

## Remote I/O & Wireless Sensing Modules

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# **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

7-3

Software and Industry Solutions

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Intelligent System

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Intelligent HMI and Monitors 

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Automation Computers

note I/O & Wireless

. Industrial I/O and Video Solutions

Industrial Server

## **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.



**Wireless RFID Gateway and Edge Device** 

### 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.



Communication

Range



Better penetration and less interference



Easy to organize LPWAN network data access



Ethernet/Wi-Fi interface for uplink

- 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
D	escription	6-ch loT wireless I/O module for loT 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 loT wireless I/O module with 1 x RS-485 port
	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.)
Wireless Interface	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
	Channel	2-ch (differential)	4-ch		-	
	Input Type	V	V, A, Dry contact DI		-	
Analog	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			
Analog Input	Current Range	-	0 ~ 20, 4 ~ 20, ±20 mA		-	
	Resolution	12-bit	16-bit			
	Sampling Rate	10 Hz (total)	10 Hz (total)			
	Accuracy	±0.1 Vpc	Voltage: ±0.1% of FSR Current: ±0.2% of FSR			
	Burnout Detection	-	✓ (4 ~ 20 mA only)		-	
	Isolation	-	3,000 V <sub>rms</sub>		-	
District	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
Digital	Counter Input	3 kHz	2 Hz	3 kHz	3 kHz	3 kHz
inpat	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 Vrms	3,000 Vrms	3,000 Vrms	3,000 Vrms
	Channel	2-ch relay	2-ch (sink-type)	4-ch (sink-type)	4-ch power relay	-
Digital Output	Output Rating (Resistive Load)	120 V <sub>AC</sub> @ 0.5 A 30 V <sub>DC</sub> @ 1 A	Open collector to 3	0 $V_{DC}$ , 400 mA max.	250 V <sub>AC</sub> @ 5 A 30 V <sub>DC</sub> @ 3 A	-
	Pulse Output	60 operations/min	5 kHz	5 kHz	60 operations/min	-
	Isolation	1,500 V <sub>rms</sub>	3,000 V <sub>rms</sub>	3,000 V <sub>rms</sub>	3,000 V <sub>AC</sub>	-
	Port Number			-		1
	lype			-		RS-485
Serial Port	Data Bits			-		7,8
				-		I, Z
	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_Bx
General	Real-Time Clock	~	<ul> <li>✓ (with battery backup)</li> </ul>	<ul> <li>✓ (with battery backup)</li> </ul>	<ul> <li>✓ (with battery backup)</li> </ul>	<ul> <li>✓ (with battery backup)</li> </ul>
	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)	
	Operating Temperature			-25 ~ 70°C (-13 ~ 158°F)		
Environment	Storage Temperature			-40 ~ 85°C (-40 ~ 185°F)		
	Operating Humidity		20	~ 95% RH (non-condensi	ng)	
	Storage Humidity		0 -	~ 95% RH (non-condensir	ng)	
	Input Range	Micro USB 5 V <sub>DC</sub>	10 ~ 30 Vpc	10 ~ 30 Vpc	10 ~ 30 Vpc	10 ~ 30 Vpc
Power	Protection	-	Power reversal protection	Power reversal protection	Power reversal protection	Power reversal protection
	Power Consumption	1.5 W @ 5 V <sub>DC</sub>	2.5 W @ 24 V <sub>DC</sub>	2.2 W @ 24 V <sub>DC</sub>	2.5 W @ 24 V <sub>DC</sub>	2.2 W @ 24 V <sub>DC</sub>

