

RS-485 I/O Modules: ADAM-4000

RS-485 I/O Modules

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Advanced Communication & I/O Modules

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| ADAM-4520I | Robust RS-232 to RS-422/485 Converter | 16-10 |
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Communication & Controller Modules

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|-----------------------|---|--------------|
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| ADAM-4520/4522 | RS-232 to RS-422/485 Converter | 16-12 |
| ADAM-4521 | Addressable RS-422/485 to RS-232 Converter | |
| ADAM-4541 | Multi-mode Fiber Optic to RS-232/422/485 Converter | |
| ADAM-4542+ | Single-mode Fiber Optic to RS-232/422/485 Converter | 16-13 |
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Analog Input Modules

| | | |
|-------------------|--|--------------|
| ADAM-4011 | 1-ch Thermocouple Input Module | |
| ADAM-4012 | 1-ch Analog Input Module | 16-14 |
| ADAM-4013 | 1-ch RTD Input Module | |
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| ADAM-4015T | 6-ch Thermistor Module with Modbus | 16-15 |
| ADAM-4016 | 1-ch Analog Input/Output Module | |
| ADAM-4017+ | 8-ch Analog Input Module with Modbus | |
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Analog Output Modules

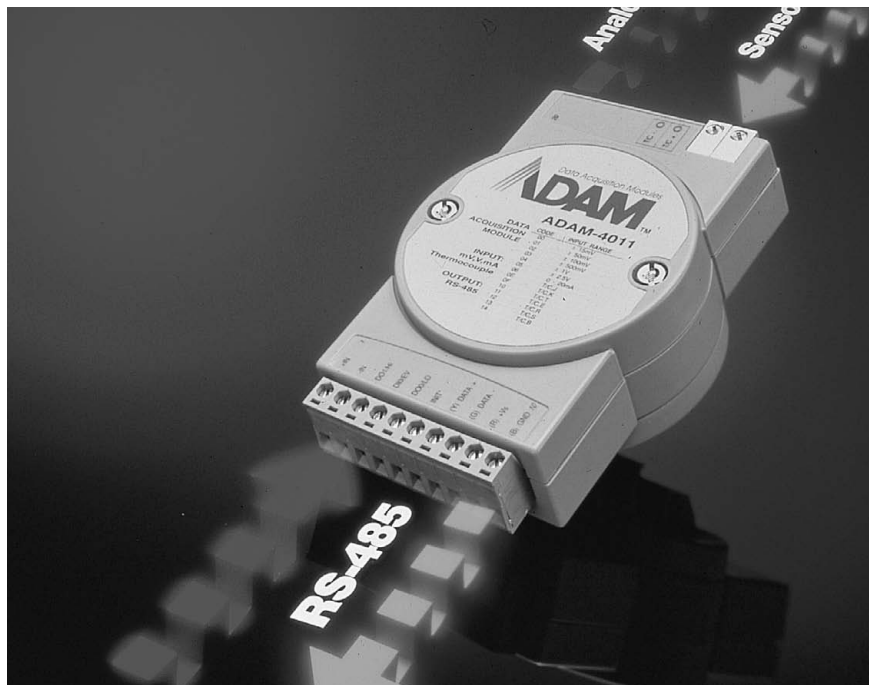
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|-------------------|--|--------------|
| ADAM-4021 | 1-ch Analog Output Module | |
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| | | |
|------------------|---|--------------|
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To view all of Advantech's RS-485 I/O Modules: ADAM-4000, please visit www.advantech.com/products.

ADAM-4000 Series



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

Introduction

The ADAM-4000 series modules are compact, versatile sensor-to-computer interface units designed specifically for reliable operation in harsh environments. Their built-in microprocessors, encased in rugged industrial grade plastic, 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.



General Features

RS-485

The ADAM-4000 series of modules use the EIA RS-485 communication protocol, the industry's most widely used bi-directional, balanced transmission line standard. The EIA RS-485 was specifically developed for industrial applications. It lets ADAM-4000 modules transmit and receive data at high rates over long distances. All modules use optical isolators to prevent ground loop problems and reduce damages caused by power surges.

Modbus Communication Protocol

Since Modbus is one of the most popular communication standards in the world, Advantech has applied it as the major communication protocol for eAutomation product development. The new-generation ADAM-4000 modules now also support the Modbus/RTU protocol as the remote data transmission mechanism. Featuring the Modbus-support capacity, the new ADAM-4000 series becomes universal remote I/O modules, which work with any Modbus systems. The HMI server or controller can read/write data via standard Modbus command 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 provides great reliability to the system.

Flexible Networking

ADAM-4000 series modules need just two wires to communicate with their controlling host computer over a multidrop RS-485 network. Their ASCII-based command/response protocol ensures compatibility with virtually any computer system.

Modular Industrial Design

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

Controller Features

Alternative Standalone Control Solution

A standalone control solution is made possible when the ADAM-4000 series modules are controlled by the ADAM-4501 or ADAM-4502 PC-based communication controller. The ADAM-4501 and ADAM-4502 allow users to download an application (written in a high-level programming language) into its Flash ROM. This allows customization for your applications.

Remote Data Acquisition and Control Modules Overview

I/O Module Features

Remotely Programmable Input Ranges

The ADAM-4000 series modules stand out because of their ability to accommodate multiple types and ranges of analog input. The type and range can be remotely selected by issuing commands from a host computer. One type of module satisfies many different tasks, which greatly simplifies design and maintenance. A single kind of module can handle the measurement needs of a whole plant. Since all modules are remotely configured by the host computer, physical adjustments are unnecessary.

