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7

Remote I/O & Wireless Sensing Modules

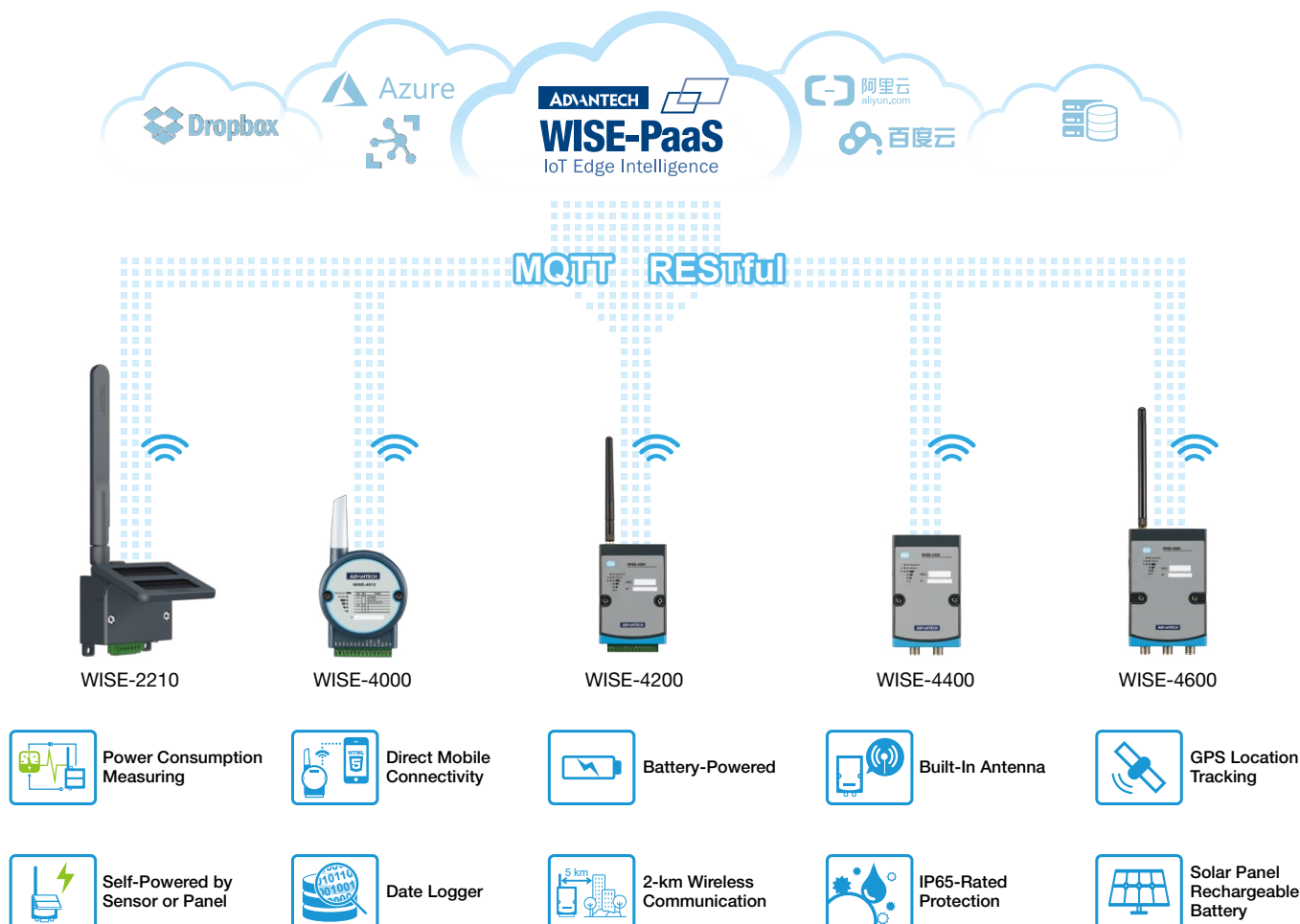# Wireless IoT Sensing Devices

Overview

Coinciding with the development of wireless and cloud technologies, remote management is now distributed across wider areas due to the availability of cloud services. To shorten the gap between the edge and the cloud, Advantech has launched wireless sensing devices that can directly pass data from the edge to different cloud platforms via MQTT and RESTful APIs.

For wide area communication, WISE-4000 I/O modules and sensor nodes have been designed with LPWAN, LoRa, NB-IoT/eMTC, 3G/LTE, and IP65-rated features, making them highly suitable for outdoor applications. WISE-2000 sensor devices are all-in-one devices designed for specific applications, whereas WISE-6000 devices are ready-to-use M2I edge devices for machine status monitoring in the field of remote management.

To realize a complete IoT sensing solution, the WISE-4000 series goes beyond merely providing a wireless communication interface for sensors—it also provides cloud connectivity for additional user applications. With support for IoT protocols such as MQTT and RESTful API, the WISE-4000 series can communicate with cloud services or other web services via secure web sockets. The WISE-4000 series comes with pre-integrated APIs for major cloud service providers (e.g., Dropbox) and IoT cloud services (e.g., Azure IoT Hub) and provides support for both private cloud platforms (e.g., private file servers or databases) and ERP/MES systems.

Wireless Sensor and Sensing Devices

WISE-2210   WISE-4000   WISE-4200   WISE-4400   WISE-4600

Power Consumption Measuring

Direct Mobile Connectivity

Battery-Powered

Built-In Antenna

GPS Location Tracking

Self-Powered by Sensor or Panel

Date Logger

2-km Wireless Communication

IP65-Rated Protection

Solar Panel Rechargeable Battery
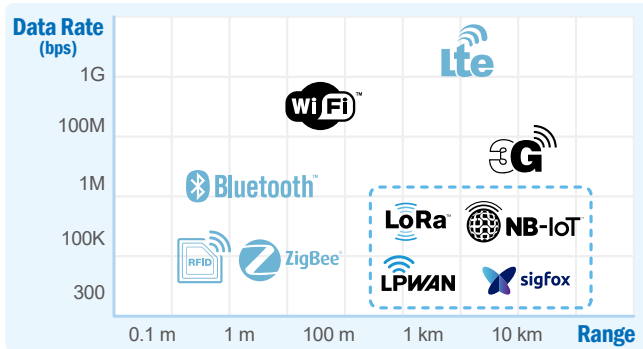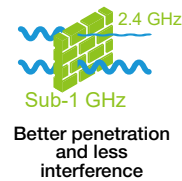
Wireless Communication

Wireless Technology

Advancements in IoT have led to the development of many wireless technologies that can be implemented in a range of hardware products. The WISE-4000 series utilizes Wi-Fi, 3G, and LPWAN to meet specific wireless communication requirements of virtually any project.

Low-Power Wide-Area Network (LPWAN, Sub-1 GHz)

LPWAN technology, including LoRa, SigFox, and NB-IoT, is suitable for applications requiring low-volume, long-range data transmission while maintaining a long battery life, minimal cost, and low levels of interference. The WISE-4000 series provides both standard LPWAN, eMTC/NB-IoT, and LoRa devices to meet different long-range sensing requirements. For the WISE-4210 and WISE-4610 end nodes, Advantech also provides LPWAN access points or LoRa gateways, enabling users to easily build up an LPWAN or LoRa network.

Up to 5-km Communication Range

Better penetration and less interference

Easy to organize LPWAN network data access

Software and Industry Solutions 1

Industrial Server 2

Intelligent System 3

Intelligent HMI and Monitors 4

Automation Computers and Controllers 5

Industrial Communication 6

Remote I/O & Wireless Sensing Modules 7

Industrial I/O and Video Solutions 8

Wireless RFID Gateway and Edge Device

- 4-port UHF RFID read/write function
- Node-RED programmable for data read, write, filter, and transfer
- Application-ready function block
- Ethernet/Wi-Fi interface for uplink

- Supports more than 100 PLC drivers by WISE-PaaS/EdgeLink
- Built-in digital I/O, analog I/O, and RS-485 for machine status monitoring
- Wi-Fi, 3G, NB-IoT with mini PCIe communication
- Intelligent logic control with Node-RED
- ePaper for local visualization and web service support for remote management

IoT Wireless I/O Modules

Model		WISE-4012E	WISE-4012	WISE-4050	WISE-4060	WISE-4051
Description		6-ch IoT wireless I/O module for IoT developers	4-ch universal input + 2-ch digital output IoT wireless I/O module	4-ch digital input + 4-ch digital output IoT wireless I/O module	4-ch digital input + 4-ch relay output IoT wireless I/O module	8-ch digital input IoT wireless I/O module with 1 x RS-485 port
Wireless Interface	IEEE Standard	IEEE 802.11b/g/n	IEEE 802.11b/g/n	IEEE 802.11b/g/n	IEEE 802.11b/g/n	IEEE 802.11b/g/n
	Frequency Band	2.4 GHz	2.4 GHz	2.4 GHz	2.4 GHz	2.4 GHz
	Outdoor Range	110 m (L.O.S.)	110 m (L.O.S.)	110 m (L.O.S.)	110 m (L.O.S.)	110 m (L.O.S.)
	Network Mode	Infrastructure, Limited AP	Infrastructure, Limited AP	Infrastructure, Limited AP	Infrastructure, Limited AP	Infrastructure, Limited AP
	Security	WPA2 Personal and Enterprise	WPA2 Personal and Enterprise	WPA2 Personal and Enterprise	WPA2 Personal and Enterprise	WPA2 Personal and Enterprise
	Antenna Connector	Reverse SMA	Reverse SMA	Reverse SMA	Reverse SMA	Reverse SMA
Analog Input	Channel	2-ch (differential)	4-ch	-		
	Input Type	V	V, A, Dry contact DI		-	
	Voltage Range	0 ~ 10 V	±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V, 0 ~ 150 mV, 0 ~ 500 mV, 0 ~ 1 V, 0 ~ 5 V, 0 ~ 10 V		-	
	Current Range	-	0 ~ 20, 4 ~ 20, ±20 mA		-	
	Resolution	12-bit	16-bit		-	
	Sampling Rate	10 Hz (total)	10 Hz (total)		-	
	Accuracy	±0.1 V_{DC}	Voltage: ±0.1% of FSR Current: ±0.2% of FSR		-	
	Burnout Detection	-	✓ (4 ~ 20 mA only)		-	
	Isolation	-	3,000 V_{rms}		-	
Digital Input	Channel	2-ch dry contact	Shared with analog input	4-ch dry contact or wet contact	4-ch dry contact or wet contact	8-ch dry contact or wet contact
	Counter Input	3 kHz	2 Hz	3 kHz	3 kHz	3 kHz
	Frequency Input	0.1 ~ 3 kHz	0.1 ~ 2 Hz	0.1 ~ 3 kHz	0.1 ~ 3 kHz	0.1 ~ 3 kHz
	Isolation	-	3,000 V_{rms}	3,000 V_{rms}	3,000 V_{rms}	3,000 V_{rms}
Digital Output	Channel	2-ch relay	2-ch (sink-type)	4-ch (sink-type)	4-ch power relay	-
	Output Rating (Resistive Load)	120 V_{AC} @ 0.5 A 30 V_{DC} @ 1 A	Open collector to 30 V_{DC}, 400 mA max.		250 V_{AC} @ 5 A 30 V_{DC} @ 3 A	-
	Pulse Output	60 operations/min	5 kHz	5 kHz	60 operations/min	-
	Isolation	1,500 V_{rms}	3,000 V_{rms}	3,000 V_{rms}	3,000 V_{AC}	-
Serial Port	Port Number			-		1
	Type			-		RS-485
	Data Bits			-		7, 8
	Stop Bits			-		1, 2
	Parity			-		None, odd, even
General	LED Indicators	Status, communication, network mode, quality	Status, communication, network mode, quality	Status, communication, network mode, quality	Status, communication, network mode, quality	Status, communication, network mode, quality, serial Tx, Rx
	Real-Time Clock	✓	✓ (with battery backup)	✓ (with battery backup)	✓ (with battery backup)	✓ (with battery backup)
	Connectors	I/O: Terminal block Power: Micro-B USB	Plug-in screw terminal block (I/O and power)	Plug-in screw terminal block (I/O and power)	Plug-in screw terminal block (I/O and power)	Plug-in screw terminal block (I/O and power)
	Dimensions	80 x 148 x 25 mm (W x H x D)				
Environment	Operating Temperature	-25 ~ 70°C (-13 ~ 158°F)				
	Storage Temperature	-40 ~ 85°C (-40 ~ 185°F)				
	Operating Humidity	20 ~ 95% RH (non-condensing)				
	Storage Humidity	0 ~ 95% RH (non-condensing)				
Power	Input Range	Micro USB 5 V_{DC}	10 ~ 30 V_{DC}	10 ~ 30 V_{DC}	10 ~ 30 V_{DC}	10 ~ 30 V_{DC}
	Protection	-	Power reversal protection	Power reversal protection	Power reversal protection	Power reversal protection
	Power Consumption	1.5 W @ 5 V_{DC}	2.5 W @ 24 V_{DC}	2.2 W @ 24 V_{DC}	2.5 W @ 24 V_{DC}	2.2 W @ 24 V_{DC}

WISE-4012E

6-ch Input/Output IoT Wireless I/O Module for IoT Developers

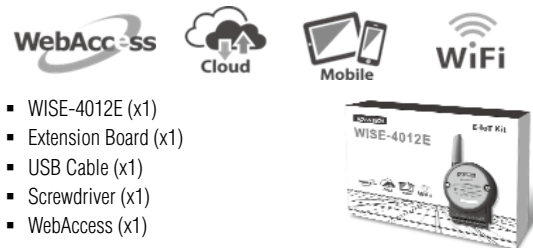## Features

- 2.4 GHz IEEE 802.11b/g/n WLAN
- 2-ch 0 ~ 10V Input, 2-ch DI, and 2-ch Relay Output
- Includes WebAccess with demo project for developer
- Includes extension board for simulating sensor status
- Includes micro USB cable for power input
- Supports Modbus/TCP with RESTful web service
- Supports wireless client and server mode that can be accessed directly without AP or router
- Supports mobile device web configuration with HTML5 without the platform limitation
- Supports file-based cloud storage and local logging with time stamp
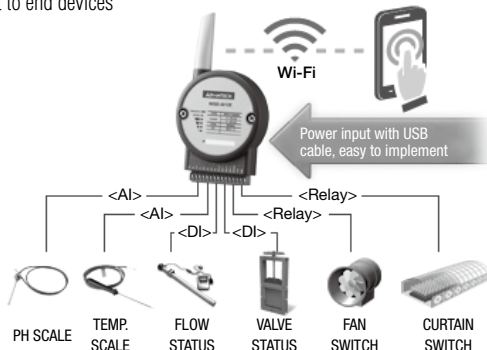
ANATEL CE FC R&TTE SRRC

Introduction

The Advantech WISE IoT Developer Kit is a complete hardware & software solution to help users develop IoT applications and simulate their projects in the simplest way. The WISE IoT Developer Kit provides everything you need to get going: a WISE-4012E 6-ch universal input or output wireless Ethernet I/O module, and developer kit including: WebAccess 8.0 with open interfaces for intelligent application developer, extension board for simulating sensor status, a micro USB cable for power input, and a screwdriver for wiring. The WISE-4012E has an integrated Wi-Fi interface with AP mode and web configuration which can be accessed by mobile device directly. Data can be logged in the I/O module and then automatically pushed to the file-based cloud.

Your Smart Phone with WISE
Direct Cloud Accessibility, Easy Application, Instant Sensing

Product Concept: Data A-P-P

BROAD ADAPTABILITY	LOCAL INTELLIGENCE	RESTful WEB SERVICE
Data **A**cquisition	Data **P**rocessing	Data **P**ublishing

IoT Developer Kit

WebAccess   Cloud   Mobile   WiFi

- WISE-4012E (x1)
- Extension Board (x1)
- USB Cable (x1)
- Screwdriver (x1)
- WebAccess (x1)

WISE-4012E E-IoT Kit

Application Scenario 1
Connect to end devices

Wi-Fi

Power input with USB cable, easy to implement

<AI> <AI> <DI> <DI> <Relay> <Relay>

PH SCALE   TEMP. SCALE   FLOW STATUS   VALVE STATUS   FAN SWITCH   CURTAIN SWITCH

Application Scenario 2
Connect to an extension board
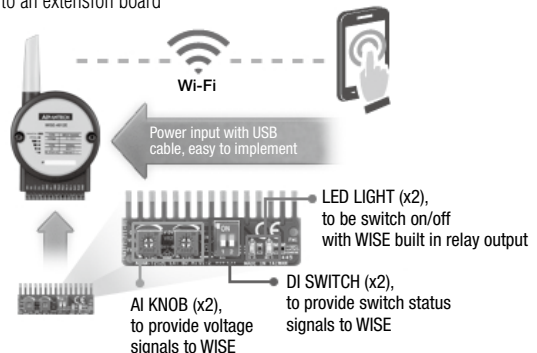
Wi-Fi

Power input with USB cable, easy to implement

LED LIGHT (x2), to be switch on/off with WISE built in relay output

DI SWITCH (x2), to provide switch status signals to WISE

AI KNOB (x2), to provide voltage signals to WISE

Specifications

Voltage Input

- **Channel**   2
- **Resolution**   12-bit
- **Sampling Rate**   10 Hz (Total)
- **Accuracy**   ±0.1 V_{DC}
- **Input Type and Range**   0 ~ 10 V
- **Input Impedance**   100 kΩ

Digital Input

- **Channels**   2
- **Logic level**   Dry Contact 0: Open
                             1: Close to GND
- **Supports 3 kHz Counter Input (32-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports 3 kHz Frequency Input**
- **Supports Inverted DI Status**

Relay Output

- **Channels**   2 (Form A)
- **Contact Rating**   120 V_{AC} @ 0.5 A
  (Resistive Load)   30 V_{DC} @ 1A
- **Isolation** (b/w coil & contacts)   1,500 V_{rms}
- **Relay On Time**   10 ms
- **Relay Off Time**   7 ms
- **Insulation Resistance** 1 GΩ min. @ 500 V_{DC}
- **Maximum Switching**   60 operations/minute
- **Supports Pulse Output**
- **Supports High-to-Low and Low-to-High Delay Output**

Environment

- **Operating Temperature** -25 ~ 70°C (-13 ~ 158°F)
- **Storage Temperature**   -40 ~ 85°C (-40 ~ 185°F)
- **Operating Humidity**   20 ~ 95% RH (non-condensing)
- **Storage Humidity**   0 ~ 95% RH (non-condensing)

General

- **WLAN**   IEEE 802.11b/g/n 2.4GHz
- **Connectors**   Plug-in screw terminal block (I/O)
- **Watchdog Timer**   System (1.6 second) and
                             Communication (programmable)
- **Certification**   CE, FCC, R&TTE, NCC, SRRC, RoHS, ANATEL
- **Dimensions (W x H x D)** 80 x 139 x 25 mm
- **Enclosure**   PC
- **Power Input**   Micro-B USB 5 V_{DC}
- **Power Consumption**   1.5 W @ 5 V_{DC}
- **Supports User Defined Modbus Address**
- **Supports Data Log Function**   Up to 10,000 samples with time stamp
- **Supported Protocols**   Modbus/TCP, TCP/IP, UDP, DHCP, and HTTP
- **Supports RESTful Web API in JSON format**
- **Supports Web Server in HTML5 with JavaScript & CSS3**
- **Supports System Configuration Backup and User Access Control**

Ordering Information

- **WISE-4012E-AE-WA**   WISE-4012E IoT Developer Kit with WebAccess

Advantech WebAccess 8.0

WebAccess Cloud Architecture

WebAccess is a 100% web based HMI and SCADA software with private cloud software architecture. WebAccess can provide large equipment vendors, SIs, and Enterprises access to and manipulation of centralized data to configure, change/update, or monitor their equipment, projects, and systems all over the world using a standard web browser. Also, all the engineering works, such as: database configuration, graphics drawing and system management and the troubleshooting can be operated remotely. This can significantly increase the efficiency of maintenance operations and reduce maintenance costs.

Business Intelligence Dashboard

WebAccess 8.0 provides an HTML5 based Dashboard as the next generation of WebAccess HMI. System integrators can use Dashboard Editor to create the customized information page by using analysis charts and diagrams which are called widgets. Ample widgets have been included in the built-in widget library, such as trends, bars, alarm summary, maps…etc. After the dashboard screens have been created, end user can view the data by Dashboard Viewer in different platforms, like Explorer, Safari, Chrome, and Firefox for a seamless viewing experience across PCs, Macs, tablets and smartphones.

Open Interfaces

WebAccess has three interfaces for different uses. First, WebAccess provides a Web Service interface for partners to integrate WebAccess data into APPs or application system. Second, a pluggable widget interface has been opened for programmer to develop their widget and run on WebAccess Dashboard. Last, WebAccess API, a DLL interface for programmer to access WebAccess platform and develop Windows applications. With these interfaces, WebAccess can act as an IoT platform for partners to develop IoT applications in various vertical markets.

Google Maps and GPS Tracking Integration

WebAccess integrates real-time data on each geographical site with Google Maps and GPS location tracking. For remote monitoring, users can intuitively view the current energy consumption on each building, production rate on each field or traffic flow on the highway together with alarm status. By right-clicking on Google Maps or entering the coordinate of the target, users can create a marker for the target and associate the real-time data of three sites with a display label. Furthermore, this function also integrates with GPS modules to track the location of the marker in Google Maps and allows it to be used in vehicle systems.

Ample Driver Support

WebAccess supports hundreds of devices. In addition to Advantech I/Os and controllers, WebAccess also supports all major PLCs, controllers and I/Os, like Allen Bradley, Siemens, LonWorks, Mitsubushi, Beckhoff, Yokogawa etc. WebAccess can easily integrate all devices in one SCADA. All of these device drivers are integrated into WebAccess and free of charge. For a complete list of WebAccess drivers, refer to webaccess.advantech.com.

Distributed SCADA Architecture with Central Database Server

SCADA nodes run independent of any other node. Each SCADA node communicates to automation equipment using communication drivers supplied with Advantech WebAccess. The Project Node is a centralized database server of configuration data. A copy of the database and graphics of all SCADA nodes is kept on the Project Node. The historical data is also stored in the database in project node.

Open Data Connectivity

Advantech WebAccess exchanges online data with 3rd party software in real-time by supporting OPC UA/DA, DDE, Modbus and BACnet Server/Client. It supports SQL, Oracle, MySQL, and MS Access for offline data sharing.

Software Requirements

- **Operating System**   Windows XP (SCADA Node Only), Windows 7 SP1, Windows 8 Professional, Windows Server 2008 R2 or later
- **Hardware**   Intel Atom or Celeron. Dual Core processors or higher recommended
                         2GB RAM minimum, more recommended
                         30GB or more free disk space

WISE-4012

4-ch Universal Input and 2-ch Digital Output IoT Wireless I/O Module

1 Software and Industry Solutions
2 Industrial Server
3 Intelligent System
4 Intelligent HMI and Monitors
5 Automation Computers and Controllers
6 Industrial Communication
7 Remote I/O & Wireless Sensing Modules
8 Industrial I/O and Video Solutions

Features

- 4-ch universal input and 2-ch digital output
- 2.4GHz Wi-Fi reducing the wiring cost during big data acquisition
- Easily extend the existing network by adding APs, and share existing Ethernet software
- Configured by mobile devices directly without installing any software or Apps
- Zero data loss using the log function with RTC time stamp
- Data can be automatically pushed to Dropbox or computer
- Supports RESTful web API in JSON format for IoT integration

Introduction

The WISE-4000 series is an Ethernet-based wireless IoT device, integrated with IoT data acquisition, processing, and publishing functions. As well as various I/O types, the WISE-4000 series provides data pre-scaling, data logic, and data logger functions. These data can be accessed via mobile devices and be securley published to the cloud anytime from anywhere.

Features

IEEE 802.11 b/g/n 2.4GHz 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-4000 to be accessed via other Wi-Fi devices directly as an AP.

HTML5 Web Configuration Interface

All the configuration interfaces are applied in web service, and the web pages are based on HTML5, so users can configure the WISE-4000 without the limitation of OS/devices. You can use your mobile phone or tablet to directly configure the WISE-4000.

RESTful Web Service with Security Socket

As well as supporting Modbus/TCP, the WISE-4000 series also supports IoT communication protocol, RESTful web service. Data can be polled or even be pushed automatically from the WISE-4000 when the I/O status is changed. The I/O status can be retrieved over the web using JSON. The WISE-4000 also supports HTTPS which has security that can be used in a Wide Area Network (WAN).

Data Storage

The WISE-4000 can log up to 10,000 samples of data with a time stamp. The I/O data can be logged periodically, and also when the I/O status changes. Once the memory is full, users can choose to overwrite the old data to ring log or just stop the log function.

Cloud Storage

Data logger can push the data to file-based cloud services like Dropbox using pre-configured criteria. With RESTful API, the data can also been pushed to a private cloud server in the format of JSON. Users can setup their private cloud server using the provided RESTful API and their own platform.

