



NATIONAL INSTRUMENTS™

FieldPoint™

FP-1000/1001 FieldPoint Quick Start Guide

What You Need to Get Set Up

- Network Module
- Mounting Hardware (DIN rail or panel mount accessory)
- Terminal Base(s)
- I/O Module(s)
- Power Supply
- Accessories: serial cable, screwdriver
- PC running Windows
- FieldPoint Software CD

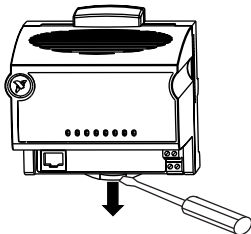


Install the Network Module

You can mount the modules on a DIN rail or to a panel.

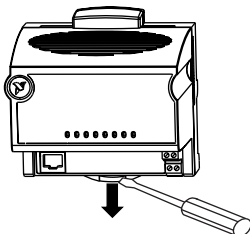
DIN Rail Mount

A. Unlock rail clip.



Panel Mount

A. Unlock rail clip.

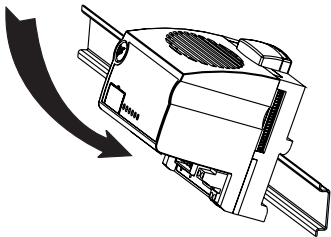


DIN Rail Mount

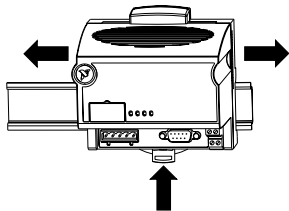


NOTE: Do not use spliced DIN rails. Use only a single DIN rail.

- B. Hook lip on back of module onto top of DIN rail, press down, and snap into place.

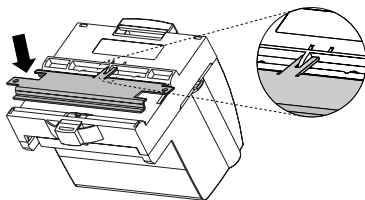


- C. Slide module into position and lock rail clip.

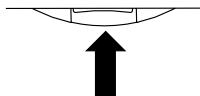


Panel Mount

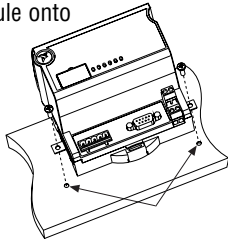
- B. Snap panel mount accessory (which you can order separately) onto module.



- C. Lock rail clip.



- D. Use template that came with the accessory to drill pilot holes and mount module onto panel using accessory.





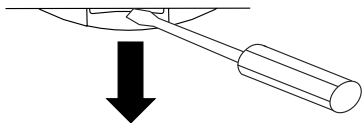
Install the Terminal Base(s)



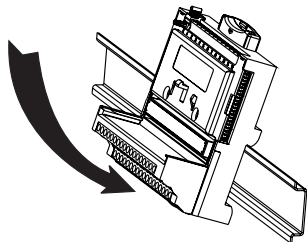
CAUTION: Terminal bases must be connected to the network module before applying power to the module. Do *not* connect or disconnect terminal bases while power is applied to the network module.

DIN Rail Mount

- A. Unlock rail clip.

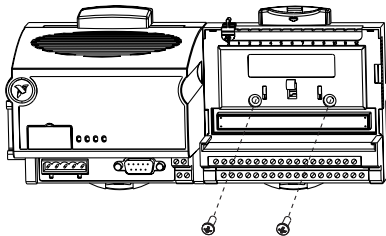


- B. Press base onto rail.



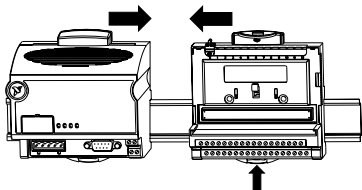
Panel Mount

- A. Use template that came with the accessory to drill pilot holes.
- B. Connect terminal base to network module connector, being careful not to bend any connector pins.
- C. Fasten terminal base to panel.



