Quick Start Guide

FieldPoint™ cFP-20*xx*

What You Need to Get Set Up

- cFP-20*xx* LabVIEW RT controller
- Mounting hardware (DIN rail, panel-mount, or rack-mount accessory)
- I/O module(s)
- cFP-BP-*x* backplane, connector blocks, cables
- 11–30 VDC power supply
- Accessories: Ethernet cable, number 2 Phillips screwdriver
- PC running Windows
- FieldPoint software 3.0.2 or later
- LabVIEW RT

NATIONAL INSTRUMENTS
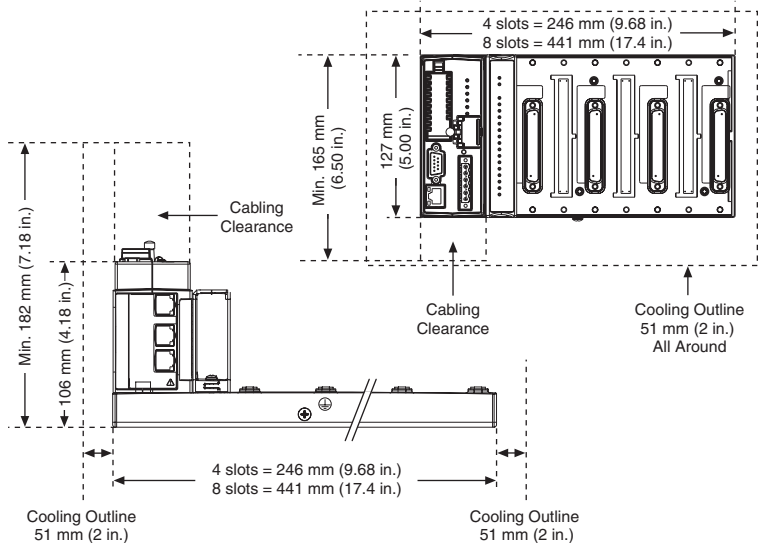
1. Mount the Compact FieldPoint Backplane

You can mount the cFP-BP-*x* backplane on a 35 mm DIN rail, on a panel, or in a standard 19 in. rack. Before using any of these mounting methods, record the serial number from the back of the backplane.

Each set of mounting instructions in this document includes an instruction to connect the protective earth (PE) ground terminal on the cFP-BP-*x* backplane to the system safety ground. The backplane PE ground terminal has the following symbol stamped beside it: ⏚. Connect the backplane PE ground terminal to the system safety ground using 14 AWG (1.6 mm) wire with a ring lug. Use the 5/16 in. panhead screw shipped with the backplane to secure the ring lug to the backplane PE ground terminal.

⚠ **Caution**   Keep in mind these requirements for space and cabling clearance:

- Allow at least 51 mm (2 in.) all around the backplane for air circulation.

- Allow 38 mm (1.5 in.) below and 51 mm (2 in.) above the controller for cabling clearance.

4 slots = 246 mm (9.68 in.)
8 slots = 441 mm (17.4 in.)

Min. 165 mm (6.50 in.)

127 mm (5.00 in.)

Cabling Clearance

Cooling Outline 51 mm (2 in.) All Around

Min. 182 mm (7.18 in.)

106 mm (4.18 in.)

Cabling Clearance

4 slots = 246 mm (9.68 in.)
8 slots = 441 mm (17.4 in.)

Cooling Outline 51 mm (2 in.)

Cooling Outline 51 mm (2 in.)

