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

<table>
<thead>
<tr>
<th><strong>RS-485 I/O Modules</strong></th>
<th><strong>Communication and Controller Module Selection Guide</strong></th>
<th>16-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADAM-4000 Series</td>
<td>Remote Data Acquisition and Control Modules Overview</td>
<td>16-4</td>
</tr>
<tr>
<td>ADAM-4000 Series</td>
<td>I/O Module Selection Guide</td>
<td>16-5</td>
</tr>
</tbody>
</table>

### Advanced Communication & I/O Modules

| ADAM-4100 Series       | Robust Remote Data Acquisition and Control Modules Overview | 16-8 |
| ADAM-4100 Series       | Robust RS-485 I/O Module Selection Guide                | 16-9 |

| ADAM-4510I              | Robust RS-422/485 Repeater                             | 16-10 |
| ADAM-4520I              | Robust RS-232 to RS-422/485 Converter                 | 16-11 |
| ADAM-4117               | Robust 8-ch Analog Input Module with Modbus            | 16-12 |
| ADAM-4118               | Robust 8-ch Thermocouple Input Module with Modbus      | 16-13 |
| ADAM-4150               | Robust 15-ch Digital I/O Module with Modbus            | 16-14 |
| ADAM-4168               | Robust 8-ch Relay Output Module with Modbus            | 16-15 |

### Communication & Controller Modules

| ADAM-4510/S             | RS-422/485 Repeater                                    | 16-16 |
| ADAM-4520/4522          | RS-232 to RS-422/485 Converter                         | 16-17 |
| ADAM-4521               | Addressable RS-422/485 to RS-232 Converter            | 16-18 |
| ADAM-4541               | Multi-mode Fiber Optic to RS-232/422/485 Converter    | 16-19 |
| ADAM-4542+              | Single-mode Fiber Optic to RS-232/422/485 Converter   | 16-20 |
| ADAM-4561/4562          | 1-port Isolated USB to RS-232/422/485 Converter       | 16-21 |

### Analog Input Modules

| ADAM-4011               | 1-ch Thermocouple Input Module                         | 16-22 |
| ADAM-4012               | 1-ch Analog Input Module                                | 16-23 |
| ADAM-4013               | 1-ch RTD Input Module                                   | 16-24 |
| ADAM-4015               | 6-ch RTD Module with Modbus                             | 16-25 |
| ADAM-4015T              | 6-ch Thermistor Module with Modbus                     | 16-26 |
| ADAM-4016               | 1-ch Analog Input/Output Module                        | 16-27 |
| ADAM-4017+              | 8-ch Analog Input Module with Modbus                   | 16-28 |
| ADAM-4018+              | 8-ch Thermocouple Input Module with Modbus             | 16-29 |
| ADAM-4019+              | 8-ch Universal Analog Input Module with Modbus         | 16-30 |

### Analog Output Modules

| ADAM-4021               | 1-ch Analog Output Module                              | 16-31 |
| ADAM-4023T              | 2-ch Serial Based Dual Loop PID Controller with Modbus | 16-32 |
| ADAM-4024               | 4-ch Analog Output Module                              | 16-33 |

### Digital Input/Output Modules

| ADAM-4050               | 15-ch Digital I/O Module                               | 16-34 |
| ADAM-4051               | 16-ch Isolated Digital Input Module with Modbus        | 16-35 |
| ADAM-4052               | 8-ch Isolated Digital Input Module                     | 16-36 |
| ADAM-4053               | 16-ch Digital Input Module                             | 16-37 |
| ADAM-4055               | 16-ch Isolated Digital I/O Module with Modbus          | 16-38 |
| ADAM-4080               | 2-ch Counter/Frequency Module                          | 16-39 |
| ADAM-4060               | 4-ch Relay Output Module                               | 16-40 |
| ADAM-4068               | 8-ch Relay Output Module                               | 16-41 |
| ADAM-4069               | 8-ch Power Relay Output Module                         | 16-42 |

To view all of Advantech’s RS-485 I/O Modules: ADAM-4000, please visit www.advantech.com/products.
ADAM-4000 Series

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.

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

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 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

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## Communication and Controller Module Selection Guide

