

# User Manual

## WISE-4210 Series

**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 merchandise 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.

# 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](http://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@advan-tech.com](mailto:support@advan-tech.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-4210-APNA/UA

- 1 x WISE-4210-APNA/UA module
- 1 x Mounting bracket
- 1x China RoHS (UA series only)
- 1x Antenna (UA sereis only)

### WISE-4210-S231NA/UA

- 1 x WISE-4210-S231NA/UA module
- 1 x Mounting bracket
- 1x China RoHS (UA series only)
- 1x Antenna (UA sereis only)

### WISE-4210-S251NA/UA

- 1 x WISE-4210-S251NA/UA module
- 1 x Mounting bracket
- 1x China RoHS (UA series only)
- 1x Antenna (UA sereis only)

**Note!** *Antenna for NA series should be ordered respectively based on the required frequency range.*



- 1750008836-01 863-870MHz Dipole Antenna for WISE-4210
- 1750008837-01 902-928MHz Dipole Antenna for WISE-4210

**Note!** *Battery needs to order separately*



- 1760002647-01 3.6V/2500mAh AA Cylindrical Battery (non-rechargeable)

## 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:
  15. The power cord or plug is damaged.
  16. Liquid has penetrated into the equipment.
  17. The equipment has been exposed to moisture.
  18. The equipment does not work well, or you cannot get it to work according to the user's manual.
  19. The equipment has been dropped and damaged.
  20. The equipment has obvious signs of breakage.
21. 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.
22. 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.

23. 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。

## Industry Canada statement:

This device complies with ISSED's licence-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'ISSED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

### FOR MOBILE DEVICE USAGE (>20cm/low power)

Radiation Exposure Statement:

This equipment complies with ISSED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements ISSED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

### DETACHABLE ANTENNA USAGE

This radio transmitter (IC: 9404A-WISE4210 / Model: WISE-4210-S231, WISE-4210-S251, WISE-4210-AP) has been approved by ISSED to operate with the antenna type listed below with maximum permissible gain indicated. Antenna types not included in

this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (IC: M82-WISE4210 / Model: WISE-4210-S231, WISE-4210-S251, WISE-4210-AP) a été approuvé par ISED pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Approved antenna(s) list

| Type   | Gain     | Brand | Manufacturer  |
|--------|----------|-------|---------------|
| Dipole | 2.19 dBi | PSA   | 1750008836-01 |
| Dipole | 1.33 dBi | PSA   | 1750008837-01 |



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# Chapter 1

## Product Overview

## 1.1 Series Family and Specifications

| Function              | Model          | Description                                                         |
|-----------------------|----------------|---------------------------------------------------------------------|
| Wireless Access Point | WISE-4210-AP   | LPWAN IoT Wireless to Ethernet AP                                   |
| Wireless Sensor Node  | WISE-4210-S231 | LPWAN IoT Wireless Sensor Node with Temperature and Humidity Sensor |
| Wireless Sensor Node  | WISE-4210-S251 | LPWAN IoT Wireless Sensor Node with 6-ch DI and 1-port RS-485       |

## 1.2 Mechanical Design and Dimensions

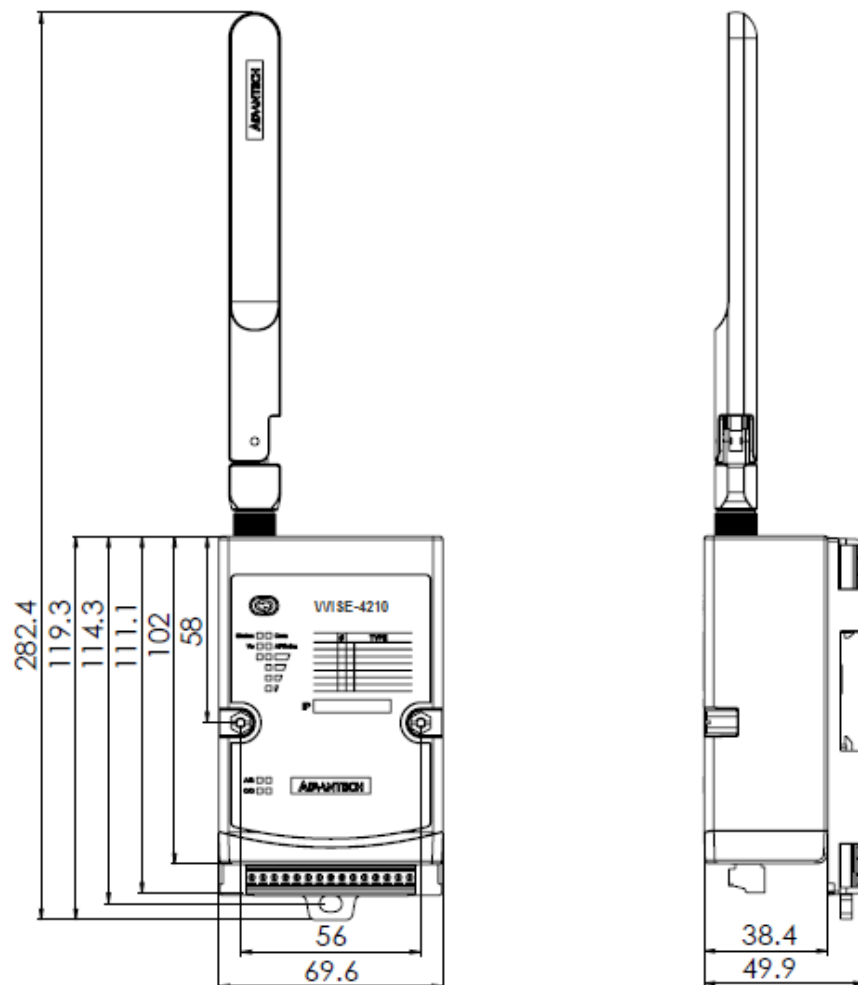


Figure 1.1 WISE-4210 Dimension Front & Side

## 1.3 LED Definition

### 1.3.1 WISE-4210-AP

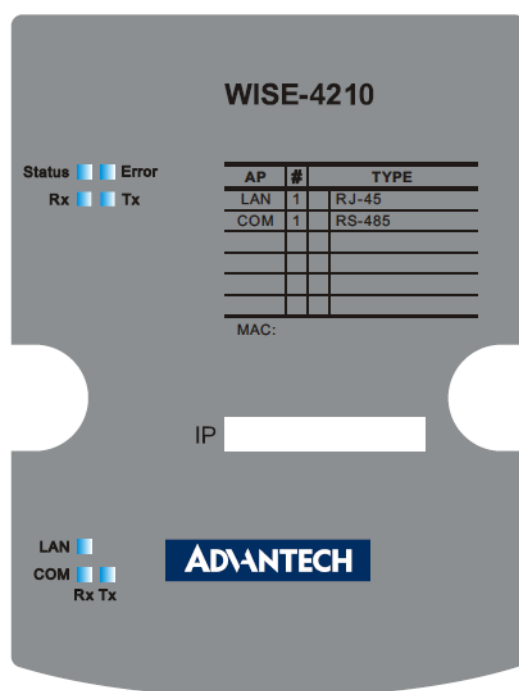


Figure 1.2 WISE-4210-AP LED Indicator

| LED    | Color  | Indication    | Behavior                                               |
|--------|--------|---------------|--------------------------------------------------------|
| Status | Green  | Blinking      | 0.5Hz: Operating normally                              |
| Error  | Red    | Blinking      | 2Hz: I/O error or RF related error                     |
| Rx     | Green  | Blinking      | Receiving data from LPWAN nodes                        |
| Tx     | Green  | Not Used      |                                                        |
| LAN    | Green  | Blinking      | 1Hz: Gateway's IP is available and is normally at work |
|        |        | On for 30 Sec | When enable LOCATE function                            |
| COM Rx | Green  | Steady On     | Receiving data from RS-485<br>Turn on at last 10ms     |
|        |        | Off           | No data received from RS-485                           |
| COM Tx | Yellow | Steady On     | Sending data to RS-485<br>Turn on at last 10ms         |
|        |        | Off           | No data sent to RS-485                                 |

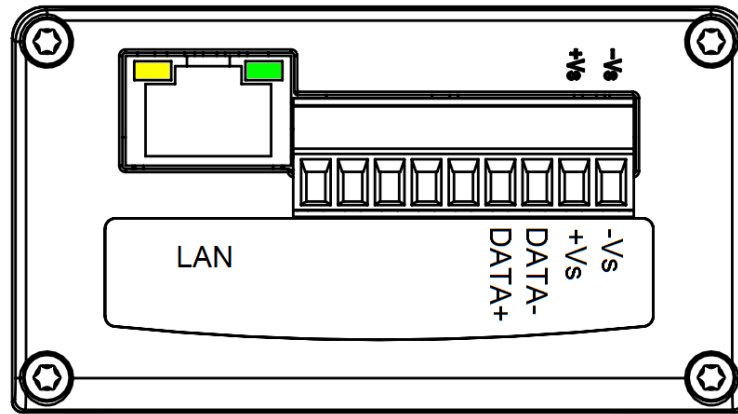


Figure 1.3 WISE-4210-AP LAN Port LED

| LED   | Color  | Indication | Behavior                           |
|-------|--------|------------|------------------------------------|
| Link  | Green  | On         | Both ends of devices are connected |
|       |        | Off        | Not connected yet                  |
| Speed | Yellow | On         | 100 Mbps                           |
|       |        | Off        | Less than 100 Mbps                 |

