VS-4AD Analog Input Module

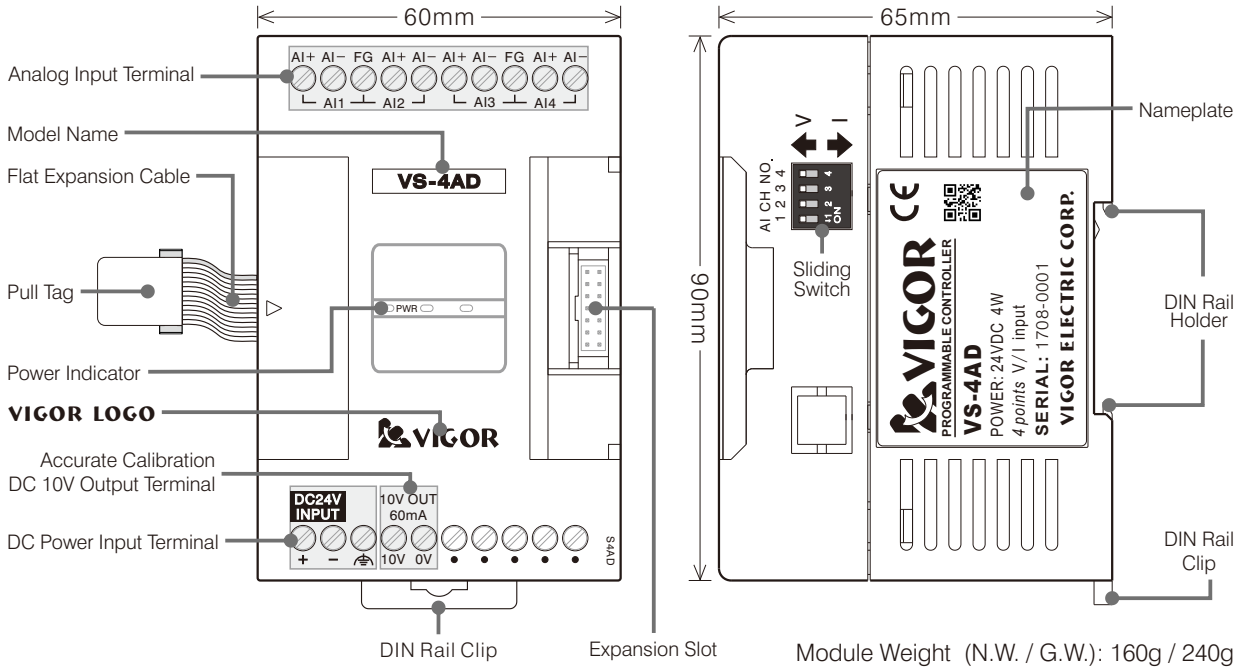
The VS-4AD Analog Input Module has 4 analog input channels and one accurate calibrated DC 10V output.

This module can convert external analog inputs of voltage or current signals to 16-bit digital values. When the FROM instruction is executed, the VS Main Unit reads out AD conversion data from the VS-4AD module and stores that to registers. Thus, it provides the reference data for digital monitoring or controls.

This module provides an accurate calibration DC 10V voltage output to connect with variable resistor or position transducer easily.

The VS-4AD Analog Input Module requires a DC 24V external power input for the isolated DC to DC regulated power to provide its AD converter. Also, between the PLC inner circuit and the analog inputs are isolated by the Magnetic-coupler thus the module can get a stable analog to digital conversion. Please read following instructions before use.

- Product Exterior



Module Weight (N.W. / G.W.): 160g / 240g

- Product Specification

Analog Input Specification

Item	Voltage Input Spec.	Current Input Spec.	
	The voltage or current input switch is located on the module's right side also the operation mode BFM is required to set.		
Analog Input Range	−10V～+10V	4～20mA	−20mA～+20mA
Converted Value	−32000～+32000 / −10000～+10000	0～16000	−16000～+16000 / −20000～+20000
Input Resistance	200kΩ	250Ω	250Ω
Max. Resolution	0.3125mV	1.25μA	1.25μA
Overall Accuracy	• Ambient temp. 25 ±5℃ is ±0.3% full scale (±60mV) • Ambient temp. 0～55℃ is ±0.5% full scale (±100mV)	• Ambient temp. 25 ±5℃ is ±120μA • Ambient temp. 0～55℃ is ±200μA	• Ambient temp. 25 ±5℃ is ±0.3% full scale (±120μA) • Ambient temp. 0～55℃ is ±0.5% full scale (±200μA)
Max. Input Range	−15V～+15V	−32mA～+32mA	−32mA～+32mA
Conversion Curve Diagram	Mode 0 / Mode 1 −10V～+10V voltage input Converted digital value Mode 0: +32000 Mode 1: +10000 Voltage input −10V 0 +10V Mode 0: −32000 Mode 1: −10000	Mode 2 4mA～20mA current input Converted digital value +16000 Current input −12mA 0 4mA +20mA −4000 −16000	Mode 3 / Mode 4 −20mA～+20mA current input Converted digital value Mode 3: +16000 Mode 4: +20000 Current input −20mA 0 +20mA Mode 3: −16000 Mode 4: −20000

Basic Specification

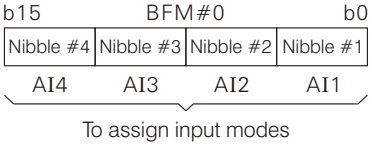
Item	Specification
Response Time	0.8ms
Accurate Calibration Voltage Output	DC 10V ± 0.5%, 60mA (Max.)
Isolation Method	The external DC 24V input through an isolated DC/DC power to provide AD convert circuit; Magnetic-coupler isolation between PLC and analog circuit; no isolation between input channels
Power Consumption	DC 24V ± 20%, 140mA (Max.) from external + DC 5V 15mA from PLC's inner power

- Definition of Buffer Memory BFM in the VS-4AD Module

The VS-4AD module uses the BFM to communicate with the VS Main Unit for the parameter setting and converted value access.