Mounting the Backplane on a Panel

1. Fasten the panel-mount plates to the back of the cFP-BP-*x* using a number 2 Phillips screwdriver and the 8-32 × 5/16 in. countersink screws shipped with the kit.
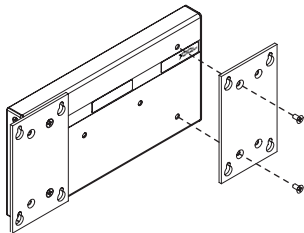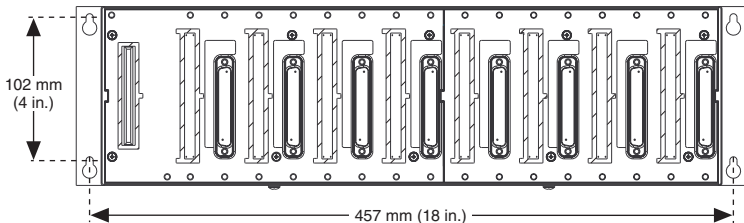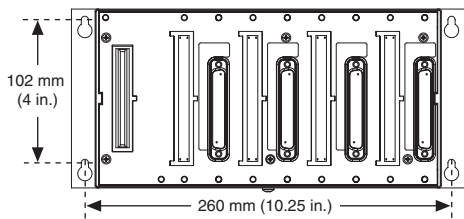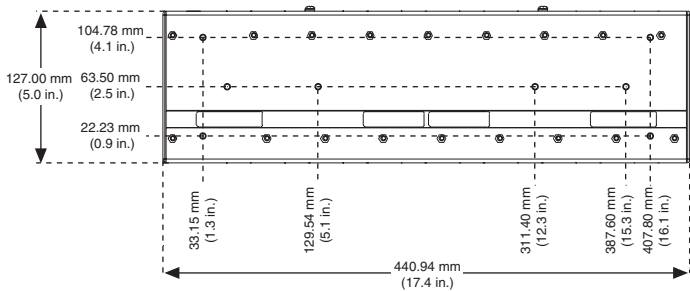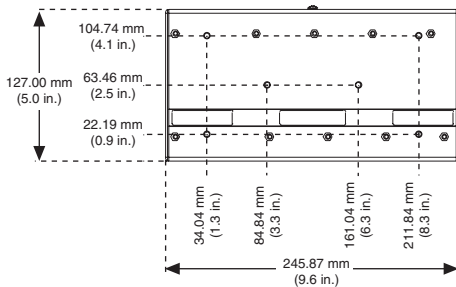

⚠ **Caution** Do not use screws longer than 5/16 in. to fasten the panel-mount plates to the backplane.

102 mm (4 in.)

457 mm (18 in.)

Dimensions:
- 104.74 mm (4.1 in.)
- 127.00 mm (5.0 in.)
- 63.46 mm (2.5 in.)
- 22.19 mm (0.9 in.)
- 34.04 mm (1.3 in.)
- 84.84 mm (3.3 in.)
- 161.04 mm (6.3 in.)
- 211.84 mm (8.3 in.)
- 245.87 mm (9.6 in.)

2. Bolt or screw the panel-mount accessory to a panel.

3. Connect the PE ground terminal on the cFP-BP-*x* to safety ground.

⚠ **Caution** Disconnect power before removing the backplane from the panel.

Mounting the Backplane on a DIN Rail

NI recommends DIN rail mounting for the cFP-BP-4 only. Use panel mounting or rack mounting for the cFP-BP-8. The DIN rail mounting kit is NI part number 778614-01.

1. Fasten the DIN rail clip to the cFP-BP-4 using a number 2 Phillips screwdriver and the 8-32 × 5/16 in. countersink screws shipped with the clip.
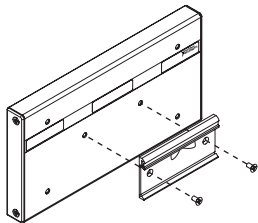
> ⚠️ **Caution** Do not use screws longer than 5/16 in. to fasten the DIN rail clip to the backplane.

2. Insert one edge of the DIN rail into the deeper opening of the DIN rail clip.

3. Press down firmly on the backplane to compress the spring until the clip locks in place on the DIN rail.

4. Connect the PE ground terminal on the cFP-BP-4 to safety ground.

> ⚠️ **Caution** Disconnect power before removing the backplane from the DIN rail.
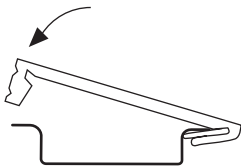
Mounting the Backplane in a Standard 19-in. Rack

1. Fasten the rack-mount bracket to the back of the cFP-BP-*x* using the captive screws on the bracket.
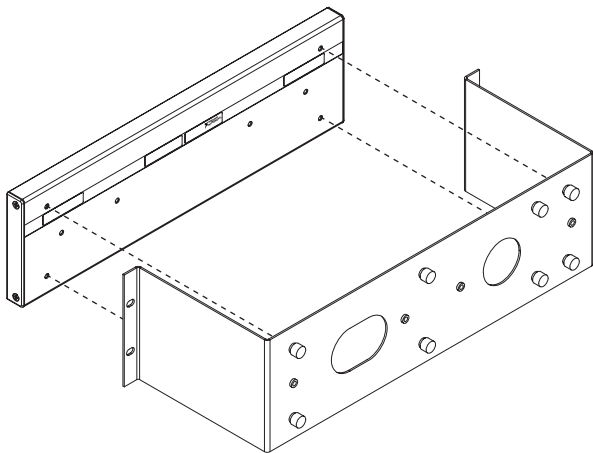
2. Bolt the rack-mount accessory to a standard 19-in. rack.

