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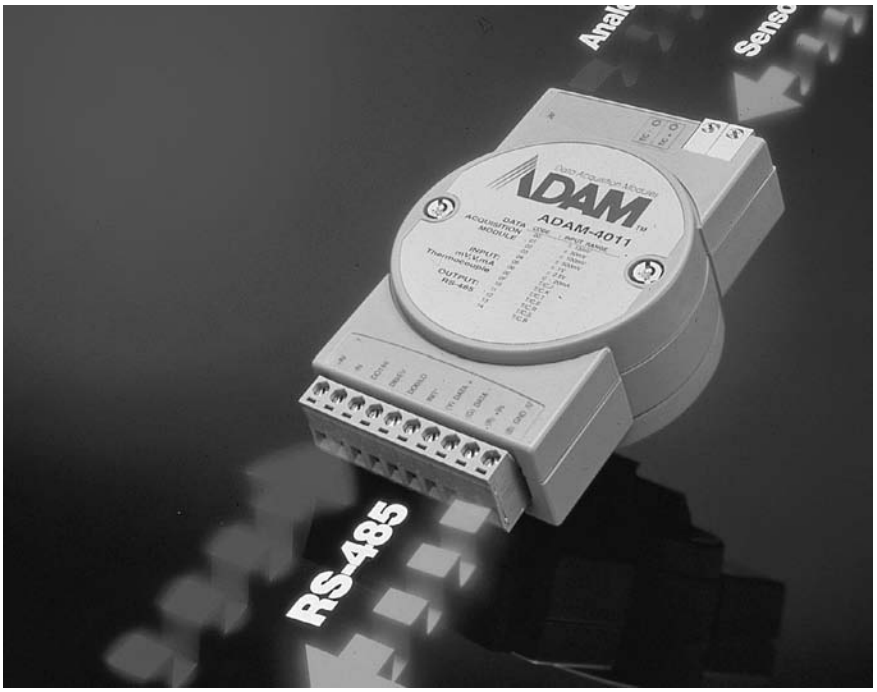
Remote DA&C Modules
ADAM-4000 Series

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.

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.

Watchdog Timer Inside

A watchdog timer supervisory function will automatically reset the ADAM-4000 series modules if required, which reduces the need for maintenance.

Flexible Networking

The 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.

Alternative Standalone Control Solution

A stand-alone control solution is made possible when the ADAM-4000 series modules are controlled by the ADAM-4500 or ADAM-4501 PC-based communication controller. The ADAM-4500 or ADAM-4501 allows users to download an application (written in a high-level programming language) into its Flash ROM. This allows customization for your applications.

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.

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 are bundled with a Modbus driver, and can access the ADAM-4000 I/O directly. Moreover, Advantech provides Modbus OPC Server & Modbus/TCP OPC Server as data exchange interfaces between the ADAM-4000 Modbus I/O and any Windows Applications.

FM APPROVED

Class I, Div. 2 Groups ABCD
(NI / I / 2 / ABCD / T*)

ADAM-4000 Remote DA&C System

The ADAM-4000 remote DA&C system encompasses a full product line integrating HMI platforms and numerous I/O modules such as DI/O, AI/O, relay and counter modules. In addition, we offer many communication models for data transfer: Ethernet wireless, Modbus, RS-485, and fiber optics. Users can choose among specific modes according to their specific application purposes. Data transfer can be uploaded to HMI platforms via a safe Ethernet channel for monitoring and controlling. All this can be done using an existing data bus without investing in extra hardware.

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. These modules (ADAM-4015/4017+/4018+/4019+/4024/4051/4055/4056S/4056SO/4068/4069), include analog I/O and digital I/O, needed in a data acquisition system. 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.

Ethernet

ADAM-4570 and ADAM-4571 are designed for the connection between serial devices (RS-232/485/422) 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.

RS-485

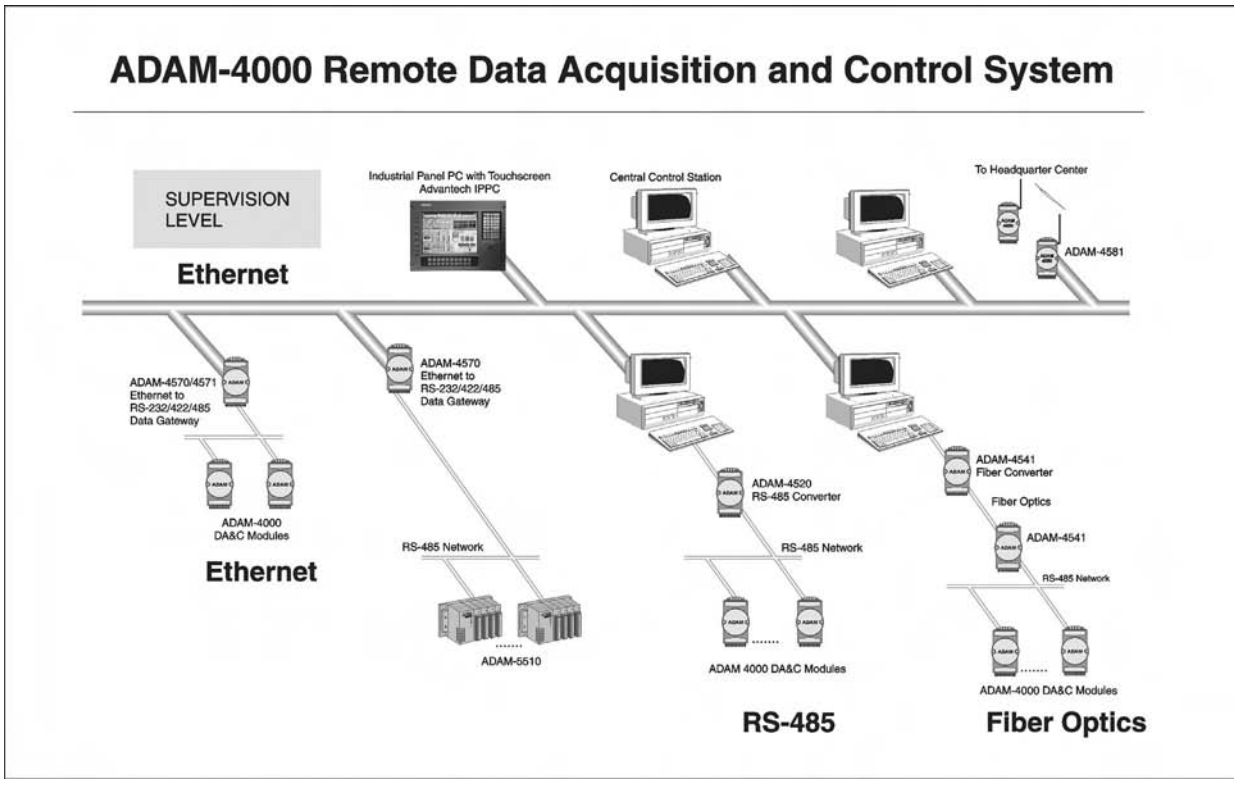
The ADAM-4000 series of modules use the EIA RS-485 communication protocol, the industry's most widely used bi-directional, balanced transmission line standard. The EIA RS-485 was specifically developed for industrial applications. It lets ADAM-4000 modules transmit and receive data at high rates over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

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-232/485. It offers a transmission distance of up to 2500 m with a total immunity to electromagnetic noise.

USB communication

ADAM-4561/4562 is a one-port isolated USB to RS-232 converter. The major feature 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-4100 Series

Wide Temperature Remote Data Acquisition and Control Modules

Introduction

The ADAM-4100 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 plastic, independently provide intelligent signal conditioning, analog I/O, digital I/O, LED data display, and an address mode with a user-friendly design for convenient address reading.

Industrial Design for a Larger Variety of Applications

The ADAM-4100 series is designed to endure more adverse environments than the earlier ADAM-4000 series. This makes them suitable for more widespread applications.

Ready for Unfriendly Industrial Environments

Broader Operating Temperature Range

The ADAM-4100 series 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-4100 series 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

ADAM-4100 modules accept 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

- Supports 200 VDC Hi common mode voltage (ADAM-4117)
- Supports unipolar and bipolar input (ADAM-4117)
- Supports +/- 15 V input range (ADAM-4117)
- Supports filter auto-tuning or filter-out 50 Hz / 60 Hz (ADAM-4117/4118)
- Digital filter function (ADAM-4150)
- DI channels can be used as 1 kHz counters (ADAM-4150)
- Over current / short circuit protection (ADAM-4150)
- DO channels support pulse output function (ADAM-4150 / 4168)

ADAM-4100 Module with LED Display

ADAM-4100 modules have a LED display that lets you monitor the status address settings. The modules have two operating modes (initial and normal), and a new address mode for easier reading of the address settings.

Online Firmware Update

ADAM-4100 modules have a friendly and convenient design where firmware can be updated through a local network or the Internet. 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, ADAM-4100 modules support both the ADAM 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) but also accepts 1 start bit, 8 data bits, and 1 or 2 stop bits, with parity check (none, odd, even).

ADAM-4000/4100 Series

Analog Input Modules

The ADAM-4000 and 4100 series of analog input modules use microprocessor-controlled, high-resolution, 16-bit, sigma-delta A/D converters to acquire sensor signals such as voltage, current, thermocouple or RTD. They translate analog data into one of the following formats: engineering units, % of FSR, two's complement or ohms. After the modules receive a request from the host, the data is sent in the desired format over the RS-485 network.

The analog input modules protect your equipment from ground loops by providing 3,000 VDC isolation and a wide power supply input of 10 to 30 VDC for ADAM-4000 and 10 to 48 VDC for the ADAM-4100 series.

ADAM-4011, 4011D and 4012 modules feature digital inputs and outputs that may be used for alarms and event counting.

