



NATIONAL INSTRUMENTS™

**FieldPoint™**

## FP-1000/1001 FieldPoint Quick Start Guide

### *What You Need to Get Set Up*

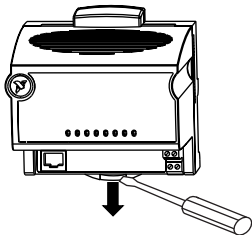
- Network Module
- Mounting Hardware (DIN rail or panel mount accessory)
- Terminal Base(s)
- I/O Module(s)
- Power Supply
- Accessories: serial cable, screwdriver
- PC running Windows
- FieldPoint Software CD



### *Install the Network Module*

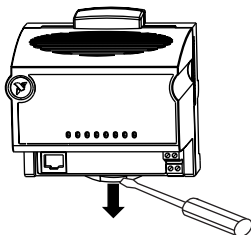
#### **DIN Rail Mount**

A. Unlock rail clip.



#### **Panel Mount**

A. Unlock rail clip.

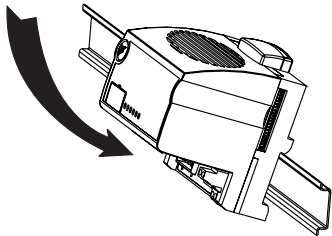


## DIN Rail Mount

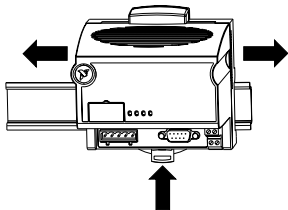


**NOTE:** Do not use spliced DIN rails. Use only a single DIN rail.

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

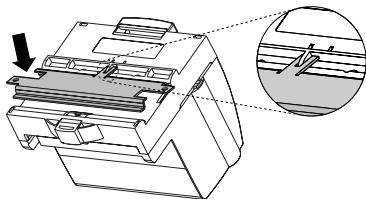


- C. Slide module into position and lock rail clip.

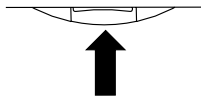


## Panel Mount

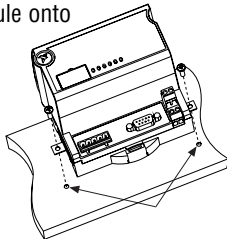
- B. Snap panel mount accessory (which you can order separately) onto module.



- C. Lock rail clip.



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



## 2

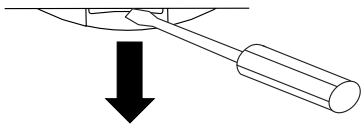
### Install the Terminal Base(s)



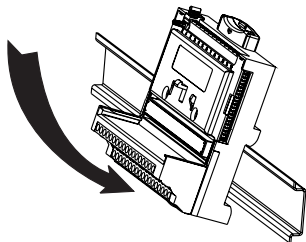
**CAUTION:** Terminal bases must be connected to the network module before applying power to the module. Do *not* connect or disconnect terminal bases while power is applied to the network module.

#### DIN Rail Mount

- A. Unlock rail clip.

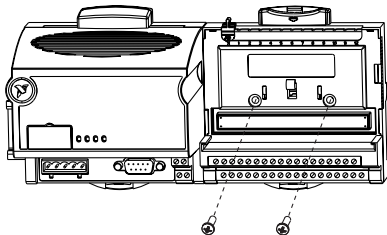


- B. Press base onto rail.



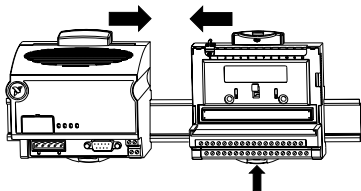
#### Panel Mount

- A. Use template that came with your 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.



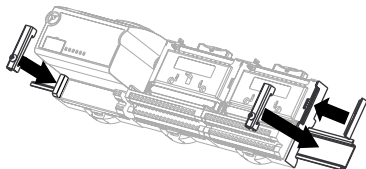
## DIN Rail Mount

- 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 your FieldPoint bank is too long for your available space.

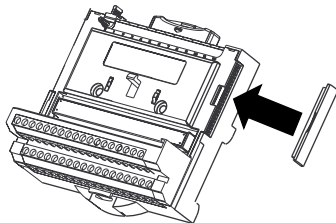
- E. Place protective cover on last base, and install rail locks at each end.



## 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 your FieldPoint bank is too long for your available space.

- E. Place protective cover on last base.