3. Connect the PE ground terminal on the cFP-BP-*x* to safety ground.
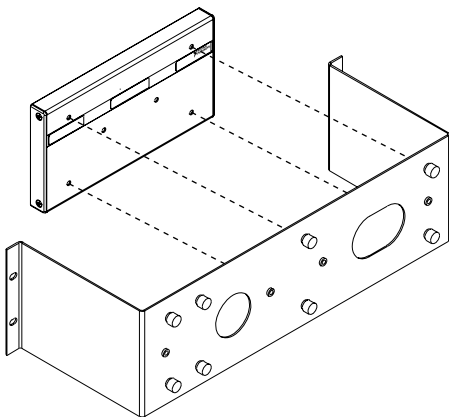
⚠ **Caution** Disconnect power before removing the backplane from the bracket.

2. Install the cFP-20*xx* Controller on the Backplane

1. Make sure that no power is connected to the controller.
2. Make sure that the cFP-20*xx* controller is right side up with the NI logo at the top, and align the captive screws on the controller with the holes on the backplane.
3. Seat the card edge at the back of the controller in the card-edge connector on the backplane.
4. Press the controller firmly to seat it on the backplane.
5. Using a number 2 Phillips screwdriver with a shank of at least 64 mm (2.5 in.) length, tighten the captive screws to 1.1 N · m (10 lb · in.) of torque.
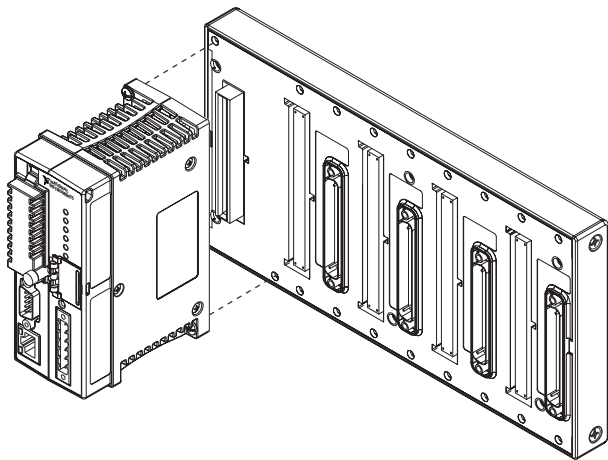
3. Install I/O Modules on the Backplane

1. Align the captive screws on the I/O module with the holes on the backplane.

2. Press firmly to seat the I/O module on the backplane.

3. Using a number 2 Phillips screwdriver with a shank of at least 64 mm (2.5 in.) length, tighten the captive screws to 1.1 N · m (10 lb · in.) of torque.

4. Repeat this procedure to install additional I/O modules on the backplane.
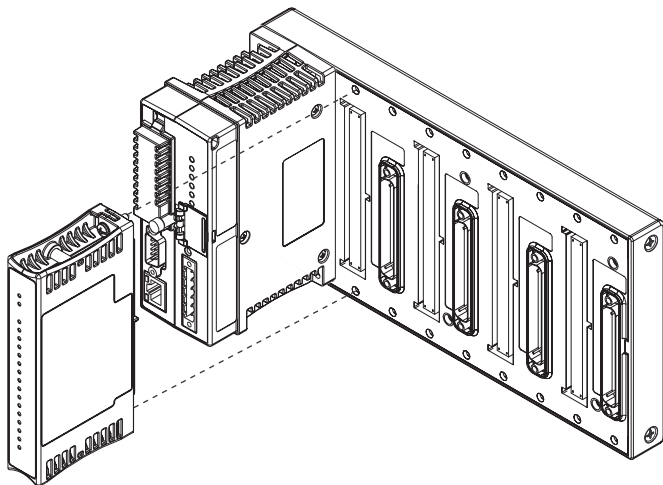
4. Install Connector Blocks on the Backplane

In order to connect I/O modules to input signals or to external loads, you need to install a cFP-CB-*x* connector block or other connectivity accessory for each I/O module on the backplane. Use the connector socket to the right of each I/O module socket.

⚠️ **Caution** Do not insert or remove connector blocks or other connectivity accessories while power is applied to them.

1. Wire field devices as described in the I/O module and connector block operating instructions.

   ⚠️ **Caution** Hazardous voltage wiring should be performed by qualified personnel and in accordance with local electrical standards.

2. Align the captive screws on the connector block with the holes on the backplane.

3. Press firmly to seat the connector block on the backplane.

4. Using a number 2 Phillips screwdriver with a shank of at least 64 mm (2.5 in.) length, tighten the captive screws to 1.1 N · m (10 lb · in.) of torque.