ADAM-4017, 4017+, and 4117 are 16-bit, 8-channel analog input modules that provide programmable input ranges on all channels. These modules are an extremely cost-effective solution for industrial measurement and monitoring applications. The ADAM-4018, 4018+, 4118, and 4019+ are also 8-channel analog input modules that support thermocouple sensor input.

RTD Input Modules

RTD modules are popular for temperature measurements. Unlike traditional designs, the ADAM-4015 provides six RTD input channels for different types of RTD signals as a cost-effective solution for industrial and building automation. Occasionally, broken external wiring can lead to inaccurate current values. The ADAM-4015 provides a broken wiring detection function so users can easily troubleshoot this.

Analog Output Modules

The ADAM-4021 analog output module supplies single-channel analog output in a range of voltages and currents. In order to fully cover the role as a multi-channel analog output module, ADAM-4024 provides four universal output channels. Moreover, it is designed with four digital inputs for integrating applications, such as emergency latch outputs or triggers. It uses optical isolators to prevent ground loop effects and limit damage from power surges. You can specify slew rates and start-up currents.

Digital Input and Output Modules

ADAM-4050 and 4150 feature seven digital input channels and eight digital output channels. The outputs are open-collector transistor switches that you can control from the host computer. You can also use the switches to control solid-state relays, which in turn can control heaters, pumps or other power equipment. The ADAM-4150 digital I/O channels can also support event counter and pulse output functions.

ADAM-4051 is a 16-ch. digital input module with 3,000 VDC optical isolation. It accepts 10 to 50 volts as input voltage for various digital signals, such as 12 VDC, 24 VDC, and 48 VDC. Moreover, users can read the current status from the LED indicators on the front panel.

ADAM-4052 provides eight digital input channels: six fully independent isolated channels and two isolated channels with a common ground. The ADAM-4053 provides 16 digital input channels for dry or wet contact signals. For dry contact, the effective distance from digital input to contact point is up to 500 m.

ADAM-4055 offers 8 isolated digital input channels and 8 isolated digital output channels for critical applications. The inputs accept 10 to 50 volts, and the outputs supply 5 ~ 40 VDC open collector. Considered to be very user-friendly, the ADAM-4055 is also built with a LED indicator for easy status reading.

ADAM-4056S and 4056SO are 12-channel sink/source type isolated digital output modules. The isolated channels are designed for digital output for critical applications. ADAM-4056S can provide from 5 to 40 VDC, while ADAM-4056SO can be used in the range of 10 to 35 VDC with maximum 1 A per channel.

Counter/Frequency Modules

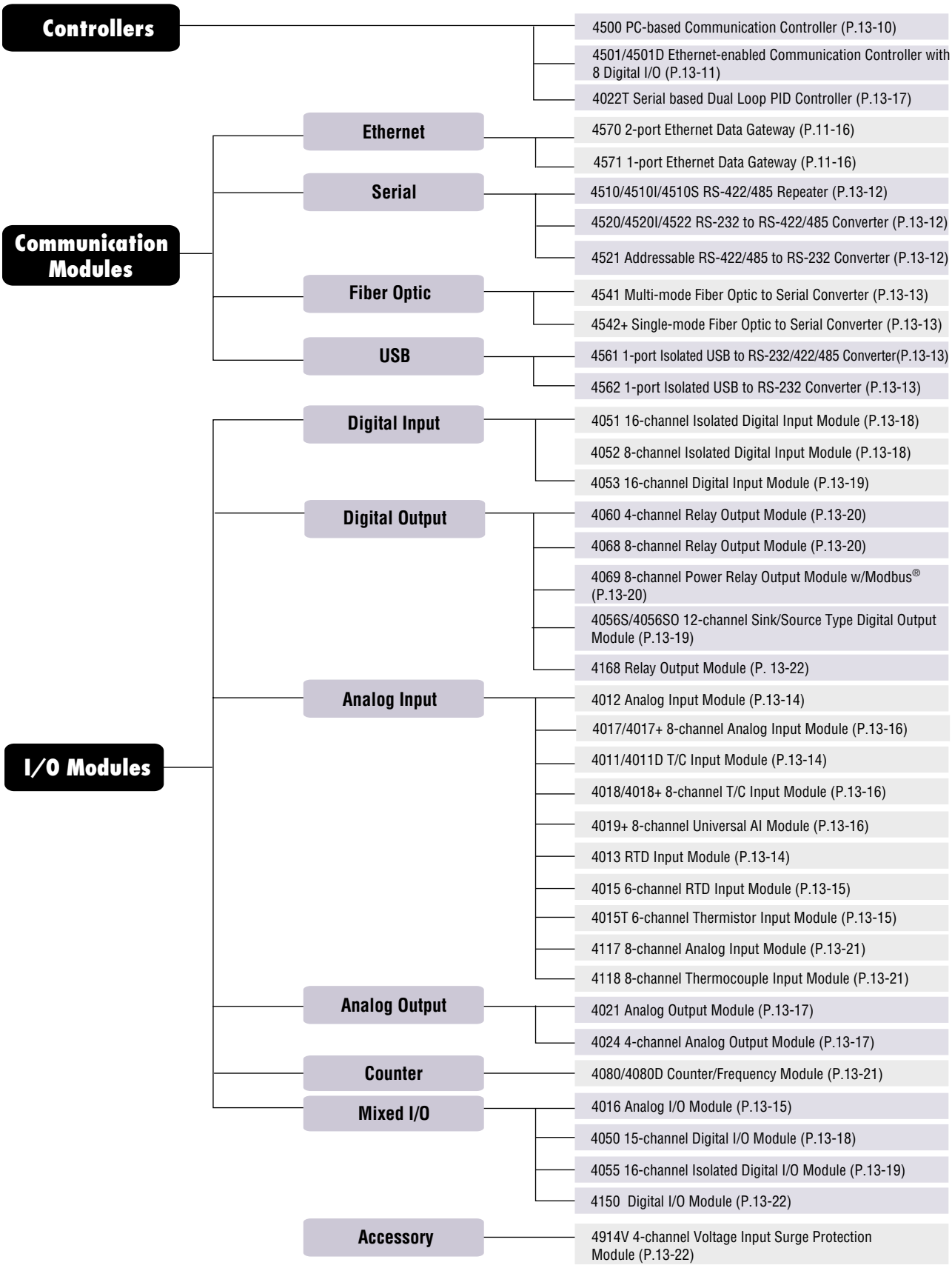
The ADAM-4080 and 4080D isolated counter/frequency modules have two 32-bit counter channels and a built-in programmable timer for frequency measurement.

- Programmable Alarm Output
  ADAM-4080 and 4080D include digital alarm functions. You can set alarm values (32-bit) into the module from your host computer.
- Programmable Digital Filter and Threshold
  ADAM-4080 and 4080D modules include a unique programmable digital filter to reject noise on the input signal. You can specify separate time constants to provide stable output readings.
- Programmable Preset Value
  The ADAM-4080 module includes a programmable preset mode. You can preset the value of a counter into the module from your host computer.
- Front Panel LED Display
  The ADAM-4080D module's 5-digit LED displays the data being sent over an RS-485 line to the host computer. The module can be programmed to show either channel 0 or channel 1.

Relay Output Modules

As with other ADAM modules, the ADAM-4060, 4068, 4069 and 4168 relay modules are controlled remotely and store configuration data in EEPROM. They provide 4/8 channels, with a mix of form A and form C. These modules are designed for on/off control or low-power switching and power relay output applications. The ADAM-4168 also support pulse output functionality.

Module Selection Chart



ADAM-4000 Selection Guide

Communication Modules

	Controllers			Repeaters		Converters & Data Gateways			
Module	**ADAM-4500**	**ADAM-4501 ADAM-4501D**	**ADAM-4022T**	**ADAM-4510 ADAM-4510I ADAM-4510S**	**ADAM-4520 ADAM-4520I ADAM-4522**	**ADAM-4521**	**ADAM- 4541/4542+**	**ADAM- 4561/4562**	**ADAM-4570 ADAM-4571**
Network	RS-232 RS-485	Ethernet, RS-485	RS-485	RS-422 RS-485	RS-232 to RS-422 RS-485	RS-232 to RS-422 RS-485	Fiber Optic to RS-232/422/485	USB to RS-232/485/422	Ethernet to RS-232/422/485
Comm. Protocol	ADAM	Modbus/RTU, Modbus/TCP	ADAM/Modbus	-	-	-	-	-	-
Comm. Speed (bps)	From 1200 to 115.2 k	Ethernet: 10/100M Serial: From 1200 to 115.2 kbps	From 1200 to 115.2 k	From 1200 to 115.2 k	From 1200 to 115.2 k	From 1200 to 115.2 k	From 1200 to 115.2 k	From 1200 to 115.2 k	Ethernet: 10/100 M Serial: up to 230.4 k
Comm. Distance	Serial: 1.2 km	Ethernet: 100 m Serial: 1.2 Km	Serial: 1.2 km	Serial: 1.2 km	Serial: 1.2 km	Serial: 1.2 km	ADAM-4541: 2.5 km ADAM-4542+: 15 km	Serial: 1.2 km	LAN: 100 m Serial: 1.2 km
Interface Connectors	RS-232: female DB9 RS-485: plug-in screw terminal	Ehternet: RJ45 RS-485: plug-in screw terminal RS-232:RJ48	RS-485: plug-in screw terminal	RS-422/485: plug-in screw terminal	RS-232: female DB9 RS-422/485: plug-in screw terminal	RS-232: female DB9 RS-422/485: plug-in screw terminal	Fiber : ST(ADAM-4541) SC(ADAM-4542+) plug-in screw terminal	USB client connector ADAM-4561: plug-in screw terminal ADAM-4562: DB9	Ethernet: RJ-45 RS-232/422/485: RJ-48
LED Indicators	Comm. & Power	Comm. & Power	Power	Comm. & Power	Comm. & Power	Comm. & Power	Comm. & Power	Comm. & Power	Network: Tx/Rx Link, Speed, Power
Data Flow Control	Yes	Yes	Yes	-	-	Yes	-	Yes	Yes
Watchdog Timer	Yes	Yes	Yes	-	-	Yes	-	Yes	Yes
Isolation Voltage	-	-	3000 V_{DC}	3000 V_{DC} (ADAM-4510S/ ADAM-4510I)	3000 V_{DC} (ADAM-4520/ ADAM-4520I)	-	-	3000 V_{DC}	-
Power Requirement	+10 ~ +30 V_{DC}	+10 ~ +30 V_{DC}	+10 ~ +30 V_{DC}	4510/4510S: +10 ~ +30 V_{DC} 4510I: +10 ~ + 48 V_{DC}	4520/4522: +10 ~ +30 V_{DC} 4510I: +10 ~ + 48 V_{DC}	+10 ~ +30 V_{DC}	+10 ~ +30 V_{DC}	+10 ~ +30 V_{DC}	+10 ~ +30 V_{DC}
Operating Temperature	-10 ~ 70° C	-10 ~ 70° C	-10 ~ 50° C	4510/4510S: -10 ~ 70° C 4510I: -40 ~ 85° C	4520/4522: -10 ~ 70° C 4520I: -40 ~ 85° C	-10 ~ 70° C	-10 ~ 70° C	-10 ~ 70° C	0 ~ 60° C
Humidity	5 ~ 95 %	5 ~ 95 %	5 ~ 95 %	5 ~ 95 %	5 ~ 95 %	5 ~ 95 %	5 ~ 95 %	5 ~ 95 %	20 ~ 95 %
Power Consumption	2.0 W	4 W	4 W	1.4 W	1.2 W	1 W	1 W (typical) 1.5 W (max.)	1 W	4 W
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Analog Input