### Controllers

<table>
<thead>
<tr>
<th>Model</th>
<th>ADAM-4501</th>
<th>ADAM-4502</th>
<th>ADAM-4022T</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network</strong></td>
<td>Ethernet, RS-232, RS-485</td>
<td>RS-485</td>
<td></td>
</tr>
<tr>
<td><strong>Comm. Protocol</strong></td>
<td>Modbus/RTU, Modbus/TCP TCP/IP, UDP, ICMP, ARP, DHCP</td>
<td>ASCII Command</td>
<td>Modbus</td>
</tr>
<tr>
<td><strong>Comm. Speed (bps)</strong></td>
<td>Ethernet: 10/100M Serial: From 1,200 to 115.2 kbps</td>
<td>Serial: From 1,200 to 115.2 kbps</td>
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<tr>
<td><strong>Comm. Distance</strong></td>
<td>Ethernet: 100 m Serial: 1.2 Km</td>
<td>Serial: 1.2 km</td>
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<tr>
<td><strong>LED Indicators</strong></td>
<td>Communication &amp; Power</td>
<td>Power</td>
<td></td>
</tr>
<tr>
<td><strong>Data Flow Control</strong></td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>Watchdog Timer</strong></td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>Isolation Voltage</strong></td>
<td>-</td>
<td>1,000 Vdc</td>
<td>3,000 Vdc</td>
</tr>
<tr>
<td><strong>Special Features</strong></td>
<td>Built-in HTTP and FTP Server</td>
<td>PID Control</td>
<td></td>
</tr>
<tr>
<td><strong>Built-in I/O</strong></td>
<td>4DI/4DO</td>
<td>1AI/1AO/2DI/2DO</td>
<td>-</td>
</tr>
<tr>
<td><strong>Power Requirement</strong></td>
<td>10 ~ 30 Vdc</td>
<td>-</td>
<td>10 ~ 30 Vdc</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>-10 ~ 70°C (14 ~ 158°F)</td>
<td>-10 ~ 70°C (14 ~ 158°F)</td>
<td></td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>5 ~ 95% RH</td>
<td>5 ~ 95% RH</td>
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<tr>
<td><strong>Power Consumption</strong></td>
<td>4 W @ 24 Vdc</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Page</strong></td>
<td>online</td>
<td>online</td>
<td>16-17</td>
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</table>

### Repeaters

<table>
<thead>
<tr>
<th>Model</th>
<th>ADAM-4510</th>
<th>ADAM-4510S</th>
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</thead>
<tbody>
<tr>
<td><strong>Network</strong></td>
<td>RS-422</td>
<td>RS-485</td>
</tr>
<tr>
<td><strong>Comm. Protocol</strong></td>
<td>-</td>
<td>Serial: From 1,200 to 115.2 kbps</td>
</tr>
<tr>
<td><strong>Comm. Speed (bps)</strong></td>
<td>-</td>
<td>Serial: 1.2 km</td>
</tr>
<tr>
<td><strong>Interface Connectors</strong></td>
<td>RS-422/485: plug-in screw terminal</td>
<td>RS-422/485: plug-in screw terminal</td>
</tr>
<tr>
<td><strong>LED Indicators</strong></td>
<td>Communication &amp; Power</td>
<td>Communication &amp; Power</td>
</tr>
<tr>
<td><strong>Data Flow Control</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Watchdog Timer</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Isolation Voltage</strong></td>
<td>ADAM-4510: -</td>
<td>ADAM-4510S: 3,000 Vdc</td>
</tr>
<tr>
<td><strong>Power Requirement</strong></td>
<td>10 ~ 30 Vdc</td>
<td>-</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>-10 ~ 70°C (14 ~ 158°F)</td>
<td>5 ~ 95% RH</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>5 ~ 95% RH</td>
<td>1.4 W @ 24 Vdc</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>1.2 W @ 24 Vdc</td>
<td>-</td>
</tr>
<tr>
<td><strong>Page</strong></td>
<td>16-12</td>
<td>16-12</td>
</tr>
</tbody>
</table>

### Converters

<table>
<thead>
<tr>
<th>Model</th>
<th>ADAM-4520</th>
<th>ADAM-4521</th>
<th>ADAM-4541</th>
<th>ADAM-4542</th>
<th>ADAM-4561</th>
<th>ADAM-4562</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comm. Protocol</strong></td>
<td>-</td>
<td>-</td>
<td>Serial: 1,200 to 115.2 kbps</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Comm. Speed (bps)</strong></td>
<td>Serial: 1.2 km</td>
<td>Serial: 1.2 km</td>
<td>ADAM-4541: 2.5 km ADAM-4542+: 15 km</td>
<td>Serial: 1.2 km</td>
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<td></td>
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<tr>
<td><strong>Interface Connectors</strong></td>
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<td>-</td>
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<tr>
<td><strong>LED Indicators</strong></td>
<td>Communication &amp; Power</td>
<td>Communication &amp; Power</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Data Flow Control</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Watchdog Timer</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Isolation Voltage</strong></td>
<td>ADAM-4520: 3,000 Vac</td>
<td>ADAM-4521: 3,000 Vac</td>
<td>ADAM-4541: 3,000 Vac ADAM-4542: 3,000 Vac</td>
<td>ADAM-4561: 3,000 Vac ADAM-4562: 3,000 Vac</td>
<td>ADAM-4561: 3,000 Vac ADAM-4562: 2,500 Vac</td>
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</tr>
<tr>
<td><strong>Power Requirement</strong></td>
<td>10 ~ 30 Vac</td>
<td>-</td>
<td>ADAM-4561: 3,000 Vac ADAM-4562: 2,500 Vac</td>
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<td>-</td>
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<tr>
<td><strong>Operating Temperature</strong></td>
<td>-10 ~ 70°C (14 ~ 158°F)</td>
<td>5 ~ 95% RH</td>
<td>ADAM-4561: 3,000 Vac ADAM-4562: 2,500 Vac</td>
<td>5 ~ 95% RH</td>
<td>1.4 W @ 24 Vac</td>
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<tr>
<td><strong>Humidity</strong></td>
<td>5 ~ 95% RH</td>
<td>1.4 W @ 24 Vac</td>
<td>ADAM-4561: 1.5 W @ 24 Vac ADAM-4562: 1.1 W @ 24 Vac</td>
<td>ADAM-4561: 1.5 W @ 5 Vac ADAM-4562: 1.1 W @ 5 Vac</td>
<td>ADAM-4561: 1.5 W @ 5 Vac ADAM-4562: 1.1 W @ 5 Vac</td>
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<tr>
<td><strong>Power Consumption</strong></td>
<td>1.2 W @ 24 Vac</td>
<td>1 W @ 24 Vac</td>
<td>ADAM-4541: 1.5 W @ 24 Vac ADAM-4542+: 3 W @ 24 Vac</td>
<td>ADAM-4561: 1.5 W @ 24 Vac ADAM-4562: 1.1 W @ 5 Vac</td>
<td>ADAM-4561: 1.5 W @ 24 Vac ADAM-4562: 1.1 W @ 5 Vac</td>
<td></td>
</tr>
<tr>
<td><strong>Page</strong></td>
<td>16-12</td>
<td>16-12</td>
<td>16-13</td>
<td>16-13</td>
<td>16-13</td>
<td>16-13</td>
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## Analog Input

