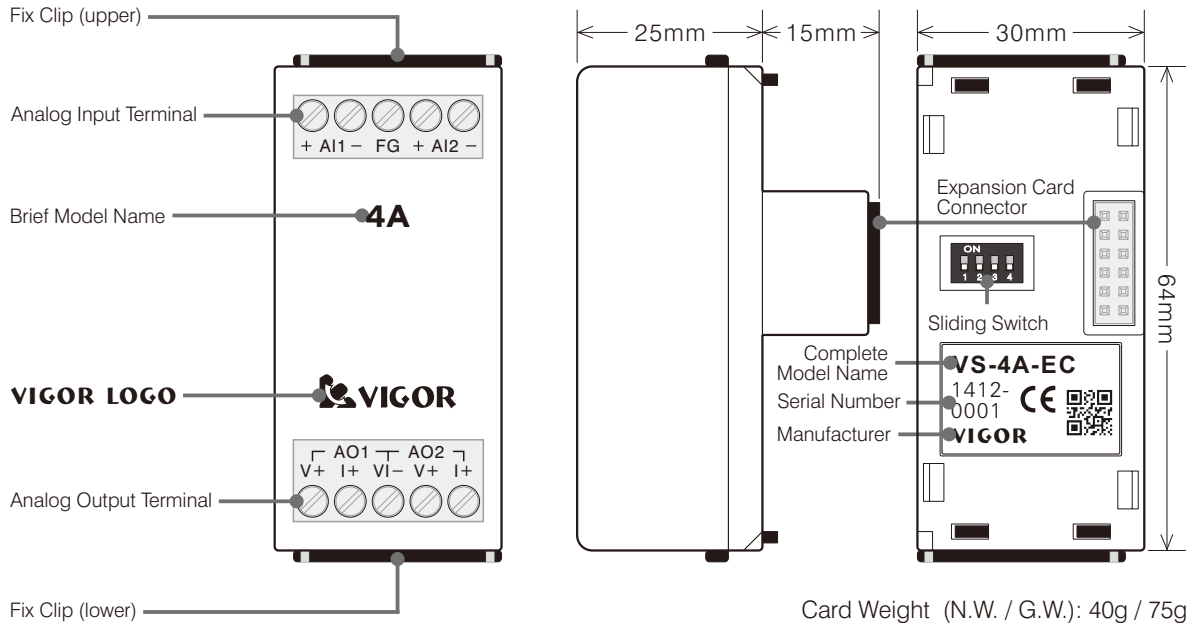


VS-4A-EC Analog Input and Output Expansion Card

The VS-4A-EC Analog Input/Output Expansion Card can receive 2 channels of external voltage or current signal inputs then convert the analog signals to 12-bit digital values. When the END instruction is executed, the VS Main Unit reads out AD conversion data from the VS-4A-EC card and stores the values to respective EC card registers. Thus, it provides the reference data for digital monitoring or control. In addition, this card can generate 2 channels of external voltage or current signal outputs, those are converted from the sources of 12-bit digital set values. When the END instruction is executed, the VS Main Unit sends out source data to the VS-4A-EC card and stores the values to respective EC card registers then its DA circuit converts the data to analog outputs. Thus, it provides two analog signal outputs from digital set values to control the external loads.

The VS-4A-EC Analog Input and Output Expansion Card is non-isolated. Please read following instructions before use.

• Product Exterior



• Product Specification

Basic Specification

Item	Specification
Power Consumption	DC5V 20mA, DC12V 60mA (from PLC Main Unit)

Analog Input Specification

Item	Voltage Input Spec.	Current Input Spec.	
	The voltage or current input switch is located on the card's bottom also the operation mode special register is required to set.		
Analog Input Range	0~10V	4~20mA	0~20mA
Converted Value	0~4000	0~3200	0~4000
Input Resistance	200kΩ	250Ω	250Ω
Resolution	2.5mV	5μA	5μA
Overall Accuracy	± 1% Overall Max.		
Response Time	1.2 ms × (No. of enabled AI CHs) + 15 μs × (No. of enabled AO CHs); the AI values will be renewed at the END		
Isolation Method	No isolation between PLC and inputs; no isolation between input channels		
Max. Input Range	-0.5V ~ +12V	-2mA ~ +30mA	-2mA ~ +30mA
Conversion Curve Diagram			

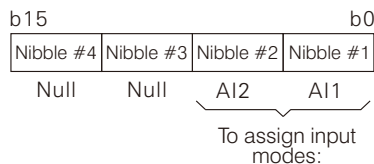
Analog Output Specification

Item	Voltage Output Spec.	Current Output Spec.	
	The voltage or current output is selected by EC card mode register and makes the output through specific terminals		
Analog Output Range	0~10V	4~20mA	0~20mA
Digital Set Range	0~4000	0~3200	0~4000
Load Resistance	500Ω~1MΩ	500Ω(Max.)	500Ω(Max.)
Resolution	2.5mV	5μA	5μA
Overall Accuracy	± 1.5% Overall Max.		
Conversion Speed	1.2 ms×(No. of enabled AI CHs) + 15 μs×(No. of enabled AO CHs); the AI values will be renewed at the END		
Isolation Method	No isolation between PLC and outputs; no isolation between output channels		
Conversion Curve Diagram			