Module		ADAM-4011/ ADAM-4011D	ADAM-4012	ADAM-4013	ADAM-4015 ADAM-4015T	ADAM-4016	ADAM-4017/ ADAM-4017+	ADAM-4018/ ADAM-4018+	ADAM-4019+	ADAM-4117	ADAM-4118
Resolution		16 bit	16 bit	16 bit	16 bit	16 bit	16 bit	16 bit	16 bit	16 bit	16 bit
Analog Input	Input Channels	1 differential	1 differential	1 differential	6 differential	1 differential	8 differential (ADAM-4017+)	8 differential (ADAM-4018+)	8 differential	8 differential	8 differential
	Sampling Rate	10 Hz	10 Hz	10 Hz	10 Hz (total)	10 Hz (total)	10 Hz (total)	10 Hz (total)	10 Hz (total)	10 Hz (total)	10 Hz (total)
	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	±15 mV ±50 mV ±100 mV ±500 mV ±1 V ±2.5 V (4018)	± 100 mV ± 500 mV ± 1 V ± 2.5 V ± 5 V ± 10 V	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, ±15 V	±15 mV ±50 mV ±100 mV ±500 mV ±1 V ±2.5V
	Current Input	±20 mA	±20 mA	-	-	±20 mA	4017+: 4~20 mA, ±20 mA 4017: ±20 mA	4018+: 4~20 mA, ±20 mA 4018: ±20 mA	4 ~ 20 mA ± 20 mA	0~20 mA, ±20 mA, 4~20 mA	±20 mA, 4~20 mA
	Direct Sensor Input	J, K, T, E, R, S, B Thermocouple	-	RTD Pt, Ni	ADAM-4015: RTD ADAM-4015T: Thermistor	-	-	J, K, T, E, R, S, B Thermocouple	J, K, T, E, R, S, B Thermocouple	-	J, K, T, E, R, S, B Thermocouple
	Burn-out Detection	-	-	-	Yes	-	-	Yes (4018+)	Yes (+4 ~ 20 mA & All T/C)	Yes (mA)	Yes (mA & All T/C)
	Channel Independant Configuration	-	-	-	Yes	-	Yes (4017+)	Yes (4018+)	Yes	Yes	Yes
	Storage Capacity	-	-	-	-	-	-	-	-	-	-
Analog Output	Output Channels	-	-	-	-	1	-	-	-	-	-
	Voltage Output	-	-	-	-	0 - 10 V	-	-	-	-	-
	Current Output	-	-	-	-	30 mA	-	-	-	-	-
Digital Input and Output	Digital Input Channels	1	1	-	-	-	-	-	-	-	-
	Digital Output Channels	2	2	-	-	4	-	-	-	-	-
	Alarm Settings	Yes	Yes	-	-	-	-	-	-	-	-
Counter (32-bit)	Channels										
	Input Frequency										
Isolation		3000 V_{DC}	3000 V_{DC}	3000 V_{DC}	3000 V_{DC}	3000 V_{DC}	3000 V_{DC}	3000 V_{DC}	3000 V_{DC}	3000 V_{DC}	3000 V_{DC}
Digital LED Indicator		Yes (4011D)	-	-	-	-	-	-	-	Yes	Yes
Watchdog Timer		Yes (System)	Yes (System)	Yes (System)	Yes (System & Comm.)	Yes (System)	Yes 4017: System 4017+: System & Comm.	Yes 4018: System 4018+: System & Comm.	Yes (System & Comm.)	Yes (System & Comm.)	Yes (System & Comm.)
Safety Setting											
Modbus Support		-	-	-	Yes	-	Yes (4017+)	Yes (4018+)	Yes	Yes	Yes
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Analog Output		Digital Input/Output						Relay Output			Counter
ADAM-4021	ADAM-4024	ADAM-4050 ADAM-4150	ADAM-4051	ADAM-4052	ADAM-4053	ADAM-4055	ADAM-4056S/ ADAM-4056SO	ADAM-4060	ADAM-4068 ADAM-4168	ADAM-4069	ADAM-4080/ ADAM-4080D
12 bit	12 bit	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	Yes	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
1	4	-	-	-	-	-	-	-	-	-	-
0 - 10 V	0 - 10 V +/-10V	-	-	-	-	-	-	-	-	-	-
0 - 20 mA 4 - 20 mA	0 - 20 mA 4 - 20 mA	-	-	-	-	-	-	-	-	-	-
-	4	7	16	8	16	8	-	-	-	-	-
-	-	8	-	-	-	8	12 (Sink): ADAM-4056S 12 (Source): ADAM-4056SO	4-channel relay	8-channel relay	8-channel power relay	2
-	Yes	-	-	-	-	-	-	-	-	-	Yes
-		-		-	-		-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	50 kHz
3,000 V_{DC}	3,000 V_{DC}	-	2,500 V_{DC}	5,000 V_{RMS}	-	2,500 V_{DC}	2,500 V_{DC}	-	-	-	2,500 V_{RMS}
-	-	-	Yes	-	-	Yes	Yes	-	-	-	5-digit (4080D)
Yes (System)	Yes (System & Comm.)	4050: Yes (system) 4150: Yes (System & Comm.)	Yes (System & Comm.)	Yes (System)	Yes (System)	Yes (System & Comm.)	Yes (System & Comm.)	Yes (System)	Yes (System & Comm.)	Yes (System & Comm.)	Yes (System)
-	Yes	Yes (4150)	-	-	-	Yes	Yes	Yes	Yes	Yes	-
-	Yes	Yes (4150)	Yes	-	-	Yes	Yes	-	Yes	Yes	-
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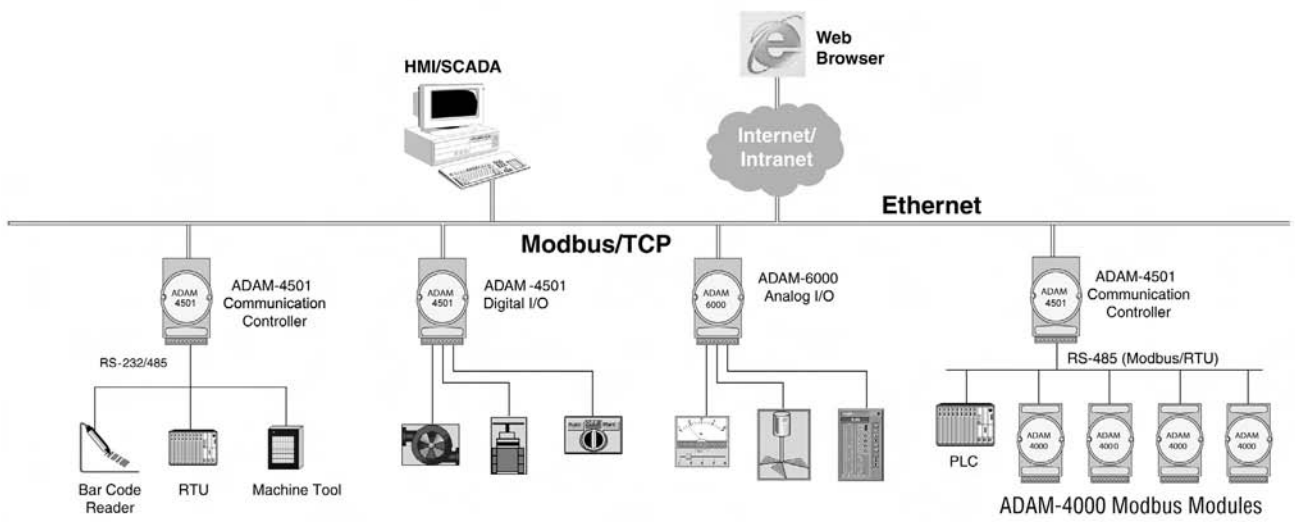
ADAM-4500 Series

ADAM-4500 System Architecture



Designed for Ethernet Connectivity

ADAM-4500 Series are designed with a 10/100 Mbps Ethernet port. The Ethernet-enabled features include built-in HTTP Server, FTP Server, FTP Client function, Email Alarm function and TCP/UDP connection functions. The HTTP Server will let authorized users to monitor ADAM-4500 I/O status by Internet Explorer via Internet. The FTP Server and Client can be used for remote maintenance. The Email Alarm function of ADAM-4500 can send email to pre-defined users for alarm message. All features are very easy to use and ready-to-use sample programs are available.

