MicroSmart FC6A PLC
Analog I/O Module Specifications

KEY FEATURES

- 8 modules to choose from
- Up to 16-bit resolution
- Fast sampling rate
- Wide range of signals:
  - 0/4-20mA, 0-10V DC, -10 to 10V DC, Type K, J, R, S, B, E, T, N, C thermocouple and RTD

SPECIFICATIONS

Analog I/O Module Specifications

Part Number	FC6A-J2C1	FC6A-J4A1	FC6A-J8A1	FC6A-L06A1	FC6A-L03CN1	FC6A-J4CN1	FC6A-J8CU1	FC6A-K4A1
Input Points	2	4	8	4	2	4	8	–
Input Signal Type	Voltage (0 to 10V) Voltage (-10 to +10V) Current (0 to 20mA) Current (4 to 20mA)				Voltage (0 to 10V) Voltage (-10 to +10V) Current (0 to 20mA) Current (4 to 20mA) Thermocouple Resistance Thermometer		Thermocouple Thermistor (NTC, PTC)	–
Output Points	–	–	–	2	1	–	–	4
Output Signal Style	–	–	–	Voltage (0 to 10V) Voltage (-10 to +10V) Current (0 to 20mA) Current (4 to 20mA)		–	–	Voltage (0 to 10V) Voltage (–10 to +10V) Current (0 to 20mA) Current (4 to 20mA)
External Power Supply	Rated Power Voltage 24V DC, Allowable Voltage Range 20.4 to 28.8V DC							
External Current Draw (24V DC) [1]	25mA	30mA	40mA	100mA	80mA	40mA	30mA	125mA
Connector Insertion/ Removal Durability	100 times minimum							
Applicable Ferrule	1-wire: AI 0.5-10 (Phoenix Contact), 2-wire: AI-TWIN 2×0.5-10 (Phoenix Contact)							
Internal Power Consumption (5V DC)	40mA max.	45mA max.	40mA max.	55mA max.	55mA max.	50mA max.	45mA max.	50mA max.
Internal Power Consumption (at 24V DC while all I/Os are ON)	0.27W	0.30W	0.27W	0.37W	0.37W	0.34W	0.30W	0.34W
Weight (approx.)	115g	110g	110g	110g	115g	110g	110g	115g

Note 1: The external current draw is the value when all the analog inputs are used and the analog output value is at 100%.

Analog Input Specifications (1)

Part Number		FC6A-J2C1		FC6A-J4A1/FC6A-J8A1/FC6A-L06A1	
Input Signal Type		Voltage Input	Current Input	Voltage Input	Current Input
Input Range		0 to 10V -10 to +10V	0 to 20mA 4 to 20mA	0 to 10V -10 to +10V	0 to 20mA 4 to 20mA
Input Impedance		1MΩ maximum	50Ω maximum	1MΩ maximum	50Ω maximum
Input Detection Current		–	–	–	–
AD Conversion	Sampling Duration Time	1ms		1ms or 10ms (selectable with application software)	
	Sampling Repetition Time	Sampling time × valid input channels			
	Total Input System Transfer Time	Sampling time + sampling interval + 1 scan time			
	Type of Input	Single-ended input			
	Operating Mode	Self-scan			
	Conversion Method	∑ Δ type ADC			
Input Error	Maximum Error at 25°C	±0.1% of full scale		±0.2% of full scale	
	Cold Junction Compensation Error	–	–	–	–
	Temperature Coefficient	±0.006% of full scale/°C		±0.01% of full scale/°C	
Data	Digital Resolution	65,536 increments (16 bits)		4,096 increments (12 bits)	
	Input per Resolution	0 to 10V: 0.15mV -10 to +10V: 0.30mV	0 to 20mA: 0.30µA 4 to 20mA: 0.244µA	0 to 10V: 2.44mV -10 to +10V: 4.88mV	0 to 20mA: 4.88µA 4 to 20mA: 3.91µA
	Data Type in Application Program	Optional: -32,768 to 32,767 (selectable for each channel) [1]			
	Monotonicity	Yes			
	Input Data Out of Range	Detectable [2]			
Noise Resistance	Input Filter	Soft filter (0 to 10 s, selectable in increments of 0.1 s)			
	Recommended Cable for Noise Immunity	Twisted pair shielded cable			
	Crosstalk	1LSB maximum			
Isolation		Between input and power circuit: Transformer-isolated Between input and internal circuit: Photocoupler-isolated			
Effect of Improper Input Connection		No damage			
Maximum Permanent Allowed Overload (No Damage)		13V DC	40mA	13V DC	40mA
Selection of Analog Input Signal Type		Using programming software			
Calibration or Verification to Maintain Rated Accuracy		Not possible			

