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Find the *National Instruments FP-SG-140* at our website: ***Click HERE***

Strain Gauge Modules for Compact FieldPoint And FieldPoint

NI [c]FP-SG-140

NEW

- Accept full and half-bridge strain gauge inputs directly
- Quarter-bridge gauges require external bridge-completion resistor
- Compatible with load cells, force sensors, and torque sensors
- Built-in signal conditioning
  - 15, 60, and 240 Hz noise rejection
  - Pulsed excitation to prevent self-heating
- 16-bit resolution
- Input ranges software configurable per channel
- 2,300 V_{rms} bank isolation for transient overvoltage protection
- Hot-swappable with auto configuration
- -40 to 70 °C operating range



Module	Input Channels	Resolution	Input Ranges (Software Configurable per Channel)	15/60/240 Hz Noise Filter	All Channel Update Rate
[c}FP-SG-140	8	16 bits	±3.5 mV/V, ±7.5 mV/V, ±30 mV/V, ±60 mV/V	Software selectable	1.11 to 0.87 Hz (rate varies with filter settings)

Overview

The National Instruments [c]FP-SG-140 is a versatile resistance bridge input module for Compact FieldPoint and FieldPoint that can be used to measure values from resistor bridges including full and half-bridge strain gauges, quarter-bridge strain gauges (using an external completion register), and load and torque sensors. The [c]FP-SG-140 includes built-in excitation, overranging, and onboard diagnostics to ensure trouble-free installation and maintenance. The module measures and linearizes signals onboard to return scaled values to your control or monitoring software. The [c]FP-SG-140 comes with a NIST-traceable calibration certificate, ensuring accurate and reliable analog measurements.

Smart I/O Modules

With the SG-140, you can connect directly to industrial sensors or units under test and get high-accuracy measurements. The module filters, calibrates, and scales raw sensor signals to engineering units, as well as performing self-diagnostics to look for problems with the module or with the wiring. With the SG-140 module, your software application reads a linearized, calibrated, and scaled value from the I/O module, eliminating the error-prone step of converting binary values.

Because the [c]FP-SG-140 measures in units of millivolts per volt, it can interface with a wide variety of transducers, such as load cells and pressure sensors. The module uses a pulsed excitation of up to 21 mA per channel that turns on and off the excitation to each channel. This reduces self-heating effects and provides more accurate and repeatable strain measurements. The [c]FP-SG-140 also provides true ratiometric readings to eliminate errors caused by variations in excitation voltage. Each channel on the module can be configured for a different excitation level of 2.5, 5, or 10 V. For increased accuracy and noise rejection, the [c]FP-SG-140 uses a 16-bit delta-sigma ADC with an integrated lowpass filter on each channel, which you can configure for 15, 60, or 240 Hz. With a high-accuracy 16-bit delta-sigma ADC, you also get instrument-quality measurements on an industrially rugged, distributed, embedded system.

The [c]FP-SG-140 has three update rates to fit your application, ranging from 0.87 to 1.11 Hz. These rates vary based on the noise filter setting selected on the module. Overall data throughput depends on software loop speeds and network speeds. With overranging and underranging, the modules can zero out unstrained readings in software to compensate for field devices with span errors of up to 12 percent.

Isolation

The [c]FP-SG-140 features optical bank isolation with 2,300 V_{rms} of breakdown isolation. These Compact FieldPoint and FieldPoint modules do not have channel-to-channel isolation.

Field I/O Connections

Compact FieldPoint and FieldPoint modules include a built-in power distribution bus that provides multiple power connections on the module. A field-wired power supply connected to the voltage (V) and common (C) terminals is internally connected to a power distribution bus that provides additional breakout terminals for voltage supply (V_{SUP}) and common (COM). These terminals provide a convenient way to distribute power to field devices that require external power.

