User Manual

WISE-221X

IoT Wireless Sensor Node

ADVANTECH

Enabling an Intelligent Planet

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Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.

2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.

3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.

4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.

5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   – Product name and serial number
   – Description of your peripheral attachments
   – Description of your software (operating system, version, application software, etc.)
   – A complete description of the problem
   – The exact wording of any error messages

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*

Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

Note! *Notes provide optional additional information.*

Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

Package List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

WISE-2210-NA

- 1 x WISE-2210 module
- 1 x Mounting bracket
- 1 x Quick start manual
  *Antenna should be ordered respectively per required frequency range.

WISE-2211-NA

- 1 x WISE-2211 module
- 1 x Mounting bracket
- 1 x Quick start manual
  *Antenna should be ordered respectively per required frequency range.

Note! *User have to install a antenna when they use WISE-2210 or WISE-2211.*

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
- The power cord or plug is damaged.
- Liquid has penetrated into the equipment.
- The equipment has been exposed to moisture.
- The equipment does not work well, or you cannot get it to work according to the user's manual.
- The equipment has been dropped and damaged.
- The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
16. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
17. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

■ To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.

■ Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

NCC 警语

第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

Frequency	Type	Gain	Brand	Part Number
863-870 MHz	Dipole	2.02 dBi	Advantech	1750008836-01
902-928 MHz	Dipole	1.48 dBi	Advantech	1750008837-01

Contents

Chapter 1

Product Overview

1.1 Series Family and Specifications

WISE-221X series support frequency band as below.

Function	Model	Description
Wireless Sensor Node	WISE-2210	LPWAN Wireless Self-powered CT Node
Wireless Sensor Node	WISE-2211	LPWAN Wireless Self-powered Sensor Node

1.2 Features

WISE-221X

- Self-powered sensor node: No power and communication wiring
- Measure and transmit power current every minutes
- Less interference and better penetration through concrete and steel, compared-with 2.4GHz spectrum
  Max. 3 AI channels for CT or sensors
  MQTT and RESTful API IoT Protocol Support
- Plug and play

WISE-2210

- Directly measure equipment power current via CT (Current transformer, AC 0~100mA)

WISE-2211

- Directly measure sensor data(DC, 4~20mA)

1.3 System Architecture

User can use WISE-2210 and CT(Current Transformer) to measure power current of facility equipment, industrial machine and other production equipment. User also can use WISE-2211 to acquire sensor data from AI(Analog input) which connected 4~20mA sensor transmitter.

WISE-221x transmits sensor data to WISE-4210-AP via Advantech LPWAN wireless technology. WISE-4210-AP provides Ethernet and RS-485 connectivity, and support Modbus, RESTful Web API, and iSensing MQTT protocol for integration. One WISE-4210-AP can have 64 end nodes capacity for each LPWAN network, and don't need joint progress. WISE-4210-AP need 10~50VDC wide range voltage by line power.
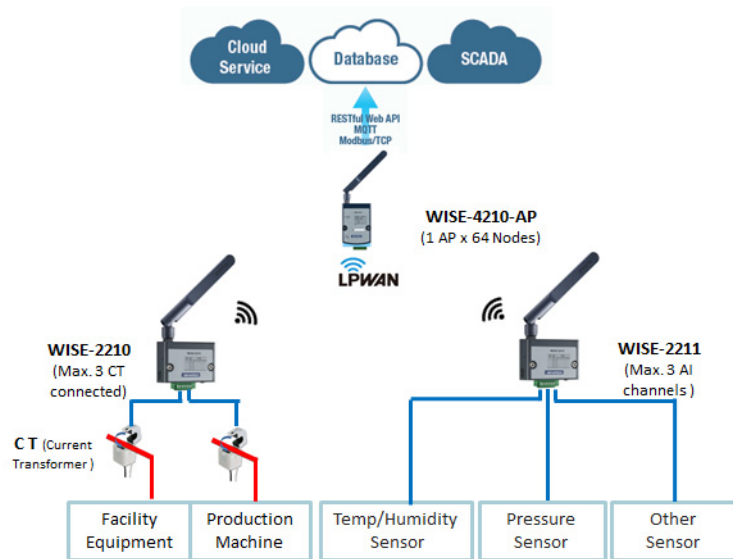
Figure 1.1 System Architecture
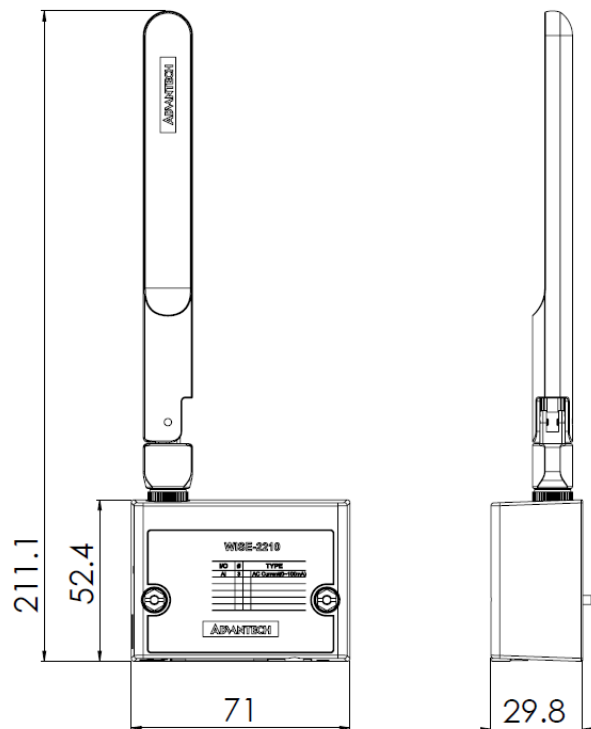
1.4 Mechanical Design and Dimensions

Figure 1.2 WISE-221X Dimension Front and Side

Note!   *User need to install antenna when you use WISE-2210/2211*
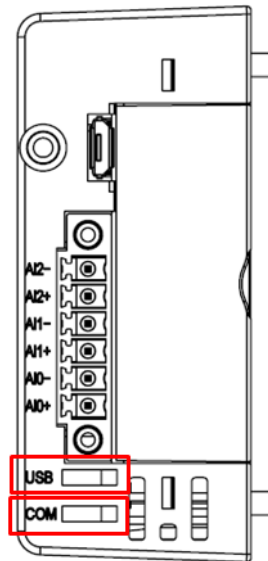
1.5 LED