# IoT Ethernet I/O Modules



Model	Name	WISE-4010/LAN	WISE-4050/LAN	WISE-4060/LAN		
Desci	ription	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		
	Channels	4	-	-		
Analog I/O	Resolution	12-bit	-	-		
	Accurancy	±0.2% of FSR	-	-		
	Sampling Rate	10/100 Hz per channel	-	-		
	Current Input	0 ~ 20, 4 ~ 20 mA	-	-		
	Input Channels	-	4	4		
	Output Channels	4	4	4 (from a power relay)		
Digital I/O	Counter Input	-	3 kHz	3 kHz		
	Frequency Input	-	3 kHz	3 kHz		
	Pules Output	1 kHz	1 kHz	1 kHz		
Isolation I	Protection	-	3,000 V <sub>rms</sub>	3,000 V <sub>rms</sub>		
LED Inc	dicators		Status, Comm			
Power Re	quirement		$10 \sim 30 V_{DC}$ (24 V <sub>DC</sub> Standard)			
Power Co	nsumption	1.2 W @ 24 V <sub>DC</sub>	2.2 W @ 24 V <sub>DC</sub>	2.5 W @ 24 V <sub>DC</sub>		
Operating 1	emperature		-40 ~ 70°C (-40~158°F)			
Storage Te	emperature		-40 ~ 85°C (-40~185°F)			
Operating	Humidity		20 ~ 95% RH (non-condensing)			
Storage	Humidity	0 ~ 95% BH (non-condensing)				



# **IoT Wireless Sensor Nodes**









N	Wireless		Wi-Fi		Lo	Ra
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 Al 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 Al and 4-ch DI
	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		
Wireless Interface	Frequency Band		2.4GHz	NA915, EU868,	JP925, CN470	
	Mode / Topology		Infrastructure, Limited AP	St	ar	
	Outdoor Range		110m (L.O.S.)	5000m (L.O.S.)		
	GNSS		-	GPS/GLON/	ASS/BeiDou	
Notwork	Interface		WLAN	Micro-	B USB	
INELWOIK	Protocol	Mod	dbus/TCP, REST, MQTT, A	-	-	
	Channel	Built-in Sensors	4-ch	4-ch	-	4-ch
Analog / Sensor	Input Type	Temperature, Humiidty	V, A	2, 3-wire Pt RTD	-	V, A
Input	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	Battery Power		-		Solar Recharg	geable Battery
Input	External Power		10 ~ 50 V <sub>DC</sub>		10 ~ 5	50 Vdc









١	Wireless			Cellular			
Model Name		WISE-4470-S250	WISE-4470-S414	WISE-4470-S472	WISE-4670-S672	WISE-4670-S614	
De	escription	3G WSN with 1-port RS-485 and DIO	IP65 3G WSN with 4-ch Al	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	
	Function	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node	
IEEE Standard			GSM/GPRS/HSPA	GSM/GPRS/HSPA			
Wireless Interface	Frequency Band	UM GSM/GPRS/E	TS/HSPA: 1/8 (900/2100N DGE: 2/3/5/8(1900/1800/8	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 Protocol			Micro-B USB		Micro-	B USB	
		REST, MQTT, Azure			REST, MQTT, Azure		
	Channel	-	4-ch	-	-	4-ch	
Analog / Sensor	Input Type	-	V, A	-	-	V, A	
Input	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	Battery Power		-		Solar Recharg	eable Battery	
Input	External Power		$10 \sim 50 V_{\text{DC}}$		10 ~ 5	50 V <sub>DC</sub>	

							Software and Industry Solutions Industrial Server	
	Wireless			LPWAN				
Mo	odel 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 Al and 4-ch DI	LPWAN WSN with 4-ch RTD	Intelligent HMI and Monitors	
	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						
Wireless Interface	Frequency Band	433, 868, or 923 MHz						
internatio	Topology			Star				
	Outdoor Range			2000m (L.O.S.)				
	Configuration	RJ-45	Micro-B USB				Industrial	
Network	Protocol	Modbus/TCP, REST, MQTT, Azure	-	-	-	-	Communication	
Analog (	Channel	-	Built-in Sensors	-	4-ch	4-ch		
Sensor	Input Type	-	Temperature, Humiidty	-	V, A	2, 3-wire Pt RTD	Remote I/O & Wireless	
Input	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	Sensing Modules	
Digital Input / Output	Channel	-	-	6-ch Dry Contact DI	4-ch Dry Contact DI	-	Industrial I/O and Video Solutions	
Serial Port	Port Number	-	-	1-port RS-485 for Modbus/RTU	-	-		
Power	Battery Power	-		3 x AA, 3.6V V <sub>D0</sub>	c Lithium Battery			
Input	External Power	10 ~ 50 V <sub>DC</sub>		10 ~ {	50 V <sub>DC</sub>			





