group 4: 5572404C696E6B4C6F52613230313826
Multicast	32-digit key. Default values:

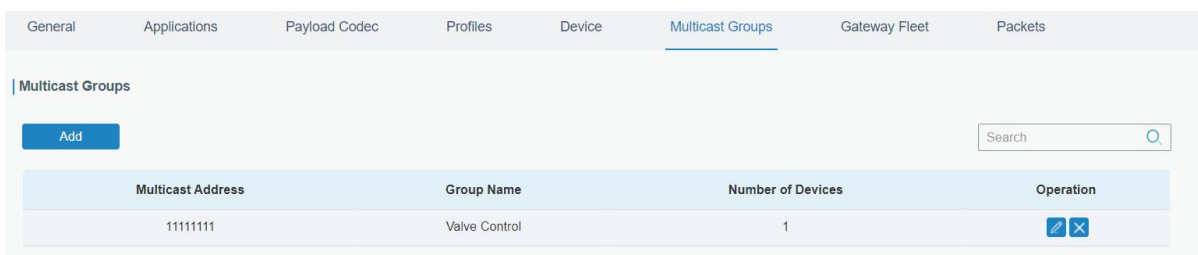
McNetSkey	Multicast Group 1: 5572404C696E6B4C6F52613230313823 Multicast Group 2: 5572404C696E6B4C6F52613230313824 Multicast Group 3: 5572404C696E6B4C6F52613230313825 Multicast Group 4: 5572404C696E6B4C6F52613230313826
-----------	--

3. Add a multicast group on the network server. Take Milesight UG6x gateway as an example, go to **Network Server > Multicast Groups**, and click **Add** to add a multicast group.



Fill in the multicast group information that is the same as device settings, and select the devices that you need to control, then click **Save**.

Group Name	Valve Control
Multicast Address	11111111
Multicast Network Session Key	5572404C696E6B4C6F526132
Multicast Application Session Key	5572404C696E6B4C6F526132
Class Type	Class C
Datarate	DR0 (SF12, 125 kHz)
Frequency	505300000 Hz
Frame-counter	0
Selected Devices	UC51X



4. Go to **Network Server > Packets**, select the multicast group and fill in the downlink command, then click **Send**. The network server will broadcast the command to devices that belong to this multicast group.

Note: ensure all devices' application ports are the same.

The screenshot shows the Milesight web interface with the 'Packets' tab selected. The 'Send Data to Multicast Group' section is highlighted with a red box. It contains a table with the following columns: Multicast Group, Type, Payload, Port, and Confirmed. The 'Valve Control' group is selected with a 'hex' type and a payload of 'ff1d2100'. The port is set to 85. A 'Send' button is visible next to the configuration.

Multicast Group	Type	Payload	Port	Confirmed
Valve Control	hex	ff1d2100	85	<input type="checkbox"/>

4.4 Solenoid & GPIO Settings

4.4.1 Solenoid Valve Control

UC51x series supports to control the solenoid valve via ToolBox locally. Besides, this can also be executed via downlink commands or local rules.

Via ToolBox App:

The screenshot shows the ToolBox App interface with the 'Setting' tab selected. The 'Valve1(Required Status)' setting is highlighted with a red box and is currently set to 'Off'. The 'Valve2(Required Status)' setting is currently set to 'On'. Other settings include Device Status (ON), Reading Mode (NFC), Battery (100%), Counter 2 (16), and Device Time (2024-02-28 20:26).

Setting	Value
Device Status	ON
Reading Mode	NFC
Battery	100%
Valve1(Required Status)	Off
Valve2(Required Status)	On
Counter 2	16
Device Time	2024-02-28 20:26

Via ToolBox Software:

Status > Power Off

Model:	UC511-DI-915M
Serial Number:	6460D-██████████
Device EUI:	24e124-██████████
PN:	EA
Firmware Version:	01.01-a2
Hardware Version:	4.0

Device Status:	On
Reading Mode:	General
Valve1 (Required Status) :	Close Open
Valve1 (Current Status) :	Open
Valve2 (Required Status) :	Close Open

4.4.2 Basic Settings

Reporting Interval(min)

360

Data Storage ⓘ

Data Retransmission ⓘ

Auto-Confirmed Mechanism ⓘ

Solenoid Valve Wiring Switch ⓘ

Data Reporting

All ▼

When Power is Restored

Last Working Status ▼

Working Mode ⓘ

Class C ▼

Change Password

Parameters	Description
Reporting Interval	Reporting interval of transmitting data to the network server. Default: 360min, Range: 1-1080 mins.
Data Storage	Disable or enable data storage locally.
Data	Disable or enable data retransmission.