Figure 1.3 LED of USB and COM

LED	Colour	Behaviour	Description
COM (RF Tx)	Green	On	**Flash when data transmission:** Transmit data to AP **Always on:** In bootloader mode
		off	Idle
USB	Green	On	USB connector plug in
		off	USB connector plug out

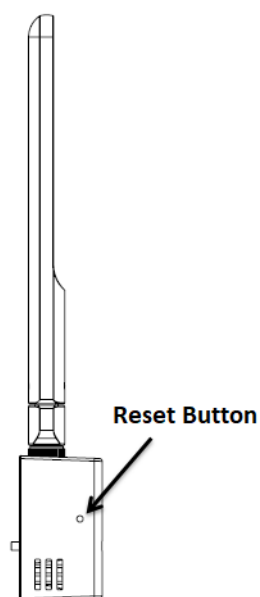## 1.6 Reset button

Reset Button

Figure 1.4 Reset button

Chapter 2

Product Specification

2.1 Wireless Interface

- IEEE Standard: IEEE 802.15.4g
- Operating Frequency:
    - NA923: 923MHz (920.8~924.4), BW:400KHz
    - EU868: 868MHz (865.2~868.8), BW:400KHz
- Data Rate: 625bps / 2.5k bps / 5k bps / 50k bps
- Antenna Gain
    - 902~928MHz: 1.48 dBi
    - 863~870MHz: 2.02 dBi
- Transmit Power: This module is up to +12dBm, but real application need to follow local regulation (e.g. FCC, 0 dBm at 625 /2.5K /5K bps; 10 dBm at 50Kbps)
- Tx
    - 115 dBm at 625bps(Long-Rang Mode)
    - 100 dBm at 50Kbps
- Topology: Star
- Network Capacity: Up to 64 end nodes (WISE-221X)
- Channel list
EU868: 868MHz (865.2~868.8),BW:400KHz

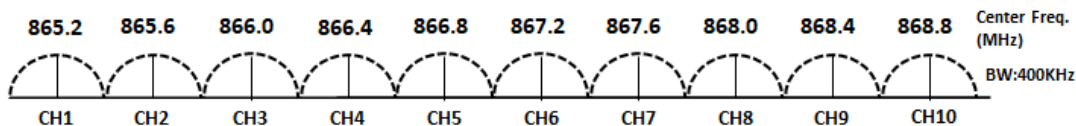| Channel	Freq.(MHz)	Channel	Freq.(MHz)	Channel	Freq.(MHz)	Channel	Freq.(MHz)
1	865.2	4	866.4	7	867.6	10	868.8
2	865.6	5	866.8	8	868.0		
3	866.0	6	867.2	9	868.4		

Figure 2.1 channel list for EU868

NA923: 923MHz (920.8~924.4),BW:400KHz

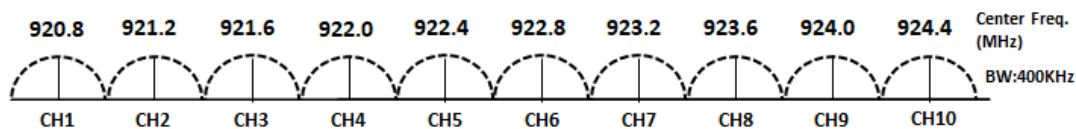| Channel	Freq.(MHz)	Channel	Freq.(MHz)	Channel	Freq.(MHz)	Channel	Freq.(MHz)
1	920.8	4	922.0	7	923.2	10	924.4
2	921.2	5	922.4	8	923.6		
3	921.6	6	922.8	9	924.0		

Figure 2.2 channel list for NA923)

> **Note!** The transmitting distance is subject to the environment of application site. Please perform site survey to determine the set up range of the wireless network

2.2 General

- I/O & Power connector: 3.5-mm spacing plug-in screw terminal block
- Enclosure: PC
- Mounting: DIN 35 rail, wall, pole
- Dimensions (W x H x D): 71 x 52 x 30 mm (without Antenna)
- Operation temperature: -25~70°C (-13~158°F)
- Storage temperature: -40~85°C (-40~185°F)
- Operating humidity: 5~95% RH (non-condensing)
- Storage humidity: 0~95% RH (non-condensing)

> *Note!* *Equipment will operate below 30% humidity. However, static electricity-problems occur much more frequently at lower humidity levels. Make sure you take adequate precautions when you touch the equipment. Consider using ground straps, anti-static floor coverings, etc. if you use the equipment in low humidity environments.*

2.3 Power

2.3.1 WISE-2210

1. Input power requirements:

WISE-2210 is a self-powered sensor node, power source is obtained from AI(Analog input) which connected 0~100 mA current transformer. In other words, WISE-2210 measures data and gets power current from connected current transformer.

2. Charging time

Data Transmission Time Period	Minimum alternating current of CT Primary Current Value	1st Charging Time for WISE-2210
1s	18A	1 min
5s	6A	8 min
10s	3A	20 min
30s	2A	35 min
60s	2A	35 min

Test Condition:

- Data Rate: 50Kbps
- Transmit Power: 5dBm
- Frequency 920.8MHz
- Distance: 500 meters, Line of sight

2.3.2 WISE-2211

1. Input power requirements:

WISE-2211 is a self-powered sensor node, power source is obtained from AI(Analog input) which connected 4~20mA sensor transmitter. In other words, WISE-2211 measures data and gets power current from connected sensor transmitter.

2. Charging time

Data rate	TX power	Data Transmission Time period	1st Charging Time for WISE-2211
50Kbps	12 dBm	1s	
2.5Kbps	5 dBm	5s	
	12 dBm	10s	90s
5K bps	5 dBm	5s	
	12 dBm	10s	
625 bps	12 dBm	30 s	

Test Condition:
- Current input of WISE-2211: 4mA, direct current

2.4 Software

Utility: WISE Studio

WISE-4210-AP Protocols: TCP/IP, UDP, HTTP, HTTPS, DHCP, ARP, SNTP, MQTT, Modbus/TCP, Modbus/RTU

WISE-4210-AP supports RESTful Web API .JSON format

2.5 Configuration Interface

WISE-221X

Interface: USB virtual COM port

Connector: Micro-B USB

USB chipset: Silicon Labs CP210x

Driver: CP210x USB to UART Bridge VCP Drivers (https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers)