Easy Plug-in System Integration

With 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

Ethernet

ADAM-4570 and ADAM-4571 are designed for the connection between serial devices (RS-232/422/485) and Ethernet. With ADAM-4570 or ADAM-4571, you can use graphical control software to monitor and control I/O modules. With existing devices, you can connect to an Ethernet network with the benefits of enhanced host performance and convenience.

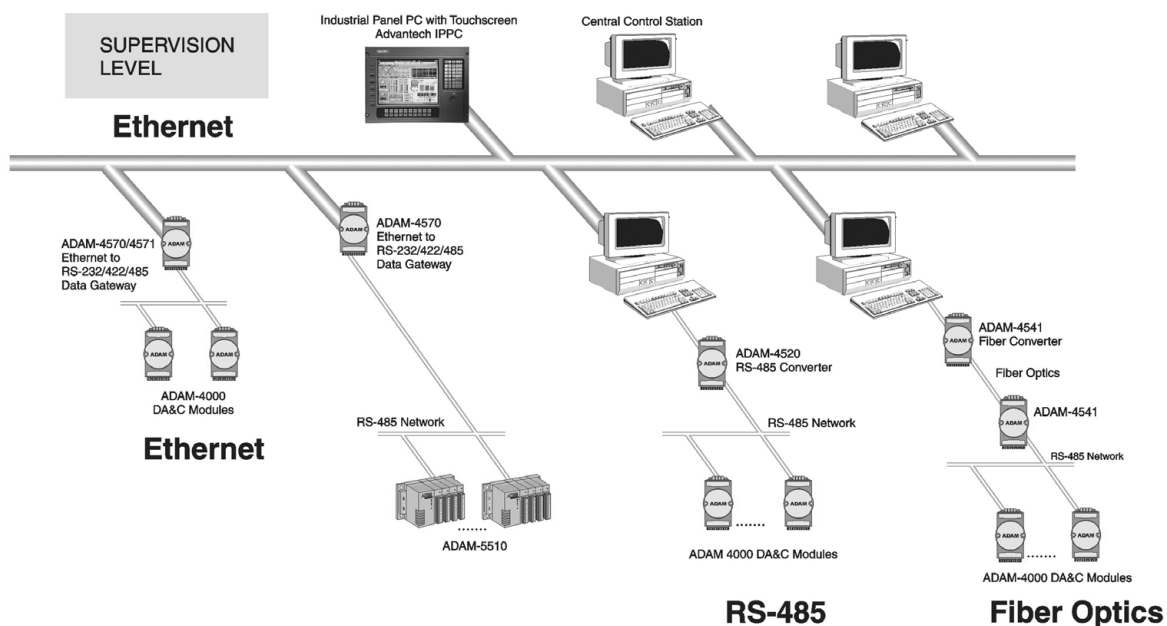
Fiber Optics

If users need to transmit over long distances without noise interference, ADAM-4541 and ADAM-4542+ are designed for this task. The ADAM-4541 is a multi-mode converter, which carries signals from fiber optics to RS-232/422/485. It offers a transmission distance of up to 2,500 m with a total immunity to electromagnetic noise. The ADAM-4542+ is a single-mode converter, which carries signals from fiber to optics to RS-232/422/485. It offers a transmission distance of up to 15 km with total immunity to electromagnetic noise.

USB Communications

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

ADAM-4000 Remote Data Acquisition and Control System



- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
- 5 Automation Software
- 6 Operator Panels
- 7 Automation Panel PCs
- 8 Industrial Monitors
- 9 Industrial Ethernet
- 10 Device Servers & Gateways
- 11 Serial Communication Cards
- 12 Embedded Auto. Computers
- 13 PACs
- 14 M2M I/O
- 15 Distributed Nano Controllers
- 16 RS-485 I/O
- 17 Ethernet I/O
- 18 DAQ Boards

Communication and Controller Module Selection Guide

Controllers



Repeaters



| Model | ADAM-4501 | ADAM-4502 | ADAM-4022T | ADAM-4510 ADAM-4510S |
|-----------------------|--|-----------------------|-----------------------------------|---|
| Network | Ethernet, RS-232, RS-485 | | RS-485 | RS-422 RS-485 |
| Comm. Protocol | Modbus/RTU, Modbus/TCP TCP/IP, UDP, ICMP, ARP, DHCP | | ASCII Command/ Modbus | - |
| Comm. Speed (bps) | Ethernet: 10/100M Serial: From 1,200 to 115.2 kbps | | Serial: From 1,200 to 115.2 k | Serial: From 1,200 to 115.2 k |
| Comm. Distance | Ethernet: 100 m Serial: 1.2 Km | | Serial: 1.2 km | Serial: 1.2 km |
| Interface Connectors | Ethernet: RJ-45 RS-485: plug-in screw terminal RS-232: RJ-48 | | RS-485: plug-in screw terminal | RS-422/485: plug-in screw terminal |
| LED Indicators | Communication & Power | | Power | Communication & Power |
| Data Flow Control | Yes | | Yes | - |
| Watchdog Timer | Yes | | Yes | - |
| Isolation Voltage | - | 1,000 V _{DC} | 3,000 V _{DC} | ADAM-4510: - ADAM-4510S: 3,000 V _{DC} |
| Special Features | Email function Built-in HTTP and FTP Server | | PID Control | - |
| Built-in I/O | 4DI/4DO | 1AI/1AO/2DI/2DO | - | - |
| Power Requirement | 10 ~ 30 V _{DC} | | | 10 ~ 30 V _{DC} |
| Operating Temperature | -10 ~ 70°C (14 ~ 158°F) | | | -10 ~ 70°C (14 ~ 158°F) |
| Humidity | 5 ~ 95% RH | | | 5 ~ 95% RH |
| Power Consumption | 4 W @ 24 V _{DC} | | | 1.4 W @ 24 V _{DC} |
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Converters