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Strain Gauge Modules for Compact FieldPoint And FieldPoint

Each input channel on the [c]FP-SG-140 has four terminals:

1. Excitation voltage output (V_{exc})
2. Positive signal input ($_{VIN}$+)
3. Negative signal input ($_{VIN}$-)
4. Common input (COM)

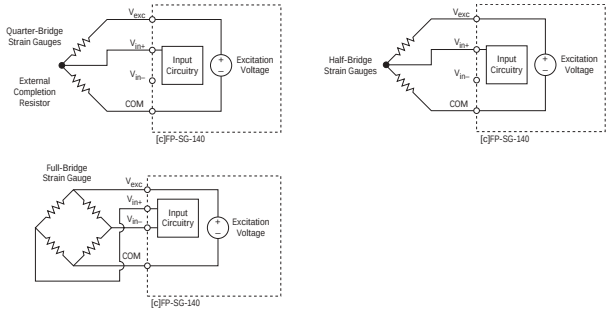


Figure 1. Wiring Schematic for the [c]FP-SG-140 Module

Ordering Information

Compact FieldPoint

NI cFP-SG-140 777318-140

Recommended Compact FieldPoint System Products

NI cFP-2020 777317-2020
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

FieldPoint

NI FP-SG-140 777518-140

Recommended FieldPoint System Products

NI FP-1601 777792-01
NI FP-TB-1 777519-01
PS-4 Power Supply 778586-90
NI Developer Suite Standard Control Edition 777905-03

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Specifications

Typical for -40 to 70 °C unless otherwise noted.

Input Characteristics

Number of inputs ..... 8 differential
Resolution..... 16 bits, 1 in 65,536
Type of ADC..... Delta-sigma
Filters ..... 15, 60, 240 Hz, user-selectable
Excitation voltage..... 2.5, 5, 10 V, user-selectable, current-limited to 21 mA per channel
Bridge configurations..... Half and full-bridge circuits, quarter-bridge with external completion resistor
Gauge factor..... Any (software value)
Input impedance..... 20 MΩ
Offset error
  15 to 35 °C..... 7.6 µV typ, 28 µV max
  –40 to 70 °C..... 50 µV typ, 140 µV max
Gain error
  15 to 35 °C..... 0.06%
  –40 to 70 °C..... 0.4%
Input noise (60 Hz filter)
  ± 3.5 mV/V..... ±3 LSB_{pp}
  ± 7.5 mV/V..... ±2 LSB_{pp}
Other ranges..... ±1 LSB_{pp}
All-channel update periods
  15 Hz..... 1.15 s
  60 Hz..... 0.95 s
  240 Hz..... 0.90 s

Isolation Voltage

Maximum isolation voltage ..... 250 V_{rms}, Installation Category II
Channel-to-channel isolation..... No isolation between channels
Transient overvoltage..... 2,300 V_{rms}

Physical Characteristics

LED indicators
  POWER (green) ..... Power on and self-test passed
  READY (green) ..... Module configured and ready
  OVERCURRENT (red)..... Overcurrent condition on channel
Dimensions (including terminal base)..... 10.9 by 10.7 by 9.1 cm (4.3 by 4.2 by 3.6 in.)
Weight
  FP-SG-140 ..... 140 g (4.8 oz)
  cFP-SG-140 ..... 110 g (3.7 oz)

Power Requirement

Power from network module..... 1,000 mW

Environmental

FieldPoint modules are intended for indoor use only. For outdoor use, they must be mounted inside a sealed enclosure.

Operating temperature..... -40 to 60 °C
Storage temperature..... -55 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

These specifications apply only to Compact FieldPoint. NI recommends Compact FieldPoint if your application is subject to shock and vibration.

Operating vibration, random
  (IEC 60068-2-64) ..... 10–500 Hz, 5 g_{rms}
Operating vibration, sinusoidal
  (IEC 60068-2-6) ..... 10–500 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

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 3121-1, UL 61010C-1
- CAN/CSA C22.2 No. 1010.1

For UL, hazardous location, and other safety certifications, refer to the product label or to ***ni.com***

Electromagnetic Compatibility

CE, C-Tick, and FCC Part 15 (Class A) Compliant
Emissions..... EN 55011 Class A at 10 m
FCC Part 15A above 1 GHz
Immunity..... EN 61326:1997 +A2:2001, Table 1

For EMC compliance, you must operate this device with shielded cabling.

CE Compliance

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

Low-Voltage Directive (safety)..... 73/23/EEC
Electromagnetic Compatibility Directive (EMC) 89/336/EEC

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/hardref.nsf/*** and search by model number or product line.

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