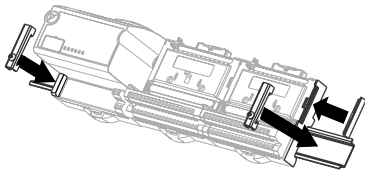
DIN Rail Mount

- C. Slide into position and lock the rail clip. Be careful not to bend any pins.



- D. Repeat for each terminal base, up to nine for each network module in most cases. You can use one or two extender cables (which you can order separately) if the FieldPoint bank is too long for the available space.

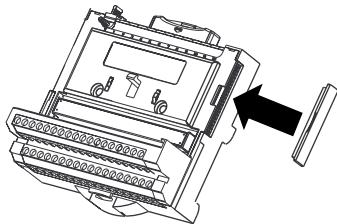
- E. Place protective cover on last base, and install rail locks at each end.



Panel Mount

- D. Repeat for each terminal base, up to nine for each network module in most cases. You can use one or two extender cables (which you can order separately) if the FieldPoint bank is too long for the available space.

- E. Place protective cover on last base.



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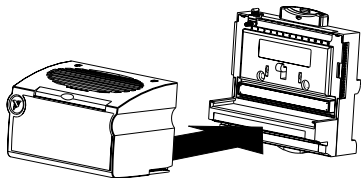
Install the I/O Module(s)

It does not matter where you install each I/O module, except for these types of situations:

- If you plan to cascade power between any I/O modules using the V and C terminals, those modules should be grouped together.
- For more accurate measurements, you might want to locate any thermocouple modules away from heat sources, including network modules or relay modules, unless you are mounting them on an FP-TB-3.

A. Align slots on module with guide rails on base, and press onto base until terminal base's latch locks the module in place.

B. Repeat for each I/O module.



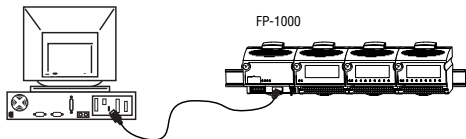
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Connect the Network Cables

You have several network connection options with the FP-1000 and FP-1001, as shown here.

Connecting the FP-1000 to a Computer's RS-232 Serial Port

Use a male-to-female (straight through) cable to connect the computer's RS-232 port to the 9-position DSub RS-232 connector on the FP-1000.



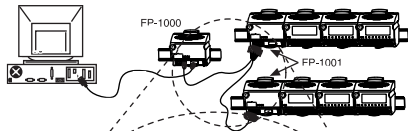
NOTE: You cannot connect the RS-485 port of the FP-1000 directly to an RS-485 port on the computer.

If you are using multiple FieldPoint serial network modules, you may need to connect the grounds of the RS-485 communication ports to each other to prevent damage from differences in ground potentials.

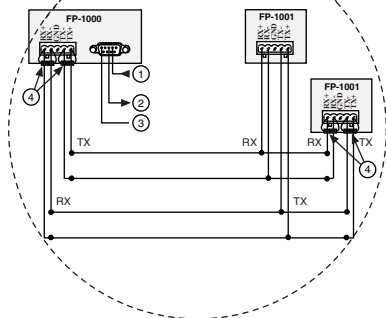
Connecting the FP-1000 to an FP-1001

You can connect up to 24 FP-1001 RS-485 serial network modules to an FP-1000. Use the RS-485 repeater port of the FP-1000, with the connection shown in this figure.

A. Connect the TX outputs of the FP-1001 to the RX inputs of the FP-1000, and the RX inputs of the FP-1001 to the TX outputs of the FP-1000.



B. Install the termination resistors. Terminate each end of your RS-485 network using the $120\ \Omega$ termination resistors included with the FP-1001. Install them between the RX and TX pair of the FP-1000's RS-485 port, and between the RX and TX pair on the last FP-1001's RS-485 port, as shown. Twist the resistor leads with the RS-485 signal wires and insert them into the RS-485 port terminals.



