I/O Modules

3

3.1 ADAM-4011/4011D/4012/4013 Analog Input Modules

Analog input modules use a microprocessor-controlled integrating A/D converter to convert sensor voltage, current, thermocouple, or RTD signals into digital data. The digital data is then translated into either engineering units, twos complement hexadecimal format or percentage of full-scale range (FSR) according to the module's configuration. When prompted by the host computer, the data is sent through a standard RS-485 interface.

The Analog Input Modules offer signal conditioning, A/D conversion, ranging, and RS-485 digital communication functions. They protect your equipment from ground loops and power surges by providing opto-isolation of the A/D input and transformer based isolation up to 3000 V_{DC}. (ADAM-4011 has transformer-based isolation up to 500 V_{DC})

Open Thermocouple Detection and Input Surge Protection (ADAM-4011D only)

The ADAM-4011D provides an open thermocouple detection function. Users can use a simple command to detect whether the thermocouple is open or closed. The module also provides surge protection on its input channel. Internal high speed transient suppressor on its input channel protects the module from dangerous spikes and voltages.

Front Panel LED Indicator (ADAM-4011D only)

The 4½ digit LED display on the back of the ADAM-4011D lets you monitor process readings right at their source. The module displays readings in a wide variety of formats as well as high-low alarm messages. The ADAM-4011D offers flexibility, ease of installation and direct availability of process data. For critical process monitoring, this module is the ideal choice.

Digital Inputs/Outputs (Except ADAM-4013)

Analog input modules also contain two digital outputs and one digital input. Outputs are open-collector transistor switches that may be controlled by the host computer. They can control solid-state relays which in turn may control heaters, pumps, and other electrical powered equipment. The digital inputs may be read by the host computer and used to sense the state of a remote digital signal.

Event counting (Except ADAM-4013)

The event counter is connected to the Digital Input channel and can be used to keep track of the total amount of external low-speed pulses. Its accumulated maximal count is 65535. The number 65535 is held, even if the actual number of events exceeds 65535. The counter can be read or reset to 0 by the host computer.

Since the Event counter's data is not stored in EEPROM, the event counter is cleared and set to zero after every reset or power up of the analog input module.

Alarm signalling (Except ADAM-4013)

Analog input modules include High and Low alarm functions. High and Low alarm limits may be downloaded into the module's EEPROM by the host computer.

The alarm functions can be enabled or disabled remotely. When the alarm function is enabled, both Digital Output channels are used to indicate the High and Low alarm state. Digital Output channel 1 (DO1) equals High alarm state and Digital Output channel 0 (DO0) equals Low alarm state. The High and Low alarm states can be read at any time by the host computer.

Every A/D conversion will be followed by a comparison with the High and Low limit. When the input value exceeds one of these limits, the High or Low alarm state is set to ON.

There are two alarm mode options: Momentary and Latching.

If the alarm is in Latching mode, the alarm will stay on even when the input value returns within limits. An alarm in Latching mode can be turned OFF by issuing a Clear Alarm command from the host computer. A Latching alarm is cleared by the module when the opposite alarm is set. For example: the alarm is in latching mode and the High alarm is turned ON.

When the module receives a value that is lower than the Low alarm limit, it will clear the High alarm and turn the Low alarm ON.

When the alarm is in Momentary mode, the alarm will be turned OFF as soon as the input value returns to within limits.

The arrangement of coupling High and Low alarm states with Digital Output lines may be utilized to build ON/OFF controllers that can operate without host computer involvement.

Function Description for the ADAM-4011 analog input module

To provide a better understanding of the functioning of the ADAM modules, the following is a description of the module with the most extensive set of functions, the ADAM-4011.

All analog input data first flows through the PGA (programmable gain amplifier). The amplifier can vary its gain from 1 to 128. The PGA automatically adjusts the signal to a range of -2.5 V to +2.5 V. This ensures optimal input voltage and resolution for the A/D converter.

The A/D conversion is supervised by the microprocessor that holds the calibration software. Two kinds of calibration take place automatically on startup or reset: Auto Zero calibration and Auto Span calibration. Normal calibration is used to adjust the signal according to calibration parameters defined by the user.

The digital 10 Hz filter provides a steady state output by using the DΣ function.

Before the data enters the microprocessor it passes through an optical isolation device. The opto isolation prevents ground loops and limits the chance of damage from power surges.

The microprocessor has six basic functions:

- Linearization of T/C (Thermocouple)
- Communication software and command set
- Calibration software
- Alarm monitoring
- Event counting
- Management of the EEPROM device that holds the system parameters
- Data transformation

After data has been transformed to the right data format its is passed on the RS-485 output port.

If an input value exceeds the High alarm setting or falls below the Low alarm setting, a flag is set in one of the Digital Output channels.

Finally, the on-board switching regulator accepts voltage between +10 and +30 V_{DC}. This power circuit has an isolation value of 500 V_{DC} to protect your equipment from damage from power surges.

ADAM-4011

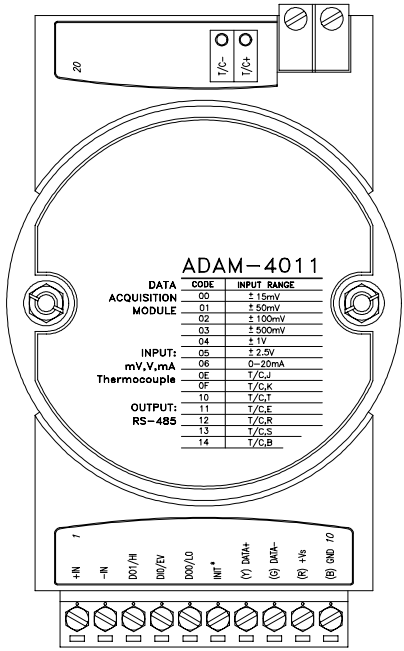

Figure 3-1 *ADAM-4011 Thermocouple Input Module*

Accepts:

- J, K, T, E, R, S and B thermocouples
- millivolt inputs: ±15 mV, ±50 mV, ±100 mV and ±500 mV
- Volt inputs: ±1 V and ±2.5 V
- Current input: ±20 mA (Requires a 125 Ω resistor)

Two digital output channels and one digital input channel are provided.

Depending on the module's configuration setting, it can forward the data to the host computer in one of the following formats:

- engineering units (°C, mV, V, or mA)
- percent of full-scale range (FSR)
- twos complement hexadecimal

ADAM-4011D

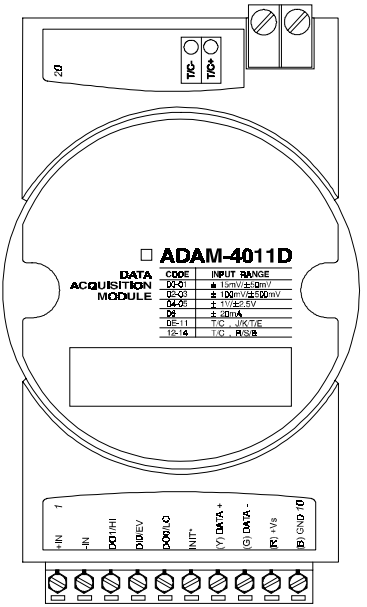

Figure 3-2 *ADAM-4011D Thermocouple Input Module with LED Display*

Accepts:

- J, K, T, E, R, S and B thermocouples
- millivolt inputs: ±15 mV, ±50 mV, ±100 mV and ±500 mV
- Volt inputs: ±1 V and ±2.5 V
- Current input: ±20 mA (Requires a 125 Ω resistor)

Two digital output channels and one digital input channel are provided.

