# WISE-4250

## Dual-Band Wi-Fi 5 Industrial IoT Wireless I/O Module

## Features

- Supports IEEE 802.11ac (2.4/5GHz) to reduce interference and ensure stable high-speed transmission
- Supports interchangeable antenna, I/O and Sensor module
- Supports 802.11k/v/r for seamless switching between Access Points (APs), ensuring zero data loss for mobile applications like AGVs
- Secures data with WPA3, TLS 1.3 encryption, and X.509 certificates. Includes IP Access Control (Whitelisting) for enhanced network protection
- Decentralized P2P Enables direct device-to-device control. Input events on one module can instantly trigger outputs on another without a central controller
- Supports Dropbox, WebAccess, iSensing MQTT, IFTTT, Azure, AWS, Azure MQTT, Line messaging API, and other cloud services

## Introduction

The WISE-4250 series is a robust wireless IoT solution designed for industrial applications. Featuring dual-band Wi-Fi (2.4/5GHz) and an interchangeable modular design, it integrates data acquisition, processing, and publishing into a single device. With built-in support for MQTT, RESTful APIs, and decentralized P2P communication, the WISE-4250 enables rapid deployment without complex programming. To ensure mission-critical reliability, it features smart roaming (802.11k/v/r) and enterprise-grade security (WPA3/TLS 1.3), making it ideal for AGV, facility monitoring, and machine automation.

## Features

### Robust & Versatile Hardware Architecture

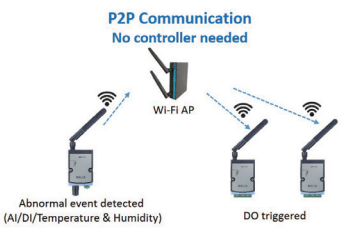
Engineered for harsh environments, the WISE-4250 combines dual-band Wi-Fi 5 connectivity with interchangeable I/O modules. It features a wide 10~50 VDC power input , flexible DIN-rail/wall/pole mounting , and a built-in data logger (10,000+ samples), delivering all-in-one industrial reliability in a compact form factor

### Peer to Peer (P2P)

WISE-4250 supports Peer-to-Peer communication for direct device-to-device control without relying on SCADA or PLC systems, enabling real-time, decentralized, and low- latency responses.

Up to 16 modules can be linked. Signals can be sent periodically or triggered by input status changes (e.g., DI/AI input triggering DO output).

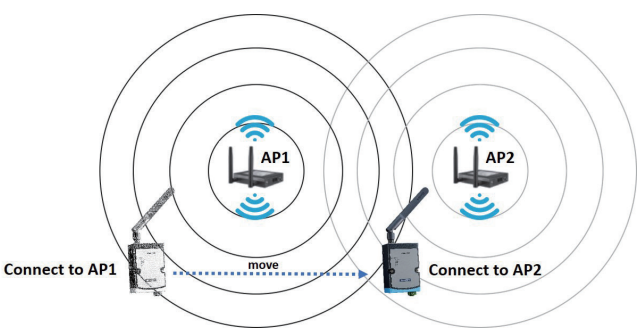
Communication uses UDP and supports AES-128 encryption for enhanced security.




### Smart Roaming

Smart roaming allows WISE-4250 to dynamically connect to the most optimal access point.

With 802.11k/v/r support, the device significantly reduces connection downtime and ensures reliable wireless coverage in roaming environments.




### Security Features

☐ X.509 Certificate

Digital Certificate

☐ WPA2 & WPA3 Personal/Enterprise

Protect Wi-Fi networks from attacks

- WPA3 uses a longer 192-bit key, further enhancing security.

☐ TLS1.3 encryption

Cryptographic Protocol

- Secures data transmission between clients and the server
- Supports **EAP-PEAP** and **EAP-TLS** security types

☐ AES-128 encrypted

- UDP based AES-128 (advanced encryption standard) encrypted wireless **P2P** (Peer to Peer) function

