F&eIT Series
Isolated High-Resolution Analog Output Module

DAI16-4(FIT)GY

This product can control an external device by converting digital data into analog voltage or current signals.

This product can connect to F&eIT Series controller module <CPU-CAxx(FIT)GY, CPU-SBxx(FIT)GY) etc.> and construct the 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

Analog output module providing high precision at a resolution of 16 bits.

The output range is common to different channels, and can be selected from two output ranges: ±10V, and 0 - 20mA.

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 output	Current output
Analog output section		
Output format	Bus-isolated voltage output	Bus-isolated current output
Output range	Bipolar ±10V (Output current ±5mA)	0 - 20mA
Output impedance	Voltage range: 10Ω (Max.)	----
Output channel	4 channels	
Resolution	16 Bits	
Conversion accuracy *1	±18LSB(±0.027% of FSR)	
Settling time	10μsec/ch	20μsec/ch
Data buffer	64-Word	
Interrupt	Either IRQ5 or IRQ7 or IRQ9 *2	
Internal Paser timer	10μsec - 1,073,741,824μsec *2	
Common section		
Internal power consumption	5VDC±5% 500mA(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)	100 g	
Module connection method	Stack connection by the connector that is provided with the side of module	
Module installation method	One-touch connection to 35mm DIN rails (standard connection mechanism provided in the system)	
Compatible wires	AWG 28 - 16	
Connectors	FRONT-MC 1,5/12-STF-3,81 (mfd by PHOENIX CONTACT Corp.) 3.81 mm-pitch, nominal current : 8A (Max.)	

*1   The Conversion accuracy 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 DAI16-4(FIT)GYs connected to the CPU-SBxx(FIT)GY.

⚠ 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.

Current output requires an external power supply.   With large external power supply fluctuations (ripple), the conversion precision indicated in the specifications may not be attainable.   If this problem occurs, please use a low-ripple power supply.

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

Packing List

Module[DAI16-4(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.

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
Standard	FCC Class A, VCCI Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA

Block Diagram

Physical Dimensions

[mm]
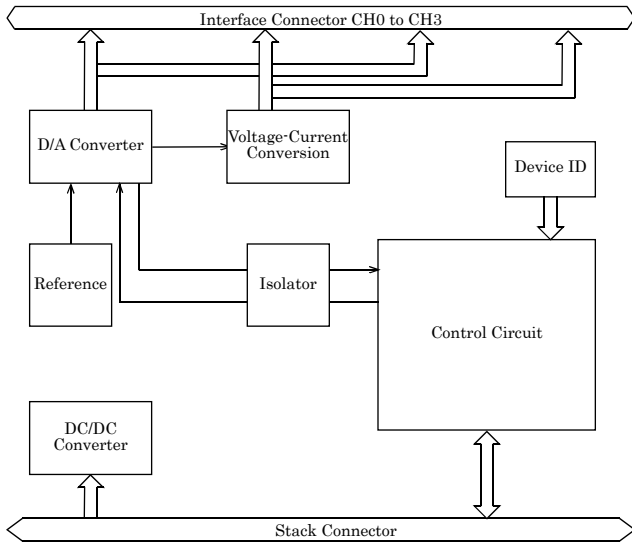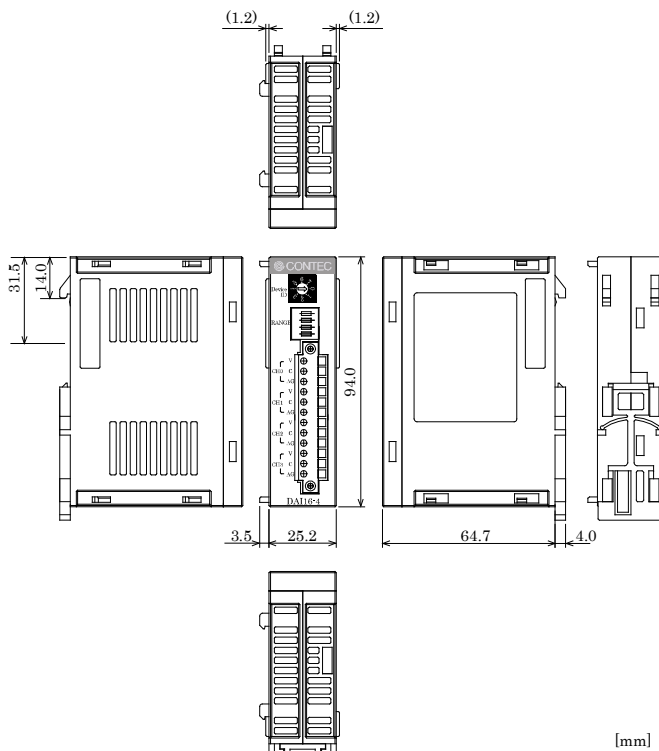
Interface Connector