Depending on the module's configuration setting, it can forward the data to the host computer in one of the following formats:

- engineering units (°C, mV, V, or mA)
- percent of full-scale range (FSR)
- twos complement hexadecimal

ADAM-4012

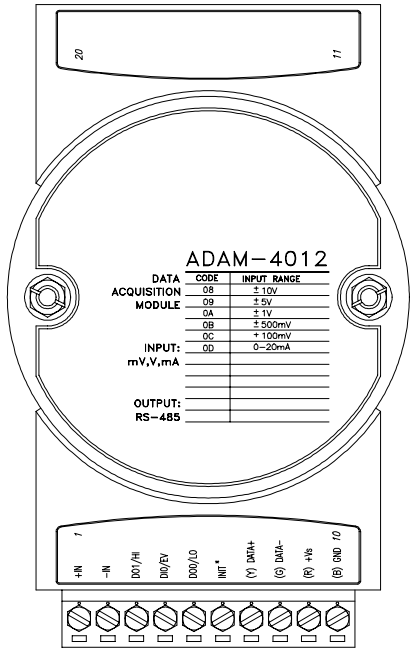

Figure 3-3 *ADAM-4012 Analog Input Module*

Accepts:

- millivolt inputs ± 150 mV and ±500 mV
- volt inputs: ±1 V, ±5 V and ±10 V
- current input: ±20 mA (requires a 125 Ω resistor)

Two digital output channels and one digital input channel are provided.

Depending on the module's configuration setting, it can forward the data to the host computer in one of the following formats:

- engineering units (mV, V, or mA)
- percent of full-scale range (FSR)
- twos complement hexadecimal

ADAM-4013

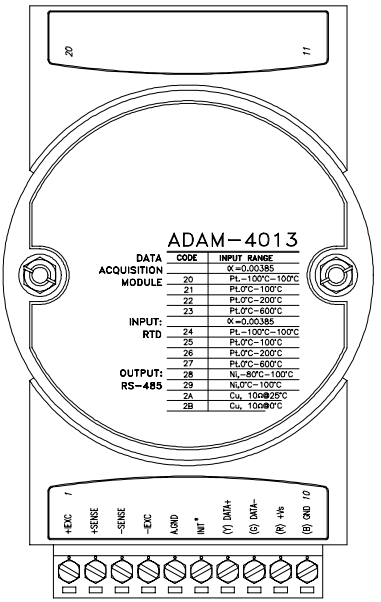

Figure 3-4 *ADAM-4013 RTD Input Module*

Accepts:

- input from platinum and nickel RTDs

Depending on the module's configuration setting, it can forward the data to the host computer in one of the following formats:

- engineering units (°C)
- percent of full-scale range (FSR)
- twos complement hexadecimal

Application Wiring

The following gives you examples how to connect various types of analog inpuit and high-low alarm applications to your ADAM modules.

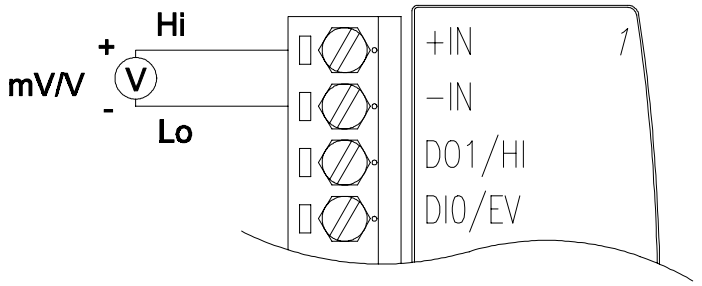

Figure 3-5 *Millivolt and Volt Input*

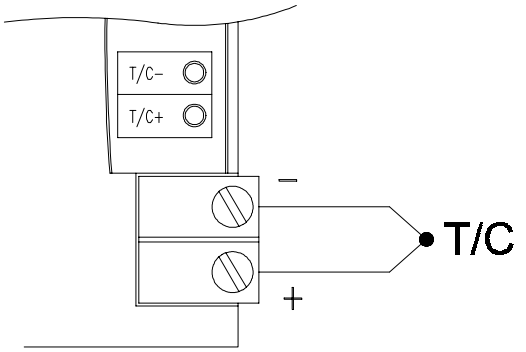

Figure 3-6 *Thermocouple Input*

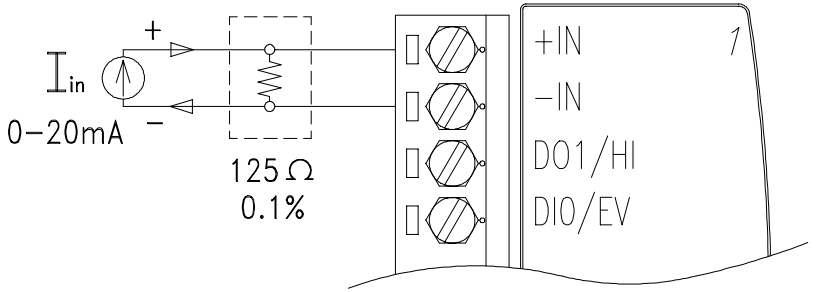

Figure 3-7 *Process Current Input*

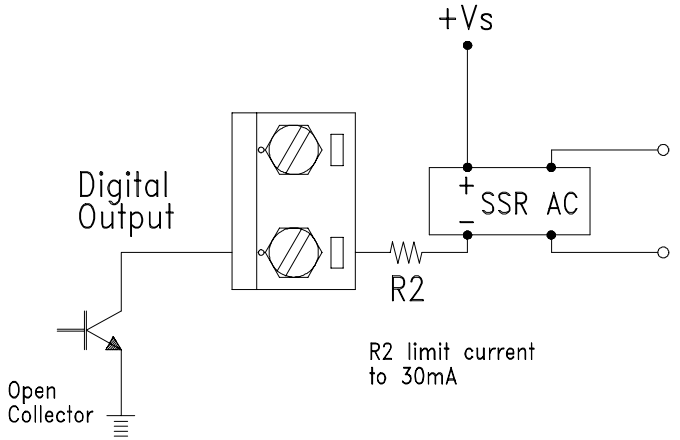

Figure 3-8 *Digital Output used with SSR (HI-LO alarm)*

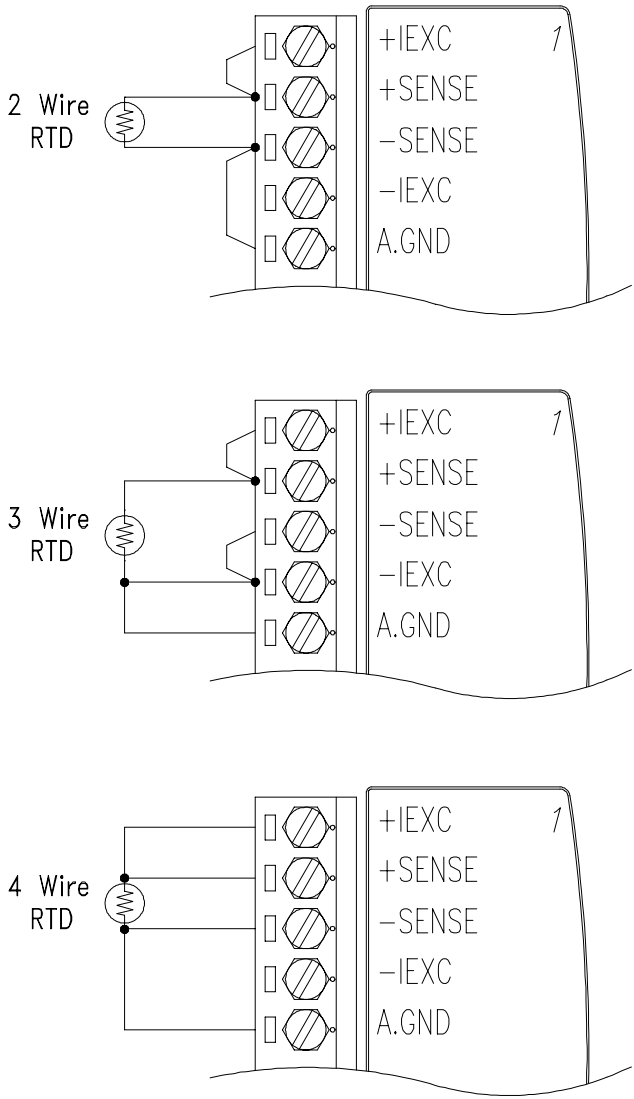

Figure 3-9 *RTD Inputs*

3.2 ADAM-4014D Analog Input Module with LED Display

The ADAM-4014D uses a 16-bit microprocessor-controlled sigma-delta A/D converter to convert sensor voltage and current signals into digital data. The module then translates the digital data into either engineering units, twos complement hexadecimal format or percentage of full-scale range (FSR) according to the module's configuration. When prompted by the host computer, the module sends the data to the host through a standard RS-485 interface.