Specifications

Universal Input

- **Channels**   4
- **Resolution**   16-bit
- **Sampling Rate**   Analog Input   10Hz (Total)
  Digital Input   2Hz (Per Channel)
- **Accuracy**   ±0.1% of FSR (Voltage)
  ±0.2% of FSR (Current)
- **Input Type and Range**
  Analog Input   ±150mV, ±500mV, ±1V, ±5V, ±10V,
  0~150mV, 0~500mV, 0~1V, 0~5V, 0~10V,
  0~20mA, 4~20mA, ±20mA
  Digital Input (Dry Contact)   0: Open, 1: Close
- **Input Impedance**   > 10M Ω (Voltage)
  120 Ω (External resistor for current)
- **Over Voltage Protection**   ±35 V_{DC}
- **Burn-out Detection**   Yes (4~20mA only)
- **Supports Data Scaling and Averaging**

Digital Output

- **Channels**   2
  (Open collector to 30 V, 400 mA max.
  for resistance load)
- **Isolation**   3,000 V_{rms}
- **Supports 5 kHz Pules Output**
- **Supports High-to-Low and Low-to-High Delay Output**

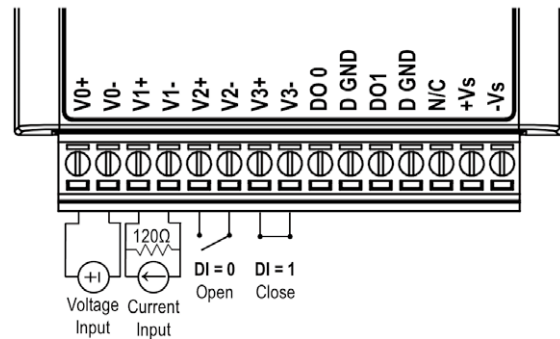## General

- **WLAN**   IEEE 802.11b/g/n 2.4GHz
- **Outdoor Range**   110 m with line of sight
- **Connectors**   Plug-in screw terminal block (I/O and power)
- **Watchdog Timer**   System (1.6 second) and
  Communication (programmable)
- **Certification**   CE, FCC, R&TTE, NCC, SRRC, RoHS, KC
- **Dimensions (W x H x D)**   80 x 148 x 25 mm
- **Enclosure**   PC
- **Mounting**   DIN 35 rail, wall, and stack
- **Power Input**   10 ~ 30 V_{DC}
- **Power Consumption**   2.5 W @ 24 V_{DC}
- **Power Reversal Protection**
- **Supports User Defined Modbus Address**
- **Supports Data Log Function**   Up to 10000 samples with RTC time stamp
- **Supported Protocols**   Modbus/TCP, TCP/IP, UDP, DHCP, and HTTP

- Supports RESTful Web API 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**   20 ~ 95% RH (non-condensing)
- **Storage Humidity**   0 ~ 95% RH (non-condensing)

Pin Assignment

Ordering Information

- **WISE-4012-AE**   4-ch Universal Input and 2-ch Digital Output IoT Wireless I/O Module

Selection Table

Model Name	Universal Input	Digital Input	Digital Output	Relay Output	RS-485
WISE-4012	4		2		
WISE-4050		4	4		
WISE-4051		8			1
WISE-4060		4		4	

Accessories

- **PWR-242-AE**   DIN-rail Power Supply (2.1A Output Current)
- **PWR-243-AE**   Panel Mount Power Supply (3A Output Current)
- **PWR-244-AE**   Panel Mount Power Supply (4.2A Output Current)

Dimensions

Unit: mm

Front View   Side View   Mounting Kit

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WISE-4050

4-ch Digital Input and 4-ch Digital Output IoT Wireless I/O Module

1 Software and Industry Solutions
2 Industrial Server
3 Intelligent System
4 Intelligent HMI and Monitors
5 Automation Computers and Controllers
6 Industrial Communication
7 Remote I/O & Wireless Sensing Modules
8 Industrial I/O and Video Solutions

Features

- 4-ch digital input and 4-ch digital output
- 2.4GHz Wi-Fi reducing the wiring cost during big data acquisition
- Easily extend the existing network by adding APs, and share existing Ethernet software
- Configured by mobile devices directly without installing any software or Apps
- Zero data loss using the log function with RTC time stamp
- Data can be automatically pushed to Dropbox or computer
- Supports RESTful web API in JSON format for IoT integration

Introduction

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Cloud Storage

Data logger can push the data to file-based cloud services like Dropbox using pre-configured criteria. With RESTful API, the data can also been pushed to a private cloud server in the format of JSON. Users can setup their private cloud server using the provided RESTful API and their own platform.

All product specifications are subject to change without notice.   ▲ Back to Top   Last updated: 31-Aug-2018

Specifications

Digital Input

- **Channels** — 4
- **Logic Level** — Dry Contact 0: Open
  1: Close to DI COM
  Wet Contact 0: 0 ~ 3 V_{DC}
  1: 10 ~ 30 V_{DC} (3 mA min.)
- **Isolation** — 3,000 V_{rms}
- **Supports 3 kHz Counter Input (32-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports 3 kHz Frequency Input**
- **Supports Inverted DI Status**

Digital Output

- **Channels** — 4
  (Open collector to 30 V, 400 mA max. for resistance load)
- **Isolation** — 3,000 V_{rms}
- **Supports 5 kHz Pules Output**
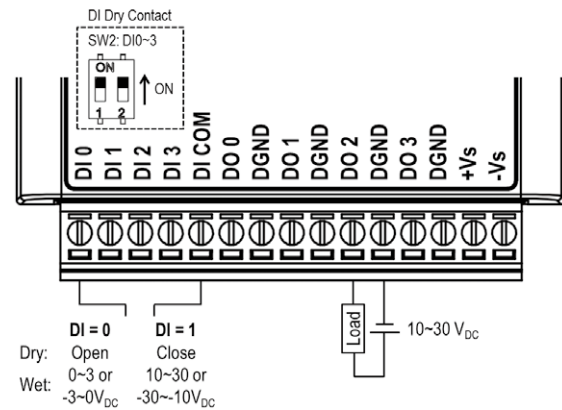- **Supports High-to-Low and Low-to-High Delay Output**

General

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- **Outdoor Range** — 110 m with line of sight
- **Connectors** — Plug-in screw terminal block (I/O and power)
- **Watchdog Timer** — System (1.6 second) and Communication (programmable)
- **Certification** — CE, FCC, R&TTE, NCC, SRRC, RoHS, KC, ANATEL
- **Dimensions (W x H x D)** — 80 x 148 x 25 mm
- **Enclosure** — PC
- **Mounting** — DIN 35 rail, wall, and stack
- **Power Input** — 10 ~ 30 V_{DC}
- **Power Consumption** — 2.2 W @ 24 V_{DC}
- **Power Reversal Protection**
- **Supports User Defined Modbus Address**
- **Supports Data Log Function** — Up to 10000 samples with RTC time stamp
- **Supported Protocols** — Modbus/TCP, TCP/IP, UDP, DHCP, and HTTP
- **Supports RESTful Web API 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** — 20 ~ 95% RH (non-condensing)
- **Storage Humidity** — 0 ~ 95% RH (non-condensing)

Pin Assignment

Ordering Information

- **WISE-4050-AE** — 4-ch Digital Input and 4-ch Digital Output IoT Wireless I/O Module

Selection Table

Model Name	Universal Input	Digital Input	Digital Output	Relay Output	RS-485
WISE-4012	4		2		
WISE-4050		4	4		
WISE-4051		8			1
WISE-4060		4		4	

Accessories

- **PWR-242-AE** — DIN-rail Power Supply (2.1A Output Current)
- **PWR-243-AE** — Panel Mount Power Supply (3A Output Current)
- **PWR-244-AE** — Panel Mount Power Supply (4.2A Output Current)

Dimensions

Unit: mm

Front View

Side View

Mounting Kit

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WISE-4060

4-ch Digital Input and 4-ch Relay Output IoT Wireless I/O Module

1 Software and Industry Solutions

2 Industrial Server

3 Intelligent System

4 Intelligent HMI and Monitors

5 Automation Computers and Controllers

6 Industrial Communication

7 Remote I/O & Wireless Sensing Modules

8 Industrial I/O and Video Solutions

Features

- 4-ch digital input and 4-ch relay output
- 2.4GHz Wi-Fi reducing the wiring cost during big data acquisition
- Easily extend the existing network by adding APs, and share existing Ethernet software
- Configured by mobile devices directly without installing any software or Apps
- Zero data loss using the log function with RTC time stamp
- Data can be automatically pushed to Dropbox or computer
- Supports RESTful web API in JSON format for IoT integration

CE FC R&TTE SRRC ANATEL IC TAIWAN EXCELLENCE 2016

Introduction

The WISE-4060 is an Ethernet-based wireless IoT device, integrated with IoT data acquisition, processing, and publishing functions. As well as various I/O types, the WISE-4060 provides data pre-scaling, data logic, and data logger functions. Data can be accessed via mobile devices and be securely published to the cloud anytime from anywhere.

Features

IEEE 802.11 b/g/n 2.4GHz 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-4000 to be accessed via other Wi-Fi devices directly as an AP.

HTML5 Web Configuration Interface

All the configuration interfaces are applied in web service, and the web pages are based on HTML5, so users can configure the WISE-4000 without the limitation of OS/devices. You can use your mobile phone or tablet to directly configure the WISE-4000.

RESTful Web Service with Security Socket

As well as supporting Modbus/TCP, the WISE-4060 series also supports IoT communication protocol, RESTful web service. Data can be polled or even be pushed automatically from the WISE-4060 when the I/O status is changed. The I/O status can be retrieved over the web using JSON. The WISE-4060 also supports HTTPS which has security that can be used in a Wide Area Network (WAN).

Data Storage

The WISE-4000 can log up to 10,000 samples of data with a time stamp. The I/O data can be logged periodically, and also when the I/O status changes. Once the memory is full, users can choose to overwrite the old data to ring log or just stop the log function.

Cloud Storage

Data logger can push the data to file-based cloud services like Dropbox using pre-configured criteria. With RESTful API, the data can also been pushed to a private cloud server in the format of JSON. Users can setup their private cloud server using the provided RESTful API and their own platform.

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Specifications

Digital Input

- **Channels**   4
- **Logic Level**   Dry Contact   0: Open
  1: Close to DI COM
  Wet Contact 0: 0 ~ 3 V_{DC}
  1: 10 ~ 30 V_{DC} (3 mA min.)
- **Isolation**   3,000 V_{rms}
- **Supports 3 kHz Counter Input (32-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports 3 kHz Frequency Input**
- **Supports Inverted DI Status**

Relay Output

- **Channels**   4 (Form A)
- **Contact Rating**   250 V_{AC} @ 5 A
  (Resistive Load)   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 V_{DC}
- **Maximum Switching**   60 operations/minute
- **Supports Pulse Output**
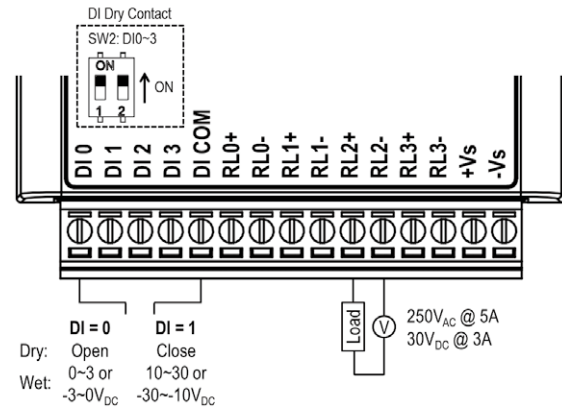- **Supports High-to-Low and Low-to-High Delay Output**

General

- **WLAN**   IEEE 802.11b/g/n 2.4GHz
- **Outdoor Range**   110 m with line of sight
- **Connectors**   Plug-in screw terminal block (I/O and power)
- **Watchdog Timer**   System (1.6 second) and
  Communication (programmable)
- **Certification**   CE, FCC, R&TTE, NCC, SRRC, RoHS, ANATEL
- **Dimensions (W x H x D)**   80 x 148 x 25 mm
- **Enclosure**   PC
- **Mounting**   DIN 35 rail, wall, and stack
- **Power Input**   10 ~ 30 V_{DC}
- **Power Consumption**   2.5 W @ 24 V_{DC}
- **Power Reversal Protection**
- **Supports User Defined Modbus Address**
- **Supports Data Log Function**   Up to 10000 samples with RTC time stamp
- **Supported Protocols**   Modbus/TCP, TCP/IP, UDP, DHCP, and HTTP
- **Supports RESTful Web API 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**   20 ~ 95% RH (non-condensing)
- **Storage Humidity**   0 ~ 95% RH (non-condensing)

Pin Assignment

Ordering Information

- **WISE-4060-AE**   4-ch Digital Input and 4-ch Relay Output IoT Wireless I/O Module

Selection Table

Model Name	Universal Input	Digital Input	Digital Output	Relay Output	RS-485
WISE-4012	4		2		
WISE-4050		4	4		
WISE-4051		8			1
WISE-4060		4		4	

Accessories

- **PWR-242-AE**   DIN-rail Power Supply (2.1A Output Current)
- **PWR-243-AE**   Panel Mount Power Supply (3A Output Current)
- **PWR-244-AE**   Panel Mount Power Supply (4.2A Output Current)

Dimensions

Unit: mm

Front View

Side View

Mounting Kit

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WISE-4051

8-ch Digital Input IoT Wireless I/O Module with RS-485 Port

Features

- 8-ch digital input with 1-port RS-485 for Modbus devices
- 2.4GHz Wi-Fi reducing the wiring cost during big data acquisition
- Easily extend the existing network by adding APs, and share existing Ethernet software
- Configured by mobile devices directly without installing any software or Apps
- Zero data loss using the log function with RTC time stamp
- Data can be automatically pushed to Dropbox or computer
- Supports RESTful web API in JSON format for IoT integration

CE FC R&TTE SRRC

Introduction

The WISE-4051 is an Ethernet-based wireless IoT device, integrated with IoT data acquisition, processing, and publishing functions. As well as various I/O types, the WISE-4051 provides data pre-scaling, data logic, and data logger functions. Data can be accessed via mobile devices and be securely published to the cloud anytime from anywhere.

Features

IEEE 802.11 b/g/n 2.4GHz 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-4000 to be accessed via other Wi-Fi devices directly as an AP.

Modbus/RTU to Web Service or Modbus/TCP

The RS-485 port of the WISE-4051 supports Modbus, which can be used to poll the data from Modbus/RTU devices, like ADAM-4000, or ADAM- 5000/485. Then you can access the data by Modbus or REST from the WISE-4051. The data can also be logged.

RESTful Web Service with Security Socket

As well as supporting Modbus/TCP, the WISE-4051 series also supports IoT communication protocol, RESTful web service. Data can be polled or even be pushed automatically from the WISE-4051 when the I/O status is changed. The I/O status can be retrieved over the web using JSON. The WISE-4051 also supports HTTPS which has security that can be used in a Wide Area Network (WAN).

Data Storage

The WISE-4000 can log up to 10,000 samples of data with a time stamp. The I/O data can be logged periodically, and also when the I/O status changes. Once the memory is full, users can choose to overwrite the old data to ring log or just stop the log function.

Cloud Storage

Data logger can push the data to file-based cloud services like Dropbox using pre-configured criteria. With RESTful API, the data can also been pushed to a private cloud server in the format of JSON. Users can setup their private cloud server using the provided RESTful API and their own platform.

Online Download www.advantech.com/products

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Specifications

Digital Input
- **Channels** — 8
- **Logic Level** — Dry Contact 0: Open
  1: Close to DCOM
  Wet Contact 0: 0 ~ 3 V_{DC}
  1: 10 ~ 30 V_{DC} (3 mA min.)
- **Isolation** — 3,000 V_{rms}
- **Supports 3 kHz Counter Input (32-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports 3 kHz Frequency Input**
- **Supports Inverted DI Status**

Serial Port
- **Port Number** — 1
- **Type** — RS-485
- **Serial Signal** — DATA+, DATA-
- **Data Bits** — 7, 8
- **Stop Bits** — 1, 2
- **Parity** — None, Odd, Even
- **Baud Rate** (bps) — 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
- **Protection** — 15 kV ESD
- **Protocol** — Modbus/RTU (Total 32 address by max. 8 instructions)

General
- **WLAN** — IEEE 802.11b/g/n 2.4GHz
- **Outdoor Range** — 110 m with line of sight
- **Connectors** — Plug-in screw terminal block (I/O and power)
- **Watchdog Timer** — System (1.6 second) and Communication (programmable)
- **Certification** — CE, FCC, R&TTE, NCC, SRRC, RoHS
- **Dimensions (W x H x D)** — 80 x 148 x 25 mm
- **Enclosure** — PC
- **Mounting** — DIN 35 rail, wall, and stack
- **Power Input** — 10 ~ 30 V_{DC}
- **Power Consumption** — 2.2 W @ 24 V_{DC}
- **Power Reversal Protection**
- **Supports User Defined Modbus Address**
- **Supports Data Log Function** — Up to 10000 samples with RTC time stamp
- **Supported Protocols** — Modbus/TCP, TCP/IP, UDP, DHCP, and HTTP
- **Supports RESTful Web API 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** — 20 ~ 95% RH (non-condensing)
- **Storage Humidity** — 0 ~ 95% RH (non-condensing)

Pin Assignment

Ordering Information
- **WISE-4051-AE** — 8-ch Digital Input IoT Wireless I/O Module with RS-485 Port

Selection Table

Model Name	Universal Input	Digital Input	Digital Output	Relay Output	RS-485
WISE-4012	4		2		
WISE-4050		4	4		
WISE-4051		8			1
WISE-4060		4		4	

Accessories
- **PWR-242-AE** — DIN-rail Power Supply (2.1A Output Current)
- **PWR-243-AE** — Panel Mount Power Supply (3A Output Current)
- **PWR-244-AE** — Panel Mount Power Supply (4.2A Output Current)

Dimensions

Unit: mm

Front View   Side View   Mounting Kit

IoT Ethernet I/O Modules

1 Software and Industry Solutions

2 Industrial Server

3 Intelligent System

4 Intelligent HMI and Monitors

5 Automation Computers and Controllers

6 Industrial Communication

7 Remote I/O & Wireless Sensing Modules

8 Industrial I/O and Video Solutions

Model Name		WISE-4010/LAN	WISE-4050/LAN	WISE-4060/LAN
Description		4-ch current input + 4-ch digital output IoT Ethernet I/O module	4-ch digital input + 4-ch digital output IoT Ethernet I/O module	4-ch digital input + 4-ch relay output IoT Ethernet I/O module
Analog I/O	Channels	4	-	-
	Resolution	12-bit	-	-
	Accurancy	±0.2% of FSR	-	-
	Sampling Rate	10/100 Hz per channel	-	-
	Current Input	0 ~ 20, 4 ~ 20 mA	-	-
Digital I/O	Input Channels	-	4	4
	Output Channels	4	4	4 (from a power relay)
	Counter Input	-	3 kHz	3 kHz
	Frequency Input	-	3 kHz	3 kHz
	Pules Output	1 kHz	1 kHz	1 kHz
Isolation Protection		-	3,000 V_{rms}	3,000 V_{rms}
LED Indicators		Status, Comm		
Power Requirement		10 ~ 30 V_{DC} (24 V_{DC} Standard)		
Power Consumption		1.2 W @ 24 V_{DC}	2.2 W @ 24 V_{DC}	2.5 W @ 24 V_{DC}
Operating Temperature		-40 ~ 70°C (-40~158°F)		
Storage Temperature		-40 ~ 85°C (-40~185°F)		
Operating Humidity		20 ~ 95% RH (non-condensing)		
Storage Humidity		0 ~ 95% RH (non-condensing)		

WISE-4000/LAN Series

IoT Ethernet I/O Module

Features

- IEEE 802.3u 10/100Base-T(X)
- Industrial grade operating temperature -40~70°C
- Supported Protocols: Modbus/TCP, TCP/IP, UDP, DHCP, HTTP
- Supports RESTful web API in JSON format
- Supports local logging with RTC time stamp
- Supports mobile device web configuration in HTML5
- Supports 10~30V_{DC} power with reverse protection

Introduction

The WISE-4000/LAN series is a newly designed IoT Ethernet I/O module which supports new RESTful web API for IoT applications. A HTML5 web configured interface enables users to configure WISE modules without the limitation of a platform or operating system. The built-in data logger function logs data with time information. Wide operating temperatures enable the WISE series to be implemented in more IoT data acquisition applications. As well as these functions, the new mechanical design allows users to install the module and perform diagnostics easier than before.

Specifications

Current Input

- **Channel** WISE-4010/LAN: 4 (differential)
- **Resolution** 12-bit
- **Sampling Rate** 10/100 Hz/channel
- **Accuracy** ±0.2% of FSR @ 25°C
- **Input Range** 0~20 mA, 4~20 mA
- **Input Impedance** 120 Ω
- **Burn-out Detection** Yes (4~20 mA only)
- **Supports Data Scaling and Averaging**

Digital Input

- **Channels** WISE-4050/LAN: 4
  WISE-4060/LAN: 4
- **Logic level:** Dry Contact 0: Open
  1: Close to DI COM
  Wet Contact 0: 0 ~ 3 V_{DC}
  1: 10 ~ 30 V_{DC} (3 mA min.)
- **Isolation** 3,000 V_{rms}
- **Supports 32-bit Counter Input Function (Maximum frequency 3kHz)**
- **Keep/Discard Counter Value when Power-off**
- **Supports Frequency Input Function (Maximum frequency 3 kHz)**
- **Supports Inverted DI Status**

Digital Output

- **Channels** WISE-4010/LAN: 4
  WISE-4050/LAN: 4
  (Open collector to 30 V, 500 mA max. for resistance load)
- **Isolation** 3,000 V_{rms} (WISE-4050/LAN only)
- **Supports 1 kHz Pulse Output**
- **Supports High-to-Low and Low-to-High Delay Output**

Relay Output

- **Channels** WISE-4060/LAN: 4 (Form A)
- **Contact Rating** 250 V_{AC} @ 5 A
  (Resistive Load) 30 V_{DC} @ 3 A
- **Isolation** (b/t coil & contact) 3,000 V_{rms}
- **Relay On Time** 10 ms
- **Relay Off Time** 5 ms
- **Insulation Resistance** 1 GΩ min. @ 500 V_{DC}
- **Maximum Switching** 60 operations/minute
- **Supports Pulse Output**
- **Supports High-to-Low and Low-to-High Delay Output**

Environment

- **Operating Temperature** -40 ~ 70°C (-40~158°F)
- **Storage Temperature** -40 ~ 85°C (-40~185°F)
- **Operating Humidity** 20 ~ 95% RH (non-condensing)
- **Storage Humidity** 0 ~ 95% RH (non-condensing)

General

- **LAN** IEEE 802.3u 10/100Base-T(X)
- **Connectors** Plug-in screw terminal block (I/O and power)
- **Watchdog Timer** System (1.6 second) and Communication (programmable)
- **Certification** CE, FCC, RoHS
- **Dimensions (W x H x D)** 80 x 98 x 25 mm
- **Enclosure** PC
- **Mounting** DIN 35 rail, wall, and stack
- **Power Input** 10 ~ 30 V_{DC}
- **Power Consumption** WISE-4010/LAN: 1.2 W @ 24 V_{DC}
  WISE-4050/LAN: 2.2 W @ 24 V_{DC}
  WISE-4060/LAN: 2.5 W @ 24 V_{DC}
- **Power Reversal Protection**
- **Supports Data Log Function** Up to 10000 samples with time stamp
- **Supports User Defined Modbus Address**
- **Supported Protocols** Modbus/TCP, TCP/IP, UDP, DHCP, and HTTP
- **Supports RESTful Web API in JSON format**
- **Supports Web Server in HTML5 with JavaScript & CSS3**
- **Supports System Configuration Backup and User Access Control**

Ordering Information

- **WISE-4010/LAN** 4-ch Current Input and 4-ch Digital Output IoT Ethernet I/O Module
- **WISE-4050/LAN** 4-ch Digital Input and 4-ch Digital Output IoT Ethernet I/O Module
- **WISE-4060/LAN** 4-ch Digital Input and 4-ch Relay Output IoT Ethernet I/O Module

Selection Table

Model Name	Current Input	Digital Input	Digital Output	Relay Output
WISE-4010/LAN	4		4	
WISE-4050/LAN		4	4	
WISE-4060/LAN		4		4

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ADVANTECH **Wireless IoT Sensing Devices**

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IoT Wireless Sensor Nodes

Wireless		Wi-Fi			LoRa	
Model Name		WISE-4220-S231	WISE-4220-S214	WISE-4220-S215	WISE-4610-S672	WISE-4610-S614
Description		Wireless IoT WSN with Temperature/Humidity Sensors	Wireless IoT WSN with 4-ch AI and 4-ch DI	Wireless IoT WSN with 4-ch RTD	LoRa WSN with 2 Serial Port & 6-ch DI	LoRa WSN with 4-ch AI and 4-ch DI
Wireless Interface	Function	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node
	IEEE Standard	IEEE 802.11b/g/n			IEEE 802.15.4g LoRa Modulation	
	Frequency Band	2.4GHz			NA915, EU868, JP925, CN470	
	Mode / Topology	Infrastructure, Limited AP			Star	
	Outdoor Range	110m (L.O.S.)			5000m (L.O.S.)	
	GNSS	-			GPS/GLONASS/BeiDou	
Network	Interface	WLAN			Micro-B USB	
	Protocol	Modbus/TCP, REST, MQTT, Azure			-	-
Analog / Sensor Input	Channel	Built-in Sensors	4-ch	4-ch	-	4-ch
	Input Type	Temperature, Humiidty	V, A	2, 3-wire Pt RTD	-	V, A
	Input Range	-25 ~ 70°C 0 ~ 90% RH	0~10V, 0~20mA, 4~20mA	Pt-100: -200~200°C Pt-1000: -40~160°C	-	0~10V, 0~20mA, 4~20mA
Digital Input / Output	Channel	-	4-ch Dry Contact DI	-	6-ch Dry Contact DI	4-ch Dry Contact DI
Serial Port	Port Number	-	-	-	1-port RS-485 1-port RS-232/485	-
Power Input	Battery Power	-			Solar Rechargeable Battery	
	External Power	10 ~ 50 V$_{DC}$			10 ~ 50 V$_{DC}$	

