WISE-4250

Wi-Fi 2.4/5 GHz 802.11 a/b/g/n/ac I/O and Sensor Module



Features

- Supports IEEE 802.11 ac (2.4/5GHz) for stable and high-speed wireless connectivity
- Supports interchangeable, antenna, I/O and Sensor module
- Smart roaming with 802.11k/v/r ensures seamless and uninterrupted connectivity
- Supports MQTT, Modbus/TCP, SNTP, TCP/IP, HTTPS, RESTful, UDP, and DHCP protocols
- Advanced security: X.509 certificates, WPA3, and TLS 1.3 encryption
- AES-128 encrypted wireless P2P enables automatic triggering of multiple WISE modules on abnormal input
- Easy configuration via web UI with mobile devices and PC
- Built-in data logger (10,000+ samples) with SNTP/RTC sync and watchdog-based auto-reconnect
- Supports Dropbox, WebAccess, iSensing MQTT, IFTTT, Azure, AWS, Azure MQTT, Line messaging API, and other cloud services

Introduction

The WISE-4250 series is a wireless IoT solution designed for industrial applications. This Ethernet-based device is compatible with various I/O and sensors and integrates data acquisition, processing, and publishing functions. It supports real-time P2P communication between devices, enabling edge intelligence without a central controller, making it ideal for applications requiring rapid response and distributed control. Furthermore, a watchdog timer and smart roaming ensure stable device operation in any environment. The WISE- 4250 also prioritizes data security, with a data logger, data recovery function, WPA3/TLS1.3 encryption, and IP whitelisting to prevent data loss and unauthorized access. Best of all, it supports MQTT, Modbus, and RESTful APIs, enabling you to easily publish data to various cloud platforms for data-driven decision-making.

Features

IEEE 802.11 a/b/g/n/ac 2.4/5GHz Wi-Fi with AP Mode

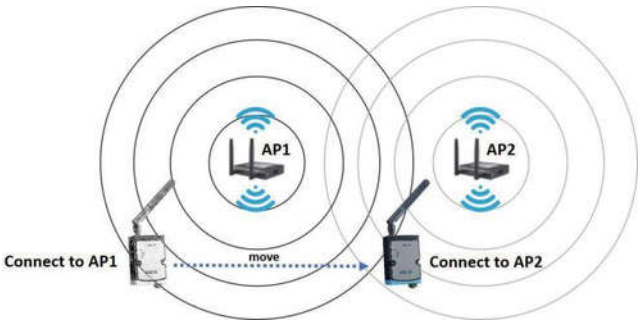
The Wi-Fi interface is easily integrated with wired or wireless Ethernet devices, users only need to add a wireless router or AP to extend existing Ethernet network to wireless. The limited AP mode enables the WISE-4250 to be accessed via other Wi-Fi devices directly as an AP.



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.



Data Logger and Recovery

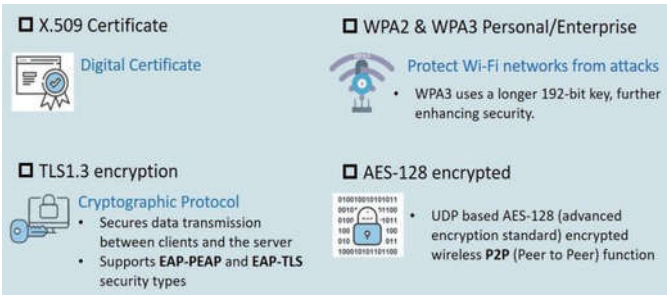
The WISE-4250 includes a built-in data logger that records over 10,000 samples with SNTP/RTC timestamps.

*Normal logging interval: 100ms

*Enhanced logging (during signal changes): 50ms

Users may configure the buffer to either overwrite oldest data (ring buffer) or stop recording when full, ensuring no data loss in mission-critical operations.

Security Features



All product specifications are subject to change without notice.

Last updated: 10-July-2025

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).

Supports two modes:

- **Basic Mode:** Fixed 1-to-1 channel mapping across modules; ideal for simple control.
- **Advanced Mode:** Flexible channel mapping for complex signal routing.

