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Find the *National Instruments cFP-AI-118* at our website: ***Click HERE***

Analog Input Module for Compact FieldPoint

NI cFP-AI-118

- 8 analog voltage differential input channels
- 8 voltage input ranges – ±1, ±5, ±10, ±15, 0 to 1, 0 to 5, 0 to 10, and 0 to 15 V
- 16-bit resolution
- Simultaneous sampling on all channels
- 10 Hz digital sync filter configurable per channel
- 100 V_{rms} Category I continuous channel-to-channel isolation, verified by 750 V_{rms}, 5 s dielectric withstand test
- 250 V_{rms} Category II continuous channel-to-ground isolation, verified by a 2,300 V_{rms}, 5 s dielectric withstand test
- Hot-swappable
- -40 to 70 °C operation



Overview

The National Instruments cFP-AI-118 Compact FieldPoint module can measure eight analog inputs at 16-bit resolution at a 10 kS/s per-channel sampling rate with multiple voltage ranges. In addition to high resolution and simultaneous sampling, the NI cFP-AI-118 features 750 V_{rms} channel-to-channel isolation and 2,300 V_{rms} channel-to-backplane isolation, verified by a 5 s dielectric withstand test. This module also was designed using a new architecture in which the controller obtains access to the module memory immediately, significantly reducing jitter. This feature makes this module ideal for industrial environments where sensors and actuators work at different voltage levels, and ground loops are common.

Ordering Information

NI cFP-AI-118 777318-118

Recommended Compact FieldPoint System Products

NI cFP-2120 777317-2120
NI cFP-BP-4.....778617-04
NI cFP-CB-1.....778618-01
NI PS-5 power supply.....778805-90
NI Developer Suite Professional Control Edition.....777906-03

BUY NOW!

For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to **ni.com/compactfieldpoint**.

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Specifications

Typical for -40 to 70 °C temperature range and for operation with the 10 Hz filter enabled unless otherwise noted.

Input Characteristics

Number of channels ..... 8 differential
Maximum signal input range ..... ±15 V (±15.75 V with overranging)
Maximum voltage
(V+ or V- to earth) ..... 250 V_{rms}, Measurement Category II
ADC resolution ..... 16 bits (refer to table)
Type of ADC ..... Delta-sigma

Effective Resolution by Input Range and Filter Setting

Nominal Input Range (V)	With Overranging (V)	Effective Resolution[1] (No Filtering) (µV)	Effective Resolution[1] with 10 Hz Filter (µV)
±1	±1.05	100	32
±5	±5.25	160	160
±10	±10.5	320	320
±15	±15.75	480	480
0 to 1	0 to 1.05	100	16
0 to 5	0 to 5.25	100	80
0 to 10	0 to 10.5	160	160
0 to 15	0 to 15.75	240	240

[1]Includes quantization errors and typical RMS noise.

All-channel sample rate
With 10 Hz filter ..... 3.45 kHz[1]
Without filtering ..... 10.42 kHz[1]
Input bandwidth (-3 dB) ..... 3 kHz minimum

Common-mode rejection at 60 Hz, with 50 Ω source impedance and no filtering
Channel to channel ..... 110 db
Channel to ground ..... 110 db
Crosstalk attenuation ..... >100 dB
RMS noise ..... 100 µV
Peak-to-peak noise ..... 700 µV
Settling time to 1 LSB
Full-scale step (-15 to 15 V) ..... 2.1 ms
1% step ..... 1.6 ms
Semaphore acquisition jitter ..... None
Monotonicity ..... Warranted over the operating temperature range
Input resistance ..... 1 MΩ
Input capacitance ..... <50 pF
Overvoltage protection ..... ±250 V

[1]The all-channel update rate refers to the time the module takes to sample all channels. The overall system update rate is affected by other factors, such as the aggregate module update rate and software loop rate. To calculate the system update rate, visit **ni.com/info** and enter "systemrate."

Accuracy by Input Range and Temperature Range

Nominal Input Range (V)	Typical Accuracy at 15 to 35 °C (% of Reading; % of Full Scale)	Warranted Accuracy at 15 to 35 °C (% of Reading; % of Full Scale)
±1	±0.037; ±0.006	±0.086; ±0.036
±5	±0.037; ±0.003	±0.066; ±0.009
±10	±0.037; ±0.003	±0.064; ±0.005
±15	±0.037; ±0.003	±0.063; ±0.004
0 to 1	±0.037; ±0.006	±0.111; ±0.036
0 to 5	±0.037; ±0.003	±0.071; ±0.009
0 to 10	±0.037; ±0.003	±0.066; ±0.005
0 to 15	±0.037; ±0.003	±0.065; ±0.004

Gain error drift ..... 7.4 ppm/°C
Offset error drift ..... 3 µV/°C

Isolation Voltage

Isolation voltage is verified by a dielectric withstand test.
Channel-to-channel isolation
Continuous ..... 100 V_{rms}
Withstand ..... 750 V_{rms}, 5 s max
Channel-to-backplane isolation
Continuous ..... 250 V_{rms}
Withstand ..... 2,300 V_{rms}, 5 s max
Channel-to-ground isolation
Continuous ..... 250 V_{rms}
Withstand ..... 2,300 V_{rms}, 5 s max

Physical Characteristics

LED indicators
Power (green)
Ready (green)
Dimensions ..... 127.1 by 73.3 by 23.9 mm (5.00 by 2.89 by 0.94 in.)
Weight ..... 117 g (4.1 oz)
Warm-up time ..... 30 minutes

Power Requirements

Power from network module ..... 1.125 W

Environment

Operating temperature ..... -40 to 70 °C
Storage temperature ..... -40 to 85 °C
Relative humidity ..... 10 to 90%, noncondensing
Maximum altitude ..... 2,000 m; at higher altitudes the isolation voltage ratings must be lowered
Pollution degree 2

Shock and Vibration

Operating vibration, random
(IEC 60068-2-64) ..... 10 to 500 Hz, 5 g_{rms}
Operating vibration, sinusoidal
(IEC 60068-2-6) ..... 10 to 500 Hz, 5 g
Operating shock
(IEC 60068-2-27) ..... 50 g, 3 ms half sine, 18 shocks at 6 orientations; 30 g, 11 ms half sine, 18 shocks at 6 orientations

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Safety and Compliance

Safety

This product is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note: For UL and other safety certifications, refer to the product label or visit **ni.com/certification**, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A

Note: For EMC compliance, operate this device according to product documentation.

CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Note: Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit **ni.com/certification**, search by model number or product line, and click the appropriate link in the Certification column.

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