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 - 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 - 16.
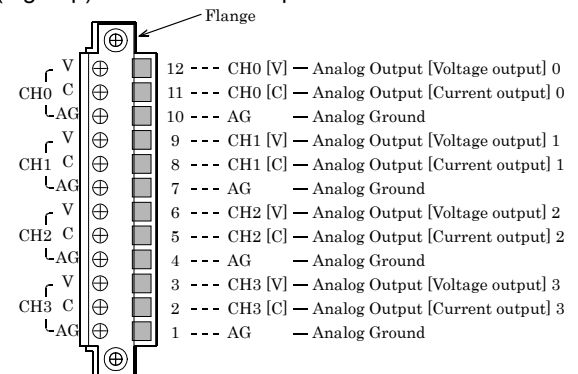

Approximately 9 - 10mm
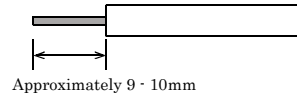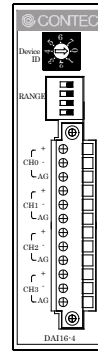
· Applicable connector
3.81mm-pitch, 12-pin type of rated current 8A
MC-1,5/12-GF-3,81 [Made by Phoenix Contact]

· 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.


12 --- CH0 [V]	— Analog Output [Voltage output] 0
11 --- CH0 [C]	— Analog Output [Current output] 0
10 --- AG	— Analog Ground
9 --- CH1 [V]	— Analog Output [Voltage output] 1
8 --- CH1 [C]	— Analog Output [Current output] 1
7 --- AG	— Analog Ground
6 --- CH2 [V]	— Analog Output [Voltage output] 2
5 --- CH2 [C]	— Analog Output [Current output] 2
4 --- AG	— Analog Ground
3 --- CH3 [V]	— Analog Output [Voltage output] 3
2 --- CH3 [C]	— Analog Output [Current output] 3
1 --- AG	— Analog Ground

Connecting an Analog Output Signal

Connecting a Voltage Output

Connecting with a Flat Cable

This example involves connecting the voltage output and the analog ground for each channel to the input and the ground of an external device, using a flat cable.

Connecting a Voltage Output (Flat Cable)
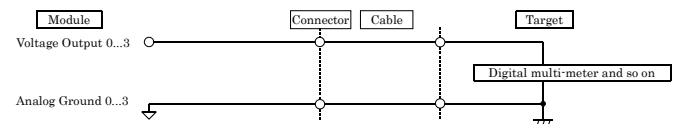
Connecting with a coaxial cable

A coaxial cable can be used in situations where the module is at a relatively large distance from the external device or when the noise immunity of the module must be improved.   In this case, the voltage output and the analog ground for each channel are connected to the input and the ground, respectively, of the external device by using the core wire and the shield braid of the coaxial cable.

Connecting a Voltage Output (Coaxial Cable)
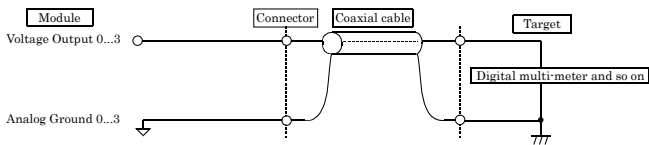
⚠ CAUTION

When the power is turned on or the module is reset, the voltage output signal will be 0V.