### 1.3.2 WISE-4210-S231

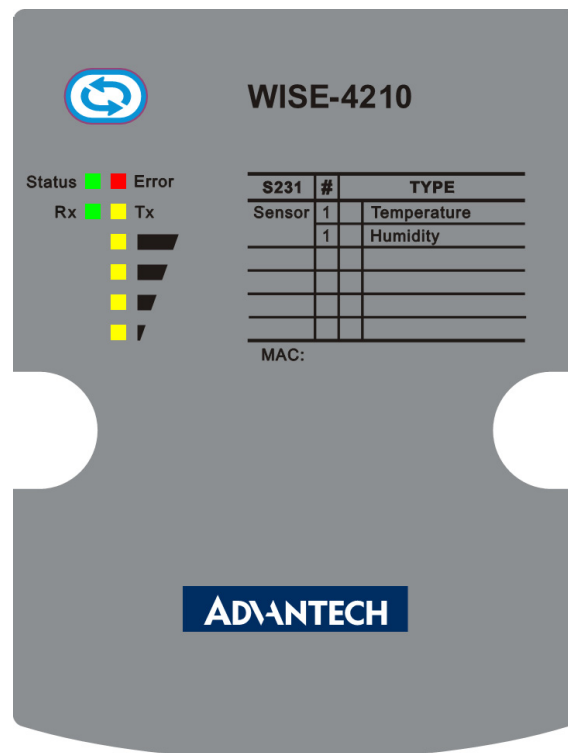


Figure 1.4 WISE-4210-S231 LED Indicator

|                                                                  | LED               | Color     | Indication                                                | Behavior                             |
|------------------------------------------------------------------|-------------------|-----------|-----------------------------------------------------------|--------------------------------------|
| Normal Mode                                                      | Status            | Green     | Blinking (2Hz)                                            | Initial Status                       |
|                                                                  |                   |           | Blinking (0.5Hz)                                          | Push Status                          |
|                                                                  | Error             | Red       | Blinking (0.5Hz)                                          | Battery Voltage Low                  |
|                                                                  |                   | Red+Green | Error blinking (2Hz) + Signal Indicator (Strong) blinking | RF related error                     |
|                                                                  |                   | Red+Green | Error blinking (2Hz) + Signal Indicator (Good) blinking   | I/O related error                    |
|                                                                  | Rx                | Green     | NA                                                        | NA                                   |
|                                                                  | Tx                | Yellow    | Steady on                                                 | Sending data to Gateway (Push Only)* |
|                                                                  | Signal Indicators | Green     | Steady on                                                 |                                      |
| *Automatically disable after 15 secs when battery power is used. |                   |           |                                                           |                                      |
| Site Survey Mode                                                 | Status            | Green     | Steady on                                                 | Site Survey Mode                     |
|                                                                  |                   |           | Blinking (0.5Hz)                                          | Battery Voltage Low                  |
|                                                                  | Error             | Red       | Blinking (0.5Hz)                                          | Battery Voltage Low                  |
|                                                                  |                   | Red+Green | Error blinking (2Hz) + Signal Indicator (Strong) blinking | RF related error                     |
|                                                                  |                   | Red+Green | Error blinking (2Hz) + Signal Indicator (Good) blinking   | I/O related error                    |
|                                                                  | Rx                | Green     | NA                                                        | NA                                   |
|                                                                  | Tx                | Yellow    | Steady on                                                 | Sending data to Gateway (Push Only)* |
|                                                                  | Signal Indicators | Green     | Steady on                                                 |                                      |
| *Automatically disable after 15 secs when battery power is used. |                   |           |                                                           |                                      |
| OTA Mode                                                         | Error             | Red       | Blinking (0.5Hz)                                          | Battery Voltage Low                  |
|                                                                  |                   | Red+Green | Error blinking (2Hz) + Signal Indicator (Strong) blinking | RF related error                     |
|                                                                  |                   | Red+Green | Error blinking (2Hz) + Signal Indicator (Good) blinking   | I/O related error                    |
|                                                                  |                   | Red+Green | Error blinking (2Hz) + Signal Indicator (Good) blinking   | I/O related error                    |
|                                                                  | Rx                | Green     | Steady on                                                 | OTA Rx Mode                          |
|                                                                  | Tx                | Yellow    | Steady on                                                 | OTA Tx Mode                          |
|                                                                  | Signal Indicators | Green     | Steady on                                                 |                                      |
|                                                                  | Signal Indicators | Green     | Steady on                                                 |                                      |

COM Rx (Green): Steady on; Receiving response from slave device

COM Tx (Yellow): Steady on; Sending request to slave device

1.3.3 WISE-4210-S251

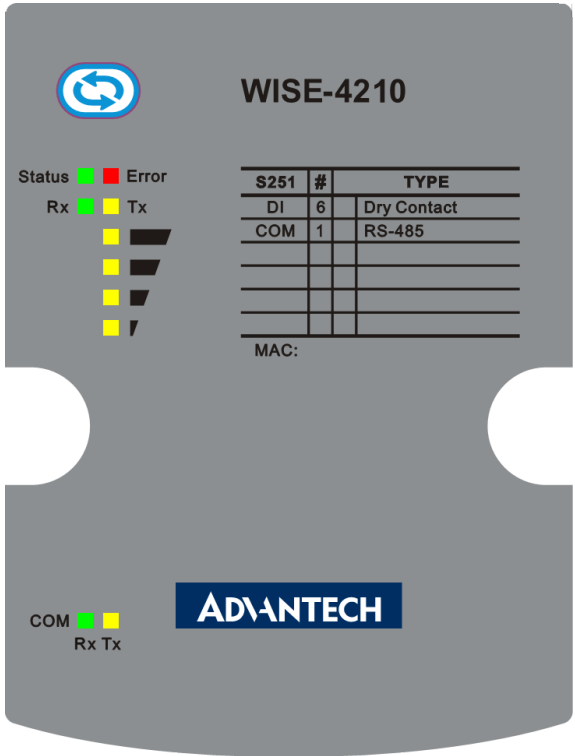


Figure 1.5 WISE-4210-S251 LED Indicator



|                                                                  | LED               | Color     | Indication                                                | Behavior                             |
|------------------------------------------------------------------|-------------------|-----------|-----------------------------------------------------------|--------------------------------------|
| Normal Mode                                                      | Status            | Green     | Blinking (2Hz)                                            | Initial Status                       |
|                                                                  |                   |           | Blinking (0.5Hz)                                          | Push Status                          |
|                                                                  | Error             | Red       | Blinking (0.5Hz)                                          | Battery Voltage Low                  |
|                                                                  |                   | Red+Green | Error blinking (2Hz) + Signal Indicator (Strong) blinking | RF related error                     |
|                                                                  |                   | Red+Green | Error blinking (2Hz) + Signal Indicator (Good) blinking   | I/O related error                    |
|                                                                  | Rx                | Green     | NA                                                        | NA                                   |
|                                                                  | Tx                | Yellow    | Steady on                                                 | Sending data to Gateway (Push Only)* |
|                                                                  | Signal Indicators | Green     | Steady on                                                 |                                      |
| *Automatically disable after 15 secs when battery power is used. |                   |           |                                                           |                                      |
| Site Survey Mode                                                 | Status            | Green     | Steady on                                                 | Site Survey Mode                     |
|                                                                  |                   | Red       | Blinking (0.5Hz)                                          | Battery Voltage Low                  |
|                                                                  | Error             | Red+Green | Error blinking (2Hz) + Signal Indicator (Strong) blinking | RF related error                     |
|                                                                  |                   | Red+Green | Error blinking (2Hz) + Signal Indicator (Good) blinking   | I/O related error                    |
|                                                                  | Rx                | Green     | NA                                                        | NA                                   |
|                                                                  | Tx                | Yellow    | Steady on                                                 | Sending data to Gateway (Push Only)* |
|                                                                  | Signal Indicators | Green     | Steady on                                                 |                                      |
| *Automatically disable after 15 secs when battery power is used. |                   |           |                                                           |                                      |
| OTA Mode                                                         | Error             | Red       | Blinking (0.5Hz)                                          | Battery Voltage Low                  |
|                                                                  |                   | Red+Green | Error blinking (2Hz) + Signal Indicator (Strong) blinking | RF related error                     |
|                                                                  |                   | Red+Green | Error blinking (2Hz) + Signal Indicator (Good) blinking   | I/O related error                    |
|                                                                  | Rx                | Green     | Steady on                                                 | OTA Rx Mode                          |
|                                                                  | Tx                | Yellow    | Steady on                                                 | OTA Tx Mode                          |
|                                                                  | Signal Indicators | Green     | Steady on                                                 |                                      |

COM Rx (Green): Steady on; Receiving response from slave device

COM Tx (Yellow): Steady on; Sending request to slave device

## 1.4 Membrane Button

WISE-4210-Sxxx end nodes have one membrane button on name plate. This button is design for switching different LED display mode or operation mode.

**Note!** *WISE-4210-AP doesn't have membrane button, please use LAN port to do further configuration.*

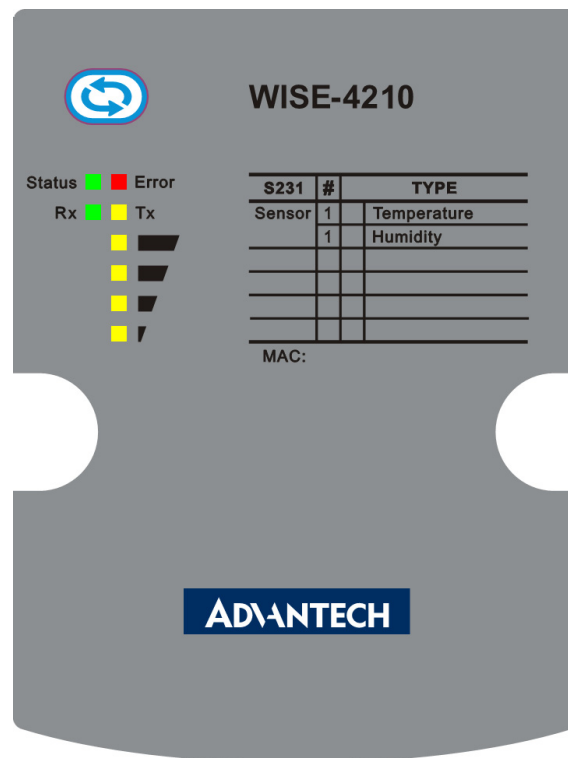
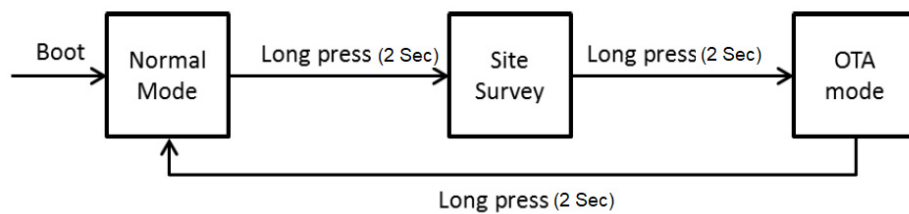