Versatile Protocols of Communication Function Libraries

The communication protocol of the ADAM-4500 is user-defined and there are library functions of Modbus/RTU protocol and Modbus/TCP protocol available for users. The function libraries include following protocols.

- Modbus/RTU Master Function for connecting to remote I/O modules via RS-485 port
- Modbus/RTU Slave Function for connecting to HMI/SCADA software via RS-485 port
- Modbus/TCP Server Function for connecting to HMI/SCADA software via Ethernet port
- Modbus/TCP Client Function for connecting to Ethernet-enabled remote I/O modules via Ethernet port

Compact Size and Modularized I/O Design

The ADAM-4500 modularized I/O expansion board provides high flexibility for versatile application requirements. The compact size and modularized design makes ADAM-4500 fit into places with limited space. Advantech will offer versatile I/O expansion modules in the future for different application needs.

More Data Memory to Support Versatile Applications

ADAM-4500 is designed with 640 KB SRAM, 512KB flash memory and 1MB flash disk. So it offers a good supply of memory for developing complex control program or data storage applications, such as data recording, which is difficult for traditional controllers.

Supports 4 Communication Ports

Not only equips with an Ethernet interface, ADAM-4500 also has 4 RS-485 communication ports for system networks. The COM1 features RS-232 port with full modem signals. Both COM2 and COM3 are RS-485 ports which can connect to remote I/O modules or control devices. The COM4 is RS-232/485 selectable which is used for downloading application program by default.

ADAM-4501/4501D

Ethernet-enabled Communication Controller with 8 Digital I/O

CE

Features

- 10/100Base-T Ethernet Interface
- Email alarm function
- Built-in Web Server
- Built-in FTP Server and Client
- Supports functionally versatile I/O modules
- Full Functions of Standard TCP and UDP Sockets
- Optional 4 digit 7-segment LED display
- Supports Modbus/RTU and Modbus/TCP function libraries
- 1.5 MB Flash ROM/640 KB SRAM
- Four Serial Ports Available
- Integrated All Operations in Windows Utility

Introduction

The ADAM-4501 consists of compact-sized Ethernet-enabled communication controllers with a x-86 CPU architecture. They support not only an Ethernet interface but also 4 serial ports, which makes them very suitable for industrial communication and control applications. The Ethernet-enabled features include built-in HTTP Server, FTP Server and e-mail alarm functions. The modularized I/O design provides high flexibility for versatile application requirements. The ADAM-4501 also supports rich Modbus function libraries including Modbus/RTU Master/Slave and Modbus/TCP Server/Client function libraries.

Specifications

General

- **Certifications** CE
- **Connectors** 1 x RJ45 (Ethernet)
  1 x RJ48 (COM1)
  2 x Plug-in terminal blocks (#14 ~ 28 AWG)
- **Enclosure** ABS+PC
- **Indicators** LEDs for: Power, CPU, communication and battery
- **Mounting** DIN 35 rail, stack, wall
- **Power Input** Unregulated 10~30 V_{DC} w/power reversal protection

System

- **CPU** 40 MHz, 16-bit
- **CPU Power Consumption** 4 W @ 24 V_{DC}
- **Memory** 1.5 MB flash memory:
  - 256 KB system flash disk (Drive C: Read Only)
  - 256 KB flash memory (accessed by function LIB)
  - 1024 KB file system, 960 KB for user applications (Drive D: Read/Write)
  - 640 KB SRAM, up to 384 KB with battery backup (accessed by function LIB)
- **Real-time Clock** Yes
- **Watchdog Timer** Yes

Input/Output

- **Digital Input**
  Channels: 4
  Dry Contact: Logic level 0: Close to GND
  Logic level 1 : Open
  Wet Contact: Logic level 0: +2 V max.
  Logic level 1: 4 V ~ 30 V
- **Digital Output**
  Channels: 4
  Open Collector to +40 V, 200 mA max. load

Communication

- **LAN** 1 x 10/100Base-T
- **RS-485 Speed** 1.2 to 115.2 kbps
- **RS-485 Max. Nodes** 256 multi-drop systems per serial port
- **Serial Ports** COM1: RS-232 (Full Modem Signals)
  COM2, COM3: RS-485
  COM4 (Programming port): RS-232/485 (jumper)

Software

- **C Library** Borland C++ 3.0 for DOS
- **Operating System** ROM-DOS

Environment

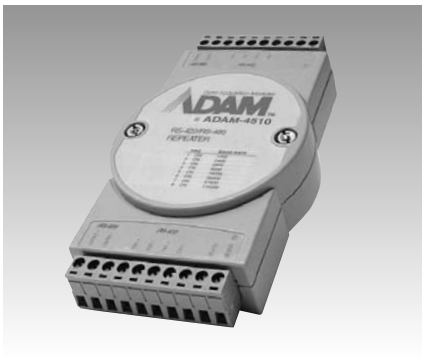
- **Humidity** 5 ~ 95% RH
- **Operating Temperature** - 10 ~ 70° C (14 ~ 158° F)
- **Storage Temperature** - 25 ~ 85° C (-13 ~ 185° F)

Ordering Information

- **ADAM-4501** Ethernet-enabled Communication Controller with 8 Digital I/O
- **ADAM-4501D** Ethernet-enabled Communication Controller with LED and 8 Digital I/O

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

RS-422/485 Repeaters
RS-232 to RS-422/485 Converters
Addressable RS-422/485 to RS-232 Converter



ADAM-4510/4510I/4510S

Specifications

General

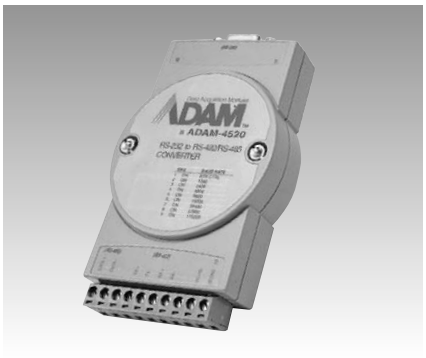
- **Connectors** 2 x Plug-in terminal blocks (#14 ~ 22 AWG)
- **Isolation Protection** 3000 V_{DC} (4510I/4510S only)
- **Power Consumption** 1.4 W @ 24 V_{DC}

Communications

- **Input** RS-485 (2-wire) or RS-422 (4-wire)
- **Output** RS-485 (2-wire) or RS-422 (4-wire).
- **Speed Modes (bps)** 1200,2400, 4800, 9600, 19.2 k, 38.4 k, 57.6 k, 115.2 k, RTS control and RS-422. (switchable)

Environment

- **Operating Temperature**
  ADAM-4510/4510S: -10~70° C (14~158° F)
  ADAM-4510I: - 40~85° C (-40~185° F)
- **Storage Temperature**
  ADAM-4510/4510S: - 25~85°C (-13~185° F)
  ADAM-4510I: - 40~85° C (-40~185° F)



ADAM-4520/4520I/4522

Specifications

General

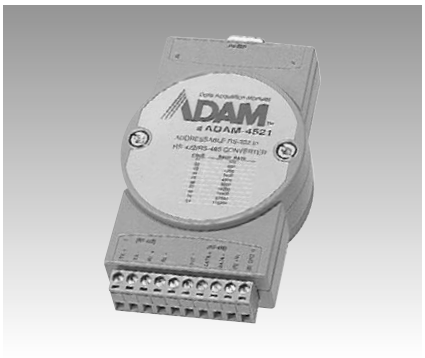
- **Connectors** 1 x Plug-in terminal block (#14 ~ 22 AWG) (RS-422, RS-485)
  1 x DB9-F (RS-232)
- **Isolation Protection** 3000 V_{DC} (4520/4520I only)
- **Power Consumption** 1.2 W @ 24 V_{DC}

Communications

- **Input** RS-232 (4-wire)
- **Output** RS-485 (2-wire) or RS-422 (4-wire).
- **Speed Modes (bps)** 1200,2400, 4800, 9600, 19.2 k, 38.4 k, 57.6 k, 115.2 k, RTS control and RS-422. (switchable)

Environment

- **Operating Temperature**
  ADAM-4520/4522: - 10~70° C (14~158° F)
  ADAM-4520I: - 40~85° C (-40~185° F)
- **Storage Temperature**
  ADAM-4520/4522: - 25~85°C (-13~185° F)
  ADAM-4520I: - 40~85° C (-40~185° F)



ADAM-4521

Specifications

General

- **Connectors** 1 x Plug-in terminal block (#14 ~ 22 AWG) (RS-422, RS-485)
  1 x DB9-F (RS-232)
- **Power Consumption** 1.0 W @ 24 V_{DC}

Communications

- **Built-in microprocessor and watchdog timer**
- **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**
- **Speed Modes (bps)** 300, 600, 1200, 2400, 4800, 9600, 19.2 k, 38.4 k, 57.6 k, 115.2 k (software configurable)

Environment

- **Operating Temperature** - 10~70° C (14~158° F)
- **Storage Temperature** - 25~85°C (-13~185° F)

Common Specifications

General

- **Dimensions (WxHxD)** 70 x 122 x 30 mm
- **Enclosure** ABS + PC
- **Mounting** DIN 35 rail, stack, wall
- **Power Input** Unregulated 10~30 V_{DC} w/power reversal protection

