

# WISE-4210

## Industrial Proprietary LPWAN (SUB-G) Wireless I/O Module



### Introduction

LPWAN, created for machine-to-machine (M2M) and Internet of things (IoT) networks, is not a single technology, but a variety of low-power, wide area network technologies. Compared with traditional mobile network, LPWAN is known as lower cost with higher power efficiency. WISE-4210 series is the proprietary LPWAN which provides better connection compared with traditional 2.4G WiFi, WISE-4210 series is helpful of eliminating network interference.

Additionally, WISE-4210 utilize a LPWAN (low-power, wide-area networks) wireless interface, which has a kilometer-long communication distance and battery power. The features of LPWAN make WISE modules ideal solutions for energy and environment monitoring.

### Reduced Interference and Extended Communication Range

Compared with Wi-Fi, Bluetooth, Zigbee, or other 2.4GHz wireless interfaces, a sub-GHz interface can reduce interference at sites. Moreover, Sub-GHz is a type of LPWAN designed for long-range communications. Under the same power consumption, sub-GHz offers a longer communication range with low data rate than other 2.4 GHz technologies.

### Powered by a 3.6V AA Lithium Battery

The low power consumption of sub-GHz enables the sensor node to be powered by a battery. With a 3.6V AA Lithium battery, the sensor node can maintain communication at a distance of 5 km for up to 5 years, thereby eliminating the need to recharge or change batteries.



### Star Topology

Star topology, also known as star network, is the most common network setup. In star topology, every node connects to a central network device which means WISE-4210-S200 series nodes acting as clients should be connected with WISE-4210-AP. In this configuration, users can organize their own network with 64 nodes paired. Data on a star network passes through WISE-4210-AP before continuing to its destination. WISE-4210-AP with a LAN cable manages and controls most of all functions of the network.

### Features

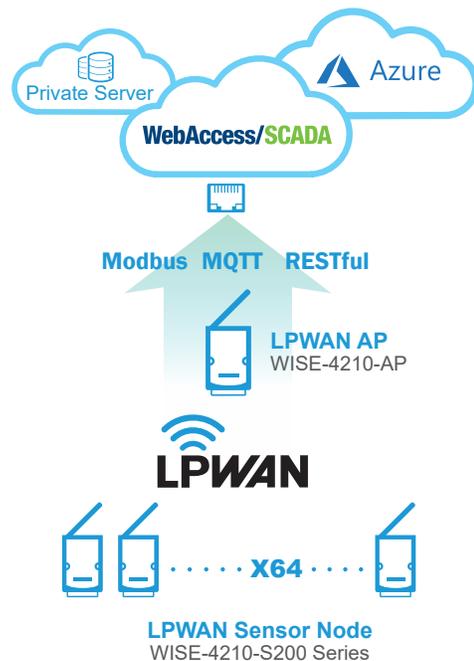
- Proprietary LPWAN with using sub-1GHz wireless frequency
- Battery power for 5 years with 3 x 3.6V AA batteries
- Up to 5 km communication range in open space
- Longer communication range than 2.4GHz
- Better penetration through concrete and steel than 2.4GHz
- Less interference than 2.4GHz spectrum
- Application-ready I/O combination with modularization design

### MQTT and RESTful API IoT Protocol Support

IoT Wireless sensor nodes are designed for not only automation applications but also IoT applications that may use MQTT or RESTful web API IoT protocols for cloud integrations.

### Azure IoT Hub Support

To provide a complete IoT sensing solution, the WISE-4210 series goes beyond being a wireless communication interface for sensors—it also provides cloud connectivity for additional user applications. With support for HTTPS and integrated APIs for Azure IoT Hub, the WISE-4210 series can automatically push data to the cloud without requiring an IoT gateway.