5. Repeat this procedure to install additional connector blocks on the backplane.
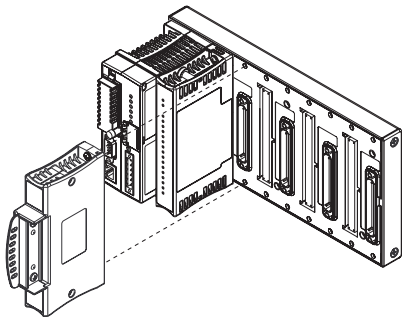
5. Connect the cFP-20*xx* to Your Network

Connect the cFP-20*xx* controller to an Ethernet network using the RJ-45 Ethernet port on the controller. Use a standard Category 5 Ethernet cable to connect the cFP-20*xx* to an Ethernet hub, or use an Ethernet crossover cable to connect the controller directly to a computer.

⚠️ **Caution** To prevent data loss and to maintain the integrity of your Ethernet installation, do not use a cable longer than 100 m. If you are using a 100 Mbps Ethernet, National Instruments recommends using a Category 5 shielded twisted-pair Ethernet cable.

If the host PC is already configured on a network, you must configure the cFP-20*xx* on the same network. If neither is connected to a network, you can connect the two directly using a crossover cable.

In order for you to configure the cFP-20*xx*, it must reside on the same subnet as the host PC.

6. Wire Power to the Compact FieldPoint System

Each cFP-20*xx* on your network requires an 11–30 VDC power supply.

1. Connect the positive lead of the primary power supply to one of the V1 terminals and the negative lead to one of the C terminals.

2. If you are using a backup power supply, connect the positive lead to V2 and the negative lead to one of the C terminals. The cFP-20*xx* uses the power supply with the higher voltage level. V2 is isolated from the other V terminals.

3. Refer to the operating instructions for the power requirements of each I/O module.

4. Use a separate power supply for each module that needs external power.
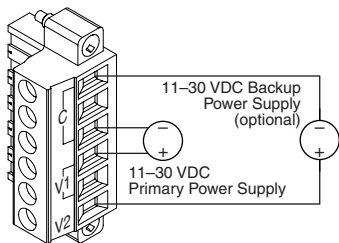
⚠ **Caution** Cascading power defeats isolation between the cascaded modules.

7. Powering Up the cFP-20*xx*

Check the DIP switches on the controller, making sure that the RESET IP switch is not enabled. Plug in each power supply to the Compact FieldPoint system. The cFP-20*xx* runs a power-on self test (POST) that takes several seconds. You should see the POWER and STATUS LEDs come on. After about five seconds, the STATUS LED begins flashing steadily. The cFP-20*xx* is ready to be configured.

If you have already assigned an IP address to the cFP-20*xx*, the STATUS LED turns off, and the A, B, C, and D LEDs come on for about 15 seconds as LabVIEW RT starts up. Once they turn off, the I/O module READY LEDs come on, and the cFP-20*xx* is ready for use. The total boot time for a configured system is 30–45 seconds.

If the STATUS LED does not light up as described here, refer to the *cFP-20xx and cFP-BP-x User Manual*.
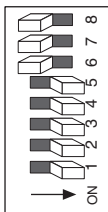
DIP Switches	Functions
1, 2	User-configurable on cFP-2000 and cFP-2010; disabled on cFP-2020
3, 4, 5	User-configurable
6	DISABLE VI
7	SAFE MODE
8	RESET IP

8. Install Software on the Host PC

1. Install the software packages you plan to use, such as LabVIEW,
   LabVIEW RT, Measurement Studio, VI Logger, or LabWindows™/CVI™,
   before you install the FieldPoint software. The FieldPoint software
   installation installs the LabVIEW VIs and examples and the
   LabWindows/CVI instrument driver only if it finds the corresponding
   development software installed.

2. Close all other applications.

3. Insert the National Instruments FieldPoint Software CD into the CD-ROM
   drive on your computer.

4. Follow the onscreen instructions to complete the installation.

> **Note** If the setup does not launch automatically, select **Start»Run** from
> Windows, enter d:\setup, where d is the letter of your CD-ROM drive,
> and select **OK**.

9. Configure the cFP-20*xx*

Launch Measurement & Automation Explorer (MAX) to configure the cFP-20*xx*.
For information about configuring the cFP-20*xx* in software, refer to the
Measurement & Automation Explorer Help for FieldPoint (**Start»Programs»
National Instruments»FieldPoint»FieldPoint Help**).