To avoid any malfunction, the voltage output signal should not be connected to the analog ground.

To avoid any malfunction, the voltage output signal should not be connected to another analog output signal or the output signal of an external device.

To avoid any malfunction, the connector plug should not be attached or detached when the power for the module or the external device is on.

The maximum current capacity for a voltage output signal is ±5mA. To avoid any malfunction, do not connect an external device that generates a load exceeding this range.

In situations where the connecting cable is subject to the effects of noise, the accurate voltage output can fail. The connecting cable should be installed away from any source of noise.

In situations where the connecting cable is excessively long, the accurate voltage output can fail. Use a cable that is as short as possible.

Because the D/A converter in the module does not contain a built-in deglitcher, a glitch can sometimes occur.

Connecting a Current Output

Example of Connecting a Negative Load Resistor

Two types of connection methods can be employed: fixed load and floating load. If the module is used as a load resistance, multiple current loops can be implemented by using the same power supply. The use of current output requires an external power supply (22 - 24V). In such a case, a power supply with a small ripple should be used in order to avoid an adverse impact on the conversion accuracy due to a large power supply ripple. The load resistance RL that is connected to the current output of each channel should be less than 500Ω, including the wire resistance.
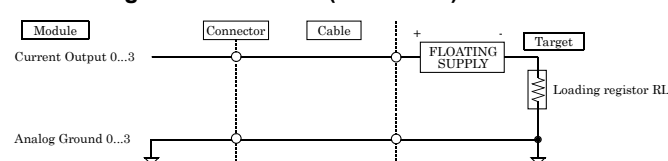
Example of Connecting with a Flat Cable

Use a flat cable to connect the voltage output and the analog ground of each channel to the load resistance RL.

### Connecting to a Floating Load (Flat Cable)
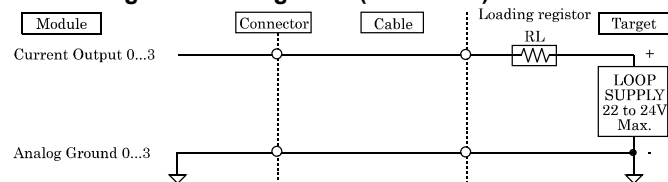
### Connecting to a Fixed Load (Flat Cable)

Example of Connecting with a Coaxial Cable

A coaxial cable can be used in situations where the module is at a relatively large distance from the external device or when the noise immunity of the module must be improved. In this case, the current output and the analog ground for each channel are connected to the load resistance RL of the external device by using the core wire and the shield braid of the coaxial cable.

Connecting to a Floating Load (Coaxial Cable)
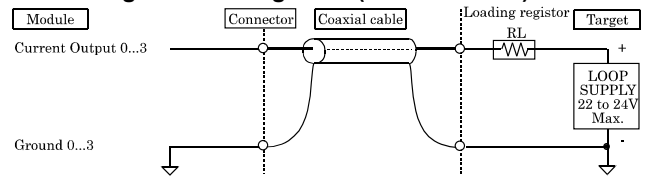
Connecting to a Fixed Load (Coaxial Cable)
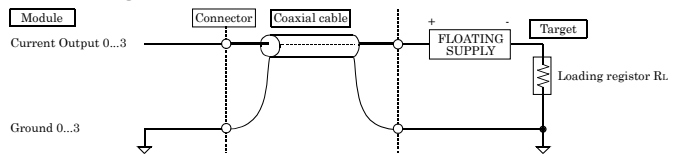
⚠ CAUTION

When the power is turned on or the module is reset, the current output signal will be 10 mA.
If there is a problem with the current value output when the power is turned on, provide the module with an external relay.

To avoid any malfunction, the current output signal should not be connected to the analog ground.

To avoid any malfunction, the current output signal should not be connected to another analog output signal or the output signal of an external device.

To avoid any malfunction, the connector plug should not be attached or detached when the power for the module or the external device is on.

In situations where the connecting cable is subject to the effects of noise, the accurate current output can fail. The connecting cable should be installed away from any source of noise.

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 - 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.