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١	Wireless		LPWAN			
Мс	odel Name	WISE-4471-S250	WISE-4471-S214	WISE-4671-S672	WISE-4671-S614	PCM-24S1S1
De	escription	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
	Function	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node	Wireless Sensor Node	Wireless Access Point
Wireless Interface	IEEE Standard		R13 LTE Ca	at M1 / NB1		IEEE 802.15.4g
Wireless	Frequency Band		00450-	10 10 00 00		433, 868, or 923 MHz
Vireless Interface Network Analog / Sensor Input Digital	Topology		2, 3, 4, 3, 6,	12, 13, 20, 20		Star
	Outdoor Range					2000m (L.O.S.)
	GPS		-	Op	2     WISE-4671-S614     P       -loT     Ourdoor eMTC/NB-loT     LP       Port     WSN with 4-AI & 4-DI     LP       ode     Wireless Sensor Node     Wireles       IE     433,     20       Option     Micro-B USB     20       Option     Micro-B USB     4-ch       VDP, CoAP     M       REST, MQTT     F       4-ch     V, A       0~10V, 0~20mA, 4~20mA     20       DI     4-ch Dry Contact DI       35     -       schargeable Battery     0	-
	Interface	Micro-B USB	Micro-B USB	Micro-B USB	Micro-B USB	mPCIE
Wireless Model Nam Descriptio IEEE Freque Interface Network Analog / Sensor Input Digital Input / Output Serial Port Power Input Exter	Protocol	UDP, CoAP REST, MQTT	UDP, CoAP REST, MQTT	UDP, CoAP REST, MQTT	UDP, CoAP REST, MQTT	Modbus/TCP, REST, MQTT
	Channel	-	4-ch	-	4-ch	-
Analog / Sensor	Input Type	-	V, A	-	V, A	-
Input	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	Battery Power		-	Solar Recharg	geable Battery	-
Input	External Power		10 ~ 5	50 V <sub>DC</sub>		-



## **IoT Wireless Sensor Devices**





			Tradition and a set
Mode	el 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
	Function	Wireless sensor device	RFID sensor
	Communication Standard	IEEE 802.15.4g	IEEE 802.15.4g and EPC Global Class 1 Gen 2
Wireless Interface	Frequency Band	868, 923 MHz	860 ~ 928 MHz
Wireless Interface	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
	Channel	3-ch	-
	Input Type	V	-
	Voltage Range	1 ~ 5 V	-
CT Input	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 Vrms
	Channel	-	4-ch (sink-type)
Digital Output	Output Rating (Resistive Load)	-	Open collector to 50 V, 400 mA max.
	Pulse Output	-	5 kHz
	Isolation	-	2,000 Vrms
Sorial Port	Port Number	-	1
Senai Port	Туре	-	RS-485
	LED Indicators	COM, USB	Status, communication, network mode, signal quality
	Real-Time Clock	-	$\checkmark$
General	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)
	Operating Temperature	-25 ~ 70°C (-13 ~ 158°F)	-25 ~ 70°C (-13 ~ 158°F)
Environment	Storage Temperature	-40 ~ 85°C (-40 ~ 185°F)	-40 ~ 85°C (-40 ~ 185°F)
Environment	Operating Humidity	20 ~ 95% RH (non-condensing)	20 ~ 95% RH (non-condensing)
	Storage Humidity	0 ~ 95% RH (non-condensing)	0 ~ 95% RH (non-condensing)
	Input Range	Micro USB: 5 V <sub>DC</sub> CT: 1 ~ 5 V <sub>DC</sub>	10 ~ 30 Vdc
Power	Protection	-	Power reversal protection
	Power Consumption	0.1 mW @ 3.3 Vpc	5 W @ 24 Vpc