<u>Retransmission</u>	
Auto-Confirmed Mechanism	After enabled, the device will reply the confirmed packet starting with "FE" to the network server when receiving downlink commands.
Solenoid Valve Wiring Switch	When this option is enabled, the UC51x will turn on automatically when a data cable is connected to any solenoid interface.
Data Reporting	Select the periodic packet report content. The options are All, Interface 1 Only, and Interface 2 Only. Note: every interface has a solenoid valve control interface and a GPIO interface.
Device Return to Power Supply State	If the device loses power and returns to power supply, the solenoid valve interface will be on or off according to this parameter.
Class Type	Working mode of LoRaWAN [®] device. UC511: Class A, Class B, Class C and Class C to B are available; UC512: Class A and Class B are available. Note: for Class B mode, if the device does not receive beacons for more than 120 minutes, it will switch to Class A mode automatically; for Class C to B mode, if the device does not receive beacons for more than 30 minutes, it will switch to Class C mode automatically.
Response Time	When the class type is Class A: the device will send a blank packet to allow to receive the control commands at every Response Time interval. Range: 0-64800s, 0 means disabled. When the class type is Class B or Class C to B: the device will open the reception window according to the response time interval. Note: The shorter the response time, the shorter the battery life.
Change Password	Change the password for ToolBox App write this device or ToolBox software to log in the device configuration page.

GPIO1 Working Mode

GPIO2 Working Mode

Counter 2

Prevent Jitter Delay Time(s) ⓘ

Pulse Filter Setting ⓘ

Parameters	Description
GPIO1/2 Working Mode	Select Digital Input or Water Volume Counter (Pulse Counter). Digital Input: detect the real state of the valve to know if valve control takes effect. Water Volume Counter: connect to pulse water meter to measure the water volume.
Counter	Set the initial counting value and click Confirm to save this value.
Prevent Jitter Delay Time (s)	The device will not upload GPIO status during this time to avoid frequent uplinks. This only works when GPIO working mode is Digital Input and this applies to both GPIO interfaces.
Pulse Filter Setting	Filter the pulse counting values below this rate. This only works when GPIO working mode is Water Volume Counter and this applies to both GPIO interfaces.

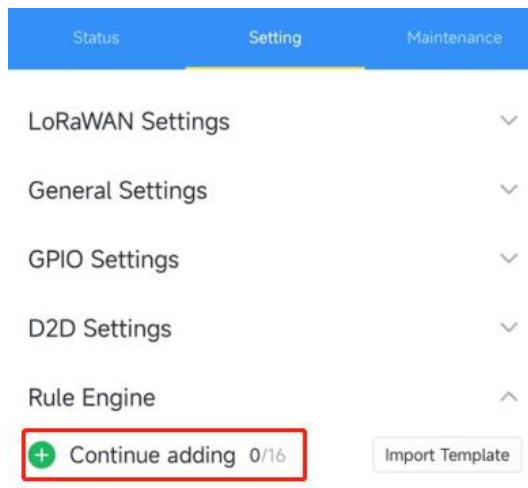
Note:

- 1) Reboot or re-join will not affect the counting.
- 2) The pulse value supports to clear manually via ToolBox or downlink command, or clear automatically when it calculates to max value: 4294967295 (0xffffffff).

4.5 Rule Settings

Go to **Setting > Rule Engine** page of ToolBox App or **Command** page of ToolBox software to add rules. One device supports to add 16 rules at most.

1. Add rule.



2. Set the rule as required. UC51x series supports to add below types of rules:

- Valve time schedule control

Example: During the time range 2024-3-1 0:00 to 2024-9-1 23:59, open the valve 1 at 0:00 for 5 minutes every 5 days.

Note: Ensure the device time is correct (see section [Time Synchronization](#)).

- Water volume threshold

Example: when the GPIO2 detects 20 pulses within 2 minutes, the device will report a status packet or a custom message to network server.

Note: the max length of custom message is 8 characters.

If

Water Volume

Water Volume Counter 2

Period(min)

2

Threshold(Pulses)

20

Then

Report counter value and valve status

- Water volume increase threshold

Example: Every time the counter of GPIO2 increases 20, the device will report a status packet or a custom message to the network server.

Note: the max length of custom message is 8 characters.

