F&eIt Series
Isolated High-Resolution Analog Input Module
ADI16-4(FIT)GY

Congratulations on your recent purchase of an Isolated Analog Input Module.

This product can be connected to the F&eIT series of controller modules (such as the CPU-CAxx(FIT)GY and CPU-SBxx(FIT)GY) to construct a system.

The isolation between external signals and the Controller Module permits the use of the Controller Module without compromising the communications features of the latter.

* Specifications, color and design of the products are subject to change without notice.

Features

Bus-isolated analog input module providing high precision at a resolution of 16 bits.

Selectable input ranges common to channels: Bipolar input from -10 to +10 V and current input from 0 to 20 mA.

Support for differential input, capable of accurate measurement of voltages over a distance from the signal source or with potential differences.

A rotary switch allows you to set device IDs to help you keep track of device numbers.

Flanged two-piece connector used to prevent disconnection from the connector on the controller module.

Similar to other F&eIT series products, the system, in the module itself, incorporates a 35-mm DIN rail mounting mechanism as a standard item.   A connection to a controller module can be effected on a lateral, stack basis in a unique configuration, which permits a simple, smart system configuration without the need for a backplane board.

Specification

Specifications

Item	Specifications	
	Voltage input	Current input
Analog input section		
Input format	Bus-isolated voltage input	Bus-isolated current input
Input range	Bipolar ±10V	0 to 20mA
Maximum input ratings	±20V	30mA
Input impedance	1MΩ(Min.)	250Ω(Typ.)
Input channel	Differential input, 4 channels	
Resolution	16-bit	
Non-linear error *1*3	±8LSB(±0.012% of FSR)	±20LSB (±0.030% of FSR)
Conversion rate	Number of conversion channels x 10μsec + 20μsec	Number of conversion channels x 40μsec + 20μsec
Data buffer	64-Word	
Interrupt	Either IRQ5 or IRQ7 or IRQ9 *2	
Internal sampling timer	10μsec to 1,073,741,824μsec *2	
Common section		
Internal power consumption	5VDC±5% 300mA(Max.)	
Maximum distance of signal extension	1.5m	
Physical dimensions (mm)	25.2(W) x 64.7(D) x 94.0(H) (exclusive of protrusions)	
Weight (module itself)	100g	
Module installation method	One-touch connection to 35mm DIN rails (standard connection mechanism provided in the system)	
Compatible wires	AWG28 to 16 Cross-section 0.08 to 1.25mm	
Connectors	FK- MC1.5/12-STF-3.81 plug (made by Phoenix Contact Corp.) 3.81 mm-pitch, nominal current: 4A (Max.)	

*1   The non-linearity error means an error of approximately 0.1% occurs over the maximum range at 0°C and 50°C ambient temperature.
*2   Available only when the ADI16-4(FIT)GYs connected to the CPU-SBxx(FIT)GY.
*3   For this product, as the analog signal is input to A/D converter without being processed in order not make the frequency characteristics to deteriorate, if the connection cable is affected by noise, correct analog input may not be achieved.

⚠ CAUTION

When connecting one of the modules to a controller module, the internal power consumption should be taken into account. If the total current exceeds the capacity of the power supply unit, the integrity of the operation cannot be guaranteed. For further details, please see the Controller Module manual.

Depending upon the specific controller module that is used, some of the functions are not supported.

Installation Environment Requirements

| Parameter	Requirement description
Operating temperature	0 - 50°C
Storage temperature	-10 - 60°C
Humidity	10 - 90% RH (No condensation)
Floating dust particles	Not to be excessive
Corrosive gases	None

Packing List

Module[ADI16-4(FIT)GY] …1
First Step Guide …1
CD-ROM [F&eIT Series Setup Disk] *1…1
Interface connector plug…1

*1   The CD-ROM contains various software and User's Manual.