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## 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-byp	Dass	-	✓
GCL		$\checkmark$	$\checkmark$
Peer-to-peer		✓	$\checkmark$
Web server (HTML5)		$\checkmark$	$\checkmark$
Configuration backup		✓	$\checkmark$
Access control		$\checkmark$	$\checkmark$
	Modbus/TCP	✓	$\checkmark$
Protocol Support	MQTT	$\checkmark$	$\checkmark$
	SNMP	✓	$\checkmark$
	RESTful	$\checkmark$	$\checkmark$

## 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.



#### 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.



Software and Industry

Industrial Server

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Intelligent System

Intelligent HMI and

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note I/O & Wireless

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Industrial I/O and Video Solutions

## **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.

ADAN

## **Real-Time Systems**

· Million Manager

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.

## **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<sub>DC</sub> 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.



## EtherNet/IP

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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.

Advantech prethods to different pro

Communication

Input/Output

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## **ADAM-6000 Series Selection Guide**











Spec.	Model	ADAM-6015	ADAM-6017	ADAM-6018	ADAM-6022	ADAM-6024
	Interface			10/100 Mbps Ethernet		
	Peer-to-Peer <sup>1</sup>		$\checkmark$		-	Receiver Only <sup>2</sup>
	GCL <sup>1</sup>		$\checkmark$		-	Receiver Only <sup>2</sup>
	Resolution		16 bit		16-bit for analog inputs 12-bit for analog outputs	16-bit for analog inputs 12-bit for analog outputs
	Channels	7	8	8	6	6
	Sampling Rate			10 Hz		
ig Input	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
nal	Current Input	-	0 ~ 20, 4 ~ 20, ±20 mA	-	0 ~ 20, 4 ~ 20 mA	0 ~ 20, 4 ~ 20 mA
A	Direct Sensor Input	Pt, Balco, and Ni RTD	-	J, K, T, E, R, S, B thermocouple	-	-
	Burnout Detection	✓	✓ (4 ~ 20mA only)	$\checkmark$	-	-
	Math. Functions	Max. Min. Avg.	Max. Min. Avg.	Max. Min. Avg.	-	-
	Channels	-	-	-	2	2
nalog utput	Current Output	-	-	-	0 ~ 20, 4 ~ 20 mA @ 15 V <sub>DC</sub>	0 ~ 20, 4 ~ 20 mA @ 15 V <sub>DC</sub>
_∢0	Voltage Output	-	-	-	0 ~ 10 V_{DC} @ 30 mA	0 ~ 10 V_{DC} @ 30 mA
	Input Channels	-	-	-	2	2
	Output Channels	-	2 (sink)	8 (sink)	2 (sink)	2 (sink)
2	Extra Counter Channels	-	-	-	-	-
ital	Counter Input	-	-	-	-	-
Dig	Frequency Input	-	-	-	-	-
	Pulse Output	-	-	-	-	-
	High/Low Alarm Settings	✓	$\checkmark$	✓	-	-
ls	olation Protection		2,000 VDC		2,000 Vdc3	2,000 VDC3
	Remark	-	-	-	Built-in dual loop PID control algorithm	-



Spec.	Widder	ADAM-6050	ADAM-6051	ADAM-6052	ADAM-6060	ADAM-6066			
Interface		10/100 Mbps Ethernet							
	Peer-to-Peer <sup>1</sup>	√	$\checkmark$	$\checkmark$	$\checkmark$	✓			
	GCL <sup>1</sup>	✓	$\checkmark$	$\checkmark$	$\checkmark$	✓			
	Input Channels	12	12	8	6	6			
	Output Channels	6 (sink)	2 (sink)	8 (source)	6-ch relay	6-ch power relay			
0/1	Extra Counter Channels	-	2	-	-	-			
ital	Counter Input	3 kHz	4.5 kHz	3 kHz	3 kHz	3 kHz			
Dig	Frequency Input	3 kHz	4.5 kHz	3 kHz	3 kHz	3 kHz			
	Pulse Output	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	✓			
	High/Low Alarm Settings	-	-	-	-	-			
ls	olation Protection			2,000 V <sub>DC</sub>					