If

Every increase of water volume

Water Volume Counter 2

Threshold(Pulses)

20

Then

Report customized message

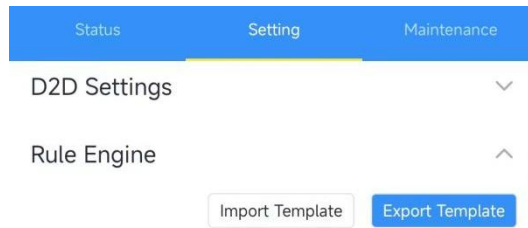
Message

alarm

- Milesight D2D Agent: see [Milesight D2D Settings](#)

3. Enable or disable the rules as required.
4. Click **Write** to save the rule setting into the device.
5. Rule Backup

ToolBox App: Click **Export Template** to back up the rule settings into the smartphone; if you need to import the rule settings from other devices, click **Import Template** to import the setting.



ToolBox Software: Click **Save Schedule** to backup the settings as a file; if you need to import this schedule from other devices, click **Select Schedule** to import the setting.

Note:

- 1) D2D rule has higher execute priority than types of rules.
- 2) When the device has multiple rules that are conflicted, the device will execute the rule with front number ID in priority.

4.6 Milesight D2D Settings

Milesight D2D protocol is developed by Milesight and used for setting up transmission among Milesight devices without a gateway. When the Milesight D2D setting is enabled, UC51x can work as a Milesight D2D agent to receive commands to control the solenoid valve status.

1. Enable Milesight D2D feature and define a unique Milesight D2D key which is the same as Milesight D2D controller or agent devices. (Default Milesight D2D Key: 5572404C696E6B4C6F52613230313823)



2. Ensure the RX2 datarate and RX2 frequency are the same as Milesight D2D controller RX2 settings.



3. Set rule to work as a Milesight D2D agent.

Example: When the device receives Milesight D2D commands, it can open or close solenoid valves for some time.

The screenshot shows a configuration interface with two main sections: 'If' and 'Then'.
Under the 'If' section, there is a dropdown menu with 'D2D' selected and a text input field containing 'ff01'.
Under the 'Then' section, there is a dropdown menu with 'Valve 1' selected, a dropdown menu with 'Open' selected, and a text input field labeled 'Duration(min)' containing the number '5'.

4.7 Data Storage

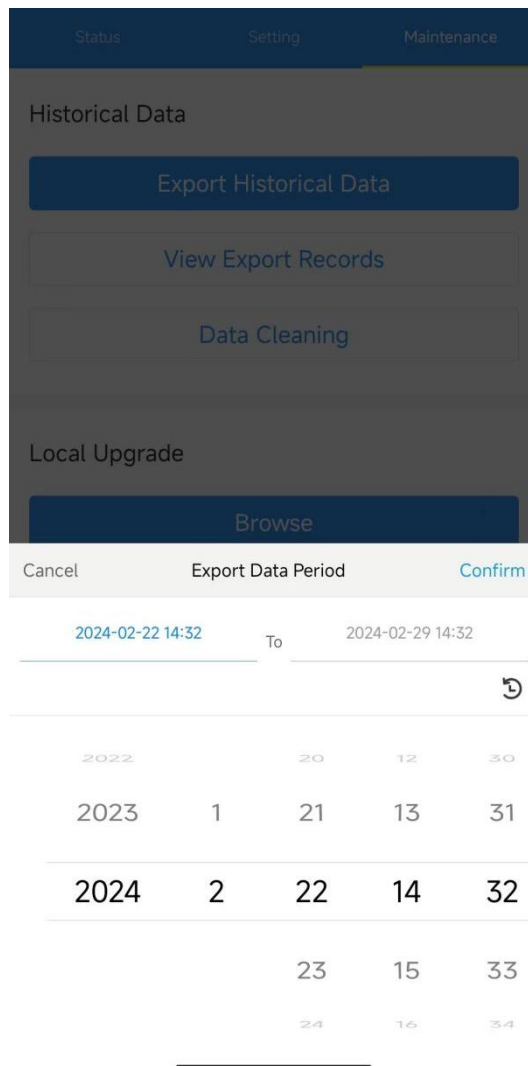
UC51x series supports storing 500 data records locally and exports data via ToolBox App or ToolBox software. The device will record the data according to the reporting interval even if it is not connected to a network.

1. Ensure the device time is correct (see section [Time Synchronization](#));
2. Enable data storage feature.

The screenshot shows the 'General Settings' interface. At the top, 'General Settings' is displayed with an upward arrow. Below it, the 'Reporting Interval' is set to '10 min', with minus and plus buttons for adjustment. The 'Data Storage' option is shown with an information icon and a green toggle switch that is turned on.