ADAM-4014D offers signal conditioning, data display, A/D conversion, ranging, high-low alarm and RS-485 digital communication functions. The module protects your equipment from ground loops and power surges by providing opto-isolation on the A/D input and transformer based isolation of up to 500 V_{DC}.

Front Panel LED Indicator

The 4½ digit LED display on the back of the ADAM-4014D lets you monitor process readings right at their source. The module displays readings in a wide variety of formats as well as high-low alarm messages. The ADAM-4014D offers flexibility, ease of installation and direct availability of process data. For critical process monitoring, this module is the ideal choice.

Isolated Loop Power for 2-wire Transmitter

The ADAM-4014D includes an isolated loop power source. This module lets you drive 2- or 3-wire transmitters without an external power source. The module provides individual power loops for each channel, simplifying wiring while maintaining isolation between connected transmitters.

Input Conversion and Display

The ADAM-4014D can convert linear input to engineering units and show them on its built-in LED display (direct display).

When the input is nonlinear, the module first sends data to the host computer for conversion to engineering units. The host computer sends the data back to the ADAM-4014D to show on the module's LED display (remote display).

For example:

When measuring pressure, a pressure sensor outputs voltages between 1 and 5 Volt while the actual pressure varies between 0 and 100 psi. The relation between presure and the sensor's voltage output is linear. By using ADAM-40104D's linear mapping function we can convert the values back to the actual psi display the actual pressure in egineering units psi on the LED display without any host involvement.

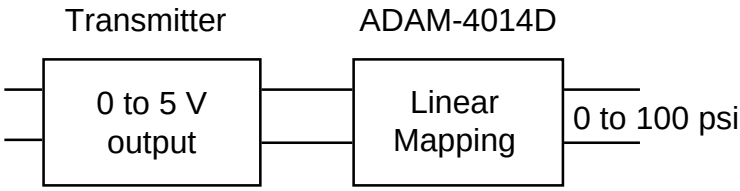

Figure 3-10 *Linear Mapping*

The ADAM-4014D can be programmed to convert the voltages to the actual psi units which are more easy to interpret.

To program the ADAM-4014D the following commands are send:

$AA6+00.000+05.000
("Write Source High/Low Values for Linear Mapping" command)

$AA7+000.00+100.00
("Write Target High/Low Values for Linear Mapping" command)

Digital Inputs/Outputs

Analog input modules also contain two digital outputs and one digital input. Outputs are open-collector transistor switches that may be controlled by the host computer. They can control solid-state relays which in turn may control heaters, pumps, and other electrical powered equipment. The digital inputs may be read by the host computer and used to sense the state of a remote digital signal.

Event counting

The event counter is connected to the Digital Input channel and can be used to keep track of the total amount of external low-speed pulses. Its accumulated maximal count is 65535. The number 65535 is held, even if the actual number of events exceeds 65535. The counter can be read or reset to 0 by the host computer.

Since the event counter's data is not stored in EEPROM, the event counter is cleared and set to zero every time you reset or power up the analog input module.

Alarm signalling

The ADAM-4014D includes high and low alarm functions. High and low alarm limits may be downloaded into the module's EEPROM by the host computer.

The alarm functions can be enabled or disabled remotely. When the alarm function is enabled, both digital output channels are used to indicate the high and low alarm states. Digital output channel 1 (DO1) equals the high alarm state and digital output channel 0 (DO0) equals the low alarm state. The high and low alarm states can be read at any time by the host computer.

Every A/D conversion will be followed by a comparison with the high and low limits. If the input value exceeds one of these limits, the corresponding high or low alarm state is set to ON.

There are two alarm mode options: momentary and latching. If the alarm is in latching mode, the alarm will stay on even when the input value returns within limits. An alarm in latching mode can be turned OFF by issuing a Clear Alarm command from the host computer. A latching alarm is cleared by the module when the opposite alarm is set. For example: the alarm is in latching mode and the high alarm is turned ON. When the module receives a value that is lower than the low alarm limit, it will clear the high alarm and turn the low alarm ON.

When the alarm is in Momentary mode, the alarm will be turned OFF as soon as the input value returns to within limits.

The arrangement of coupling high and low alarm states with digital output lines may be utilized to build ON/OFF controllers that can operate without host computer involvement.

ADAM-4014D

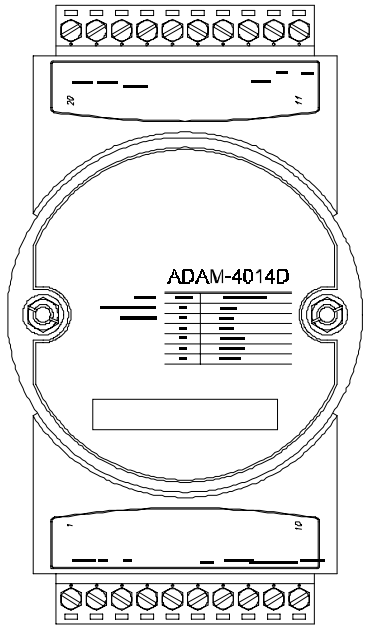

Figure 3-11 *ADAM-4014D Analog Input Module with LED Display*

Accepts:

- millivolt inputs: ±150 mV and ±500 mV
- Volt inputs: ±1 V, ±5 V and ±10 V
- Current input: ±20 mA

Two digital output channels and one digital input channel are provided.

Depending on the module's configuration setting, it can forward the data to the host computer in one of the following formats:

- engineering units (mV, V or mA)
- percent of full-scale range (FSR)
- twos complement hexadecimal