## Common Specification

### WISE-4210

- **Frequency Band** NA915: 923MHz (920.60~924.60), BW: 400kHz  
EU868: 868MHz (865.00~869.00), BW: 400kHz
- **Antenna Gain** 902~928MHz: 1.33 dBi  
863~870MHz: 2.19 dBi
- **Data Rate** 625bps, 50kbps
- **Outdoor Range** 625bps: 5 km with line of sight  
50kbps: 2 km with line of sight
- **Topology** Star
- **Network Capacity** 64 clients

### General

- **Power Input** AP: 10 ~ 50 V<sub>DC</sub>  
Sensor Node: 3 x AA, 3.6V Lithium Battery or 10 ~ 50 V<sub>DC</sub>
- **Battery Life** 625bps: 5 years with 10 minute update rate @ 25°C with WISE-S251/S231  
50kbps: 5 years with 1 minute update rate @ 25°C with WISE-S251/S231
- **Configuration Interface** AP: LAN port  
Sensor Node: Micro-B USB
- **LED Indicator** Status, Error, Tx, Rx, Battery/Signal Level
- **Mounting** DIN 35 rail, wall, pole and stack
- **Dimension (W x H x D)** 70 x 102 x 38 mm
- **Certification** CE, FCC, IC, NCC, TELEC

### Environment

- **Operating Temperature** -25 ~ 70°C
- **Operating Humidity** 5 ~ 95% RH
- **Storage Temperature** -40 ~ 85°C
- **Storage Humidity** 0 ~ 95% RH

## WISE-4210-AP (Access Point)

- **Data Rate** 625 bps, 2.5k bps, 5k bps, 50k bps,
- **Ethernet** RJ-45 (for configuration and data query)
- **RS-485** Data+, Data- (for query node data)
- **Messaging Protocol** Modbus/TCP, Modbus/RTU, REST, MQTT
- **Application Protocol** HTTP, HTTPS, SNMP, DHCP
- **Transport Protocol** TCP, UDP
- **Supports RESTful Web API in JSON format with HTTP protocol**
- **Supports Web Server in HTML5**

## WISE-4210-S232 (Temperature & Humidity Sensor)

### Temperature

- **Operating Range** -25°C ~ 70°C (-13°F ~ 158°F)
- **Update Rate** Min. 1 second, Max. 24 hours
- **Resolution** 0.01 (°C)
- **Accuracy** ±0.2°C at 25°C (Based on built-in SHT41-AD1F sensor)
- **Response time (τ<sub>63%</sub>)** 2 seconds
- **Long Term Drift** <0.04°C/year

### Humidity

- **Operating Range** 0 ~ 100% RH
- **Update Rate** Min. 1 second, Max. 24 hours
- **Resolution** 0.01% RH
- **Accuracy** ±1.8% RH at 25°C (Based on built-in SHT41-AD1F sensor)
- **Response time (τ<sub>63%</sub>)** 4 seconds
- **Long Term Drift** <0.5%RH/year

\* Default value of measurement interval is 15 seconds, user can set in the configuration page.  
\* The white PTFE filter membrane is pre-installed in the black cap. For environments with high oil mist or dust levels, install the filter membrane as needed.  
\* τ<sub>63%</sub>: Time for achieving 63% of a temperature or humidity step function, measured at 25 °C and 1 m/s airflow.

## Dimensions

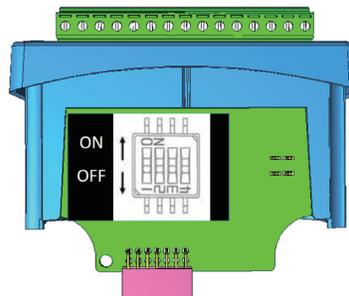
Unit: mm



## WISE-S214 (4AI/4DI)

### Analog Input

- **Channels** 4
- **Resolution** 16bits Bipolar  
15bits Unipolar
- **Sampling Rate** 1Hz (per Channel) with 50/60Hz Rejection (Power Saving Mode)  
10Hz (Total) with 50/60Hz Rejection (Normal Mode)
- **Accuracy** ±0.1% for Voltage Input  
±0.2% for Current Input
- **Input Range** 0~150mV, 0~500mV, 0~1V, 0~5V, 0~10V, ±150mV, ±500mV, ±1V, ±5V, ±10V, 0~20mA, ±20mA, 4~20mA
- **Input Impedance** >1MΩ (Voltage)
- **Isolated voltage** 3kVrms
- **Support Data Scaling and Averaging**
- **Supports Burn-out Detection (4~20mA only), prevent failures and downtime**
- **Supports High/Low value Alarm modes**
- **Supports Latch and Momentary Alarm Modes**
- **Switch Label**