| Model | ADAM-4520 ADAM-4522 | 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 115.2 k | | | |
| 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 & Power | | | |
| Data Flow Control | - | Yes | - | Yes |
| Watchdog Timer | - | Yes | - | Yes |
| Isolation Voltage | ADAM-4520: 3,000 V _{DC} ADAM-4522: - | 1,000 V _{DC} | - | ADAM-4561: 3,000 V _{DC} ADAM-4562: 2,500 V _{DC} |
| Power Requirement | 10 ~ 30 V _{DC} | | | |
| Operating Temperature | -10 ~ 70°C (14 ~ 158°F) | | | |
| 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} |
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I/O Module Selection Guide

Analog Input



| Model | ADAM-4011 | ADAM-4012 | ADAM-4013 | ADAM-4015 ADAM-4015T | ADAM-4016 | ADAM-4017+ |
|-------------------------------------|--|---|----------------|---|--|---|
| Resolution | 16 bit | | | | | |
| Channels | 1 differential | 1 differential | 1 differential | 6 differential | 1 differential | 8 differential |
| Sampling Rate | 10 Hz | | | | | |
| Voltage Input | ±15 mV ±50 mV ±100 mV ±500 mV ±1 V ±2.5 V | ±150 mV ±500 mV ±1 V ±5 V ±10 V | - | - | ±15 mV ±50 mV ±100 mV ±500 mV | ±150 mV ±500 mV ±1 V ±5 V ±10 V |
| Current Input | ±20 mA | ±20 mA | - | - | ±20 mA | 4 ~ 20 mA ±20 mA |
| Direct Sensor Input | J, K, T, E, R, S, B Thermocouple | - | RTD | ADAM-4015: RTD ADAM-4015T: Thermistor | - | - |
| Burn-out Detection | Yes | - | - | Yes | - | - |
| Channel Independent Configuration | - | - | - | Yes | - | Yes |
| Analog Output Channels | - | - | - | - | 1 | - |
| Voltage Output | - | - | - | - | 0 - 10 V | - |
| Current Output | - | - | - | - | 30 mA | - |
| Digital Input/Output Input Channels | 1 | 1 | - | - | - | - |
| Output Channels | 2 | 2 | - | - | 4 | - |
| Alarm Settings | Yes | Yes | - | - | - | - |
| Counter (32-bit) Channels | - | - | - | - | - | - |
| Input Frequency | - | - | - | - | - | - |
| Isolation Voltage | 3,000 V _{DC} | | | | | |
| Digital LED Indicator | - | | | | | |
| Watchdog Timer | Yes (System) | Yes (System) | Yes (System) | Yes (System & Comm.) | Yes (System) | Yes (System & Comm.) |
| Safety Setting | - | | | | | |
| Modbus Support * | - | - | - | Yes | - | Yes |
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*: All ADAM-4000 I/O Modules support ASCII Commands