2.6 I/O Specifications

WISE-2210

- Channel: 3 (for CT, 0-100mA, AC)
- Input Range: 0-100mA, Alternating current
- Resolution: 11 bits
- Accuracy: ±0.2 % of FSR
- Drift: 40ppm

WISE-2211

- Channel: 3 (for sensor, 4-20mA, DC)
- Input Range: 4-20mA, Direct current
- Resolution: 11 bits
- Accuracy: ± 0.2 % of FSR
- Drift: 40ppm

> *Note!* *WISE-221X modules can operate below 30% humidity. However, environments with low relative humidity are prone to problems with electrostatic discharge. Therefore, you should ensure that you take adequate precautions by using ground straps, anti-static floor coverings, or similar equipment whenever you handle this equipment, especially in low-humidity environments.*

> *Note!* *User can order Advantech's accessory: CT(Current Transformer), please see chapter 2.11.Accessory: CT(Current Transformer).*
>
> *If user want to choose CT by themselves, please choose Turns Ratio Np:Ns is above 1:3000, and the output range of CT Secondary Current Value should choose 0-100(mA).*

2.7 Configuration Interface

Configuration Interface Micro-B USB

> *Note!* *A USB cable is used for configuration only.*
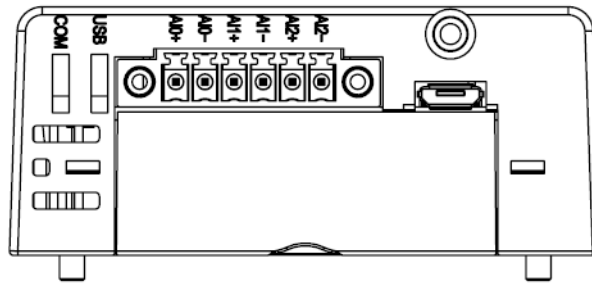
2.8 Pin Assignment

Figure 2.3 WISE-221X Pin Assignment

2.9 Application Wiring

WISE-2210

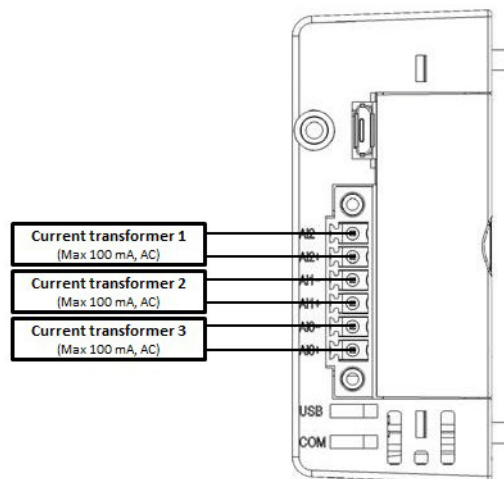AI Input current: Alternating Current (0~100 mA)

Figure 2.4 WISE-2210 I/O Pinout & Application Wiring
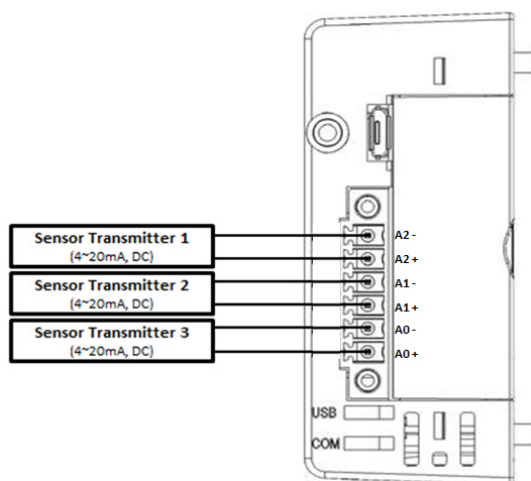
WISE-2211

AI Input current: Direct Current (4~20mA)

Figure 2.5 WISE-2211 I/O Pinout & Application Wiring
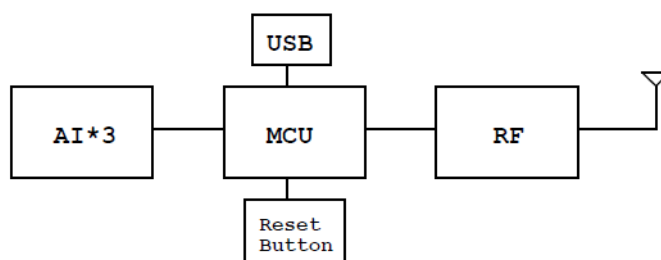
2.10 Block Diagram

Figure 2.6 WISE-2210/2211 Block Diagram

2.11 Accessory: CT(Current Transformer)

User can order Advantech accessory, CT(Current Transformer) as below:

P/N	Power Current Range (Primary	Hole sizing (Primary)	Accuracy	Operating Temperature
96PD-CT241-60A	3~60A	10.0+/-0.2mm	Class 0.5	-20~65°C
96PD-CT248-100A	5~100A	15.7+/-0.3mm	Class 0.5	-40~65°C
96PD-CT24F-200A	10~200A	20.5+/-0.3mm	Class 0.5	-40~85°C
96PD-CT24C-300A	15~300A	35.7+/-0.3mm	Class 0.5	-40~85°C

Note! *The class designation is an approximate measure of the CT's accuracy. The ratio (primary to secondary current) error of a Class 1 CT is 1% at rated current; the ratio error of a Class 0.5 CT is 0.5% or less. (source: https://en.wikipedia.org/wiki/Current_transformer)*