Specifications

Network

Network interface .... 10BaseT and 100BaseTX Ethernet

Compatibility IEEE802.3

Communication rates .... 10 Mbps, 100 Mbps, auto-negotiated

Maximum cabling distance .... 100 m/segment

Maximum power
to connected I/O modules .... 9 W

Maximum number of banks .... Determined by network topology

Memory

cFP-2000 .... 16 MB nonvolatile; 16 MB DRAM

cFP-2010 .... 32 MB nonvolatile; 32 MB DRAM

cFP-2020 .... 32 MB nonvolatile; 32 MB DRAM

For information about the memory used by the LabVIEW RT module and the operating system, go to ni.com/info and enter rdfpec.

RS-485 Isolation Voltage

Maximum isolation voltage .... 100 Vrms

Transient overvoltage .... 740 Vrms

Power Requirement

Power supply range........................... 11 to 30 VDC

Recommended power supply

    cFP-BP-4 system .... 15 W

    cFP-BP-8 system .... 20 W

Power consumption

    cFP-2000 .... 4.8 W + 1.1 (*I/O module power requirements*)

    cFP-2010 .... 5.0 W + 1.1 (*I/O module power requirements)*

    cFP-2020 .... 6.1 W + 1.1 (*I/O module power requirements*)

Physical Characteristics

Screw-terminal wiring .... 16–26 AWG copper conductor wire with 7 mm (0.28 in.) of insulation stripped from the end

Torque for screw terminals .... 0.5– 0.6 N · m (4.4–5.3 lb · in.)

Weight of cFP-20*xx* .... 278 g (9.8 oz)

Environmental

FieldPoint modules are intended for indoor use only. For outdoor use, they must be installed in a suitable sealed enclosure.

Operating temperature .... –25 to 60 °C

Storage temperature .... –40 to 85 °C

Humidity .... 10 to 90% RH, 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)......... 10–500 Hz, 5 g_{rms}

    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 meets 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

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

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

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:

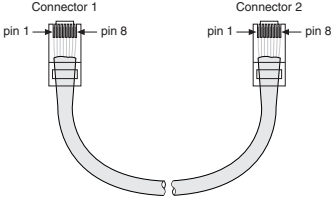Low-Voltage Directive (safety).........2006/95/EC

Electromagnetic
Compatibility
Directive (EMC) 2004/108/EC

Note Refer to the Declaration of Conformity (DoC) for this product for additional regulatory compliance information. To obtain the DoC for this product, click **Declarations of Conformity Information** at ni.com/hardref.nsf.

Cabling

The table below shows the standard Ethernet cable wiring connections for both normal and crossover cables.

Ethernet Cable Connector Pinouts		Pin	Connector 1	Connector 2 (Normal)	Connector 2 (Crossover)
		1	white/orange	white/orange	white/green
		2	orange	orange	green
		3	white/green	white/green	white/orange
		4	blue	blue	blue
		5	white/blue	white/blue	white/blue
		6	green	green	orange
		7	white/brown	white/brown	white/brown
		8	brown	brown	brown

Where to Go for Support

The National Instruments Web site is your complete resource for technical support. At ni.com/support you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. National Instruments also has offices located around the world to help address your support needs. For telephone support in the United States, create your service request at ni.com/support and follow the calling instructions or dial 512 795 8248. For telephone support outside the United States, contact your local branch office:

Australia 1800 300 800, Austria 43 662 457990-0, Belgium 32 (0) 2 757 0020, Brazil 55 11 3262 3599, Canada 800 433 3488, China 86 21 5050 9800, Czech Republic 420 224 235 774, Denmark 45 45 76 26 00, Finland 358 (0) 9 725 72511, France 01 57 66 24 24, Germany 49 89 7413130, India 91 80 41190000, Israel 972 3 6393737, Italy 39 02 41309277, Japan 0120-527196, Korea 82 02 3451 3400, Lebanon 961 (0) 1 33 28 28, Malaysia 1800 887710, Mexico 01 800 010 0793, Netherlands 31 (0) 348 433 466, New Zealand 0800 553 322, Norway 47 (0) 66 90 76 60, Poland 48 22 328 90 10, Portugal 351 210 311 210, Russia 7 495 783 6851, Singapore 1800 226 5886, Slovenia 386 3 425 42 00, South Africa 27 0 11 805 8197, Spain 34 91 640 0085, Sweden 46 (0) 8 587 895 00, Switzerland 41 56 2005151, Taiwan 886 02 2377 2222, Thailand 662 278 6777, Turkey 90 212 279 3031, United Kingdom 44 (0) 1635 523545