Last updated: 27-Nov-2025

# Specifications

### General

- **WLAN Standard** IEEE 802.11a/b/g/n/ac
- **Modulation** 802.11b : CCK(11, 5.5Mbps), DQPSK(2Mbps), BPSK(1Mbps)
  802.11a/g/n/ac : OFDM
- **Transmit Power** 2.4 GHz
  802.11b: 16.0 dBm ±2dBm
  802.11g: 14.0 dBm ±2dBm
  802.11n: 12.0 dBm ±2dBm
  5 GHz
  802.11a: 13.0 dBm ±2dBm
  802.11n: 10.0 dBm ±2dBm
  802.11ac: 8.0 dBm ±2dBm
- **Wireless Security** X.509 (TLS1.2/1.3), WPA2/WPA3 Personal and Enterprise
- **Antenna** Connector: RP-SMA
  Gain (Peak): 2.4G 3.64 dBi / 5G 5.65 dBi
- **Connectors** Plug-in-and-play I/O and sensor modules
- **Watchdog Timer** System (1.6 second) and Communication (programmable)
- **Certification** CE, FCC, IC, TELEC, NBTC, RCM
- **Dimensions (W x H x D)** 70 x 102 x 38 mm
- **Enclosure** PC
- **Mounting** DIN 35 rail, wall, stack, and pole
- **Power Input** 10 ~ 50 $V_{DC}$
- **Power Consumption** 1.6W @ 24 $V_{DC}$
- **RTC Accuracy** ±2 second/day
- **Cloud** Dropbox, WebAccess, iSensing MQTT, IFTTT, Azure, AWS, Azure MQTT, Line messaging API
- **Reliability Test** IEC60068-2-64 Vibration broadband random test
  Package Drop Test
- **Support wireless P2P (Peer to Peer) with AES-128 encryption and UDP protocol**
- **Support MQTT data recovery function**
- **Support smart roaming function and 802.11k/v/r**
- **Supports User Defined Modbus Address**
- **Power Reversal Protection**
- **Supports Data Log** 10000+ samples with SNTP/RTC sync time stamp
- **Supported Protocols** Modbus/TCP, TCP/IP, SNMP V2, SNTP, UDP, DHCP, HTTP(S), and MQTT
- **Supports RESTful API Client/Server in JSON format**
- **Supports Web Server in HTML5 with JavaScript & CSS3**
- **Supports System Configuration Backup and User Access Control**

### Environment

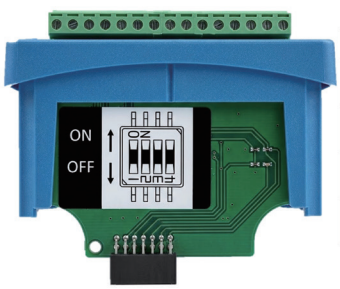
- **Operating Temperature** -25 ~ 70°C (-13~158°F)
- **Storage Temperature** -40 ~ 85°C (-40~185°F)
- **Operating Humidity** 10 ~ 85% RH (non-condensing)
- **Storage Humidity** 0 ~ 60% RH (non-condensing)

# Supported I/O module

## WISE-4250-S214 (4AI/4DI)

### Analog Input

- **Channels** 4
- **Resolution** 16bits Bipolar; 15bits Unipolar
- **Sampling Rate** 10Hz (Total) with 50/60Hz Rejection
- **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)
  240 Ω (current)
- **Support Data** Max/min, 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 200Hz Counter Input (32-bit + 1-bit overflow)**
- **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-4250-S250 (6DI, 2DO& 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 3kHz Frequency Input**
- **Supports 3kHz Counter Input (32-bit + 1-bit overflow)**
- **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**

### Digital Output (Sink Type)

- **Channel** 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** 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 30 Rules (instructions)
- **Support Server response timeout and Delay between Polls setting**
- **Supports quick setting with Advantech's sensor, reduce the complexity of setting.**

## WISE-4250-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 200Hz Counter Input (32-bit + 1-bit overflow)**
- **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**

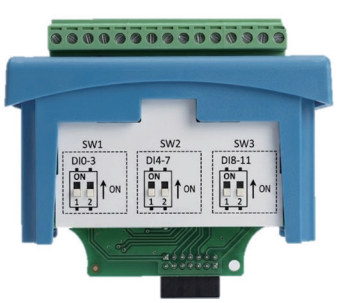
### Serial Port

- **Port Number** 1
- **Type** RS-485
- **Data Bits** 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 30 Rules (instructions)
- **Support Server response timeout and Delay between Polls setting**
- **Supports quick setting with Advantech's sensor, reduce the complexity of setting.**