Block Diagram

Physical Dimensions

[mm]
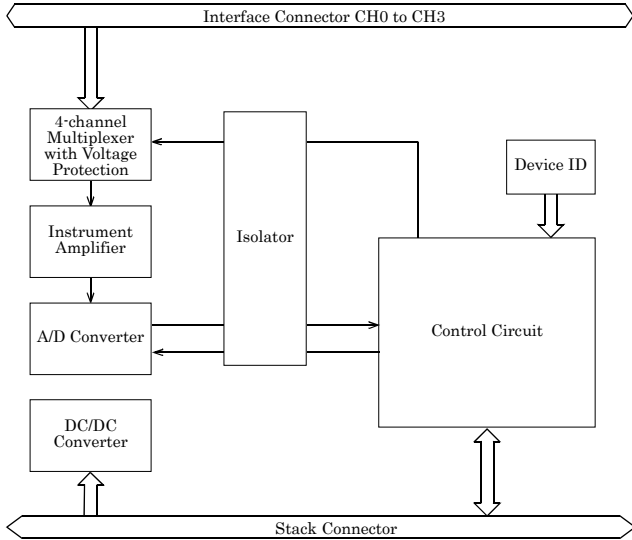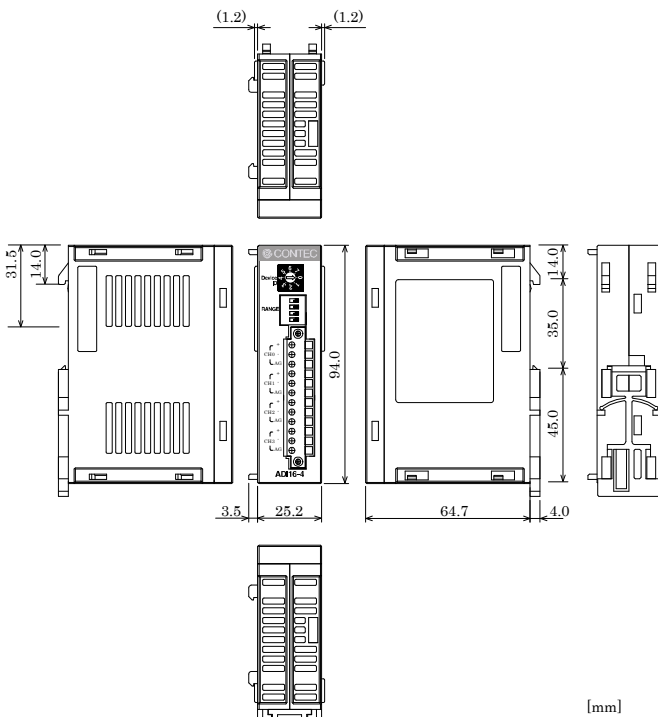
Interface Connector

How to Connect an Interface Connector

When connecting the Module to an external device, you can use the supplied connector plug.
To wire each terminal, strip the wire about 9 to 10 mm from the end and insert it into the opening.   After inserting the wire, tighten the screw to fasten it.   Compatible wires are AWG 28 to 16.
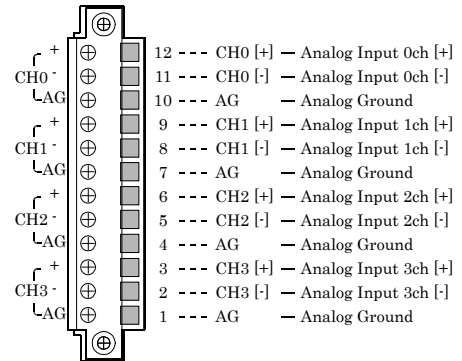

Approximately 9 to 10mm
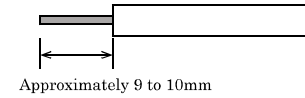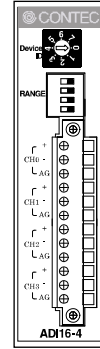
- Applicable connector
    3.81mm-pitch, 12-pin type of rated current 8A
    MC-1,5/12-GF-3,81 [Made by Phoenix Contact]

- Applicable plug(accessory bundled)
    Front-screw type with connector locking flange
    FRONT-MC 1,5/12-STF-3,81 [Made by Phoenix Contact]
    Applicable cable AWG28-16

⚠ CAUTION
   Removing the connector plug by grasping the cable can break the wire.

