Ethernet I/O Modules: ADAM-6000

Real-time Ethernet I/O Modules

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Ethernet I/O Modules

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<tr>
<td>ADAM-6017</td>
<td>8-ch Isolated Analog Input Modbus TCP Module with 2-ch DO</td>
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<td>8-ch Isolated Thermocouple Input Modbus TCP Module with 8-ch DO</td>
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<table>
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<th>Description</th>
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</table>

ADAM-6000 Series Common Specifications

To view all of Advantech’s Ethernet I/O Modules: ADAM-6000, please visit www.advantech.com/products.
Real-time Systems

A real-time system is one in which the correctness of a result not only depends on correct calculations, but also upon correct timing.

In computing, real-time refers to a time frame that is very brief, appearing to be immediate. When a computer processes data in real time, it reads and handles data as it is received, producing results without delay. A non real-time computer process does not have a deadline. Such a process can be considered non-real-time, even if fast results are preferred. A real-time system, on the other hand, is expected to respond not just quickly, but also within a predictable period of time. In an automation control system, real-time technology provides multiple advantages, such as improved safety, quality, and efficiency.

To build a real-time distributed control system, it is critical to establish reliable and real-time communication among the controllers and targets. Distributed processors must be able to intercommunicate via real-time protocols. There is now increasing interest in the use of Ethernet as the link-layer protocol, such as EtherNet/IP, PROFINET, EtherCAT, Ethernet PowerLink, SERCOS III.

EtherNet/IP

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

PROFINET

PROFINET is the open industrial Ethernet standard of PROFIBUS & PROFINET International (PI) for automation. Like EtherNet/IP, it uses TCP/IP standards as protocols for communication in the network. It includes two modes - PROFINET IO and PROFINET CBA - and allows to combine distributed automation and distributed I/O. With its flexible capabilities, PROFINET is suitable for most automation technology requirements.

Feature Highlights

Daisy Chain Connections

Each ADAM-6100 module has two built-in Ethernet switches to allow daisy chain connections in an Ethernet network, making it easier to deploy, helping improve scalability and improving resistance against interference common in factory settings.

2,500 Vdc Isolation Protection

With triple isolation, including power supply, input/output, and Ethernet communication, ADAM-6100 series ensures I/O data to be controlled correctly, and prevents devices from breaking down.

Ethernet-based Configuration Tool

ADAM NET Utility comes bundled with each ADAM-6100 module. With ADAM NET Utility, users can configure, set and test ADAM-6100 modules through Ethernet.

Multiple Mounting Mechanisms

Advantech provides versatile mounting methods to fit various demands in the field. ADAM-6100 series supports DIN-rail mounting, wall mounting and piggybacking.
ADAM-6100 Series
Selection Guide

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<th>Model</th>
<th>ADAM-6117</th>
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<th>ADAM-6160</th>
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<tbody>
<tr>
<td>Interface</td>
<td>10/100 Mbps Ethernet</td>
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<td>Support Protocol</td>
<td>ADAM-6100EI: EtherNet/IP; ADAM-6100PN: PROFINET</td>
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</table>

### Analog Input

| Resolution | 16 bits | 16 bits | - | - | - | - | - |
| Channels   | 8       | 7       | - | - | - | - | - |
| Sampling Rate | 10 S/s  | 10 S/s  | - | - | - | - | - |
| Voltage Input | ±150 mV | ±100 mV | ±1 V | ±5 V | ±10 V | ±50 mV | ±100 mV | ±1 V | ±5 V | ±10 V |
| Current Input | 0 – 20 mA | 0 – 20 mA | 0 – 20 mA | 4 – 20 mA | 4 – 20 mA | ±20 mA | ±20 mA |
| Direct Sensor Input | - J, K, T, E, R, S, B Thermocouple | - | - | - | - | - | - |

### Analog Output

| Resolution | - | - | 12 bits | - | - | - | - |
| Channels   | - | - | 4 | - | - | - | - |
| Voltage Output | - | - | 0 – 5 V | - | - | - | - |
| Current Output | - | - | 0 – 20 mA, 4 – 20 mA | - | - | - | - |

| Input Channels | - | - | 4 (Dry Contact Only) | 8 | 16 | - | - |
| Output Channels | - | - | - | 7 | - | 16 | 6-ch power relay |
| Isolation Protection | 2,500 VDC | 2,500 VDC | 2,500 VDC | 2,500 VDC | 2,500 VDC | 2,500 VDC | 2,500 VDC |
| Connectors | 2 x RJ-45 LAN (Daisy Chain) | Plug-in screw terminal block (I/O and power) |

