F&eIT Series
Isolated Analog Output Module
DAI12-4(FIT)GY

This product can control external devices by converting digital data that is output from a, F&eIT-series controller module <CPU-CAxx(FIT)GY, CPU-SBxx(FIT)GY etc> into either voltage or current-based analog signals. The insulation 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

The output range is common to different channels, and can be selected from five output ranges: 0 - 10V, 0 - 5V, ±10V, ±5V, and 0 - 20mA.

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

The system incorporates a screwless connector plug that allows you to easily attach and detach wires without using any special tools.

Similar to other F&eIT series products, the system, in the module itself, incorporates a 35mm 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.

Packing List

Module …1
First Step Guide …1
CD-ROM [F&eIT Series Setup Disk] *1…1
Interface connector plugs ...2

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

Specification

Specifications

Item	Specification
Analog output section	
Output format	Bus-isolated voltage/current output
Output range	Voltage:　Bipolar ±10V, ±5V 　　　　　　Unipolar 0 - 10V, 0 - 5V (Output voltage ±5mA) Current: 0 - 20mA
Output impedance	Voltage range: 10Ω (Max.)
Output channel	4 channels
Resolution	12 Bits
Conversion accuracy *1	Voltage range±3LSB, Current range±5LSB
Settling time	Voltage range: 10μsec/ch, Current range: 20μsec/ch
Interrupt	Either IRQ5 or IRQ7 or IRQ9 *2
Internal sampling timer	10μsec - 1,073,741,824μsec *1 *3
Common section	
Internal power consumption	5VDC±5%　400mA(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 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)
Applicable wire	AWG 28 - 20
Applicable plug	FK-MC 0,5/12-ST-2,5 (made by PHOENIX CONTACT Corp.)

*1   When the environment temperature is near 0ºC or 50ºC, the non-linearity error may become larger.
*2   Available only when this product is connected to the CPU-SBxx(FIT)GY.
*3   If connected to a DAI12-4(USB)GY, uses the internal timer in the DAI12-4(USB)GY.
      The setting range is from 1000 to 1,073,741,000 μsec.

Notes!

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.

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
Line-Noise resistance	Line-noise	AC line/2kV, Signal line/1kV (IEC1000-4-4Level 3, EN61000-4-4Level 3)
	Static electricity resistance	Contact discharge/4kV (IEC1000-4-2Level 2, EN61000-4-2Level 2) Atmospheric discharge/8kV (IEC1000-4-2Level 3, EN61000-4-2Level 3)
Vibration resistance	Sweep resistance	10 - 57Hz/semi-amplitude 0.15mm, 57 - 150Hz/2.0G 80minutes each in X, Y, and Z directions (JIS C0040-compliant, IEC68-2-6-compliant)
Impact resistance		15G, half-sine shock for 11ms in X, Y, and Z directions (JIS C004-compliant, IEC68-2-27-compliant)
Standard		FCC Class A, VCCI Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA
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Block Diagram