BFM No.	Component Description	
#0	To assign the analog input modes of AI1~AI4. When the power is turned from OFF to ON, the default value is H0000.	
#1	To set the average times of AI1.	When the power is turned from OFF to ON, the default value is 10. The available range is 1~32,767, otherwise it is equivalent to 10.
#2	To set the average times of AI2.	
#3	To set the average times of AI3.	
#4	To set the average times of AI4.	
#5	Converted digital value of AI1 (the average times is designated by BFM #1).	
#6	Converted digital value of AI2 (the average times is designated by BFM #2).	
#7	Converted digital value of AI3 (the average times is designated by BFM #3).	
#8	Converted digital value of AI4 (the average times is designated by BFM #4).	
#30	Identification code: VS-4AD = K201 (can use the FROM instruction to check whether the place is this module or not)	
#31	The version number of this module. (the content value □□ indicates Ver. □.□)	

BFM#0 To appoint the modes of analog inputs: (the sliding switch should also consistent with the modes)



Value of Nibble	Analog Input Mode	
0	–10V~+10V voltage input	Converted digital value: −32000~+32000
1		Converted digital value: −10000~+10000
2	4mA~20mA current input	Converted digital value: 0~+16000
3	–20mA~+20mA current input	Converted digital value: −16000~+16000
4		Converted digital value: −20000~+20000
Other	Disabled	

Example: If the BFM #0 of a VS-4AD is set to be H5420, then

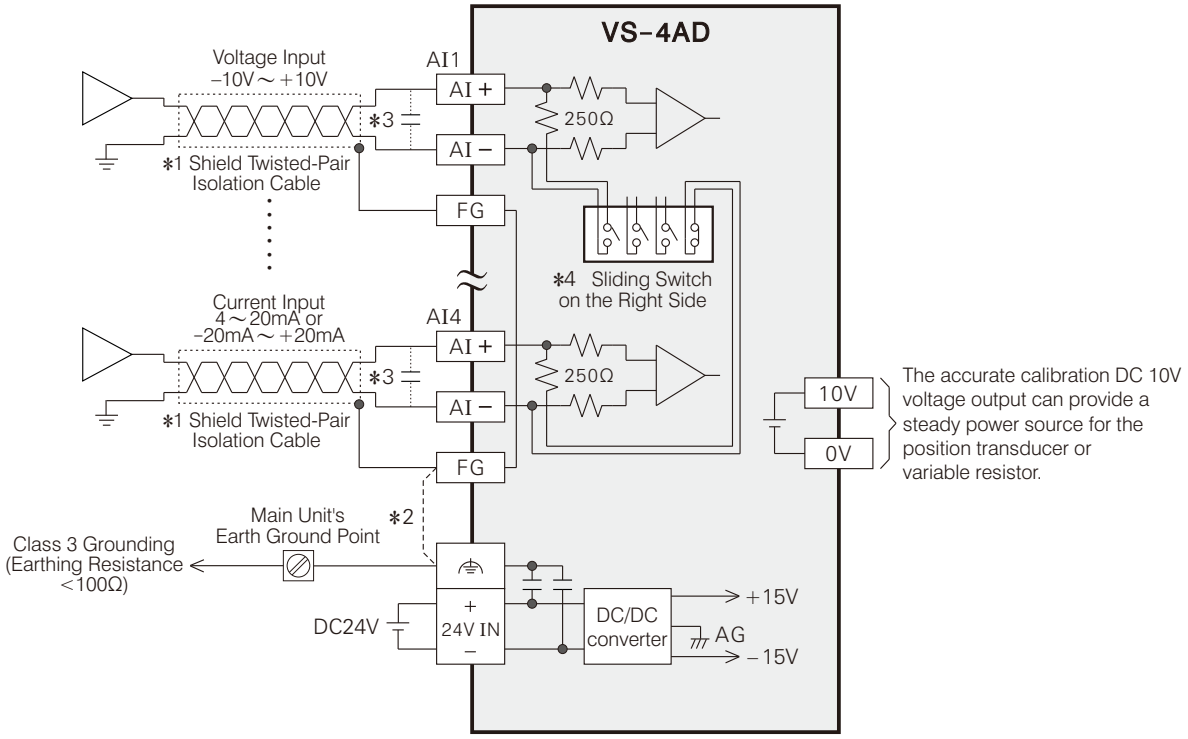
AI1: For –10V~+10V voltage input, that will be converted to the value –32,000~+32,000 at this mode.

AI2: For 4mA~20mA current input, that will be converted to the value 0~+16,000 at this mode.

AI3: For –20mA~+20mA current input, that will be converted to the value –20,000~+20,000 at this mode.

AI4: Disabled

● External Wiring



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

∗2: Please connect the end of cable shield to the FG terminal. If the noise is huge, should connect the FG to the ⏚ terminal at the Main Unit.

∗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 μF～0.47 μF, 25V) between the input terminals.

∗4: To set the operating modes of AI1～AI4, two things MUST be done:
1. Assign the relative nibbles of the BFM #0.
2. Adjust the sliding switches on the right side of the module.

V Upper position is for the voltage mode.

I Lower position (ON) is for the current mode.

● Example Program

The VS-4AD is installed next to the Main Unit and became the 1st. special module.
Its AI1～AI3 are used for -10V～10V inputs, AI4 is used for 4～20mA input. Input converted values of AI1～AI4 are sequentially stored at D100～D103.