Figure 1.6 WISE-4210 Membrane Button



| Normal Mode           |                    |                                             |                |                                 |
|-----------------------|--------------------|---------------------------------------------|----------------|---------------------------------|
| Mode                  |                    | Power Saving Mode                           |                | Non-power saving Mode           |
| Light Press (0.5 Sec) |                    | LED turn on→Get battery level→LED turn off* |                | Get battery level→LED turn off* |
| Long Press (2 Sec)    |                    | Leave normal mode                           |                | Leave normal mode               |
| Site Survey Mode      |                    |                                             |                |                                 |
| Light Press (0.5 Sec) |                    | Tx site survey packet                       |                |                                 |
| Long Press (2 Sec)    |                    | Leave site survey mode                      |                |                                 |
| OTA Mode              |                    |                                             |                |                                 |
| Status                | Rx Status          | Tx Status<br>(by USB port)                  | Low Battery    | Update FW fail                  |
| Light Press (0.5 Sec) | Read battery level | Tx Configuration                            | NA             | Reset OTA mode                  |
| Long Press (2 Sec)    | Leave OTA mode     | Tx Firmware                                 | Leave OTA mode | NA                              |

\*(LED indicator will go off automatically 15 secs later when using battery power.)

## 1.5 Battery Power Switch

Open the rubber cover on the side of WISE-4210-Sxxx nodes, there is a battery switch to turn on or turn off the battery power supply.

**Note!**



*This switch is only available for WISE-4210-Sxxx nodes, not for WISE-4210-AP.*

*This switch only controls the power supply from batteries. It did not control the power supply of line power from terminal block.*

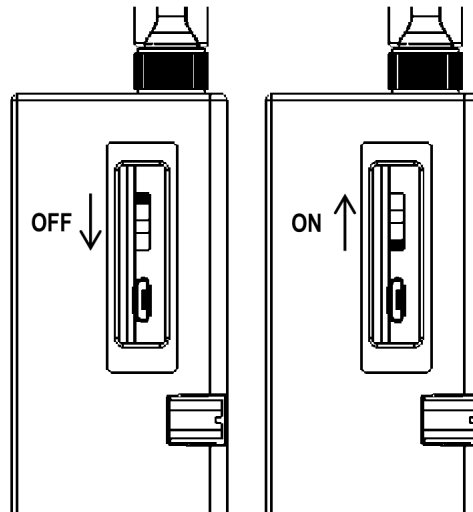


Figure 1.7 WISE-4210 Battery Switch

## 1.6 Package Information

### WISE-4210-APNA/UA

- 1 x WISE-4210-APNA/UA module
- 1 x Mounting bracket
- 1x China RoHS (UA series only)
- 1x Antenna (UA series only)

### WISE-4210-S231NA/UA

- 1 x WISE-4210-S231NA/UA module
- 1 x Mounting bracket
- 1x China RoHS (UA series only)
- 1x Antenna (UA series only)

### WISE-4210-S251NA/UA

- 1 x WISE-4210-S251NA/UA module
- 1 x Mounting bracket
- 1x China RoHS (UA series only)
- 1x Antenna (UA series only)

**Note!** *Antenna for NA series should be ordered respectively based on the required frequency range.*



- **1750008836-01** 863-870MHz Dipole Antenna for WISE-4210
- **1750008837-01** 902-928MHz Dipole Antenna for WISE-4210

**Note!** *Battery needs to order separately.*



- **1760002647-01** 3.6V/2500mAh AA Cylindrical Battery (non-rechargeable)

**Note!** *Micro-B USB cable for configuring WISE-4210-Sxxx nodes can be ordered optionally.*



- **1700023619-01** 1M micro USB type-B male to USB type-A male cable



# Chapter 2

## General Specification

## 2.1 General Specification

### 2.1.1 Wireless Interface

- IEEE Standard
  - 625bps: IEEE 802.15.4g FSK Modulation
  - 50kbps: IEEE 802.15.4g GFSK Modulation
- Frequency Band
  - 923MHz (920.60~924.60), BW: 400kHz
  - 868MHz (865.00~869.00), BW: 400kHz
- Data Rate: 625bps, 50kbps
- Outdoor Range
  - 625bps: 5 km (Line of sight)
  - 50kbps: 2 km (Line of sight)
- Antenna Gain
  - 902~928MHz: 1.33 dBi
  - 863~870MHz: 2.19 dBi
- Transmit Power (CE): 14dBm±1dBm
- Receiver Sensitivity: -100dBm
- Topology: Star
- Network Capacity: Up to 64 end nodes (WISE-4210-S2xx)

**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.*



### 2.1.2 General

- I/O connector
  - WISE-4210-AP: RJ-45 LAN port  
3.5-mm spacing plug-in screw terminal block
  - WISE-4210-S251: 3.5-mm spacing plug-in screw terminal block
- Power connector:
  - WISE-4210-AP: 3.5-mm spacing plug-in screw terminal block
  - WISE-4210-S231: 3.5-mm spacing plug-in screw terminal block
  - WISE-4210-S251: 3.5-mm spacing plug-in screw terminal block
- Watchdog timer (WDT)
  - System: 1.6 s
  - Communication
  - Programmable (FSV)
- Real-time clock (RTC) accuracy: ±1 min/month
- Enclosure: PC
- Mounting: DIN 35 rail, wall, pole, and stack
- Dimensions (W x H x D): 69 x 102 x 38 mm
- Operation temperature: -25~70°C (-13~158°F)
- Storage temperature: -40~85°C (-40~185°F)
- Operating humidity: 10~95% 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.

**Note!**  Measuring temperature and humidity will depend on sensor type. Whether the device is measuring temperature or humidity depends on the settings of the sensors.

### 2.1.3 Power

- Power input voltage: 10 ~ 50 V<sub>DC</sub>
- Power consumption:
  - WISE-4210-AP: 0.8 W @ 24 V<sub>DC</sub>
  - WISE-4210-S231: 0.3 W @ 24 V<sub>DC</sub>
  - WISE-4210-S251: 0.3 W @ 24 V<sub>DC</sub>
- Battery socket (WISE-4210-Sxxx nodes only)
  - AA 3.6VDC battery x 3 (parallel connection)
- Battery life (2500mAh battery x3) @ 25°C:
  - 625bps: 5 years with 10 minute update rate
  - 50kbps: 5 years with 1 minute update rate

**Note!**  The battery life is estimated with 2500mAh battery, SB-AA11 by Vitzro-cell Co.,Ltd.

Testing condition:

- WISE-4210-S231: Temperature/Humidity sensor
- WISE-4210-S251: Digital input only

**Note!**  The battery life is estimated in the environment at 25°C. If the battery operated in low temperature, the battery life would be lower. Here is the estimation for battery SB-AA11 at different temperature:

- SB-AA11 @ 0°C: Less than 30%
- SB-AA11 @ -10°C: Less than 18%
- SB-AA11 @ -25°C: Less than 13%

### 2.1.4 Software

- Utility: WISE Studio
- Driver: ADAM .NET Class Library
- WISE-4210-AP Protocols: TCP/IP, UDP, HTTP, HTTPS, DHCP, ARP, SNTP
- WISE-4210-AP supports RESTful Web API .JSON format

## 2.1.5 Configuration Interface

### WISE-4210-AP

- Interface: LAN port
- Connector: RJ-45

### WISE-4210-Sxxx Nodes

- 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>)

## 2.2 WISE-4210-AP

### 2.2.1 Uplink Communication Port

#### LAN port

- Ethernet: IEEE 802.3u 10/100Base-T(X)
- Connector: 1-port RJ-45
- Protocol: Modbus/TCP, RESTful web API

#### RS-485 port

- Signal: DATA+, DATA-
- Connector: 3.5-mm spacing plug-in screw terminal block
- Protocol: Modbus/RTU

### 2.2.2 Pin Assignment

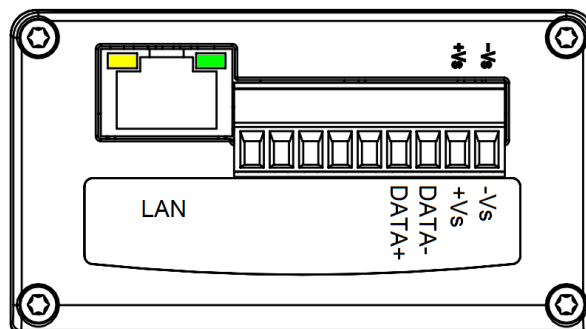


Figure 2.1 WISE-4210-AP Pin Assignment

## 2.2.3 Block Diagram

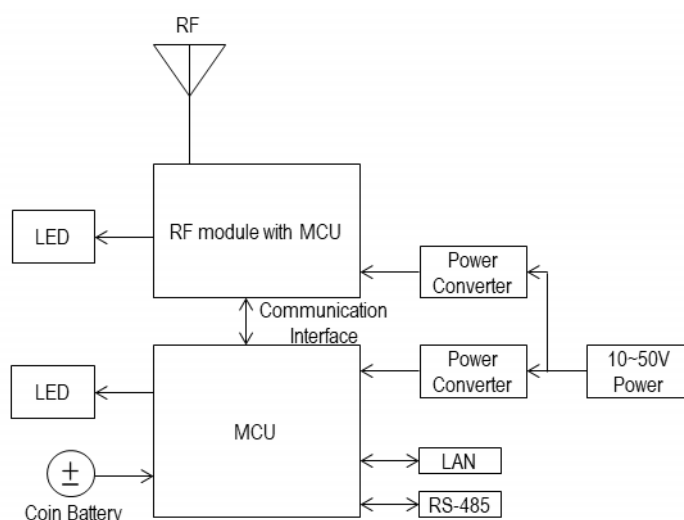


Figure 2.2 WISE-4210-AP Block Diagram

## 2.3 WISE-S231

### 2.3.1 I/O Specifications

#### Temperature Sensor Input

- Operating Range:  $-25^{\circ}\text{C} \sim 70^{\circ}\text{C}$  ( $-4^{\circ}\text{F} \sim 157.9^{\circ}\text{F}$ )
- Data Resolution:  $0.1 (^{\circ}\text{C}/^{\circ}\text{F}/\text{K})$
- Accuracy:  $\pm 1.0^{\circ}\text{C}$  (Vertical Installation)
- Update Rate: Minimum 1 second
- Response Time: 15 seconds (Achieving 63% of a step function)
- Long Term Drift:  $0.05^{\circ}\text{C}/\text{Year}$  ( $0.09^{\circ}\text{F}/\text{Year}$ )