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Ethernet I/O Modules

ADAM-6117
ADAM-6118
ADAM-6124

8-ch Isolated Analog Input Real-time Ethernet Module
7-ch Thermocouple Input Real-time Ethernet Module
4-ch Analog Output Real-time Ethernet Module

Specifications

Analog Input
- Channels: 8 (differential)
- Input Impedance: > 10 MΩ (voltage), > 120 Ω (current)
- Input Type: mV, V, mA
- Input Range: ±150 mV, ±400 mV, ±1 V, ±5 V, ±10 V, ±20 mA, ±25 mA
- Span Drift: ± 30 ppm/°C
- Zero Drift: ± 6 μV/°C
- Resolution: 16-bit with accuracy ±0.1% of FSR (voltage), ±0.2% (current)
- Sampling Rate: 12 sample/second (total)
- CMR @ 50/60 Hz: 92 dB
- NMR @ 50/60 Hz: 60 dB
- High Common Mode: 200 Vdc

Ordering Information
- ADAM-6117EI: 8-ch Isolated AI EtherNet/IP Module
- ADAM-6117PN: 8-ch Isolated AI PROFINET Module

Common Specifications

General
- LAN: 10/100Base-T(X)
- Power Consumption: 3 W @ 24 Vdc
- Connectors: 2 x RJ-45 LAN, (Daisy Chain)
- Watchdog: System (1.5 second) and Communication (programmable)
- Power Input: 10 – 30 Vdc

Protection
- Isolation Protection: 2,500 Vdc
- Built-in TVS/ESD Protection
- Power Reversal Protection

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

Digital Input
- Channels: 4
- Input Type: Dry Contact (Close to Isolated GND)

Ordering Information
- ADAM-6124EI: 4-ch Isolated Analog Output EtherNet/IP Module
- ADAM-6124PN: 4-ch Isolated Analog Output PROFINET Module
ADAM-6150
ADAM-6151/6156
ADAM-6160

15-ch Isolated Digital I/O Real-time Ethernet Module
16-ch Isolated Digital Input/ Digital Output Real-time Ethernet Module
6-ch Relay Real-time Ethernet Module

Specifications

Digital Input
- Channels
  ADAM-6150: 8
  ADAM-6151: 16
- Dry Contact
  Logic level 0: open
  Logic level 1: close to DGND
- Wet Contact
  Logic level 0: 0 ~ 3 VDC or 0 ~ -3 VDC
  Logic level 1: 10 ~ 30 VDC or -10 ~ -30 VDC
  (Dry/Wet Contact decided by switch)
- Input Impedance
  10 kΩ
- Transition Time
  From logic level 0 to 1: 0.2 ms
  From logic level 1 to 0: 0.2 ms

Digital Output
- Channels
  ADAM-6150: 7
  ADAM-6156: 16
- Output Voltage Range
  8 ~ 35 VDC
- Normal Output Current
  100 mA (per channel)

Ordering Information
- ADAM-6150EI
  15-ch Isolated DI/O EtherNet/IP Module
- ADAM-6151EI
  16-ch Isolated DI EtherNet/IP Module
- ADAM-6156EI
  16-ch Isolated DO EtherNet/IP Module
- ADAM-6150PN
  15-ch Isolated DI/O PROFINET Module
- ADAM-6151PN
  16-ch Isolated DI PROFINET Module
- ADAM-6156PN
  16-ch Isolated DO PROFINET Module

Specifications

Relay Output
- Channels
  5 Form C
- Contact Rating
  AC: 250 V @ 5 A
  DC: 30 V @ 5 A
- Mechanism
  20,000,000 operations
- Breakdown Voltage
  500 VDC (50/60 Hz)
- Relay On Time
  7 ms
- Relay Off Time
  3 ms
- Contact Resistance
  30 mΩ (maximum)
- Insulation Resistance
  1 GΩ (minimum) at 500 VDC

Ordering Information
- ADAM-6160EI
  6-ch Relay EtherNet/IP Module
- ADAM-6160PN
  6-ch Relay PROFINET Module