Physical Dimensions

[mm]
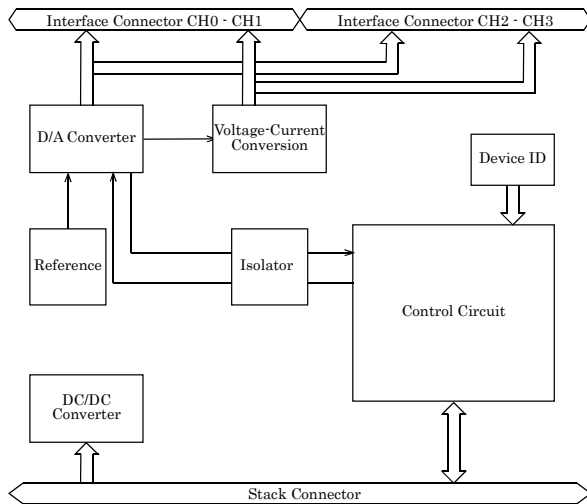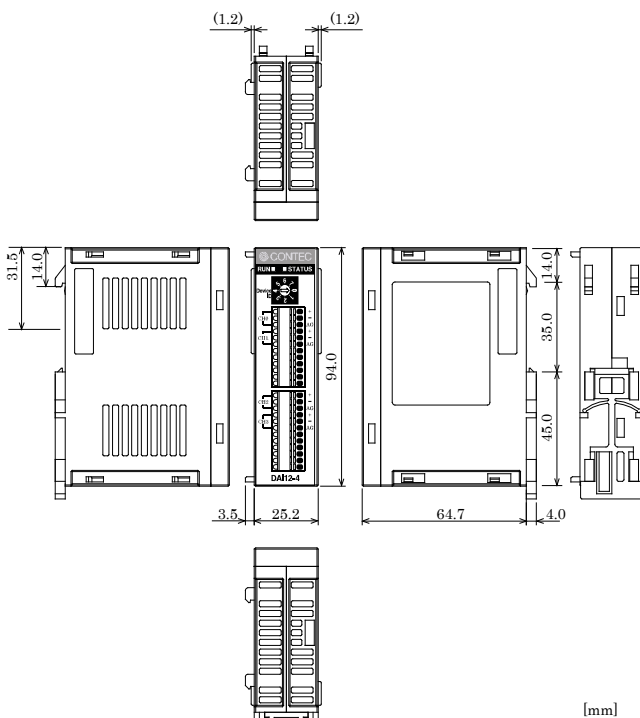
How to Connect an Interface Connector

When connecting the Module to an external device, you can use the supplied connector plug.　When wiring the Module, strip off approximately 7 - 8 mm of the covering for the cable, and insert the bare wire by pressing the orange button on the connector plug.　Releasing the orange button after the wire is inserted to fix the cable. Compatible wires are AWG 28 - 20.
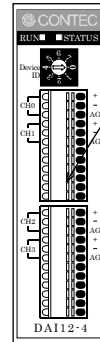
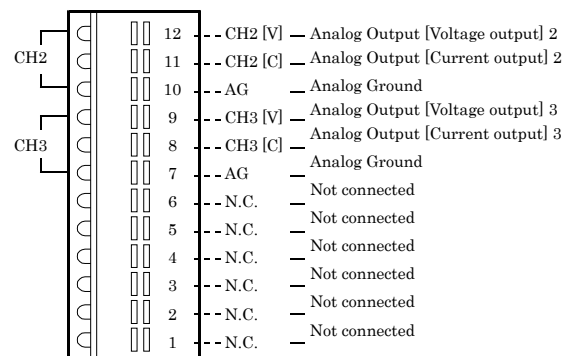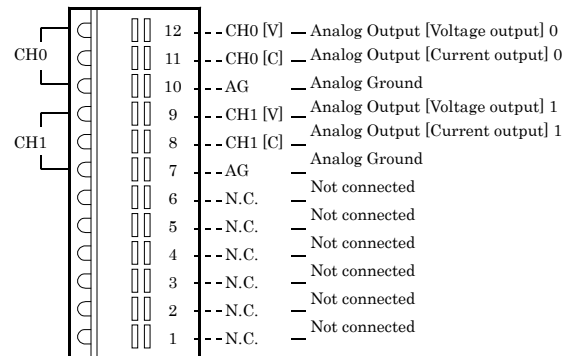Press this section to insert the wire material.

7 - 8mm
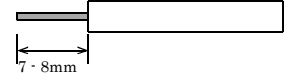
- Connector used:
  2.5mm pitch, 12-pin type, 4.0A nominal current MC0.5/12-G-2.5 connector (made by Phoenix Contact Corp.)
- Applicable plug (bundled):
  Front-operable spring gauge type FK-MC0,5/12-ST-2,5 plug (made by Phoenix Contact Corp.)

  Applicable cable: AWG 28 - 20

Notes!
　Removing the connector plug by grasping the cable can break the wire.