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I/O Module Selection Guide

Analog Input

Analog Output

Digital Input/Output

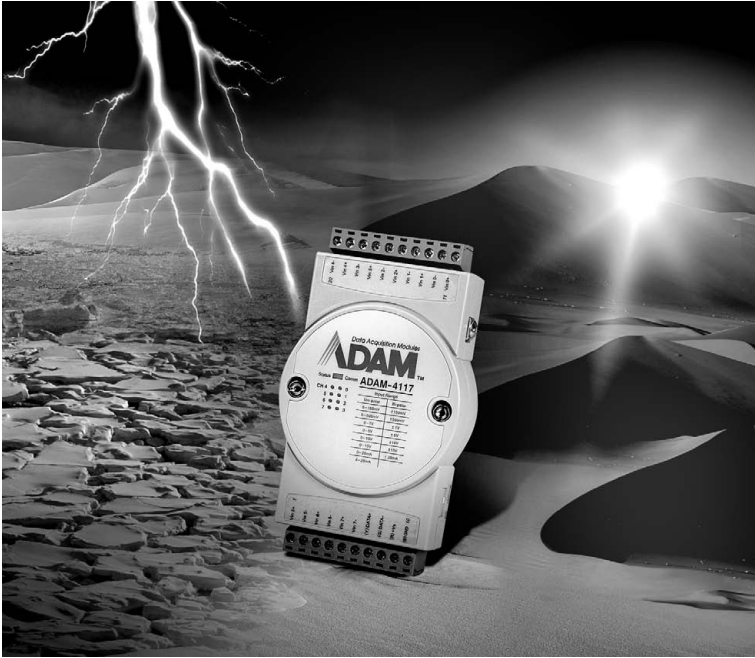


| Model | | ADAM-4018+ | ADAM-4019+ | ADAM-4021 | ADAM-4024 | ADAM-4050 | ADAM-4051 |
|-----------------------|-----------------------------------|-------------------------------------|---|------------------------|------------------------|--------------|-----------------------|
| Resolution | | 16 bit | | 12 bit | 12 bit | - | - |
| Analog Input | Channels | 8 differential | 8 differential | - | - | - | - |
| | Sampling Rate | 10 Hz | 10 Hz | - | - | - | - |
| | Voltage Input | - | ± 100 mV ± 500 mV ± 1 V ± 2.5 V ± 5 V ± 10 V | - | - | - | - |
| | Current Input | 4 ~ 20 mA ±20 mA | 4 ~ 20 mA ±20 mA | - | - | - | - |
| | Direct Sensor Input | J, K, T, E, R, S, B Thermocouple | J, K, T, E, R, S, B Thermocouple | - | - | - | - |
| | Burn-out Detection | Yes | Yes (4 ~ 20 mA & All T/C) | - | - | - | - |
| | Channel Independent Configuration | Yes | Yes | - | - | - | - |
| Analog Output | Channels | - | - | 1 | 4 | - | - |
| | Voltage Output | - | - | 0 ~ 10 V | ±10 V | - | - |
| | Current Output | - | - | 0 ~ 20 mA 4 ~ 20 mA | 0 ~ 20 mA 4 ~ 20 mA | - | - |
| Digital Input/Output | Input Channels | - | - | - | 4 | 7 | 16 |
| | Output Channels | - | - | - | - | 8 | - |
| | Alarm Settings | - | - | - | Yes | - | - |
| Counter (32-bit) | Channels | - | - | - | - | - | - |
| | Input Frequency | - | - | - | - | - | - |
| Isolation Voltage | | 3,000 V _{DC} | 3,000 V _{DC} | 3,000 V _{DC} | 3,000 V _{DC} | - | 2,500 V _{DC} |
| Digital LED Indicator | | - | - | - | - | - | Yes |
| Watchdog Timer | | Yes (System & Comm.) | Yes (System & Comm.) | Yes (System) | Yes (System & Comm.) | Yes (System) | Yes (System & Comm.) |
| Safety Setting | | - | - | - | Yes | - | - |
| Modbus Support * | | Yes | Yes | - | Yes | - | Yes |
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*: All ADAM-4000 I/O Modules support ASCII Commands

ADAM-4100 Series

Robust Remote Data Acquisition and Control Modules Overview



Introduction

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

The ADAM-4000 robust family is designed to endure more severe and adverse environments. The operating temperature is $-40 \sim 85^{\circ}\text{C}$ which makes them suitable for more widespread applications.

Designed for Severe Industrial Environments

Broader Operating Temperature Range

The ADAM-4000 robust family supports a broad operating temperature range of -40 to 85°C .

Higher Noise Immunity

In order to prevent noise from affecting your system, the ADAM-4000 robust family has been designed with more protection to counteract these effects. New standard features include: 1 kV surge protection on power inputs, 3 kV EFT, and 8 kV ESD protection.

Broader Power Input Range

The ADAM-4000 robust family accepts any unregulated power source between 10 and 48 V_{DC}. In addition, they are also protected against accidental power reversals, and can be safely connected or disconnected without disturbing a running network.

New Features for I/O Modules

- **ADAM-4117/4118**
 1. Supports 200 V_{DC} High Common Mode voltage
 2. Software Filter
 3. Supports Auto Optimized Working Frequency
 4. Auto noise rejection at 50/60 Hz
 5. Higher over voltage protection ± 60 V_{DC}
 6. Optional Sampling Rate 10 or 100 samples/sec
 7. Supports unipolar and bipolar input (ADAM-4117 only)
 8. Supports $\pm 15\text{V}$ input range (ADAM-4117 only)

▪ ADAM-4150

1. Over current and temperature protection circuit
2. DI channels support counter (32-bit, overflow flag) and frequency type signal input
3. DO channels support pulse (1 kHz) and delay (high-to-low and low-to-high) type signal output
4. Support invert DI status

▪ ADAM-4168

1. Supports 1 kHz pulse output

ADAM-4100 Module with LED Display

The ADAM-4100 series modules have a LED display that lets you monitor the channel status. Using ADAM-4117/4118, the LED will be lit when related channel is active. Using ADAM-4150/4168, the LED will be lit when related channel value is high. The ADAM-4100 series modules have two operating modes (initial and normal), unlike the old module using extra wiring, ADAM-4100 modules can use the switch on the case to set "initial" mode or "normal" mode. It is very convenient for the user to configure. When you set to "initial" mode, the LED display can represent the node address of that module. Besides, when you use multiple ADAM-4100 series modules, you can locate the module through ADAM utility and LED display. All of these functions are very helpful to diagnose the ADAM-4100 series system.

Online Firmware Updates

The ADAM-4100 series modules have a friendly and convenient design where firmware can be updated through a local network or the Internet. You can easily update latest firmware using utility on host PC. This saves time and ensures that the module always runs with the latest functional enhancements.

Legacy Communication Protocol Support

To satisfy both the current ADAM users, and Modbus users, The ADAM-4100 series modules support both the ADAM (ASCII) protocol and the Modbus/RTU protocol. You can select the communication mode you want through the Windows Utility Software. The Modbus protocol not only supports the original data format (N, 8, 1) for (parity check, data bit, stop check) but also accepts (N, 8, 1) (N, 8, 2) (E, 8, 1) (O, 8, 1).