## **ADAM-6200 Series Selection Guide**











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	Model	ADAM-6217	ADAM-6224	ADAM-6250	ADAM-6251	ADAM-6256	ADAM-6260	ADAM-6266
			De esti seu Orth 2	1	0/100Mbps Etherne	et	,	/
•	Peer-to-Peer	•	Receiver Only-	<b>v</b>	•	•	*	•
	GCL <sup>.</sup>	•	v	v	v	v	v	v
	Input Impedance	o >10MΩ (voltage) 120Ω (current)	-	-	-	-	-	-
ıput	Voltage Input	±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V	-	-		-		
	Current Input	0 ~ 20, 4 ~ 20, ±20 mA	-	-	-	-	-	-
og l	Sampling Rate	10 Hz	-	-	-	-	-	-
Anal	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	-	-	-	-	-	-
Output	Channels	-	4	-	-	-	-	-
	Voltage Output	-	$\begin{array}{c} 0  \sim  5,  0  \sim  10,  \pm 5, \\ \pm 10   V \end{array}$	-	-	-	-	-
Analog	Current Output	-	0 ~ 20, 4 ~ 20 mA	-	-	-	-	-
	Resolution	-	12-bit	-	-	-	-	-
	Input Channels	-	4 (dry contact only)	8	16	-	-	4
	Output Channels	-	-	7 (sink)	-	16 (sink)	-	-
0	Relay Output	-	-	-	-	-	6 (5 Form C + 1 Form A)	4 (Form C)
gital I/(	Contact Rating	-	-	-	-	-	250 VA 30 Vd	c @ 5A @ 5A
Ō	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
Pow	ver Consumption	3.5 W	6 W	3 W	2.7 W	3.2 W	4.5 W	4.2 W
lso	olation Voltage				2,500 VDC			
W	atchdog Timer			Comn	System (1.6 s) nunication (program	mable)		
Comm	unication Protocol			Modbus TCP, TCI	P/IP, UDP, HTTP, DH	ICP, MQTT, SNMP		
Pow	er Requirements			10 ~	$30 V_{DC}$ (24 $V_{DC}$ stan	dard)		
Opera	ating Temperature			-1	0 ~ 70°C (14 ~ 158	°F)		
Stor	age Temperature			-2	20 ~ 80°C (-4 ~ 176	°F)		
Ope	erating Humidity			20~ 9	95% RH (non-conde	ensing)		
Storage Humidity				0~9	5% RH (non-conde	nsing)		

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.

Industrial I/O and Video Solutions

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## **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			
	Resolution	16-bit	-	-	-	-	
	Channels	8			-	-	
ŧ	Sampling Rate	10 Hz	-	-	-	-	
Analog Inpu	Voltage Input	±150 mV ±500 mV ±1 V ±5 V ±10 V	-	-	-	-	
	Current Input	0 ~ 20, 4 ~ 20, ±20 mA	-	-	-	-	
	Direct Sensor Input	-	-	-	-	-	
	Resolution	-	-	-	-	-	
llog	Channels	-	-	-	-	-	
Ana Out	Current Output	-	-	-	-	-	
	Voltage Output	-	-	-	-	-	
iital O	Input Channels	-	8	16	-	-	
Dig I/	Output Channels	-	7	-	16	6-ch power relay	
Isolation Protection		2,500 VDC	2,500 VDC	2,500 VDC	2,500 VDC	2,500 VDC	
Connectors		2 x RJ-45 LAN (daisy chain) Plug-in screw terminal block (I/O and power)					

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## **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.



### **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.



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Industrial Server

Intelligent HMI and

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Remote I/O & Wireless Sensing Modules



## 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<sub>DC</sub>
- 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 sensorto-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.



## **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 will reflect the latest ADAM module information. This innovative design makes ADAM modules more flexible for IoT applications.