Signal Layout on the Interface Connector

The Module can be connected to an external device using a 12-pin (1 group) connector that is provided on the Module face.


CH0	+	12 --- CH0 [+]	Analog Input 0ch [+]
	-	11 --- CH0 [-]	Analog Input 0ch [-]
	AG	10 --- AG	Analog Ground
CH1	+	9 --- CH1 [+]	Analog Input 1ch [+]
	-	8 --- CH1 [-]	Analog Input 1ch [-]
	AG	7 --- AG	Analog Ground
CH2	+	6 --- CH2 [+]	Analog Input 2ch [+]
	-	5 --- CH2 [-]	Analog Input 2ch [-]
	AG	4 --- AG	Analog Ground
CH3	+	3 --- CH3 [+]	Analog Input 3ch [+]
	-	2 --- CH3 [-]	Analog Input 3ch [-]
	AG	1 --- AG	Analog Ground

Analog Signal Connection

Differential input connection examples

This section gives examples of connecting analog input signals from an external device to the Module using a flat cable and a shielded cable.
The following example uses a flat cable to connect the Module to an external device.
Connect the [+] and [-] analog input channels of the Module to the output and ground of the signal source, respectively.   Also connect the analog ground of the Module to the ground of the signal source.
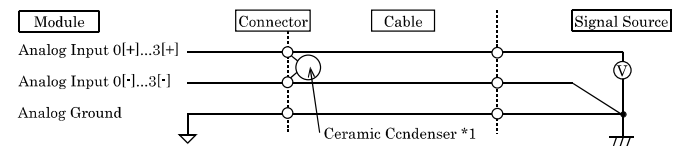
*1   When using a ceramic capacitor, make the lead as short as possible.

The following example uses a shielded two-conductor cable to connect the Module to an external device. Use this type of cable if the signal source is located at a distance from the Module or if the connection requires higher noise immunity. Connect the [+] and [-] analog input channels of the Module to the output and ground of the signal source, respectively. Also connect the analog ground of the Module to the ground of the signal source using the shield braid.
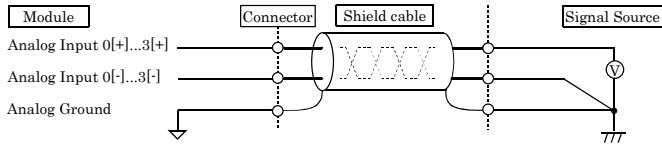
⚠ CAUTION

If the signal source contains over 1MHz signals, the signal may effect the cross-talk noise between channels.

Converted data is undefined with the analog ground unconnected.

If the connecting cable is affected by noise, accurate analog input may not be made. To secure the accuracy, place the connecting cable far from the source of the noise and put a laminated ceramic capacitor on the connector of the module.

When affected by noise, the connection cable may fail to input accurate analog signals. Route the connection cable apart from noise sources.

The connection cable may fail to input accurate analog signals if it is long. The connection cable should therefore be as short as possible.

The analog signal input to the [+] and [-] inputs must not exceed the maximum input voltage with reference to the analog ground of the module. Exceeding the input voltage can damage the module.

Converted data is undefined when either of the [+] and [-] input terminals is left unconnected. Connect both of the [+] and [-] input terminals of the channel not connected to the signal source to the analog ground.

Setting a Device ID

The controller module distinguishes and keeps track of the modules that are connected to it by assigning device IDs to them. Each module, therefore, should be assigned a unique ID.
A Device ID can be assigned in a 0 to 7 range, so that a maximum of eight modules can be distinguished.

Setup Method

A device ID can be set by turning the rotary switch on the device face.
To set a device ID, turn the switch knob.