#### Humidity Sensor Input

- Operating Range: 10~90% RH
- Resolution: 0.1% RH
- Accuracy:
  - $\pm 4\%$  for 0%~50% RH
  - $\pm 6\%$  for 50%~60% RH
  - $\pm 10\%$  for 60%~90% RH
- Update Rate: Minimum 1 second
- Response Time: 10 seconds (Achieving 63% of a step function)
- Long Term Drift: 0.5% RH/Year

### 2.3.2 Pin Assignment

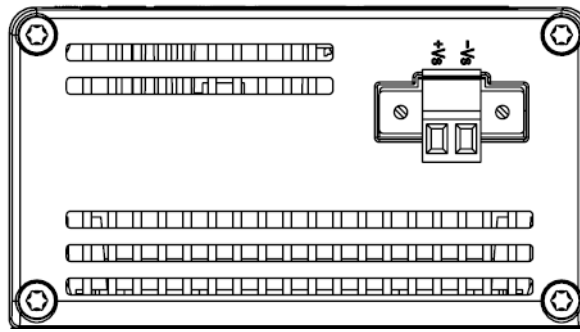


Figure 2.3 WISE-S231 Pin Assignment

### 2.3.3 Block Diagram

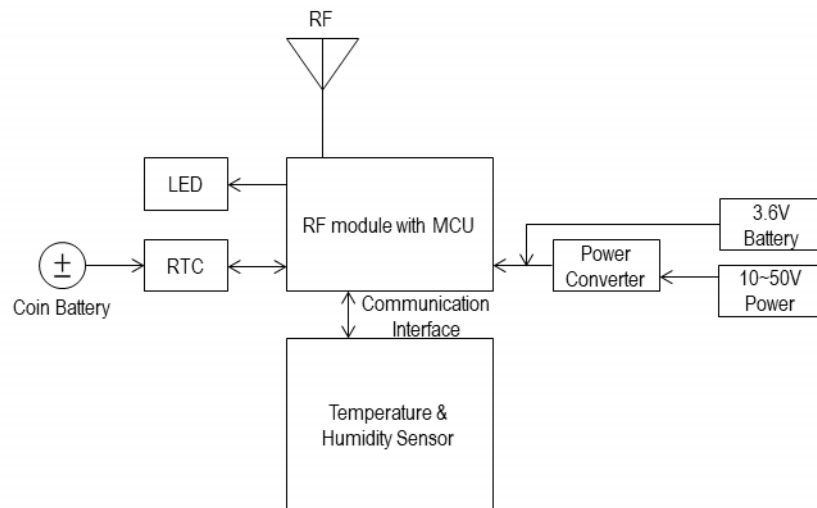


Figure 2.4 WISE-S231 Block Diagram

## 2.4 WISE-S251

### 2.4.1 I/O Specifications

#### 2.4.1.1 Digital Input

- Channels: 6
- Logic level (dry contact)
  - 0: Open
  - 1: Close DI COM
- Supports 32-bit counter input function (maximum signal frequency, 200Hz)
- Supports keep/discard counter value on power-off
- Supports inverted digital input status

#### 2.4.1.2 RS-485 Port

- Port Number: 1
- Type: RS-485
- Data Bits: 7, 8
- Stop Bits: 1, 2
- Parity None, Odd, Even
- Baud Rate (bps): 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
- Protocol: Modbus/RTU (Total 32 address by max. 8 instructions)

