Digital Input Modules for Compact FieldPoint

NI cFP-DI-300, NI cFP-DI-301, NI cFP-DI-304, NI cFP-DI-330

- 8-,16-, or 32-channel inputs
  - 24 VDC inputs
  - 4 to 250 VDC inputs
  - 15 to 250 VAC inputs (50/60 Hz AC)
  - 3 to 250 VAC inputs (1 kHz AC)
- 2,300 V_{rms} bank isolation for transient overvoltage protection
- Hot-swappable with autoconfiguration
- -40 to 70 °C operating range

Module	Input Channels	Input Ranges	Input Type	Compatibility Examples	Separate Ground Plane per Channel	All Channel Update Rate[1]	Additional Features
cFP-DI-300	8	18 to 30 VDC	Sinking	24 VDC sourcing devices	–	1 kHz	–
cFP-DI-301	16	18 to 30 VDC	Sinking	24 VDC sourcing devices	–	1 kHz	–
cFP-DI-304	32	10 to 30 VDC	Sinking	24 VDC sourcing devices	–	1 kHz	Hysteresis
cFP-DI-330	8	5 to 48 VDC 5 to 250 VAC	Sinking or sourcing	TTL, CMOS, 12 VDC, 24 VDC, 48 VDC, 120/240 VAC/VDC	✓	1 kHz	Input current limiting (1.5 mA)

[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."

Overview

National Instruments cFP-DI-3xx devices are versatile digital input modules available for Compact FieldPoint systems. You can use these modules to monitor digital signals ranging from low-voltage levels up to 250 V. They are commonly used to monitor proximity and limit switches, pushbutton switches, thermostat outputs, relay closures, power circuits, and TTL devices. All the modules include onboard diagnostics to ensure trouble-free installation and maintenance.

Digital Input Modules

The cFP-DI-3xx modules provide built-in module-to-module isolation to protect your Compact FieldPoint system and controller or communication interface from high voltage levels. The cFP-DI-300, cFP-DI-301, and cFP-DI-304 modules use a common ground plane for all the input channels. Each channel on the cFP-DI-300, cFP-DI-301, and cFP-DI-304 modules includes current-limiting circuitry to prevent module damage when connected directly to a 24 VDC source. The cFP-DI-330 uses eight optically isolated input channels so that each digital input has a separate ground plane, and you can use each channel with a different voltage potential. Thus, you can connect one channel to a 5 VDC TTL signal and another signal on the same cFP-DI-330 module to a 250 VAC line voltage.

Each channel on the cFP-DI-330 includes circuitry that limits the total current to 1.5 mA to prevent damaging the module. All channels on the cFP-DI-3xx modules feature LEDs that indicate the input state of each channel. The modules include an all-channel update rate of 1 kHz. Overall data throughput depends on software loop speeds and network speeds.
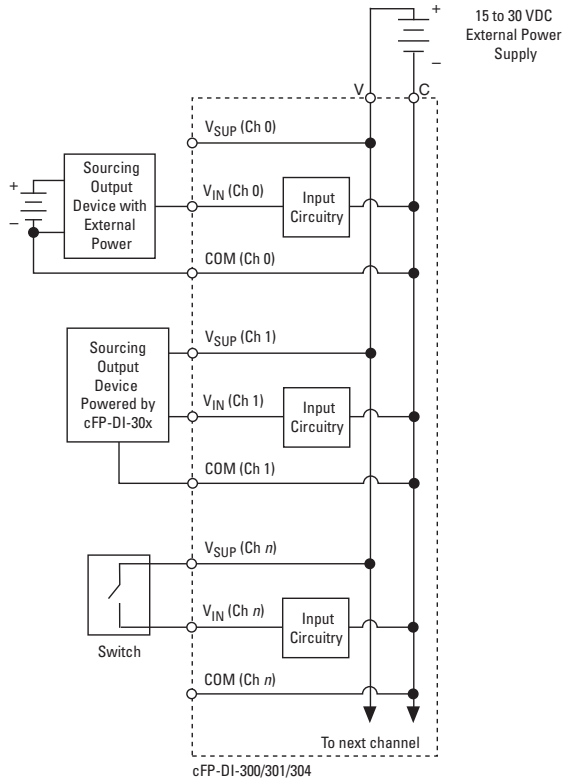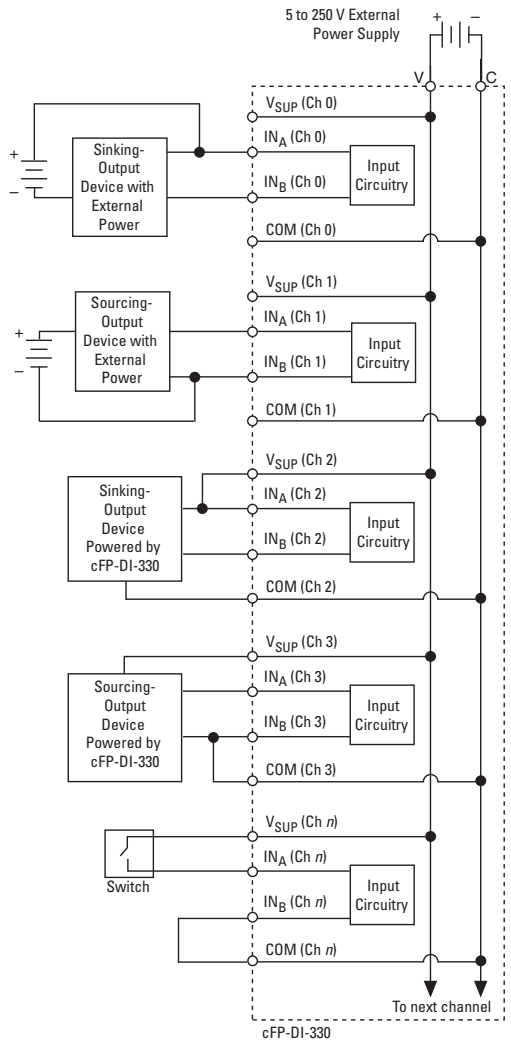
Isolation