Application Wiring

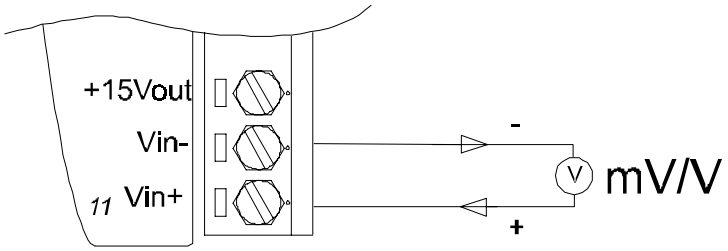

Figure 3-12 *Millivolt and Volt Input*

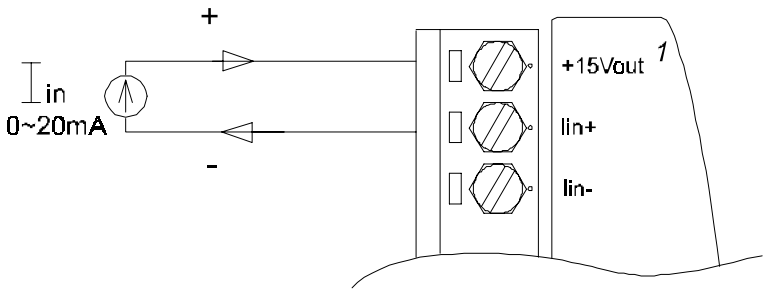

Figure 3-13 *Process Current Input*

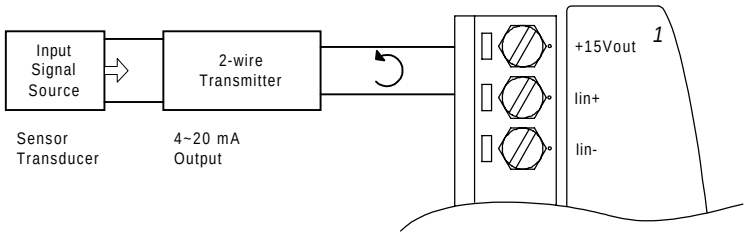

Figure 3-14 *2-wire Transmitter Input*

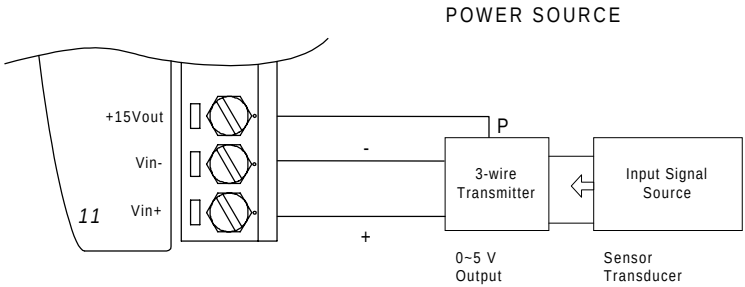

Figure 3-15 *3-wire Transmitter Input*

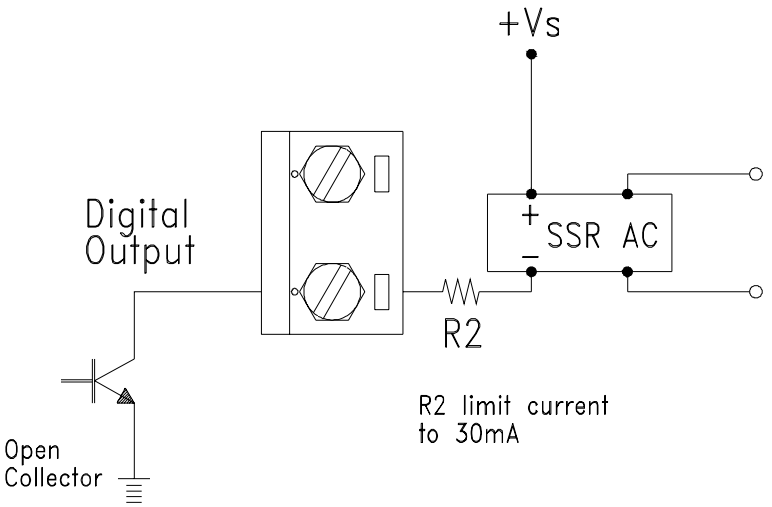

Figure 3-16 *Digital Ouput used with SSR (HI-LO Alarm)*

3.3 ADAM-4016 Strain Gauge Input Module

A strain gauge input module uses a microprocessor-controlled integrating A/D converter to convert sensor voltage or current signals into digital data for load cell and stress measurement. The digital data is then translated into either engineering units, twos complement hexadecimal format or percentage of full-scale range (FSR) according to the module's configuration. When prompted by the host computer, the data is sent through a standard RS-485 interface.

The strain gauge input module offers signal conditioning, A/D conversion, ranging, and RS-485 digital communication functions. They protect your equipment from ground loops and power surges by providing opto-isolation of the A/D input and transformer based isolation up to 3000 V_{DC}.

Excitation Voltage Ouput

A strain gauge input module can supply single channel voltage output for excitation. The module receives digital input from the host computer. The format of the data is engineering units. It then uses its microprocessor-controlled D/A converter to convert the digital data into output signals.

Strain gauge input modules protect your equipment from ground loops and power surges by providing opto-isolation of the D/A output and transformer-based isolation up to 3000 V_{DC}.

Digital Outputs

A strain gauge input module also contains 4 digital outputs. Outputs are open-collector transistor switches that may be controlled by the host computer. They can control solid-state relays which in turn may control heaters, pumps, and other electrical equipment.

Alarm signalling

Strain Gauge input modules include High and Low alarm functions. High and Low alarm limits may be downloaded into the module's EEPROM by the host computer.

The alarm functions can be enabled or disabled remotely. When the alarm function is enabled, both Digital Output channels are used to indicate the High and Low alarm state. Digital Output channel 1 (DO1) equals High alarm state and Digital Output channel 0 (DO0) equals Low alarm state. The High and Low alarm states can be read at any time by the host computer.

Every A/D conversion will be followed by a comparison with the High and Low limit. When the input value exceeds one of these limits, the High or Low alarm state is set to ON.

There are two alarm mode options: Momentary and Latching.

If the alarm is in Latching mode, the alarm will stay on even when the input value returns within limits. An alarm in Latching mode can be turned OFF by issuing a Clear Alarm command from the host computer. A Latching alarm is cleared by the module when the opposite alarm is set. For example: the alarm is in latching mode and the High alarm is turned ON.

When the module receives a value that is lower than the Low alarm limit, it will clear the High alarm and turn the Low alarm ON.

When the alarm is in Momentary mode, the alarm will be turned OFF as soon as the input value returns to within limits.

The arrangement of coupling High and Low alarm states with Digital Output lines may be utilized to build ON/OFF controllers that can operate without host computer involvement. .

ADAM-4016

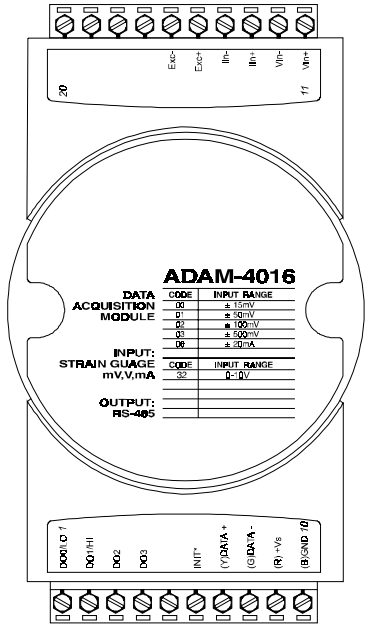

Figure 3-17 *ADAM-4016 Strain Gauge Input Module*

Accepts:

- millivolt inputs: ±15 mV, ±50 mV, ±100 mV, ±500 mV
- Current input: ±20 mA
- Excitation voltage output: 0 ~ 10 V

Four digital output channels are provided.

Depending on the module's configuration setting, it can forward the data to the host computer in one of the following formats:

- engineering units (mV or mA)
- percent of full-scale range (FSR)
- twos complement hexadecimal