Common Specifications

General
- LAN
  10/100Base-T(X)
- Power Consumption
  ADAM-6150: 2.4 W @ 24 VDC
  ADAM-6151: 2.4 W @ 24 VDC
  ADAM-6156: 2.7 W @ 24 VDC
  ADAM-6160: 3.5 W @ 24 VDC
- Connectors
  2 x RJ-45 LAN, (Daisy Chain)
  Plug-in screw terminal block (I/O and power)
- Watchdog
  System (1.6 second) and Communication (programmable)
- Power Input
  10 ~ 30 VDC

Protection
- Over Voltage Protection
  ±35 VDC
- Isolation Protection
  2,500 VDC
- Power Reversal Protection

Environment
- Operating Temperature
  -10 ~ 70°C (14 ~ 158°F)
- Storage Temperature
  -20 ~ 80°C (-4 ~ 176°F)
- Operating Humidity
  20 ~ 95% RH (non-condensing)
- Storage Humidity
  0 ~ 95% RH (non-condensing)
The Path to Seamless Integration

The integration of automation and enterprise systems require a change in the architecture of open control systems. From Advantech’s point of view, the level of integration between automation and enterprise systems can only be accomplished through Internet technology.

It is believed that IP/Ethernet protocols will progress beyond the control layer, into the field layers. Placing remote I/O with IP/Ethernet connections on the shop floor is economical. Advantech believes that over the next five years, Internet protocols over Ethernet will dominate major field connections. The Advantech ADAM-6000 series offers ideal remote I/O solutions with Internet protocols for industrial automation environments.

ADAM-6000 firmware features a built-in Modbus/TCP server. Advantech provides the ADAM .NET Utility, ADAM .NET class library and OPC Server for the ADAM-6000 series to support these functions as well. Users can configure DA&C systems via ADAM .NET Utility and integrate it with an HMI software package via Modbus/TCP driver or Modbus/TCP OPC Server. Furthermore, users can easily use the ADAM .NET class library to develop their own applications.

Web-enabled Technology Becomes Popular on Factory Floors

As Internet technologies and standards have rapidly developed over the past decade, Web-based control methodologies now obviously represent a powerful opportunity for extending efficient network-based management techniques to encompass non-IT real-world assets. The ADAM-6000 series is equipped with a built-in web server so that its data can be viewed, anytime-anywhere via the Internet. Moreover, ADAM-6000 series allows users to configure user-defined web pages to meet the diverse needs in various applications. With this powerful function, the ADAM-6000 series breaks the boundary of traditional multi-layer automation architecture and allows users to access field data directly in real time, which enables seamless integration between the plant floor and the front office.

HMI has provided a friendly operator interface for discrete control and sharply reduced the cost and complexity of automation systems. A web server has been added to most HMI software and a browser allows access to HMI displays from remote locations via the network. The end user is able to see and use an identical HMI from any Internet connected computer anytime, anywhere. ADAM-6000 series can be be fully integrated with standard HMI software which supports Modbus/TCP.
ADAM-6000 Features: GCL

Using Ethernet I/O Modules as Controllers

What is GCL?

GCL (Graphic Condition Logic) gives Ethernet I/O modules control ability. Users can define the control logic rules using graphic configuration environment in ADAM.NET Utility, and download defined logic rules to ADAM-6000 Ethernet I/O modules. Then, that Ethernet I/O module will execute the logic rules automatically just like a standalone controller.

For each Ethernet I/O module, 16 logic rules can be defined. In the configuration environment of ADAM.NET Utility, 4 graphic icons shows the 4 stages of one logic rule: Input, Logic, Execution and Output (Refer to figure below). Users can simply click on each icon and one dialog window will pop-up for users to configure each stage. After completing all configurations, users can click one button to download the defined logic rules to the specific Ethernet I/O module.

ADAM-6000 GCL is the Simplest Logic Ethernet I/O

- Complete Graphic Configuration Environment
  Unlike other text-based logic configuration utility, Advantech GCL provides a complete graphic configuration utility, which is very intuitive to use. By simply clicking the icons, all related configurations can be done through the pop-up dialog window. GCL is not only easy-to-use, but also features very powerful functionality.

- Supports Both Local and Remote Output
  When users defines the destination of Output stage (such as digital output, analog output, counter and pulse output), users can choose either local module or remote module as target.