Chapter 3

Mechanical and Hardware Installation
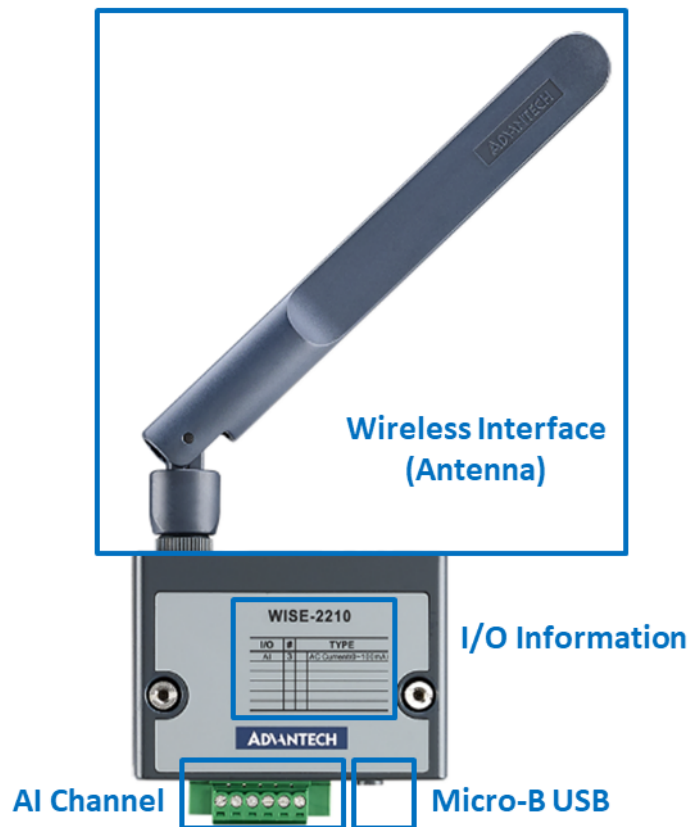
3.1 Interface Introduction

Figure 3.1 WISE-221x Interface Introduction

3.2 Mounting

Applicable installation methods are briefly described in the following sections.

3.2.1 Poll Mount

Use a screwdriver to fasten WISE-221X and mount kit. And then Use cable tie to fasten mount kit and pole.
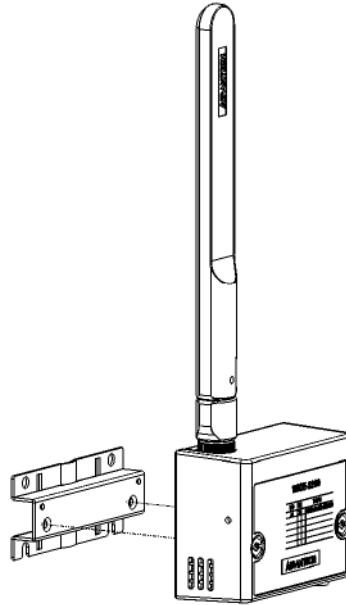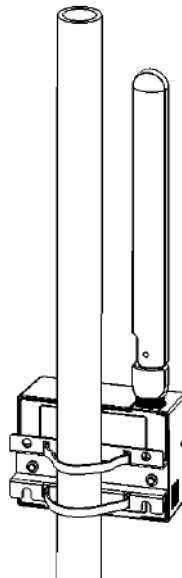

Figure 3.2 Pole Mounting (front)

Figure 3.3 Pole Mounting (back)

3.2.2 Wall Mounting

WISE-221X can be fixed to a wall with mounting kit. Use a screwdriver to fasten the mounting adapter to your module, and use the end brackets included in the package in order to keep it from sliding.
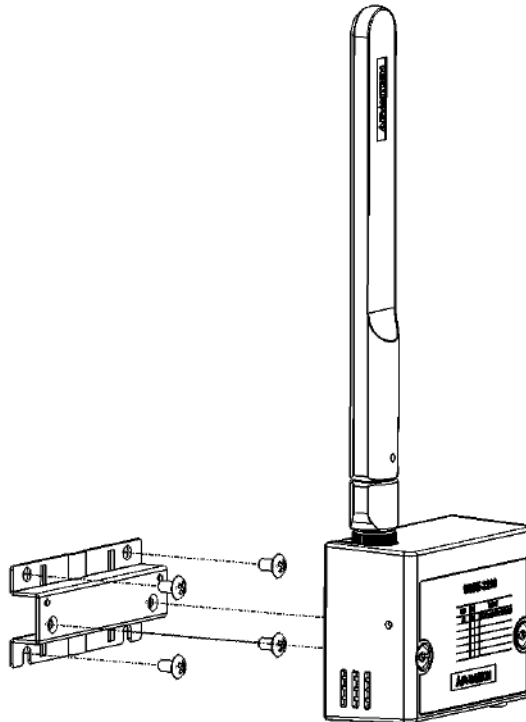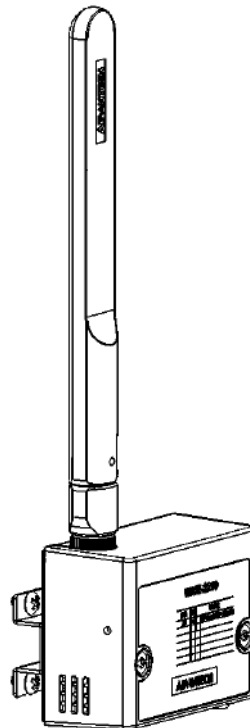
Figure 3.4 Wall Mounting Install

Figure 3.5 Wall Mounting Install

3.2.3 DIN-Rail Mounting

WISE-221X can be fixed to a cabinet with mounting rails. Use a screwdriver to fasten the DIN rail adapter to your module, and use the end brackets included in the package in order to keep it from sliding.

Note! *DIN-Rail Mounting adapter for WISE-221X is available for ordered:*

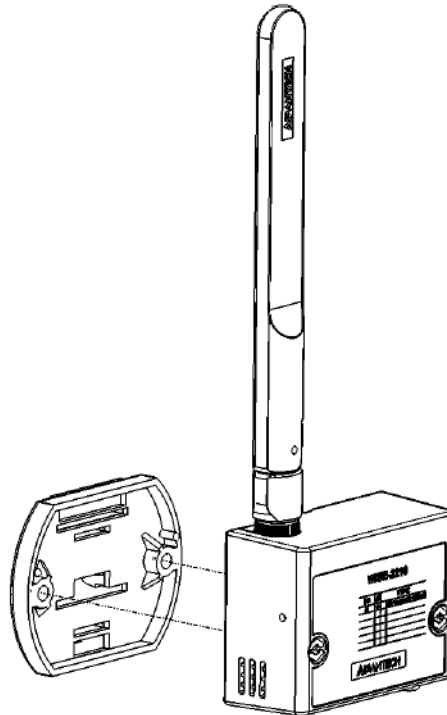■ ***1970000000T000*** *DIN-Rail Mounting kit*