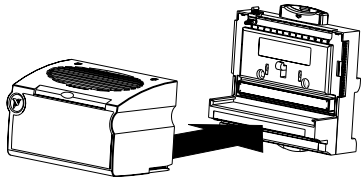
### 3 **Install the I/O Module(s)**

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.

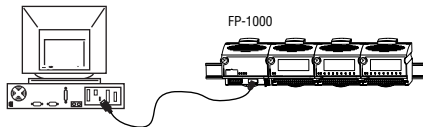


### 4 **Connect the Network Cables**

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 your computer's RS-232 port to the 9-position DSub RS-232 connector on the FP-1000.



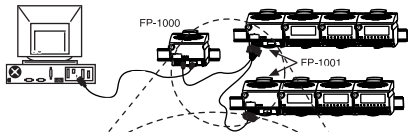


**NOTE:** You cannot connect the RS-485 port of the FP-1000 directly to an RS-485 port on your computer.

## Connecting the FP-1000 to an FP-1001

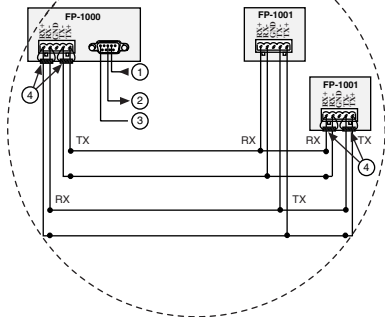
You can connect up to 24 FP-1001 RS-485 serial network modules to an FP-1000. Use the RS-485 repeater port of the FP-1000, with the connection shown in this figure.

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

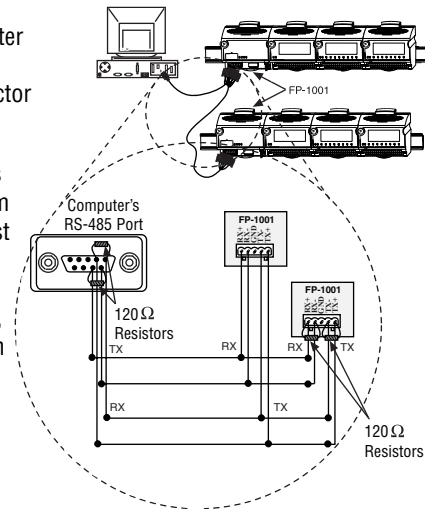
## Connecting the FP-1001 to a Computer's RS-485 Serial Port

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.

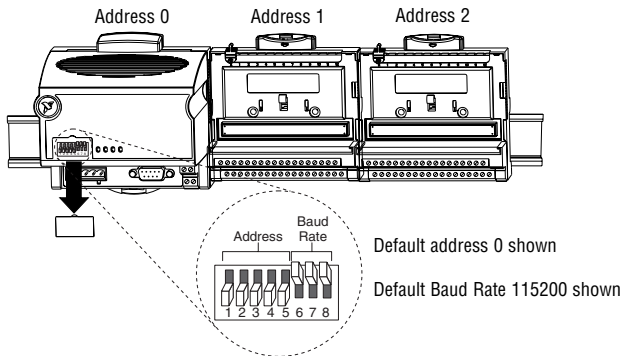


**NOTE:** The pinout for the RS-485 DB-9 connector shown is for National Instruments RS-485 cards. Please refer to the manuals that came with your RS-485 card, as the pinout may vary by manufacturer.

# 5

## Set the Network Address and Baud Rate










If the default values will 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 your software.
2. If power was supplied to the network module, cycle it off and back on again to enable the new settings.