- Cascade Logic
  The output of one logic rule can be another rule. Therefore, different rules can be combined together. GCL provides this kind of functionality called Cascade Logic. It helps to create more input number of logic rule. For example, if users combine rule 1 and rule 2 with rule 3, the maximum inputs become 7 inputs. (Two inputs of rule 3 will be rule 1 and rule 2. Refer to figure below.) So users can define complex logic architecture to satisfy various application requirements.

- Distributed Cascade Logic
  Users can assign other rule as output of one logic rule. In fact, that “Other Rule” can be on the same module, or on another remote module. So, one GCL logic architecture can operate across different modules. Several Ethernet I/O modules can be integrated into one complete logic system.

- Feedback
  Users can assign input and output of logic rule to the same internal register. This gives GCL feedback ability. No hardware wiring is needed.

- Rich I/O Options
  | Analog Input | Thermocouple, RTD, Voltage, Current |
  | Analog Output | Voltage, Current |
  | Digital Input | Dry Contact, Wet Contact, Counter/Frequency input |
  | Digital Output | Sink, Source, Relay output, Pulse output |

- Fast Execution Time
  Advantech GCL features extremely short logic rule execution time in the market. When users choose local output (input and output channel are on the same module), the processing time (including hardware input delay time, one logic rule execution time and hardware output delay time) is less than 1 millisecond. When users choose remote output (input and output channel are on different modules), the total time needed (including processing and communication time) is less than 3 milliseconds.

- Analog Input Scaling
  When configuring analog input condition, GCL provides linear scaling function to convert measured voltage/current value to its engineer unit value (such as temperature or pressure unit). Then users can use the engineer unit value to define the logic condition, and it is more intuitive for users.

- Online Monitoring
  After users complete all GCL configurations in ADAM.NET Utility, they can simply click the “Run Monitoring” button. Then users can see real-time execution workflow of logic rule on ADAM-6000 modules. Besides, current input values will also be displayed. This greatly helps users to maintain the system easily.

- Sending Messages
  In GCL, you can define your custom message. When conditions are satisfied, message, module’s IP and I/O status will be sent to defined PC or device.

- Local DO Status Can be Input Condition
  In GCL, you can read the local DO channel value and use it in the input condition. You can define logic rule based on the local DO status.
**ADAM-6000 Features: Peer-to-Peer**

**Requirements**
One of our clients has three branches across multiple countries. For each branch, cameras were installed near the gates. At the headquarters, people in the control room can monitor each gate via Intranet. Now they want to enhance the system to remotely control each gate, so that each gate can be controlled from inside the control room of the headquarters. Since the distance between the headquarters and each branch is thousands of miles away, it may be very difficult to establish extra communication network for this purpose.

**Solution**
Through 3 pairs of Advantech ADAM-6000 Peer-to-Peer Ethernet I/O modules (without any additional hardware), this application has been easily solved. For each pair of ADAM-6000 modules, one module is inside control room of headquarters, and another is located at each branch. When the module in headquarters is activated, it will notify its paired module at the branch to open or close the gate. The communication is Ethernet-based, so that our clients can leverage their existing Ethernet infrastructure.

**What Benefits Do Peer-to-Peer Modules Provide?**

**No Controller Required**
For Ethernet I/O modules without Peer-to-Peer functionality, a controller is needed to read data from the input module and then send data to the output module. With Peer-to-Peer solutions, the controller can be removed since data will automatically transfer. This not only simplifies the process, but also helps save system hardware costs.

**No Programming Required**
To utilize Peer-to-Peer modules, the only thing required is to configure related setting through ADAM .NET Utility. No additional programming effort is needed, that it helps to save system development time.

**Simple and Flexible System Wiring**
Long distance wiring can easily become a nightmare. For some automation applications, if the PLC and the sensors are far away, one remote I/O module needs to be located near the sensors, and a proprietary communication network needs to connect the PLC and the remote I/O module, and the communications distance is severely limited. Moreover, networks provided by PLC manufacturers are rarely open. Peer-to-Peer modules can replace limited and closed networks with no limitations since they leverage the most open and flexible Ethernet networks.

**Why is Advantech's Peer-to-Peer Technology the Best Choice?**

- **Flexible Channel Mapping**
  ADAM-6000 Peer-to-Peer modules provide two modes: Basic and Advanced. For Basic mode, channels on one input module are directly mapped to channels on another single output module. For Advanced mode, channels on one input module can be mapped to channels on different output modules. (Refer to figure below)

- **Fast Response Time**
  Advantech Peer-to-Peer modules feature excellent execution performance in market. The execution time to transfer data from input to output module is less than 1.2 millisecond.