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

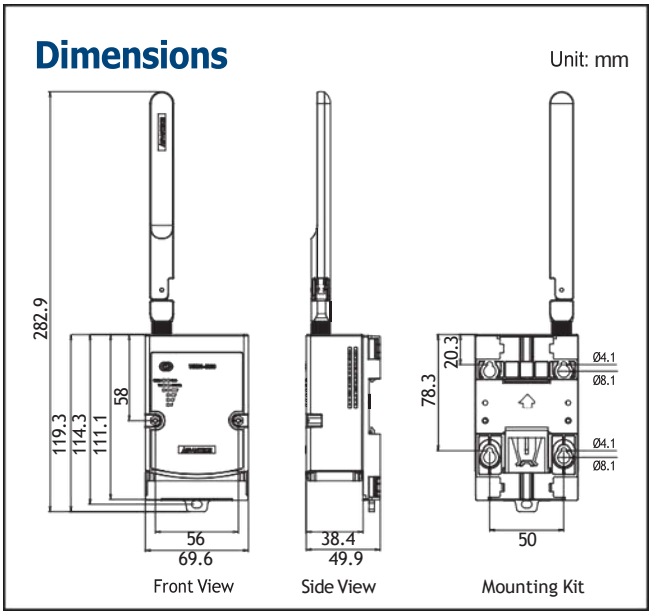


RESTful Web Service with Security Socket

WISE-4250 also supports IoT communication protocol, RESTful web service. Data can be polled or even be pushed automatically from the WISE-4250 when the I/O status is changed. The I/O status can be retrieved over the web using JSON. The WISE-4250 also supports HTTPS which has security that can be used in a Wide Area Network (WAN).







HTML5 Web Configuration Interface

All configurations can be performed via an HTML5-based web interface.

This allows setup from any browser—on mobile or desktop—without requiring dedicated software tools. For best results, we recommend using Microsoft Edge.



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
- **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

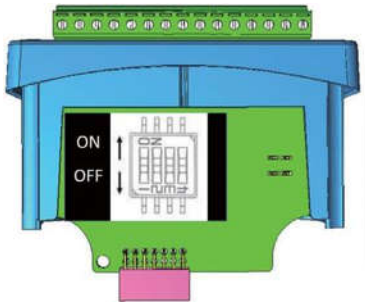
- **Operating Temperature** -25 ~ 70°C (-13~158°F)
- **Storage Temperature** -40 ~ 85°C (-40~185°F)
- **Operating Humidity** 10 ~ 85% RH (non-condensing)
- **Storage Humidity** 0 ~ 60% RH (non-condensing)

Supported I/O module

WISE-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** >1M (Voltage)
  240 (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)**
- **Keep Last Value:** Ensures counter retains data even after power loss
- **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
- **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-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)**
- **Keep Last Value:** Ensures counter retains data even after power loss
- **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**

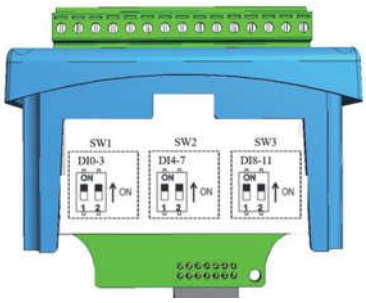
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- **Data Bits** 8
- **Stop Bits** 1, 2
- **Parity** None, Odd, Even
- **Baud Rate (bps)** 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
- **Protocol** Modbus/RTU Supports up to 64 addresses with a maximum of 30 Rules (instructions)
- **Support Server response timeout and Delay between Polls setting**
- **Supports quick setting with Advantech's sensor, reduce the complexity of setting.**

WISE-S252 (12DI/12DO)

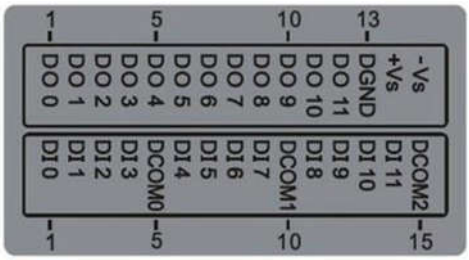
Digital Input

- **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** -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
SW1-1	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-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 ($T_{63\%}$)** 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 ($T_{63\%}$)** 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.
* $T_{63\%}$: 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** Wi-Fi 5 (2.4/5 GHz) Wireless I/O Module with Temperature & Humidity Sensor
- **WISE-4250-S214** Wi-Fi 5 (2.4/5 GHz) Wireless I/O Module with 4AI+4DI
- **WISE-4250-S252** Wi-Fi 5 (2.4/5 GHz) Wireless I/O Module with 12DI+12DO

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-S252-A		12 (Dry/Wet Contact)	12 (Sink Type)		
WISE-S232-A					✔

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