Note 1: The data processed in the analog I/O module can be linear-converted to a value between -32,768 and 32,767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
Note 2: When an error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

Analog Input Specifications (2)

Part Number		FC6A-L03CN1/FC6A-J4CN1				FC6A-J8CU1		
Input Signal Type		Voltage Input	Current Input	Resistance Thermometer	Thermocouple	Thermocouple	NTC Thermistor	PTC Thermistor
Input Range		0 to 10V DC -10 to +10V	0 to 20mA 4 to 20mA	Pt100, Pt1000 3-wire type (-200 to 850°C) Ni100, Ni1000 3-wire type (-60 to 180°C)	Type K (-200 to +1,300°C) Type J (-200 to +1,000°C) Type R (0 to 1,760°C) Type S (0 to 1,760°C) Type B (0 to 1,820°C) Type E (-200 to +800°C) Type T (-200 to +400°C) Type N (-200 to +1,300°C) Type C (0 to 2,315°C)	Type K (-200 to +1,300°C) Type J (-200 to +1,000°C) Type R (0 to 1,760°C) Type S (0 to 1,760°C) Type B (0 to 1,820°C) Type E (-200 to +800°C) Type T (-200 to +400°C) Type N (-200 to +1,300°C) Type C (0 to 2,315°C)	-90 to +150°C	100 to 10,000Ω
Input Impedance		1 MΩ minimum	50Ω maximum	1 MΩ minimum	1 MΩ minimum	1 MΩ minimum	1 MΩ minimum	
Input Detection Current		—	—	0.1mA maximum	0.1mA maximum	0.1mA maximum	0.1mA maximum	
AD Conversion	Sampling Duration Time	10ms, 100ms or 104ms (selectable using application software)				104ms		
	Sampling Repetition Time	Sampling time × valid input channels						
	Total Input System Transfer Time	Sampling time + sampling interval + 1 scan time						
	Type of Input	Single-ended input						
	Operating Mode	Self-scan						
	Conversion Method	∑ Δ type ADC						
Input Error	Maximum Error at 25°C	±0.2% of full scale		FC6A-L03CN1: ±0.1% of full scale + cold junction compensation error FC6A-J4CN1: ±0.2% of full scale + cold junction compensation error [3]		±0.2% of full scale + cold junction compensation error [3]		
	Cold Junction Compensation Error	—	—	±4°C maximum		±4°C maximum		
	Temperature Coefficient	FC6A-L03CN1: 0.006%/°C of full scale FC6A-J4CN1: 0.01%/°C of full scale				0.01%/°C of full scale		
Data	Digital Resolution	65,536 increments (16 bits)		Pt100: approx. 10,500 increments (14 bits) Pt1,000: approx. 8,000 increments (13 bits) Ni100: approx. 2,400 increments (12 bits) Ni1,000: approx. 2,400 increments (12 bits)	Type K: approx. 15,000 increments (14 bits) Type J: approx. 12,000 increments (14 bits) Type R: approx. 17,600 increments (15 bits) Type S: approx. 17,600 increments (15 bits) Type B: approx. 18,200 increments (15 bits) Type E: approx. 10,000 increments (14 bits) Type T: approx. 6,000 increments (13 bits) Type N: approx. 15,000 increments (14 bits) Type C: approx. 23,150 increments (15 bits)	Type K: approx. 15,000 increments (14 bits) Type J: approx. 12,000 increments (14 bits) Type R: approx. 17,600 increments (15 bits) Type S: approx. 17,600 increments (15 bits) Type B: approx. 18,200 increments (15 bits) Type E: approx. 10,000 increments (14 bits) Type T: approx. 6,000 increments (13 bits) Type N: approx. 15,000 increments (14 bits) Type C: approx. 23,150 increments (15 bits)	NTC: approx. 2,400 increments (12 bits) PTC: approx. 9,900 increments (14 bits)	
	Input Value of LSB	0 to 10V: 0.15mV -10 to +10V: 0.30mV	0 to 20mA: 0.30μA 4 to 20mA: 0.244μA	0.1°C	0.1°C	0.1°C	0.1°C	1Ω
	Data Type in Application Program	Optional: selectable for each channel from -32,768 to 32,767 [1]						
	Monotonicity	Yes						
	Input Data Out of Range	Detectable [2]						
Noise Resistance	Input Filter	Software						
	Recommended Cable for Noise Immunity	Twisted pair shielded cable		Twisted pair cable				
	Crosstalk	1 LSB maximum						
Isolation		Between input and power circuit: Transformer-isolated Between input and internal circuit: Photocoupler-isolated						
Effect of Improper Input Connection		No damage						
Maximum Permanent Allowed Overload (No Damage)		13V DC 40mA						
Selection of Input Signal Type and Input Range		Using programming software						
Calibration or Verification to Maintain Rated Accuracy		Not possible						