<table>
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<tr>
<th>Model</th>
<th>ADAM-4011</th>
<th>ADAM-4012</th>
<th>ADAM-4013</th>
<th>ADAM-4015</th>
<th>ADAM-4015T</th>
<th>ADAM-4016</th>
<th>ADAM-4017+</th>
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<td>1 differential</td>
<td>1 differential</td>
<td>6 differential</td>
<td>1 differential</td>
<td>8 differential</td>
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<td>Sampling Rate</td>
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<td>Voltage Input</td>
<td>±15 mV</td>
<td>±50 mV</td>
<td>±100 mV</td>
<td>±500 mV</td>
<td>±1 V</td>
<td>±10 V</td>
<td>±15 mV</td>
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<td></td>
<td>±50 mV</td>
<td>±100 mV</td>
<td>±500 mV</td>
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<td>±10 V</td>
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<td>Current Input</td>
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<td>±20 mA</td>
<td>±20 mA</td>
<td>±20 mA</td>
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<td>Direct Sensor Input</td>
<td>J, K, T, E, R, S, B Thermocouple</td>
<td>RTD</td>
<td>ADAM-4015: RTD</td>
<td>ADAM-4015T: Thermistor</td>
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<td>Channel Burn-out Detection</td>
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<td>Channel Independent Configuration</td>
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<td>Channel Voltage Output</td>
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<td>Channel Current Output</td>
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<td>Counter (32-bit)</td>
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<td>Input Frequency</td>
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<tr>
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<tr>
<td>Digital LED Indicator</td>
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<td>-</td>
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<tr>
<td>Watchdog Timer</td>
<td>Yes (System)</td>
<td>Yes (System)</td>
<td>Yes (System)</td>
<td>Yes (System)</td>
<td>Yes (System &amp; Comm.)</td>
<td>Yes (System)</td>
<td>Yes (System &amp; Comm.)</td>
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<td>Modbus Support</td>
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<tr>
<td>Page</td>
<td>16-14</td>
<td>16-14</td>
<td>16-14</td>
<td>16-15</td>
<td>16-15</td>
<td>16-16</td>
<td>16-16</td>
</tr>
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*: All ADAM-4000 I/O Modules support ASCII Commands.
## I/O Module Selection Guide

### Analog Input

<table>
<thead>
<tr>
<th>Model</th>
<th>ADAM-4018+</th>
<th>ADAM-4019+</th>
<th>ADAM-4021</th>
<th>ADAM-4024</th>
<th>ADAM-4050</th>
<th>ADAM-4051</th>
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<tbody>
<tr>
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<td>10 Hz</td>
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<td>± 500 mV</td>
<td>± 1 V</td>
<td>± 2.5 V</td>
<td>± 5 V</td>
<td>± 10 V</td>
</tr>
<tr>
<td>Current Input</td>
<td>4 ~ 20 mA</td>
<td>±20 mA</td>
<td>4 ~ 20 mA</td>
<td>±20 mA</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Direct Sensor Input</td>
<td>J, K, T, E, R, S, B Thermocouple</td>
<td>J, K, T, E, R, S, B Thermocouple</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>Burn-out Detection</td>
<td>Yes</td>
<td>Yes</td>
<td>(4 ~ 20 mA &amp; All T/C)</td>
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### Analog Output

<table>
<thead>
<tr>
<th>Model</th>
<th>ADAM-4018+</th>
<th>ADAM-4019+</th>
<th>ADAM-4021</th>
<th>ADAM-4024</th>
<th>ADAM-4050</th>
<th>ADAM-4051</th>
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<tr>
<td>Channels</td>
<td>-</td>
<td>-</td>
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<td>Voltage Output</td>
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<td>Alarm Settings</td>
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<td>Yes</td>
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### Digital Input/Output