• EC Card Register (Simple Code) related to VS-4A-EC

EC1	EC2	EC3	Component Description
EC1D0	EC2D0	EC3D0	To assign the input modes of AI1~AI2.
EC1D1	EC2D1	EC3D1	Read value of AI1, 0~4000 or 0~3200.
EC1D2	EC2D2	EC3D2	Read value of AI2, 0~4000 or 0~3200.
EC1D10	EC2D10	EC3D10	To assign the output modes of AO1~AO2.
EC1D11	EC2D11	EC3D11	Write value of AO1, 0~4000 or 0~3200.
EC1D12	EC2D12	EC3D12	Write value of AO2, 0~4000 or 0~3200.
EC1D18	EC2D18	EC3D18	Identification code: K103 (If code = K240, means connecting error between Main Unit and card)
EC1D19	EC2D19	EC3D19	The version number of this card. (the content value □□ indicates Ver. □.□)

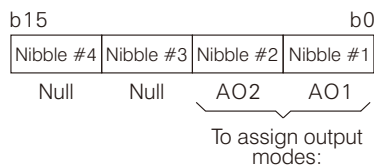
To appoint the modes of analog inputs: (the sliding switch should also consistent with the modes)



- If the nibble = 0, the channel is assigned for (0~10V) voltage input.
- If the nibble = 1, the channel is assigned for (4~20mA) current input.
- If the nibble = 2, the channel is assigned for (0~20mA) current input.
- If the nibble is any number other than 0, 1 or 2, the channel is disabled.

Example: If a VS-4A-EC is installed at the EC1, and its EC1D0 is set to be H10, then
 AI1: voltage input (0~10V) AI2: current input (4~20mA)

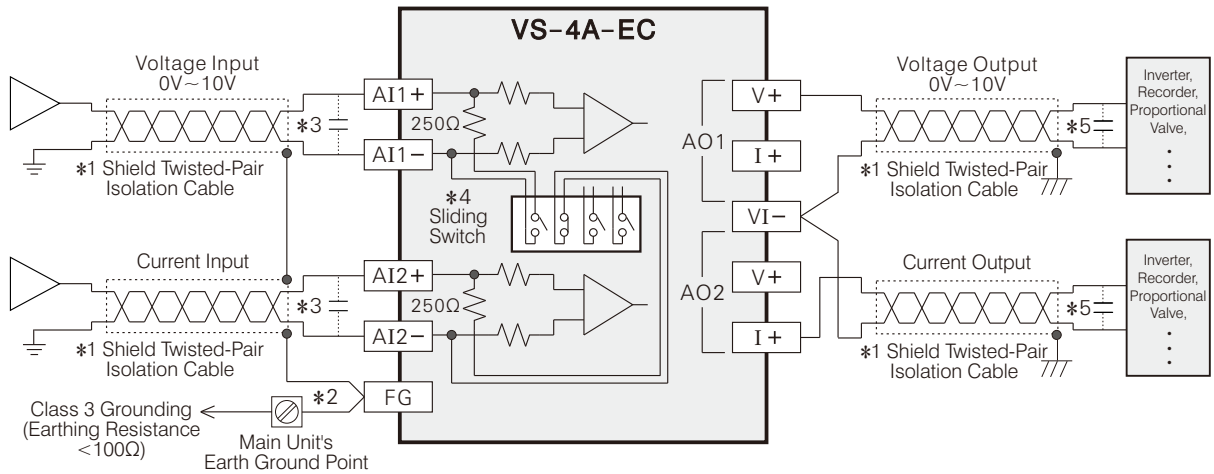
To appoint the modes of analog outputs:



- If the nibble = 0, the channel is assigned for (0~10V) voltage output.
- If the nibble = 1, the channel is assigned for (4~20mA) current output.
- If the nibble = 2, the channel is assigned for (0~20mA) current output.
- If the nibble is any number other than 0, 1 or 2, the channel is disabled.

Example: If VS-4A-EC is installed in EC1, and EC1D10 is set to be H10, then
 AO1: voltage output (0~10V) AO2: current output (4~20mA)

● External Wiring



*1: Please use the Shield Twisted-Pair isolation cable for every analog input or output channel. Must keep the signal cable away from any power line (including the power of motor, valve or contactor) to prevent external interference or card damage.

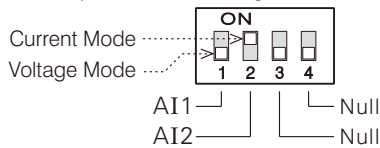
*2: First, please connect the end of the covering layer of shielded cables. Then, connect that end to the earth ground point of Main Unit. After that, make use of class 3 grounding for the point.

*3: If the reading value of voltage/current signal is fluctuating or with electrically induced noise on the external wiring, please parallel connect a smoothing capacitor ($0.1\ \mu\text{F}$ ~ $0.47\ \mu\text{F}$, 25V) between the input terminals.

*4 Please note on setting AI1~AI2 as either voltage or current input:

1. Set EC card register based on the operating modes of AI1~AI2.
2. Based on the operating modes of AI1~AI2 to adjust the sliding switches on the bottom of card.

Upper position (ON) is for current mode.
Lower position is for voltage mode.



*5: If the reading value of voltage/current signal is fluctuating or with electrically induced noise on the external wiring, please parallel connect a smoothing capacitor ($0.1\ \mu\text{F}$ ~ $0.47\ \mu\text{F}$, 25V) between the input terminals.

*6: For every analog output channel, either voltage or current output can be used but not both at the same time.

● Example Program

If the VS-4A-EC is installed at the EC2.

Its AI1 is used for 0~10V input, AI2 is used for 4~20mA input. Input converted values of AI1~AI2 are sequentially stored at D100~D101.

Its AO1 is used for 0~10V output, AO2 is used for 4~20mA output. Output digital set values of AO1~AO2 are sequentially stored at D7000~D7001.