# I/O Module Selection Guide

### **Analog Input**

	Model	ADAM-4015	ADAM-4017+	ADAM-4018+	ADAM-4019+	
	Resolution			16	bit	
	Channels	6 differential	8 differential	8 differential	8 differential	
	Sampling Rate	10	Hz	10 Hz	10 Hz	
Analog	Voltage Input	-	±150 mV ±500 mV ±1 V ±5 V ±10 V	-	$\pm 100 \text{ mV}$ $\pm 500 \text{ mV}$ $\pm 1 \text{ V}$ $\pm 2.5 \text{ V}$ $\pm 5 \text{ V}$ $\pm 10 \text{ V}$	
mpar	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	$\checkmark$	-	$\checkmark$	✓ (4 ~ 20 mA and all T/C)	
	Channel Independent Configuration	hannel Independent		$\checkmark$	$\checkmark$	
Isolation Voltage		3,000 V <sub>DC</sub>		3,000 V <sub>DC</sub>	3,000 V <sub>DC</sub>	
W	atchdog Timer	✓ (system and comm.)	✓ (system and comm.)	✓ (system and comm.)	<ul> <li>✓ (system and comm.)</li> </ul>	
Modbus Support *		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	

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

### **Analog Output**

### **Digital Input/Output**

		Carling of the second s				
	Model	ADAM-4021	ADAM-4024	ADAM-4050	ADAM-4051	ADAM-4052
Resolution		12 bit	12 bit	-	-	-
	Channels	1	4	-	-	-
Analog Output	Voltage Output	0 ~ 10 V	±10 V	-	-	-
	Current Output	0 ~ 20, 4 ~ 20 mA	0 ~ 20, 4 ~ 20 mA	-	-	-
	Input Channels	-	4	7	16	8
Digital I/O	Output Channels	-	-	8	-	-
	Alarm Settings	-	✓	-	-	-
Isola	tion Voltage	3,000 V <sub>DC</sub>	3,000 V <sub>DC</sub>	-	2,500 V <sub>DC</sub>	5,000 V <sub>RMS</sub>
Digital LED Indicator		-	-	-	Yes	-
Watchdog Timer		✓ (system)	<ul> <li>✓ (system and comm.)</li> </ul>	✓ (system)	✓ (system and comm.)	✓ (system)
Safety Setting		-	✓	-	-	-
Modbus Support *		-	$\checkmark$	-	$\checkmark$	-

\*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		-	-	-	-	-	-	-
	Channels	-	-	-	-	-	-	-
	Sampling Rate	-	-	-	-	-	-	-
	Voltage Input	-	-	-	-	-	-	-
Analog	Current Input	-	-	-	-	-	-	-
Input	Direct Sensor Input	-	-	-	-	-	-	-
	Burnout Detection	-	-	-	-	-	-	-
	Channel Independent Configuration	-	-	-	-	-	-	-
	Channels	-	-	-	-	-	-	-
Analog Output	Voltage Output	-	-	-	-	-	-	-
	Current Output	-	-	-	-	-	-	-
	Input Channels	16	8	-	-	-	-	-
Digital I/O	Output Channels	-	8	12	4-ch relay	8-ch relay	8-ch power relay	2
	Alarm Settings	-	-	-	-	-	-	Yes
Counter	Channels	-	-	-	-	-	-	2
(32-bit)	Input Frequency	-	-	-	-	-	-	50 kHz
Isolati	on Voltage	-	2,500 V <sub>DC</sub>	5,000 V <sub>DC</sub>	-	-	-	2,500 V <sub>RMS</sub>
Digital L	ED Indicator	-	~	$\checkmark$	-	✓	-	-
Watchdog Timer		✓ (system)	<ul> <li>✓ (system and comm.)</li> </ul>	<ul> <li>✓ (system and comm.)</li> </ul>	✓ (system)	<ul> <li>✓ (system and comm.)</li> </ul>	<ul> <li>✓ (system and comm.)</li> </ul>	✓ (system)
Safet	ty Setting	-	✓	-	✓	✓	✓	-
Modbus Support *		-	$\checkmark$	$\checkmark$	-	$\checkmark$	$\checkmark$	supported in E version