### 2.4.2 Pin Assignment

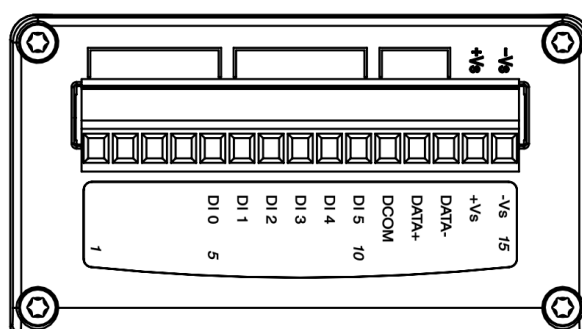


Figure 2.5 WISE-S251 Pin Assignment

### 2.4.3 Block Diagram

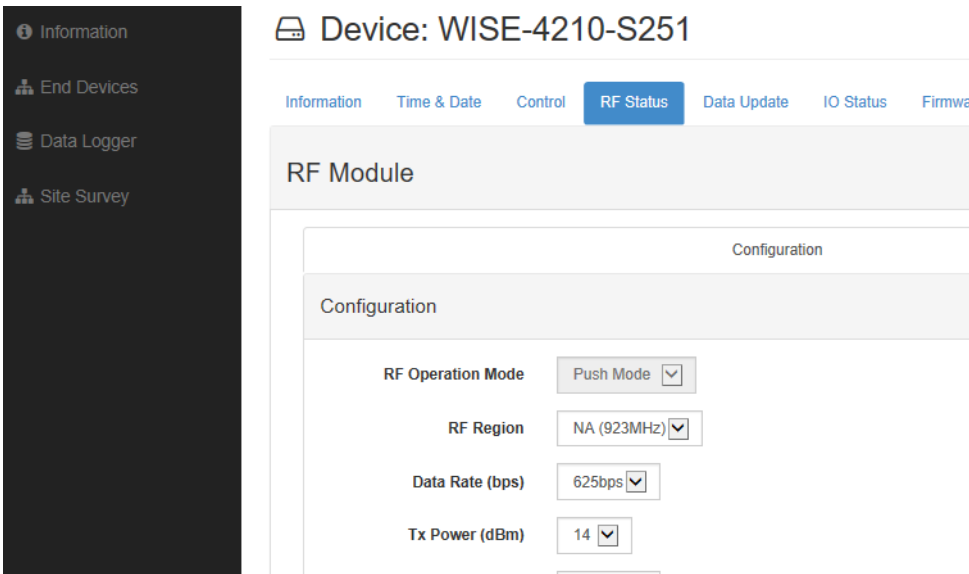


Figure 2.6 WISE-S251 Block Diagram

## 2.4.4 Application Wiring

### WISE-S214

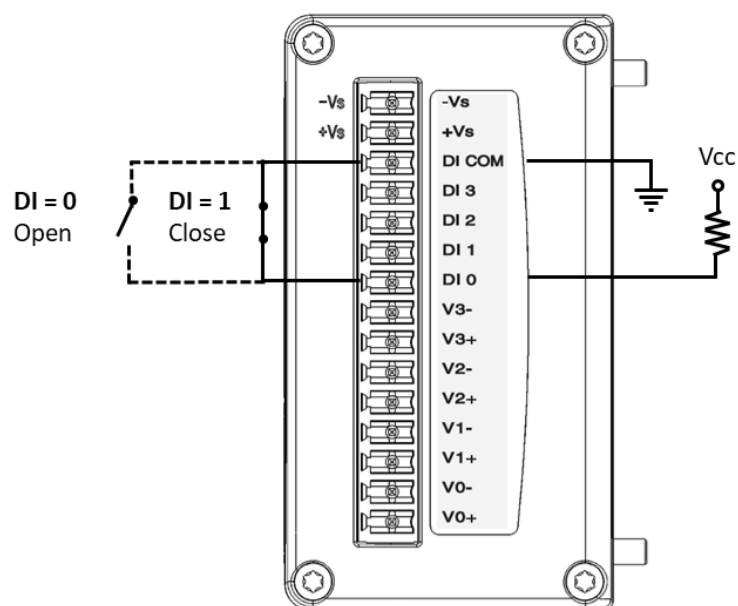


Figure 2.7 WISE-S214 Digital Input Wiring Diagram

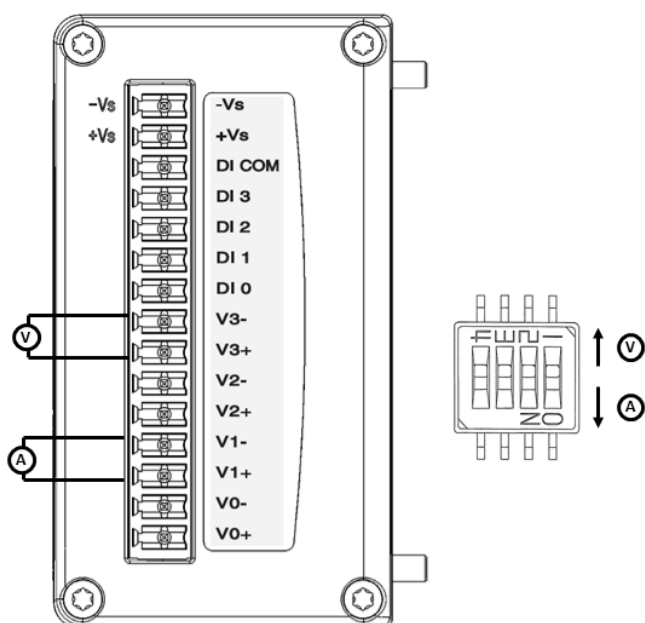


Figure 2.8 WISE-S214 Analog Input Wiring Diagram

WISE-S251

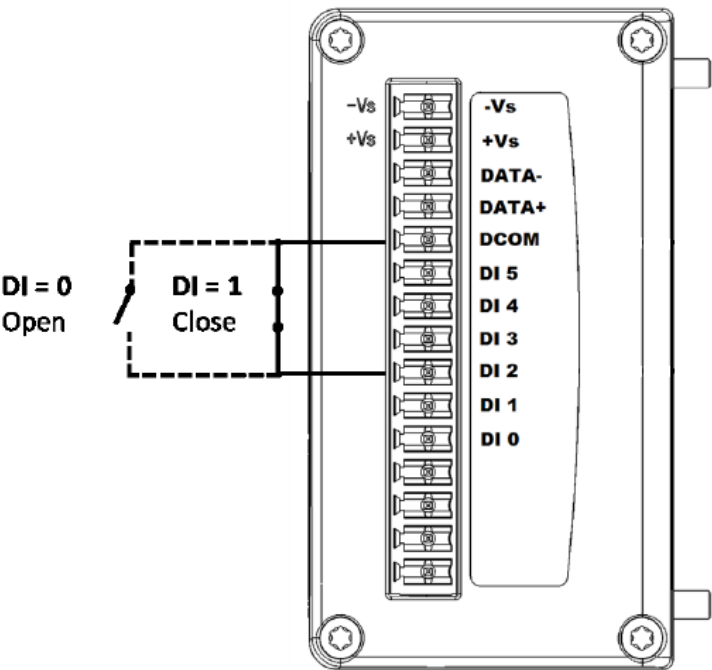


Figure 2.9 WISE-S251 Digital Input Wiring Diagram

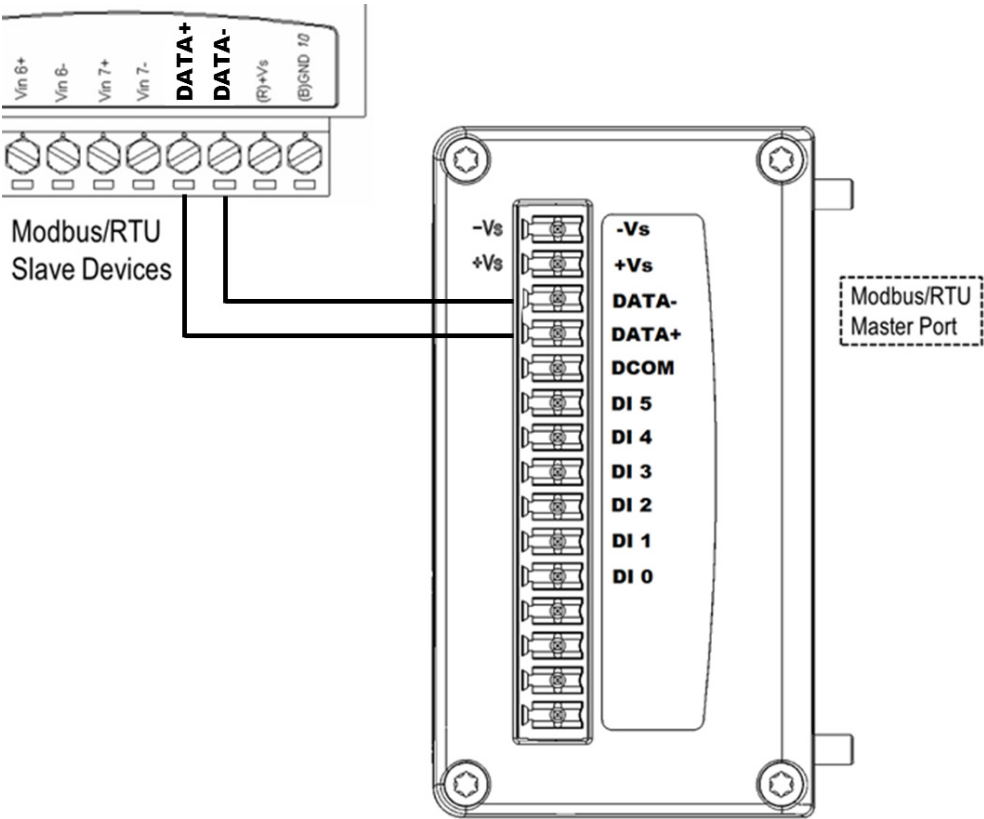


Figure 2.10 WISE-S251 RS-485 Wiring Diagram



# Chapter 3

## Hardware Installations

## 3.1 Interface Introduction

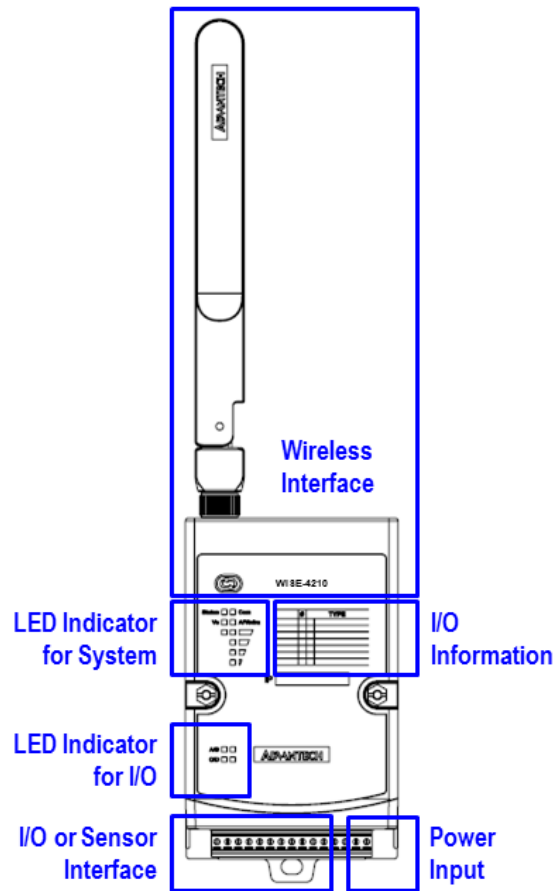
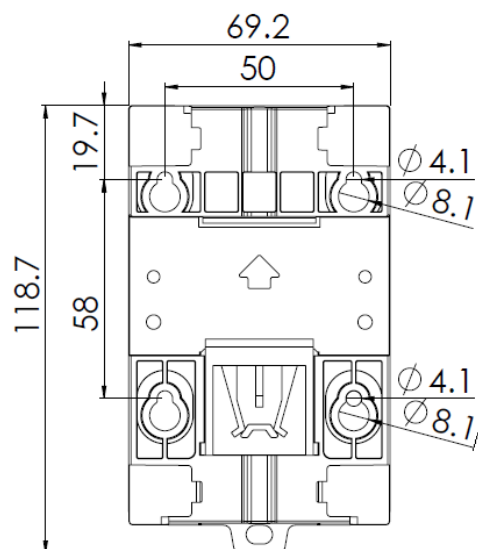


Figure 3.1 WISE-4210 Interface Introduction

## 3.2 Mounting

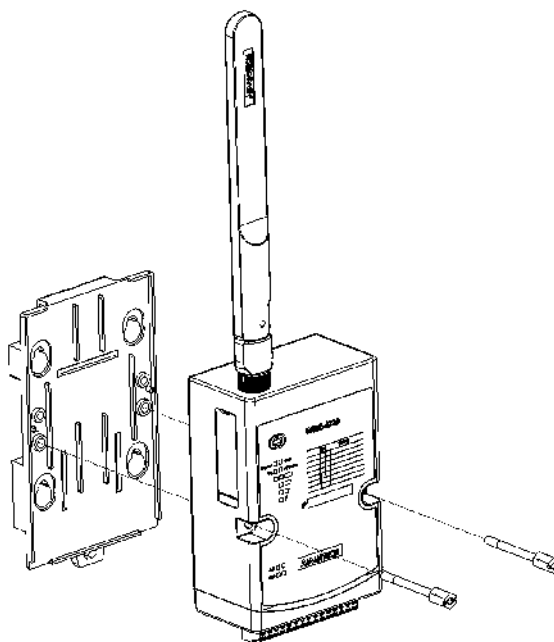
Like all WISE-4000 series modules, the WISE-4210 series of wireless sensor nodes are designed as compact units. Applicable installation methods are briefly described in the following sections.



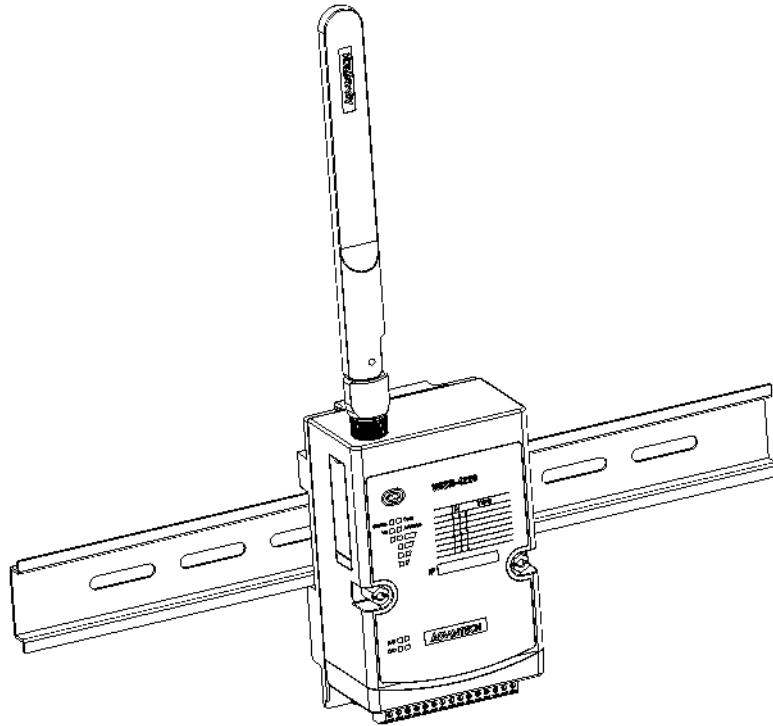
**Figure 3.2 WISE-4000 Series Mounting Kit Dimensions**