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 mA, ±20 mA, 4 ~ 20 mA | ±20 mA, 4 ~ 20 mA | - | - |
| | Direct Sensor Input | - | J, K, T, E, R, S, B Thermocouple | - | - |
| | Burn-out Detection | Yes (mA) | Yes (mA and All T/C) | - | - |
| | Channel Independent Configuration | Yes | | - | - |
| Digital Input/ Output | 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 | | - | - | Yes | Yes |
| Communication Protocol | | ASCII Command/Modbus | | | |
| Power Requirement | | 10 ~ 48 V _{DC} | | | |
| Operating Temperature | | -40 ~ 85°C (-40 ~ 185°F) | | | |
| Storage Temperature | | -40 ~ 85°C (-40 ~ 185°F) | | | |
| 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} |
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| 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 | Yes | |
| Isolation Voltage | 3,000 V _{DC} | |
| Power Requirement | 10 ~ 48 V _{DC} | |
| Operating Temperature | -40 ~ 85°C (-40 ~ 185°F) | |
| Storage Temperature | -40 ~ 85°C (-40 ~ 185°F) | |
| Humidity | 5 ~ 95% | |
| Power Consumption | 1.4 W @ 24 V _{DC} | 1.2 W @ 24 V _{DC} |
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- 1 Motion Control
- 2 Hazardous Location
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- 6 Operator Panels
- 7 Automation Panel PCs
- 8 Industrial Monitors
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- 10 Device Servers & Gateways
- 11 Serial Communication Cards
- 12 Embedded Auto. Computers
- 13 PACs
- 14 M2M I/O
- 15 Distributed Nano Controllers
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- 17 Ethernet I/O
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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



ADAM-4520I



ADAM-4117



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}

Analog Input

- **Channels** 8 differential and independent configuration channels
- **Input Impedance** Voltage: 20 M Ω
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, ± 1 V, ± 5 V, ± 10 V, ± 15 V, ± 20 mA, 0 ~ 20 mA, 4 ~ 20mA
- **Accuracy** Voltage mode : $\pm 0.1\%$ or better
Current mode : $\pm 0.2\%$ or better
- **Resolution** 16 bits
- **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/ $^{\circ}$ C
- **Zero Drift** $\pm 6\mu$ V/ $^{\circ}$ 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

- **Humidity** 5 ~ 95% RH
- **Operating Temperature** - 40 ~ 85 $^{\circ}$ C (-40 ~ 185 $^{\circ}$ F)
- **Storage Temperature** - 40 ~ 85 $^{\circ}$ C (-40 ~ 185 $^{\circ}$ 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

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



ADAM-4150



ADAM-4168



Specifications

General

- Power Consumption 0.5W @ 24 V_{DC}

Analog Input

- Channels 8 differential and independent configuration channels
- Input Impedance Voltage: 20 M Ω
Current: 120 Ω
- Input Type T/C, mV, V, mA
- Input Range Thermocouple
J 0 ~ 760°C
K 0 ~ 1370°C
T -100 ~ 400°C
E 0 ~ 1,000°C
R 500 ~ 1,750°C
S 500 ~ 1,750°C
B 500 ~ 1,800°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: $\pm 0.1\%$ or better
Current mode: $\pm 0.2\%$ 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
- Zero Drift $\pm 6 \mu$ V/°C
- Built-in TVS/ESD Protection
- Burn-out 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 (1 A max. load)
- Power Dissipation 1W load max
- RON Maximum 150 m Ω
- 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 0.5 A @ 120 V_{AC} (Resistive)
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 On: 3ms
Off: 1ms
- Total Switching Time 10 ms
- Supports 100 Hz pulse output
- Maximum Operating Speed 50 operations/min (at related load)

1
Motion Control

2
Hazardous Location

3
Energy Automation

4
Building Automation Systems

5
Automation Software

6
Operator Panels

7
Automation Panel PCs

8
Industrial Monitors

9
Industrial Ethernet

10
Device Servers & Gateways

11
Serial Communication Cards

12
Embedded Auto. Computers

13
PACs

14
M2M I/O

15
Distributed Nano Controllers

16
RS-485 I/O

17
Ethernet I/O

18
DAQ Boards

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}

- Supported Protocols ASCII Command and Modbus/RTU

Environment

- 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 18-ch Relay Output Module with Modbus

ADAM-4510/S ADAM-4520/4522 ADAM-4521

RS-422/485 Repeater

RS-232 to RS-422/485 Converter

Addressable RS-422/485 to RS-232 Converter



ADAM-4510/4510S    

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)



ADAM-4520/4522    

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} (ADAM-4520)
- **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)



ADAM-4521    

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

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-4522** RS-232 to RS-422/485 Converter
- **ADAM-4521** Addressable RS-422/485 to RS-232 Converter

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



ADAM-4542+



ADAM-4561/4562



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}

Serial Communications

- **Communication Mode** Asynchronous
- **Speed Modes (bps)** 1,200, 2,400, 4,800, 9,600, 19.2 k, 38.4 k, 57.6 k, 115.2 k and RS-232/422 mode (switchable)
- **Transmission Mode** Full/half duplex, bidirectional

Fiber Optic Communications

- **Optical Power Budget (Attenuation)** 12.5 dB (measured with 62.5/125 μm)
- **Transmission Distance** 2.5 km
- **Transmission Mode** Multi mode (Send and Receive)
- **Wavelength** 820 nm

Specifications

General

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

Serial Communications

- **Communication Mode** Asynchronous
- **Speed Modes (bps)** 1,200, 2,400, 4,800, 9,600, 19.2 k, 38.4 k, 57.6 k, 115.2 k and RS-232/422 mode (switchable)
- **Transmission Modes** Full/half duplex, bidirectional

Fiber Optic Communications

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

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: 2,500 V_{AC}
- ADAM-4562: 2,500 V_{AC}

Power Consumption

- ADAM-4561: 1.5 W @ 5 V
- ADAM-4562: 1.1 W @ 5 V

Driver Support

- ADAM-4561: Windows 2000/2003/XP/Vista/7
- ADAM-4562: Windows 98/2000/XP

USB Specification Compliance

- ADAM-4561: USB2.0
- ADAM-4562: USB1.1

Serial Communications

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

Common Specifications

Environment

- **Humidity** 5 ~ 95% RH
- **Operating Temperature** -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