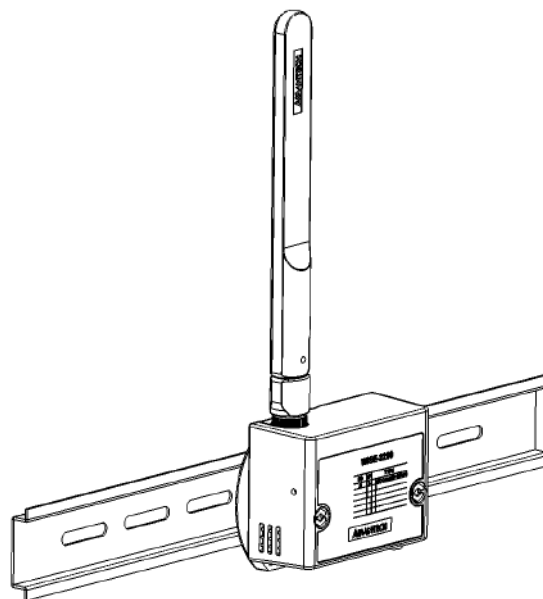**Figure 3.6 DIN Mounting Install**

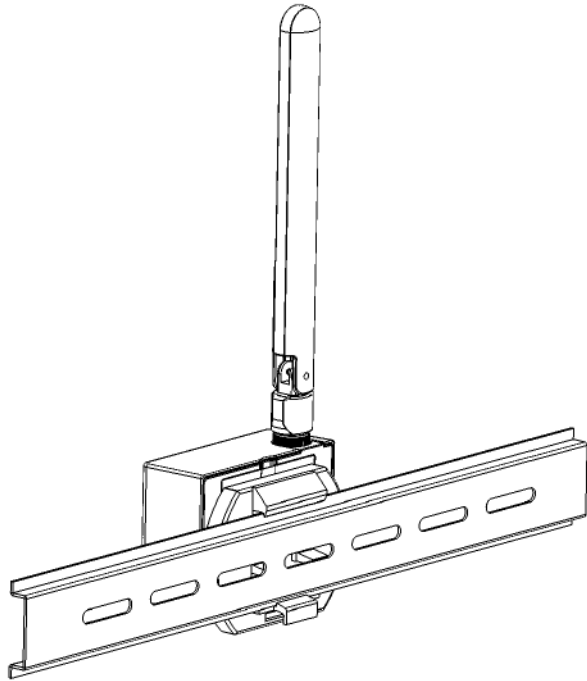**Figure 3.7 DIN Mounting Install (Front)**

Figure 3.8 DIN Mounting Install (Back)

3.3 Power Supply Wiring

WISE-221X is a self-powered sensor node, power source is obtained from AI(Analog input) channels.

Chapter 4

System Configuration

4.1 Connection

1. Connect WISE-221X to your computer via a micro-B USB port. The USB driver is required for creating a virtual COM port of a computer. Please refer to following link to get the latest USB driver: CP210x USB to UART Bridge VCP Drivers (https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers)
2. Connect WISE-4210-AP to your computer via the RJ-45 LAN port, and configure the IP address of your computer as same IP domain as default IP address of module:10.0.0.1

Figure 4.1 Connection WISE-221X and WISE-4210-AP

> **Note!** *Micro-B USB cable for configuring WISE-4210 nodes is available for ordered:*
>
> ■ **1700023619-01** *1M micro USB type-B male to USB type-A male cable*

4.2 Configuring WISE-4210-AP with Browser

4.2.1 System Requirements

The web utility of WISE-4210-AP is developed with HTML 5, but for detailed indication and data transmission mode, the type of web utility will depend on web page of the operating system.

For mobile devices, the minimum system requirements of web browsers are as below:

- Safari 6 in Apple iOS
- Web Browser in Google Android 4.0 (Ice Cream Sandwich)
- Chrome in Google Android 4.0 (Ice Cream Sandwich)

Mobile Browser	Chrome	Android	Safari
Configuration	Y	Y	Y
File Upload	N	N	N
Data Log Chart	Y	Y	Y
Data Log Export	N	N	N

For PC platforms, the minimum requirements of web browsers are as below:

- Internet Explorer (version 11)
- Google Chrome (version 30)
- Mozilla Firefox (version 25)

Mobile Browser	Chrome	Firefox	IE11	IE10
Configuration	Y	Y	Y	Y
File Upload	Y	Y	Y	N
Data Log Chart	Y	Y	Y	Y
Data Log Export	Y	Y	N	N

4.2.2 Factory Default Settings

- IP Mode: Static IP Address
- Default IP: 10.0.0.1
- Subnet Mask: 255.0.0.0
- Default Gateway: 0.0.0.0
- IP Mode: Static
- HTTP Port: 80

4.2.3 Module Authorization

Account	Default Password	Access Ability
root	00000000	All privileges
admin	00000000	All privileges except change, reset password and reset to default
user	00000000	View module status only. Not allow to change configurations

Functions	Account		
	root	**admin**	**user**
Device information	View	View	View
Device setting	Edit	Edit	Deny
System Restart	Edit	Edit	Edit
Module Locate	Edit	Edit	Edit
Change passwords	Edit	Deny	Deny
Reset Password	Edit	Deny	Deny
Reset to default	Edit	Deny	Deny
Access control configurations	Edit	Edit	Deny
Group configurations	Edit	Edit	Deny
Download/upload processes	Edit	Edit	Deny
Network configurations	Edit	Edit	View
Data log configuration and query	Edit	Edit	View
Clear data log	Edit	Edit	Deny

4.3 Install WISE Studio and Configure End Devices

Step 1. Download and install WISE Studio through the following link:

https://support.advantech.com/support/new_default.aspx

Step 2. Execute WISE Studio

Step 3. Power up WISE-4210-AP by line power.

Step 4. Use a USB cable to communicate WISE-221x through a computer.

Step 5. Click "Go to Configuration" while it shows "available USB-Serial" in USB-Serial box. (If device cannot be connected through USB, please install CP210x USB to UART Bridge VCP Drivers from the following website:

https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers)

Step 6. Click "Connect" to access the end device.