### 3.2.1 DIN-Rail Mounting

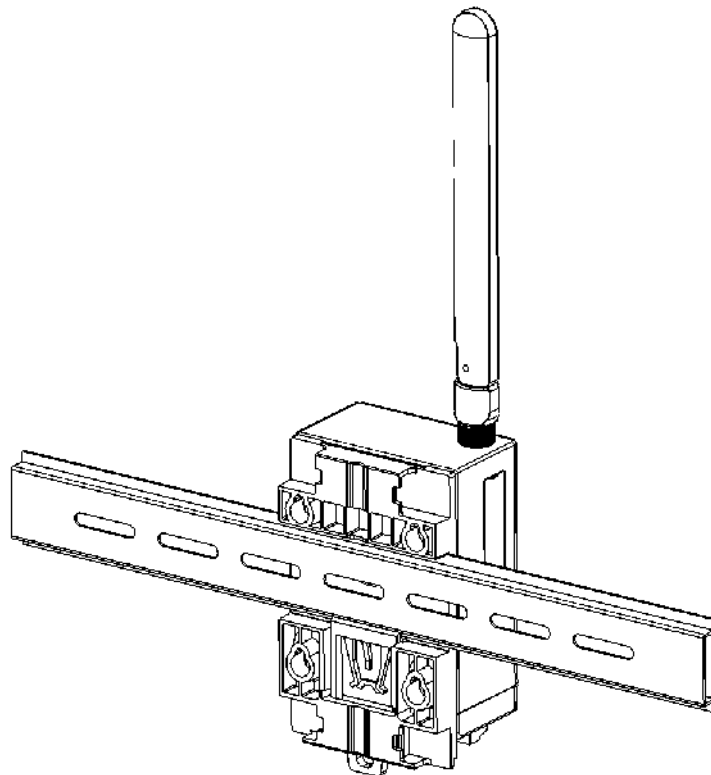
WISE-4210 modules can be fixed to a cabinet with mounting rails. Use a flathead screwdriver to fasten the DIN rail adapter to your module. You can then use the end brackets included in the package in order to keep it from sliding.



**Figure 3.3 DIN-rail Mounting Installation**



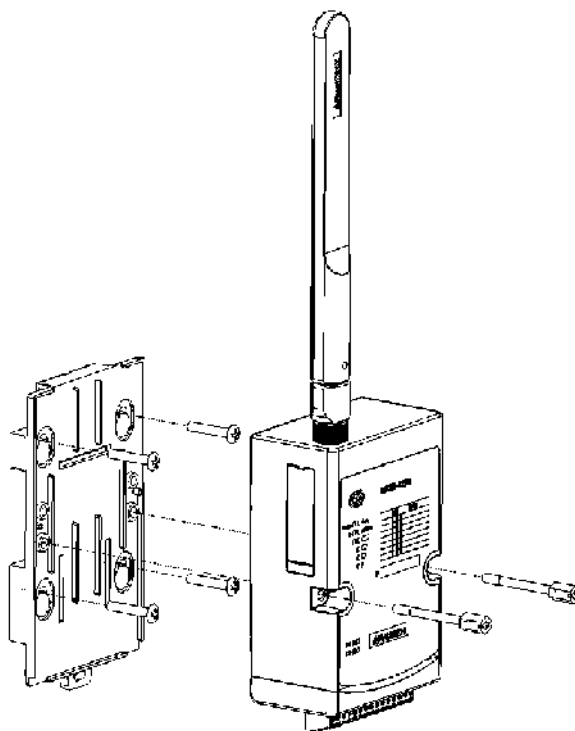
### Figure 3.4 DIN-rail Mounting (front)



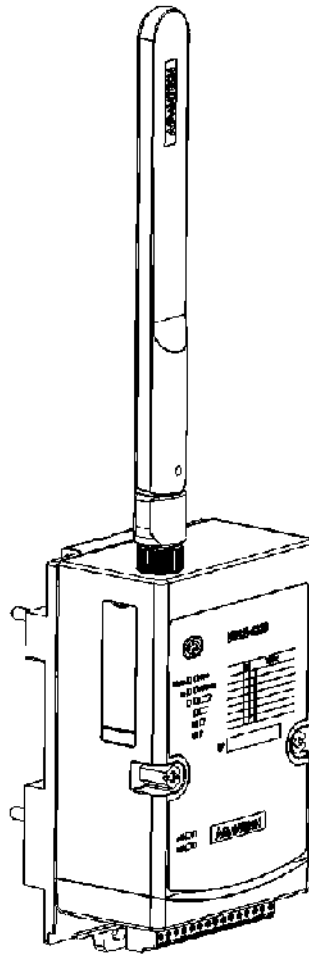
### Figure 3.5 DIN-rail Mounting (back)

### 3.2.2 Wall Mounting

The plastic wall-mounting bracket that comes with the module can be used to mount it on a wall, panel, or cabinet.



**Figure 3.6 Wall Mounting Installation**



**Figure 3.7 Wall Mounting Installation**

### 3.2.3 Pole Mounting

Put the pole mounting ring through the middle hole of it. Note that you should unlock the pole mounting ring with a screw driver before putting it through the device. Then mount the WISE-4200 module steadily to the pole by locking the pole mounting ring tightly.

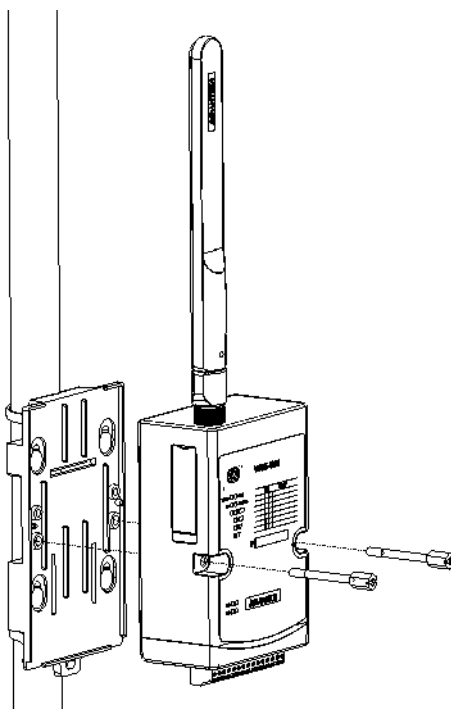


Figure 3.8 Pole Mounting (front)

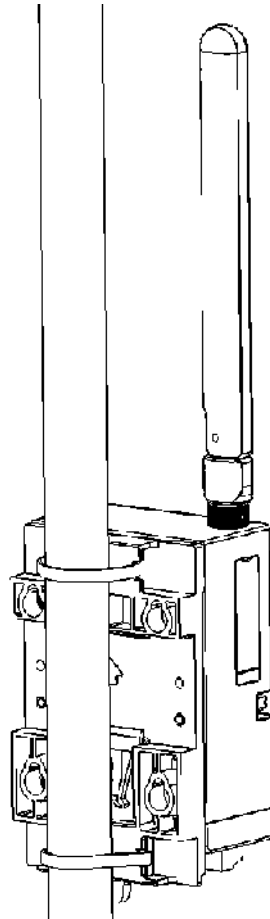


Figure 3.9 Pole Mounting (back)

### 3.3 Wiring and Connections

This section provides basic information on wiring the power supply and I/O units.

#### 3.3.1 Power Supply Wiring

WISE-4210 modules are designed to support a standard industrial unregulated 24- $V_{DC}$  power supply. For other applications, they can also accept +10 to +50  $V_{DC}$  input with 200 mV of peak-to-peak power ripple. The immediate ripple voltage should be maintained between +10 and +50  $V_{DC}$ . The screw terminals labeled "+Vs" and "-Vs" are for the power supply wiring.