<table>
<thead>
<tr>
<th>Model</th>
<th>ADAM-4018+</th>
<th>ADAM-4019+</th>
<th>ADAM-4021</th>
<th>ADAM-4024</th>
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<tr>
<td>Isolation Voltage</td>
<td>3,000 VDC</td>
<td>3,000 VDC</td>
<td>3,000 VDC</td>
<td>3,000 VDC</td>
<td>-</td>
<td>2,500 VDC</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Watchdog Timer</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (System)</td>
<td>Yes (System)</td>
<td>-</td>
<td>Yes</td>
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<tr>
<td>Safety Setting</td>
<td>-</td>
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<td>-</td>
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<tr>
<td>Modbus Support *</td>
<td>Yes</td>
<td>Yes</td>
<td>-</td>
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<td>-</td>
<td>Yes</td>
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<tr>
<td>Page</td>
<td>16-16</td>
<td>16-16</td>
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<td>16-18</td>
<td>16-18</td>
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*: All ADAM-4000 I/O Modules support ASCII Commands
<table>
<thead>
<tr>
<th>Model</th>
<th>ADAM-4052</th>
<th>ADAM-4053</th>
<th>ADAM-4055</th>
<th>ADAM-4060</th>
<th>ADAM-4068</th>
<th>ADAM-4069</th>
<th>ADAM-4080</th>
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<tr>
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<td>8 differential</td>
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<tr>
<td>4~20 mA Current Input</td>
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<td>-</td>
<td>4~20 mA</td>
<td>±20 mA</td>
<td>4~20 mA</td>
<td>±20 mA</td>
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<tr>
<td>±100 mV Voltage Input</td>
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<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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<tr>
<td>±500 mV Voltage Input</td>
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<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>±1 V Voltage Input</td>
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<td>-</td>
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<td>-</td>
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<tr>
<td>±2.5 V Voltage Input</td>
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<tr>
<td>±5 V Voltage Input</td>
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<tr>
<td>±10 V Voltage Input</td>
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<td>J, K, T, E, R, S, B Direct Sensor Input</td>
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<tr>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>8 16 8</td>
<td>8</td>
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<tr>
<td>5,000 Vrms 2,500 Vdc</td>
<td>-</td>
<td>2,500 Vdc</td>
<td>-</td>
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<tr>
<td>Yes (System) Yes (System &amp; Comm.)</td>
<td>Yes</td>
<td>Yes</td>
<td>-</td>
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<tr>
<td>Yes (System) Yes (System &amp; Comm.)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Counter</td>
<td>ADAM-4080</td>
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<td>ADAM-4069</td>
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<tr>
<td>4-ch relay 8-ch relay 8-ch power relay</td>
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<td>-</td>
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<td>2</td>
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<td>Yes</td>
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<td>-</td>
<td>-</td>
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<td>2 50 kHz</td>
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<td>2,500 Vrms</td>
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<td>Yes</td>
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<td>-</td>
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<tr>
<td>5,000 VDC 3,000 VDC 3,000 VDC 3,000 VDC</td>
<td>2,500 VRMS</td>
<td>2,500 VDC</td>
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<td>-</td>
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<tr>
<td>Digital LED Indicator</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Watchdog Timer (System &amp; Comm.)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Safety Setting</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Modbus Support *</td>
<td>Yes Yes - Yes - Yes</td>
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<td>-</td>
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<tr>
<td>*: All ADAM-4000 I/O Modules support ASCII Commands</td>
<td>Yes Yes - Yes - Yes</td>
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<td>-</td>
<td>-</td>
<td>-</td>
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### Selection Guide

**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. MEMS VD**

**15. Smart Energy Interfaces**

**16. RS-485 VD**

**17. Ethernet VD**

**18. DAQ Boards**

**Online Download** [www.advantech.com/products](http://www.advantech.com/products)
ADAM-4100 Series

Introduction
The ADAM-4100 series modules include the ADAM-4117, ADAM-4118, ADAM-4150, and ADAM-4168 modules. These 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-4150 and ADAM-4168 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 ~ 85°C which makes them suitable for more widespread applications.

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 VDC. 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 VDC 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 VDC
  6. Optional Sampling Rate 10 or 100 samples/sec
  7. Supports unipolar and bipolar input (ADAM-4117 only)
  8. Supports ±15V input range (ADAM-4117 only)

- **ADAM-4158**
  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 isolate 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).