Step 7. Once everything is all set, you are successfully into configuration page.
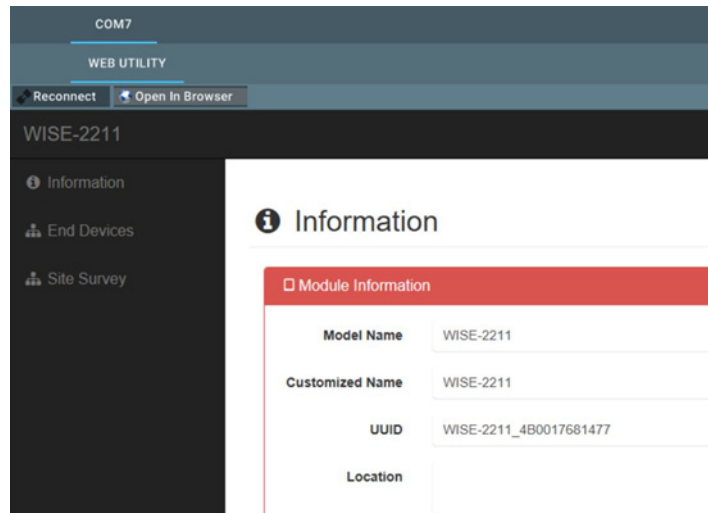
4.4 Connection between AP and Nodes

The first step of the connection between WISE-221x devices and WISE-4210-AP is to configure the units in the same network with the same frequency range. Please go to "**End Devices \ RF Status \ Configuration**" to configure the RF module by following below instructions.

- RF Operation Mode: WISE-221x devices supports "Push Mode", the communication from the end node device to AP is uplink only, no downlink.
- Data Rate (bps): Lower data rate is helpful of extending communication range, while higher data rate can reduce the communication time which allows more data to be uploaded to AP in the same period of time.
- Tx Power (dBm): Lower Tx power helps to reduce the power consumption; higher Tx power enhances the communication distance.
- Baseband (kHz): If several WISE-4210-AP or sub-GHz networks are in the same area, users can select different basebands to reduce the interference of each network. Please be noted that each WISE-221x devices in the same network should use the same baseband as WISE-4210-AP.


Once the network configuration is finished, please go to "End Devices \ IO Status" for I/O function configuration.
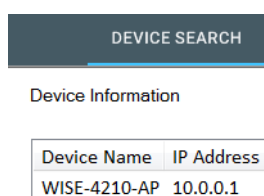
4.5 Configure WISE-4210-AP

Step 1. The default IP address of WISE-4210-AP is 10.0.0.1, if you are not able to access WISE-4210-AP, please follow step 2 to search the IP address of WISE-4210-AP.

Step 2. Configure the Ethernet adapter under the same subnet as 10.0.0.1. In the following figure, the IP address of this computer is configured as 10.0.0.100. Find the Ethernet box in WISE Studio, and click "Go to Configuration".
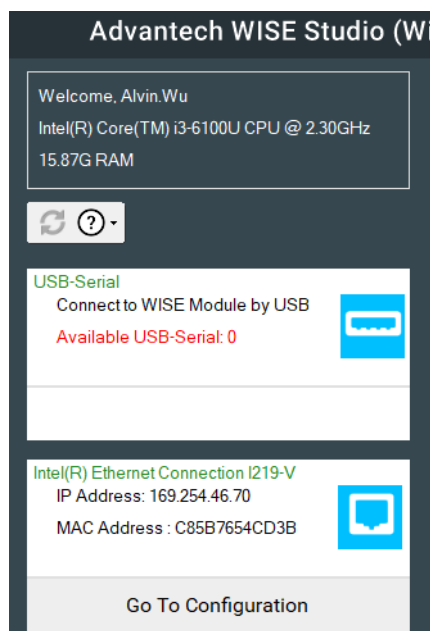

Step 3. After the above steps, WISE Stuido will search WISE-42xx series under the same subnet, and you will find the IP address of WISE-4210-AP in **Device Information**.
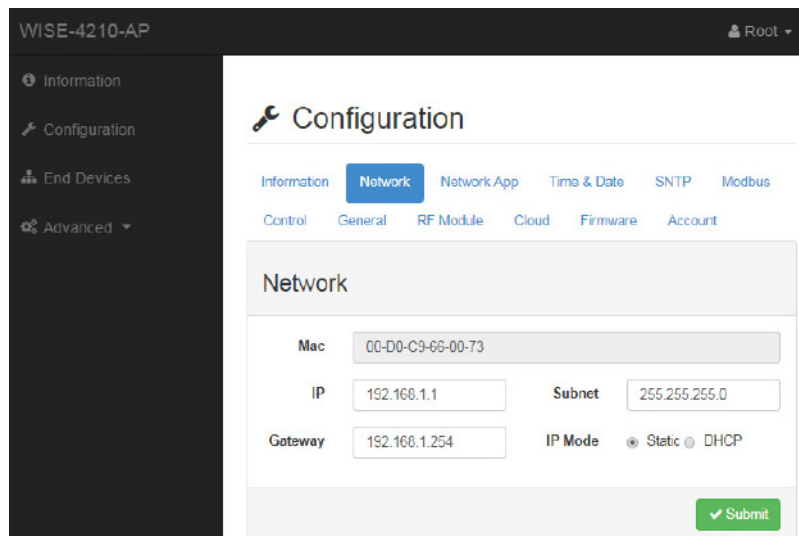

Step 4. Enter the IP address of WISE-4210-AP in the browser, or you can keep using WISE Studio to do further configuration.

The default account and password of WISE-4210-AP to log into web page is root and 00000000. Click "Login".
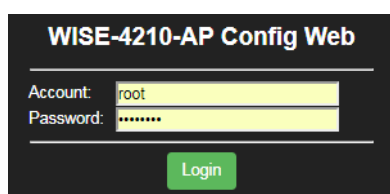
Step 5. Go to "Configuration \ Network" to configure LAN port parameters of WISE-4210-AP.