- ① From the Computer's RS-232 Transmit Output
- ② To Host Computer's RS-232 Receive Input
- ③ Ground
- ④ $120\ \Omega$ Termination Resistors

Connecting the FP-1001 to a Computer's RS-485 Serial Port

You may connect up to 25 FP-1001 network modules to a single RS-485 port of a host computer. Use the connection shown in this figure.

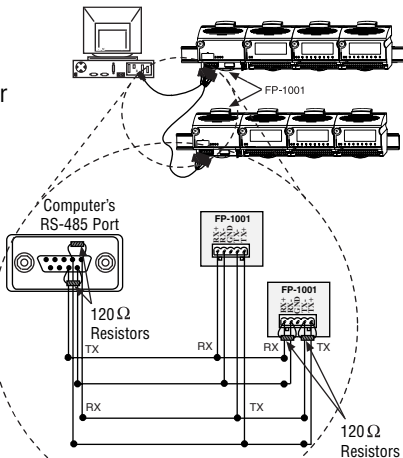
A. Connect the FP-1001 to a host computer using the 5-position Combicon screw terminal adapter of the RS-485 connector on the FP-1001.

B. Install the $120\ \Omega$ termination resistors included with the FP-1001. Install them between the RX and TX pair of the host computer's RS-485 port, and between the RX and TX pair on the RS-485 port of the last FP-1001 in the system, as shown. Twist the resistor leads with the RS-485 signal wires and insert them into the RS-485 port terminals.

C. Check the biasing feature. The host computer's RS-485 interface usually provides for biasing resistors, which are required on an RS-485 network. You should use this biasing feature for better reliability and noise immunity.



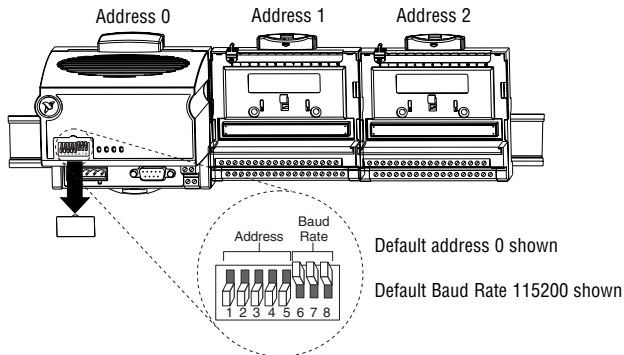
NOTE: The pinout for the RS-485 DB-9 connector shown is for National Instruments RS-485 cards. Please refer to the manuals that came with your RS-485 card, as the pinout may vary by manufacturer.



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Set the Network Address and Baud Rate










If the default values do not work for you, remove the switch cover from the 8-position switch on the front of the FP-1000/1001 to set the network address and baud rate.










A. Check/Set the Network Address

Give every network module connected to one serial port of the host computer a unique address, but modules on different serial ports may have the same address. The addresses of the terminal bases connected to the network module are automatically configured to be sequentially higher than the network module's address, moving out from the network module. The default network address for the FP-1000/1001 is 0.




Switch Positions 1-5	Network Module Address (Decimal)
	0 Default
	10
	20
	30
	40
	50
	60
	70
	80




Switch Positions 1-5	Network Module Address (Decimal)
	90
	100
	110
	120
	130
	140
	150
	160
	170



Switch Positions 1-5	Network Module Address (Decimal)
	180
	190
	200
	210
	220
	230
	240
Other Settings	Not Allowed

B. Check/Set the Baud Rate

Every module on one serial port of the host computer must have the same baud rate, which must be less than or equal to the computer's serial port baud rate. The default baud rate for the FP-1000/1001 is 115200, which should provide the fastest performance. You should not need to change this setting unless you experience communication problems.