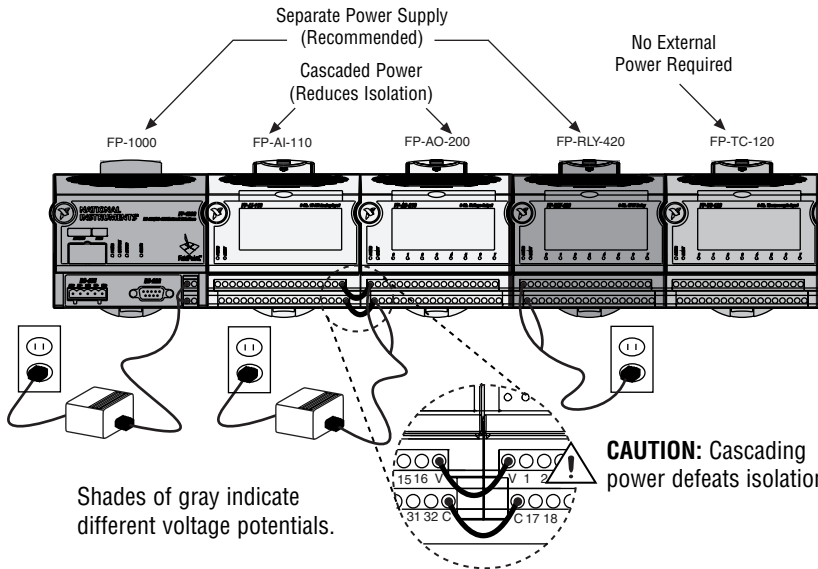


## ***Wire Power to Your FieldPoint System***

- A. Connect 11-30 VDC power supply leads to V and C terminals of the network module. If you want to verify that your power supply is sufficient for your modules and devices, refer to your 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
- 13 input ranges:  $\pm 10\text{ V}$ ,  $\pm 5\text{ V}$ ,  $\pm 1\text{ V}$ ,  $\pm 200\text{ mV}$ ,  $\pm 100\text{ mV}$ ,  $\pm 50\text{ mV}$ ,  $\pm 25\text{ mV}$ ,  $\pm 10\text{ mV}$ ,  $\pm 5\text{ mV}$ ,  $\pm 2\text{ mV}$ ,  $\pm 1\text{ mV}$ , and  $500\text{ }\mu\text{V}$
- Three filter settings: 50 Hz, 60 Hz, and 500 Hz
- 16-bit resolution
- 5000 V input in signal isolation
- Flexible installation for 250 V rms working voltage
- $\pm 0.5\%$  to  $\pm 0.1\%$  accuracy

**Overview**

The FP-AI-110 is a FieldPoint analog input module with eight analog input channels. The FP-AI-110 can be used with voltage or current inputs. The FP-AI-110 is a shielded low-frequency signal, and has three configurable filter settings to reduce noise and provide accurate, reliable solutions, and the range settings that are available and continuous, as possible.

These operating instructions describe the characteristics of the FP-AI-110 according to the FP-AI-110. For the part number FP-AI-110, see the FP-AI-110.

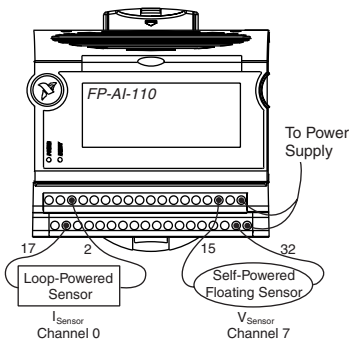
**2-Ch. 16-Bit Analog Input**  
mv,  $\mu\text{V}$ , 20 mA

**FP-AI-110**

CH#	In	V <sub>REF</sub>	COM	I <sub>V</sub>	CURRENT SOURCE	POWERED SOURCE
CH# 1	2	17	13	1	+	+
CH# 2	1	19	23	1	+	+
CH# 3	6	21	22	1	+	+
CH# 4	7	8	23	24	+	+
CH# 5	15	25	26	1	+	+
CH# 11	12	27	28	1	+	+
CH# 13	14	29	30	1	+	+
CH# 15	16	31	32	1	+	+

**2-Ch. 16-Bit Analog Input**

**POWER**  
**REAR**



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

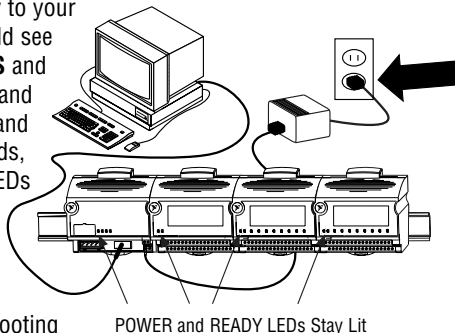
## 8

## 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 your 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.

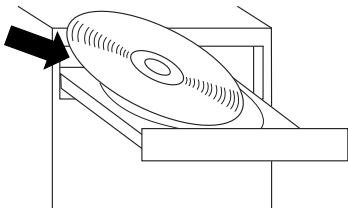


After the hardware is installed, you should verify communication, configure the modules, configure your power-up states and watchdog settings. If you are using National Instruments FieldPoint software for these tasks, continue to the following section.

# 9

## Install the FieldPoint Software

- 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.