## WISE-4250-S252 (12DI/12DO)

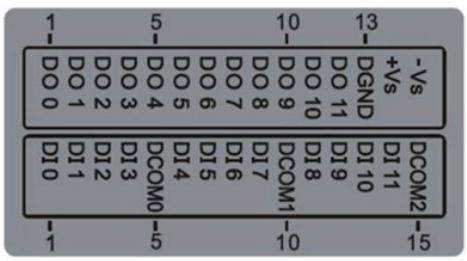
### Digital Input

- **Channels** 12
- **Logic Level** – Dry Contact 0: Open
  1: Close to DCOM
  – Wet Contact 0: -5~5 $V_{DC}$
  1: -17~-30 $V_{DC}$ or 17~30 $V_{DC}$ (2 mA min.)
- **Input Voltage** 30 $V_{DC}$ max
- **Isolation** 3,000 Vrms
- **Channel Mode** DI (Logic status), Counter, Low to High Latch, High to Low Latch, Frequency
- **Supports 1kHz Counter Input (32-bit + 1-bit overflow)**
- **Supports keep/discard counter value on power-off**
- **Support inverted digital input status**
- **Support digital filter (min 0.1ms)**
- **Support high-to-low and low-to-high latch**
- **Contact Type Label (Dry/Wet)**




| DI Switch | Status | Condition |
|---|---|---|
| SW1-1 | ON | DI 0-3 Dry Contact |
| SW1-2 | OFF | DI 0-3 Wet Contact |
| SW2-1 | ON | DI 4-7 Dry Contact |
| SW2-2 | OFF | DI 4-7 Wet Contact |
| SW3-1 | ON | DI 8-11 Dry Contact |
| SW3-2 | OFF | DI 8-11 Wet Contact |

- **I/O Label**



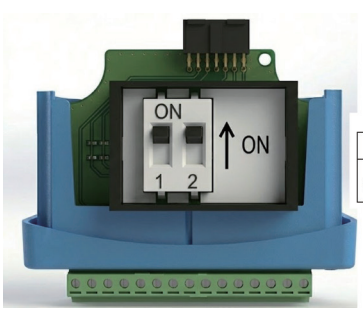

### Digital Output (Sink Type)

- **Channel** 12
- **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**

## WISE-4250-S260 (4DI/4Relay Output)

### Digital Input

- **Channels** 4
- **Logic Level** – Dry Contact 0: Open
  1: Close to DCOM
  – Wet Contact 0: -5~5 $V_{DC}$
  1: -15~-30 $V_{DC}$ or 15~30 $V_{DC}$ (2 mA min.)
- **Input Voltage** 50 $V_{DC}$ max
- **Isolation** 3,000 $V_{DC}$
- **Channel Mode** -Logic Status
  -Event Counter (32-bit + overflow)
  -Frequency Input
  -Latch Mode (Rising/Falling Edge)
- **Supports 1kHz Counter Input (32-bit + 1-bit overflow)**
- **Keep Last Value: Ensures counter retains data even after power loss**
- **Support inverted digital input status**
- **Support digital filter (min 0.1ms)**
- **Support high-to-low and low-to-high latch**
- **Contact Type Label (Dry/Wet)**




| DI Switch | Status | Condition |
|---|---|---|
| SW1&SW2 | ON | DI 0-3 Dry Contact |
| | OFF | DI 0-3 Wet Contact |

### Relay Output

- **Channels** 4 (Form A)
- **Contact Rating** 250 $V_{AC}$ @ 5 A
  30 $V_{DC}$ @ 3 A
- **Isolation (b/w coil & contacts)** 3,000 $V_{AC}$
- **Relay On Time** 10 ms
- **Relay Off Time** 5 ms
- **Insulation Resistance** 1 GΩ min. @ 500 VDC
- **Maximum Switching** 60 operations/minute
- **Supports Pulse Output**
- **Supports High-to-Low and Low-to-High Delay Output**

## WISE-4250-S232 (Temperature & Humidity Sensor with a protection filter)

### Temperature

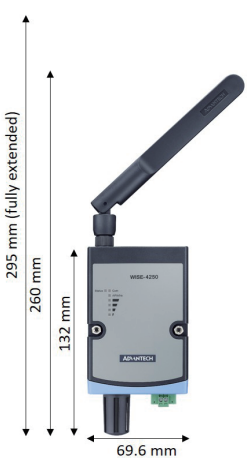
- **Operating Range** -25°C ~ 70°C (-13°F ~ 158°F)
- **Update Rate** Min. 1 second, Max. 24 hours
- **Resolution** 0.01 (°C)
- **Accuracy** ±0.2°C at 25°C (Based on built-in SHT41-AD1F sensor)
- **Response time ($\tau_{63\%}$)** 2 seconds
- **Long Term Drift** <0.04°C/year

### 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 ($\tau_{63\%}$)** 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.
* $\tau_{63\%}$: Time for achieving 63% of a temperature or humidity step function, measured at 25 °C and 1 m/s airflow.