Switch Positions 6-8	Network Module Baud Rate
	300
	1200
	2400

Switch Positions 6-8	Network Module Baud Rate
	9600
	19200
	38400

Switch Positions 6-8	Network Module Baud Rate
	57600
	115200 (Default)

C. Apply the New Settings

1. Note the new settings on the FP-1000/1001 label so that you can refer to them when you configure the software.
2. If power was supplied to the network module, cycle it off and back on again to enable the new settings.



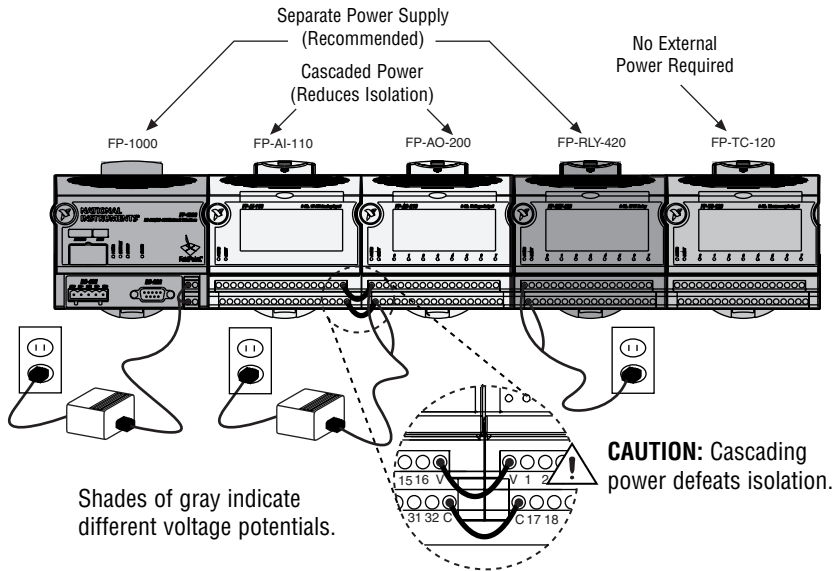
Wire Power to Your FieldPoint System

- A. Connect 11-30 VDC power supply leads to V and C terminals of the network module. If you want to verify that the power supply is sufficient for the modules and devices, refer to the FieldPoint hardware documents for instructions on calculating power requirements.

- B. Connect power to the FieldPoint modules that require external power for outputs (output modules, counter modules, PWM, PG, QUAD). Refer to the I/O module's operating instructions for power consumption details. You can power a module by connecting the V and C inputs on its terminal base to a separate power supply, connecting the V and C outputs of a neighboring terminal base or network module, or using a combination of both methods. If you want to power field I/O devices from a terminal base, supply power to the terminal base, and then connect the terminal base V and C output terminals to the field device.



CAUTION: Cascading power from neighboring bases or network modules defeats isolation between cascaded modules.





Connect to Field Devices

Use each I/O module's operating instructions, or the diagram under its removable label, to help you connect your field devices.

FP-AI-110
8 Channel, 16-Bit Analog Input Module

Highlights

- Eight analog voltage or current input channels
- 1 input range: $\pm 0.5 \text{ V}$, $\pm 0.5 \text{ V}$, $\pm 1 \text{ V}$, $\pm 100 \text{ mV}$, $\pm 0.5 \text{ mV}$, 0.01 V , 0.01 V , 0.01 V , 0.01 V , 0.01 V
- Three (three voltage: 0.1 k Ω , 10 k Ω , and 100 k Ω)
- 1.0-bit resolution
- $\pm 0.001 \text{ V}$ input in voltage isolation
- Double-isolated for 200 V rms working voltage
- $\pm 0.01^\circ \text{C}$ resolution

Overview

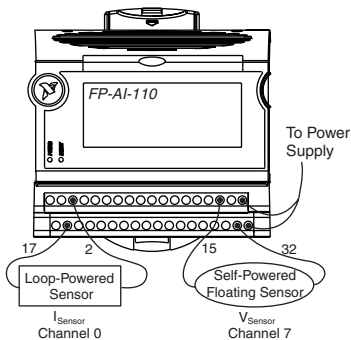
The FP-AI-110 is a FieldPoint analog input module with eight analog input channels. The FP-AI-110 can be used to do voltage-current inputs. The FP-AI-110 is used for low frequency signals, and has three configurable I/O settings to voltage and current inputs, voltage isolation, and voltage isolation that are all built-in and configurable.