Wireless		Cellular				
Model Name		WISE-4470-S250	WISE-4470-S414	WISE-4470-S472	WISE-4670-S672	WISE-4670-S614
Description		3G WSN with 1-port RS-485 and DIO	IP65 3G WSN with 4-ch AI	IP65 3G WSN with 2 Serial Port	Outdoor 3G WSN with 2 Serial Port & 6-ch DI	Outdoor 3G WSN with 4-ch AI and 4-ch DI
Wireless Interface	Function	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node
	IEEE Standard	GSM/GPRS/HSPA			GSM/GPRS/HSPA	
	Frequency Band	UMTS/HSPA: 1/8 (900/2100MHz) GSM/GPRS/EDGE: 2/3/5/8(1900/1800/850/900MHz)			UMTS/HSPA: 1/8(2100/900MHz) GSM/GPRS/EDGE: 2/3/5/8(1900/1800/850/900MHz)	
	Outdoor Range	-			-	
	GNSS	-			GPS/GLONASS/BeiDou	
Network	Configuration	Micro-B USB			Micro-B USB	
	Protocol	REST, MQTT, Azure			REST, MQTT, Azure	
Analog / Sensor Input	Channel	-	4-ch	-	-	4-ch
	Input Type	-	V, A	-	-	V, A
	Input Range	-	0~10V, 0~20mA, 4~20mA	-	-	0~10V, 0~20mA, 4~20mA
Digital Input / Output	Channel	6-ch Dry Contact DI 2-ch Sink-type DO	-	-	6-ch Dry Contact DI	4-ch Dry Contact DI
Serial Port	Port Number	1-port RS-485 for Modbus/RTU	-	1-port RS-485 1-port RS-232/485	1-port RS-485 1-port RS-232/485	-
Power Input	Battery Power	-			Solar Rechargeable Battery	
	External Power	10 ~ 50 V$_{DC}$			10 ~ 50 V$_{DC}$	

IoT Wireless Sensor Nodes

Wireless		LPWAN				
Model Name		WISE-4210-AP	WISE-4210-S231	WISE-4210-S251	WISE-4210-S214	WISE-4210-S215
Description		LPWAN Wireless to Ethernet AP	LPWAN WSN with Temperature/Humidity Sensors	LPWAN WSN with 1-port RS-485 and 6-ch DI	LPWAN WSN with 4-ch AI and 4-ch DI	LPWAN WSN with 4-ch RTD
Wireless Interface	Function	Wireless Access Point	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node
	IEEE Standard	IEEE 802.15.4g FSK/GFSK Modulation				
	Frequency Band	433, 868, or 923 MHz				
	Topology	Star				
	Outdoor Range	2000m (L.O.S.)				
Network	Configuration	RJ-45	Micro-B USB			
	Protocol	Modbus/TCP, REST, MQTT, Azure	-	-	-	-
Analog / Sensor Input	Channel	-	Built-in Sensors	-	4-ch	4-ch
	Input Type	-	Temperature, Humiidty	-	V, A	2, 3-wire Pt RTD
	Input Range	-	-25°C ~ 70°C 0 ~ 90% RH	-	0~10V, 0~20mA, 4~20mA	Pt-100: -200~200°C Pt-1000: -40~160°C
Digital Input / Output	Channel	-	-	6-ch Dry Contact DI	4-ch Dry Contact DI	-
Serial Port	Port Number	-	-	1-port RS-485 for Modbus/RTU	-	-
Power Input	Battery Power	-	3 x AA, 3.6V V_{DC} Lithium Battery			
	External Power	10 ~ 50 V_{DC}	10 ~ 50 V_{DC}			

Wireless		eMTC / NB-IoT				LPWAN
Model Name		WISE-4471-S250	WISE-4471-S214	WISE-4671-S672	WISE-4671-S614	PCM-24S1S1
Description		eMTC/NB-IoT WSN with 1-port RS-485 and DIO	eMTC/NB-IoT WSN with 4-ch AI and 4-ch DI	Ourdoor eMTC/NB-IoT WSN with 2 Serial Port	Ourdoor eMTC/NB-IoT WSN with 4-AI & 4-DI	LPWAN Wireless iDoor AP
Wireless Interface	Function	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node	Wireless Access Point
	IEEE Standard	R13 LTE Cat M1 / NB1				IEEE 802.15.4g
	Frequency Band	2, 3, 4, 5, 8, 12, 13, 20, 28				433, 868, or 923 MHz
	Topology					Star
	Outdoor Range	-				2000m (L.O.S.)
	GPS	-		Option		
Network	Interface	Micro-B USB	Micro-B USB	Micro-B USB	Micro-B USB	mPCIE
	Protocol	UDP, CoAP REST, MQTT	UDP, CoAP REST, MQTT	UDP, CoAP REST, MQTT	UDP, CoAP REST, MQTT	Modbus/TCP, REST, MQTT
Analog / Sensor Input	Channel	-	4-ch	-	4-ch	-
	Input Type	-	V, A	-	V, A	-
	Input Range	-	0~10V, 0~20mA, 4~20mA	-	0~10V, 0~20mA, 4~20mA	-
Digital Input / Output	Channel	6-ch Dry Contact DI 2-ch Sink-type DO	4-ch Dry Contact DI	6-ch Dry Contact DI	4-ch Dry Contact DI	-
Serial Port	Port Number	1-port RS-485 for Modbus/RTU	-	1-port RS-485 1-port RS-232/485	-	-
Power Input	Battery Power	-	Solar Rechargeable Battery			-
	External Power	10 ~ 50 V_{DC}				-

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WISE-4220-S231

Wi-Fi IoT WSN with Temperature and Humidity Sensors

NEW

SRRC

Features

- Built-in temperature and humidity sensors
- 2.4GHz Wi-Fi reducing the wiring cost during big data acquisition
- Easily extend the existing network by adding APs, and share existing Ethernet software
- Configured by mobile devices directly without installing any software or Apps
- Zero data loss using the log function with RTC time stamp
- Data can be automatically pushed to Dropbox or computer
- Supports RESTful web API in JSON format for IoT integration

Introduction

The WISE-4220 series is an Ethernet-based wireless IoT device, integrated with IoT data acquisition, processing, and publishing functions. As well as various I/O and sensor types, the WISE-4220 series provides data pre-scaling, data logic, and data logger functions. These data can be accessed via mobile devices and be published to the cloud with security at anytime and anywhere.

Features

IEEE 802.11 b/g/n 2.4GHz 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-4220 to be accessed via other Wi-Fi devices directly as an AP.

HTML5 Web Configuration Interface

All the configuration interfaces are applied in web service, and the web pages are based on HTML5, so users can configure the WISE-4220 without the limitation of OS/devices. You can use your mobile phone or tablet to directly configure the WISE-4220.

RESTful Web Service with Security Socket

As well as supporting Modbus/TCP, the WISE-4220 series also supports IoT communication protocol, RESTful web service. Data can be polled or even be pushed automatically from the WISE-4220 when the I/O status is changed. The I/O status can be retrieved by internet media types like JSON. The WISE-4220 also supports HTTPS which has security that can be used in a Wide Area Network (WAN).

Wi-Fi WPA2 Encryption
HTTPS Secure Socket
HTTPS
User Authorized and White List

Data Storage

The WISE-4220 can log up to 10,000 samples of data with a time stamp. The I/O data can be logged periodically, and also when the I/O status changes. Once the memory is full, users can choose to overwrite the old data to ring log or just stop the log function.

10,000 Samples

Cloud Storage

Data logger can push the data to file-based cloud services like Dropbox using pre-configured criteria. With RESTful API, the data can also been pushed to a private cloud server in the format of JSON. Users can setup their private cloud server using the provided RESTful API and their own platform.

File-based Public Cloud
batch / push
Private Cloud

1 Software and Industry Solutions
2 Industrial Server
3 Intelligent System
4 Intelligent HMI and Monitors
5 Automation Computers and Controllers
6 Industrial Communication
7 Remote I/O & Wireless Sensing Modules
8 Industrial I/O and Video Solutions

Specifications

Temperature Sensor

- **Operating Range** -25°C ~ 70°C (-13°F ~ 157.9°F)
- **Resolution** 0.1 (°C/°F/K)
- **Accuracy** ±1.0°C (±1.8°F) (vertical installation)

Humidity Sensor

- **Operating Range** 10 ~ 90% RH
- **Resolution** 0.1% RH
- **Accuracy** ±4% for 0%~50% RH
  ±6% for 50%~60% RH
  ±10% for 60%~90% RH

General

- **WLAN** IEEE 802.11b/g/n 2.4GHz
- **Outdoor Range** 150m with line of sight
- **Connectors** Plug-in screw terminal block (power)
- **Watchdog Timer** System (1.6 second) and Communication (programmable)
- **Certification** CE, FCC, IC, RED, NCC, SRRC, RCM, VCCI, TELEC (CC3200 listed antenna)
- **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** 1.2 W @ 24 V_{DC}
- **Power Reversal Protection**
- **Supports User Defined Modbus Address**
- **Supports Data Log Function** Up to 10000 samples with RTC time stamp
- **Supported Protocols** Modbus/TCP, TCP/IP, UDP, DHCP, and HTTP
- **Supports RESTful Web API 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** 20 ~ 95% RH (non-condensing)
- **Storage Humidity** 0 ~ 95% RH (non-condensing)

Pin Assignment
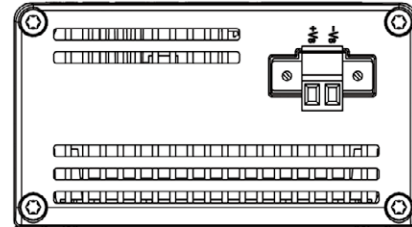
Ordering Information

- **WISE-4220-S231A** IoT WSN with Temperature and Humidity Sensors

Selection Table

Model Name	Analog Input	Digital Input	Digital Output	Relay Output	RS-485	Built-in Sensor
WISE-4012	4		2			
WISE-4050		4	4			
WISE-4051		8			1	
WISE-4060		4		4		
WISE-4220-S231						Temp. & Humidity

Accessories

- **PWR-242-AE** DIN-rail Power Supply (2.1A Output Current)
- **PWR-243-AE** Panel Mount Power Supply (3A Output Current)
- **PWR-244-AE** Panel Mount Power Supply (4.2A Output Current)

Dimensions

Unit: mm

Front View   Side View   Mounting Kit
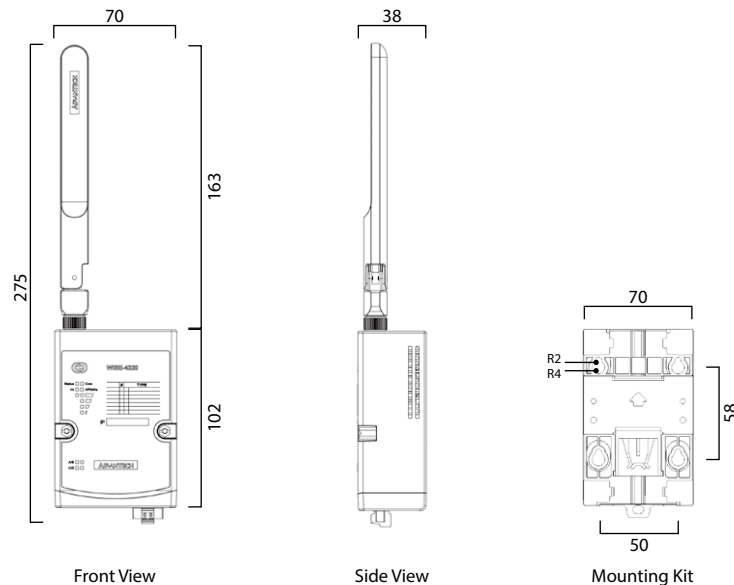
WISE-4210

LPWAN IoT Wireless Sensor Node

Preliminary

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

1 Software and Industry Solutions
2 Industrial Server
3 Intelligent System
4 Intelligent HMI and Monitors
5 Automation Computers and Controllers
6 Industrial Communication
7 Remote I/O & Wireless Sensing Modules
8 Industrial I/O and Video Solutions

Common Specification

Wireless Communication
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
	433MHz (433.05~434.55), BW: 300kHz
Data Rate	625bps, 50kbps
Outdoor Range	625bps: 5 km with line of sight (with 2 dBi antenna)
	50kbps: 2 km with line of sight (with 2 dBi antenna)
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
	50kbps: 5 years with 1 minute update rate
Configuration Interface	AP: LAN port
	Sensor Node: Micro-B USB
LED Indicator	Status, Error, Tx, Rx, Battery/Signal Level
Mounting	DIN 35 rail, wall, and stack
Dimension (W x H x D)	70 x 102 x 38 mm

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

WISE-4210-AP

General
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, SNTP, DHCP
Transport Protocol	TCP, UDP
Supports RESTful Web API in JSON format	
Supports Web Server in HTML5	

WISE-4210-S231

Temperature Sensor
Operating Range	-25°C ~ 70°C (-13°F ~ 157.9°F)
Resolution	0.1 (°C/°F/K)
Accuracy	±1.0°C (±1.8°F) (vertical installation)

Humidity Sensor
Operating Range	10 ~ 90% RH
Resolution	0.1% RH
Accuracy	±4% for 0%~50% RH
	±6% for 50%~60% RH
	±10% for 60%~90% RH

WISE-4210-S214

Analog Input
Channels	4
Resolution	16-bit
Input Range	±5V, ±10V, 0~5V, 0~10V, 0~20mA, 4~20mA, ±20mA

Digital Input
Channels	4 (Dry Contact)

WISE-4210-S251

Digital Input
Channels	6 (Dry Contact)

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 (Total 32 address by max. 8 instructions)

WISE-4210-S215 (Preliminary)

RTD Input
Channels	4
Input Type	2, 3-wire Pt RTD or digital input
Temperature Range	Pt-100: -200 ~ 200°C
	Pt-1000: -40 ~ 160°C
Accuracy	±0.1% or better

Ordering Information

Wireless Access Point
WISE-4210-APNA*	LPWAN Wireless to Ethernet AP – AS923/EU868
WISE-4210-APUA	LPWAN Wireless to Ethernet AP – UN433

Wireless Sensor Node
WISE-4210-S231NA*	LPWAN WSN with Temp/RH Sensors – AS923/EU868
WISE-4210-S251NA*	LPWAN WSN with 6DI and RS-485 – AS923/EU868
WISE-4210-S214NA*	LPWAN WSN with 4AI and 4DI – AS923/EU868
WISE-4210-S215NA*	LPWAN WSN with 4-ch RTD – AS923/EU868
WISE-4210-S231UA	LPWAN WSN with Temp/RH Sensors – UN433
WISE-4210-S251UA	LPWAN WSN with 6DI and RS-485 – UN433
WISE-4210-S214UA	LPWAN WSN with 4AI and 4DI – UN433
WISE-4210-S215UA	LPWAN WSN with 4-ch RTD – UN433

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

* AS923/EU868 version of WISE-4210 need to order antenna separately

WISE-4470

3G IP65 IoT Wireless Sensor Node

Preliminary

Features

- Application-ready I/O combination with optional IP65 I/O
- Global coverage of 3G frequency bands from 800 to 2100MHz
- Supports multiple cellular technologies including GSM, GPRS & HSPA
- Fast and easy deployment to reduce operation cost
- Supports RESTful web API in JSON format for IoT integration
- Data buffered function with RTC reducing data lost

Common Specification

Wireless Communication

- **3GPP Standards**   GSM/GPRS/HSPA
- **Frequency Band**
  GSM/GPRS/EDGE: 850, 900, 1800, 1900MHz
  UMTS/HSPA: 900, 2100MHz
- **Antenna Type**   Internal

General

- **Power Input** $10{\sim}50V_{DC}$ external power
- **Configuration Interface** Micro-B USB
- **Connector**
  WISE-4470-S2xx: Plug-in screw terminal block (I/O and power)
  WISE-4470-S4xx: M12 4-pin code-A male x 1 (Power)
                              M12 8-pin code-D female x 1 (I/O)
- **LED Indicator**   Status, Error, Tx, Rx, Signal Level
- **Mounting**   DIN 35 rail, wall, pole, and stack
- **Dimension (W x H x D)**   69 x 112 x 38 mm

Environment

- **Operating Temperature**   -25 ~ 70°C
- **Storage Temperature**   -40 ~ 85°C
- **Operating Humidity**   20 ~ 95% RH
- **Storage Humidity**   0 ~ 95% RH

WISE-4470-S250

Digital Input

- **Channels**   6 (Dry Contact)
- **Supports 3kHz Frequency Input**

Digital Output

- **Channels**   2

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
                              (Total 32 addresses by 8 max. instructions)

WISE-4470-S214/S414

Analog Input

- **Channels**   S214: 4
                              S414: 4
- **Resolution**   16-bit
- **Input Range**   ±5V, ±10V, 0~5V, 0~10V, 0~20mA, 4~20mA, ±20mA

Digital Input

- **Channels**   S214: 4 (Dry Contact)
- **Supports 3kHz Frequency Input**

WISE-4470-S215

RTD Input

- **Channels**   4
- **Input Type**   2, 3-wire Pt RTD or digital input
- **Temperature Range**   Pt-100: -200~200°C
                              Pt-1000: -40~160°C
- **Accuracy**   ±0.1% or better

WISE-4470-S472

Serial Port

- **Port Number**   2
- **Type**   Port1: RS-485
                              Port2: RS-485/RS-232
- **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 addresses by 8 max. instructions)

Ordering Information

Wireless Sensor Node

- **WISE-4470-S250CA**   3G IoT WSN with 6DI, 2DO, and RS-485
- **WISE-4470-S214CA**   3G IoT WSN with 4AI and 4DI
- **WISE-4470-S215CA**   3G IoT WSN with 4-ch RTD
- **WISE-4470-S414CA**   3G IP65 IoT WSN with 4-ch Analog Input
- **WISE-4470-S472CA**   3G IP65 IoT WSN with 2 serial ports

ADVANTECH **Wireless IoT Sensing Devices**

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WISE-4471

NB-IoT / eMTC IoT Wireless Sensor Node

Preliminary

Features

- Global coverage of NB-IoT and eMTC frequency bands
- Application-ready I/O combination with optional IP65 I/O
- Wide voltage power input with 10~50V$_{DC}$
- Data buffered function with RTC reducing data lost
- Fast and easy deployment to reduce operation cost
- Supports direct cloud service for IoT integration
- Support MQTT and CoAP protocols

Common Specification

Wireless Communication

- **3GPP Standards**   R13 LTE Cat M1 / NB1
- **Frequency Band**   1, 2, 3, 4, 5, 8, 12, 13, 17, 18, 19, 20, 25, 26, 28 (and band 39 in M1-only)
- **Antenna Type**   Internal

General

- **Power Input**   10~50V$_{DC}$ external power
- **Configuration Interface** Micro-B USB
- **Connector**
  WISE-4471-S2xx: Plug-in screw terminal block (I/O and power)
  WISE-4471-S4xx: M12 4-pin code-A male x 1 (Power)
                        M12 8-pin code-D female x 1 (I/O)
- **LED Indicator**   Status, Error, Tx, Rx, Signal Level
- **Mounting**   DIN 35 rail, wall, pole, and stack
- **Dimension (W x H x D)**   69 x 112 x 38 mm

Environment

- **Operating Temperature** -20 ~ 65°C
- **Storage Temperature**   -40 ~ 85°C
- **Operating Humidity**   20 ~ 95% RH
- **Storage Humidity**   0 ~ 95% RH

WISE-4471-S250

Digital Input

- **Channels**   6 (Dry Contact)
- **Supports 3kHz Frequency Input**

Digital Output

- **Channels**   2

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 (Total 32 addresses by 8 max. instructions)

WISE-4471-S214/S414

Analog Input

- **Channels**   S214: 4
                             S414: 4
- **Resolution**   16-bit
- **Input Range**   ±5V, ±10V, 0~5V, 0~10V, 0~20mA, 4~20mA, ±20mA

Digital Iutput

- **Channels**   S214: 4
- **Supports 3kHz Frequency Input**

WISE-4471-S215

RTD Input

- **Channels**   4
- **Input Type**   2, 3-wire Pt RTD or digital input
- **Temperature Range**   Pt-100: -200~200°C
                             Pt-1000: -40~160°C
- **Accuracy**   ±0.1% or better

WISE-4471-S472

Serial Port

- **Port Number**   2
- **Type**   Port1: RS-485
                             Port2: RS-485/RS-232
- **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 addresses by 8 max. instructions)

Ordering Information

Wireless Sensor Node

- **WISE-4471-S250UA**   NB-IoT/eMTC IoT WSN with 6DI, 2DO, and RS-485
- **WISE-4471-S214UA**   NB-IoT/eMTC IoT WSN with 4AI and 4DI
- **WISE-4471-S215UA**   NB-IoT/eMTC IoT WSN with 4-ch RTD
- **WISE-4471-S414UA**   NB-IoT/eMTC IP65 IoT WSN with 4-ch Analog Input
- **WISE-4471-S472UA**   NB-IoT/eMTC IP65 IoT WSN with 2 serial ports

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WISE-4610

LoRa Outdoor Wireless Sensor Node

Preliminary

Features

- For North America, Europe, Japan, and China
- 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 IP65 housing
- Powered by solar rechargeable battery or 10~50V$_{DC}$ input
- Global Positioning System (GPS) support

Common Specification

Wireless Communication

IEEE Standard	IEEE 802.15.4g
Frequency Band	868.1~896.5MHz for Europe (Proprietary LoRa)
	903.0~927.5MHz for North America (Proprietary LoRa)
	920.6~923.4MHz for Japan (Proprietary LoRa)
	470.3~509.7MHz for China (Proprietary LoRa)
Spreading Factor	7~12
Outdoor Range	5km with line of sight (with 2 dBi Antenna)
Transmit Power	Up to +18dBm
Receiver Sensitivity	Up to -136dBm at SF = 12 / 125KHz
Data Rate	50 kbps at FSK mode EU868
	21.9 kbps at SF7 mode US915
	5.47 kbps at SF7 mode JP923
Topology	Star
Function	End Node

GPS[1]

GNSS Systems	GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1I
Update Rates	Single GNSS: up to 18 Hz
	2 Concurrent GNSS: up to 10 Hz
SBAS (L1 C/A)	WAAS, EGNOS, MSAS, GAGAN
Accuracy	Position: 2.5 m CEP (50% confidence)
	With SBAS: 2.0 m CEP (50% confidence)
Acquisition Time	Cold starts: 26 s

General

Power Input	Built-in 4000mA Lithium rechargeable battery pack[2]
	or 10~50V$_{DC}$ external power
Battery Life	6 months (1 hour data update and 1 day GPS update)
Configuration Interface	Micro-B USB
Connector	Power: M12 4-pin code-A male x 1
	I/O: M12 8-pin code-D female x 2
LED Indicator	Status, Error, Tx, Rx, Battery/Signal Level
Mounting	DIN 35 rail, wall, pole, and stack
Dimension (W x H x D)	82 x 122 x 49 mm (without antenna)

Environment

Operating Temperature[2]	0~60°C
	No Battery Version: -20~70°C
Operating Humidity	5~95% RH

[1] No GPS version, can be order by request
[2] No battery version, can be order by request

WISE-4610-S672

Serial Port

Port Number	2
Type	Port 1: RS-485
	Port 2: RS-485/232
Serial Signal	RS-485: DATA+, DATA-
	RS-232: Tx, Rx, GND
Data Bits	7, 8
Stop Bits	1, 2
Parity	None, Odd, Even
Baud Rate (bps)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Protection	15 kV ESD
Protocol	Modbus/RTU (Total 8 address)

Digital Input

Channels	6
Input Type	Dry Contact (Wet Contact by request)
Logic Level	0: Open
	1: Close to DCOM
Isolation Voltage	3,000V$_{rms}$
Supports 200Hz Counter Input (16-bit + 1-bit overflow)	
Keep/Discard Counter Value when Power-off	
Supports 200Hz Frequency Input	
Supports Inverted DI Status	

WISE-4610-S614

Analog Input

Channels	4
Resolution	16-bit
Sampling Rate	1Hz per channel
Accuracy	±0.1% of FSR (Voltage)
	±0.2% of FSR (Current)
Input Range	±5V, ±10V, 0~5V, 0~10V, 0~20mA, 4~20mA, ±20mA
Input Impedance	> 2M Ω (Voltage)
	120 Ω (External resistor for current)
Isolation Voltage	3000V$_{rms}$
Over Voltage Protection	±35 V$_{DC}$
Burn-out Detection	Yes (4~20mA only)
Supports Data Scaling and Averaging	

Digital Input

Channels	4
Input Type	Dry Contact (Wet Contact by request)
Logic Level	0: Open
	1: Close to DCOM
Isolation Voltage	3,000V$_{rms}$
Supports 200Hz Counter Input (16-bit + 1-bit overflow)	
Keep/Discard Counter Value when Power-off	
Supports 200Hz Frequency Input	
Supports Inverted DI Status	