3. Go to **Device > Maintenance** of ToolBox App or **Maintenance > Backup and Reset** of ToolBox software, click **Export**, then select the data time range and click **Save** to export data.

Note: ToolBox App can only export the last 14 days' data. If you need to export more data, please use ToolBox software.



4. Clear all stored data inside the device as required.

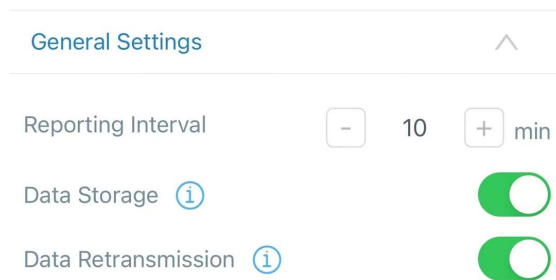
4.8 Data Retransmission

UC51x series supports data retransmission to ensure the network server can get all data even if the network is down for some times. There are two ways to get the lost data:

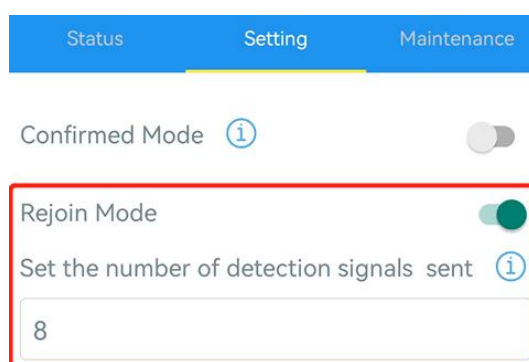
- Network server sends downlink commands to enquire the historical data for specified time range, see ***UC51x Series Communication Protocol***;
- When network is down if no response from LinkCheckReq MAC packets for a period of time, the device will record the network disconnected time and re-transmit the lost data after the device re-connects the network.

Here are the steps for data retransmission:

1. Enable data storage feature and data retransmission feature;



2. Enable rejoin mode feature and set the number of packets sent. Take below as example, the device will send LinkCheckReq MAC packets to the network server regularly to check if the network is disconnected; if there is no response for 8+1 times, the join status will change to de-active and the device will record a data lost time point(the time to join the network).



3. After the network connected back, the device will send the missing data, starting from the point in time when the data was lost, according to the reporting interval.

Note:

- 1) If the device is rebooted or powered off during data retransmission and the process is not completed, the device will resend all retransmitted data again after reconnecting to the network;
- 2) If the network is disconnected again during data retransmission, it will only send the latest disconnection data;
- 3) The retransmission data format is started with "20ce", please refer to **UC51x Series Communication Protocol**.
- 4) Data retransmission will increase the uplinks and shorten the battery life.

4.9 Maintenance

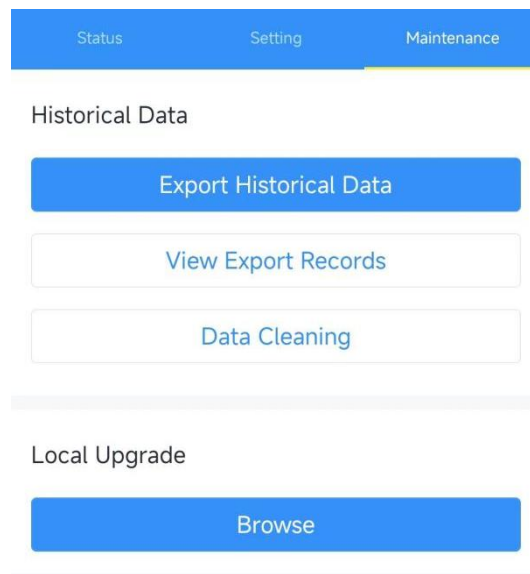
4.9.1 Upgrade

ToolBox App:

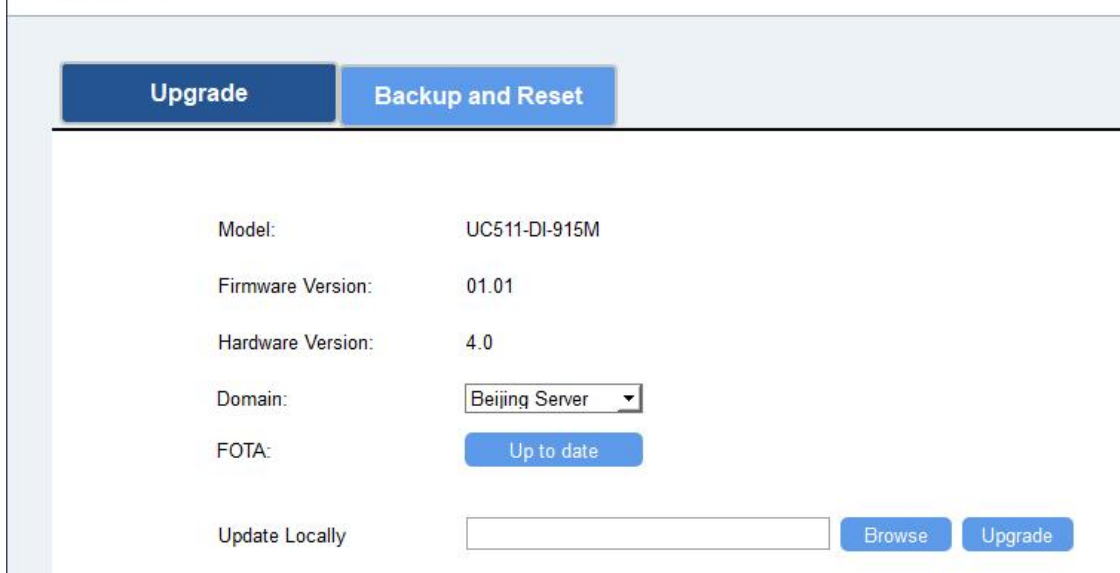
1. Download firmware from Milesight website to your smartphone.
2. Open ToolBox App and click **Browse** to import firmware and upgrade the device.

Note:

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

**ToolBox Software:**

1. Download firmware from Milesight website to your PC.
2. Go to **Maintenance > Upgrade** of ToolBox software, click **Browse** to import firmware and upgrade the device.

Maintenance >**4.9.2 Backup**

UC51x devices support configuration backup for easy and quick device configuration in bulk.

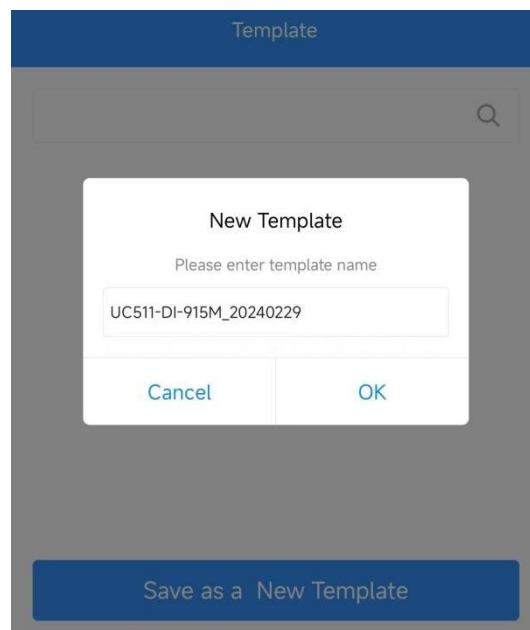
Backup is allowed only for devices with the same model and LoRaWAN® frequency band.

Note: the backup file will not save schedule setting, please backup rule settings.

Please select one of following methods to backup device:

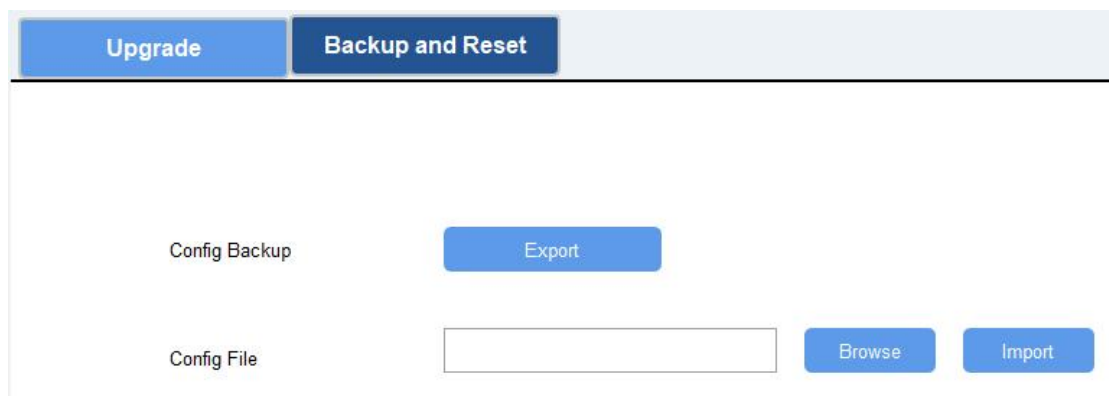
ToolBox App:

1. Go to **Template** page on the App and save current settings as a template. You can also edit the template file.
2. Select this template and attach to another device to write configuration.