**Overview**

**Designed for Severe Industrial Environments**

- **Broader Operating Temperature Range**
- **Higher Noise Immunity**
- **Broader Power Input Range**
- **New Features for I/O Modules**
# Robust RS-485 I/O Module Selection Guide

<table>
<thead>
<tr>
<th>Model</th>
<th>ADAM-4117</th>
<th>ADAM-4118</th>
<th>ADAM-4150</th>
<th>ADAM-4168</th>
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<td>Resolution</td>
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<td>Channels</td>
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<tr>
<td>Sampling Rate</td>
<td>10 kHz (total)</td>
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<td>Voltage Input</td>
<td>0 ~ 150 mV, 0 ~ 500 mV, 0 ~ 1 V, 0 ~ 5 V, 0 ~ 10 V, 0 ~ 15 V, ±100 mV, ±500 mV, ±1 V, ±5 V, ±10 V, ±15 V</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Current Input</td>
<td>0 ~ 20 mA, ±20 mA, 4 ~ 20 mA</td>
<td>±20 mA, 4 ~ 20 mA</td>
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<td>-</td>
</tr>
<tr>
<td>Direct Sensor Input</td>
<td>-</td>
<td>J, K, T, E, R, S, B Thermocouple</td>
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<td>-</td>
</tr>
<tr>
<td>Burn-out Detection</td>
<td>Yes (mA)</td>
<td>Yes (mA and All T/C)</td>
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<tr>
<td>Channel Independent Configuration</td>
<td>Yes</td>
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<td>Digital Input/Output</td>
<td>Input Channels</td>
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<td>7</td>
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<td></td>
<td>Output Channels</td>
<td>-</td>
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<td>8, 8-ch relay</td>
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<td>7</td>
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<tr>
<td>Input Frequency</td>
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<td>-</td>
<td>3 kHz</td>
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<td>3,000 Vdc</td>
<td>Communication and Power</td>
<td>Yes (System &amp; Communication)</td>
<td>Yes</td>
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<tr>
<td>Digital LED Indicator</td>
<td>Communication and Power</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Communication Protocol</td>
<td>ASCII Command/Modbus</td>
<td>10 ~ 48 Vdc</td>
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<td>Power Requirement</td>
<td>-90°C to 85°C (-40 ~ 185°F)</td>
<td>-90°C to 85°C (-40 ~ 185°F)</td>
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<td>Operating Temperature</td>
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<td>-40 ~ 85°C (-40 ~ 185°F)</td>
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<td>Storage Temperature</td>
<td>5 ~ 95% RH</td>
<td>5 ~ 95% RH</td>
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<td>Humidity</td>
<td>1.2 W @ 24 Vdc</td>
<td>0.5 W @ 24 Vdc</td>
<td>0.7 W @ 24 Vdc</td>
<td>1.8 W @ 24 Vdc</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>Page</td>
<td>16-10</td>
<td>16-11</td>
<td>16-10</td>
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<table>
<thead>
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<th>ADAM-4510I</th>
<th>ADAM-4520I</th>
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<td>RS-422/485</td>
<td>RS-232 to RS-422/485</td>
</tr>
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<td>Communication Speed (bps)</td>
<td>From 1,200 to 115.2 k</td>
<td>Serial: 1.2 km</td>
</tr>
<tr>
<td>Communication Distance</td>
<td>RS-422/485: plug-in screw terminal</td>
<td>RS-422/485: plug-in screw terminal</td>
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<tr>
<td>Digital LED Indicators</td>
<td>Communication and Power</td>
<td>Communication and Power</td>
</tr>
<tr>
<td>Auto Data Flow Control</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Isolation Voltage</td>
<td>3,000 Vdc</td>
<td>3,000 Vdc</td>
</tr>
<tr>
<td>Power Requirement</td>
<td>10 ~ 48 Vdc</td>
<td>10 ~ 48 Vdc</td>
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<tr>
<td>Operating Temperature</td>
<td>-40 ~ 85°C (-40 ~ 185°F)</td>
<td>-40 ~ 85°C (-40 ~ 185°F)</td>
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<tr>
<td>Storage Temperature</td>
<td>-40 ~ 85°C (-40 ~ 185°F)</td>
<td>-40 ~ 85°C (-40 ~ 185°F)</td>
</tr>
<tr>
<td>Humidity</td>
<td>1.4 W @ 24 Vdc</td>
<td>1.2 W @ 24 Vdc</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>Page</td>
<td>16-10</td>
</tr>
</tbody>
</table>
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

Specifications

General
- Connectors: 2 x plug-in terminal blocks (#14 – 22 AWG)
- Power Consumption: 1.4 W @ 24 Vdc

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)
- Power Consumption: 1.2 W @ 24 Vdc

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 Vdc

Analog Input
- Channels: 8 differential and independent configuration channels
- Input Impedance: Voltage: 20 MΩ, mA (V supports unipolar and bipolar), mA
- Input Type: Voltage: 0 – 150mV, 0 – 500mV, 0 – 1V, 0 – 5V, 0 – 10V, 0 – 15V, ±150 mV, ±500 mV, ±1V, ±5V, ±10 V, ±15V, ±20mA, 0 – 20 mA, 4 – 20mA
- Accuracy
  - Voltage mode: ±0.1% or better
  - Current mode: ±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 Vdc
- High Common Mode: 200 Vdc
- Span Drift: ±25 ppm/°C
- Zero Drift: ±50μV/°C
- Built-in TVS/ESD Protection

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

Common Specifications

General
- Power Input: Unregulated 10 – 48 Vdc w/power reversal protection
- Isolation Voltage: 3,000 Vdc