Ordering Information

Wireless Sensor Node

WISE-4610-S672NA	LoRa Outdoor WSN with 6DI & 2COM - NA915
WISE-4610-S672EA	LoRa Outdoor WSN with 6DI & 2COM - EU868
WISE-4610-S672JA	LoRa Outdoor WSN with 6DI & 2COM - JP923
WISE-4610-S672CA	LoRa Outdoor WSN with 6DI & 2COM - CN470
WISE-4610-S614NA	LoRa Outdoor WSN with 4AI & 4DI - NA915
WISE-4610-S614EA	LoRa Outdoor WSN with 4AI & 4DI - EU868
WISE-4610-S614JA	LoRa Outdoor WSN with 4AI & 4DI - JP923
WISE-4610-S614CA	LoRa Outdoor WSN with 4AI & 4DI - CN470

Private LoRa Network Gateway

WISE-3610ILS-51A1N	Private LoRa Network IoT Gateway - NA915
WISE-3610ILS-51A1E	Private LoRa Network IoT Gateway - EU868
WISE-3610ILS-51A1J	Private LoRa Network IoT Gateway - JP923
WISE-3610ILS-51A1C	Private LoRa Network IoT Gateway - CN470

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WISE-4670

3G IoT Outdoor Wireless Sensor Node

Preliminary

Features

- Global coverage of frequency bands from 800 to 2100MHz
- Multiple cellular technologies including UMTS, HSPA, GSM & GPRS
- Application-ready I/O combination with IP65 housing
- Global Positioning System (GPS) support
- Fast and easy deployment to reduce operation cost
- Supports RESTful web API in JSON format for IoT integration
- Data buffered function with RTC reducing data lost

Common Specification

Wireless Communication

- **3GPP Standards**   GSM/GPRS/HSPA
- **Frequency Band**   GSM/GPRS/EDGE: 850, 900, 1800, 1900MHz
                         UMTS/HSPA: 900, 2100MHz
- **Transmit Power**   Up to +32dBm
- **Antenna Type**   External

GPS[1]

- **Support System**   GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1L
- **Update Rates**   Single GNSS: up to 18 Hz
                         2 Concurrent GNSS: up to 10 Hz
- **SBAS (L1 C/A)**   WAAS, EGNOS, MSAS, GAGAN
- **Accuracy**   Position: 2.5 m CEP (50% confidence)
                         With SBAS: 2.0 m CEP (50% confidence)
- **Acquisition Time**   Cold starts: 26 s

General

- **Power Input**   Built-in 4000mA Lithium rechargeable battery pack[2]
                         or 10~50V_DC external power
- **Configuration Interface** Micro-B USB
- **Connector**   Power: M12 4-pin code-A male x 1
                         I/O: M12 8-pin code-D female x 2
- **LED Indicator**   Status, Error, Tx, Rx, Battery/Signal Level
- **Mounting**   DIN 35 rail, wall, pole, and stack
- **Dimension (W x H x D)** 82 x 122 x 49 mm

Environment

- **Operating Temperature[2]**   0 ~ 60°C
                                 No Battery Version: -20 ~ 70°C
- **Operating Humidity**   5~95% RH

[1] No GPS version can be order by request
[2] No Battery version can be order by request

WISE-4670-S672

Serial Port

- **Port Number**   2
- **Type**   Port 1: RS-485
                         Port 2: RS-485/232
- **Serial Signal**   RS-485: DATA+, DATA-
                         RS-232: Tx, Rx, GND
- **Data Bits**   7, 8
- **Stop Bits**   1, 2
- **Parity**   None, Odd, Even
- **Baud Rate (bps)**   1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
- **Protection**   15 kV ESD
- **Protocol**   Modbus/RTU (total 8 address)

Digital Input

- **Channels**   6
- **Input Type**   Dry Contact (Wet Contact by request)
- **Logic Level**   0: Open
                         1: Close to DCOM
- **Supports 200Hz Counter Input (16-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports 200Hz Frequency Input**
- **Supports Inverted DI Status**

WISE-4670-S614

Analog Input

- **Channels**   4
- **Resolution**   16-bit
- **Sampling Rate**   1Hz per channel
- **Accuracy**   ±0.1% of FSR (Voltage)
                         ±0.2% of FSR (Current)
- **Input Range**   ±5V, ±10V, 0~5V, 0~10V, 0~20mA, 4~20mA, ±20mA
- **Input Impedance**   > 2M Ω (Voltage)
                         120 Ω (External resistor for current)
- **Isolation Voltage** 3000V_rms
- **Burn-out Detection** Yes (4~20mA only)
- **Supports Data Scaling and Averaging**

Digital Input

- **Channels**   4
- **Input Type**   Dry Contact (Wet Contact by request)
- **Logic Level**   0: Open
                         1: Close to DCOM
- **Supports 200Hz Counter Input (16-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports 200Hz Frequency Input**
- **Supports Inverted DI Status**

Ordering Information

Wireless Sensor Node (with GPS & Battery)

- **WISE-4670-S672CA**   3G Outdoor IoT WSN with 6DI & 2COM
- **WISE-4670-S614CA**   3G Outdoor IoT WSN with 4AI & 4DI

All product specifications are subject to change without notice.   ▲ Back to Top   Last updated: 31-Aug-2018

WISE-4671

NB-IoT / eMTC
Outdoor IoT Wireless Sensor Node

Preliminary

Features

- Global coverage of NB-IoT and eMTC
- Application-ready I/O combination with IP65 housing
- Powered by solar rechargeable battery or 10~50V$_{DC}$ input
- Global Positioning System (GPS) support
- Data buffered function with RTC reducing data lost
- Support MQTT and CoAP protocols

Common Specification

Wireless Communication
- **3GPP Standard**   Rel.13 LTE Cat. NB1/Cat. M1
- **Frequency Band**   1, 2, 3, 4, 5, 8, 12, 13, 17, 18, 19, 20, 25, 26, 28 (and band 39 in M1-only)
- **Antenna Type**   External

GPS[1]
- **Support System**   GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1L
- **Update Rates**   Single GNSS: up to 18 Hz
                           2 Concurrent GNSS: up to 10 Hz
- **SBAS (L1 C/A)**   WAAS, EGNOS, MSAS, GAGAN
- **Accuracy**   Position: 2.5 m CEP (50% confidence)
                           With SBAS: 2.0 m CEP (50% confidence)
- **Acquisition Time**   Cold starts: 26 s

General
- **Power Input**   Built-in 4000mA Lithium rechargeable battery pack[2] or 10~50V$_{DC}$ external power
- **Battery Life[2]**   6 months (1 hour data update and 1 day GPS update)
- **Configuration Interface** Micro-B USB
- **Connector**   Power: M12 4-pin code-A male x 1
                           I/O: M12 8-pin code-D female x 2
- **LED Indicator**   Status, Error, Tx, Rx, Battery/Signal Level
- **Mounting**   DIN 35 rail, wall, pole, and stack
- **Dimension (W x H x D)** 82 x 122 x 49 mm

Environment
- **Operating Temperature[2]** 0~60°C
                                No Battery Version: -20~65°C
- **Operating Humidity**   5~95% RH

[1] No GPS version, can be order by request
[2] No battery version, can be order by request

WISE-4671-S672

Serial Port
- **Port Number**   2
- **Type**   Port 1: RS-485
                           Port 2: RS-485/232
- **Serial Signal**   RS-485: DATA+, DATA-
                           RS-232: Tx, Rx, GND
- **Data Bits**   7, 8
- **Stop Bits**   1, 2
- **Parity**   None, Odd, Even
- **Baud Rate (bps)**   1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
- **Protection**   15 kV ESD
- **Protocol**   Modbus/RTU (Total 8 address)

Digital Input
- **Channels**   6
- **Input Type**   Dry Contact (Wet Contact by request)
- **Logic Level**   0: Open
                           1: Close to DCOM
- **Supports 100Hz Counter Input (16-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports 100Hz Frequency Input**
- **Supports Inverted DI Status**

WISE-4671-S614

Analog Input
- **Channels**   4
- **Resolution**   16-bit
- **Sampling Rate**   1Hz per channel
- **Accuracy**   ±0.1% of FSR (Voltage)
                           ±0.2% of FSR (Current)
- **Input Range**   ±5V, ±10V, 0~5V, 0~10V, 0~20mA, 4~20mA, ±20mA
- **Input Impedance**   > 2M Ω (Voltage)
                           120 Ω (External resistor for current)
- **Isolation Voltage**   3000Vrms
- **Burn-out Detection**   Yes (4~20mA only)
- **Supports Data Scaling and Averaging**

Digital Input
- **Channels**   4
- **Input Type**   Dry Contact (Wet Contact by request)
- **Logic Level**   0: Open
                           1: Close to DCOM
- **Supports 100Hz Counter Input (16-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports 100Hz Frequency Input**
- **Supports Inverted DI Status**

Ordering Information

Wireless Sensor Node
- **WISE-4671-S672UA**   NB-IoT/eMTC Outdoor Wireless Sensor Node with 6-ch DI & 2-port RS-485
- **WISE-4671-S614UA**   NB-IoT/eMTC Outdoor Wireless Sensor Node with 4-ch DI & 4-ch AI

ADVANTECH   **Wireless IoT Sensing Devices**

All product specifications are subject to change without notice.

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Last updated: 31-Aug-2018

IoT Wireless Sensor Devices

Preliminary   Preliminary

Model Name		WISE-2210	WISE-2834
Description		3-ch CT input self-powered wireless sensor node	4-ch digital I/O Ethernet/Wi-Fi intelligent RFID gateway
Wireless Interface	Function	Wireless sensor device	RFID sensor
	Communication Standard	IEEE 802.15.4g	IEEE 802.15.4g and EPC Global Class 1 Gen 2
	Frequency Band	868, 923 MHz	860 ~ 928 MHz
	Outdoor Range	1000m (L.O.S.)	10m (L.O.S.)
	Topology	Star	-
	Security	WPA2 Personal and Enterprise of AP	WPA2 Personal and Enterprise
	Antenna Connector	Reverse SMA	RFID: Reverse TNC WiFI: Reverse SMA
CT Input	Channel	3-ch	-
	Input Type	V	-
	Voltage Range	1 ~ 5 V	-
	Current Range	200 mA (max.)	-
	Resolution	12-bit	-
	Sampling Rate	10 Hz (total)	-
	Accuracy	Voltage: ±1% of FSR	-
Digital Input	Channel	-	2-ch dry contact 2-ch wet contact
	Counter Input	-	3 kHz
	Frequency Input	-	0.1 ~ 3 kHz
	Isolation	-	2,000 V_{rms}
Digital Output	Channel	-	4-ch (sink-type)
	Output Rating (Resistive Load)	-	Open collector to 50 V, 400 mA max.
	Pulse Output	-	5 kHz
	Isolation	-	2,000 V_{rms}
Serial Port	Port Number	-	1
	Type	-	RS-485
General	LED Indicators	COM, USB	Status, communication, network mode, signal quality
	Real-Time Clock	-	✓
	Connectors	I/O: Plug-in screw terminal block Power: Micro USB	Terminal block (I/O and RS485)
	Dimensions	71 x 72.7 x 29.8 mm (W x H x D)	190 x 120 x 30.2 mm (W x H x D)
Environment	Operating Temperature	-25 ~ 70°C (-13 ~ 158°F)	-25 ~ 70°C (-13 ~ 158°F)
	Storage Temperature	-40 ~ 85°C (-40 ~ 185°F)	-40 ~ 85°C (-40 ~ 185°F)
	Operating Humidity	20 ~ 95% RH (non-condensing)	20 ~ 95% RH (non-condensing)
	Storage Humidity	0 ~ 95% RH (non-condensing)	0 ~ 95% RH (non-condensing)
Power	Input Range	Micro USB: 5 V_{DC} CT: 1 ~ 5 V_{DC}	10 ~ 30 V_{DC}
	Protection	-	Power reversal protection
	Power Consumption	0.1 mW @ 3.3 V_{DC}	5 W @ 24 V_{DC}

WISE-2210

LPWAN Self-Powered Wireless Sensor Node

Preliminary

Features

- Wireless and self-powered design reduce installation cost
- Energy harvesting from sensors or photovoltaic panel
- Proprietary LPWAN with using sub-1GHz wireless frequency
- Longer communication range than 2.4GHz
- Better penetration through concrete and steel than 2.4GHz
- Less interference than 2.4GHz spectrum
- RESTful Web API supported by access point (AP)

Common Specification

Wireless Communication

- **IEEE Standard**   IEEE 802.15.4g
- **Frequency Band**   923MHz (920.60~924.60), BW: 400kHz
  868MHz (865.00~869.00), BW: 400kHz
- **Data Rate**   2.5kbps
- **Outdoor Range**   2000m with line of sight (with external antenna)
  100m with line of sight (with internal antenna)
- **Configuration Interface**   AP: LAN Port
  Sensor Node: Micro-B USB
- **Topology**   Star
- **Network Capacity**   1 AP for 64 Nodes

Environment

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

CT Sensor Node

General

- **Power Input**   USB: 5V$_{DC}$
  CT: 1~5V$_{DC}$
- **Recharge Time**   1V: 10mins @ 1k ohm
  5V: 5s @ 1k ohm
- **LED Indicator**   Comm, USB
- **Mounting DIN**   35 rail, wall, pole and stack
- **Connector**   3 Channel CT Input
- **Dimension(W x H x D)**   71 x 72 x 30 mm
  77 x 72 x 41 mm (with photovoltaic panel)

Temperature and Humidity Sensors

Temperature Sensor

- **Operating Range**   -25°C ~ 70°C (-4°F ~ 157.9°F)
- **Resolution**   0.1 (°C/°F/K)
- **Accuracy**   ±1.0°C (±1.8°F) (vertical installation)

Humidity Sensor

- **Operating Range**   10 ~ 90% RH
- **Resolution**   0.1% RH
- **Accuracy**   ±4% RH @ 0~50% RH
  ±6% RH @ 50~60% RH
  ±10% RH @ 60~90% RH

Photovoltaic Panel Specification

- **Peak Power**   378uW
- **Peak Voltage**   0.925V
- **Peak Current**   408uA
- **Panel Daily Provide Power:**

Lux	mW
300	0.23
500	0.40
1,000	0.81
1,500	1.49
3,000	2.13
6,000	2.94
10,000	3.75

Wireless Access Point

- **Power Input**   10 ~ 50 V$_{DC}$
- **Ethernet**   RJ-45 (for configuration and data query)
- **RS-485**   Data+, Data- (for query node data)
- **Mounting**   DIN 35 rail, wall, and pole
- **Messaging Protocol**   Modbus/RTU, Modbus/TCP, REST
- **Dimension (W x H x D)**   70 x 102 x 38 mm

Ordering Information

Wireless Access Point

- **WISE-4210-APNA***   LPWAN IoT Wireless to Ethernet AP - AS923/EU868

Wireless Sensor Node

- **WISE-2210A-CNA***   LPWAN Self-Powered Sensor Node for CT - AS923/EU868
- **WISE-2210A-THPNA***   LPWAN Self-Powered Sensor Node with Temperature & Humidity sensor and Photovoltaic Panel - AS923/EU868
- **WISE-2210-CNA**   LPWAN Self-Powered Sensor Node for CT with internal antenna - AS923
- **WISE-2210-THPA**   LPWAN Self-Powered Sensor Node with Temperature & Humidity sensor, Photovoltaic Panel and internal antenna - AS923

Accessories

- **1750008836-01**   863-870MHz Dipole Antenna for EU868
- **1750008837-01**   902-928MHz Dipole Antenna for AS923

* External antenna need to order separately

WISE-2834

Intelligent RFID Gateway

Preliminary

Features

- Intelligent RFID Gateway
- Support Ethernet and WiFi data communication
- Intelligent NodeRed function reducing coding effort
- Data read, filter, transfer could be configured automatically
- Linux operation system and provide web dashboard for RFID setting
- Data log function and cloud connectivity
- Flexible mounting methods suitable for different environment

Common Specification

General

- **RFID Standard**   EPC Global Class 1 Gen. 2 (ISO18000-6C)
- **Frequency Band**   FCC 902-928 MHz (American)
                              ETSI 865.6-867.6 MHz (EU)
                              NCC 922-928 MHz (Taiwan)
- **RFID Power Output**   Available to adjust from +10 ~ +31.5dBm
- **Max Receive Sensitivity** -82dBm
- **Antenna Number**   4 port antennas
- **Antenna Connector**   4 RP-TNC

System Hardware

- **Power Input** $10\sim30V_{DC}$
- **Dimension**   190x120x30.2 mm
- **CPU**   ARM Cotex-A8, 400MHz
- **Storage**   NAND Flash 512MB for system
- **Memory**   DDR3L 512MB
- **SD Slot**   1 x Micro SD card
- **Mounting**   DIN 35 rail, Wall, and Pole
- **Watch Dog Timer** System & Power Monitor
- **Real Time Clock** Time Accuracy to Second
- **Programming**   Node-RED, Linux OS

Environment

- **Operating Temperature** -25°C~70°C
- **Operating Humidity**   20~95% RH
- **Storage Temperature**   -40°C~ 85°C
- **Storage Humidity**   0~95% RH
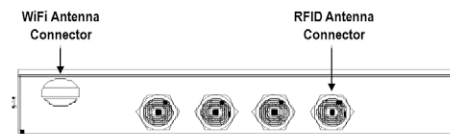
I/O Interface

- **Ethernet**   1 x 10/100 Based-T RJ-45
- **Serial Port**   1 x RS-232/RS485: 50 ~ 115.2 kbps
- **USB Port**   1 x USB2.0 High Speed (Up to 480Mbps)
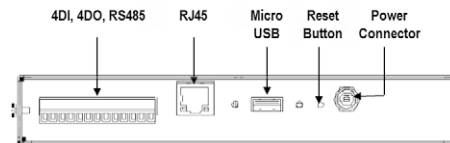- **Digital Input** 4 Dry/Wet Contact
- **Digital Output** 4 Sink Type

Wireless Communication

- **Interface** 1 x Mini-PCIE (Half-Size)
- **Type**   WiFi

TOP I/O View

Bottom I/O View

Side I/O View
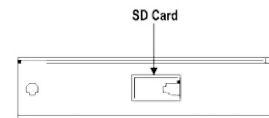
Ordering Information

Wireless Access Point

- **WISE-2834-A**   Ethernet intelligent RFID gateway

Optional Accessories

- **96PD-RYUW131**   Half-size mini card, supports 802.11bgn
- **96PSA-A60W12W6**   ADP A/D 100-240V 60W 12V C14 LOCKABLE DC PLUG
- **1700000596-11**   Power Cable China Plug 1.8M
- **1702002600**   Power Cable US Plug 1.8M
- **1702002605**   Power Cable EU Plug 1.8M
- **1702031802**   Power Cable UK Plug 1.8M

ADAM-6000 and ADAM-6200 Series

Intelligent Ethernet I/O Modules

Transition and Vision for Remote DAQ Devices

IT and network infrastructure have become established technologies. In the future, there are will be many potentially key elements such as artificial intelligence, energy-efficiency, cloud computing, cyber-security, and mobile communication technologies being progressively leveraged in automation markets. We believe that these will also contribute to ideal remote data acquisition devices in IoT world.

To fulfill the transition requirements and future applications, Advantech has developed the ADAM-6000/6200 series of Ethernet I/O modules, comprising analog I/O, digital I/O, and relay modules. ADAM-6000/6200 series modules possess a multitude of advanced features that can cope with changes in hardware design and user expectations regarding useful software functions for applications in the field. With a new design and strong capabilities, ADAM-6000/6200 series modules can provide a well-integrated I/O solution for Ethernet control systems.

Major Functionality Comparison

		ADAM-6000	ADAM-6200
Daisy-chain with auto-bypass		-	✓
GCL		✓	✓
Peer-to-peer		✓	✓
Web server (HTML5)		✓	✓
Configuration backup		✓	✓
Access control		✓	✓
Protocol Support	Modbus/TCP	✓	✓
	MQTT	✓	✓
	SNMP	✓	✓
	RESTful	✓	✓

Flexible Deployment with Daisy Chain Networking and Auto-Bypass Protection

ADAM-6200 modules have built-in Ethernet switches to allow daisy chain connections in an Ethernet network, making it easier to deploy, saving on wiring costs, and helping to improve scalability. The two Ethernet ports are fully compliant with IEEE 802.3u 10/100 Mbps via standard RJ-45 connectors.

Although the daisy chain topology brings cost-saving benefits for users, it still comes with the risk that once any device in the chain suffers a power outage, it will cause the disconnection of all devices data stream.

Auto-Bypass Protection

To prevent this critical issue from happening, Advantech has refined the hardware design of ADAM-6200 modules so that they can rapidly recover the network connection within approximately 2.5 s, thereby greatly minimizing any potential damage.

Remote Monitoring and Control with Smart Portable Devices

At the early stage of automation, it was difficult to access or obtain online equipment data when conducting on-site inspections. Mostly, the only possible way to do this was by communicating with engineers on the factory floor or in a central control room where the SCADA program was running. With these factors considered, on-site inspections and debugging were invariably arduous tasks that took considerable effort to complete.

Overcoming this, the ADAM-6200 series of modules integrates HTML5, allowing users to remotely monitor the status of all online modules without bridging a SCADA system. These modules also allow users to perform basic I/O configuration on any built-in HMI device such as a smartphone or digital pad via the Internet. Moreover, users can further develop extended applications based on the default HTML5 file embedded in the module.

With its enhanced syntax structure and integration of rich web technologies such as CSS and JavaScript, the now widely used markup language HTML5 has enhanced the design of web content. This is particularly beneficial for ADAM module users because it allows them to implement more web services and APIs and to develop more interactive applications for configuring and monitoring their hardware.
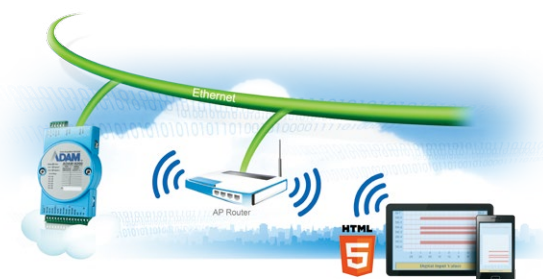
# ADAM-6000 GCL is the Simplest Logic Ethernet I/O

▪ **What is GCL?**

Graphic Condition Logic (GCL) gives controllability to Ethernet I/O modules. Users can define control logic rules using the graphic configuration environment in ADAM series modules and download defined logic rules to ADAM-6000/6200 Ethernet I/O modules. The modules will then execute the logic rules automatically, just like a standalone controller. For each Ethernet I/O module, 16 logic rules can be defined. In the configuration environment of Adasm/Apax .NET Utility, four graphic icons show the four stages of one logic rule, referring to the input, logic, execution, and output stages (refer to the image below). Users can simply click on each icon and a dialog window will appear to configure each stage. After completing all configurations, users can simply click a button to download the defined logic rules to their module.
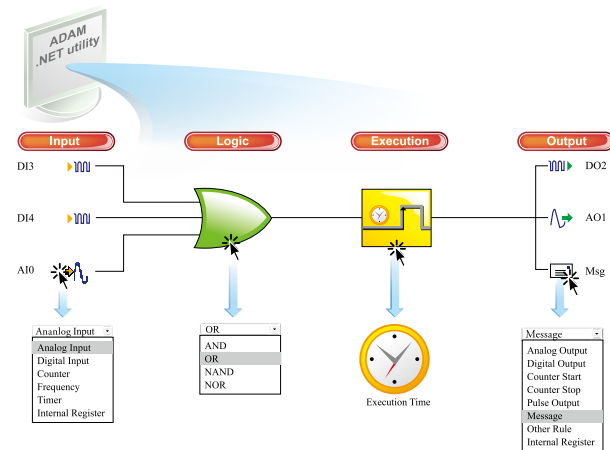
▪ **Supports Both Local and Remote Output**

When users define the destination of the output stage (e.g., digital output, analog output, counter, and pulse output), the target module can be set as either the local module or another remote module, thus giving the ability to develop complex logic rules.

Local Output   Remote Output
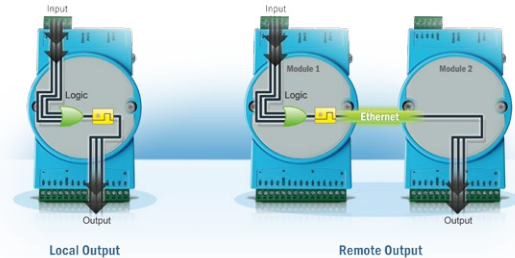
▪ **Fast Execution Time**

Advantech GCL features the shortest logic rule execution time on the market. When a local output is selected (i.e., the input and output channels are on the same module), the processing time (including an hardware input delay time, logic rule, execution time, and hardware output delay time) is <1 ms. When a remote output is selected (i.e., the input and output channels are on different modules), the total processing time (including processing and communication time) is <3 ms.

▪ **Sending Messages**

In GCL, you can define customized message. When the specified conditions are met, the message, module IP, and I/O status will be sent to the PC or device you define.

What Benefits Do Peer-to-Peer Modules Provide?

What is Peer-to-Peer?

Unlike client /server mode, peer-to-peer mode enabled modules to actively update their input channel status to a specific output channel. For this, a pair of modules is used: one input module and one output module. Users can define the mapping between them and the input value of one module will be transferred to the output channel of the other module.

No Controller Required

For Ethernet I/O modules without peer-to-peer functionality, a controller is needed to read data from the input module and then send the data to the output module. With peer-to-peer solutions, the controller can be removed since data will be automatically transferred. This not only simplifies the process but also helps save on system hardware costs.