Environment

- **Humidity** 5 ~ 95% RH

Ordering Information

- **ADAM-4510** RS-422/RS-485 Repeater
- **ADAM-4510S** Isolated RS-422/RS-485 Repeater
- **ADAM-4510I** Robust Isolated RS-422/485 Repeater
- **ADAM-4520** Isolated RS-232 to RS-422/RS-485 Converter
- **ADAM-4520I** Robust 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

- **Connectors** 1 x Plug-in terminal block (#14 ~ 22 AWG) (RS-232/422/485)
  2 x ST fiber connector
- **Power Consumption** 1 W (typ), 1.5 W (max)

Serial Communications

- **Communication Mode** Asynchronous
- **Speed Modes (bps)** 1200, 2400, 4800, 9600, 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 mm)
- **Transmission Distance** 2.5 km
- **Transmission Mode** Multi mode (Send and receive)
- **Wavelength** 820 nm

Specifications

General

- **Connectors** 1 x Plug-in terminal block (#14 ~ 22 AWG) (RS-232/422/485)
  1 x SC fiber connector
- **Power Consumption** 1 W (typ), 1.5 W (max)

Serial Communications

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

Fiber Optic Communications

- **Optical Power Budget (attenuation)** 15 dBm
- **Fiber Redundant Support**
- **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)
  ADAM-4562: 1 x DB-9 serial connectors
- **Isolation Protection**
  ADAM-4561: 3,000 V_{DC}
  ADAM-4562: 2,500 V_{DC}
- **Power Consumption**
  ADAM-4561: 300 mA @ 5 V (Max.)
  ADAM-4562: 220 mA @ 5 V (Max.)

Serial Communications

- **Driver Support** Windows 98/2000/XP
- **Speed Modes (bps)** 75 bps to 115.2 kbps
- **Transmission Modes** Full/half duplex, bidirectional
- **USB Compatibility** V 1.1

Common Specifications

General

- **Dimensions (WxHxD)** 70 x 112 x 25 mm
- **Enclosure** ABS+PC
- **Mounting** DIN 35 rail, stack, wall
- **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-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

ADAM-4011/4011D
ADAM-4012
ADAM-4013

Thermocouple Input Module

Analog Input Module

RTD Input Module

ADAM-4011/4011D

ADAM-4012

ADAM-4013

Specifications

General

- **LED Indicators** 5-digit (ADAM-4011D)
- **Power Consumption** 1.2 W @ 24 V_{DC}

Analog Input

- **Input Impedance** Voltage: 2 MΩ
  Current: 125 Ω
  (Added by users)
- **Input Types** T/C, mV, V or mA
- **Input Range** ±15 mV, ±50 mV, ±100 mV, ±500 mV, ±1 V, ±2.5 V, ±20 mA
- **T/C Type and Temperature Range**

J	0 ~ 760° C	**R**	500 ~1750° C
K	0 ~ 1370° C	**S**	500 ~1750° C
T	-100 ~ 400° C	**B**	500 ~1800° C
E	0 ~ 1000° C		

- **Input Surge Protection** Yes
- **NMR @ 50/60 Hz** 100 dB
- **Sampling Rate** 10 samples/sec.
- **Span Drift** ±25 ppm/° C
- **Zero Drift** ±3 μV/° C

Digital Input

- **Channels** 1
  Logic levels 0: 1 V max. 1: 3.5~30 V
  Pull up current: 0.5 mA, 10 kΩ 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

Specifications

General

- **Power Consumption** 1.2 W @ 24 V_{DC}

Analog Input

- **Input Impedance** Voltage: 2 MΩ
  Current: 125 Ω
  (Added by users)
- **Input Types** mV, V or mA
- **Input Range** ±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V and ±20 mA
- **NMR @ 50/60 Hz** 100 dB
- **Span Drift** ±25 ppm/° C
- **Zero Drift** ±6 μV/° 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
- **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}

Analog Input

- **Input Connections** 2, 3 or 4 wire
- **Input Impedance** 2 MΩ
- **Input Type** Pt or Ni RTD
- **NMR @ 50/60 Hz** 100 dB
- **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

- **Sampling Rate** 10 samples/sec.
- **Span Drift** ±25 ppm/° C
- **Zero Drift** ±3 μV/° C

Common Specification

General

- **Dimensions (WxHxD)** 70 x 122 x 30 mm
- **Enclosure** ABS +PC
- **Mounting** DIN 35 rail, stack, wall
- **Power Input** Unregulated 10~30 V_{DC}
- **Watchdog Time** 1.6 sec. (system)
- **Connectors** 1 x Plug-in terminal blcok (#14~22 AWG)

Environment

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

Ordering Information

- **ADAM-4011** Thermocouple Input Module
- **ADAM-4011D** Thermocouple Input Module w/LED Display
- **ADAM-4012** Analog Input Module
- **ADAM-4013** RTD Input Module

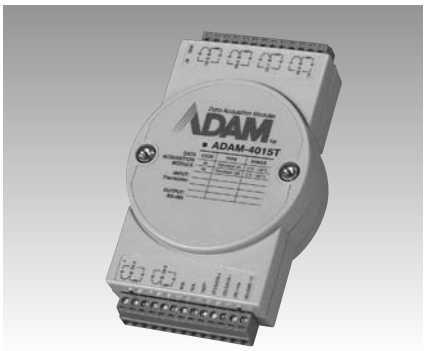
ADAM-4015
ADAM-4015T
ADAM-4016

6-channel RTD Module with Modbus®

6-channel Thermistor Module with Modbus®

Analog Input/Output Module

ADAM-4015



ADAM-4015T

ADAM-4016

Specifications

General

- **Connectors** 2 x Plug-in terminal block (#14 ~ 28 AWG)
- **Power Consumption** 1.2 W @ 24 V_{DC}
- **Wire-Burnout Detector** Yes

Analog Input

- **Channels** 6 differential
- **Input Connections** 2 or 3 wire
- **Input Impedance** 10 MΩ
- **Input Type** Pt, Balco and Ni RTD
- **Isolation Voltage** 3000 V_{DC}
- **NMR @ 50/60 Hz** 100 dB
- **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

- **Sampling Rate** 10 samples / sec.
- **Span Drift** ± 25 ppm/° C
- **Zero Drift** ± 3 µV/° C

Specifications

General

- **Connectors** 2 x Plug-in terminal block (#14 ~ 28 AWG)
- **Power Consumption** 1.2 W @ 24 V_{DC}
- **Wire-Burnout Detector** Yes

Analog Input

- **Channels** 6 differential
- **Input Connections** 2 or 3 wires
- **Input Impedance** 10 MΩ
- **Input Type** Thermistor
- **Isolation Voltage** 3000 V_{DC}
- **NMR @ 50/60 Hz** 100 dB
- **Sampling Rate** 10 samples / sec.
- **Span Drift** ± 25 ppm/° C
- **Thermistor Types and Temperature Ranges**

Thermistor 3k	0 ~ 100° C
Thermistor 10k	0 ~ 100° C

- **Zero Drift** ± 3 µV/° C

Specifications

General

- **Connectors** 2 x Plug-in terminal block (#14 ~ 22 AWG)
- **Power Consumption** 2.2 W @ 24 V_{DC}

Analog Input

- **Channels** 1 differential
- **Input Impedance** Voltage: 2 MΩ
  Current: 125 Ω
  (Added by users)
- **Input Range** ±15 mV, ±50 mV, ±100 mV, ±500 mV, ±20 mA
- **Input Type** mV and mA
- **Isolation Voltage** 3,000 V_{DC}
- **NMR @ 50/60 Hz** 100 dB
- **Sampling Rate** 10 samples/sec.
- **Span Ddrift** ±25 ppm/° C
- **Zero Drift** ±6 µV/° C

Analog Output

- **Accuracy** 0.05% of FSR
- **Channels** 1
- **Drift** ±50 ppm/° C
- **Drive Current** 30 mA
- **Isolation Voltage** 3000 V_{DC}
- **Output Type** V
- **Output Range** 0 ~ 10 V

Digital Output

- **Built-in TVS/ESD Protection**
- **Channels** 2, open collector to 30 V, 30 mA max. load

Common Specifications

General

- **Dimensions (WxHxD)** 70 x 122 x 30 mm
- **Enclosure** ABS + PC
- **Mounting** DIN 35 rail, stack, wall
- **Power Input** Unregulated 10~30 V_{DC}
- **Watchdog Timer** 1.6 sec. (system)

Analog Input

- **Accuracy** ±0.05% or better
- **Bandwidth** 2.62 Hz
- **CMR @ 50/60 Hz** 150 dB
- **Isolation Protection** 3000 V_{DC}
- **Resolution** 16 bits

Environment

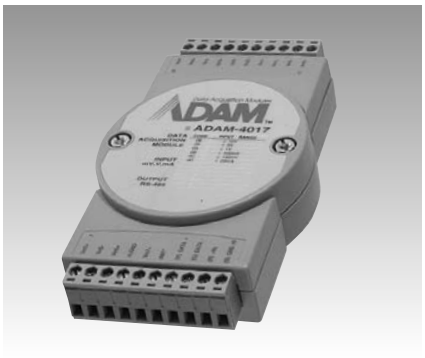
- **Humidity** 5 ~ 95% RH
- **Operating Temperature** - 10~70° C (14~158° F)
- **Storage Temperature** - 25~85°C (-13~185° F)

Ordering Information

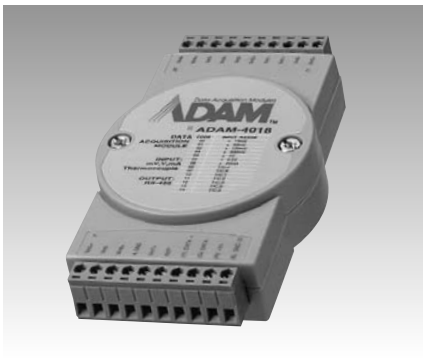
ADAM-4015	6-channel RTD Input Module w/Modbus®
ADAM-4015T	6-channel Thermistor Input Module w/Modbus®
ADAM-4016	Analog Input/Output Module