Environment
- Humidity: 5 – 95% RH
- Operating Temperature: -40 – 85°C (-40 – 185°F)
- Storage Temperature: -40 – 85°C (-40 – 185°F)
- Supports Noise Rejection

RoHS COMPLIANT 2002/95/EC
### Specifications

#### General
- **Power Consumption**: 0.5W @ 24 Vdc

#### Analog Input
- **Channels**: 8 differential and independent configuration channels
- **Input Impedance**:
  - Voltage: 20 MΩ
  - Current: 120 Ω
- **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, ±20 mA
- **Accuracy**:
  - Voltage mode: ±0.1% or better
  - Current mode: ±0.2% or better
- **Resolution**: 16-bit
- **Sampling Rate**: 10/100 samples/sec (selected by Utility)
- **CMR @ 50/60 Hz**: 92 dB
- **NMR @ 50/60 Hz**: 60 dB
- **Overvoltage Protection**: ±60 Vdc
- **High Common Mode**: 200 Vdc
- **Span Drift**: ±25 ppm/°C
- **Zero Drift**: ±6 μV/°C
- **Built-in TVS/ESD Protection**
- **Burn-out Detection**

#### Digital Input
- **Channels**: 8 differential and independent configuration
- **Input Level**:
  - Dry contact: Logic level 0: Close to GND
  - Logic level 1: Open
  - Wet contact: Logic level 0: ±15 mV, ±50 mV, ±100 mV, ±500 mV, ±1 V, ±2.5 V
  - Logic level 1: 3 V max
- **Accuracy**:
  - Voltage mode: ±0.1% or better
  - Current mode: ±0.2% or better
- **Resolution**: 16-bit
- **Sampling Rate**: 10/100 samples/sec (selected by Utility)
- **CMR @ 50/60 Hz**: 92 dB
- **NMR @ 50/60 Hz**: 60 dB
- **Overvoltage Protection**: ±60 Vdc
- **High Common Mode**: 200 Vdc
- **Span Drift**: ±25 ppm/°C
- **Zero Drift**: ±6 μV/°C
- **Built-in TVS/ESD Protection**
- **Burn-out Detection**

### Common Specifications

#### General
- **Power Input**: Unregulated 10 ~ 48 Vdc
- **Watchdog Timer**: System (1.6 second) & Communication
- **Connector**: 2 x plug-in terminal blocks (#14 ~ 22 AWG)
- **Isolation Voltage**: 3,000 Vdc
- **Supported Protocols**: ASCII Command and Modbus/RTU

#### Environment
- **Humidity**: 5 ~ 95% RH
- **Operating Temperature**: -40 ~ -185°F
- **Storage Temperature**: -40 ~ 185°F

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

#### Specifications

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

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

### Specifications

**General**
- Connectors: 1 x plug-in terminal block (#14 – 22 AWG) (RS-422/485)
- Isolation Voltage: 3,000 VDC (ADAM-4520)
- Power Consumption: 1.2 W @ 24 VDC

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

### Specifications

**General**
- Connectors: 1 x plug-in terminal block (#14 – 22 AWG) (RS-422/485)
- Isolation Voltage: 1,000 VDC
- Power Consumption: 1.0 W @ 24 VDC
- 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 VDC 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

**RoHS Compliant**
2002/95/EC
ADAM-4541
ADAM-4542+
ADAM-4561/4562

Specifications

General
- Power Input: Unregulated 10 ~ 30 Vdc
- 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 Vdc

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

Ordering Information
- ADAM-4541: Multi-mode Fiber Optic to RS-232/422/485 Converter
- ADAM-4542+: Single-mode Fiber Optic 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

Common Specifications

Environment
- Humidity: 5 ~ 95% RH
- Operating Temperature: -10 ~ 70°C (14 ~ 158°F)
- Storage Temperature: -25 ~ 85°C (-13 ~ 185°F)
ADAM-4011
ADAM-4012
ADAM-4013

1-ch Thermocouple Input Module
1-ch Analog Input Module
1-ch RTD Input Module

Specifications

General
- Power Consumption: 1.4 W @ 24 Vdc
- Supported Protocols: ASCII command

Analog Input
- Channels: 1
- Input Impedance:
  - Voltage: 2 MΩ
  - 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: ±0.1% or better
  - Current mode: ±0.2% or better
- T/C Type and Temperature Range
  - J: 0 ~ 760°C
  - K: 0 ~ 1,370°C
  - T: 0 ~ 200°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 kΩ resistor to 5 V
- Pull up current freq.: 50 Hz
- Max. input freq.: 50 Hz
- Event Counter
- Min. input pulse width: 1 ms
- Supports high/low alarms

Common Specifications
- Power Input: Unregulated 10 ~ 30 Vdc
- Connectors: 1 x plug-in terminal block (#14 ~ 22 AWG)
- Watchdog Timer: System (16 second)
- Resolution: 16-bit
- Sampling Rate: 10 sample/second
- CMR @ 50/60 Hz: 150 dB
- NMR @ 50/60 Hz: 100 dB
- Isolation Voltage: 3,000 Vdc
- Humidity: 5 ~ 95% RH
- Operating Temperature: -10 ~ 70°C (14 ~ 158°F)
- Storage Temperature: -25 ~ 85°C (-13 ~ 185°F)