No Programming Required

To utilize peer-to-peer modules, the only thing required is to configure the settings using Adam/Apax .NET Utility. Because no additional programming effort is needed, this greatly reduces system development time.

Fast Response Time

Advantech peer-to-peer modules offer the best execution times on the market; specifically, the execution time to transfer data from input to output is <1.2 ms.

Advanced Security

When peer-to-peer modules are employed, it is critical that they not be controlled by unauthorized computers or devices. ADAM-6000 series peer-to-peer modules allow users to decide which IP or MAC address has control authority. This can make ensure that output modules are controlled only by their paired input modules.

Simple and Flexible System Wiring

Long-distance wiring can introduce difficulties into any project. For some automation applications, if the PLC and the sensors are far away, a remote I/O module needs to be located near the sensors and a proprietary communication network needs to connect the PLC and the remote I/O module. However, with this setup, communication will be severely limited. Moreover, networks provided by PLC manufacturers are rarely open networks. Peer-to-peer modules can replace limited and closed networks with no limitations since they leverage the most open and flexible Ethernet networks.
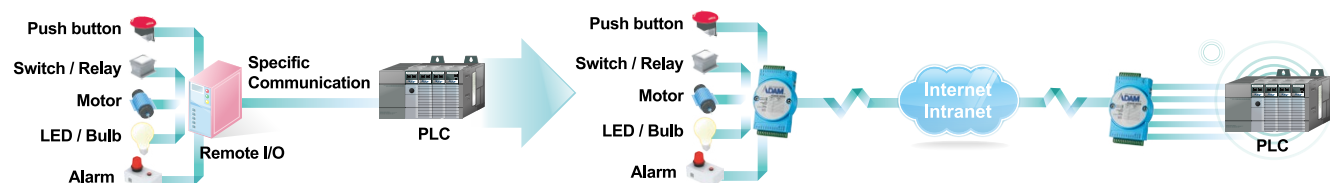
ADAM-6100 Series
EtherNet/IP and Profinet I/O Modules
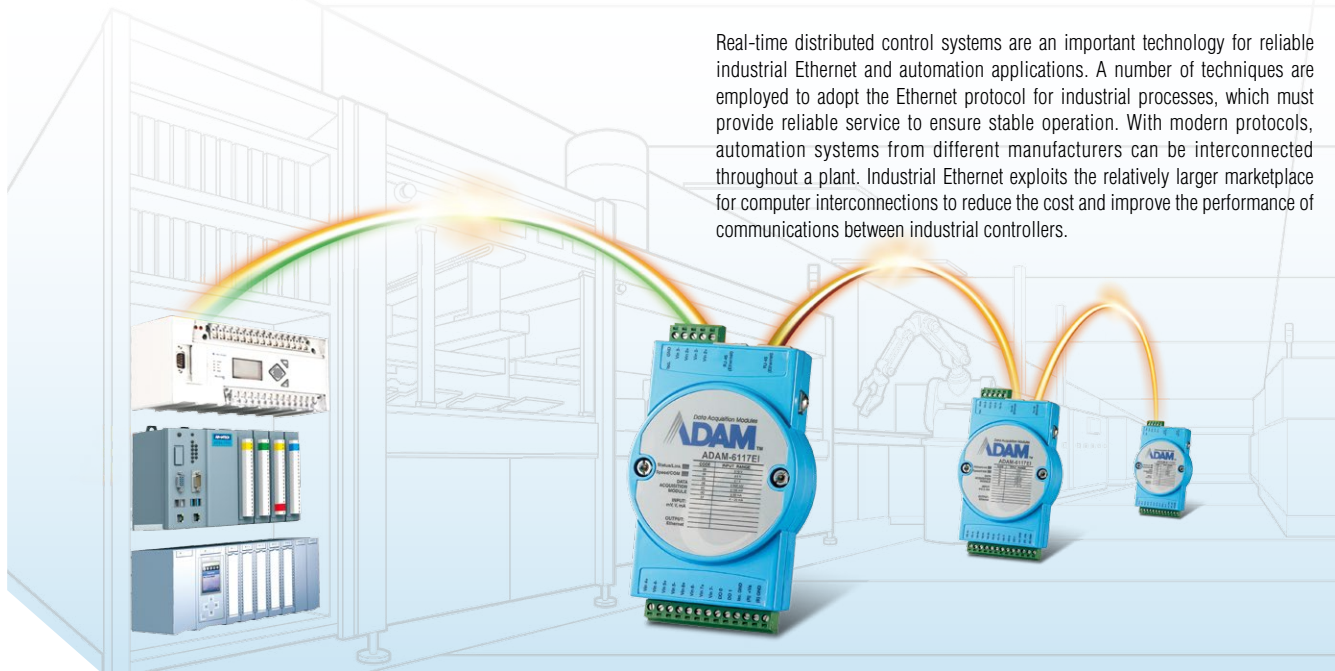
Real-time distributed control systems are an important technology for reliable industrial Ethernet and automation applications. A number of techniques are employed to adopt the Ethernet protocol for industrial processes, which must provide reliable service to ensure stable operation. With modern protocols, automation systems from different manufacturers can be interconnected throughout a plant. Industrial Ethernet exploits the relatively larger marketplace for computer interconnections to reduce the cost and improve the performance of communications between industrial controllers.

Real-Time Systems

A real-time system is one in which the correctness of a result depends not only on precise calculations but also on accurate timing. In computing, "real time" refers to a time frame that is very brief, to the point that it is virtually instantaneous. When a computer processes data in real time, it reads and handles data as it is received, producing results without any delay. A non-real-time computer process does not have a deadline. Such processes can be considered non-real-time—even if fast results are the preferred outcome. A real-time system, on the other hand, is expected to respond not just quickly, but also within a predictable period of time. In automation control systems, real-time technology provides multiple advantages, such as improved safety, quality, and efficiency. To build a real-time distributed control system, it is critical to establish reliable real-time communication among the controllers; accordingly, there is now increasing interest in the use of Ethernet protocols as the link-layer protocol, such as EtherNet/IP, PROFINET, EtherCAT, Ethernet PowerLink, SERCOS III.

EtherNet/IP

EtherNet/IP was developed in the late 1990s by Rockwell Automation for use in process control and other industrial automation applications, ensuring multi-vendor system interoperability. EtherNet/IP is a lot like standard office Ethernet, using the same TCP/IP messaging but with a new application layer added where data are arranged. This is known as object-orientated organization, which allows ordinary office Ethernet to become a markedly more versatile system. Today, EtherNet/IP is commonly used in industrial automation applications such as water processing, manufacturing, and utilities.

Profinet

PROFINET, the standard for industrial networking in automation, connects devices, systems, and cells to facilitate manufacturing that is faster, safer, less costly, and of higher quality. As it is fully compatible with office Ethernet, it can be easily integrated with existing systems and equipment while bringing enhanced features such as real-time performance and control as well as monitoring functions. Additionally, PROFINET features highly scalable architectures, remote access and maintenance of field devices over the network, and lower production/quality data monitoring costs.

Feature Highlights

Daisy Chain Connections

ADAM-6100 modules have two built-in Ethernet switches to allow daisy chain connections in an Ethernet network, making it easier to deploy while improving scalability and resistance against interference commonly found in factory settings.

Ethernet-Based Configuration Tool

Adam/Apax .NET Utility comes bundled with each ADAM-6100 module. With this utility, users can configure, set, and test ADAM-6100 modules via Ethernet.
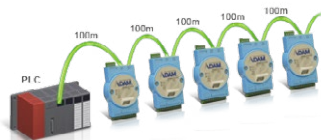
2,500 V_{DC} Isolation Protection

With triple isolation, including power supply, I/O, and Ethernet communication, ADAM-6100 series modules ensure that I/O data are controlled correctly while preventing devices from breaking down.

Multiple Mounting Options

Advantech provides various mounting methods to fit the varying needs of different projects in the field. ADAM-6100 series modules support DIN rail mounting, wall mounting, and piggybacking.

ADAM-6000 Series Selection Guide

1 Software and Industry Solutions

2 Industrial Server

3 Intelligent System

4 Intelligent HMI and Monitors

5 Automation Computers and Controllers

6 Industrial Communication

7 Remote I/O & Wireless Sensing Modules

8 Industrial I/O and Video Solutions

Spec.	Model	ADAM-6015	ADAM-6017	ADAM-6018	ADAM-6022	ADAM-6024
	Interface	10/100 Mbps Ethernet				
	Peer-to-Peer[1]		✓		-	Receiver Only[2]
	GCL[1]		✓		-	Receiver Only[2]
	Resolution	16 bit			16-bit for analog inputs 12-bit for analog outputs	16-bit for analog inputs 12-bit for analog outputs
Analog Input	Channels	7	8	8	6	6
	Sampling Rate	10 Hz				
	Voltage Input	-	±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V, 0 ~ 150 mV, 0 ~ 500 mV, 0 ~ 1 V, 0 ~ 5 V, 0 ~ 10 V	-	±10 V	±10 V
	Current Input	-	0 ~ 20, 4 ~ 20, ±20 mA	-	0 ~ 20, 4 ~ 20 mA	0 ~ 20, 4 ~ 20 mA
	Direct Sensor Input	Pt, Balco, and Ni RTD	-	J, K, T, E, R, S, B thermocouple	-	-
	Burnout Detection	✓	✓ (4 ~ 20mA only)	✓	-	-
	Math. Functions	Max. Min. Avg.	Max. Min. Avg.	Max. Min. Avg.	-	-
Analog Output	Channels	-	-	-	2	2
	Current Output	-	-	-	0 ~ 20, 4 ~ 20 mA @ 15 V$_{DC}$	0 ~ 20, 4 ~ 20 mA @ 15 V$_{DC}$
	Voltage Output	- -	-	-	0 ~ 10 V$_{DC}$ @ 30 mA	0 ~ 10 V$_{DC}$ @ 30 mA
Digital I/O	Input Channels	-	-	-	2	2
	Output Channels	-	2 (sink)	8 (sink)	2 (sink)	2 (sink)
	Extra Counter Channels	-	-	-	-	-
	Counter Input	-	-	-	-	-
	Frequency Input	-	-	-	-	-
	Pulse Output	-	-	-	-	-
	High/Low Alarm Settings	✓	✓	✓	-	-
	Isolation Protection	2,000 V$_{DC}$			2,000 V$_{DC}$[3]	2,000 V$_{DC}$[3]
	Remark	-	-	-	Built-in dual loop PID control algorithm	-

Spec.	Model	ADAM-6050	ADAM-6051	ADAM-6052	ADAM-6060	ADAM-6066
	Interface	10/100 Mbps Ethernet				
	Peer-to-Peer[1]	✓	✓	✓	✓	✓
	GCL[1]	✓	✓	✓	✓	✓
Digital I/O	Input Channels	12	12	8	6	6
	Output Channels	6 (sink)	2 (sink)	8 (source)	6-ch relay	6-ch power relay
	Extra Counter Channels	-	2	-	-	-
	Counter Input	3 kHz	4.5 kHz	3 kHz	3 kHz	3 kHz
	Frequency Input	3 kHz	4.5 kHz	3 kHz	3 kHz	3 kHz
	Pulse Output	✓	✓	✓	✓	✓
	High/Low Alarm Settings	-	-	-	-	-
	Isolation Protection	2,000 V$_{DC}$				

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ADAM-6200 Series Selection Guide

Model	ADAM-6217	ADAM-6224	ADAM-6250	ADAM-6251	ADAM-6256	ADAM-6260	ADAM-6266
Interface	10/100Mbps Ethernet						
Peer-to-Peer[1]	✓	Receiver Only[2]	✓	✓	✓	✓	✓
GCL[1]	✓	✓	✓	✓	✓	✓	✓
Analog Input — Channels	8	-	-	-	-	-	-
Input Impedance	>10MΩ (voltage) 120Ω (current)	-	-	-	-	-	-
Voltage Input	±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V	-	-	-	-	-	-
Current Input	0 ~ 20, 4 ~ 20, ±20 mA	-	-	-	-	-	-
Sampling Rate	10 Hz	-	-	-	-	-	-
Direct Sensor Input	-	-	-	-	-	-	-
Burnout Detection	✓ (4 ~ 20 mA)	-	-	-	-	-	-
Resolution	16-bit	-	-	-	-	-	-
Accuracy	±0.1% of FSR (voltage) @ 25°C ±0.2% of FSR (current) @ 25°C	-	-	-	-	-	-
Analog Output — Channels	-	4	-	-	-	-	-
Voltage Output	-	0 ~ 5, 0 ~ 10, ±5, ±10 V	-	-	-	-	-
Current Output	-	0 ~ 20, 4 ~ 20 mA	-	-	-	-	-
Resolution	-	12-bit	-	-	-	-	-
Digital I/O — Input Channels	-	4 (dry contact only)	8	16	-	-	4
Output Channels	-	-	7 (sink)	-	16 (sink)	-	-
Relay Output	-	-	-	-	-	6 (5 Form C + 1 Form A)	4 (Form C)
Contact Rating	-	-	-	-	-	250 V$_{AC}$ @ 5A 30 V$_{DC}$ @ 5A	
Counter Input	-	-	3 kHz	3 kHz	-	-	3 kHz
Frequency Input	-	-	3 kHz	3 kHz	-	-	3 kHz
Pulse Output	-	-	5 kHz	-	5 kHz	5 kHz	5 kHz
LED Indicator	-	-	8 digital outputs, 7 digital inputs	16 digital inputs	16 digital outputs	6 relay	4 digital inputs, 4 relay
Power Consumption	3.5 W	6 W	3 W	2.7 W	3.2 W	4.5 W	4.2 W
Isolation Voltage	2,500 V$_{DC}$						
Watchdog Timer	System (1.6 s) Communication (programmable)						
Communication Protocol	Modbus TCP, TCP/IP, UDP, HTTP, DHCP, MQTT, SNMP						
Power Requirements	10 ~ 30 V$_{DC}$ (24 V$_{DC}$ standard)						
Operating Temperature	-10 ~ 70°C (14 ~ 158°F)						
Storage Temperature	-20 ~ 80°C (-4 ~ 176°F)						
Operating Humidity	20 ~ 95% RH (non-condensing)						
Storage Humidity	0 ~ 95% RH (non-condensing)						

Note 1: Peer-to-peer and GCL cannot be run simultaneously; only one feature can be enabled at a time.
Note 2: The ADAM-6224 can only act as a receiver and generate analog output when peer-to-peer or GCL mode is used.

ADAM-6100 Series Selection Guide

Model	ADAM-6117	ADAM-6150	ADAM-6151	ADAM-6156	ADAM-6160
Interface	10/100 Mbps Ethernet				
Support Protocol	ADAM-6100EI: EtherNet/IP ADAM-6100PN: Profinet				
Analog Input — Resolution	16-bit	-	-	-	-
Channels	8	-	-	-	-
Sampling Rate	10 Hz	-	-	-	-
Voltage Input	±150 mV ±500 mV ±1 V ±5 V ±10 V	-	-	-	-
Current Input	0 ~ 20, 4 ~ 20, ±20 mA	-	-	-	-
Direct Sensor Input	-	-	-	-	-
Analog Output — Resolution	-	-	-	-	-
Channels	-	-	-	-	-
Current Output	-	-	-	-	-
Voltage Output	-	-	-	-	-
Digital I/O — Input Channels	-	8	16	-	-
Output Channels	-	7	-	16	6-ch power relay
Isolation Protection	2,500 V$_{DC}$	2,500 V$_{DC}$	2,500 V$_{DC}$	2,500 V$_{DC}$	2,500 V$_{DC}$
Connectors	2 x RJ-45 LAN (daisy chain) Plug-in screw terminal block (I/O and power)				

1 Software and Industry Solutions
2 Industrial Server
3 Intelligent System
4 Intelligent HMI and Monitors
5 Automation Computers and Controllers
6 Industrial Communication
7 Remote I/O & Wireless Sensing Modules
8 Industrial I/O and Video Solutions

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ADAM-6015
ADAM-6017
ADAM-6018

7-ch Isolated RTD Input Modbus TCP Module
8-ch Isolated Analog Input Modbus TCP Module
with 2-ch DO
8-ch Isolated Thermocouple Input Modbus TCP
Module with 8-ch DO

ADAM-6015 FCC CE RoHS COMPLIANT 2002/95/EC c UL us LISTED E180881 I.T.E.

ADAM-6017 FCC CE RoHS COMPLIANT 2002/95/EC c UL us LISTED E180881 I.T.E.

ADAM-6018 FCC CE RoHS COMPLIANT 2002/95/EC c UL us LISTED E180881 I.T.E.

Specifications (ADAM-6015)

Analog Input

- **Channels** — 7 (differential)
- **Input Impedance** — > 10 MΩ
- **Input Connections** — 2 or 3 wire
- **Input Type** — Pt, Balco and Ni RTD
- **RTD Types and Temperature Ranges**

Pt 100	-50°C	~	150°C
	0°C	~	100°C
	0°C	~	200°C
	0°C	~	400°C
	-200°C	~	200°C
Pt 1000	-40°C	~	160°C

  Supports both IEC 60751 ITS90 (0.0385 W/W/°C)
  and JIS C 1604 (0.0392 W/W/°C)

Balco 500	-30°C	~	120°C
Ni 518	-80°C	~	100°C
	0°C	~	100°C

- **Accuracy** — ± 0.1 % or better
- High speed mode — ±0.5% or better
- **Span Drift** — ± 25 ppm/°C
- **Zero Drift** — ± 6 µV/°C
- **Resolution** — 16-bit
- **Sampling Rate**
  10 sample/ second (total)
  High speed mode:1K sample/second (total)
  CMR @ 50/60 HZ 90dB
  NMR @ 50/60 HZ 60dB
  * high speed mode does not support CMR/NMR
- **Wire Burnout Detection**

Ordering Information

- **ADAM-6015** — 7-ch Isolated RTD Input Modbus TCP Module

Specifications (ADAM-6017)

Analog Input

- **Channels** — 8 (differential)
- **Input Impedance** — > 10 MΩ (voltage) 120 Ω (current)
- **Input Type** — mV, V, mA
- **Input Range** — ±150mV , ±500mV , ±1 V , ±5V , ±10V, 0 ~ 150mV, 0 ~ 500mV , 0 ~ 1V , 0 ~ 5V , 0 ~ 10V, 0 ~ 20mA, 4 ~ 20mA , ±20mA
- **Accuracy** — ±0.1% (voltage) ±0.2% (current)
- **Span Drift** — ±25 ppm/°C
- **Zero Drift** — ±6 µV/°C
- **Resolution** — 16-bit
- **Sampling Rate** — 10 or 100 sample/ second (total) CMR @ 50/60 HZ 90dB NMR @ 50/60 HZ 67dB
- **Common-Mode Voltage** — 350V$_{DC}$

Digital Output

- **Channels** — 2, open collector to 30 V, 100 mA max. load
- **Power Dissipation** — 300 mW for each module
- **Output Delay** — On: 100µs Off: 150µs

Ordering Information

- **ADAM-6017** — 8-ch Isolated AI with 2-ch DO Modbus TCP Module

Specifications (ADAM-6018)

Analog Input

- **Channels** — 8 (differential)
- **Input Impedance** — > 10 MΩ
- **Input Type** — Thermocouple
- **Thermocouple Type and Range:**

J	0 ~ 760°C	R	500 ~ 1,750°C
K	0 ~ 1,370°C	S	500 ~ 1,750°C
T	-100 ~ 400°C	B	500 ~ 1,800°C
E	0 ~ 1,000°C		

- **Accuracy** — ±0.1%
- **Span Drift** — ±25 ppm/°C
- **Zero Drift** — ±6 µV/°C
- **Resolution** — 16-bit
- **Sampling Rate** — 10 sample/ second (total) CMR @ 50/60 HZ 90dB NMR @ 50/60 HZ 60dB
- **Wire Burnout Detection**

Digital Output

- **Channels** — 8, open collector to 30 V, 100 mA max. load
- **Power Dissipation** — 300 mW for each module

Ordering Information

- **ADAM-6018** — 8-ch Isolated Thermocouple Input Modbus TCP Module w/ 8-ch DO

Common Specifications

General

- **LAN** — 10/100Base-T(X)
- **Power Consumption** — 2.5 W @ 24 V$_{DC}$ (ADAM-6015) 2.7 W @ 24 V$_{DC}$ (ADAM-6017) 2 W @ 24 V$_{DC}$ (ADAM-6018)
- **Connectors** — 1 x RJ-45 (LAN), Plug-in screw terminal block (I/O and power)
- **Watchdog** — System (1.6 second) and Communication (programmable)

- **Power Input** — 10 ~ 30 V$_{DC}$
- **Supports Peer-to-Peer**
- **Supports GCL**
- **Supports Modbus/TCP, TCP/IP, UDP, HTTP and MQTT (ADAM-6017) Protocols**

Protection

- **Over Voltage Protection** — ±35 V$_{DC}$
- **Isolation Protection** — 2,000 V$_{DC}$
- **Built-in TVS/ESD Protection**
- **Power Reversal Protection**

Environment

- **Operating Temperature** — -10 ~ 70°C (14 ~ 158°F) -40 ~ 70°C (-40~158°F) (ADAM-6017-D)
- **Storage Temperature** — -20 ~ 80°C (-4 ~ 176°F) -40 ~ 80°C (-40~176°F) (ADAM-6017-D)
- **Operating Humidity** — 20 ~ 95% RH (non-condensing)
- **Storage Humidity** — 0 ~ 95% RH (non-condensing)

ADVANTECH Ethernet I/O Modules: ADAM-6000

All product specifications are subject to change without notice.

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Last updated: 31-Aug-2018

ADAM-6022
ADAM-6024

**Ethernet-based Dual-loop PID Controller
12-ch Isolated Universal Input/Output
Modbus TCP Module**

ADAM-6022   FCC CE RoHS COMPLIANT 2002/95/EC

Specifications

General
- **Loop Number**   2 (3 AI, 1 AO, 1 DI, 1 DO for each control loop)

Analog Input
- **Channels**   6 (differential)
- **Input Range**   ±10 V_{DC}, 0 ~ 20 mA, 4 ~ 20 mA

Analog Output
- **Channels**   2
- **Output Type**   V, mA
- **Output Range**   0 ~ 10 V_{DC}, 4 ~ 20 mA, 0 ~ 20 mA

Digital Input
- **Channels**   2
- **Dry Contact**   Logic level 0: close to GND
                             Logic level 1: open
- **Wet Contact**   Logic level 0: 0 ~ 3 V_{DC}
                             Logic level 1: 10 ~ 30 V_{DC}

Digital Output
- **Channels**   2, open collector to 30 V, 100 mA max. load
- **Power Dissipation**   300 mW for each module

Ordering Information

- **ADAM-6022**   Ethernet-based Dual-loop PID Controller

ADAM-6024   FCC CE RoHS COMPLIANT 2002/95/EC

Specifications

Analog Input
- **Channels**   6 (differential)
- **Input Range**   ±10 V_{DC}, 0 ~ 20 mA, 4 ~ 20 mA

Analog Output
- **Channels**   2
- **Output Type**   V, mA
- **Output Range**   0 ~ 10 V_{DC}, 4 ~ 20 mA, 0 ~ 20 mA

Digital Input
- **Channels**   2
- **Dry Contact**   Logic level 0: close to GND
                             Logic level 1: open
- **Wet Contact**   Logic level 0: 0 ~ 3 V_{DC}
                             Logic level 1: 10 ~ 30 V_{DC}

Digital Output
- **Channels**   2, open collector to 30 V, 100 mA max. load
- **Power Dissipation**   300 mW for each module

Supports
- **Peer-to-Peer (Receiver only)**
- **GCL (Receiver only)**

Ordering Information

- **ADAM-6024**   12-ch Isolated Universal I/O Modbus TCP Module

Common Specifications

General
- **LAN**   10/100Base-T(X)
- **Power Consumption**   4 W @ 24 V_{DC}
- **Connectors**   1 x RJ-45 (LAN), Plug-in screw terminal block (I/O and power)
- **Watchdog**   System (1.6 second) and Communication (programmable)
- **Power Input**   10 ~ 30 V_{DC}
- **Supports Modbus/TCP, TCP/IP, UDP and HTTP Protocols**

Analog Input
- **Input Impedance**   20 MΩ
- **Accuracy**   ±0.1% of FSR
- **Resolution**   16-bit
- **Sampling Rate**   10 sample/second
- **CMR @ 50/60 Hz**   90 dB
- **NMR @ 50/60 Hz**   60 dB
- **Span Drift**   ±25 ppm/° C
- **Zero Drift**   ±6 µV/° C

Analog Output
- **Accuracy**   ±0.1% of FSR
- **Resolution**   12-bit
- **Drift**   ±50 ppm/° C
- **Current Load Resistor** Max. 500Ω
- **Voltage Load Resistor** Min. 1K Ω

Protection
- **Isolation Protection**   2,000 V_{DC}
- **Built-in TVS/ESD Protection**
- **Over Voltage Protection** ±35 V_{DC}
- **Power Reversal Protection**

Environment
- **Operating Temperature** -10 ~ 50° C (14 ~ 122° F)
- **Storage Temperature**   -20 ~ 80° C (-4 ~ 176° F)
- **Operating Humidity**   20 ~ 95% RH (non-condensing)
- **Storage Humidity**   0 ~ 95% RH (non-condensing)

ADAM-6050
ADAM-6051
ADAM-6052

18-ch Isolated Digital I/O Modbus TCP Module
14-ch Isolated Digital I/O Modbus TCP
Module with 2-ch Counter
16-ch Source-type Isolated Digital I/O
Modbus TCP Module