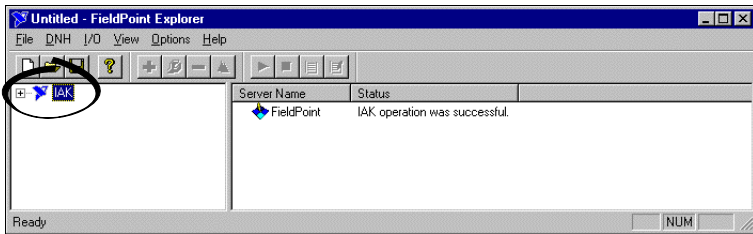
- B. Insert the FieldPoint software CD and follow the onscreen instructions.

# 10

## Configure the FP-1000/1001

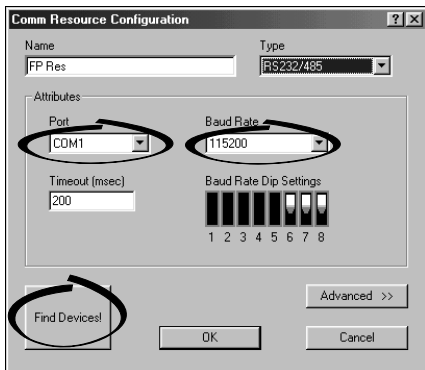
Refer to the *FP-1000/1001 User Manual* for more information about configuration settings.

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

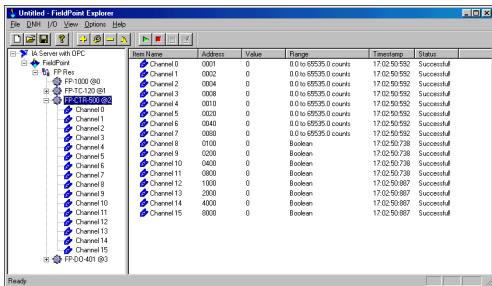


C. Right-click on the FieldPoint icon and select **Add a comm resource to this server.**

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.



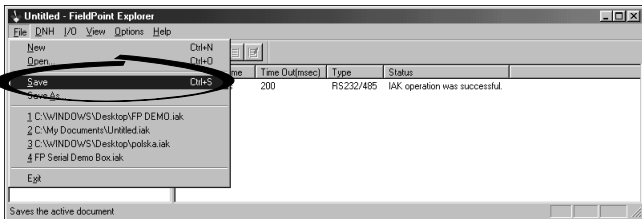


If your modules are not listed check the cable and connections and make sure the modules are all powered on. If you still have problems, refer to your *FP-1000/1001 User Manual* for troubleshooting information.

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**.



## 11 *Configure I/O Modules*

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

B. Click on 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



**NOTE:** Configuration options are module-dependent. The options shown here might not be available for your particular module. Refer to your 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 on **Send**.
- G. Repeat this procedure for each channel or group of channels you want to configure.
- H. Click on the **OK** button when you are finished, or click on the **Apply** button to save the changes and continue to configure channels. When you click on **OK** or **Apply**, the changes are immediately sent to the device.
- I. Select **File»Save** when you are done.

## **12** *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* $\Sigma$ (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

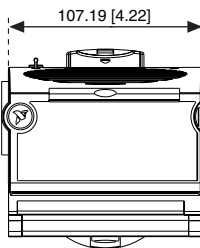
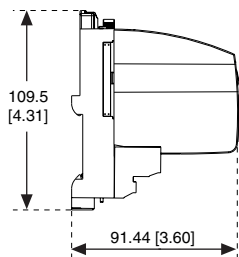
Electrical immunity . . . . . Evaluated to EN 61326: 1997/A1:1998, Table 1



**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/](http://ni.com/hardref.nsf/).

## Mechanical Dimensions

Dimensions are given in millimeters [inches].







[ni.com/support](http://ni.com/support)

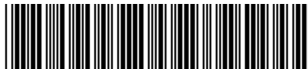
[ni.com/ask](http://ni.com/ask)

United States 512 795-8248

Australia 03 9879 5166, Austria 0662 45 79 90 0, Belgium 02 757 00 20,  
Brazil 011 284 5011, Canada (Calgary) 403 274 9391, Canada (Montreal) 514 288 5722,  
Canada (Ottawa) 613 233 5949, Canada (Québec) 514 694 8521,  
Canada (Toronto) 905 785 0085, China (Shanghai) 021 6555 7838,  
China (ShenZhen) 0755 3904939, 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 91805275406, Israel 03 6120092, Italy 02 413091,  
Japan 03 5472 2970, Korea 02 596 7456, Malaysia 603 9596711,  
Mexico 5 280 7625, Netherlands 0348 433466, New Zealand 09 914 0488,  
Norway 32 27 73 00, Poland 0 22 528 94 06, Portugal 351 1 726 9011,  
Singapore 2265886, 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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