Step 6. Go to "**Configuration \ RF Module**" to configure the RF module

- **RF Operation Mode:** WISE-221x devices supports "Push Mode", the communication from the end node device to AP is uplink only, no downlink.
- **Data Rate (bps):** Lower data rate is helpful of extending communication range, while higher data rate can reduce the communication time which allows more data to be uploaded to AP in the same period of time.
- **Baseband (kHz):** If several WISE-4210-AP or sub-GHz networks are in the same area, users can select different basebands to reduce the interference of each network. Please be noted that each WISE-221x devices in the same network should use the same baseband as WISE-4210-AP.
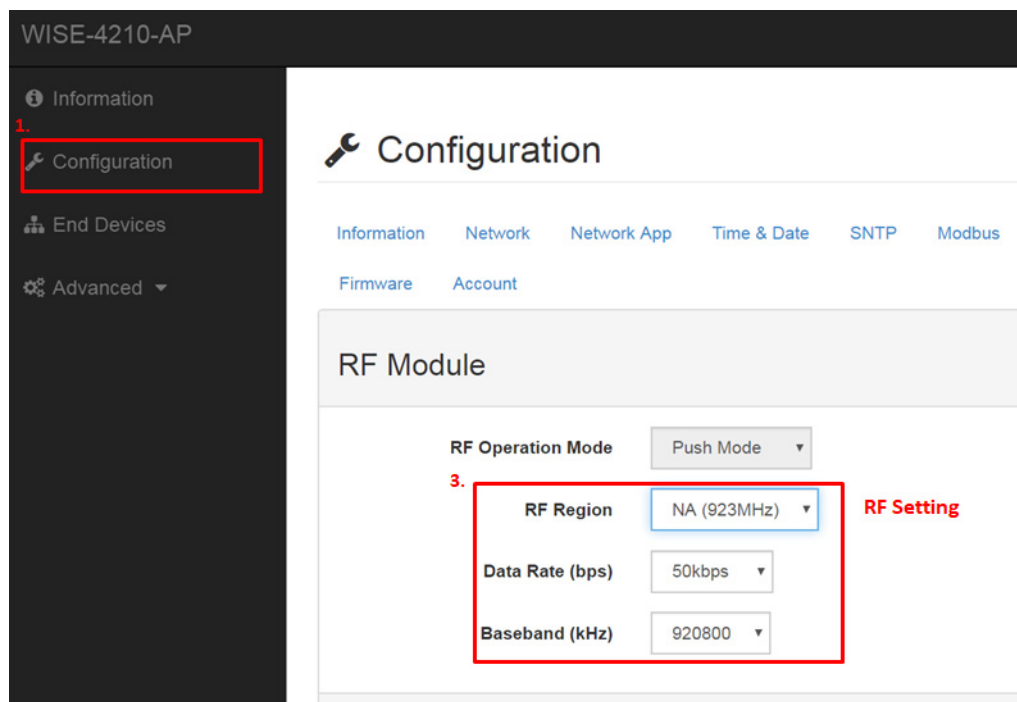
4.6 Setup WISE-221x Network

After configuring all of end devices into the same network with WISE-4210-AP, users can go to "End Devices" tab to check "End Device List".

- ■ MAC Address: The unique identifier of each end devices.
- ■ Modbus ID: Modbus ID is automatically assigned by WISE-4210-AP. User can configure Modbus ID manually in "Configuration \ Modbus \ Modbus ID".
- ■ RSSI (dBm): Signal strength when data updated from end device to AP. RSSI-will be updated after WISE-4210-AP received data from WISE-221x end node devices. RSSI level higher than -100dBm is recommended.
- ■ Inactive Time: Elapsed time since last time WISE-4210-AP receives data from an end node devices. If an end node device update data every 5 second and it has good wireless signal quality, Inactive Time will show 0 or 1 every 5 seconds.

4.7 WISE-221x IO configuration

4.7.1 Date Update

Please go to **"End Devices \ Date Update"** to configure the data sample and update interval, user can input update interval.

4.7.2 I/O Status

Please go to **"End Devices \ IO Status"** to configure the RF module by following below instructions.

- Channel: WISE-2210/2211 has three channel, user can choose channel 0~2.
- CT Primary Current Value(A): It's input power current of CT. For instance, CT Primary Current Value is the power current of facility equipment and machine (See figure 1.1).
- CT Secondary Current Value(mA): It's output power current of CT. In other words, CT Secondary Current Value is the power current into WISE-2210.

Note!

User can order Advantech's accessory: CT(Current Transformer), please see chapter 2.11.Accessory: CT(Current Transformer).

If user want to choose CT by themselves, please choose Turns Ratio Np:Ns is above 1:3000, and the output range of CT Secondary Current Value should choose 0-100(mA).

4.8 Access WISE-221x Data by Modbus/TCP Protocol

Go to **"Configuration \ Modbus \ Modbus ID"** to check and configure the Modbus ID of each MAC address of AP and end node devices. User can use Modbus/TCP and Modbus/RTU protocol to access each end devices by WISE-4210-AP, polling data from different Modbus ID for different end node devices, or AP.

Modbus Address Table for WISE-2210 and 2211:

Address 4X	Ch	Description	Attribute
40001	0		Read
40002	1		Read
40003	2		Read
40004	3		Read
40005	4	AI Value	Read
40006	5		Read
40007	6		Read
40008	7		Read
40009	Average Ch 0~7		Read
40131~40132	0		Read
40133~40134	1		Read
40135~40136	2		Read
40137~40138	3		Read
40139~40140	4	AI Floating Value (IEEE754)	Read
40141~40142	5		Read
40143~40144	6		Read
40145~40146	7		Read
40147~40148	Average Ch 0~7		Read
40201 (The type codes of channels for average value can't be changed.)	0		Read
40202	1		Read
40203	2	Type Code	Read
40204	3		Read
40205	4		Read
40206	5		Read
40207	6		Read
40208	7		Read
40209	Average Ch 0~7		Read
40231~40232	0		Read
40233~40234	1		Read
40235~40236	2		Read
40237~40238	3		Read
40239~40240	4	Physical AI Floating Value (IEEE754)	Read
40241~40242	5		Read
40243~40244	6		Read
40245~40246	7		Read
40247~40248	Average Ch 0~7		Read

