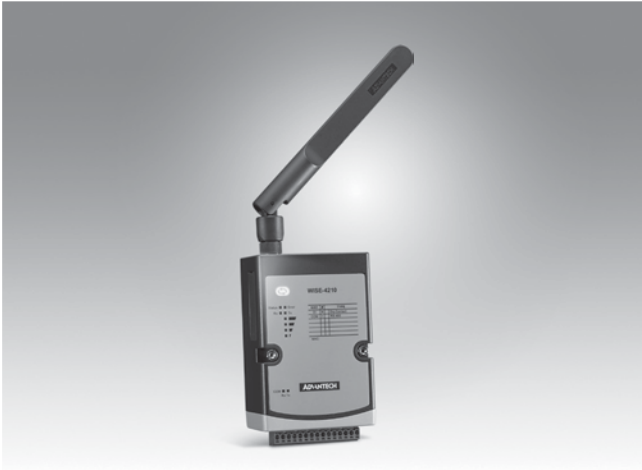


WISE-4210

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 compare 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 interfae, 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 acts as clients should be connected with WISE-4210-AP. In this configuration, user can organize their own network with 64 nodes paired. Data on a star network pass 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

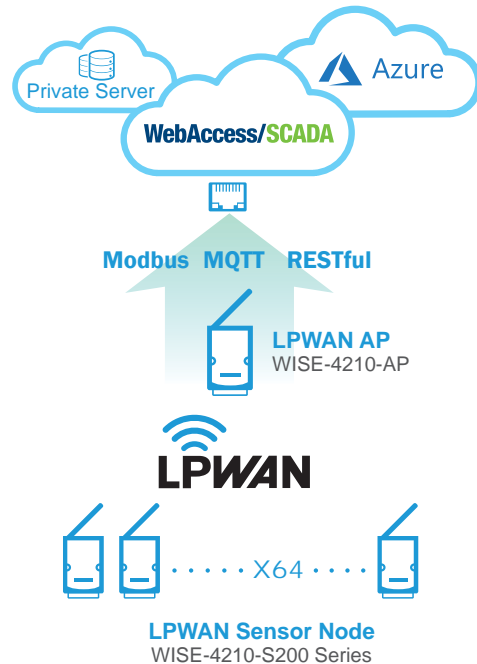
- Proprietary LPWAN with using sub-1GHz wireless frequency
- Battery power for 5 years with 3 x 3.6V AA batteries
- Up to 5 km communication range in open space
- Longer communication range than 2.4GHz
- Better penetration through concrete and steel than 2.4GHz
- Less interference than 2.4GHz spectrum
- 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_{DC}
Sensor Node: 3 x AA, 3.6V Lithium Battery or 10 ~ 50 V_{DC}
- **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_{63%})** 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_{63%})** 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_{63%}: Time for achieving 63% of a temperature or humidity step function, measured at 25 °C and 1 m/s airflow.

Dimensions

Unit: mm

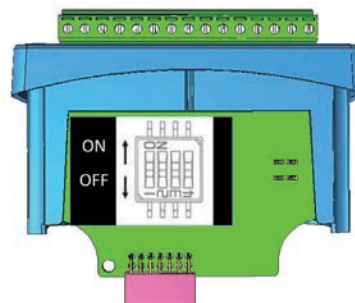


WISE-4210-S232

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
- **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
- **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
- **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**

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)

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/SOC12
- **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