ToolBox Software:

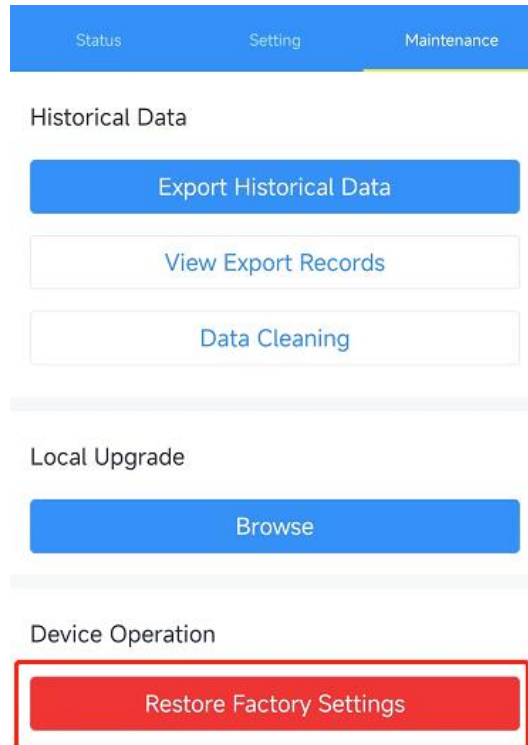
1. Go to **Maintenance > Backup and Reset**, click **Export** to save current configuration as json format backup file.
2. Click **Browse** to select backup file, then click **Import** to import the configurations.



4.9.3 Reset to Factory Default

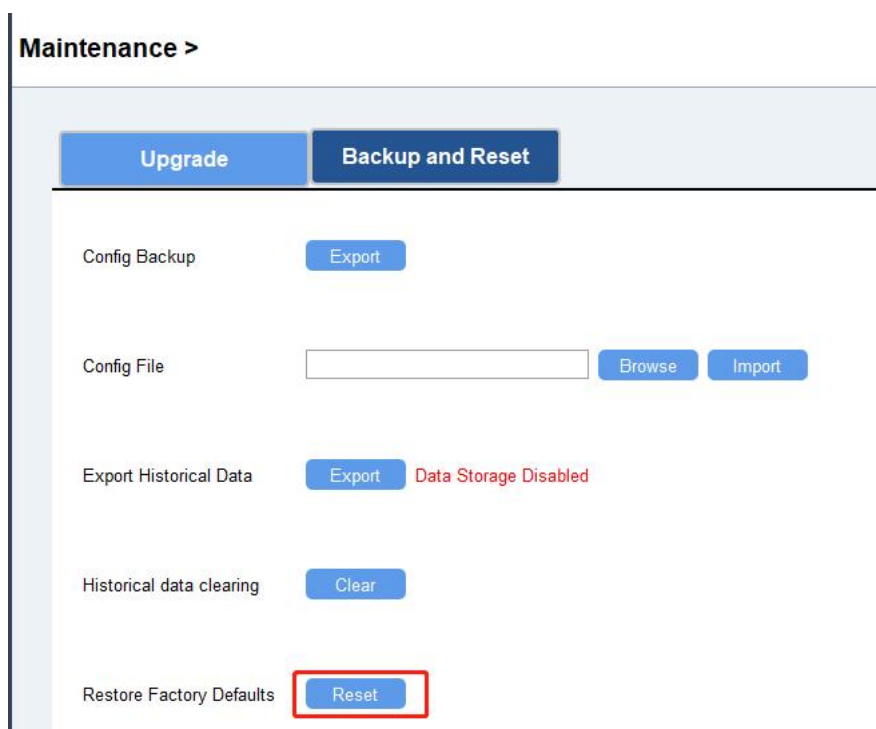
Please select one of following methods to reset device:

Via ToolBox App: Go to **Device > Maintenance** to click **Restore Factory Settings**, then attach smart phone with NFC area to UC51x to complete reset.



Via Hardware: Open the case of UC51x and hold on power button more than 10s.

Via ToolBox Software: Go to **Maintenance > Backup and Reset** to click **Reset**.