Physical Dimensions

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

Pin		
CH0	12 - CH0 [V]	Analog Output [Voltage output] 0
	11 - CH0 [C]	Analog Output [Current output] 0
	10 - AG	Analog Ground
CH1	9 - CH1 [V]	Analog Output [Voltage output] 1
	8 - CH1 [C]	Analog Output [Current output] 1
	7 - AG	Analog Ground
	6 - N.C.	Not connected
	5 - N.C.	Not connected
	4 - N.C.	Not connected
	3 - N.C.	Not connected
	2 - N.C.	Not connected
	1 - N.C.	Not connected

| Pin		
CH2	12 - CH2 [V]	Analog Output [Voltage output] 2
	11 - CH2 [C]	Analog Output [Current output] 2
	10 - AG	Analog Ground
CH3	9 - CH3 [V]	Analog Output [Voltage output] 3
	8 - CH3 [C]	Analog Output [Current output] 3
	7 - AG	Analog Ground
	6 - N.C.	Not connected
	5 - N.C.	Not connected
	4 - N.C.	Not connected
	3 - N.C.	Not connected
	2 - N.C.	Not connected
	1 - N.C.	Not connected

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.
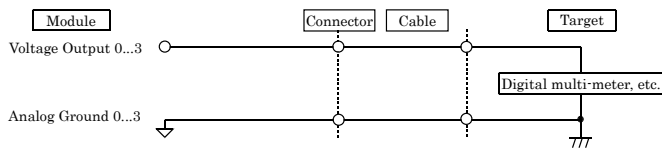
Connecting with a coaxial cable

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.
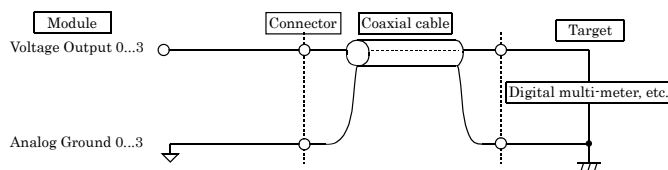
Physical Dimensions

### Example of Connecting a Negative Load Resister

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 (17 - 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 R_L that is connected to the current output of each channel should be less than 500Ω, including the wire resistance.
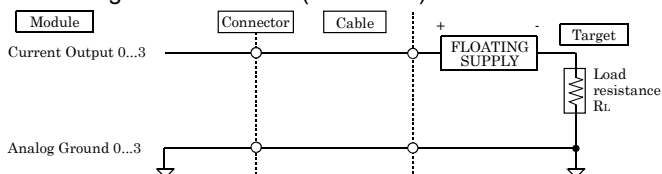
Example of Connecting with a Flat Cable

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

Connecting to a Floating Load (Flat Cable)
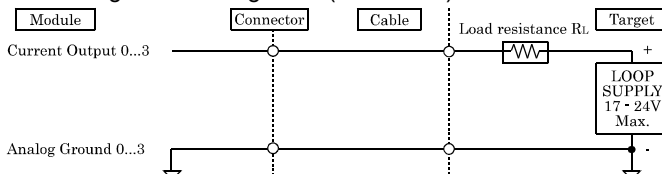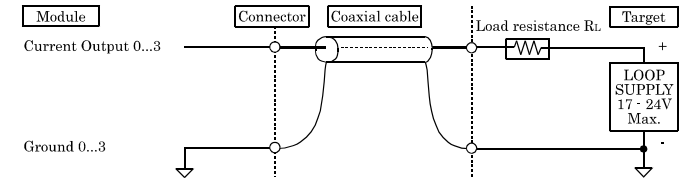

Connecting to a Fixed Load (Flat Cable)

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 R_L 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)
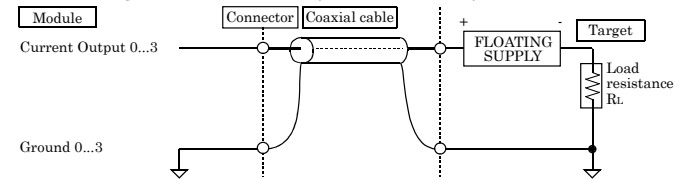
Physical Dimensions

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.
To connect this this product to the DAI12-4(USB)GY, assign a device ID between 1 and 3.
The factory setting for the Device ID is [0].

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.