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

ADAM-4015
ADAM-4015T
ADAM-4016

6-ch RTD Module with Modbus
6-ch Thermistor Module with Modbus
1-ch Analog Input/Output Module

Specifications

General
- Connectors 2 x plug-in terminal blocks (#14 – 28 AWG)
- Power Consumption 1.2 W @ 24 VDC
- 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
- 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)
  - PI 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 50° 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 VDC
- 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
- RTD Types and Temperature Ranges
  - 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 – 28 AWG)
- Power Consumption 1.2 W @ 24 VDC
- Watchdog Timer System (1.6 s) & Communication
- Supported Protocols ASCII command and Modbus/RTU
- Burn-out Detection Yes

Analog Input
- Channels 1 differential
- Input Impedance Voltage: 2 MΩ Current: 125 μA
- 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 ± 3 μV/°C

Common Specifications

General
- Power Input Unregulated 10 – 30 VDC
- Analog Input
  - Resolution 16 bits
  - NMR @ 50/60 Hz 100 dB
  - Sampling Rate 10 sample/second (total)
  - Isolation Voltage 3,000 VAC

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
## ADAM-4017+
### 8-ch Analog Input Module with Modbus
#### 8-ch Thermocouple Input Module with Modbus
#### 8-ch Universal Analog Input Module with Modbus

### Specifications

#### General
- **Power Consumption:** 1.2 W @ 24 Vdc
- **Watchdog Timer:** System (1.6 second) & Communication
- **Supported Protocols:** ASCII command and Modbus/RTU

#### Analog Input
- **Channels:** 8 differential
- **Channel Independent:** 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
  - K: 0 ~ 1,370°C
  - T: -100 ~ 400°C
  - E: 0 ~ 1,000°C
- **Burn-out Detection:** All T/C

### Common Specifications

#### General
- **Power Input:** Unregulated 10 ~ 30 Vdc
- **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 Vdc
- **Overvoltage Protection:** ±35 Vdc
- **CMR @ 50/60 Hz:** 120 dB
- **NMR @ 50/60 Hz:** ±25 ppm/°C
- **Zero Drift:** ±5 μV/°C
- **Built-in TVS/ESD Protection**

#### Environment
- **Humidity:** 5 ~ 95% RH
- **Operating Temperature:** -10 ~ 70°C
- **Storage Temperature:** -25 ~ 85°C

### Ordering Information

- **ADAM-4017+**
  - 8-ch Analog Input Module with Modbus
- **ADAM-4018+**
  - 8-ch Thermocouple Input Module with Modbus
- **ADAM-4019+**
  - 8-ch Universal Analog Input Module with Modbus
### ADAM-4021
#### 1-ch Analog Output Module

**Specifications**
- **General**
  - Connectors: 2 x plug-in terminal blocks (#14 ~ 28 AWG)
  - Power Consumption: 1.4 W @ 24 Vdc
  - Watchdog Timer: System (1.6 second)
  - Supported Protocols: ASCII command and Modbus/RTU
- **Analog Output**
  - Channels: 1
  - Output Impedance: 0.5 \( \Omega \)
  - Output Range: 0 ~ 20 mA, 4 ~ 20 mA, 0 ~ 10 V
  - Output Type: mV, V
  - Accuracy: ±0.1% of FSR for current output
  - ±0.2% of FSR for voltage output
  - Current Load: 0 to 500 Ω (source)
  - Resolution: 12-bit
  - Isolation Voltage: 3,000 VDC
  - Programmable: 0.125 ~ 128 mA/sec.
  - Output Slope: 64.0 V/sec.
  - Readback Accuracy: ±1% of FSR
  - Span Temperature: ±0.025°C/C
  - Zero Drift: Voltage output: ±30 μV/°C
    - Current output: ±0.2 μA/°C

**Common Specifications**
- **General**
  - Power Input: Unregulated 10 ~ 30 Vdc
- **Environment**
  - Humidity: 5 ~ 95% RH
  - Operating Temperature: -10 ~ 70°C (14 ~ 185°F)
  - Storage Temperature: -25 ~ 85°C (-13 ~ 185°F)

### ADAM-4022T
#### 2-ch Serial Based Dual Loop PID Controller with Modbus

**Specifications**
- **General**
  - Connectors: 2 x plug-in terminal blocks (#14 ~ 28 AWG)
  - Power Consumption: 3 W @ 24 Vdc
  - Watchdog Timer: System (1.6 second) & Communication
  - Supported Protocols: ASCII command and Modbus/RTU
- **Analog Output** (Only AI0 and AI2 are the PID input)
  - Channels: 4
  - Output Impedance: 0.5 Ω
  - Output Range: 0 ~ 20 mA, 4 ~ 20 mA, ±10 V
  - Output Type: mV, V
  - Accuracy: ±0.1% of FSR for current output
  - ±0.1% of FSR for voltage output
  - Current Load: 0 to 500 Ω (source)
  - Resolution: 12-bit
  - Isolation Voltage: 3,000 VDC
  - Programmable: 0.125 ~ 128 mA/sec.
  - Output Slope: 64.0 V/sec.
  - Span Temperature: ±0.025°C/C
  - Zero Drift: Voltage output: ±30 μV/°C
    - Current output: ±0.2 μA/°C