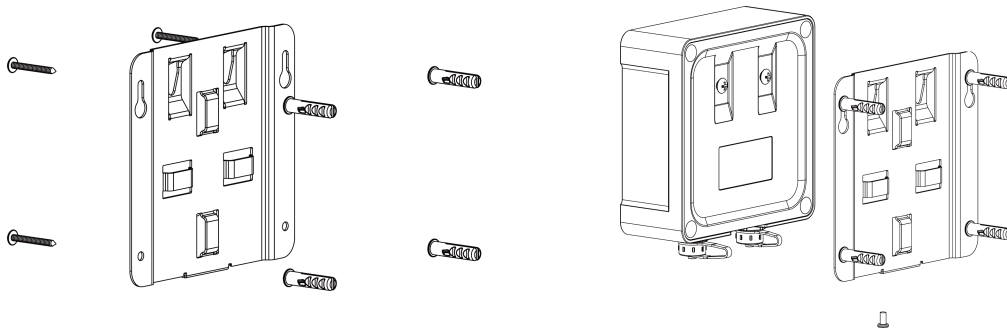


5. Device Installation

UC51x series support wall mounting or pole mounting. Before installation, make sure you have the mounting bracket, wall or pole mounting kits and other required tools.

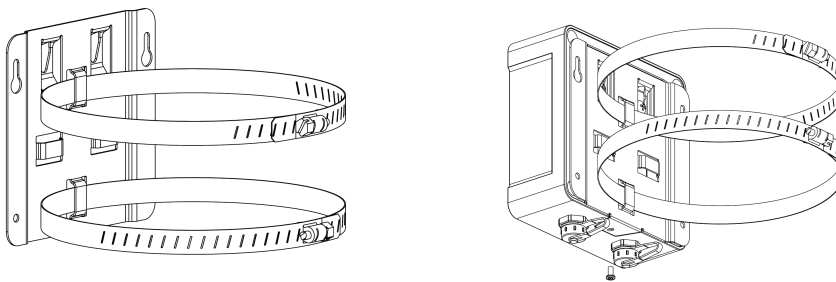
Wall Mounting:

1. Fix the wall plugs into the wall, then fix the mounting bracket to the wall plugs with screws.
2. Put the device on the mounting bracket, then fix the bottom of the device to the bracket with a fixing screw. It's necessary to fix this bracket to device, or it will affect the signal.



Pole Mounting:

1. Straighten out the hose clamp and slide it through the rectangular rings in the mounting bracket, wrap the hose clamp around the pole. After that use a screwdriver to tighten the locking mechanism by turning it clockwise.
2. Put the device on the mounting bracket, then fix the bottom of the device to the bracket with a fixing screw. It's necessary to fix this bracket to device, or it will affect the signal.

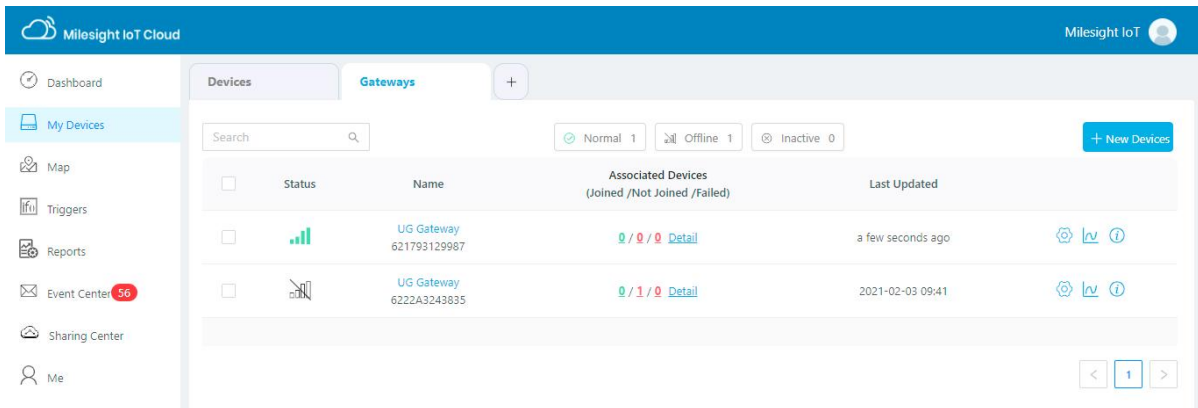


6. Milesight IoT Cloud Management


UC51x series 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.