4.9   Push WISE-4210 data by RESTful Web Service

Step 1. Configure the **Private Server** in "Configuration \ Cloud"
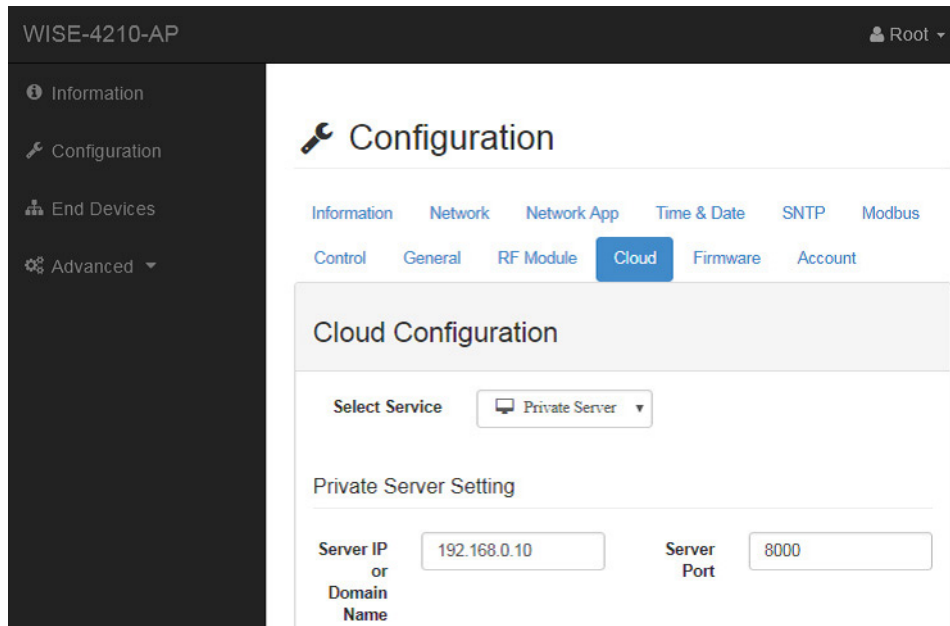
Step 2. Enable the **Data Logger** function in "**Advanced \ Data Logger \ Logger Configuration**"
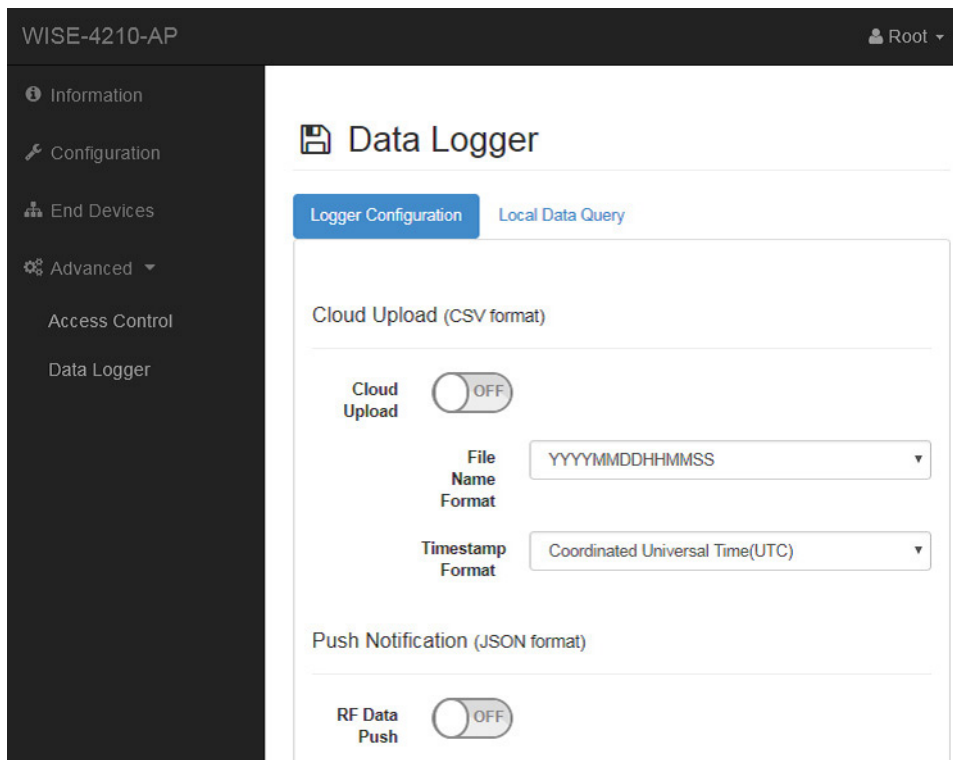
4.10 Access WISE-4210 I/O Data by RESTful API

/lpwan_message/slot_macID

Description	Retrieves the log data in system memory.
URL Structure	**http://10.0.0.1/lpwan_message/slot_macID**
HTTP Method	GET: According to the setting of filtering, server returns the all/partial of push data.

GET	Request:
	GET / lpwan_message/slot_macID
	
	[Example]:
	■ Request : **GET /lpwan_message/slot_AD4210112233 for WISE-4210 module**
	
	Content-type: application/json
	Response: 200 OK
	`{`
	    `"TIM":"2014-11-11T15:48:32+08:00",`
	`"UID":"WISE-4210-AP_00D0C90E8738",`
	`"MAC":"00-D0-C9-FE-16-01",`
	`"Rssi":-33,`
	`"Record" :`
	`[`
	`[0,0,1,0],`
	`[0,0,2,50],`
	`[0,0,3,10],`
	`[0,1,4,0],`
	`[0,1,5,456],`
	`[0,1,6,0],`
	`[0,0,30,0],`
	`[0,0,31,16],`
	`[0,0,32,32767]`
	`]`
	`}`

■ JSON array name definition:

Field	Abbreviation	Data Type
Array of I/O records	Record	Array

■ Resource value definitions:

Field	Abbreviation	Data Type	Property	Description

				Timestamp of the storage
				– Coordinated Universal Time (UTC)
				Ex. "1415757750" corresponds to November 12, 2014, 2:02:30 am, Standard Time. (meanwhile, 2014, 10:02:30 am, Taipei Time.)
Timestamp	TIM	String	R	
				– Local Date/Time according GMT time zone (ISO 8601)
				Ex. "1994-11-05T08:15:30-05:00" corresponds to November 5, 1994, 8:15:30 am, US Eastern Standard Time.
UUID	UID	String	R	Universally Unique Identifier (UUID) Max. 32 characters
MAC ID	MAC	String	R	MAC address, ex, "00-D0-C9-F0-63-F7"
RSSI	Rssi	Number	R	The RSSI value
Recording message	Record	Array	R	* The data type in array is as follows. [Number, Number, Number, Number] * The information in array is as follows. [Slot-index, Channel-index, I/O-type-index, I/O-value] * See I/O Type Index Table for I/O type-index

[I/O Type Index Table]

Index	Recording I/O-type of the storage
0	Invalid
1	DI Logic Status
2	DI Counter value
3	DI Frequency value
4	DO Logic Status
5	DO Absolute Pulse Output value
6	DO Incremental Pulse Output Value
7	AI value
8	Historical Maximum AI value
9	Historical Minimum AI value
10	AI value after scaling
11	AI status flags
12	AI engineering value
13	Historical Maximum AI engineering value
14	Historical Minimum AI engineering value
24	DI period (counter mode)
25	DI low-to-high trigger tick
30	Expansion bit data
31	Expansion bit error code
32	Expansion word data
33	Expansion word error code
40	Sensor engineering value
41	Sensor maximum engineering value
42	Sensor minimum engineering value
43	Sensor status
44	Sensor alarm status

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