DI Switch	Status	Condition
SW1 (Vo0)	ON	Current Input
	OFF	Voltage Input
SW2 (Vo1)	ON	Current Input
	OFF	Voltage Input
SW3 (Vo2)	ON	Current Input
	OFF	Voltage Input
SW4 (Vo3)	ON	Current Input
	OFF	Voltage Input

## Digital Input

- Channels 4 (Dry Contact)
- Logic Level 0: Open  
1: Close to DI COM  
3.3V/TTL
- Compatibility 3.3V/TTL
- Channel Mode DI (Logic status), Counter, Low to High Latch, High to Low Latch, Frequency
- Supports 32-bit counter input function (maximum signal frequency 200Hz)
- Supports keep/discard counter value on power-off
- Support inverted digital input status
- Support configuration by each channel
- Support digital filter (min 0.1ms)
- Support high-to-low and low-to-high latch

## WISE-S250 (6DI, 2DO& 1RS-485)

### Digital Input

- Channels 6 (Dry Contact)
- Supports 3kHz Frequency Input
- Logic Level 0: Open  
1: Close to DI COM  
3.3V/TTL
- Compatibility 3.3V/TTL
- Channel Mode DI (Logic status), Counter, Low to High Latch, High to Low Latch, Frequency

### Digital Output (Sink Type)

- Channels 2
- Output Current 100 mA  
At 0 -> 1: 100 us  
At 1 -> 0: 100 us  
(for Resistive Load)
- Supports Pules Output 5 kHz
- Max. Load Voltage 30V
- Support pulse high/low width and duty cycle adjustment
- Support high to low and low to high delay time setup
- Supports Fail Safe Value (FSV) function, ensures system safety by automatically setting outputs to a predefined state upon communication failure, maximizing safety and preventing unexpected behavior

### Serial 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 Supports up to 64 addresses with a maximum of 8 Rules (instructions)

## WISE-S251 (6DI/1RS-485)

### Digital Input

- Channels 6 (Dry Contact)
- Logic Level 0: Open  
1: Close to DI COM  
3.3V/TTL
- Compatibility 3.3V/TTL
- Channel Mode DI (Logic status), Counter, Low to High Latch, High to Low Latch, Frequency
- Supports 32-bit counter input function (maximum signal frequency 200Hz)
- Supports keep/discard counter value on power-off (line power only)
- Support inverted digital input status
- Support configuration by each channel
- Support digital filter (min 0.1ms)
- Support high-to-low and low-to-high latch

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## Ordering Information

### WISE-4210 Access Point

- WISE-4210-APNA LPWAN Wireless to Ethernet AP – NA915/EU868

### WISE-4210 Node

- WISE-4210-NA Proprietary LPWAN SUB-G Wireless I/O Module – NA915/EU868
- WISE-4210-S232-NA LPWAN IoT WSN Temp & RH Sensor- NA915/EU868
- WISE-4210-S232-JA LPWAN IoT WSN Temp & RH Sensor for Japan

### WISE I/O Board Selection

I/O board	Analog Input	Digital Input	Digital Output	RS-485	Temperature & Humidity sensor
WISE-S214-A	4 (Current/Voltage)	4 (Dry Contact)			
WISE-S250-A		6 (Dry Contact)	2 (Sink Type)	1	
WISE-S251-A		6 (Dry Contact)		1	
WISE-S232-A					✓

\* Power saving is not for downlink mode.

\* Battery-powered only supports on WISE-S251, and WISE-S232 solution

### Accessories

- 1760002647-01 Bat.Cylindrical 3.6V/2500mAh AA Li/SOCI2
- 1750008836-01\* 863-870MHz Dipole Antenna for WISE-4210
- 1750008837-01\* 902-928MHz Dipole Antenna for WISE-4210
- 1750008767-01 Magnetic Antenna Extend Cable Base 150cm
- BB-RPS-V2-WR2-US Power Supply, 12V/1A, US plug
- BB-RPS-V2-WR2-EU Power Supply, 12V/1A, EU plug
- BB-RPS-V2-WR2-UK Power Supply, 12V/1A, UK plug

\* All of WISE-4210 needs to order antenna separately

## Dimensions

Unit: mm