ADAM-4017/4017+
ADAM-4018/4018+
ADAM-4019+

8-channel Analog Input Modules with Modbus®
8-channel Thermocouple Input Module with Modbus®
8-channel Universal Analog Input Module with Modbus®



ADAM-4017/4017+



ADAM-4018/4018+

ADAM-4019+

Specifications

General

- **Power Consumption** 1.2 W @ 24 V_{DC}

Analog Input

- **Channels** Six differential, two single-ended (4017) eight differential (4017+)
- **Ch. Independent Conf.** ADAM-4017+ only
- **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, 4~20mA (4017+ only)
- **Modbus®** ADAM-4017+ only
- **Overvoltage Protection** ±35 V
- **Sampling Rate** 10 samples/sec. (total)
- **Span Drift** ±25 ppm/° C
- **TVS/ESD Protection** Built-in
- **Zero Drift** ±6 μV/° C

Specifications

General

- **Power Consumption** 0.8 W @ 24 V_{DC}
- **T/C-Burnout Detector** Yes (4018+ only)

Analog Input

- **Channels** Six differential, two single-ended (4018) eight differential (4018+)
- **Ch. Independent Conf.** ADAM-4018+ only
- **Input Impedance** Voltage: 20 MΩ Current: 120 Ω
- **Input Range** ±15 mV, ±50 mV, ±100 mV, ±500 mV, ±1 V, ±2.5 V, ±20 mA (4018); 4~20 mA (4018+)
- **Input Types** Thermocouple, mV, V, mA (4018) (4018+ Supports T/C & 4~20 mA only)
- **Modbus®** ADAM-4018+ only
- **Overvoltage Protection** ±35 V
- **Sampling Rate** 10 samples/sec. (total)
- **Span Drift** ±25 ppm/° C
- **T/C Type and Temperature Ranges**

J	0 ~ 760° C	**R**	500 ~1750° C
K	0 ~ 1370° C	**S**	500 ~1750° C
T	-100 ~ 400° C	**B**	500 ~1800° C
E	0 ~ 1000° C		

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

Specifications

General

- **Power Consumption** 1.0 W @ 24 V_{DC}

Analog Input

- **Accuracy** ±0.1% of voltage input
- **Bandwidth** 13.1 Hz @ 50 Hz, 15.72 Hz @ 60 Hz
- **Burn-out Detection** +4~20mA & all T/C
- **Channels** 8 differential channels for individual input type
- **CMR @ 50/60 Hz** 92 dB min.
- **Resolution** 16 bits
- **Input Range** +/-1V, +/-2.5V, +/-5V, +/-10V, +/- 100mV, +/-500mV, +/-20mA, +4~20mA
- **Input Impedance** Voltage: 20 MΩ Current: 120 Ω
- **Input Type** T/C, mV, V,mA
- **Isolation Protection** 3000 V_{DC}
- **Overvoltage Protection** ±35 V
- **T/C Type and Temperature Range**

J	0 ~ 760 °C
K	0 ~ 1370 °C
T	-100 ~ 400 °C
E	0 ~ 1000 °C
R	500 ~ 1750 °C
S	500 ~ 1750 °C
B	500 ~ 1800 °C

- **Span Drift** ±25 ppm/°C
- **Zero Drift** ±6 μV/°C

Common Specification

General

- **Dimensions** 70 x 122 x 30 mm
- **Connectors** 2 x Plug-in terminal block (#14~22 AWG)
- **Enclosure** ABS+PC
- **Mounting** DIN 35 rail, stack, wall
- **Power Input** Unregulated 10~30 V_{DC}
- **Watchdog Timer** 1.6 sec. (system)

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-channel Analog Input Module
- **ADAM-4017+** 8-channel Differential Analog Input Module w/Modbus®
- **ADAM-4018** 8-channel Thermocouple, mV, V, mA Input Module
- **ADAM-4018+** 8-channel Differential, mA and Thermocouple Input Module w/Modbus®
- **ADAM-4019+** 8-channel Universal Analog Input Module w/Modbus®

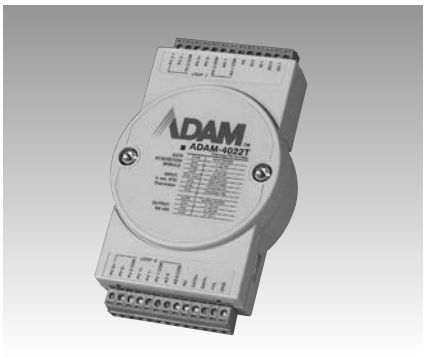
ADAM-4021
ADAM-4022T
ADAM-4024

Analog Output Module

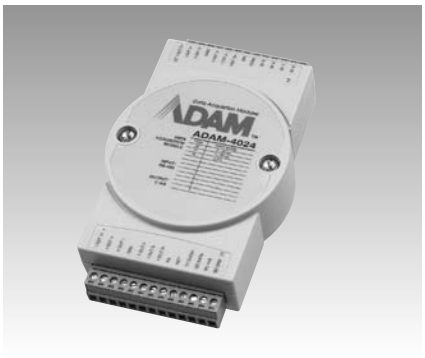
Serial Based Dual Loop PID Controller

4-channel Analog Output Module with Modbus®

ADAM-4021



ADAM-4022T



ADAM-4024

Specifications

General

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

Analog Output

- **Accuracy** ±0.1% of FSR for current output
  ±0.2% of FSR for voltage output
- **Current Load Resistor** 0 to 500 Ω (source)
- **Effective Resolution** 12-bit
- **Isolation Protection** 3000 V_{DC}
- **Output Impedance** 0.5 Ω
- **Output Range** 0 to 20 mA, 4 to 20 mA, and 0 to 10 V
- **Output Type** mA, V
- **Programmable Output Slope** 0.125 ~ 128 mA/sec.
  0.0625 ~ 64.0 V/sec.
- **Readback Accuracy** ±1% of FSR
- **Resolution** ±0.015% of FSR
- **Span Temperature Coefficient** ±25 ppm/° C
- **Zero Drift** Voltage output: ±30 μV/° C
  current output: ±0.2 μA/° C

Specifications

General

- **Connectors** 2 x Plug-in terminal block (#14 ~ 22 AWG)
- **Power Consumption** 4 W @ 24 V_{DC}
- **Surge Protection** 3,000 V_{DC}

Analog Input

- **Channels** 4
- **Input Type** mA, V, Thermistor, RTD
- **Input Range** 0 to 20 mA, 4 to 20 mA, 0 to 10 V
- **Thermistor Type and Temperature Ranges**
  Thermistor 3K: 0 ~ 100° C
  Thermistor 10K: 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

Analog Output

- **Channels** 2
- **Output Range** 0 to 20 mA, 4 to 20 mA, 0 to 10 V
- **Output Type** mA,V

Digital Input

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

Digital Output

- **Channels** 2
  Open Collector to 30 V, 100 mA max. load

Specifications

General

- **Connectors** 2 x plug-in terminal blocks (#14 ~ 28 AWG)
- **Power Consumption** 3 W @ 24 V_{DC}

Analog Output

- **Accuracy** ±0.1 % of FSR for current output
  ±0.1 % of FSR for voltage output
- **Channels** 4
- **Current Load Resistor** 0 to 500 Ω (source)
- **Effective Resolution** 12-bit
- **Isolated Digital Input** Channel: 4
  level 0: +1 V max
  level 1: 10 ~ 30 V_{DC}
- **Isolation Protection** 3000 V_{DC}
- **Output Impedance** 0.5 Ω
- **Output Range** 0 to 20 mA, 4 to 20 mA, ±10 V
- **Output Type** mA, V
- **Programmable Output Slope** 0.125 ~ 128 mA/sec.
  0.0625 ~ 64.0 V/sec.
- **Resolution** ±0.015 % of FSR
- **Span Temperature Coefficient** ±25 ppm/° C
- **Zero Drift** Voltage output: ±30 μV/° C
  Current output: ±0.2 μA/° C

Common Specifications

General

- **Dimensions (WxHxD)** 70 x 122 x 30 mm
- **Enclosure** ABS + PC
- **Mounting** DIN 35 rail, stack, wall
- **Power Input** Unregulated 10~30 V_{DC}
- **Watchdog Timer** 1.6 sec. (system)

Environment

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

Ordering Information

- **ADAM-4021** Analog Output Module – V or mA
- **ADAM-4022T** Serial Based Dual Loop PID Controller
- **ADAM-4024** 4-channel Analog Output Module w/Modbus®, V or mA

ADAM-4050
ADAM-4051
ADAM-4052

15-channel Digital I/O Module
16-channel Isolated Digital Input Module with LED & Modbus®
8-channel Isolated Digital Input Module

ADAM-4050

ADAM-4051

ADAM-4052

Specifications

General

- **Certifications** CE, FM
- **Connectors** 2 x plug-in terminal blocks (#14 ~ 22 AWG)
- **Power Consumption** 0.4 W @ 24 V_{DC}

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

Digital Output

- **Channels** 8
  open collector to 30 V, 30 mA max. load
  power dissipation: 300 mW

Specifications

General

- **Certifications** CE, FCC class A
- **Connectors** 2 x plug-in terminal blocks (#14 ~ 28 AWG)
- **LED Indicators** On: Active
  Off: Non-active
- **Power Consumption** 1 W @ 24 V_{DC} (Typical)

Digital Input

- **Channels** 16
- **Input Voltage** 50 V max
- **Input Voltage Level** (Configurable)
  Dry contact: Logic level 0: close to GND
  logic level 1: open
  Wet contact: Logic level 0: +3 V max
  Logic level 1: +10~ 50 V
- **Optical Isolation** 2,500 V_{DC}
- **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}

Digital Input

- **Channels** 8
  six fully independent isolated channels.
  two isolated channels with common ground
- **Digital Input Level** Logic level 0: +1 V max.
  Logic level 1: +3 ~ 30 V
- **Input Resistance** 3 kΩ @ 0.5 W
- **Isolation Voltage** 5,000 V_{RMS}

Common Specifications

General

- **Dimensions (WxHxD)** 70 x 122 x 30 mm
- **Enclosure** ABS + PC
- **Mounting** DIN 35 rail, stack, wall
- **Power Input** Unregulated 10~30 V_{DC}
- **Watchdog Timer** 1.6 sec. (system)

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-channel Digital I/O Module
- **ADAM-4051** 16-channel Isolated Digital Input Module with LED and Modbus®
- **ADAM-4052** 8-channel Isolated Digital Input Module

ADAM-4053
ADAM-4055
ADAM-4056S/4056SO

16-channel Isolated Digital Input Module

16-channel Isolated Digital I/O Module with LED and Modbus®

12-channel Sink/Source Type Isolated Digital Output Module

ADAM-4053

Specifications

General

- **Connectors** 2 x Plug-in terminal blocks (#14 ~ 22 AWG)
- **Power Consumption** 1 W @ 24 V_{DC}

Digital Input

- **Channels** 16
- **Digital 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 (dry contact only)** 500 m max.