- **Advanced Security**
  When engineers use Peer-to-Peer modules, they don’t want it to be controlled by non-authorized computers or devices. ADAM-6000 Peer-to-Peer module lets users decide which IP or MAC address has control authority. This can make sure the output module is only controlled by its paired input module.

- **Advanced Reliability**
  When communication between a pair of ADAM-6000 Peer-to-Peer modules is broken, the digital output module can generate pre-defined value to ensure safety.

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**What is Peer-to-Peer?**
Unlike client / server mode, Peer-to-Peer enabled modules will actively update input channel status to specific output channel. There will be a pair of module: one input module and one output module. Users can define the mapping between input channel and output channel. Then the input value will be transferred to the output channel actively.
## ADAM-6000 Series Selection Guide

### ADAM-6015, ADAM-6017, ADAM-6018, ADAM-6022, ADAM-6024

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<th>ADAM-6017</th>
<th>ADAM-6018</th>
<th>ADAM-6022</th>
<th>ADAM-6024</th>
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<tr>
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<td>Receiver Only</td>
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<td>Voltage Input</td>
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<td>Current Input</td>
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<tr>
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<td>Pt, Balco and Ni RTD</td>
<td>J, K, T, E, R, S, B</td>
<td>Thermocouple</td>
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<td>Burn-out Detection</td>
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<td>Built-in Dual Loop PID Control Algorithm</td>
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### ADAM-6050, ADAM-6051, ADAM-6052, ADAM-6060, ADAM-6066

<table>
<thead>
<tr>
<th>Spec.</th>
<th>ADAM-6050</th>
<th>ADAM-6051</th>
<th>ADAM-6052</th>
<th>ADAM-6060</th>
<th>ADAM-6066</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>10/100 Mbps Ethernet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer-to-Peer</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GCL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Input/Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Channels</td>
<td>12</td>
<td>12</td>
<td>8</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Output Channels</td>
<td>6 (Sink)</td>
<td>2 (Sink)</td>
<td>8 (Source)</td>
<td>6-channel relay</td>
<td>6-channel power relay</td>
</tr>
<tr>
<td>Extra Counter Channels</td>
<td>-</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counter Input</td>
<td>3 kHz</td>
<td>4.5 kHz</td>
<td>3 kHz</td>
<td>3 kHz</td>
<td>3 kHz</td>
</tr>
<tr>
<td>Frequency Input</td>
<td>3 kHz</td>
<td>4.5 kHz</td>
<td>3 kHz</td>
<td>3 kHz</td>
<td>3 kHz</td>
</tr>
<tr>
<td>Pulse Output</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>High/Low Alarm Settings</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Isolation Protection</td>
<td>-</td>
<td>2,000 Vdc</td>
<td>2,000 Vdc</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Page</td>
<td>17-11</td>
<td>17-11</td>
<td>17-11</td>
<td>17-12</td>
<td>17-12</td>
</tr>
</tbody>
</table>

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**Note 1:** Peer-to-Peer and GCL cannot run simultaneously, only one feature is enabled at one time.

**Note 2:** ADAM-60024 can only act as a receiver and generate analog output when using Peer-to-Peer or GCL.

**Note 3:** Only for analog input and analog output channels.
Specifications

**Analog Input**
- **Channels**: 7 (differential)
- **Input Impedance**: > 10 MΩ
- **Input Connections**: 2 or 3 wire
- **Input Type**: Pt, Balco and Ni RTD
- **RTD Types and Temperature Ranges**:
  - Pt 100: -50°C ~ 150°C, 0°C ~ 100°C, 0°C ~ 200°C, 0°C ~ 400°C, -200°C ~ 200°C
  - Pt 1000: -40°C ~ 160°C
  - Supports both IEC 60751 ITS90 (0.03851 W/W/°C) and JIS C 1604 (0.03916 W/W/°C)
- **Accuracy**: ± 0.1%
- **Span Drift**: ± 25 ppm/°C
- **Zero Drift**: ± 6 μV/°C
- **Wire Burn-out Detection**