These operating instructions describe characteristics of the FP-AI-110 according to the FP-AI-110 for the point-to-point (FP-AI-110) for the FP-AI-110.

8-Ch, 16-Bit Analog Input
mv, 0.20 mA

FP-AI-110

CH	In	V _{in}	COM	I _{in}	CURRENT SOURCE	POTENTIOMETER
CH0	2	17	13	1	1	1
CH1	4	19	15	1	1	1
CH2	6	21	17	1	1	1
CH3	8	23	19	1	1	1
CH4	10	25	21	1	1	1
CH5	12	27	23	1	1	1
CH6	14	29	25	1	1	1
CH7	16	31	27	1	1	1



NOTE: Either the self-powered sensor or power supply should be floating (not tied to earth ground).

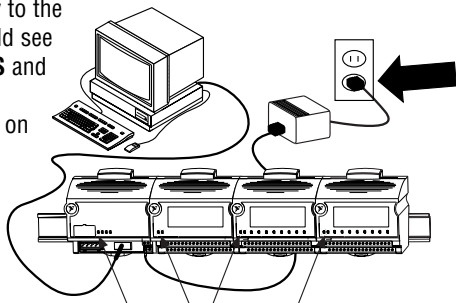
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Power Up Your FieldPoint System



CAUTION: Terminal bases must be connected to the FP-1000/1001 before power is applied to the FP-1000/1001.

Plug in each power supply to the FieldPoint bank. You should see the FP-1000/1001 **ACCESS** and **STATUS** LEDs flash once and its **POWER** LED come on and stay on. After a few seconds, the **POWER** and **READY** LEDs should be lit on each I/O module. If the LEDs do not follow this sequence, refer to the *FP-1000/1001 User Manual* for troubleshooting instructions.



POWER and READY LEDs Stay Lit

After the hardware is installed, you should verify communication, configure the modules, and configure your power-up states and watchdog settings.

9

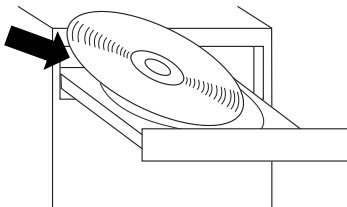
Install the FieldPoint Software



NOTE: The FieldPoint software is a Windows-based software. If you are using a non-Windows-based system or need to programmatically configure attributes and ranges for your FieldPoint system, please refer to the *FP-1000/1001 Programmer Reference Manual* for the FieldPoint Optomux commands. This manual is available on the FieldPoint Software CD or at ni.com/manuals. For simplicity and ease of use, we recommend that you use the FieldPoint software if you have a Windows-based system.

A. Close all other applications. If you plan to install National Instruments development software such as Lookout, LabVIEW, or Measurement Studio, install them before you install the FieldPoint software.

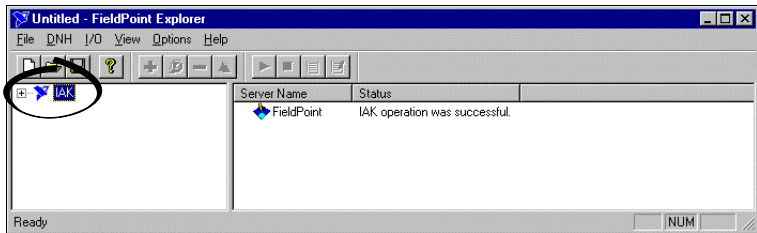
B. Insert the FieldPoint software CD and follow the onscreen instructions.