Application Wiring

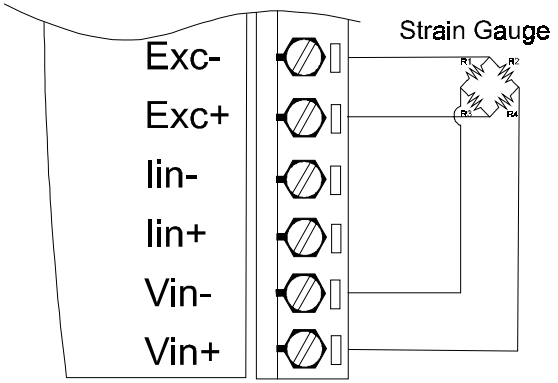

Figure 3-18 *Strain Gauge Voltage Input*

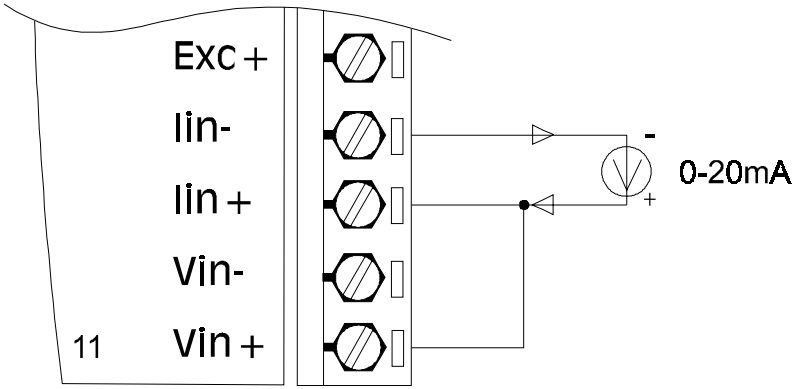

Figure 3-19 *Strain Gauge Current Input*

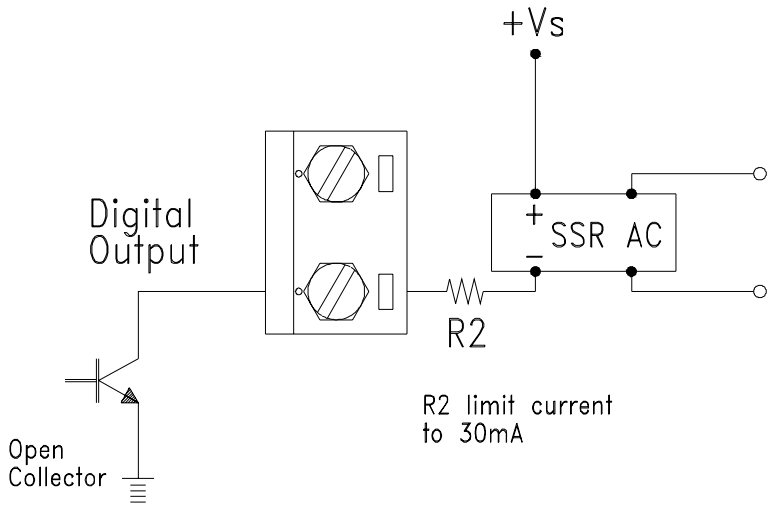

Figure 3-20 *Digital Output used with SSR*

3.4 ADAM-4017/4018/4018M 8-channel Analog Input Modules

ADAM-4017/4018 8-channel Analog Input Module

The ADAM-4017/4018 is a 16-bit, 8-channel analog input module that provides programmable input ranges on all channels. This module is an extremely cost-effective solution for industrial measurement and monitoring applications. Its opto-isolated inputs provide 3000 V_{DC} of isolation between the analog input and the module, protecting the module and peripherals from damage due to high input-line voltages.

ADAM-4017/4018 offers signal conditioning, A/D conversion, ranging and RS-485 digital communication functions. The module protects your equipment from ground loops and power surges by providing opto-isolation of A/D input and transformer based isolation up to 3000 V_{DC}.

The ADAM-4017/4018 uses a 16-bit microprocessor-controlled sigma-delta A/D converter to convert sensor voltage or current into digital data. The digital data is then translated into engineering units. When prompted by the host computer, the module sends the data to the host through a standard RS-485 interface.

ADAM-4018M 8-channel Analog Input Data logger

The ADAM-4018M is a 16-bit, 8-channel analog input data logger featuring programmable input ranges on all channels. This reliable and easy to use analog input logger can store up to 38,000 measurements for a maximum duration of 20 years. The ADAM-4018M can accept various analog inputs, such as thermocouple, mV, V and mA, and offers three configurable logging modes: standard log, event log, and mixed log. Optically isolated inputs provide 500 V_{DC} of isolation between the module and the analog input, protecting the module and peripherals from damage due to high voltages on the input lines. The ADAM-4018M is an extremely cost-effective solution for industrial measurement and monitoring applications.

ADAM-4017

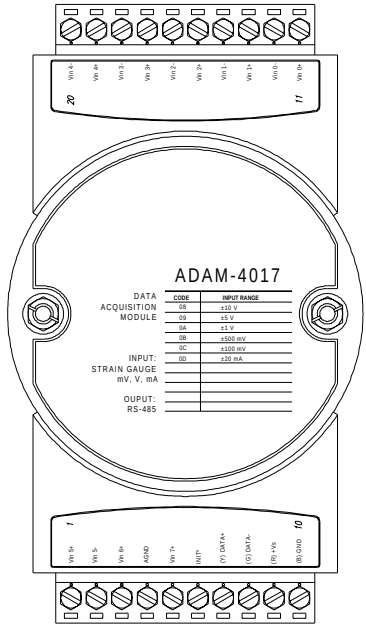

Figure 3-21 *ADAM-4017 8-channel Analog Input Module*

Channels:

- six differential, two single-ended

Accepts:

- Millivolt inputs: ±150 mV and ±500 mV
- Volt inputs: ±1 V, ±5 V, and ±10 V
- Current input: ±20 mA (requires a 125 Ω resistor)

The module forwards the data to the host computer in engineering units (mV, V, or mA)

ADAM-4018

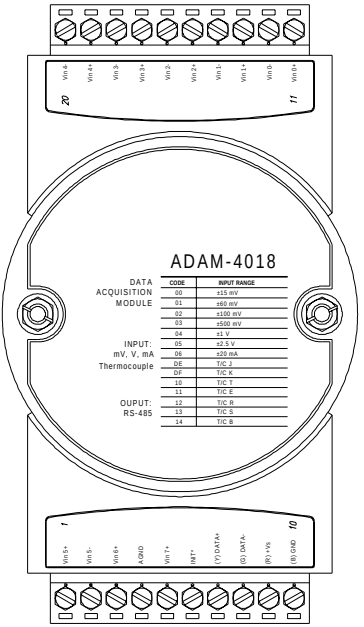

Figure 3-22 *ADAM-4018 8-channel Thermocouple Input Module*

Channels:

- six differential, two single-ended

Accepts:

- J, K, T, E, R, S and B thermocouples
- Millivolt inputs: ±15 mV, ±50 mV, ±100 mV and ±500 mV
- Volt inputs: ±1 V and ±2.5 V
- Current input: ±20 mA (requires a 125 Ω resistor)

The module forwards the data to the host computer in engineering units (ºC, mV, V, or mA)

ADAM-4018M

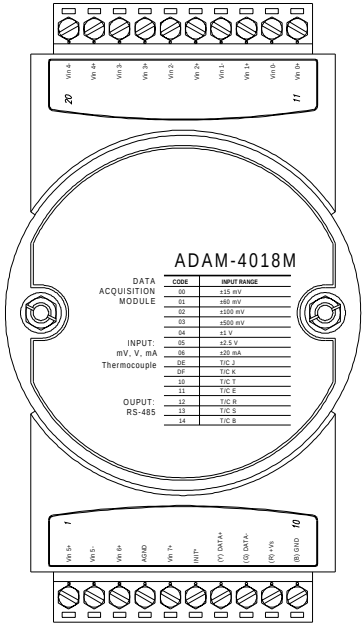

Figure 3-23 *ADAM-4018M 8-channel Analog Input Data Logger*

Channels:

- six differential, two single-ended

Accepts:

- J, K, T, E, R, S and B thermocouples
- Millivolt inputs: ±15 mV, ±50 mV, ±100 mV, ±500 mV
- Volt inputs: ±1 V and ±2.5 V
- Current input: ±20 mA (requires a 125 Ω resistor)

The module forwards the data to the host computer in engineering units (°C, mV, V, or mA)

Storage Capacity:

- 128 KB flash memory

Apllication Wiring

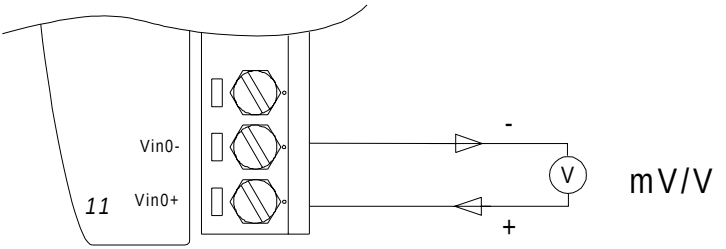

Figure 3-24 *Differential Input (CH0 to CH5)*

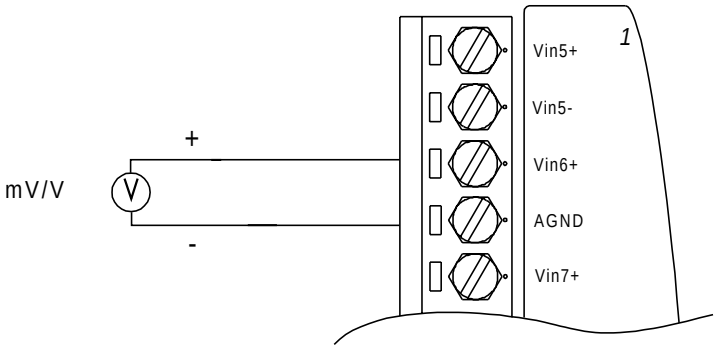

Figure 3-25 *Single-ended Input (CH6 to CH7)*

3.5 ADAM-4021 Analog Output Module

Analog output module receives their digital input through an RS-485 interface from the host computer. The format of the data is either engineering units, twos complement hexadecimal format or percentage of full-scale range (FSR), depending on the module's configuration. It then uses its microprocessor-controlled D/A converter to convert the digital data into output signals.

You get a true readback of the analog output signal from the unit's ADC, which independently monitors the output. You can specify slew rates and start up currents through the configuration software. The Analog Output Module can supply single-channel analog output in a range of voltages or currents.

They protect your equipment from ground loops and power surges by providing opto-isolation of the D/A output and transformer based isolation up to 3000 V_{DC}.

Slew Rate

The slew rate is defined as the discrepancy between the number of milliamps (or Volts) per second of the present and the required output currents (or voltages). An ADAM analog output module may be configured for a specific slew rate.

ADAM-4021

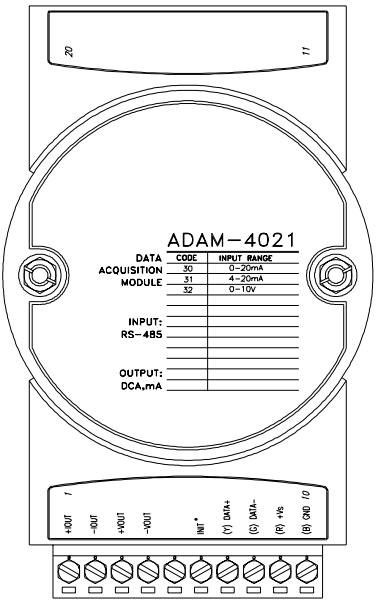

Figure 3-26 *ADAM -4021 Analog Output Module*

Depending on its configuration settings the module accepts the following formats from the host computer:

- Engineering units
- Percent of full-scale range (FSR)
- Twos complement hexadecimal format,

Output types:

- Voltage: 0 to 10 V
  (Slew rate: 0.0625 to 64 V/sec)
- Currents: 0 to 20 mA, or 4 to 20 mA.
  (Slew rate: 0.125 to 128 mA/sec)

Application Wiring

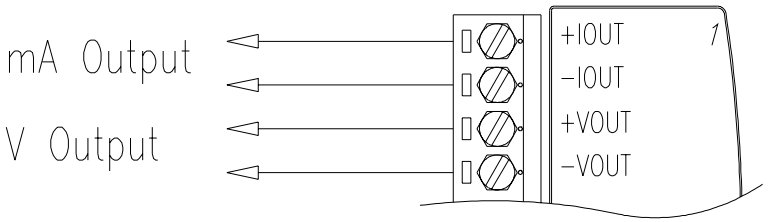

Figure 3-27 *Analog Output*

3.6 ADAM-4050/4052/4053 Digital I/O Modules

ADAM-4050 Digital I/O Module

The ADAM-4050 features 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 and power equipment. The host computer can use the module's digital inputs to determine the state of limit or safety switches or remote digital signals.

ADAM-4052 Isolated Digital Input Module

The ADAM-4052 provides eight digital input channels: six fully independent isolated channels and two isolated channels with a common ground. All have 5000 V_{RMS} isolation to prevent ground loop effects and prevent damage from power surges on the input lines.

ADAM-4053 16-channel Digital Input Module

The ADAM-4053 provides 16 digital input channnels for dry contact or wet contact signals. For dry contact, effective distance from DI to contact point is up to 500 m.

NOTE: The pin 6 in ADAM-4053 is used for DI15 and INIT*. The users should open the module case to set the 3-pin jumper. List the jumper setting as follows. And the default setting is DI15.

DI15

INIT*

ADAM-4050

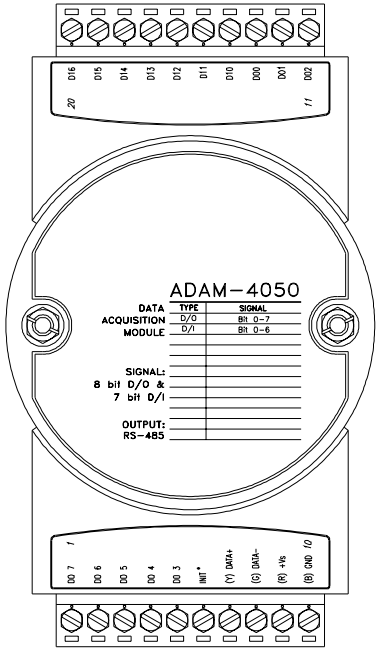

Figure 3-28 *ADAM-4050 Digital I/O Module*

Channels:

- 7 input channels
- 8 output channels

Digital Input:

- logic level 0: +1 V max.
- logic level 1: +3.5 V to +30 V

Digital Output:

- open collector to 30 V, 30 mA max. load

ADAM-4052

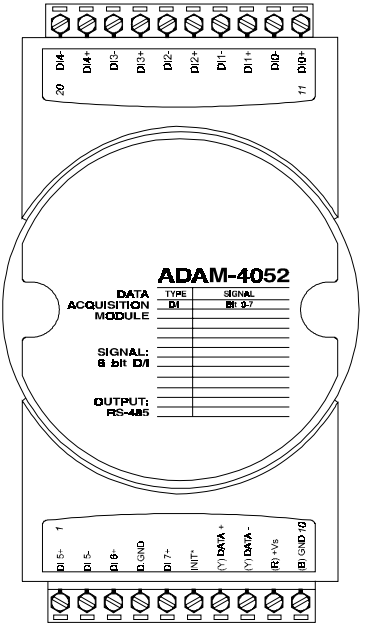

Figure 3-29 *ADAM-4052 Isolated Digital Input Module*

Channels: 8

- 6 differential
- 2 single ended

Digital Input:

- logic level 0: +1 V max.
- logic level 1: +3.5 V to +30 V

ADAM-4053

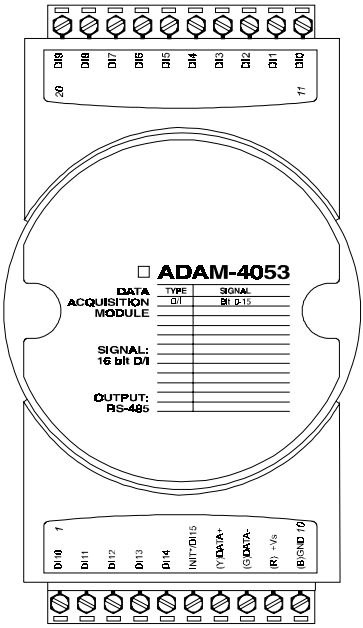

Figure 3-30 *ADAM-4053 16-channel Digital Input Module*

Channels: 16

Digital Input:

-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 to +30 V

Application Wiring

The following give you examples of how to connect various types of digital I/O applications to your ADAM modules.