**Ordering Information**
- ADAM-6015: 7-ch Isolated RTD Input Modbus TCP Module

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**Common Specifications**

**General**
- **LAN**: 10/100Base-T(X)
- **Power Consumption**: 2 W @ 24 Vcc
- **Connectors**: 1 x RJ-45 (LAN), Plug-in screw terminal block (I/O and power)
- **Watchdog**: System (1.6 second) and Communication (programmable)
- **Power Input**: 10 ~ 30 Vcc
- **Supports Peer-to-Peer**
- **Supports GCL**
- **Supports Modbus/TCP, TCP/IP, UDP and HTTP Protocols**
- **Built-in TVS/ESD Protection**
- **Power Reversal Protection**

**Analog Input**
- **Resolution**: 16-bit
- **Sampling Rate**: 10 sample/second (total)
- **CMR @ 50/60 Hz**: 90 dB
- **NMR @ 50/60 Hz**: 60 dB
- **Protection**
  - **Over Voltage Protection**: ±35 Vcc
  - **Isolation Protection**: 2,000 Vcc

**Environment**
- **Operating Temperature**: -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature**: -20 ~ 80°C (-4 ~ 176°F)
- **Operating Humidity**: 20 ~ 95% RH (non-condensing)
- **Storage Humidity**: 0 ~ 95% RH (non-condensing)
ADAM-6050 18-ch Isolated Digital I/O Modbus TCP Module
ADAM-6051 14-ch Isolated Digital I/O Modbus TCP Module with 2-ch Counter
ADAM-6052 16-ch Source-type Isolated Digital I/O Modbus TCP Module

Specifications

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

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

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

---

**Common Specifications**

**General**
- **LAN**: 10/100Base-T(X)
- **Power Consumption**: 2 W @ 24 VDC
- **Connectors**: 1 x RJ-45 (LAN), Plug-in screw terminal block (I/O and power)
- **Watchdog**: System (1.5 second) and Communication (programmable)

**Power Input**: 10 ~ 30 VDC
- **Supports Peer-to-Peer**
- **Supports GCL**
- **Supports Modbus/TCP, TCP/IP, UDP and HTTP Protocol**

**Protection**
- **Power Reversal Protection**
- **Isolation Protection**: 2,000 VAC

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

---

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

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**Digital Input**
- **Channels**: 8
- **Dry Contact**: Logic level 0: close to GND, Logic level 1: open
- **Wet Contact**: Logic level 0: 0 ~ 3 VDC, Logic level 1: 10 ~ 30 VDC
- **Supports 3 kHz Counter Input**: (32-bit + 1-bit overflow)
- **Keep/Discard Counter Value when Power-off**: Supports 3 kHz Frequency Input
- **Supports Inverted DI Status**

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

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

---

**Digital Input**
- **Channels**: 8
- **Dry Contact**: Logic level 0: close to GND, Logic level 1: open
- **Wet Contact**: Logic level 0: 0 ~ 3 VDC, Logic level 1: 10 ~ 30 VDC
- **Supports 3 kHz Counter Input**: (32-bit + 1-bit overflow)
- **Keep/Discard Counter Value when Power-off**: Supports 3 kHz Frequency Input
- **Supports Inverted DI Status**

**Digital Output**
- **Channels**: 8
- **Voltage Range**: 10 ~ 35 VDC
- **Current**: 1 A (per channel)
- **Supports 5 kHz Pulse Output**: Supports High-to-Low and Low-to-High Delay Output
- **Supports Over Current Protection**

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

General
- LAN: 10/100Base-T(X)
- Power Consumption: 2 W @ 24 VDC (ADAM-6060)
  2.5 W @ 24 VDC (ADAM-6066)
- Connectors: 1 x RJ-45 (LAN), Plug-in screw terminal block (I/O and power)
- Watchdog Timer: System (1.6 second) and Communication (programmable)
- Power Input: 10 ~ 30 Vdc
- Supports Peer-to-Peer
- Supports GCL
- Supports Modbus/TCP, TCP/IP, UDP and HTTP Protocols

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

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

Protection
- Isolation Voltage: 2,000 Vdc
- Power Reversal Protection

Environment
- Operating Temperature: -10 ~ 70°C (14 ~ 158°F)
- Storage Temperature: -20 ~ 85°C (-4 ~ 185°F)
- Operating Humidity: 20 ~ 95% RH (non-condensing)
- Storage Humidity: 0 ~ 95% RH (non-condensing)

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

ADAM-6000 Series Dimensions

ADAM-6000 Series Common Specifications

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