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
- 5 Automation Software
- 6 Operator Panels
- 7 Automation Panel PCs
- 8 Industrial Monitors
- 9 Industrial Ethernet
- 10 Device Servers & Gateways
- 11 Serial Communication Cards
- 12 Embedded Auto. Computers
- 13 PACs
- 14 M2M I/O
- 15 Distributed Nano Controllers
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- 17 Ethernet I/O
- 18 DAQ Boards

ADAM-4011 ADAM-4012 ADAM-4013

1-ch Thermocouple Input Module

1-ch Analog Input Module

1-ch RTD Input Module



ADAM-4011



ADAM-4012



ADAM-4013



Specifications

General

- Power Consumption 1.4 W @ 24 V_{DC}
- Supported Protocols ASCII command

Analog Input

- Channels 1
- Input Impedance Voltage: 2 M Ω
Current: 125 Ω
- Input Type T/C, mV, V or mA
- Input Range ± 15 mV, ± 50 mV, ± 100 mV,
 ± 500 mV, ± 1 V,
 ± 2.5 V, ± 20 mA
- Accuracy Voltage mode: $\pm 0.1\%$ or better
Current mode: $\pm 0.2\%$ or better

T/C Type and Temperature 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 | | |

- Span Drift ± 25 ppm/ $^{\circ}$ C
- Zero Drift ± 6 μ V/ $^{\circ}$ C

Digital Input

- Channels 1
Logic level 0: 1 V max.
Logic level 1: 3.5 ~ 30 V
Pull up current: 0.5 mA,
10 k Ω resistor to 5 V
- Event Counter Max. input freq: 50 Hz

Digital Output

- Channels 2, open collector to 30 V, 30 mA max. load
- Power Dissipation 300 mW
- Supports high/low alarms

Common Specifications

General

- Power Input Unregulated 10 ~ 30 V_{DC}
- Connectors 1 x plug-in terminal block (#14 ~ 22 AWG)
- Watchdog Timer System (1.6 second)

Analog Input

- Resolution 16-bit
- Sampling Rate 10 sample/second

Specifications

General

- Power Consumption 1.2 W @ 24 V_{DC}
- Supported Protocols ASCII command

Analog Input

- Channels 1
- Input Impedance Voltage: 20 M Ω
Current: 125 Ω
- Input Type mV, V or mA
- Input Range ± 150 mV, ± 500 mV, ± 1 V,
 ± 5 V, ± 10 V and ± 20 mA
- Accuracy Voltage mode: $\pm 0.1\%$ or better
Current mode: $\pm 0.2\%$ or better
- Span Drift ± 25 ppm/ $^{\circ}$ C
- Zero Drift ± 6 μ V/ $^{\circ}$ C

Digital Input

- Channels 1
Logic level 0: 1 V max.
Logic level 1: 3.5 ~ 30 V
pull up current: 0.5 mA,
10 k Ω resistor to 5 V
- Event Counter Max. input freq.: 50 Hz
Min. input pulse width: 1 msec.

Digital Output

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

Specifications

General

- Power Consumption 0.7 W @ 24 V_{DC}
- Supported Protocols ASCII command

Analog Input

- Channels 1
 - Input Connections 2 or 3-wire
 - Input Impedance 2 M Ω
 - Input Type Pt or Ni RTD
 - RTD Types and Temperature Ranges
- | IEC RTD 100 ohms | | | |
|------------------|--------|----|--------------------|
| Pt | -100°C | to | +100°C a = 0.00385 |
| Pt | 0°C | to | +100°C a = 0.00385 |
| Pt | 0°C | to | +200°C a = 0.00385 |
| Pt | 0°C | to | +600°C a = 0.00385 |
- | JIS RTD 100 ohms | | | |
|------------------|--------|----|---------------------|
| Pt | -100°C | to | +100°C a = 0.003916 |
| Pt | 0°C | to | +100°C a = 0.003916 |
| Pt | 0°C | to | +200°C a = 0.003916 |
| Pt | 0°C | to | +600°C a = 0.003916 |
- | Ni RTD | | | |
|--------|-------|----|--------|
| Ni | -80°C | to | +100°C |
| Ni | 0°C | to | +100°C |
- Accuracy $\pm 0.1\%$ or better
 - Span Drift ± 25 ppm/ $^{\circ}$ C
 - Zero Drift ± 3 μ V/ $^{\circ}$ C

Ordering Information

- ADAM-4011 1-ch Thermocouple Input Module
- ADAM-4012 1-ch Analog Input Module
- ADAM-4013 1-ch RTD Input Module

ADAM-4015 ADAM-4015T ADAM-4016

6-ch RTD Module with Modbus

6-ch Thermistor Module with Modbus

1-ch Analog Input/Output Module



ADAM-4015



ADAM-4015T



ADAM-4016



Specifications

General

- Connectors 2 x plug-in terminal blocks (#14 ~ 28 AWG)
- Power Consumption 1.2 W @ 24 V_{DC}
- Watchdog Timer System (1.6 s) & Communication
- Supported Protocols ASCII command and Modbus/RTU
- Burn-out Detection Yes

Analog Input

- Channels 6 differential
- Input Connections 2 or 3-wire
- Input Impedance 10 MΩ
- Input Type Pt, Balco and Ni RTD
- RTD Types and Temperature Ranges
 - Pt 100 RTD:
 - Pt -50°C to 150°C
 - Pt 0°C to 100°C
 - Pt 0°C to 200°C
 - Pt 0°C to 400°C
 - Pt -200°C to 200°C
 - IEC RTD 100 ohms (a = 0.00385)
 - JIS RTD 100 ohms (a = 0.00392)
 - Pt 1000 RTD
 - Pt -40°C to 160°C
 - Balco 500 RTD
 - 30°C to 120°C
 - Ni 50 RTD
 - Ni -80°C to 100°C
 - Ni 508 RTD
 - Ni 0°C to 100°C
 - BA1
 - 200°C to 600°C
- Accuracy ±0.1% or better
- CMR @ 50/60 Hz 120 dB
- Span Drift ±25 ppm/°C
- Zero Drift ±3 μV/°C