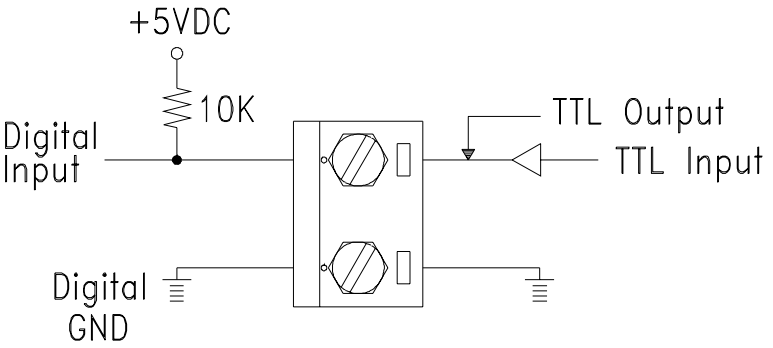

Figure 3-31 *TTL Input (ADAM-4050)*

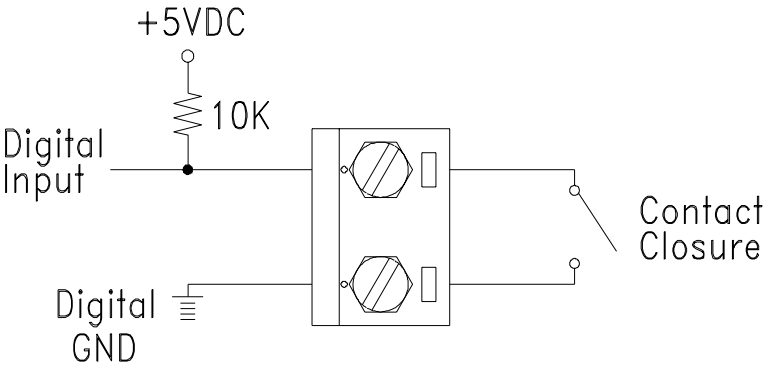

Figure 3-32 *Contact Closure Input (ADAM-4050)*

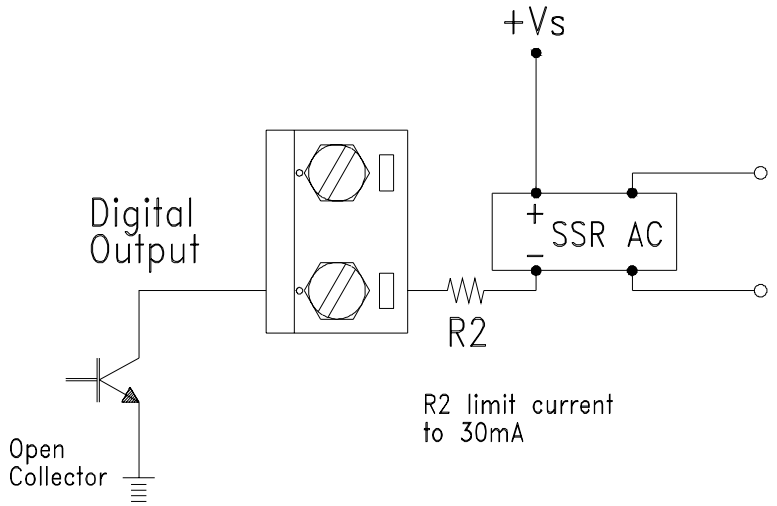

Figure 3-33 *Digital Output used with SSR (ADAM-4050)*

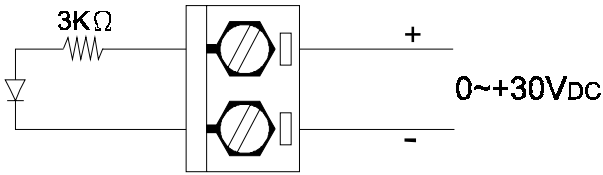

Figure 3-34 *Isolation Digital Input (ADAM-4052)*

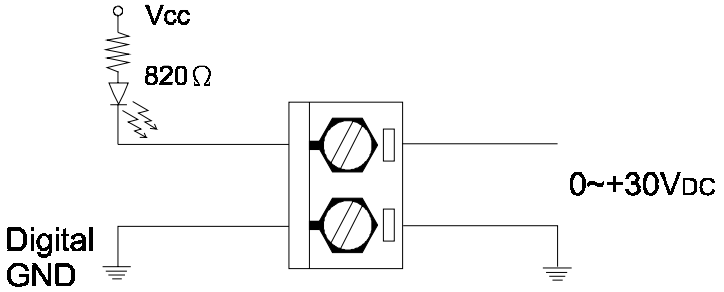

Figure 3-35 *Wet Contact Input (ADAM-4053)*

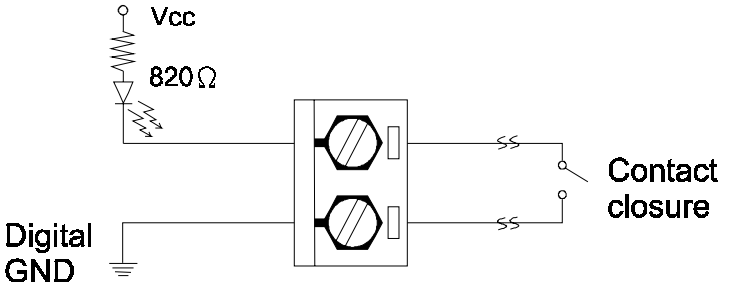

Figure 3-36 *Contact Closure Input (ADAM-4053)*

3.7 ADAM-4060 Relay Output Module

The ADAM Relay Output Module is a low-cost alternative to SSR modules. The ADAM Relay Output Module provides four relay channels, two of Form A and two of Form C. This module is excellent for ON/OFF control or low-power switching applications

ADAM-4060

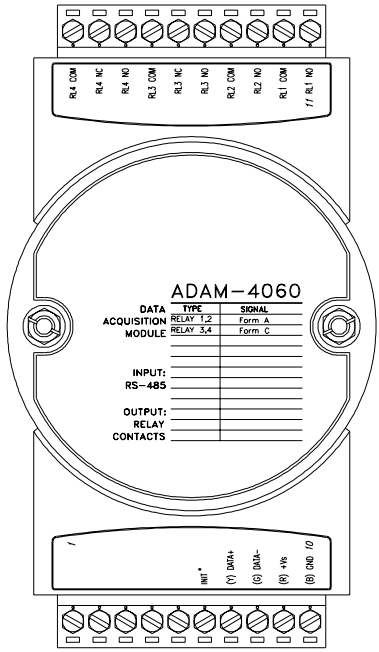

Figure 3-37 *ADAM-4060 Relay Output Module*

Contact rating for Form A and Form C:

AC: 0.5 A / 120 V_{AC}

DC: 1 A / 24 V_{DC}

Application Wiring

The following gives you examples on how to connect form A and form C relay output applications to your ADAM modules.

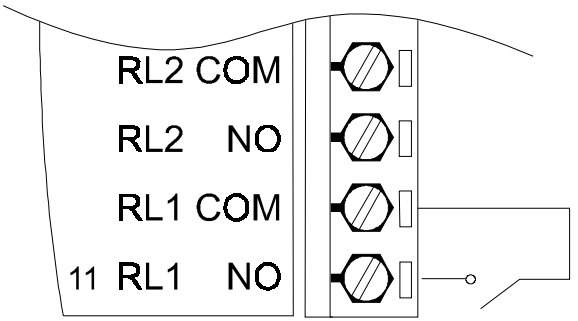

Figure 3-38 *Form A relay output*

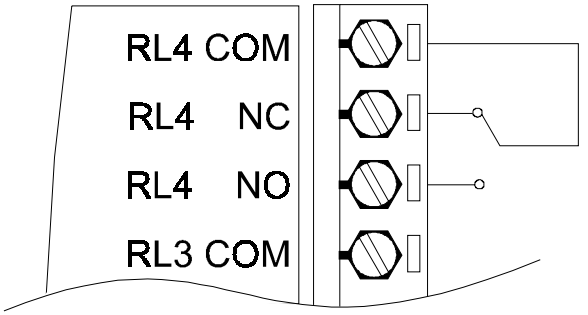

Figure 3-39 *Form C relay output*

3.8 ADAM-4080/4080D Counter/Frequency Input Modules

ADAM-4080/4080D Counter/frequency input module has two 32-bit counter input channels (counter 0 and counter 1) with built-in programmable timer for frequency measurement. These cost-effective modules let you monitor counter/frequency data as measurements are taken.