ADAM-4055

Specifications

General

- **Connectors** 2 x Plug-in terminal blocks (#14 ~ 28 AWG)
- **LED Indicators** Power
- **Power Consumption** 1 W @ 24 V_{DC}

Digital Input

- **Channels** 8
- **Digital Input**
  - Dry Contact: Logic level 0: open; Logic level 1: close to GND
  - Wet Contact: Logic level 0: +3 Vmax; Logic level 1: +10~50 V
- **Optical Isolation** 2500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}

Digital Output

- **Channels** 8, open collector to 40 V (200 mA max. load)

Power Dissipation

- **Channel Max** 1 W
- **Total** 2.2 W

ADAM-4056S/4056SO

Specifications

General

- **Connectors** 2 x Plug-in terminal blocks (#14 ~ 28 AWG)
- **DO Channels** 12
- **Optical Isolation** 5,000 V_{DC}
- **Power Consumption** 1 W @ 24 V_{DC} (Both)

ADAM-4056S

- **Digital Output** Open collector to 40V (200mA max. load)
- **Power Disspation** Channel Max: 1 W
- **Total** 2.2 W
- **Digital Output Type** Sink
- **I/O Type** Sink Type Output

ADAM-4056SO

- **Digital Output** VCC: 10 ~ 35 V_{DC}; Current: 1A (per ch.)
- **Digital Output Type** Source
- **I/O Type** Source Type Output
- **Over Current Detection and Protection**

Common Specifications

- **Dimensions** 70 x 122 x 30 mm
- **Enclosure** ABS+PC
- **Mounting** DIN 35 rail, stack, wall
- **Power Input** Unregulated 10~30 V_{DC}
- **Watchdog Timer** 1.6 sec. (system)

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-channel Isolated Digital Input Module
- **ADAM-4055** 16-channel Isolated Digital I/O Module with LED and Modbus®
- **ADAM-4056S** 12-channel Sink Type Isolated Digital Output Module
- **ADAM-4056SO** 12-channel Source Type Isolated Digital Output Module

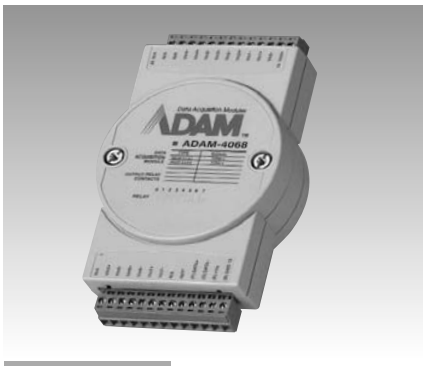
ADAM-4060
ADAM-4068
ADAM-4069

4-channel Relay Output Modules

8-channel Relay Output Modules

8-channel Power Relay Output Module with Modbus®

ADAM-4060



ADAM-4068

ADAM-4069

Specification

General

- **Connectors** 2 x plug-in terminal blocks (#14 ~ 28 AWG)
- **Power Consumption** ADAM-4060: 0.8 W @ 24 V_{DC}

Relay Output

- **Breakdown Voltage** 500 V_{AC} (50/60 Hz)
- **Channels** 4 x relay
  2 x form A
  2 x form C
- **Contact Rating** AC: 0.6 A @ 125 V
  0.3 A @ 250 V
  DC: 2 A @ 30 V
  0.6 A @ 110 V
- **Insulation Resistance** 1 G Ω min. at 500 V_{DC}
- **Relay off Time (typical)** 2 ms
- **Relay on Time (typical)** 3 ms

Specifications

General

- **Connectors** 2 x plug-in terminal blocks (#14 ~ 28 AWG)
- **Power Consumption** 0.6 W @ 24 V_{DC}

Relay Output

- **Breakdown Voltage** 500 V_{AC} (50/60 Hz)
- **Channels** 4 x form A
  4 x form C
- **Contact Rating** AC: 0.6 A @ 125 V
  0.3 A @ 250 V
  DC: 2 A @ 30 V
  0.6 A @ 110 V
- **Insulation Resistance** 1 G Ω min. at 500 V_{DC}
- **Relay off Time (typical)** 4 ms
- **Relay on Time (typical)** 3 ms

Specifications

General

- **Connectors** 2 x plug-in terminal blocks (#14 ~ 28 AWG)
- **Power Consumption** 2.2 W @ 24 V_{DC}

Relay Output

- **Breakdown Voltage** 1000 V_{AC} (50/60 Hz)
- **Channels** 4 x form A
  4 x form C
- **Contact Rating** AC: 5 A @ 250 V
  DC: 5 A @ 30 V
- **Insulation Resistance** 1 GΩ min. at 500 V_{DC}
- **Relay off Time (typical)** 5.6 ms
- **Relay on Time (typical)** 5 ms

Common Specifications

- **Dimensions** 70 x 122 x 30 mm
- **Enclosure** ABS+PC
- **Mounting** DIN 35 rail, stack, wall
- **Power Input** Unregulated 10~30 V_{DC}
- **Watchdog Timer** 1.6 sec. (system)

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-channel Relay Output Module
- **ADAM-4068** 8-channel Relay Output Module with Modbus® and LED
- **ADAM-4069** 8-channel Power Relay Output Module with Modbus®

ADAM-4080/4080D
ADAM-4117
ADAM-4118

Counter/Frequency Module

8-channel Analog Input Module

8-channel Thermocouple Input Module

ADAM-4080/4080D

ADAM-4117

ADAM-4118

Specifications

General

- **LED Indicators** 5-digit readout, CH 0 or CH 1 (programmable) (ADAM-4080D only)
- **Power Consumption** 2.0 W @ 24 V_{DC}
- **Power Input** Unregulated 10~30 V_{DC}

Counter Input

- **Alarm** Alarm comparator on each counter
- **Channels** Two independent 32-bit counters
- **Input Frequency** 50 kHz max. (non-isolation)
- **Input Pulse Width** >10 µs.
- **Input Mode** Isolated or non-isolated
- **Isolation Input Level** Logic level 0: +1 V max. Logic level 1: 3.5~30 V
- **Isolation Voltage** 2500 V_{RMS}
- **Non-isolated Input Level** Programmable threshold: Logic level 0: 0 to +5 V (default = 0.8 V) Logic level 1: 0 to +5 V (default = 2.4 V)
- **Maximum Count** 4,294,967,295 (32 bits)
- **Preset Type** Absolute or relative
- **Programmable Digital Noise Filter** 2 ~ 65 µs

Frequency Measurement

- **Range** 5 Hz ~ 50 kHz
- **Programmable Built-in Gate Time** 1.0/0.1 sec.

Digital Output

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

Specifications

General

- **Power Consumption** 1.2 W @ 24 V_{DC}
- **Power Input** Unregulated 10~48 V_{DC}

Analog Input

- **Accuracy**
  Voltage mode : ±0.1% or better
  Current mode : ±0.2% or better
- **ASCII commands and Modbus protocol**
- **Built-in TVS/ESD Protection**
- **Channels** 8 x differential and independent configuration channels
- **CMR @ 50/60 Hz** 92 dB min.
- **Fault and Overvoltage** With stands overvoltage protection up to ±60 V
- **High Common Mode** 200 V_{DC}
- **Input Impedance** Voltage: 20 MΩ Current: 120 Ω
- **Input Type** mV, V (supports uni-polar and bipolar), mA
- **Input Range** 0~150mV, 0~500mV, 0~1V, 0~5V, 0~10V, 0~15V, ±150 mV, ±500 mV, ±1V, ±5 V, ±10 V, ±15V, ±20 mA, 4~20mA
- **Isolation Protection** 3000 V_{DC}
- **Resolution** 16 bits
- **Sampling Rate** 10/100 samples/sec (selected by Utility)
- **Span Drift** ±25 ppm/° C
- **Watchdog Timers** 2
- **Zero Drift** ±6µV/° C

Common Specifications

General

- **Dimensions** 70 x 122 x 30 mm
- **Connector** 2 x Plug-in terminal blocks (#14 ~ 22 AWG)
- **Enclosure** ABS+PC
- **Mounting** DIN 35 rail, stack, wall
- **Watchdog Timer** 1.6 sec. (system)

Environment

- **Humidity** 5 ~ 95% RH
- **Operating Temperature**
  4080/4080D: -10~70°C (14~158° F)
  4117/4118: -40 ~85°C(-40~ 185° F)
- **Storage Temperature**
  4080/4080D: -25~85°C(-13~185° F)
  4117/4118: -40 ~ 85°C(-40~ 185° F)

