

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 2x0.5-10 (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 | Σ 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 | Σ 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 | | | | | | |
| | Input Filter | Software | | | | | | |
| Noise Resistance | 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 k Ω minimum Current output: 300 Ω 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 | $\pm 0.2\%$ of full scale | $\pm 0.1\%$ of full scale | $\pm 0.2\%$ of full scale |
| | Temperature Coefficient | $\pm 0.01\%/^{\circ}\text{C}$ of full scale | $\pm 0.006\%/^{\circ}\text{C}$ of full scale | $\pm 0.01\%/^{\circ}\text{C}$ of full scale |
| | Repeatability after Stabilization Time | | $\pm 0.4\%$ of full scale | |
| | Output Voltage Drop | | No damage | |
| | Non-linearity | $\pm 0.2\%$ of full scale | $\pm 0.01\%$ of full scale | $\pm 0.2\%$ of full scale |
| | Output Ripple | | 20mV maximum | |
| | Overshoot | | 0% | |
| | Total Error | | $\pm 1\%$ 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: 4.88 μA 4 to 20mA: 3.91 μA | |
| | 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)