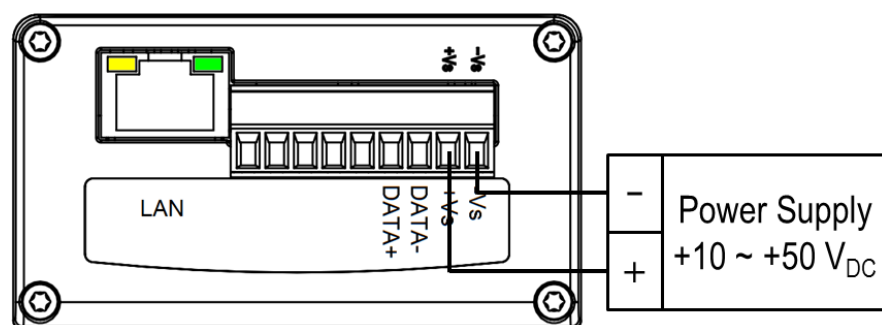


Figure 3.10 WISE-4210-AP Power Wiring



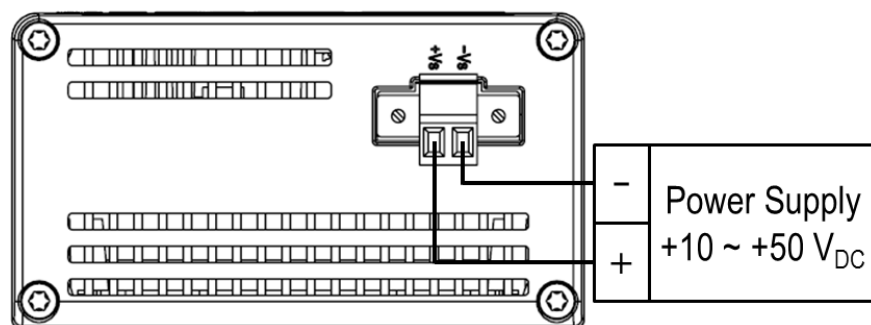


Figure 3.11 WISE-S231 Power Wiring

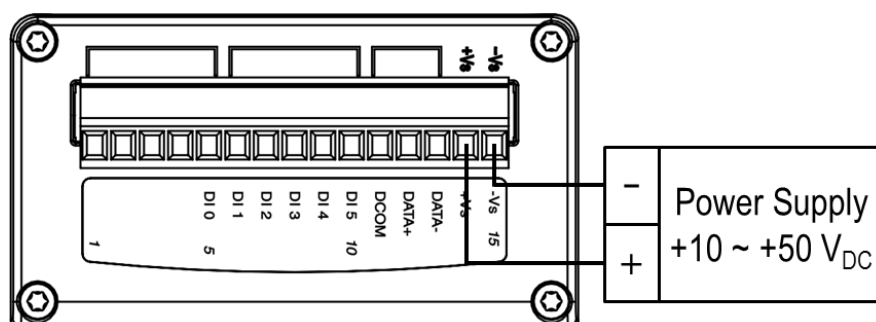


Figure 3.12 WISE-S251 Power Wiring

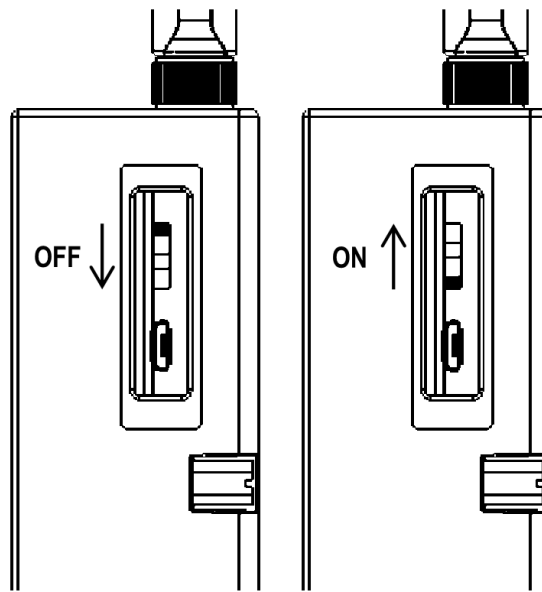
### 3.3.2 Battery Installation

Open the battery cover on the back of module. There are 3 battery sockets for 3.6VDC AA batteries. Since the batteries are parallel connection, batteries are installed in same direction, positive pole (+) on left and negative pole (-) on right.



Figure 3.13 WISE-4210 Battery Socket

Open the rubber cover on the side of WISE module, there is a battery switch to turn on or turn off the battery power supply.



**Figure 3.14 WISE-4210 Battery Switch**

**Note!** This switch is only available for WISE-4210-Sxxx nodes, not for WISE-4210-AP.



**Note!** Battery needs to order separately



- **1760002647-01** 3.6V/2500mAh AA Cylindrical Battery (non-rechargeable)

### 3.3.3 I/O Units

WISE-4210 uses a plug-in screw terminal block for the interface between WISE-4210 and field devices. The following information is critical when connecting electrical devices to I/O modules.

- Use the correct wire gauge (note that the terminal block accepts wires from 0.5 to 2.5 mm)
- Use a continuous length of wire (do not join separate wires to form a continuous length)
- Use the shortest wire length possible
- Use wire trays for routing wherever possible
- Avoid running wires near to high-energy wiring
- Avoid running input wiring near output wiring
- Avoid creating sharp bends or kinks in the wires

# Chapter 4

## System Configuration

## 4.1 Connection

### 4.1.1 WISE-4210-AP Connection

WISE-4210 uses RJ-45 LAN port for configuration. Connect your computer to Ethernet port of WISE module with RJ-45 cross-over Ethernet cable, and configure the IP address of your computer as same IP domain as default IP address of module: 10.0.0.1

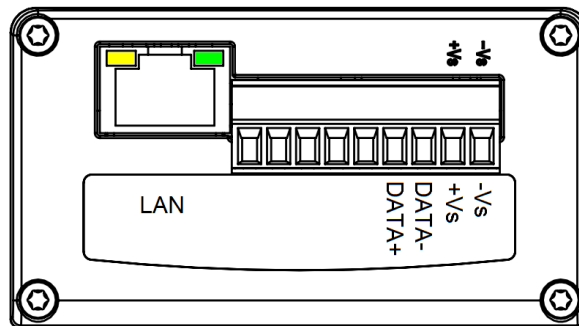


Figure 4.1 WISE-4210-AP LAN port

### 4.1.2 WISE-4210-Sxxx Node Connection

WISE-4210-Sxxx node use micro-B USB port for configuration. After remove the rubber cover on the side of WISE module, there is a micro-B connector. Connect this port to computer's USB port for configuration. The USB driver would be need for creating virtual COM port of 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>)

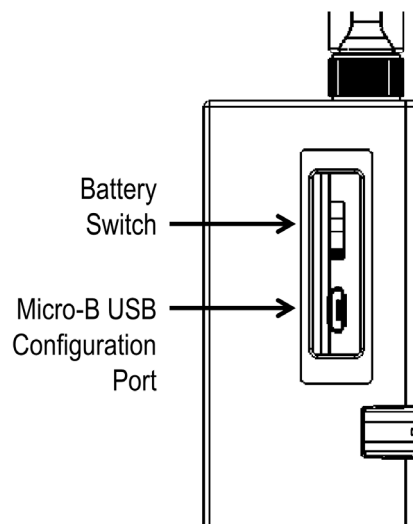


Figure 4.2 USB configuration port of WISE-4210 node

**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 public 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 | Safari | IE11 | IE10 |
|-----------------|--------|---------|--------|------|------|
| Configuration   | Y      | Y       | Y      | Y    | Y    |
| File Upload     | Y      | Y       | N      | Y    | N    |
| Data Log Chart  | Y      | Y       | Y      | Y    | Y    |
| Data Log Export | Y      | Y       | N      | 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 access control configuration             |
| user    | 00000000         | View module status only.<br>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 |
| I/O configurations               | Edit    | Edit  | View |
| I/O statuses monitor             | View    | View  | View |
| Reset AI calibration to default  | Edit    | Deny  | Deny |
| MODBUS addresses                 | 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

[https://support.advantech.com/support/new\\_default.aspx](https://support.advantech.com/support/new_default.aspx)

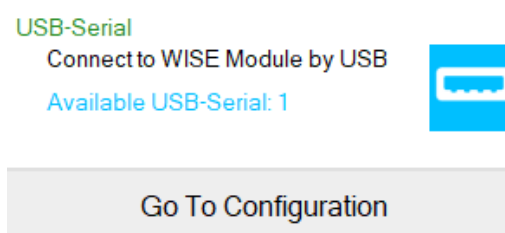
**Step 2.** Execute WISE Studio

**Step 3.** Power up WISE-4210 series by batteries or line power.

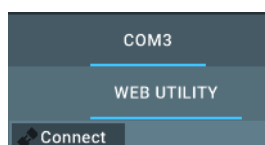
**Step 4.** Using USB cable to communicate WISE-4210 series between the computer.  
(Please take note the USB cable is not able to power up the device.)

**Step 5.** Clicking "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:

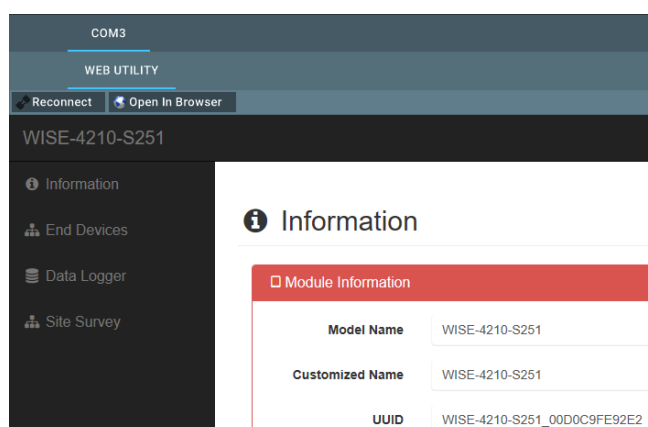
<https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers>)



**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-4210 end node 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-4210 end node 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 and extend longer battery life; 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-4210 end node devices in the same network should use the same baseband as WISE-4210-AP.

Device: WISE-4210-S251

Information Time & Date Control **RF Status** Data Update IO Status Firmware

RF Module

Configuration

Configuration

RF Operation Mode Push Mode

RF Region NA (923MHz)

Data Rate (bps) 625bps

Tx Power (dBm) 14

Baseband (kHz) 922400

Submit

Once the network configuration is finished, please go to "**End Devices \ IO Status**" for I/O function configuration.

WISE-4210-S250

Device: WISE-4210-S250

Control RF Status **IO Status** Firmware

DI COM1

Status Configuration

| Channel | Mode    | Status               |
|---------|---------|----------------------|
| 0       | Counter | 00000000 Start Reset |
| 1       | DI      | 0                    |

Overflow Status: Clear



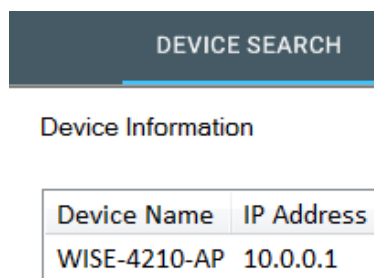
## 4.5 Configure WISE-4210-AP

**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 the steps below to search the IP address of WISE-4210-AP.

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

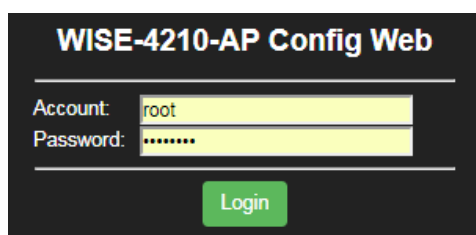


**Step 3.** After the above steps, WISE Studio will search WISE-4210-AP, and you will find the IP address of WISE-4210-AP in **Device Information**.



**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.

The screenshot shows the WISE-4210-AP web interface. The left sidebar contains a menu with 'Information', 'Configuration', 'End Devices', and 'Advanced'. The main area is titled 'Configuration' and has tabs for 'Information', 'Network' (selected), 'Network App', 'Time & Date', 'SNTP', and 'Modbus'. Below these are sub-tabs: 'Control', 'General', 'RF Module', 'Cloud', 'Firmware', and 'Account'. The 'Network' section contains fields for 'Mac' (00-D0-C9-66-00-73), 'IP' (192.168.1.1), 'Subnet' (255.255.255.0), 'Gateway' (192.168.1.254), and 'IP Mode' (Static selected, DHCP unselected). A green 'Submit' button is at the bottom right.

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

- **RF Operation Mode:** WISE-4210 end node 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-4210 end node devices in the same network should use the same baseband as WISE-4210-AP.