10 Configure the FP-1000/1001

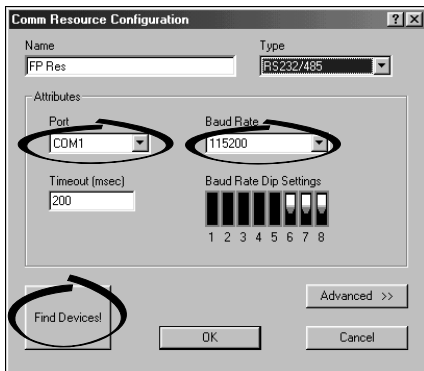
Refer to the *FP-1000/1001 User Manual* for more information about configuration settings.

- A. Select **Start»Programs»National Instruments FieldPoint»FieldPoint Explorer**.
- B. Click the + to expand the view.

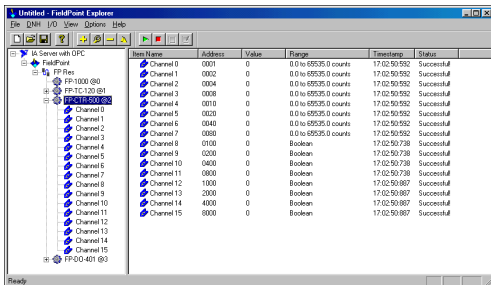


- C. Right-click the FieldPoint icon and select **Add a comm resource to this server**.


- D. In the Comm Resource Configuration dialog box, select the port to which your FieldPoint system is connected. Make sure the baud rate matches what the network module is set to use. Click **Find Devices**. If you have trouble finding devices, try changing the selections in this dialog box to make sure they match your hardware configuration.




- E. Expand the **+FP Res** item on the left side of the Explorer window to see the devices found on the network.

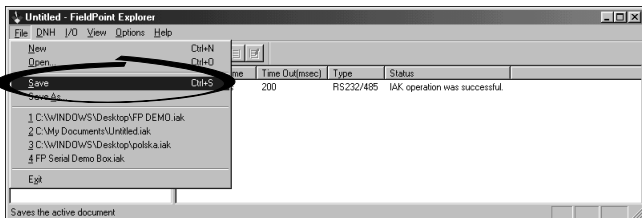


If your modules are not listed, check the cable and connections and make sure the modules are all powered on. If you still have problems, refer to your *FP-1000/1001 User Manual* for troubleshooting information.

F. Select an input module and click the start monitoring button  to view live data.

G. Select an output module channel and click the write button  to change outputs.

H. Select **File»Save**.



Configure I/O Modules

A. Right-click the device name in FieldPoint Explorer and select **Edit this Device**.

B. Click the **Channel Configuration** button to bring up the **Channel Configuration** dialog box.

- C. Select the type of channel to show, then select the channel(s) that you want to change. To select more than one channel, uncheck the **One channel at a time** box.

Channel Configuration

Channels

Type 1: Analog input

Channel 0

Channel 1

Channel 2

Channel 3

Channel 4

Channel 5

Channel 6

Channel 7

Channel 8

Channel 9

Channel 10

Channel 11

Channel 12

Channel 13

Channel 14

Channel 15

One channel at a time

Data Configuration

Range: -0.02 to 0.08 Volts

Watchdog Value: Enable

Powerup Output Value:

Channel Attributes

Attribute	Value
Thermocouple type	J

Channel Commands

Command	Text
None	<input type="text"/>



NOTE: Configuration options are module-dependent. The options shown here might not be available for your particular module. Refer to the I/O module operating instructions for details on configuration options.

- D. Set the range and output values of the selected channel(s).

- E. Set the attributes for the selected channel(s) by selecting the attribute and entering the desired value.
- F. Send commands to the selected channel(s) by choosing a command and value and clicking **Send**.
- G. Repeat this procedure for each channel or group of channels you want to configure.
- H. Click the **OK** button when you are finished, or click the **Apply** button to save the changes and continue to configure channels. When you click **OK** or **Apply**, the changes are immediately sent to the device.
- I. Select **File»Save** when you are done.