Specifications

General

- Connectors 2 x plug-in terminal blocks (#14 ~ 28 AWG)
- Power Consumption 1.2 W @ 24 V_{DC}
- Watchdog Timer System (1.6 s) & Communication
- Supported Protocols ASCII command and Modbus/RTU
- Burn-out Detection Yes

Analog Input

- Channels 6 differential
- Input Connections 2, 3-wire
- Input Impedance 10 MΩ
- Input Type Thermistor (NTC)
- Thermistor Types and Temperature Ranges
 - Thermistor 3 k 0 ~ 100°C
 - Thermistor 10 k 0 ~ 100°C
- Accuracy ±0.1% or better
- CMR @ 50/60 Hz 120 dB
- Span Drift ±25 ppm/°C
- Zero Drift ±3 μV/°C

Specifications

General

- Connectors 2 x plug-in terminal blocks (#14 ~ 22 AWG)
- Power Consumption 2.2 W @ 24 V_{DC}
- Watchdog Timer System (1.6 s)
- Supported Protocols ASCII command

Analog Input

- Channels 1 differential
- Input Impedance Voltage: 2 MΩ
Current: 125 Ω
(Added by users)
- Input Type mV and mA
- Input Range ±15 mV, ±50 mV, ±100 mV, ±500 mV, ±20 mA
- Accuracy Voltage mode: ±0.1% or better
Current mode: ±0.2% or better
- CMR @ 50/60 Hz 150 dB
- Span Drift ±25 ppm/°C
- Zero Drift ±6 μV/°C

Analog Output

- Channels 1
- Accuracy 0.05% of FSR
- Output Type V
- Output Range 0 ~ 10 V
- Drift ±50 ppm/°C
- Drive Current 30 mA
- Isolation Voltage 3,000 V_{DC}

Digital Output

- Channels 4, open collector to 30 V, 30 mA max. load
- Power Dissipation 300 mW

Common Specifications

General

- Power Input Unregulated 10 ~ 30 V_{DC}

Analog Input

- Resolution 16 bits
- NMR @ 50/60 Hz 100 dB
- Sampling Rate 10 sample/second (total)
- Isolation Voltage 3,000 V_{DC}

Environment

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

Ordering Information

- ADAM-4015 6-ch RTD Input Module with Modbus
- ADAM-4015T 6-ch Thermistor Input Module with Modbus
- ADAM-4016 1-ch Analog Input/Output Module

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
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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+



ADAM-4018+



ADAM-4019+



Specifications

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

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** 0 ~ 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 | | |

- **Burn-out Detection** All T/C

Specifications

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 | | |

- **Burn-out 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
- **Zero Drift** ±6 μV/°C
- **Built-in TVS/ESD Protection**

Environment

- **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

ADAM-4021 ADAM-4022T ADAM-4024

1-ch Analog Output Module

2-ch Serial Based Dual Loop PID Controller with Modbus

4-ch Analog Output Module with Modbus



ADAM-4021



ADAM-4022T



ADAM-4024



Specifications

General

- Connectors** 2 x plug-in terminal blocks (#14 ~ 22 AWG)
- Power Consumption** 1.4 W @ 24 V_{DC}
- Watchdog Timer** System (1.6 second)
- Supported Protocols** ASCII command

Analog Output

- Channels** 1
- Output Impedance** 0.5 Ω
- Output Range** 0 ~ 20 mA, 4 ~ 20 mA, 0 ~ 10 V
- Output Type** mA, V
- Accuracy** ±0.1% of FSR for current output
±0.2% of FSR for voltage output
- Current Load Resistor** 0 to 500 Ω (source)
- Resolution** 12-bit
- Isolation Voltage** 3,000 V_{DC}
- Programmable Output Slope** 0.125 ~ 128 mA/sec.
0.0625 ~ 64.0 V/sec.
- Readback Accuracy** ±1% of FSR
- Span Temperature Coefficient** ±25 ppm/°C
- Zero Drift** Voltage output: ±30 μV/°C
Current output: ±0.2 μA/°C

Common Specifications

General

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

Environment

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

Specifications

General

- Connectors** 2 x plug-in terminal blocks (#14 ~ 28 AWG)
- Power Consumption** 4 W @ 24 V_{DC}
- Watchdog Timer** System (1.6 second)
- Supported Protocols** ASCII command and Modbus/RTU

Analog Input (Only AI0 and AI2 are the PID input)

- Channels** 4
- Input Type** mA, V, Thermistor, RTD
- Input Range** 0 ~ 20 mA, 4 ~ 20 mA, 0 ~ 10 V
- Thermistor Type and Temperature Ranges** Thermistor 3 K (NTC): 0 ~ 100°C
Thermistor 10 K (NTC): 0 ~ 100°C
- RTD Type and Temperature Ranges** Pt 100 RTD Pt 0 ~ 100°C Pt -100 ~ 100°C
Pt 0 ~ 600°C Pt 0 ~ 200°C
IEC RTD 100 ohms (a = 0.00385)
JIS RTD 100 ohms (a = 0.00392)
Pt 1000 RTD Pt -40 ~ 160°C
- Resolution** 16-bit
- Sampling Rate** 10 sample/second
- Isolation Voltage** 3,000 V_{DC}