ADAM-6050   FCC CE RoHS COMPLIANT 2002/95/EC

ADAM-6051   FCC CE RoHS COMPLIANT 2002/95/EC

ADAM-6052   FCC CE RoHS COMPLIANT 2002/95/EC

Specifications

Digital Input
- **Channels**   12
- **Dry Contact**   Logic level 0: close to GND
  Logic level 1: open
- **Wet Contact**   Logic level 0: 0 ~ 3 V_{DC}
  Logic level 1: 10 ~ 30 V_{DC}
- **Supports 3 kHz Counter Input
  (32-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports 3 kHz Frequency Input**
- **Supports Inverted DI Status**

Digital Output
- **Channels**   6 (sink type), open
  collector to 30 V, 100 mA
  maximum load
- **Supports 5 kHz Pulse Output**
- **Supports High-to-Low and Low-to-High Delay
  Output**

Ordering Information
- **ADAM-6050**   18-ch Isolated DI/O
  Modbus TCP Module

Specifications

Digital Input
- **Channels**   12
- **Dry Contact**   Logic level 0: close to GND
  Logic level 1: open
- **Wet Contact**   Logic level 0: 0 ~ 3 V_{DC}
  Logic level 1: 10 ~ 30 V_{DC}
- **Supports 3 kHz Counter Input
  (32-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports 3 kHz Frequency Input**
- **Supports Inverted DI Status**

Counter Input
- **Channels**   2
- **Mode**   Counter, Frequency
- **Keep/Discard Counter Value when Power-off**
- **Maximum Count**   4,294,967,295
  (32-bit + 1-bit overflow)
- **Input Frequency**   Frequency Mode:
  0.2 ~ 4500 Hz
  Counter Mode: 0 ~ 4.5 kHz

Digital Output
- **Channels**   2 (sink type), open
  collector to 30 V, 100 mA
  maximum load
- **Supports 5 kHz Pulse Output**
- **Supports High-to-Low and Low-to-High Delay
  Output**

Ordering Information
- **ADAM-6051**   16-ch Isolated DI/O with
  Counter Modbus TCP
  Module

Specifications

Digital Input
- **Channels**   8
- **Dry Contact**   Logic level 0: Open
  Logic level 1: Close to Ground
- **Wet Contact**   Logic level 0 : 0 ~ 3 V_{DC}
  Logic level 1 : 10 ~ 30 V_{DC}
- **Supports 3 kHz Counter Input
  (32-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports 3 kHz Frequency Input**
- **Supports Inverted DI Status**

Digital Output
- **Channels**   8 (Source Type)
- **Voltage Range**   10 ~ 35 V_{DC}
- **Current**   1 A (per channel)
- **Supports 5 kHz Pulse Output**
- **Supports High-to-Low and Low-to-High Delay
  Output**
- **Supports Over Current Protection**

Ordering Information
- **ADAM-6052**   16-ch Source-type Isolated
  DI/O Modbus TCP Module

Common Specifications

General
- **LAN**   10/100Base-T(X)
- **Power Consumption**   2 W @ 24 V_{DC}
- **Connectors**   1 x RJ-45 (LAN), Plug-in screw
  terminal block (I/O and power)
- **Watchdog**   System (1.6 second) and
  Communication (programmable)

- **Power Input**   10 ~ 30 V_{DC}
- **Supports Peer-to-Peer, GCL**
- **Supports User Defined Modbus Address**
- **Supports Modbus/TCP, TCP/IP, UDP,
  DHCP, SNMP, HTTP and MQTT Protocol**

Protection
- **Power Reversal Protection**
- **Isolation Protection**   2,000 V_{DC}

Environment
- **Operating
  Temperature**   -20 ~ 70°C (-4 ~ 158°F)
  D version
  -40 ~ 70°C (-40~158°F)
- **Storage Temperature**   -30 ~ 80°C (-22 ~ 176°F)
  D version
  -40 ~ 80°C (-40~176°F)
- **Operating Humidity**   20 ~ 95% RH
  (non-condensing)
- **Storage Humidity**   0 ~ 95% RH
  (non-condensing)

ADVANTECH   **Ethernet I/O Modules: ADAM-6000**

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Last updated: 31-Aug-2018

ADAM-6060
ADAM-6066

6-ch Digital Input and 6-ch Relay Modbus TCP Module

6-ch Digital Input and 6-ch Power Relay Modbus TCP Module

1 Software and Industry Solutions
2 Industrial Server
3 Intelligent System
4 Intelligent HMI and Monitors
5 Automation Computers and Controllers
6 Industrial Communication
7 Remote I/O & Wireless Sensing Modules
8 Industrial I/O and Video Solutions

ADAM-6060   ADAM-6066

FCC CE RoHS COMPLIANT 2002/95/EC c UL us LISTED E180881 I.T.E.

ADAM-6000 Series Dimensions

Unit: mm

Front View

Rear View

Wall Mounting View

Side View

DIN-Rail Mounting View

Top View

Specifications

General
- **LAN**   10/100Base-T(X)
- **Power Consumption**   2 W @ 24 V$_{DC}$ (ADAM-6060)
                              2.5 W @ 24 V$_{DC}$ (ADAM-6066)
- **Connectors**   1 x RJ-45 (LAN), Plug-in screw terminal block (I/O and power)
- **Watchdog Timer**   System (1.6 second) and Communication (programmable)
- **Power Input**   10 ~ 30 V$_{DC}$
- **Supports Peer-to-Peer**
- **Supports GCL**
- **Supports Modbus/TCP, TCP/IP, UDP, DHCP, SNMP, HTTP and MQTT Protocol**

Digital Input
- **Channels**   6
- **Dry Contact**   Logic level 0: close to GND
                             Logic level 1: open
- **Wet Contact**   Logic level 0: 3 V$_{DC}$
                             Logic level 1: 10 ~ 30 V$_{DC}$
- **Supports 3 kHz Counter Input (32-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports 3 kHz Frequency Input**
- **Supports Inverted DI Status**

Relay Output (Form A)
- **Channels**   6
- **Contact Rating (Resistive)** ADAM-6060: 120 V$_{AC}$ @ 0.5 A
                                  30 V$_{DC}$ @ 1 A
                                  ADAM-6066: 250 V$_{AC}$ @ 5 A
                                  30 V$_{DC}$ @ 3 A
- **Breakdown Voltage**   500 V$_{AC}$ (50/60 Hz)
- **Relay On Time**   7 ms
- **Relay Off Time**   3 ms
- **Total Switching Time**   10 ms
- **Insulation Resistance** 1 GΩ min. at 500 V$_{DC}$
- **Maximum Switching**   20 operations/minute
  Rate (at rated load)
- **Supports Pulse Output**

Protection
- **Isolation Voltage**   2,000 V$_{DC}$
- **Power Reversal Protection**

Environment
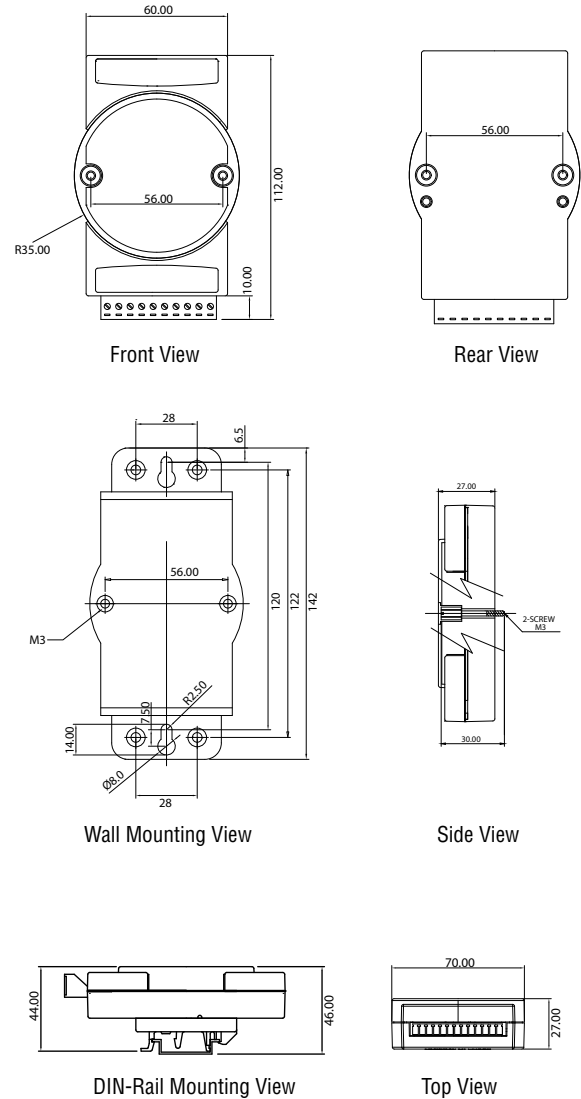- **Operating Temperature** -10 ~ 70°C (14 ~ 158°F)
                             -40 ~ 70°C (-40~158°F) for D version
- **Storage Temperature**   -20 ~ 80°C (-4 ~ 176°F)
                             -40 ~ 80°C (-40~176°F) for D version
- **Operating Humidity**   20 ~ 95% RH (non-condensing)
- **Storage Humidity**   0 ~ 95% RH (non-condensing)

ADAM-6000 Series Common Specifications

General
- **Dimensions (W x H x D)** 70 x 120 x 30 mm
- **Enclosure**   ABS+PC
- **Mounting**   DIN 35 rail, stack, wall

Ordering Information
- **ADAM-6060**   6-ch DI and 6-ch Relay Modbus TCP Module
- **ADAM-6066**   6-ch DI and 6-ch Power Relay Modbus TCP Module

ADAM-6217
ADAM-6224

8-ch Isolated Analog Input Modbus TCP Module

4-ch Isolated Analog Output Modbus TCP Module

ADAM-6217

FCC CE ☒ ⑩

ADAM-6224

FCC CE ☒ ⑩

Specifications

Analog Input

- **Channels**   8 (differential)
- **Input Impedance**   > 10 MW (voltage)
                          120 W (current)
- **Input Type**   mV, V, mA
- **Input Range**   ±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V, 0 ~ 20 mA, 4 ~ 20 mA, ±20 mA
- **Span Drift**   ± 30 ppm/°C
- **Zero Drift**   ± 6 µV/°C
- **Resolution**   16-bit
- **Accuracy**   ± 0.1% of FSR (Voltage) at 25°C
                          ± 0.2% of FSR (Current) at 25°C
- **Sampling Rate**   10 sample/second (total)
- **CMR @ 50/60 Hz**   92 dB
- **NMR @ 50/60 Hz**   67 dB
- **Common Mode**   200 V$_{DC}$

Ordering Information

- **ADAM-6217**   8-ch Isolated Analog Input Modbus TCP Module

Specifications

Analog Output

- **Channels**   4
- **Output Impedance**   2.1 Ω
- **Output Settling Time** 20 µs
- **Driving Load**   Voltage: 2kΩ
                          Current: 500 Ω
- **Programmable Output Slope** 0.125 ~ 128 mA/sec
                          0.0625 ~ 64 V/sec
- **Output Type**   V, mA
- **Output Range**   0 ~ 5 V, 0 ~ 10 V, ± 5 V, ± 10 V, 0 ~ 20 mA, 4 ~ 20 mA
- **Accuracy**   ± 0.3% of FSR (Voltage) at 25°C
                          ± 0.5% of FSR (Current) at 25°C
- **Resolution**   12-bit
- **Current Load Resistor** 0 ~ 500 Ω
- **Drift**   ± 50 ppm/°C

Digital Input

- **Channels**   4 (Dry Contact only)
- **Dry Contact**   Logic 0: Open
                          Logic 1: Closed to DGND
- **Support DI Filter**
- **Support Inverted DI Status**
- **Support Trigger to Startup or Safety Value**

Ordering Information

- **ADAM-6224**   4-ch Isolated Analog Output Modbus TCP Module

Common Specifications

General

- **Ethernet**   2-port 10/100 Base-TX (for Daisy Chain)
- **Protocol**   Modbus/TCP, TCP/IP, UDP, HTTP, DHCP
- **Connector**   Plug-in 5P/15P screw terminal blocks
- **Power Input**   10 - 30 V$_{DC}$ (24 V$_{DC}$ standard)
- **Watchdog Timer**   System (1.6 seconds)
                          Communication (Programmable)
- **Dimensions**   70 x 122 x 27 mm
- **Protection**   Built-in TVS/ESD protection
                          Power Reversal protection
                          Over Voltage protection: +/- 35V$_{DC}$
                          Isolation protection: 2500 V$_{DC}$
- **Power Consumption**   ADAM-6217: 3.5W @ 24 V$_{DC}$
                          ADAM-6224: 6W @ 24 V$_{DC}$

Features

- Daisy chain connection with auto-bypass protection
- Remote monitoring and control with smart phone/pad
- Group configuration capability for multiple module setup
- Flexible user-defined Modbus address
- Intelligent control ability by Peer-to-Peer and GCL function
- Multiple protocol support: Modbus TCP, TCP/IP, UDP, HTTP, DHCP, SNMP (ADAM-6217-B), MQTT (ADAM-6217-B)
- Web language support: XML, HTML 5, Java Script
- System configuration backup
- User Access Control

Environment

- **Operating Temperature** -10 ~ 70°C (14 ~ 158°F) ADAM-6224
                             -40 ~ 70°C (-40~158°F) ADAM-6217-B
- **Storage Temperature**   -20 ~ 80°C (-4 ~ 176°F) -40 ~ 80°C (-40~176°F) for ADAM-6217-B
- **Operating Humidity**   20 ~ 95% RH (non-condensing)
- **Storage Humidity**   0 ~ 95% RH (non-condensing)

ADVANTECH   Ethernet I/O Modules: ADAM-6000

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ADAM-6250
ADAM-6251
ADAM-6256

15-ch Isolated Digital I/O Modbus TCP Module
16-ch Isolated Digital Input Modbus TCP Module
16-ch Isolated Digital Output Modbus TCP Module

ADAM-6250 FCC CE ☒ ⑩

ADAM-6251 FCC CE ☒ ⑩

ADAM-6256 FCC CE ☒ ⑩

1 Software and Industry Solutions
2 Industrial Server
3 Intelligent System
4 Intelligent HMI and Monitors
5 Automation Computers and Controllers
6 Industrial Communication
7 Remote I/O & Wireless Sensing Modules
8 Industrial I/O & Video Solutions

Specifications

Digital Input

- **Channels**
  ADAM-6250: 8
  ADAM-6251: 16
- **Dry Contact**
  Logic 0: Open
  Logic 1: Closed to DGND
- **Wet Contact**
  Logic 0: 0 ~ 3 V_{DC} or 0 ~ -3 V_{DC}
  Logic 1: 10 ~ 30 V_{DC} or -10 ~ -30 V_{DC}
  (Dry/Wet Contact decided by Switch)
- **Input Impedance**
  5.2 kΩ (Wet Contact)
- **Transition Time**
  0.2 ms
- **Frequency Input Range**
  0.1 ~ 3kHz
- **Counter Input**
  3kHz (32 bit + 1 bit overflow)
- **Keep/Discard Counter Value when power off**
- **Supports Inverted DI Status**

Digital Output

- **Channels**
  ADAM-6250: 7 (Sink Type)
  ADAM-6256: 16 (Sink Type)
- **Output Voltage Range**
  10 ~ 30 V_{DC}
- **Normal Output Current**
  100 mA (per channel)
- **Pulse Output**
  Up to 5kHz
- **Delay Output**
  High-to-Low and Low-to-High

Ordering Information

- **ADAM-6250**   15-ch Isolated Digital I/O Modbus TCP Module
- **ADAM-6251**   16-ch Isolated Digital Input Modbus TCP Module
- **ADAM-6256**   16-ch Isolated Digital Output Modbus TCP Module

Common Specifications

General

- **Ethernet**
  2-port 10/100 Base-TX (for Daisy Chain)
- **LED Indication**
  ADAM-6250: 8 DI + 7 DO
  ADAM-6251: 16 DI
  ADAM-6256: 16 DO
- **Protocol**
  Modbus/TCP, TCP/IP, UDP, HTTP, DHCP, MQTT, SNMP
- **Connector**
  Plug-in 5P/15P screw terminal blocks
- **Power Input**
  10 - 30 V_{DC} (24 V_{DC} standard)
- **Watchdog Timer**
  System (1.6 seconds)
  Communication (Programmable)
- **Dimensions**
  70 x 122 x 27 mm
- **Protection**
  Built-in TVS/ESD protection
  Power Reversal protection
  Over Voltage protection: +/- 35V_{DC}
  Isolation protection: 2500 V_{DC}
- **Power Consumption**
  ADAM-6250: 3 W @ 24 V_{DC}
  ADAM-6251: 2.7 W @ 24 V_{DC}
  ADAM-6256: 3.2 W @ 24 V_{DC}

Features

- Daisy chain connection with auto-bypass protection
- Remote monitoring and control with smart phone/pad
- Group configuration capability for multiple module setup
- DI/O LED Indication
- Flexible user-defined Modbus address.
- Intelligent control ability by Peer-to-Peer and GCL function
- Multiple protocol support: Modbus/TCP, TCP/IP, UDP, HTTP, DHCP, MQTT, SNMP
- Web language support: XML, HTML 5, Java Script
- System configuration backup
- User Access Control

Environment

- **Operating Temperature**   -10 ~ 70°C (14 ~ 158°F)
  -40 ~ 70°C (-40~158°F) (B version)
- **Storage Temperature**   -20 ~ 80°C (-4 ~ 176°F)
  -40 ~ 80°C (-40~176°F) (B version)
- **Operating Humidity**   20 ~ 95% RH (non-condensing)
- **Storage Humidity**   0 ~ 95% RH (non-condensing)

ADAM-6260
ADAM-6266

6-ch Relay Output Modbus TCP Module
4-ch Relay Output Modbus TCP Module
with 4-ch DI

ADAM-6260

FCC C€ ⌦ ⑩

ADAM-6266

FCC C€ ⌦ ⑩

Specifications

Relay Output

▪ **Channels**	ADAM-6260: 5 Form C and 1 Form A
	ADAM-6266: 4 Form C
▪ **Contact Rating (Resistive)**	250 V_{AC} @ 5A
	30 V_{DC} @ 5A
▪ **Max. Switching Voltage**	400 V_{AC}
	300 V_{DC}
▪ **Breakdown Voltage**	500 V_{AC} (50/60Hz)
▪ **Max. Breakdown Capacity**	1250 VA
▪ **Frequency of Operation**	360 operations/hour with load
	72,000 operations/hour without load
▪ **Set/Reset Time**	8 ms/8 ms
▪ **Mechanical Endurance**	> 15 x 10^6 operations
▪ **Isolation between Contact**	1000 V_{rms}
▪ **Insulation Resistance**	> 10 GΩ @ 500 V_{DC}

Digital Input

▪ **Channels**	ADAM-6266: 4
▪ **Dry Contact**	Logic 0: Open
	Logic 1: Closed to DI COM
▪ **Wet Contact**	Logic 0: 0 ~ 3 V_{DC} or 0 ~ -3 V_{DC}
	Logic 1: 10 ~ 30 V_{DC} or -10 ~ -30 V_{DC}
	(Dry/Wet Contact decided by Switch)
▪ **Input Impedance**	5.2 kΩ (Wet Contact)
▪ **Transition Time**	0.2 ms
▪ **Frequency Input Range**	0.1 ~ 3kHz
▪ **Counter Input**	3kHz (32 bit + 1 bit overflow)
▪ **Keep/Discard Counter Value when power off**	
▪ **Supports Inverted DI Status**	

Ordering Information

Common Specifications

General

▪ **Ethernet**	2-port 10/100 Base-TX (for Daisy Chain)
▪ **LED Indication**	ADAM-6260: 6 RL
	ADAM-6266: 4 RL + 4 DI
▪ **Protocol**	Modbus/TCP, TCP/IP, UDP, HTTP, DHCP, SNMP, MQTT
▪ **Connector**	Plug-in 5P/15P screw terminal blocks
▪ **Power Input**	10 - 30 V_{DC} (24 V_{DC} standard)
▪ **Watchdog Timer**	System (1.6 seconds)
	Communication (Programmable)
▪ **Dimensions**	70 x 122 x 27 mm
▪ **Protection**	Built-in TVS/ESD protection
	Power Reversal protection
	Over Voltage protection: +/- 35V_{DC}
	Isolation protection: 2500 V_{DC}
▪ **Power Consumption**	ADAM-6260: 4.5 W @ 24 V_{DC}
	ADAM-6266: 4.2 W @ 24 V_{DC}

Features

- Daisy chain connection with auto-bypass protection
- Remote monitoring and control with smart phone/pad
- Group configuration capability for multiple module setup
- DI/O LED Indication
- Flexible user-defined Modbus address.
- Intelligent control ability by Peer-to-Peer and GCL function
- Multiple protocol support: Modbus/TCP, TCP/IP, UDP, HTTP, DHCP, SNMP, MQTT
- Web language support: XML, HTML 5, Java Script
- System configuration backup
- User Access Control

Environment

▪ **Operating Temperature**	-10 ~ 70°C (14 ~ 158°F)
	-40 ~ 70°C (-40~158°F) (B version)
▪ **Storage Temperature**	-20 ~ 80°C (-4 ~ 176°F)
	-40 ~ 80°C (-40~176°F) (B version)
▪ **Operating Humidity**	20 ~ 95% RH (non-condensing)
▪ **Storage Humidity**	0 ~ 95% RH (non-condensing)

ADVANTECH   **Ethernet I/O Modules: ADAM-6000**

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ADAM-6117
ADAM-6160

8-ch Isolated Analog Input Real-time Ethernet Module

6-ch Relay Real-time Ethernet Module

ADAM-6117

FCC CE RoHS COMPLIANT 2002/95/EC

ADAM-6160

FCC CE RoHS COMPLIANT 2002/95/EC

Specifications

Analog Input

- **Channels**   8 (differential)
- **Input Impedance**   > 10 MΩ (voltage)
                        120 Ω (current)
- **Input Type**   mV, V, mA
- **Input Range**   ±150 mV, ±500 mV, ±1 V
                        ±5 V, ±10 V, 0 ~ 20 mA,
                        4 ~ 20 mA, ±20 mA
- **Span Drift**   ± 30 ppm/°C
- **Zero Drift**   ± 6 µV/°C
- **Resolution**   16-bit
- **Accuracy**   ± 0.1% of FSR (Current) at 25°C
                        ± 0.2% of FSR (Current) at 25°C
- **Sampling Rate**   10 sample/second (total)
- **CMR @ 50/60 Hz**   92 dB
- **NMR @ 50/60 Hz**   67 dB
- **High Common Mode** 200 V_{DC}

Ordering Information

- **ADAM-6117EI**   8-ch Isolated AI EtherNet/IP Module

Specifications

Relay Output

- **Channels**   5 Form C and 1 Form A
- **Contact Rating (Resistive)** 250 V_{AC} @ 5A
                                30 V_{DC} @ 5A
- **Max. Switching Voltage**   400 V_{AC}
                                300 V_{DC}
- **Breakdown Voltage**   500 V_{AC} (50/60Hz)
- **Max. Breakdown Capacity**   1250 VA
- **Frequency of Operation**   360 operations/hour with load
                                72,000 operations/hour without load
- **Set/Reset Time**   8 ms/8 ms
- **Mechanical Endurance**   > 15 x 10^6 operations
- **Isolation between Contact** 1000 V_{rms}
- **Insulation Resistance**   > 10 GΩ @ 500 V_{DC}

Ordering Information

- **ADAM-6160EI**   6-ch Relay EtherNet/IP Module

Common Specifications

General

- **LAN**   10/100Base-T(X)
- **Power Consumption** ADAM-6117: 3.5 W @ 24 V_{DC}
                         ADAM-6160: 4.5 W @ 24 V_{DC}
- **Connectors**   2 x RJ-45 LAN (Daisy Chain)
                         Plug-in screw terminal block (I/O and power)
- **Watchdog**   System (1.6 second)
- **Power Input**   10 ~ 30 V_{DC}

Protection

- **Isolation Protection**   2,500 V_{DC}
- **Built in TVS/ESD Protection**
- **Power Reversal Protection**

Environment

- **Operating Temperature** -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature**   -20 ~ 80°C (-4 ~ 176°F)
- **Operating Humidity**   20 ~ 95% RH (non-condensing)
- **Storage Humidity**   0 ~ 95% RH (non-condensing)

ADAM-6150
ADAM-6151/6156

15-ch Isolated Digital I/O Real-time Ethernet Module

16-ch Isolated Digital Input/ Digital Output Real-time Ethernet Module

ADAM-6150

FCC CE RoHS COMPLIANT 2002/95/EC

ADAM-6151/6156

FCC CE RoHS COMPLIANT 2002/95/EC

Specifications

Digital Input

▪ **Channels**	8
▪ **Dry Contact**	Logic level 0: open
	Logic level 1: close to DGND
▪ **Wet Contact**	Logic level 0: 0 ~ 3 V_{DC} or 0 ~ -3 V_{DC}
	Logic level 1: 10 ~ 30 V_{DC} or -10 ~ -30 V_{DC}
	(Dry/Wet Contact decided by switch)
▪ **Input Impedance**	5.2 kΩ (Wet Contact)
▪ **Transition Time**	From logic level 0 to 1: 0.2 ms
	From logic level 1 to 0: 0.2 ms

Digital Output

▪ **Channels**	7
▪ **Output Voltage Range**	8 ~ 35 V_{DC}
▪ **Normal Output Current**	100 mA (per channel)

Ordering Information

Specifications

Digital Input (ADAM-6151)

▪ **Channels**	16
▪ **Dry Contact**	Logic level 0: open
	Logic level 1: close to DGND
▪ **Wet Contact**	Logic level 0: 0 ~ 3 V_{DC} or 0 ~ -3 V_{DC}
	Logic level 1: 10 ~ 30 V_{DC} or -10 ~ -30 V_{DC}
	(Dry/Wet Contact decided by switch)
▪ **Input Impedance**	5.2 kΩ (Wet Contact)
▪ **Transition Time**	From logic level 0 to 1: 0.2 ms
	From logic level 1 to 0: 0.2 ms

Digital Output (ADAM-6156)

▪ **Channels**	16
▪ **Output Voltage Range**	8 ~ 35 V_{DC}
▪ **Normal Output Current**	100 mA (per channel)

Ordering Information

▪ **ADAM-6151EI**	16-ch Isolated DI EtherNet/IP Module
▪ **ADAM-6156EI**	16-ch Isolated DO EtherNet/IP Module

Common Specifications

General

▪ **LAN**	10/100Base-T(X)
▪ **Power Consumption**	ADAM-6150: 3 W @ 24 V_{DC}
	ADAM-6151: 2.7 W @ 24 V_{DC}
	ADAM-6156: 3.2 W @ 24 V_{DC}
▪ **Connectors**	2 x RJ-45 LAN, (Daisy Chain)
	Plug-in screw terminal block (I/O and power)
▪ **Watchdog**	System (1.6 second)
▪ **Power Input**	10 ~ 30 V_{DC}

Protection

▪ **Over Voltage Protection**	±35 V_{DC}
▪ **Isolation Protection**	2,500 V_{DC}
▪ **Power Reversal Protection**	

Environment

▪ **Operating Temperature**	-10 ~ 70°C (14 ~ 158°F)
▪ **Storage Temperature**	-20 ~ 80°C (-4 ~ 176°F)
▪ **Operating Humidity**	20 ~ 95% RH (non-condensing)
▪ **Storage Humidity**	0 ~ 95% RH (non-condensing)
	0 ~ 95% RH (non-condensing)

ADVANTECH   Ethernet I/O Modules: ADAM-6000

All product specifications are subject to change without notice.   ▲ Back to Top   Last updated: 31-Aug-2018

ADAM-4000 Series

Introduction

ADAM-4000 series modules are compact, versatile sensor-to-computer interface units designed specifically for reliable operation in harsh environments. Their built-in microprocessors are encased in rugged industrial grade plastic and independently provide intelligent signal conditioning, analog I/O, digital I/O, data display, and RS-485 communication. The ADAM-4000 series can be categorized into three groups: controllers, communication modules, and I/O modules.

