VS-3A Analog I/O Module

Forward

The VS-3A Analog I/O Module has 2 analog input and 1 analog output channels, also equips one accurate calibrated DC 10V output.

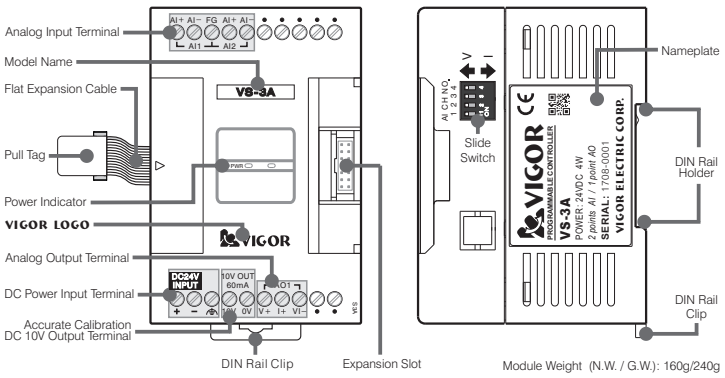
This module can convert external analog inputs of voltage or current signals to 16-bit digital values. When the FROM instruction is executed, the VS Main Unit reads out AD conversion data from the VS-3A module and stores that to registers. Thus, it provides the reference data for digital monitoring or controls.

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

Also, the module can use 16-bit digital set value to generate one channel of external voltage or current signal output.
When the TO instruction is executed, the VS Main Unit copies DA source data to the respective memory at the VS-3A then the module's DA circuit converts the data to analog output for external load.

The VS-3A Analog I/O Module requires a DC 24V external power input for the isolated DC to DC regulated power to provide its AD and DA converters. Also, between the PLC inner circuit and the analog I/O are isolated by the Magnetic-coupler thus the module can get a stable AD / DA conversion. Please read following instructions before use.

Component Designation



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

Analog output Specification

Item	Voltage Output Spec.	Current Output Spec.	
Analog Output Range	−10V～+10V	4～20mA	−20mA～+20mA
Digital Set Range	−32000～+32000 / −10000～+10000	0～32000	−32000～+32000 / −20000～+20000
Load Resistance	500Ω～1MΩ	500Ω	500Ω
Max. Resolution	0.3125mV	0.625μA	0.625μA
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)
Conversion Curve Diagram	Mode 0 / Mode 1 −10V～+10V voltage output Converted voltage output +10V Mode 0:−32000 Mode 1:−10000 Digital set value 0 Mode 0:+32000 Mode 1:+10000 −10V	Mode 2 4mA～20mA current output 20mA Converted current output 4mA 0mA 0 Digital set value 32000	Mode 3 / Mode 4 −20mA～+20mA current output Converted current output +20mA Mode 3:−32000 Mode 4:−20000 Digital set value 0 Mode 3:+32000 Mode 4:+20000 −20mA

Basic Specification

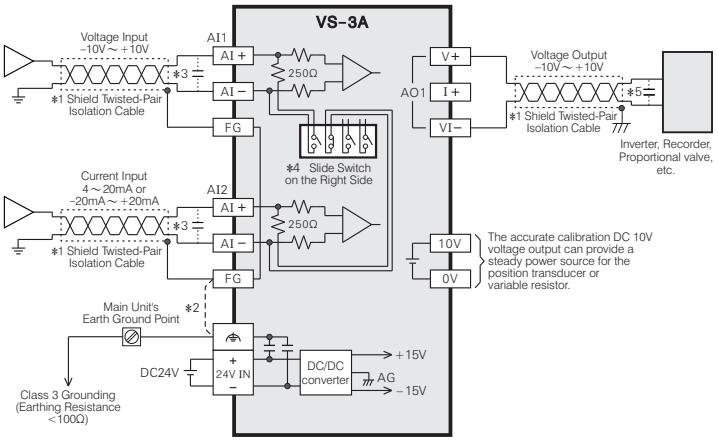
Item	Specification
Response Time	0.8ms
Accurate Calibration Voltage Output	DC 10V ± 0.5%, 60mA (Max.)
Isolation Method	The external DC 24V input through an isolated DC/DC power to provide AD & DA convert circuits; Magnetic-coupler isolation between PLC and analog circuits; no isolation between AI / AO channels
Power Consumption	DC 24V ± 20%, 160mA (Max.) from external + DC 5V 15mA from PLC's inner power

Definition of Buffer Memory BFM in the VS-3A Module

The VS-3A module uses the BFMs to communicate with the VS Main Unit for the parameter setting, converted and set values access.

BFM No.	Component Description	
#0	To assign the analog input modes of AI1～AI2. When the power is turned from OFF to ON, the default value is H00.	
#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.	
#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).	
#20	To assign the analog output mode of AO1. When the power is turned from OFF to ON, the default value is H0.	
#21	The digital set value of AO1.	When the power is turned from OFF to ON, the default value is 0.
#23	To assign the holding mode of AO1. When the power is turned from OFF to ON, the default value is H0.	
#30	Identification code: VS-3A = K203 (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 XX indicates Ver. X.X)	

External Wiring

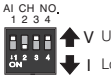


∗1: Please use the Shield Twisted-Pair isolation cable for every analog input/output channel, and keep the signal cable away from power lines to minimize external interference.

∗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 a voltage/current ripple occurs at converted value or there is 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～AI2, 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.



∗5: If a voltage/current ripple occurs at the signal input of the load, please parallel connect a smoothing capacitor (0.1 μF～0.47 μF, 25V) between the input terminals.

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

Example Program

The VS-3A is installed next to the Main Unit and became the 1st. special module.

Its AI1 is used for −10V～+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 −10V～+10V output. The output digital set value of AO1 is stored at D7000.