Front Panel LED Indicator (ADAM-4080D only)

The 5-digit LED display of the ADAM-4080D lets you monitor its counter data right at the source. The module's LED display shows counter values as well as high-low alarm messages as a counter exceeds its programmed limits (direct display).

Another option is to display data send by the host computer. The module first sends counter data to the host computer for conversion or calculation. The host computer sends the data back to the ADAM-4080D and the module shows it on the module's LED display (remote display).

Signal Input Mode

The ADAM-4080/4080D provides separate terminals for photo isolated input and non-isolated input to simplify wiring. Opto-isolated input provides 2500 V_{RMS} isolation to protect your equipment from ground loops. After you make the physical connections, program the module to identify which of its two sets of input terminals it should activate (isolated or non-isolated terminals).

Programmable Digital Filter

The ADAM-4080/4080D module includes a unique programmable digital filter to reject noise on the input lines. You can specify separate time constants, such as minimum signal width at high level and minimum signal width at low level, to provide stable output readings.

Programmable Threshold

When the ADAM-4080/4080D is programmed for non-isolated input you can set a high and low trigger level. Like the programmable digital filter, the programmable threshold rejects noise on the input lines and provides stable input readings

External Control (Gate mode)

Besides the GND and counter terminal each channel has a gate terminal to connect an external gate signal. The gate signal (high or low) can trigger the counter to start or stop counting. The gate mode can be either low, high or disabled (low means that counting starts when the gate signal is low and stops when the gate signal becomes high)

Programmable Alarm Output

The ADAM-4080 module provides a configurable alarm for each counter. The ADAM-4080D provides high and low alarm functions for counter 0. When the counter reaches an alarm limit, it will trigger the built-in digital output for machine ON/OFF control. The alarm limits may be downloaded into the module's EEPROM by the host computer. The initial count value of ADAM-4080 module's counter can be configured as any values.

The alarm functions can be enabled or disabled remotely. When the alarm functions are enabled, digital output channels are used to indicate the alarm states. For ADAM-4080, digital output channel 0 equals the alarm state of counter 0, and digital output channel 1 equals the alarm state of counter 1. For ADAM-4080D, digital output channel 0 equals the low alarm state of the counter 0 and digital output channel 1 equals the high alarm state of the counter 0.

Every A/D conversion will be followed by a comparison with the alarm limits. If the input value exceeds one of these limits, the corresponding alarm state is set to ON.

There are two alarm mode options for the ADAM-4080D: momentary and latching. If the alarm is in latchinng mode, the alarm will stay on even when the input value returns within limits. An alarm in latching mode can be turned off by issuing a Clear Alarm command from the host computer. A latching alarm is cleared by the module when the opposite alarm is set. For example: the alarm is in latching mode and the high alarm is turned ON. When the module receives a value that is lower than the low alarm limit, it will clear the high alarm and turn the low alarm ON.

When the alarm is in Momentary mode, the alarm will be turned OFF as soon as the input value returns to within limits.

The arrangement of coupling high and low alarm states with digital output lines may be utilized to build ON/OFF controllers that can operate without host computer involvement.

ADAM-4080

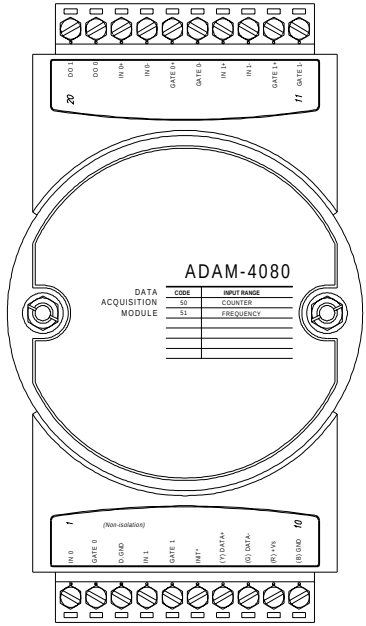

Figure 3-40 *ADAM-4080 Counter/Frequncy Input Module*

Channels: Two independent 32-bit counters (counter 0 and counter 1)

Input frequency: 50 kHz max.

Input mode: Isolated or non-isolated

Isolation input level:
-Logic level 0: +1 V max
-Logic level 1: +3.5 V to +30 V

Non-isolation input level (programmable threshold):
- Logic level 0: 0 to +5V (default=0.8 V)
- Logic level 1: 0 to +5V (default = 2.4 V)

ADAM-4080D

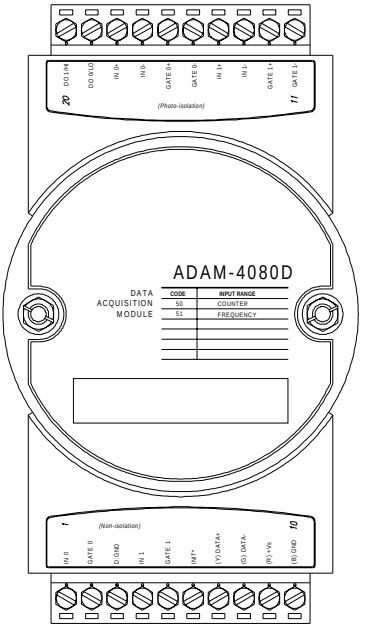

Figure 3-41 *ADAM-4080D Counter/Frequency Input Module with LED Display*

Channels: Two independent 32-bit counters (counter 0 and counter 1)

Input frequency: 50 kHz max.

Input mode: Isolated or non-isolated

Isolation input level:
-Logic level 0: +1 V max
-Logic level 1: +3.5 V to +30 V

Non-isolation input level (programmable threshold):
- Logic level 0: 0 to +5V (default=0.8 V)
- Logic level 1: 0 to +5V (default = 2.4 V)

Application Wiring

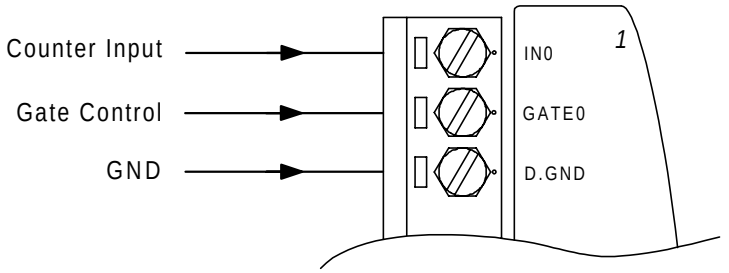

Figure 3-42 *Non-isolated Input*

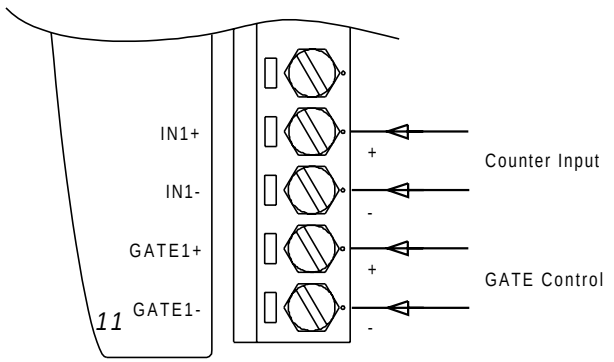

Figure 3-43 *Photo-isolated Input*