The screenshot shows the WISE-4210-AP web interface with the 'RF Module' configuration page selected. The left sidebar is the same. The main area has tabs for 'Information', 'Network', 'Network App', 'Time & Date', 'SNTP', and 'Modbus'. Below these are sub-tabs: 'Control', 'Data Update', 'RF Module' (selected), 'RS-485', 'Cloud', 'Firmware', and 'Account'. The 'RF Module' section contains three dropdown menus: 'RF Operation Mode' (Push Mode selected), 'Data Rate (bps)' (50kbps selected), and 'Baseband (kHz)' (920700 selected). A green 'Submit' button is at the bottom right.

## 4.6 Setup WISE-4210 Network

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

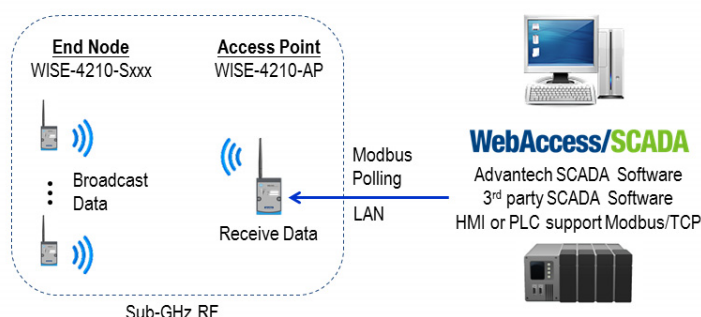
- **MAC Address:** The unique identifier of each end devices.
- **Modbus ID:** Modbus ID is automatically assigned by WISE-4210-AP. User can configure Modbus ID manually in "**Configuration \ Modbus \ Modbus ID**".
- **RSSI (dBm):** Signal strength when data updated from end device to AP. RSSI will be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

 End Device List

List 16 entries

| MAC Address  | Modbus ID | RSSI | Inactive Time | Battery Status | Battery Level | RTC Battery Status | Power Source               | Device Status |
|--------------|-----------|------|---------------|----------------|---------------|--------------------|----------------------------|---------------|
| 4B0012CD11AC | 1         | -71  | 2             | No Error       | 100 %         | No Error           | Line power, Device battery | Active        |
| 4B0012CC4166 | 2         | -72  | 4             | No Error       | 100 %         | No Error           | Line power, Device battery | Active        |
| 4B0012CD140B | 3         | -62  | 2             | No Error       | 100 %         | No Error           | Line power, Device battery | Active        |

## 4.7 Access WISE-4210 I/O Data by Modbus/TCP Protocol



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

## Configuration

Information Network Network App Time & Date SNTP **Modbus** Control

Data Update RF Module RS-485 Cloud Firmware Account

Modbus Address

Modbus ID

Modbus ID

AP

Modbus ID

End Devices

| End Device MAC | Modbus ID                      |                                                                                              |
|----------------|--------------------------------|----------------------------------------------------------------------------------------------|
| 4B0012CC4166   | <input type="text" value="2"/> |  Delete   |
| 4B0012CD140B   | <input type="text" value="3"/> |  Delete  |
| 4B0012CC414D   | <input type="text" value="4"/> |  Delete |
| 4B0012CD11EB   | <input type="text" value="5"/> |  Delete |
| 4B0012CD11AC   | <input type="text" value="1"/> |  Delete |
| 4B0012CD1427   | <input type="text" value="6"/> |  Delete |
| 4B0008FB79A1   | <input type="text" value="7"/> |  Delete |

✓ Submit

 Delete All End Devices

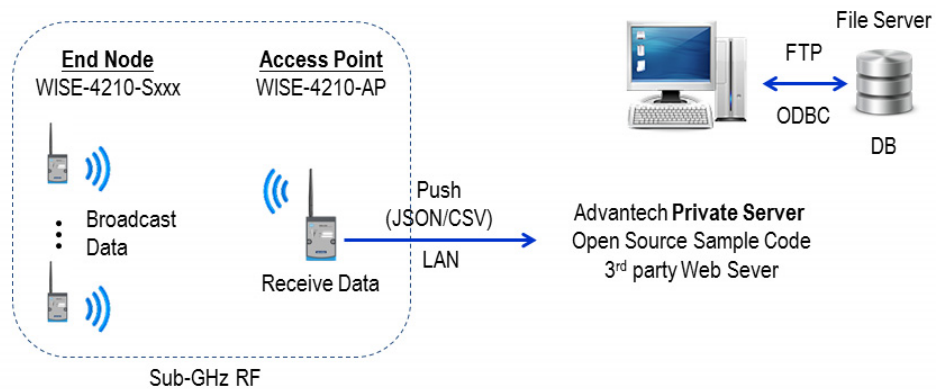
## 1. Modbus Address Table for WISE-4210-S231

| Modbus Address | Sensor Input |
|----------------|--------------|
| 40501          | Temperature  |
| 40502          | Humidity     |
| 45302          | RSSI (-dBm)  |

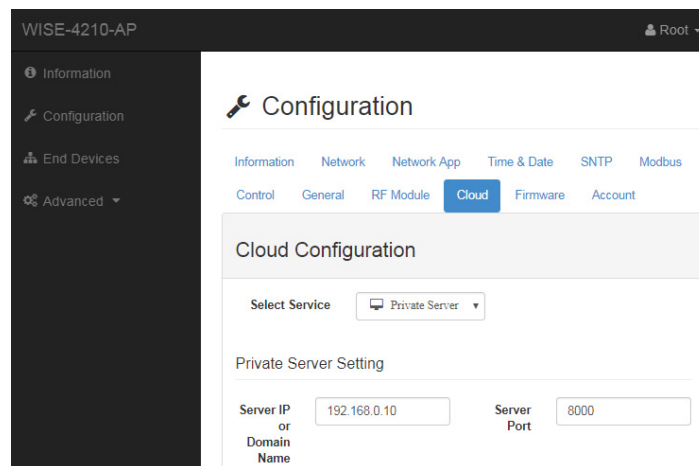
## 2. Modbus Address Table for WISE-4210-S250

| Modbus Address | I/O              |
|----------------|------------------|
| 00001          | DI0              |
| 00002          | DI1              |
| 00003          | DI2              |
| 00004          | DI3              |
| 00005          | DI4              |
| 00006          | DI5              |
| 01001~01032    | RS-458 Coils     |
| 41001~41032    | RS-458 Registers |
| 45302          | RSSI (-dBm)      |

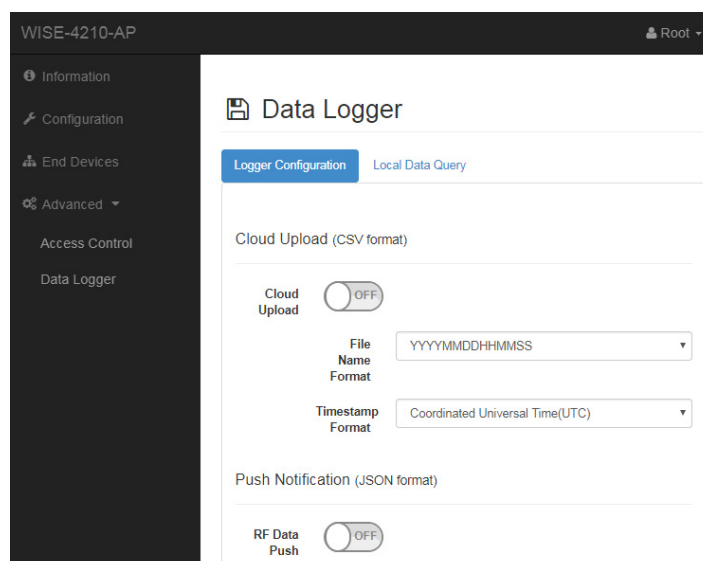
## 4.8 Push WISE-4210 data by RESTful Web Service



**Step 1. Configure the Private Server in "Configuration \ Cloud"**



**Step 2. Enable the Data Logger function in "Advanced \ Data Logger \ Logger Configuration"**



## 4.9 Access WISE-4210 I/O Data by RESTful API

/lpwan\_message/slot\_macID

|                               |                                                                                                                                                                                                                                                                                                                                                                  |           |                      |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------|
| Description                   | Retrieves the log data in system memory.                                                                                                                                                                                                                                                                                                                         |           |                      |
| URL Structure                 | <b>http://10.0.0.1/lpwan_message/slot_macID</b>                                                                                                                                                                                                                                                                                                                  |           |                      |
| HTTP Method                   | GET: According to the setting of filtering, server returns the all/partial of push data.                                                                                                                                                                                                                                                                         |           |                      |
| GET                           | Request:<br><b>GET / lpwan_message/slot_macID</b>                                                                                                                                                                                                                                                                                                                |           |                      |
|                               | [Example]:<br>■ Request : <b>GET /lpwan_message/slot_AD4210112233 for WISE-4210 module</b>                                                                                                                                                                                                                                                                       |           |                      |
|                               | Content-type: application/json<br>Response: 200 OK                                                                                                                                                                                                                                                                                                               |           |                      |
|                               | <pre>{     "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]     ] }</pre> |           |                      |
|                               | ■ 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         | TIM    | String | R | <p>Timestamp of the storage</p> <ul style="list-style-type: none"> <li>– Coordinated Universal Time (UTC)</li> </ul> <p><b>Ex.</b> "1415757750" corresponds to November 12, 2014, 2:02:30 am, Standard Time. (meanwhile, 2014, 10:02:30 am, Taipei Time.)</p> |
|                   |        |        |   | <ul style="list-style-type: none"> <li>– Local Date/Time according GMT time zone (ISO 8601)</li> </ul> <p><b>Ex.</b> "1994-11-05T08:15:30-05:00" corresponds to November 5, 1994, 8:15:30 am, US Eastern Standard Time.</p>                                   |
| UUID              | UID    | String | R | Universally Unique Identifier (UUID)<br>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 | <p>* The data type in array is as follows.<br/>[Number, Number, Number, Number]</p> <p>* The information in array is as follows.<br/>[Slot-index, Channel-index, I/O-type-index, I/O-value]</p> <p>* See I/O Type Index Table for I/O type-index</p>          |



[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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