Analog I/O   Sensor Input   RS-485

1 Software and Industry Solutions
2 Industrial Server
3 Intelligent System
4 Intelligent HMI and Monitors
5 Automation Computers and Controllers
6 Industrial Communication
7 Remote I/O & Wireless Sensing Modules
8 Industrial I/O and Video Solutions

Applications

- Remote data acquisition
- Process monitoring
- Industrial process control
- Energy management
- Supervisory control
- Security systems
- Laboratory automation
- Building automation
- Product testing
- Direct digital control
- Relay control

General Features

Modbus Communication Protocol

Since Modbus is one of the most widely used communication standards in the world, Advantech has applied it as the major communication protocol for eAutomation product development. The new generation of ADAM-4000 modules now also supports Modbus/RTU as the remote data transmission protocol. Featuring Modbus-support capacity, the new ADAM-4000 series have become universal remote I/O modules that can operate with any Modbus system. HMI servers or controllers can read/write data via standard Modbus commands instead of complex ASCII code.

Watchdog Timer

A watchdog timer supervisory function will automatically reset the ADAM-4000 series modules if required, which reduces the need for maintenance. It also contributes a high level of reliability to the system.

Modular Industrial Design

You can easily mount modules on a DIN rail, panel, or piggyback them on top of each other. Signal connections can be formed through plug-in screw-terminal blocks, ensuring simple installation, modification, and maintenance.

I/O Module Features

Easy Plug-In System Integration

With the ADAM-4000's Modbus I/O and built-in Modbus/RTU protocol, any controller using the Modbus/RTU standard can be integrated as part of an ADAM-4000 control system. Any Modbus Ethernet data gateway can upgrade these I/O modules up to the Modbus/TCP Ethernet layer. Most HMI software is bundled with a Modbus driver and can access the ADAM-4000 I/O directly. Moreover, Advantech provides Modbus OPC Server and Modbus/TCP OPC Server as data exchange interfaces between the ADAM-4000 Modbus I/O and any Windows applications.

Communication Module Features

Fiber Converter

The ADAM-4541 and ADAM-4542+ have been designed specifically for transmitting data over long distances without noise interference. The ADAM-4541 is a multi-mode converter that carries signals from fiber optics to RS-232/422/485. It offers a transmission distance of up to 2,500 m with total immunity against electromagnetic noise. The ADAM-4542+ is a single-mode converter that carries signals from fiber optics to RS-232/422/485. It offers an incredible transmission distance of up to 15 km, also with total immunity against electromagnetic noise.

USB Converter

The ADAM-4561 and ADAM-4562 are one-port isolated USB to RS-232/422/485 converters. The ADAM-4561 can convert USB to RS-232/422/485 with a plug-in terminal, and its major features are the capability to use 9-wire RS-232 and to draw power from a USB port. With 9-wire RS-232 capability, this converter meets the requirements of PLCs, modems, and controller equipment. The ADAM-4562 is a USB-to-serial converter that supports Plug & Play and hot-swapping, which simplifies the configuration process while allowing the module to draw power via USB, thus making it no longer necessary to have an external power supply.

ADAM-4100 Series

Robust Remote Data Acquisition and Control Modules Overview

Applications

- Wide operating temperature: -40 ~ 85°C
- Higher Noise Immunity
  ESD (IEC 61000-4-2) 8KV
  EFT (IEC 61000-4-4) 4KV
  Surge (IEC 61000-4-5) 4KV
- Wide power input: 10 ~ 48 V_{DC}
- Support modbus/RTU
- Multiple interface :RS-485, Micro USB

Introduction

The robust ADAM-4000 family includes ADAM-4100 series modules, the ADAM-4510I, and the ADAM-4520I modules. The ADAM-4100 series comprises compact, versatile sensor-to-computer interface units designed for reliable operation in harsh environments. Their built-in microprocessors, encased in rugged industrial-grade PC plastic, independently provide intelligent signal conditioning, analog I/O, digital I/O, LED data display, and an address mode with a user-friendly design for convenient address reading. The ADAM-4510I and ADAM-4520I modules are robust industrial-grade communication modules.

Designed for Harsh Industrial Environments

### ADAM-4100 Module with LED Display

ADAM-4100 series modules have an LED display that lets you monitor the channel status. For the ADAM-4117 and ADAM-4118, the LED will be lit when the related channel is active; for the ADAM-4150 and ADAM-4168, the LED will be lit when the related channel value is high. ADAM-4100 series modules have two operating modes: initial and normal. In contrast to old modules that require additional wiring to set the mode, this can be done using a switch with ADAM-4100 modules, making it very convenient to configure. When set to initial mode, the LED display represents the node address of the module. Additionally, in systems where multiple ADAM-4100 series modules are used, you can locate individual modules using Adam/Apax .NET Utility and the LED display on the module. All of these functions are very helpful for diagnosing ADAM-4100 series systems.

Online Firmware Updates

ADAM-4100 series modules have a user-friendly and convenient design that allows for firmware updates via a local network or the Internet. You can easily update to the latest firmware using Adam/Apax .NET Utility on the host PC. This saves time and ensures that the module always runs with the latest functional enhancements.

Micro USB interface

USB has become common interface in IoT devices, and it is easy to be accessed via PC. To expand the accessibility of ADAM-4100 series modules, in addition to an RS-485 serial port, the B version of these modules also has a micro USB interface that supplies power and a communication interface. Users have the option to use the RS-485 and USB ports concurrently or independently, depending on their application. The ADAM-4100 micro USB interface can be adapted to standard micro USB cable. Advantech also offers a 90° cable (optional) with a locking screw mechanism to further enhance the connection stability.

Customized 90 degrees designed cable (optional accessory)

USB

Micro USB
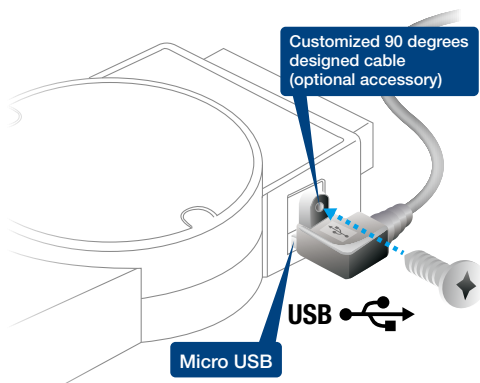
Access ADAM by Passive RFID

There is a trend in current IoT applications where increasingly more data are needed. Consequently, the demand for I/O modules is increasing. Users are pursuing efficient ways to set up and manage the modules. Thus, how to deploy I/O modules quickly and trace related usage information to avoid downtime have become key requirements in IoT applications. To fulfill these needs, ADAM-4100 series modules (B version) implement a passive internal RFID tag. This remarkable feature means that module information such as the model name, device ID, I/O value, firmware version, alarm events, and serial number are stored in the RFID tag. In contrast to typical RFID tags that contain fixed data, the RFID tag information in ADAM modules can be dynamically updated, which means that the RFID tag will reflect the latest ADAM module information. This innovative design makes ADAM modules more flexible for IoT applications.

One-to-Many
Wireless
Configuration

Always-On
Wireless
Inspection
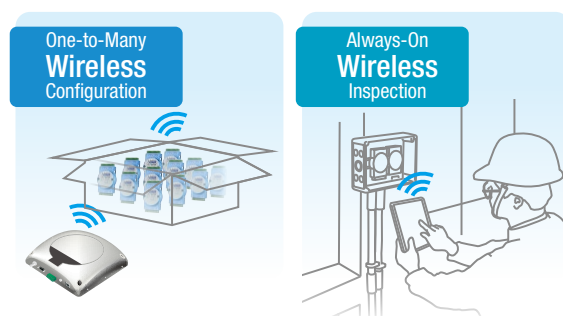
I/O Module Selection Guide

Analog Input

Model		ADAM-4015	ADAM-4017+	ADAM-4018+	ADAM-4019+
Resolution			16 bit		
Analog Input	Channels	6 differential	8 differential	8 differential	8 differential
	Sampling Rate		10 Hz	10 Hz	10 Hz
	Voltage Input	-	±150 mV ±500 mV ±1 V ±5 V ±10 V	-	± 100 mV ± 500 mV ± 1 V ± 2.5 V ± 5 V ± 10 V
	Current Input	-	4 ~ 20, ±20 mA	4 ~ 20, ±20 mA	4 ~ 20, ±20 mA
	Direct Sensor Input	RTD	-	J, K, T, E, R, S, B thermocouple	J, K, T, E, R, S, B thermocouple
	Burnout Detection	✓	-	✓	✓ (4 ~ 20 mA and all T/C)
	Channel Independent Configuration	✓	✓	✓	✓
Isolation Voltage		3,000 V_{DC}		3,000 V_{DC}	3,000 V_{DC}
Watchdog Timer		✓ (system and comm.)	✓ (system and comm.)	✓ (system and comm.)	✓ (system and comm.)
Modbus Support *		✓	✓	✓	✓

*All ADAM-4000 I/O modules support ASCII commands

Analog Output

Digital Input/Output

Model		ADAM-4021	ADAM-4024	ADAM-4050	ADAM-4051	ADAM-4052
Resolution		12 bit	12 bit	-	-	-
Analog Output	Channels	1	4	-	-	-
	Voltage Output	0 ~ 10 V	±10 V	-	-	-
	Current Output	0 ~ 20, 4 ~ 20 mA	0 ~ 20, 4 ~ 20 mA	-	-	-
Digital I/O	Input Channels	-	4	7	16	8
	Output Channels	-	-	8	-	-
	Alarm Settings	-	✓	-	-	-
Isolation Voltage		3,000 V_{DC}	3,000 V_{DC}	-	2,500 V_{DC}	5,000 V_{RMS}
Digital LED Indicator		-	-	-	Yes	-
Watchdog Timer		✓ (system)	✓ (system and comm.)	✓ (system)	✓ (system and comm.)	✓ (system)
Safety Setting		-	✓	-	-	-
Modbus Support *		-	✓	-	✓	-

*All ADAM-4000 I/O modules support ASCII commands

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I/O Module Selection Guide

		Digital Input/Output			**Relay Output**			**Counter**
Model		ADAM-4053	ADAM-4055	ADAM-4056S/4056SO	ADAM-4060	ADAM-4068	ADAM-4069	ADAM-4080
Resolution		-	-	-	-	-	-	-
Analog Input	Channels	-	-	-	-	-	-	-
	Sampling Rate	-	-	-	-	-	-	-
	Voltage Input	-	-	-	-	-	-	-
	Current Input	-	-	-	-	-	-	-
	Direct Sensor Input	-	-	-	-	-	-	-
	Burnout Detection	-	-	-	-	-	-	-
	Channel Independent Configuration	-	-	-	-	-	-	-
Analog Output	Channels	-	-	-	-	-	-	-
	Voltage Output	-	-	-	-	-	-	-
	Current Output	-	-	-	-	-	-	-
Digital I/O	Input Channels	16	8	-	-	-	-	-
	Output Channels	-	8	12	4-ch relay	8-ch relay	8-ch power relay	2
	Alarm Settings	-	-	-	-	-	-	Yes
Counter (32-bit)	Channels	-	-	-	-	-	-	2
	Input Frequency	-	-	-	-	-	-	50 kHz
Isolation Voltage		-	2,500 V_{DC}	5,000 V_{DC}	-	-	-	2,500 V_{RMS}
Digital LED Indicator		-	✓	✓	-	✓	-	-
Watchdog Timer		✓ (system)	✓ (system and comm.)	✓ (system and comm.)	✓ (system)	✓ (system and comm.)	✓ (system and comm.)	✓ (system)
Safety Setting		-	✓	-	✓	✓	✓	-
Modbus Support *		-	✓	✓	-	✓	✓	supported in E version

*All ADAM-4000 I/O modules support ASCII commands

Communication and Controller Module Selection Guide

1 Software and Industry Solutions

2 Industrial Server

3 Intelligent System

4 Intelligent HMI and Monitors

5 Automation Computers and Controllers

6 Industrial Communication

7 Remote I/O & Wireless Sensing Modules

8 Industrial I/O and Video Solutions

Repeaters

Model	ADAM-4510 / ADAM-4510S
Network	RS-422 / RS-485
Comm. Protocol	-
Comm. Speed (bps)	Serial: From 1,200 to 115.2K
Comm. Distance	Serial: 1.2 km
Interface Connectors	RS-422/485: plug-in screw terminal
LED Indicators	Communication and power
Data Flow Control	-
Watchdog Timer	-
Isolation Voltage	ADAM-4510: - / ADAM-4510S: 3,000 V_{DC}
Special Features	-
Built-In I/O	-
Power Requirements	10 ~ 30 V_{DC}
Operating Temperature	-10 ~ 70°C (14 ~ 158°F)
Operating Humidity	5 ~ 95% RH
Power Consumption	1.4 W @ 24 V_{DC}

Converters

Model	ADAM-4520	ADAM-4521	ADAM-4541 / ADAM-4542+	ADAM-4561 / ADAM-4562
Network	RS-232 to RS-422/485		Fiber optic to RS-232/422/485	USB to RS-232/485/422
Comm. Protocol	-			
Comm. Speed (bps)	Serial: From 1,200 to 115.2K			
Comm. Distance	Serial: 1.2 km	Serial: 1.2 km	ADAM-4541: 2.5 km / ADAM-4542+: 15 km	Serial: 1.2 km
Interface Connectors	RS-232: female DB9 / RS-422/485: plug-in screw terminal	RS-232: female DB9 / RS-422/485: plug-in screw terminal	RS-232/422/485: plug-in screw terminal / Fiber: / ADAM-4541: ST connector / ADAM-4542+: SC connector	USB: type A client connector / Serial: ADAM-4561: plug-in screw terminal (RS-232/422/485) / ADAM-4562: DB9 (RS-232)
LED Indicators	Communication and power			
Data Flow Control	-	✓	-	✓
Watchdog Timer	-	✓	-	✓
Isolation Voltage	3,000 V_{DC}	1,000 V_{DC}	-	ADAM-4561: 3,000 V_{DC} / ADAM-4562: 2,500 V_{DC}
Power Requirements	10 ~ 30 V_{DC}			
Operating Temperature	-10 ~ 70°C (14 ~ 158°F)			
Operating Humidity	5 ~ 95% RH			
Power Consumption	1.2 W @ 24 V_{DC}	1 W @ 24 V_{DC}	ADAM-4541: 1.5 W @ 24 V_{DC} / ADAM-4542+: 3 W @ 24 V_{DC}	ADAM-4561: 1.5 W @ 5 V_{DC} / ADAM-4562: 1.1 W @ 5 V_{DC}

Robust RS-485 I/O Module Selection Guide

Model		ADAM-4117	ADAM-4118	ADAM-4150	ADAM-4168
Resolution		16 bit		-	-
Analog Input	Channels	8 differential		-	-
	Sampling Rate	10/100 Hz (total)		-	-
	Voltage Input	0 ~ 150 mV, 0 ~ 500 mV, 0 ~ 1 V, 0 ~ 5 V, 0 ~ 10 V, 0 ~ 15 V, ±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V, ±15V	±15 mV, ±50 mV, ±100 mV, ±500 mV, ±1 V, ±2.5V	-	-
	Current Input	0 ~ 20, 4 ~ 20, ±20 mA	4 ~ 20, ±20 mA	-	-
	Direct Sensor Input	-	J, K, T, E, R, S, B Thermocouple	-	-
	Burnout Detection	✓ (mA)	✓ (mA and All T/C)	-	-
	Channel Independent Configuration	✓	✓	-	-
Digital I/O	Input Channels	-	-	7	-
	Output Channels	-	-	8	8-ch relay
Counter	Channels	-	-	7	-
	Input Frequency	-	-	3 kHz	-
Isolation Voltage		3,000 V_{DC}			
Digital LED Indicator		Communication and Power			
Watchdog Timer		Yes (System & Communication)			
Safety Setting		-	-	✓	✓
Communication Protocol		ASCII Command/Modbus			
Power Requirements		10 ~ 48 V_{DC}			
Operating Temperature		-40 ~ 85°C (-40 ~ 185°F)			
Storage Temperature		-40 ~ 85°C (-40 ~ 185°F)			
Operating Humidity		5 ~ 95% RH			
Power Consumption		1.2 W @ 24 V_{DC}	0.5 W @ 24 V_{DC}	0.7 W @ 24 V_{DC}	1.8 W @ 24 V_{DC}
Page		16-18	16-19		

Model	ADAM-4510I	ADAM-4520I
Network	RS-422/485	RS-232 to RS-422/485
Communication Speed (bps)	From 1,200 to 115.2k	
Communication Distance	Serial: 1.2 km	
Interface Connectors	RS-422/485: plug-in screw terminal	RS-232: female DB9 RS-422/485: plug-in screw terminal
Digital LED Indicators	Communication and Power	
Auto Data Flow Control	✓	
Isolation Voltage	3,000 V_{DC}	
Power Requirements	10 ~ 48 V_{DC}	
Operating Temperature	-40 ~ 85°C (-40 ~ 185°F)	
Storage Temperature	-40 ~ 85°C (-40 ~ 185°F)	
Operating Humidity	5 ~ 95%	
Power Consumption	1.4 W @ 24 V_{DC}	1.2 W @ 24 V_{DC}
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ADAM-4017+
ADAM-4018+
ADAM-4019+

8-ch Analog Input Module with Modbus

8-ch Thermocouple Input Module with Modbus

8-ch Universal Analog Input Module with Modbus

ADAM-4017+   FCC   CE   RoHS COMPLIANT 2002/95/EC   c(UL)us LISTED E180881 I.T.E.

ADAM-4018+   FCC   CE   RoHS COMPLIANT 2002/95/EC   c(UL)us LISTED E180881 I.T.E.

ADAM-4019+   FCC   CE   RoHS COMPLIANT 2002/95/EC   c(UL)us LISTED E180881 I.T.E.

Specifications (ADAM-4017+)

General

- **Power Consumption**   1.2 W @ 24 V_{DC}
- **Watchdog Timer**   System (1.6 second) & Communication
- **Supported Protocols**   ASCII command and Modbus/RTU

Analog Input

- **Channels**   8 differential
- **Channel Independent Configuration**   Yes
- **Input Impedance**   Voltage: 20 MΩ / Current: 120 Ω
- **Input Type**   mV, V, mA
- **Input Range**   ±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V, ±20 mA, 4 ~ 20 mA

Specifications (ADAM-4018+)

General

- **Power Consumption**   0.8 W @ 24 V_{DC}
- **Watchdog Timer**   System (1.6 second) & Communication
- **Supported Protocols**   ASCII command and Modbus/RTU

Analog Input

- **Channels**   8 differential
- **Channel Independent Configuration**   Yes
- **Input Impedance**   Voltage: 20 MΩ / Current: 120 Ω
- **Input Type**   Thermocouple, mA
- **Input Range**   ± 20 mA, 4 ~ 20 mA
- **T/C Types and Temperature Ranges**

J	0 ~ 760°C	R	500 ~ 1,750°C
K	0 ~ 1,370°C	S	500 ~ 1,750°C
T	-100 ~ 400°C	B	500 ~ 1,800°C
E	0 ~ 1,000°C		

- **Burnout Detection**   All T/C

Specifications (ADAM-4019+)

General

- **Power Consumption**   1.0 W @ 24 V_{DC}
- **Watchdog Timer**   System (1.6 second) & Communication
- **Supported Protocols**   ASCII command and Modbus/RTU

Analog Input

- **Channels**   8 differential channels for individual input type
- **Channel Independent Configuration**   Yes
- **Input Impedance**   Voltage: 20 MΩ / Current: 120 Ω
- **Input Type**   T/C, mV, V, mA
- **Input Range**   ±1 V, ±2.5 V, ±5 V, ±10 V, ±100 mV, ±500 mV, ±20 mA, 4 ~ 20 mA
- **T/C Types and Temperature Ranges**

J	0 ~ 760°C	R	500 ~ 1,750°C
K	0 ~ 1,370°C	S	500 ~ 1,750°C
T	-100 ~ 400°C	B	500 ~ 1,800°C
E	0 ~ 1,000°C		

- **Burnout Detection**   4 ~ 20 mA & all T/C

Common Specifications

General

- **Power Input**   Unregulated 10 ~ 30 V_{DC}
- **Connectors**   2 x plug-in terminal block (#14 ~ 22 AWG)

Analog Input

- **Accuracy**   Voltage mode: ±0.1% or better / Current mode: ±0.2% or better
- **Resolution**   16-bit
- **Sampling Rate**   10 sample/second (total)
- **Isolation Voltage**   3,000 V_{DC}
- **Overvoltage Protection**   ±35 V_{DC}
- **CMR @ 50/60 Hz**   120 dB
- **NMR @ 50/60 Hz**   100 dB
- **Span Drift**   ±25 ppm/°C (Typical)
- **Zero Drift**   ±6 µV/°C
- **Built-in TVS/ESD Protection**

Environment

- **Operating Humidity**   5 ~ 95% RH
- **Operating Temperature**   -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature**   -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-4017+**   8-ch Analog Input Module with Modbus
- **ADAM-4018+**   8-ch Thermocouple Input Module w/Modbus
- **ADAM-4019+**   8-ch Universal Analog Input Module w/Modbus

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ADAM-4050
ADAM-4051
ADAM-4052

15-ch Digital I/O Module

16-ch Isolated Digital Input Module with Modbus

8-ch Isolated Digital Input Module

ADAM-4050   FM APPROVED   CE   RoHS COMPLIANT 2002/95/EC   c(UL)us LISTED E180881 I.T.E.

ADAM-4051   FCC CE   RoHS COMPLIANT 2002/95/EC   c(UL)us LISTED E180881 I.T.E.

ADAM-4052   FM APPROVED   CE   RoHS COMPLIANT 2002/95/EC   c(UL)us LISTED E180881 I.T.E.