**Digital Input**
- Channels: 4
- Input Level: Logic level 1: 1 V max.
- Input Voltage: Logic level 1: 10 ~ 30 Vdc
- Isolation Voltage: 3,000 Vdc

### ADAM-4024
#### 4-ch Analog Output Module with Modbus

**Specifications**
- **General**
  - Connectors: 2 x plug-in terminal blocks (#14 ~ 28 AWG)
  - Power Consumption: 4 W @ 24 Vdc
  - Watchdog Timer: System (1.6 second) & Modbus
  - 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: mV, V
  - Accuracy: ±0.1% of FSR for current output
  - ±0.1% of FSR for voltage output
  - Current Load: 0 to 500 Ω (source)
  - Resolution: 12-bit
  - Isolation Voltage: 3,000 VDC
  - Programmable: 0.125 ~ 128 mA/sec.
  - Output Slope: 64.0 V/sec.
  - Span Temperature: ±0.025°C/C
  - Zero Drift: Voltage output: ±30 μV/°C
    - Current output: ±0.2 μA/°C

**Digital Input**
- Channels: 4
- Input Level: Logic level 1: 1 V max.
- Input Voltage: Logic level 1: 10 ~ 30 Vdc
- Isolation Voltage: 3,000 Vdc

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

## Specifications

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

### Digital Input
- **Channels**: 7
  - 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
- **Input Level**: Logic level 0: 1 V max.
- **Input Voltage**: 50 V max
- **Input Level**
  - Dry contact: Logic level 0: open
  - Wet contact: Logic level 0: 3 V max
- **Isolation Voltage**: 2,500 VRMS
- **Input Resistance**: 3 kΩ
- **Overvoltage Protection**: 70 VDC

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

### Common Specifications

<table>
<thead>
<tr>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Input</strong>: Unregulated 10 ~ 30 VDC</td>
</tr>
</tbody>
</table>

| Environment
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Humidity</strong>: 5 ~ 95% RH</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong>: -10 ~ 70°C (14 ~ 158°F)</td>
</tr>
<tr>
<td><strong>Storage Temperature</strong>: -25 ~ 85°C (-13 ~ 185°F)</td>
</tr>
</tbody>
</table>

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

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**800-999-7378**
# ADAM-4053
## 16-ch Digital Input Module

### Specifications

#### General
- Connectors: 2 x plug-in terminal blocks (#14 – 22 AWG)
- Power Consumption: 1 W @ 24 Vdc
- 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)

### Ordering Information
- **ADAM-4053**: 16-ch Digital Input Module

---

# ADAM-4055
## 16-ch Isolated Digital I/O Module with Modbus

### Specifications

#### General
- Connectors: 2 x plug-in terminal blocks (#14 – 28 AWG)
- Power Consumption: 1 W @ 24 Vdc
- Watchdog Timer: System (1.6 second) & Communication
- Supported Protocols: ASCII command and Modbus/RTU
- Isolation Voltage: 2,500 Vdc
- 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 Vdc

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

### Ordering Information
- **ADAM-4055**: 16-ch Isolated Digital I/O Module with Modbus

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# ADAM-4080
## 2-ch Counter/Frequency Module

### Specifications

#### General
- Connectors: 2 x plug-in terminal blocks
- Power Consumption: 2.0 W @ 24 Vdc
- 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 μs.
- Input Mode: Isolated or non-isolated
- Isolated Input Level
  - Isolated: Logic level 0: 1 V max., Logic level 1: 3.5~30 V
  - Non-isolated: 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
- 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

### Ordering Information
- **ADAM-4080**: 2-ch Counter/Frequency Modules

---

**Common Specifications**

#### General
- Power Input: Unregulated 10 – 30 Vdc

#### 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
**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

### Specifications

**General**
- Connectors: 2 x plug-in terminal blocks (#14 – 22 AWG)
- Power Consumption: 0.6 W @ 24 VDC
- Watchdog Timer: System (1.6 second)
- Supported Protocols: ASCII command

**Relay Output**
- Breakdown Voltage: 500 Vdc (50/60 Hz)
- Channels: 4 x Form A
- Contact Rating (Resistive): 0.3 A @ 250 Vdc
- Initial Insulation Resistance: 1 GΩ min. at 500 Vdc
- Relay off Time (Typical): 2 ms
- Relay on Time (Typical): 3 ms
- Maximum Operating Speed: 50 operations/min (at related load)

### Common Specifications

**General**
- Power Input: Unregulated 10 – 30 Vdc

### 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

<table>
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<tr>
<th>Unit: mm</th>
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**ADAM-4068**

**ADAM-4069**

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

**RoHS COMPLIANT** 2002/95/EC