## Dimensions



# Ordering Information

### Wi-Fi 2.4/5GHz Wireless I/O Module

- **WISE-4250-A** Wi-Fi 5 (2.4/5 GHz) Wireless I/O Module
- **WISE-4250-S232** WISE-4250 with Temperature & Humidity Sensor
- **WISE-4250-S214** WISE-4250 with 4AI+4DI
- **WISE-4250-S250** WISE-4250 with 6DI+2DO+RS-485
- **WISE-4250-S251** WISE-4250 with 6DI+RS-485
- **WISE-4250-S252** WISE-4250 with 12DI+12DO
- **WISE-4250-S260** WISE-4250 with 4DI+4Relay Output

| I/O board | Analog Input | Digital Input | Digital Output | RS-485 | Relay Output |
|---|---|---|---|---|---|
| WISE-4250-S214 | 4 (Current/Voltage) | 4 (Dry Contact) | | | |
| WISE-4250-S250 | | 6 (Dry Contact) | 2 (Sink Type) | 1 | |
| WISE-4250-S251 | | 6 (Dry Contact) | | 1 | |
| WISE-4250-S252 | | 12 (Dry/Wet Contact) | 12 (Sink Type) | | |
| WISE-4250-S260 | | 4 (Dry/Wet Contact) | | | 4 (Form A) |

| | |
|---|---|
| WISE-4250-S232 | Temperature and Humidity sensor with a protection filter |

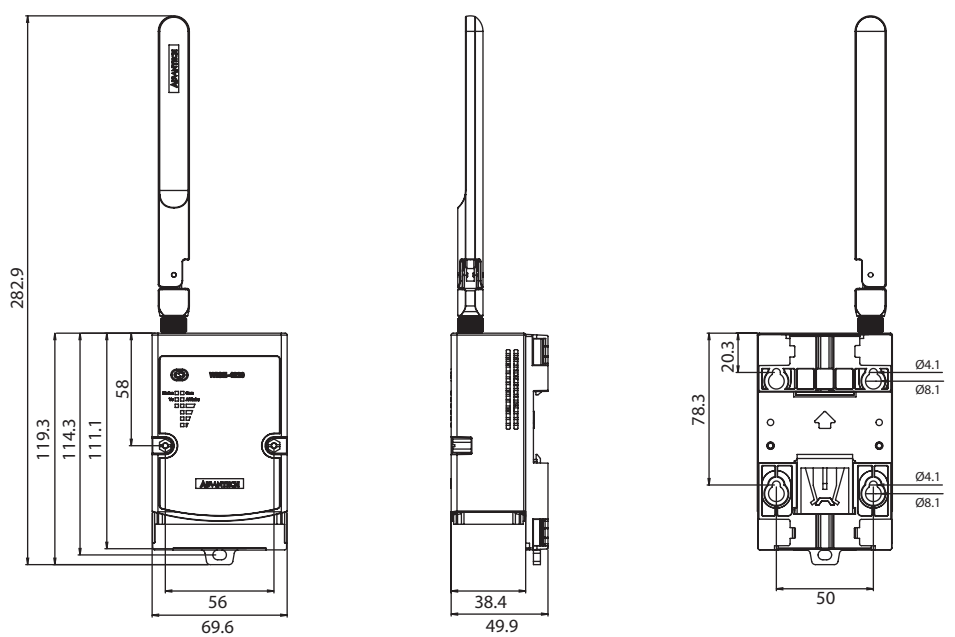
### Accessories

- **96PSD-A30W24-DS** DIN Rail Power Supply (1.25A Output Current)
- **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
- **1750008767-01** Magnetic Antenna Extend Cable Base 150cm
- **1760000897-11** RTC Battery 3V/200 mAh with Cable Connector
- **EKI-6333AC-2G** IEEE 802.11 a/b/g/n/ac Concurrent Dual-Band Wi-Fi AP/Client
- **WISES2142401-T** Wet Contact 4AI/4DI I/O Module

* WISE-4250 doesn't needs to order antenna separately

# Dimensions

Unit: mm




Front View Side View Mounting Kit