Analog Output

- Channels** 2
- Output Range** 0 ~ 20 mA, 4 ~ 20 mA, 0 ~ 10 V
- Output Type** mA, V
- Resolution** 12-bit
- Isolation Voltage** 3,000 V_{DC}

Digital Input

- Channels** 2
- Dry Contact** Logic level 0-close to GND
Logic level 1-open

Digital Output

- Channels** 2
- Power Dissipation** Open Collector to 30 V, 30 mA max. load
300 mW

Specifications

General

- Connectors** 2 x plug-in terminal blocks (#14 ~ 28 AWG)
- Power Consumption** 3 W @ 24 V_{DC}
- Watchdog Timer** System (1.6 second) & Communication
- Supported Protocols** ASCII command and Modbus/RTU

Analog Output

- Channels** 4
- Output Impedance** 0.5 Ω
- Output Range** 0 ~ 20 mA, 4 ~ 20 mA, ±10 V
- Output Type** mA, V
- Accuracy** ±0.1 % of FSR for current output
±0.1 % of FSR for voltage output
- Current Load Resistor** 0 to 500 Ω (source)
- Resolution** 12-bit
- Isolation Voltage** 3,000 V_{DC}
- Programmable Output Slope** 0.125 ~ 128 mA/sec.
0.0625 ~ 64.0 V/sec.
- Span Temperature Coefficient** ±25 ppm/°C
- Zero Drift** Voltage output: ±30 μV/°C
Current output: ±0.2 μA/°C

Digital Input

- Channels** 4
- Input Level** Logic level 0: 1 V max.
Logic level 1: 10 ~ 30 V_{DC}
- Isolation Voltage** 3,000 V_{DC}

Ordering Information

- ADAM-4021** 1-ch Analog Output Module
- ADAM-4022T** 2-ch Serial Based Dual Loop PID Controller w/ Modbus
- ADAM-4024** 4-ch Analog Output Module with Modbus

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
- 5 Automation Software
- 6 Operator Panels
- 7 Automation Panel PCs
- 8 Industrial Monitors
- 9 Industrial Ethernet
- 10 Device Servers & Gateways
- 11 Serial Communication Cards
- 12 Embedded Auto. Computers
- 13 PACs
- 14 M2M I/O
- 15 Distributed Nano Controllers
- 16 RS-485 I/O
- 17 Ethernet I/O
- 18 DAO Boards

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



ADAM-4051



ADAM-4052



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

- **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

ADAM-4053 ADAM-4055 ADAM-4080

16-ch Digital Input Module

16-ch Isolated Digital I/O Module with Modbus

2-ch Counter/Frequency Module



ADAM-4053



ADAM-4055



ADAM-4080



Specifications

General

- **Connectors** 2 x plug-in terminal blocks (#14 ~ 22 AWG)
- **Power Consumption** 1 W @ 24 V_{DC}
- **Watchdog Timer** System (1.6 second)
- **Supported Protocols** ASCII command

Digital Input

- **Channels** 16
- **Input Level**
Dry contact: Logic level 0: close to GND
Logic level 1: open
Wet contact: Logic level 0: 2 V max.
Logic level 1: 4 ~ 30 V
- **Effective Distance** 500 m max.
(dry contact only)

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)
Channel: 1 W max.
Total: 2.2 W (8 Channels)
- **Power Dissipation**

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
- **LED Indicators** 5-digit readout, Ch 0 or Ch 1 (programmable)

Counter Input

- **Channels** 2 independent counters (32-bit + 1-bit overflow)
- **Input Frequency** 50 kHz max.
- **Input Pulse Width** >10 μ s.
- **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 V_{max}.
Logic level 1: 2.4 ~ 5.0 V
- **Maximum Count** 4,294,967,295 (32 bits)
- **Preset Type** Absolute or relative
- **Programmable Digital Noise Filter** 2 μ s ~ 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

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

Ordering Information

- **ADAM-4053** 16-ch Digital Input Module
- **ADAM-4055** 16-ch Isolated Digital I/O Module with Modbus
- **ADAM-4080** 2-ch Counter/Frequency Modules

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
- 5 Automation Software
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- 7 Automation Panel PCs
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- 9 Industrial Ethernet
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- 11 Serial Communication Cards
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- 17 Ethernet I/O
- 18 DAQ Boards

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



ADAM-4068



ADAM-4069



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 GΩ 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}

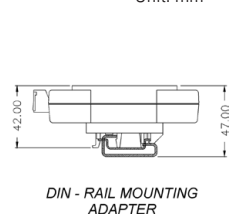
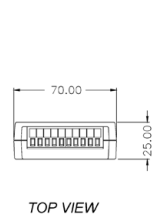
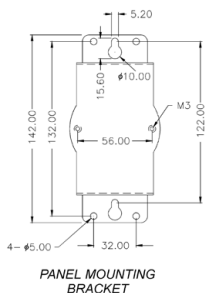
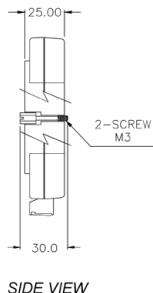
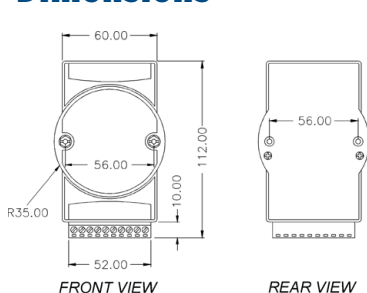
Environment

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

Ordering Information

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

Dimensions



Unit: mm