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

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## **Communication and Controller Module Selection Guide**

**Repeaters** 



Model	ADAM-4510 ADAM-4510S	Intelligent HMI and Monitors
Network	RS-422 RS-485	HO)
Comm. Protocol		and Controllers
Comm. Speed (bps)	Serial: From 1,200 to 115.2K	
Comm. Distance	Serial: 1.2 km	la durate la
Interface Connectors	RS-422/485: plug-in screw terminal	Communication
LED Indicators	Communication and power	
Data Flow Control	• •	
Watchdog Timer		Remote I/O & Wireless Sensing Modules
Isolation Voltage	ADAM-4510: - ADAM-4510S: 3,000 V₀c	8
Special Features	· ·	Industrial I/O and
Built-In I/O	• •	VIDEO SOIULIONS
Power Requirements	10 ~ 30 V <sub>DC</sub>	
Operating Temperature	-10 ~ 70°C (14 ~ 158°F)	
Operating Humidity	5 ~ 95% RH	
Power Consumption	1.4 W @ 24 Vpc	





Comm. Protocol	-					
Comm. Speed (bps)	Serial: From 1,200 to 115.2K					
Comm. Distance	m. Distance Serial: 1.2 km Serial: 1.2		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	-	$\checkmark$	-	$\checkmark$		
Watchdog Timer	-	$\checkmark$	-	$\checkmark$		
Isolation Voltage	3,000 V <sub>DC</sub>	1,000 V <sub>DC</sub>	-	ADAM-4561: 3,000 VDC ADAM-4562: 2,500 VDC		
Power Requirements	10 ~ 30 V <sub>DC</sub>					
Operating Temperature	-10 ~ 70°C (14 ~ 158°F)					
Operating Humidity	5 ~ 95% RH					
Power Consumption	1.2 W @ 24 V <sub>DC</sub>	1 W @ 24 V <sub>DC</sub>	ADAM-4541: 1.5 W @ 24 VDC ADAM-4542+: 3 W @ 24 VDC	ADAM-4561: 1.5 W @ 5 VDC ADAM-4562: 1.1 W @ 5 VDC		

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## Robust RS-485 I/O Module Selection Guide

		ADDAR .			ADAM .		
	Model	ADAM-4117	ADAM-4118	ADAM-4150	ADAM-4168		
R	esolution	16	bit	-	-		
	Channels	8 diffe	erential	-	-		
	Sampling Rate	10/100	Hz (total)	-	-		
Analog Input	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	$\checkmark$	$\checkmark$	-	-		
Digital I/O	Input Channels	-	-	7	-		
Digital I/O	Output Channels	-	-	8	8-ch relay		
Countor	Channels	-	-	7	-		
Counter	Input Frequency	-	-	3 kHz	-		
Isola	tion Voltage	3,000 V <sub>DC</sub>					
Digital	LED Indicator	Communication and Power					
Wato	chdog Timer	Yes (System & Communication)					
Saf	ety Setting	✓ <b>∨</b>					
Communication Protocol		ASCII Command/Modbus					
Power Requirements		10 ~ 48 V <sub>DC</sub>					
Operatii	ng Temperature		-40 ~ 85°C (	-40 ~ 185°F)			
Storag	e Temperature		-40 ~ 85°C (	-40 ~ 185°F)			
Opera	ting Humidity		5 ~ 95	5% RH			
Power	Consumption	1.2 W @ 24 V <sub>DC</sub>	0.5 W @ 24 V <sub>DC</sub>	0.7 W @ 24 V <sub>DC</sub>	1.8 W @ 24 V <sub>DC</sub>		
	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	$\checkmark$				
Isolation Voltage	3,000 V <sub>DC</sub>				
Power Requirements	10 ~ 48 V <sub>DC</sub>				
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 <sub>DC</sub>	1.2 W @ 24 V <sub>DC</sub>			
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