The cFP-DI-3xx modules feature bank isolation with 2,300 V_{rms} of breakdown isolation. In addition, the cFP-DI-330 provides double insulation for up to 250 V_{rms} of operational isolation. You can safely use Compact FieldPoint with the cFP-CB-1 connector block in applications where hazardous voltages are present. These Compact FieldPoint modules do not have channel-to-channel isolation.

Field I/O Connections

Compact 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 delivers additional breakout terminals for voltage supply (V_{SUP}) and common (COM). These terminals offer a convenient way to distribute power to field devices that require external power.

NATIONAL INSTRUMENTS™

Digital Input Modules for Compact FieldPoint

Wiring Schematics for the cFP-DI-3xx Modules

Ordering Information

BUY NOW!

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

Specifications

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

Digital Input Channels

cFP-DI-300, cFP-DI-330 8
cFP-DI-301 16
cFP-DI-304 32

Input Characteristics

Input impedance
   cFP-DI-300, cFP-DI-301 .... 5 kΩ
   cFP-DI-304 .... 30 kΩ
Input current limiting cFP-DI-330 .... 1.5 mA

Input Voltages

cFP-DI-300, cFP-DI-301, cFP-DI-304 .... 0 to 30 VDC
cFP-DI-330 .... 0 to 250 VDC or 0 to 250 VAC (50/60 Hz AC) or 0 to 250 VAC (1 kHz AC)

Digital Logic Levels

	cFP-DI-300		cFP-DI-301		cFP-DI-304		cFP-DI-330	
	OFF State	ON State	OFF State	ON State	OFF State	ON State	OFF State	ON State
Input Voltage (V)	<5	>15	<5	>15	≤5	≥10	≤1 VDC, ≤1 VAC	≥4 VDC, ≥15 VAC (50/60 Hz AC), ≥3 VAC (1 kHz AC)
Input Current (µA)	≤1000	≥3000	≤1000	≥3000	≤150	≥330		

Hysteresis (cFP-DI-304)

Input voltage .... 2 V min
Input current... 60 µA min

Isolation Voltage

cFP-DI-30x
   Channel-to-ground
      Continuous .... 250 V_{rms}
      Withstand.. 2,300 V_{rms}, 5 s max
   Channel-to-backplane
      Continuous .... 250 V_{rms}
      Withstand.. 2,300 V_{rms}, 5 s max
   Channel-to-channel .... None
cFP-DI-330
   Maximum isolation voltage............................. 250 V_{rms}, Installation Category II
Transient overvoltage .... 2,300 V_{rms}

Physical Characteristics

LED indicators
   Power (green) .... Power on and self-test passed
   Ready (green)... Module configured and ready
   <0..31>, <0..15>, or <0..7> (green) .... Input state of each channel
Dimensions .... 127.0 by 65.9 by 23.9 mm (5.00 by 2.60 by 0.94 in.)
Weight
   cFP-DI-300/301 .... 100 g (3.6 oz)
   cFP-DI-330... 103 g (3.7 oz)
   cFP-DI-304... 193 g (6.81 oz)

Digital Input Modules for Compact FieldPoint

Power Requirements (from Network Module)

cFP-DI-300 .... 185 mW
cFP-DI-301 .... 325 mW
cFP-DI-304 .... 1 W
cFP-DI-330 .... 200 mW

Environment

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

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 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.

Waste Electrical and Electronic Equipment (WEEE)

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Hardware Services

NI Factory Installation Services

NI Factory Installation Services (FIS) is the fastest and easiest way to use your PXI or PXI/SCXI combination systems right out of the box. Trained NI technicians install the software and hardware and configure the system to your specifications. NI extends the standard warranty by one year on hardware components (controllers, chassis, modules) purchased with FIS. To use FIS, simply configure your system online with **ni.com/pxiadvisor**.

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Repair and Extended Warranty

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