Specifications

Analog Input

- **Analog Input Channel** 8 differential & independent thermocouple configurations
- **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 ~ 1000 °C
  R 500 ~ 1750 °C
  S 500 ~ 1750 °C
  B 500 ~ 1800 °C
  Voltage mode
  ±15 mV, ±50 mV, ±100 mV, ±500 mV, ±1 V, ±2.5 V
  Current mode
  ±20 mA, +4~20 mA
- **Sampling Rate** 10/100 samples/sec(selected by Utility)
- **Isolation Protection** 3,000 V_{DC}

Power

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

Communication

- **Network** RS-485 (2-wire)
- **Speed** 1.2 ~ 115.2 kbps
- **Distance** 1.2 km (4000 ft)
- **Data Format** Advantech protocol: 1 start bit, 8 data bits, 1 stop bit, none parity
- **Modbus Protocol** 1 start bit, 8 data bits, 1 or 2 stop bit, parity check (none, even,odd)
- **Modbus/RTU Protocol Support** Yes
- **Watchdog Timers** System, Communication

Ordering Information

- **ADAM-4080** Counter/Frequency module
- **ADAM-4080D** Counter/Frequency module with LED Display
- **ADAM-4117** 8-channel Analog Input Module
- **ADAM-4118** 8-channel Thermocouple Input Module

ADAM-4150
ADAM-4168
ADAM-4914V

Digital I/O module

Relay Output Module

4-channel Voltage Input Surge Protection Module

ADAM-4150

ADAM-4168

ADAM-4914V

Specifications

Digital Input/Output

- **Channels** 7 input channels
  8 output channels
- **Digital Input (Supports 3 kHz counter)**
  Dry contact: Logic level 0: Close to GND.
  Logic level 1: Open
  Wet contact: Logic level 0: +3 V max.
  Logic level 1: +10 V to +30 V
- **Isolation Voltage** 3000 V_{DC}
- **Digital Output**
  Open drain to 40 V, 0.8A max.
  Maximum power dissipation: 1 W load
  Ron Maximum: 150m ohm
  Supports 1 kHz pulse output
- **Power Consumption** 0.4 W (Typical)
  0.7 W (Max)
- **Watchdog Timer** System, Communication

Specifications

Relay Output

- **Output Channels** 8 Form A
- **Contact Rating** AC: 125 V @ 0.6 A
  250 V @ 0.3A
  DC: 30 V @ 2 A
  110 V @ 0.6 A
- **Breakdown Voltage** 750 V_{AC} (50/60 Hz)
- **Insulation Resistance** 1 G Ω min. @ 500 V_{DC}
- **Power Consumption** 0.4 W (typical)
  1.8 W (max.)
- **Relay Response Time** ON : 3 ms Off: 1 ms (typical)
- **Total Switching Time** 10 ms
- **Supports 100 Hz pulse output**
- **Watchdog Timer** System, Communication

Specifications

Input

- **Channels** 4 differential voltage input and thermocouple

Performance

- **Discharge Current** 5,000 A (8/20 μsec.)
- **Discharge Voltage** BETWEEN LINES: 18 V min
  LINE TO GND: 350 V max.
- **Internal Series Resistance** Approx. 20 Ω including return
- **Max. Surge Voltage** BETWEEN LINES: 23 V min
  LINE TO GND: +4,000 V max.
- **Leakage Current** BETWEEN LINES: ≤ 10 μA @ 7.5 V_{DC}
  LINE TO GND: ≤ 5 μA @ +140 V_{DC}
- **Maximum Line Voltage** 10 V
- **Response Time** ≤ 0.1 μsec.

Common Specifications

- **Dimensions** 70 x 122 x 30 mm
- **Enclosure** ABS+PC
- **Mounting** DIN 35 rail, stack, wall
- **Power Input** Unregulated 10~48 V_{DC}
- **Watchdog Timer** 1.6 sec. (system)
- **Connector** 2 x Plug-in terminal blocks (#14 ~ 22 AWG)

Environment

- **Humidity** 5 ~ 95% RH
- **Operating Temperature** 4914V: -10~70 °C (14 ~ 158° F)
  4150/4168: -40 ~ 85 °C (-40 ~ 185° F)
- **Storage Temperature** 4914V: -25 ~ 85°C (-13 ~ 185° F)
  4150/4168: -40 ~ 85°C (-40 ~ 185° F)

Ordering Information

- **ADAM-4150** Digital I/O Module
- **ADAM-4168** Relay Output Module
- **ADAM-4914V** 4-channel Voltage Input Surge Protection Module

ADAM-4950-ENC

IP66 Industrial Enclosure

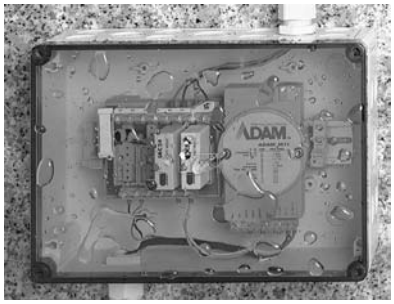
Features

- Resists temperatures up to 115° C (239° F)
- Sidewall knockouts provide factory molded openings that are conveniently positioned for wire, cable or conduit feeders.
- Groove-and-lip type seal design provides the highest degree of protection
- Built-in DIN-rail for easy mounting of ADAM modules
- Cable glands included

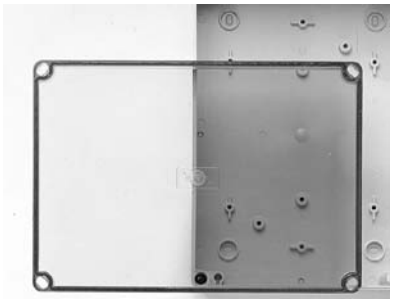
Introduction

The ADAM-4950-ENC IP66 Industrial Enclosure is designed for use in harsh environments. It offers space for 1 to 3 ADAM modules. Its rugged protective housing guards modules from UV radiation, corrosive materials, moisture and extreme temperatures.

Mounts in any position
Several screw options let you fasten the box in almost any position.

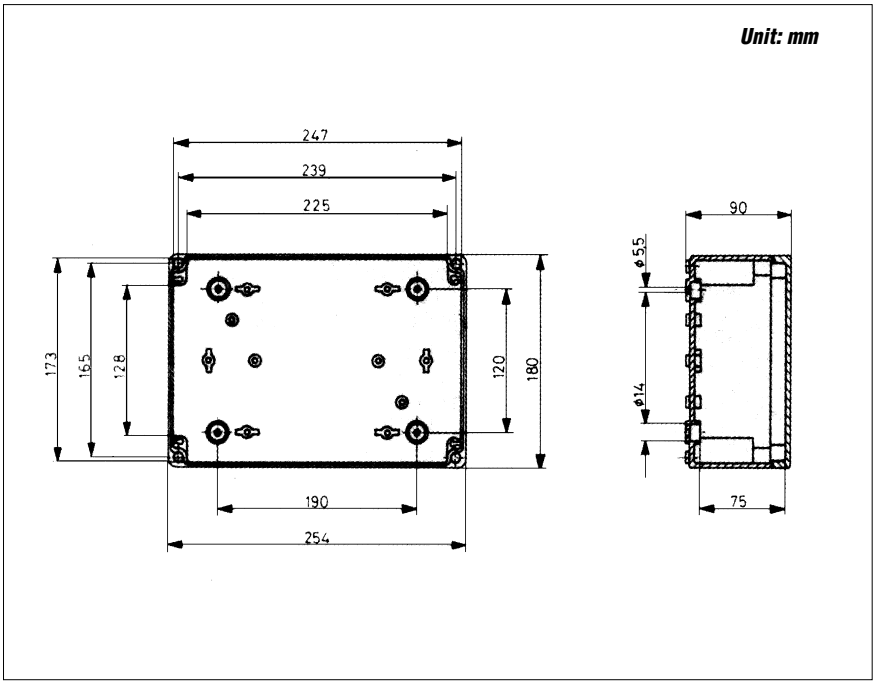


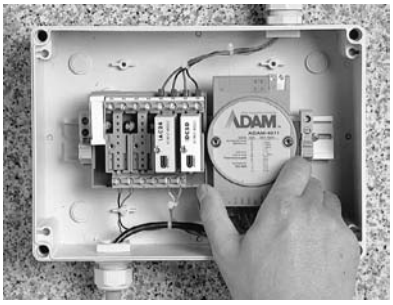
IP66 protection
Dust-tight, and protected against water jets and even temporary flooding.



Lip-groove seal
Non-aging polyurethane seal. Cannot fall out or loosen.

Dimensions





DIN-rail installation
No screws; just snap the module in place.
Offers space for three modules.

Enclosure Components

- **Case** Glass filled polycarbonate (PC), transparent cover
- **Accessories (included)** 1 x DIN-rail (21.5 cm)
  2 x Polyamide cable glands (seal from 10 - 14 mm)
  4 x Captive lid screws

Ordering Information

- **ADAM-4950-ENC** IP66 Industrial Enclosure

ADAM 4000/4100 Series

Common Specifications

Communication

- RS-485 (2-wire) to host
- Speeds: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps (ADAM-4080, ADAM-4080D only support up to 38400 bps)
- Max. communication distance: 4000 feet (1.2 km)
- Power and communication LED indicator
- ASCII command/response protocol
- Communication error checking with checksum
- Asynchronous data format:

  Advantech protocol: 1 start bit, 8 data bits, 1 stop bit, no parity

  Modbus protocol: 1 start bit, 8 data bits, 1 or 2 stop bit, parity check (none, odd, even) (ADAM-4100 series only)
- Up to 256 multidrop modules per serial port
- Online module insertion and removal
- Transient suppression on RS-485 communication lines

Dimensions