Where to Go from Here

After you get your hardware up and running, you might want to implement features such as power-up defaults or network watchdog settings. Refer to your *FP-1000/1001 User Manual* or online help for information about features, configuration, application development, and troubleshooting.

FP-1000/1001 Specifications

Installation

Terminal wiring	16-26 AWG copper conductor wire with 7 mm (0.275 in) strip length
Torque for screw terminals	0.5–0.6 Nm (4.4–5.3 in-lbs)

Network

Network ports	
FP-1000	1 RS-232 port, 1 RS-485 repeater port
FP-1001	1 RS-485 port
Baud Rates	300, 1200, 2400, 9600, 38400, 57600, 115200 (switch selectable)
Communication parameters	1 start bit, 8 data bits, 1 stop bit, No parity
RS-485 isolation	2500 Vrms breakdown, 250 Vrms operational
Power consumption	1 W + 1.15* Σ (I/O module power requirements)

Environmental

FieldPoint modules are intended for indoor use only.

Operating temperature	–40 to +70 °C
Storage temperature	–55 to +85 °C
Humidity	10% to 90% to RH, noncondensing
Maximum altitude	2,000 m
Pollution degree	2

Safety

The FP-1000/1001 meets the requirements of the following standards for safety and electrical equipment for measurement, control, and laboratory use:

- EN 61010-1:1993/A2:1995, IEC 61010-1:1990/A2:1995
- UL 3101-1:1993, UL 3111-1:1994, UL 3121:1998
- CAN/CSA c22.2 no. 1010.1:1992/A2:1997

Electromagnetic Compatibility

CE, C-Tick and FCC Part 15 (Class A) Compliant

Electrical emissions EN 55011 Class A at 10 m FCC Part 15A
above 1 GHz

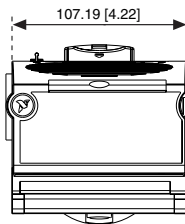
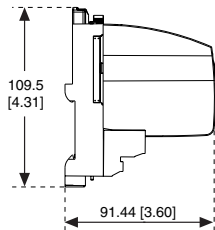
Electrical immunity Evaluated to EN 61326: 1997/A1:1998, Table 1



NOTE: For full EMC compliance, you must operate this device with shielded cabling. See the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, click **Declaration of Conformity** at ni.com/hardref.nsf/.

Mechanical Dimensions

Dimensions are given in millimeters [inches].





ni.com/support
ni.com/ask

United States 512 795-8248
Australia 03 9879 5166, Austria 0662 45 79 90 0, Belgium 02 757 00 20,
Brazil 011 3262 3599, Canada (Calgary) 403 274 9391,
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Canada (Québec) 514 694 8521, Canada (Toronto) 905 785 0085,
China (Shanghai) 021 6555 7838, China (ShenZhen) 0755 3904939,
Czech Republic 02 2423 5774, Denmark 45 76 26 00, Finland 09 725 725 11,
France 01 48 14 24 24, Germany 089 741 31 30, Greece 30 1 42 96 427,
Hong Kong 2645 3186, India 91 80 535 5406, Israel 03 6393737, Italy 02 413091,
Japan 03 5472 2970, Korea 02 3451 3400, Malaysia 603 9596711,
Mexico 001 800 010 0793, Netherlands 0348 433466, New Zealand 09 914 0488,
Norway 32 27 73 00, Poland 0 22 528 94 06, Portugal 351 210 311 210,
Russia 095 238 7139, Singapore 2265886, Slovenia 386 3 425 4200,
South Africa 11 805 8197, Spain 91 640 0085, Sweden 08 587 895 00,
Switzerland 056 200 51 51, Taiwan 02 2528 7227, United Kingdom 01635 523545

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