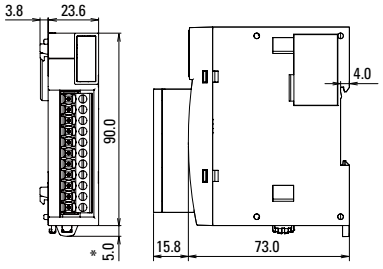
Note 1: The data processed in the analog I/O module can be linear-converted to a value between -32,768 and 32,767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
Note 2: When an error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.
Note 3: R, S: ±6 (0 to 200°C) B: no compensation K, J, E, T, N: ±0.4% of full scale (0°C maximum)

Analog Output Specifications

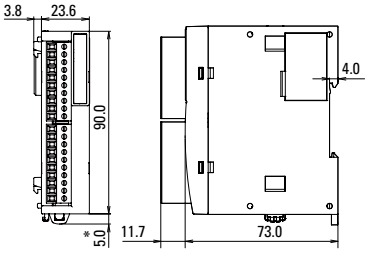
Part Number			FC6A-K4A1	FC6A-L06A1	FC6A-L03CN1
Output Signal Style/Output Range		Voltage	0 to 10V DC -10 to +10V DC		
		Current	0 to 20mA 4 to 20mA		
Load	Impedance		Voltage output: 1 kΩ minimum Current output: 300Ω maximum		
	Load Type		Resistive load		
DA Conversion	DA Conversion Time		1ms		
	Output Update Interval		1ms		
	Total Output System Transfer Time		DA Conversion Time +Output Update Interval + 1 scan time		
Output Error	Maximum Error at 25°C		±0.2% of full scale	±0.1% of full scale	±0.2% of full scale
	Temperature Coefficient		±0.01%/°C of full scale	±0.006%/°C of full scale	±0.01%/°C of full scale
	Repeatability after Stabilization Time		±0.4% of full scale		
	Output Voltage Drop		No damage		
	Non-lineality		±0.2% of full scale	±0.01%/°C of full scale	±0.2% of full scale
	Output Ripple		20mV maximum		
	Overshoot		0%		
	Total Error		±1% of full scale		
Data	Digital Resolution		4,096 increments (12 bits)		
	Output Value of LSB	Voltage	0 to 10V DC: 2.44mV -10 to +10V DC: 4.88mV		
		Current	0 to 20mA: 4.88µA 4 to 20mA: 3.91µA		
	Data Type in Application Program		Optional: -32,768 to 32,767 (selected for each channel)		
	Monotonicity		Yes		
	Current Loop Open		Undetectable		
Noise Resistance	Recommended Cable for Noise Immunity		Twisted pair shielded cable		
	Crosstalk		1LSB		
Isolation	Between output and power circuit		Transformer-isolated		
	Between output and internal circuit		Photocoupler-isolated		
Effect of Improper Output Connection			No damage		
Selection of Analog Output Signal Type			Using software programming		
Calibration or Verification to Maintain Rated Accuracy			Impossible		

DIMENSIONS (all dimensions are in mm)

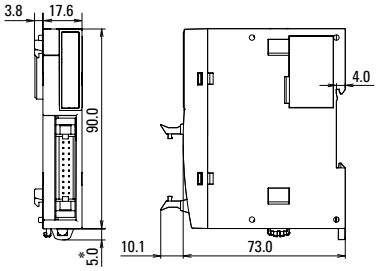
FC6A-N08B1/FC6A-N08A11/FC6A-R081
FC6A-T08K1/FC6A-T08P1/FC6A-M08BR1
FC6A-J2C1/FC6A-K4A1/FC6A-L03CN1



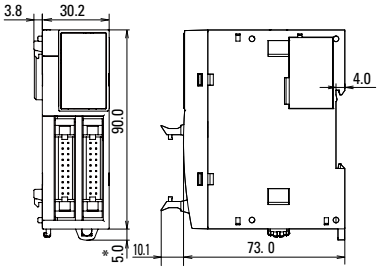
FC6A-N16B1/FC6A-R161
FC6A-T16K1/FC6A-T16P1
FC6A-J4A1/FC6A-J8A1
FC6A-J4CN1/FC6A-J8CU1
FC6A-L06A1



FC6A-N16B3/FC6A-T16K3
FC6A-T16P3



FC6A-N32B3/FC6A-T32K3
FC6A-T32P3



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