

Quadrature Encoder Input Modules for Compact FieldPoint and FieldPoint

NEW

NI [c]FP-QUAD-510

- 4-axis quadrature encoder inputs
 - Differential or single-ended inputs
 - 5 to 30 VDC
- 32-bit position registers
- 16-bit velocity registers
- Onboard 5 V regulated power supply
- 2,300 V_{rms} bank isolation for transient overvoltage protection
- Hot swappable with auto-configuration
- -40 to 70 °C operating range



Module	Number of Quadrature Encoder Inputs	Position Resolution	Velocity Resolution	Lowpass Filter Cutoff	Voltage Inputs	Regulated Power Output
[c]FP-QUAD-510	4	32 bit	16 bit	250 kHz	5 to 30 VDC	5 V at 600 mA

Overview

The National Instruments [c]FP-QUAD-510 devices are versatile quadrature encoder input modules for Compact FieldPoint and FieldPoint that can be used to directly measure position and velocity in a motion control application. These modules can connect to differential and single-ended quadrature encoders with inputs between 5 and 30 VDC. These modules are commonly used in motion control applications in conjunction with PWM-520 modules, RLY modules, PG-522 modules, or with an external serial motor controller. All the modules include onboard diagnostics to ensure trouble-free installation and maintenance.

Quadrature Encoder Input Modules

NI [c]FP-QUAD-510 modules accept up to four channels of single-ended or differential quadrature encoder inputs and can measure position and velocity in both forward and reverse directions. The module also provides a regulated power supply to power 5 V encoders.

Position Operation

The modules have four independent 32-bit position counters. You can easily accommodate encoders with various phase relationships by swapping the phase A and phase B signals. Each position counter has an index input. The counter can be programmed to reset when the index is turned on. The encoder can record frequencies as high as 1 MHz.

Velocity Operation

[c]FP-QUAD-510 modules have four independent 16-bit velocity counters. The module returns the velocity as the number of counts

per microsecond. A positive number indicates motion in the forward direction, and a negative number indicates motion in the reverse direction. There are eight selectable resolution ranges so you can read the velocity average over a long period of time or read an instantaneous velocity reading.

Isolation

The [c]FP-QUAD-510 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.

Power Requirements

Because the [c]FP-QUAD-510 requires up to 1.2 W of power, it can limit the number of I/O modules that you can connect to a single network interface module. Controllers and network interface modules supply up to 9 W to power I/O modules.

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 regulated to 5 VDC and is connected to a power distribution bus that provides additional breakout terminals for voltage supply (+5 V) and common (COM). These terminals provide a convenient way to distribute power to field devices that require external power.

Quadrature Encoder Input Modules for Compact FieldPoint and FieldPoint

Each input channel on the QUAD-510 has eight terminals:

1. Encoder A+ input (A+)
2. Encoder A- input (A-)
3. Encoder B+ input (B+)
4. Encoder B- input (B-)
5. Encoder I+ input (I+)
6. Encoder I- input (I-)
7. Common (COM)
8. 5 VDC regulated power connection to power field devices (V_{SUP})

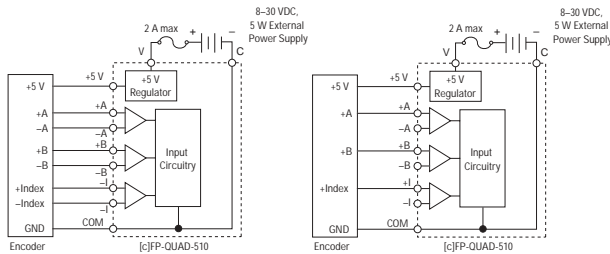


Figure 1. Wiring Schematics for QUAD Modules

Ordering Information

Compact FieldPoint
 NI cFP-QUAD-510.....777318-510

Recommended Compact FieldPoint System Products

NI cFP-2020777317-2020
 NI cFP-BP-4778617-04
 NI cFP-CB-1778618-01
 NI PS-5 Power Supply778805-90
 NI Developer Suite Professional Control Edition.....777906-03

FieldPoint

NI FP-QUAD-510777518-510

Recommended FieldPoint System Products

NI FP-1601777792-01
 NI FP-TB-1777519-01
 NI PS-4 Power Supply778586-90
 NI Developer Suite Standard Control Edition777905-03

BUY ONLINE!

Visit ni.com/info and enter *cfpquad510*, and/or *fpquad510*.

Specifications

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

Encoder Input

Number of channels	4
Input type	
Single-ended.....	$V_{IL} = 0$ to 0.8 V $V_{IH} = 2.0$ to 30.0 V (external pull up required)
Differential	
High.....	$(V_{IN+} + 0.3 \text{ V}) \leq V_{IN+} \leq 30 \text{ V}$ $0 \text{ V} \leq V_{IN-} \leq 3.0 \text{ V}$
Low	$(V_{IN+} + 0.3 \text{ V}) \leq V_{IN-} \leq 30.0 \text{ V}$ $0 \text{ V} \leq V_{IN+} \leq 3.0 \text{ V}$
Maximum protected input voltage.....	±250 VDC on each input
Input bandwidth	250 kHz for each input
Encoder frequency.....	1 million counts
Minimum input pulse width.....	2 µs
Counter widths.....	32 bits, 4 billion counts
External supply voltage (V).....	8-30 VDC at 5 W, user-provided
I/O supply voltage (V_{SUP}).....	5 VDC at 600 mA maximum
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	Green POWER and READY indicators
Dimensions (including terminal base).....	10.7 by 10.9 by 9.1 cm (4.2 by 4.3 by 3.6 in.)
Weight	143 g (5.1 oz)

Power Requirement

Power from network module).....	1.2 W maximum
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Environment

Operating temperature.....	-40 to 70 °C
Storage temperature.....	-55 to 85 °C
Relative humidity	10 to 90%, noncondensing

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 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

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, 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.