6.1 Add UC51x to Cloud

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 Devices” page and click “+New Devices”. Fill in the SN of UC51x and select associated gateway.

3. Click  and go to “Basic Settings” to change class type the same as device settings.

Besides, configure the unit of per pulse if you connect the water meter.

Devices / UC511 / Basic Settings


Basic Settings Interface Settings Maintenance Log Refresh Share

Description:

* Unit Per Pulse: gal

* Reporting Interval min

Device Offline Alarm:

4. Click  and go to "Interface Settings" to select used interfaces and customize the name and thresholds.

Milesight IoT Cloud Milesight IoT

Dashboard My Devices Map Triggers Reports Event Center 58 Sharing Center Me

Devices / UC511 / Interface Settings


Basic Settings Interface Settings Maintenance Log Refresh Share

Enable	Name	Type	Custom Name		Current Value	Alarm Threshold			
<input checked="" type="checkbox"/>	Valve 1	valve	Closed	Closed	Open	Open	Closed	=	Disable
<input checked="" type="checkbox"/>	Valve 2	Valve	Closed	Closed	Open	Open	Open	=	Disable

Enable	Name	Current Value	Unit	Alarm Threshold
<input type="checkbox"/>	Valve 1 - Last flow volume	0	gal	≤ <input type="text"/> ≥ <input type="text"/>
<input checked="" type="checkbox"/>	Valve 1 - Total flow volume	0	gal	≤ <input type="text"/> ≥ <input type="text"/>
<input type="checkbox"/>	Valve 2 - Last flow volume	0	gal	≤ <input type="text"/> ≥ <input type="text"/>
<input checked="" type="checkbox"/>	Valve 2 - Total flow volume	0	gal	≤ <input type="text"/> ≥ <input type="text"/>

6.2 Solenoid Valve Control

Solenoid valve can be controlled by Milesight IoT cloud webpage or App. **Before control, ensure all schedule plans on device are disabled.**

1. Click  to open the solenoid valve and configure the duration. Note that if you enable any local plan on UC51x device, this control will not work.

The screenshot shows the Milesight IoT Cloud interface. On the left is a navigation menu with options: Dashboard, My Devices, Map, Triggers, Reports, Event Center (58), and Sharing Center. The main area is titled 'Devices' and shows a list of devices. The 'UC511' device (ID: 6415A51585070020) is selected. Its interface status shows 'Closed' for Valve 1 and 'Open' for Valve 2. A modal window titled 'OpenValve 1' is open, asking the user to set the duration of operating in minutes. The modal has 'Cancel' and 'Open' buttons.

You can also add a switch on the dashboard to control the status of solenoid valves.

The screenshot shows a dashboard titled 'Dashboard_1' with two valve status cards. The first card, 'UC511-Valve 1', shows a 'Closed' status with a red box around the valve icon. The second card, 'UC511-Valve 2', shows an 'Open' status. A modal window titled 'OpenValve 1' is overlaid on the dashboard, asking the user to set the duration of operating in minutes. The modal has 'Cancel' and 'Open' buttons.

Note: If the working mode of UC51x is LoRaWAN® Class A, control commands will delay until the time icon disappears.

The screenshot shows the Milesight IoT Cloud interface. On the left is a navigation menu with options: Dashboard, My Devices, Map, Triggers, Reports, Event Center (58), and Sharing Center. The main area is titled 'Devices' and shows a list of devices. The 'UC511' device (ID: 6415A51585070020) is selected. Its interface status shows 'Closed' for Valve 1 and 'Closed' for Valve 2. A modal window titled 'OpenValve 1' is open, asking the user to set the duration of operating in minutes. The modal has 'Cancel' and 'Open' buttons. A 'Synchronizing...' tooltip is visible over the 'Open' button.

2. Go to "Triggers" page to add actions to trigger the solenoid valve to open for a period of time or a specific volume of water.

Note: Water volume control is only worked when you connect water meter to UC51x device.

Dashboard

My Devices

Map

Triggers

Reports

Event Center 58

Sharing Center

Me

Title

Conditions Relationship : A

Condition A When the time is... +

00:00

Sun. Mon. Tues. Wed. Thur. Fri. Sat.

Actions

Action A Trigger device(s) to... +

UC511 (6415A51585070020)

Valve 1

Open

and the duration is

min

Cancel Save

7. Device Payload

UC51x Series use the standard Milesight IoT payload format based on IPSO. Please refer to the ***UC51x Series Communication Protocol***; for decoders of Milesight IoT products please click [here](#).

-END-