Specifications

General

- **Connectors**   2 x plug-in terminal blocks (#14 ~ 22 AWG)
- **Power Consumption**   0.4 W @ 24 V_{DC}
- **Watchdog Timer**   System (1.6 second)
- **Supported Protocols**   ASCII command

Digital Input

- **Channels**   7
- **Input Level**   Logic level 0: 1 V max.
  Logic level 1: 3.5 ~ 30 V
  Pull up current: 0.5 mA,
  10 kΩ resistor to 5 V

Digital Output

- **Channels**   8
  open collector to 30 V,
  30 mA max. load
- **Power Dissipation**   300 mW

Specifications

General

- **Connectors**   2 x plug-in terminal blocks (#14 ~ 28 AWG)
- **Power Consumption**   1 W @ 24 V_{DC}
- **Watchdog Timer**   System (1.6 second)
- **Supported Protocols**   ASCII command and Modbus/RTU
- **LED Indicators**   Yes

Digital Input

- **Channels**   16
- **Input Voltage**   50 V max
- **Input Level**
  Dry contact: Logic level 0: open
  Logic level 1: close to GND
  Wet contact: Logic level 0: 3 V max
  Logic level 1: 10 ~ 50 V
  (Note: Digital Input levels 0 and 1 can be inverted)
- **Isolation Voltage**   2,500 V_{DC}
- **Input Resistance**   5.2 kΩ
- **Overvoltage Protection**   70 V_{DC}

Specifications

General

- **Connectors**   2 x plug-in terminal blocks (#14 ~ 22 AWG)
- **Power Consumption**   0.4 W @ 24 V_{DC}
- **Watchdog Timer**   System (1.6 second)
- **Supported Protocols**   ASCII command

Digital Input

- **Channels**   8
  (6 fully independent isolated channels, 2 isolated channels with common ground)
- **Input Level**   Logic level 0: 1 V max.
  Logic level 1: 3 ~ 30 V
- **Isolation Voltage**   5,000 V_{RMS}
- **Input Resistance**   3 kΩ

Common Specifications

General

- **Power Input**   Unregulated 10 ~ 30 V_{DC}

Environment

- **Operating Humidity**   5 ~ 95% RH
- **Operating Temperature**   - 10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature**   - 25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-4050**   15-ch Digital I/O Module
- **ADAM-4051**   16-ch Isolated Digital Input Module with Modbus
- **ADAM-4052**   8-ch Isolated Digital Input Module

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ADAM-4055
ADAM-4056S/4056SO
ADAM-4080

16-ch Isolated Digital I/O Module with Modbus
12-ch Sink/Source Type Isolated Digital Output Modules with Modbus

2-ch Counter/Frequency Module

ADAM-4055

ADAM-4056S/4056SO

ADAM-4080

Specifications

General

- **Connectors** 2 x plug-in terminal blocks (#14 ~ 28 AWG)
- **Power Consumption** 1 W @ 24 V_DC
- **Watchdog Timer** System (1.6 second) & Communication
- **Supported Protocols** ASCII command and Modbus/RTU
- **Isolation Voltage** 2,500 V_DC
- **LED Indicators** Yes

Digital Input

- **Channels** 8
- **Input Level**
  Dry Contact: Logic level 0: open
  Logic level 1: close to GND
  Wet Contact: Logic level 0: 3 V max.
  Logic level 1: 10 ~ 50 V
- **Overvoltage Protection** 70 V_DC

Digital Output

- **Channels** 8, open collector to 40 V (200 mA max. load)
- **Power Dissipation** Channel: 1 W max.
  Total: 2.2 W (8 Channels)

Specifications

General

- **Connectors** 2 x Plug-in terminal blocks (#14 ~ 22 AWG)
- **Watchdog Timer** System (1.6 second) & Communication
- **Support Protocol** ASCII command and Modbus/RTU
- **Isolation Voltage** 5000 V_DC
- **LED Indicators** Yes

ADAM-4056S

- **Digital Output Channels** 12
  Open collector to 40V (200mA max. load)
- **Power Dissipation** Channel: 1 W max
  Total: 4 W (12 Channels)
- **Digital Output Type** Sink

ADAM-4056SO

- **Digital Output Channels** 12
  VCC: 10 ~ 35 V_DC
  Current: 1A (per channel)
- **Digital Output Type** Source
- **Over Current Detection and Protection**

Specifications

General

- **Connectors** 2 x plug-in terminal blocks (#14 ~ 22 AWG)
- **Power Consumption** 2.0 W @ 24 V_DC
- **Watchdog Timer** System (1.6 second)
- **Supported Protocols** ASCII command modbus/RTU (E version)

Counter Input

- **Channels** 2 independent counters (32-bit + 1-bit overflow)
- **Input Frequency** 50 kHz max.
- **Input Pulse Width** >10 µs.
- **Input Mode** Isolated or non-isolated
- **Isolated Input Level** Logic level 0: 1 V max.
  Logic level 1: 3.5 ~ 30 V
- **Isolation Voltage** 2,500 V_RMS
- **Non-isolated Input Level** Programmable threshold:
  Logic level 0: 0.8 Vmax.
  Logic level 1: 2.4 ~ 5.0 V
- **Maximum Count** 4,294,967,295 (32-bit)
- **Preset Type** Absolute or relative
- **Programmable Digital Noise Filter** 2 µs ~ 65 ms
- **Alarm** Alarm comparators on each counter
- **Frequency Measurement Range** 5 Hz ~ 50 kHz
- **Programmable Built-in Gate Time** 1 or 0.1 second

Digital Output

- **Channels** 2, open collector to 30 V, 30 mA max. load
- **Power Dissipation** 300 mW for each channel

Common Specifications

General

- **Power Input** Unregulated 10 ~ 30 V_DC

Environment

- **Operating Humidity** 5 ~ 95% RH
- **Operating Temperature** -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-4055** 16-ch Isolated Digital I/O Module with Modbus
- **ADAM-4056S** 12-ch Sink Type Isolated Digital Output Module with Modbus
- **ADAM-4056SO** 12-ch Source Type Isolated Digital Output Module with Modbus
- **ADAM-4080** 2-ch Counter/Frequency Modules

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ADAM-4060
ADAM-4068
ADAM-4069

4-ch Relay Output Module

8-ch Relay Output Module with Modbus

8-ch Power Relay Output Module with Modbus

ADAM-4060   FM APPROVED CE RoHS COMPLIANT 2002/95/EC

ADAM-4068   FCC CE RoHS COMPLIANT 2002/95/EC

ADAM-4069   FCC CE RoHS COMPLIANT 2002/95/EC c UL us LISTED E183381 I.T.E.

Specifications

General

- **Connectors**   2 x plug-in terminal blocks (#14 ~ 22 AWG)
- **Power Consumption**   0.8 W @ 24 V_{DC}
- **Watchdog Timer**   System (1.6 second)
- **Supported Protocols** ASCII command

Relay Output

- **Breakdown Voltage**   500 V_{AC} (50/60 Hz)
- **Channels**   2 x Form A
                           2 x Form C
- **Contact Rating (Resistive)**   0.6 A @ 125 V_{AC}
                           0.3 A @ 250 V_{AC}
                           2 A @ 30 V_{DC}
                           0.6 A @ 110 V_{DC}
- **Initial Insulation Resistance**   1 G Ω min. at 500 V_{DC}
- **Relay off Time (Typical)**   2 ms
- **Relay on Time (Typical)**   3 ms
- **Maximum Operating Speed**
  20 operations/min (at related load)

Specifications

General

- **Connectors**   2 x plug-in terminal blocks (#14 ~ 28 AWG)
- **Power Consumption**   0.6 W @ 24 V_{DC}
- **Watchdog Timer**   System (1.6 second) & Communication
- **Supported Protocols** ASCII command and Modbus/RTU

Relay Output

- **Breakdown Voltage**   500 V_{AC} (50/60 Hz)
- **Channels**   4 x Form A
                           4 x Form C
- **Contact Rating (Resistive)**   0.5 A @ 120 V_{AC}
                           0.25 A @ 240 V_{AC}
                           1 A @ 30 V_{DC}
                           0.3 A @ 110 V_{DC}
- **Initial Insulation Resistance**   1 GΩ min. at 500 V_{DC}
- **Relay off Time (Typical)**   4 ms
- **Relay on Time (Typical)**   3 ms
- **Maximum Operating Speed**
  50 operations/min (at related load)

Specifications

General

- **Connectors**   2 x plug-in terminal blocks (#14 ~ 28 AWG)
- **Power Consumption**   2.2 W @ 24 V_{DC}
- **Watchdog Timer**   System (1.6 second) & Communication
- **Supported Protocols** ASCII command and Modbus/RTU

Relay Output

- **Breakdown Voltage**   1,000 V_{AC} (50/60 Hz)
- **Channels**   4 x Form A
                           4 x Form C
- **Contact Rating (Resistive)**   5 A @ 250 V_{AC}
                           5 A @ 30 V_{DC}
- **Initial Insulation Resistance**   1 GΩ min. at 500 V_{DC}
- **Relay off Time (Typical)**   5.6 ms
- **Relay on Time (Typical)**   5 ms
- **Maximum Operating Speed**
  6 operations/min (at related load)

Common Specifications

General

- **Power Input**   Unregulated 10 ~ 30 V_{DC}

Environment

- **Operating Humidity**   5 ~ 95% RH
- **Operating Temperature**   -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature**   -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-4060-DE**   4-ch Relay Output Module
- **ADAM-4068-BE**   8-ch Relay Output Module with Modbus
- **ADAM-4069-AE**   8-ch Power Relay Output Module with Modbus

Dimensions

Unit: mm

60.00   112.00   56.00   56.00   R35.00   10.00   Front View

56.00   Rear View

25.00   2-SCREW M3   30.00   Side View

28   6.5   56.00   120   122   142   M3   7.50   R2.50   14.00   Ø8.00   28   Panel Mounting View

70.00   25.00   Top View

44.00   46.00   Din-Rail Mounting View

ADAM-4510/S
ADAM-4520
ADAM-4521

RS-422/485 Repeater

Isolated RS-232 to RS-422/485 Converter

Addressable RS-422/485 to RS-232 Converter

ADAM-4510/4510S

ADAM-4520

ADAM-4521

Specifications

General

- **Connectors**: 2 x plug-in terminal blocks (#14 ~ 22 AWG) (RS-422/485)
- **Isolation Voltage**: 3,000 V_{DC} (ADAM-4510S)
- **Power Consumption**: 1.4 W @ 24 V_{DC}

Serial Communications

- **Input**: RS-485 (2-wire) or RS-422 (4-wire)
- **Output**: RS-485 (2-wire) or RS-422 (4-wire)
- **Speed Modes (bps)**: 1,200, 2,400, 4,800, 9,600, 19.2 k, 38.4 k, 57.6 k, 115.2 k, RTS control and RS-422 (switchable)

Specifications

General

- **Connectors**: 1 x plug-in terminal block (#14 ~ 22 AWG) (RS-422/485) 1 x DB9-F (RS-232)
- **Isolation Voltage**: 3,000 V_{DC}
- **Power Consumption**: 1.2 W @ 24 V_{DC}

Serial Communications

- **Input**: RS-232 (DB9)
- **Output**: RS-485 (2-wire) or RS-422 (4-wire)
- **Speed Modes (bps)**: 1,200, 2,400, 4,800, 9,600, 19.2 k, 38.4 k, 57.6 k, 115.2 k, RTS control and RS-422 (switchable)

Specifications

General

- **Connectors**: 1 x plug-in terminal block (#14 ~ 22 AWG) (RS-422/485) 1 x DB9-F (RS-232)
- **Isolation Voltage**: 1,000 V_{DC}
- **Power Consumption**: 1.0 W @ 24 V_{DC}
- **Built-in microprocessor and watchdog timer**

Serial Communications

- **Input**: RS-485 (2-wire) or RS-422 (4-wire)
- **Output**: RS-232 (DB9)
- **Speed Modes (bps)**: 300, 600, 1,200, 2,400, 4,800, 9,600, 19.2 k, 38.4 k, 57.6 k, 115.2 k (software configurable)
- **RS-232 and 485 can be set to different baudrates**
- **RS-485 surge protection and automatic RS-485 data flow control**
- **Software configurable to either addressable or non-addressable mode**

Common Specifications

General

- **Power Input**: Unregulated 10 ~ 30 V_{DC} w/ power reversal protection
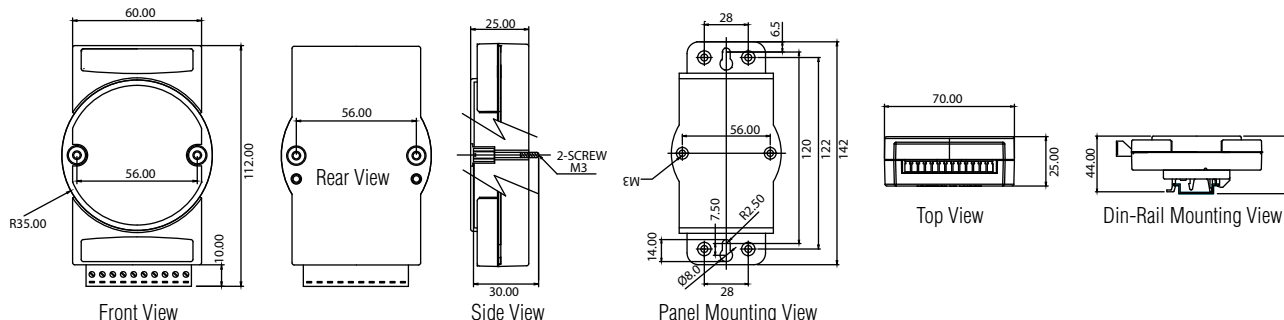
Environment

- **Operating Humidity**: 5 ~ 95% RH
- **Operating Temperature**: - 10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature**: - 25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-4510**: RS-422/485 Repeater
- **ADAM-4510S**: Isolated RS-422/485 Repeater
- **ADAM-4520**: Isolated RS-232 to RS-422/485 Converter
- **ADAM-4521**: Addressable RS-422/485 to RS-232 Converter

ADVANTECH   RS-485 I/O Modules: ADAM-4000

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ADAM-4541
ADAM-4542+
ADAM-4561/4562

Multi-mode Fiber Optic to RS-232/422/485 Converter

Single-mode Fiber Optic to RS-232/422/485 Converter

1-port Isolated USB to RS-232/422/485 Converter

ADAM-4541   FM APPROVED   CE   RoHS COMPLIANT 2002/95/EC   c UL us LISTED E180881 I.T.E.

ADAM-4542+   FCC CE   RoHS COMPLIANT 2002/95/EC   c UL us LISTED E180881 I.T.E.

ADAM-4561/4562   FCC CE   RoHS COMPLIANT 2002/95/EC   c UL us LISTED E180881 I.T.E.

Specifications

General

- **Power Input**   Unregulated 10 ~ 30 V_{DC}
- **Connectors**   1 x plug-in terminal block (#14 ~ 22 AWG) (RS-232/422/485) 2 x ST fiber connector
- **Power Consumption** 1.5 W @ 24 V_{DC}
- **Operation Modes**   Support Point-to-Point, and Ring (half-duplex)

Fiber Optic Communications

- **Optical Power Budget (Attenuation)** 15 dB (measured with 62.5/125 µm)
- **Transmission Distance** 2.5 km
- **Transmission Mode** Multi mode (Send and Receive)
- **Wavelength**   820 nm

Serial Communications

- **Communication Mode** Asynchronous
- **Speed Modes (bps)** 1200, 2400, 4800, 9600, 19.2 k, 38.4 k, 57.6k, 115.2 k and RS-232/422 mode (switchable)
- **Transmission Mode** Full/half duplex, bidirectional

Specifications

General

- **Power Input**   Unregulated 12 ~ 24 V_{DC}
- **Connectors**   1 x plug-in terminal block (#14 ~ 22 AWG) (RS-232/422/485) 1 x SC fiber connector
- **Power Consumption** 3 W @ 24 V_{DC}
- **Operation Modes**   Support Point-to-Point, Redundant and Ring (half-duplex)

Fiber Optic Communications

- **Optical Power Budget (Attenuation)** 15 dB
- **Transmission Distance** 15 km
- **Transmission Mode** Single mode (Send and Receive)
- **Wavelength**   1310 nm

Serial Communications

- **Communication Mode** Asynchronous
- **Speed Modes (bps)*** 1200, 2400, 4800, 9600, 19.2 k, 38.4 k, 57.6 k, 115.2 k, 230.4 k, 460.8 k, 921.6 k and RS-232/422 mode (switchable)
- **Transmission Modes** Full/half duplex, bidirectional

* The highest speed for RS-232 mode is 115.2 kbps

Specifications

General

- **Connectors**
  Network: USB-type A connector (type A to type B cable provided)
  Serial:
  ADAM-4561   1 x plug-in terminal (#14 ~ 22 AWG) (3-wire RS-232/422/485)
  ADAM-4562   1 x DB-9 serial connectors (9-wire RS-232)
- **Isolation Voltage**
  ADAM-4561:   3,000 V_{DC}
  ADAM-4562:   2,500 V_{DC}
- **Power Consumption**
  ADAM-4561:   1.5 W @ 5 V
  ADAM-4562:   1.1 W @ 5 V
- **Driver Support**
  ADAM-4561/4562: Windows 2000/XP/ Vista/7/8 (32&64-bit)
- **USB Specification Compliance**
  ADAM-4561:   USB 2.0
  ADAM-4562:   USB 2.0

Serial Communications

- **Speed Modes (bps)**
  ADAM-4561:   600 bps to 115.2 kbps
  ADAM-4562:   75 bps to 115.2 kbps
- **Transmission Modes** Full/half duplex, bidirectional

Common Specifications

Environment

- **Operating Humidity** 5 ~ 95% RH
- **Operating Temperature** ADAM-4541/4542+: -10 ~ 70°C (14 ~ 158°F) ADAM-4561/4562: -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-4541**   Multi-mode Fiber to RS-232/422/485 Converter
- **ADAM-4542+**   Single-mode Fiber to RS-232/422/485 Converter
- **ADAM-4561**   1-port Isolated USB to RS-232/422/485 Converter
- **ADAM-4562**   1-port Isolated USB to RS-232 Converter

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ADAM-4510I
ADAM-4520I
ADAM-4117

Robust RS-422/485 Repeater

Robust RS-232 to RS-422/485 Converter

Robust 8-ch Analog Input Module with Modbus

ADAM-4510I   FCC CE RoHS COMPLIANT 2002/95/EC   c UL us LISTED E180881 I.T.E.

ADAM-4520I   FCC CE RoHS COMPLIANT 2002/95/EC   c UL us LISTED E180881 I.T.E.

ADAM-4117   FCC CE RoHS COMPLIANT 2002/95/EC   c UL us LISTED E180881 I.T.E.

Specifications

General

- **Connectors** — 2 x plug-in terminal blocks (#14 ~ 22 AWG)
- **Power Consumption** — 1.4 W @ 24 V_{DC}

Communications

- **Input** — RS-485 (2-wire) or RS-422 (4-wire)
- **Output** — RS-485 (2-wire) or RS-422 (4-wire)
- **Speed Modes (bps)** — 1,200, 2,400, 4,800, 9,600, 19.2 k, 38.4 k, 57.6 k, 115.2 k, RTS control and RS-422 (switchable)
- **Supports Auto Baud-Rate**
- **Provide RS-485 to RS-422 Convert Ability**

Specifications

General

- **Connectors** — 1 x plug-in terminal block (#14 ~ 22 AWG) (RS-422/485)
  1 x DB9-F (RS-232)
- **Power Consumption** — 1.2 W @ 24 V_{DC}

Communications

- **Input** — RS-232 (DB9)
- **Output** — RS-485 (2-wire) or RS-422 (4-wire)
- **Speed Modes (bps)** — 1,200, 2,400, 4,800, 9,600, 19.2 k, 38.4 k, 57.6 k, 115.2 k, RTS control and RS-422 (switchable)
- **Supports Auto Baud-Rate**

Specifications

General

- **Connectors** — 2 x plug-in terminal blocks (#14 ~ 22 AWG)
- **Watchdog Timer** — System (1.6 second) & Communication
- **Supported Protocols** — ASCII Command and Modbus/RTU
- **Power Consumption** — 1.2 W @ 24 V_{DC}
- **Interface (B version)** — RS-485, micro USB

Analog Input

- **Channels** — 8 differential and independent configuration channels
- **Input Impedance** — Voltage: 800 KΩ
  Current: 120 Ω
- **Input Type** — mV, V (supports unipolar and bipolar), mA
- **Input Range** — 0 ~ 150mV, 0 ~ 500mV, 0 ~ 1V, 0 ~ 5V, 0 ~ 10V, 0 ~ 15V, ±150 mV, ±500 mV, ±1V, ±5 V, ±10 V, ±15V, ±20 mA, 0 ~ 20 mA, 4 ~ 20mA
- **Accuracy**
  Voltage mode : ±0.1% or better
  Current mode : ±0.2% or better
- **Resolution** — 16-bit
- **Sampling Rate** — 10/100 samples/sec (selected by utility)
- **CMR @ 50/60 Hz** — 92 dB
- **NMR @ 50/60 Hz** — 60 dB
- **Over Voltage Protection** — ±60 V_{DC}
- **High Common Mode** — 200 V_{DC}
- **Span Drift** — ±25 ppm/°C (Typical)
- **Zero Drift** — ±6μV/°C
- **Built-in TVS/ESD Protection**

Common Specifications

General

- **Power Input** — Unregulated 10 ~ 48 V_{DC} w/power reversal protection
- **Isolation Voltage** — 3,000 V_{DC}

Environment

- **Operating Humidity** — 5 ~ 95% RH
- **Operating Temperature** — - 40 ~ 85°C (-40 ~ 185°F)
- **Storage Temperature** — - 40 ~ 85°C (-40 ~ 185°F)
- **Supports Noise Rejection**

Ordering Information

- **ADAM-4510I** — Robust RS-422/485 Repeater
- **ADAM-4520I** — Robust RS-232 to RS-422/485 Converter
- **ADAM-4117** — Robust 8-ch Analog Input Module with Modbus

All product specifications are subject to change without notice.   ▲ Back to Top   Last updated: 31-Aug-2018

ADAM-4118
ADAM-4150
ADAM-4168

Robust 8-ch Thermocouple Input Module with Modbus

Robust 15-ch Digital I/O Module with Modbus

Robust 8-ch Relay Output Module with Modbus

ADAM-4118 FCC CE RoHS COMPLIANT 2002/95/EC c UL us LISTED E180881 I.T.E.

ADAM-4150 FCC CE RoHS COMPLIANT 2002/95/EC c UL us LISTED E180881 I.T.E.

ADAM-4168 FCC CE RoHS COMPLIANT 2002/95/EC c UL us LISTED E180881 I.T.E.

Specifications

General
- **Power Consumption** 0.5W @ 24 V_{DC}

Analog Input
- **Channels** 8 differential and independent configuration channels
- **Input Impedance** Voltage: 20 MΩ
  Current: 120 Ω
- **Input Type** T/C, mV, V, mA
- **Input Range**
  Thermocouple

J	0 ~ 760°C	R	500 ~ 1,750°C
K	0 ~ 1,370°C	S	500 ~ 1,750°C
T	-100 ~ 400°C	B	500 ~ 1,800°C
E	0 ~ 1,000°C		

  Voltage mode ±15 mV, ±50 mV, ±100 mV, ±500 mV, ±1 V, ±2.5 V
  Current mode ±20 mA, 4 ~ 20 mA
- **Accuracy** Voltage mode: ±0.1% or better
  Current mode: ±0.2% or better
- **Resolution** 16-bit
- **Sampling Rate** 10/100 samples/sec (selected by Utility)
- **CMR @ 50/60 Hz** 92 dB
- **NMR @ 50/60 Hz** 60 dB
- **Overvoltage Protection** ±60 V_{DC}
- **High Common Mode** 200 V_{DC}
- **Span Drift** ±25 ppm/°C (Typical)
- **Zero Drift** ±6μV/°C
- **Built-in TVS/ESD Protection**
- **Burnout Detection**

Specifications

General
- **Power Consumption** 0.7 W @ 24 V_{DC}

Digital Input
- **Channels** 7
- **Input Level**
  Dry contact: Logic level 0: Close to GND
  Logic level 1: Open
  Wet contact: Logic level 0: 3 V max
  Logic level 1: 10 ~ 30 V
  (Note: The Digital Input Level 0 and 1 status can be inverted)
- **Supports 3 kHz Counter Input (32-bit + 1-bit overflow)**
- **Supports 3 kHz Frequency Input**
- **Supports Invert DI Status**
- **Over Voltage Protection** 40 V_{DC}

Digital Output
- **Channels** 8, open collector to 40 V (0.8A max. load)
- **Power Dissipation** 1W load max
- **RON Maximum** 150 mΩ
- **Supports 1 kHz Pulse Output**
- **Supports High-to-Low Delay Output**
- **Supports Low-to-High Delay Output**

Specifications

General
- **Power Consumption** 1.8 W @ 24 V_{DC}

Relay Output
- **Output Channels** 8 Form A
- **Contact Rating (Resistive)** 0.5 A @ 120 V_{AC}
  0.25 A @ 240 V_{AC}
  1 A @ 30 V_{DC}
  0.3 A @ 110 V_{DC}
- **Breakdown Voltage** 750 V_{AC} (50/60 Hz)
- **Initial Insulation Resistance** 1 G Ω min. @ 500 V_{DC}
- **Relay Response Time (Typical)** On: 3ms Off: 1ms
- **Total Switching Time** 10 ms
- **Supports 100 Hz pulse output**
- **Maximum Operating Speed** 50 operations/min (at related load)

Common Specifications

General
- **Power Input** Unregulated 10 ~ 48 V_{DC}
- **Watchdog Timer** System (1.6 second) & Communication
- **Connector** 2 x plug-in terminal blocks (#14 ~ 22 AWG)
- **Isolation Voltage** 3,000 V_{DC}
- **Interface (B version)** RS-485, micro USB
- **Supported Protocols** ASCII Command and Modbus/RTU

Environment
- **Operating Humidity** 5 ~ 95% RH
- **Operating Temperature** -40 ~ 85°C (-40 ~ 185°F)
- **Storage Temperature** -40 ~ 85°C (-40 ~ 185°F)

Ordering Information
- **ADAM-4118** Robust 8-ch Thermocouple Input Module w/ Modbus
- **ADAM-4150** Robust 15-ch Digital I/O Module with Modbus
- **ADAM-4168** Robust 8-ch Relay Output Module with Modbus