TERMINAL BLOCK INSTALLATION GUIDE AND SPECIFICATIONS
NI PXIe-4353 and TB-4353

NI SC Express is a family of PXI Express modules with integrated data acquisition and signal conditioning. These devices offer increased speed, accuracy, and synchronization features that are well suited for high-density sensor measurement and signal-conditioning systems. Accessories required for signal connections to these modules include a front-mount terminal block with screw-terminal connectivity.

This guide describes how to install and configure the NI SC Express PXIe-4353 module and terminal block, connect signals, and verify that the system is working properly. Current versions of NI documents are available at ni.com/manuals.

The NI PXIe-4353 is a high-accuracy thermocouple input module that supports up to 32 thermocouple inputs and has 8 cold-junction compensation (CJC) channels for improved CJC accuracy. The TB-4353 terminal block has eight thermistors that provide CJC for thermocouples.

The TB-4353 terminal block is designed for use with the following module as specified:

NI PXIe-4353...±80 mV maximum voltage measurement range

Note   Refer to the *NI PXIe-4353 Specifications* document for additional voltage and safety information.

The keying of this terminal block prevents it from connecting to other modules that could be damaged by the voltage present on the terminal block. However, you should only use this terminal block with its supported modules.

Caution   When hazardous voltages (>30 V_{rms}/42.4 V_{pk}/60 VDC) are present on any terminal, safety low-voltage (≤30 V_{rms}/42.4 V_{pk}/60 VDC) cannot be connected to any other terminal.

Caution   Do not supply hazardous voltages (>30 V_{rms}/42.4 V_{pk}/60 VDC) to the terminal block without the terminal block being connected to the NI PXIe-4353.

Caution   Refer to the *Read Me First: Safety and Electromagnetic Compatibility* document for important safety and electromagnetic compatibility information. To obtain a copy of this document online, visit ni.com/manuals, and search for the document title.

Contents

NATIONAL INSTRUMENTS™

What You Need to Get Started

To set up and use the TB-4353 terminal block with the NI PXIe-4353 module, you need the following items:

- Hardware
    - TB-4353 terminal block
    - NI PXIe-4353 module
    - PXIe chassis
    - Shielded cabling and sensors as required for your application
- Tools
    - Number 1 and 2 Phillips-head screwdrivers
    - 1/8 in. flathead screwdriver
    - Long-nose pliers
    - Wire cutter
    - Wire insulation stripper

- Documentation
  - *NI PXIe-4353 and TB-4353 Terminal Block Installation Guide and Specifications*
  - *Read Me First: Safety and Electromagnetic Compatibility*
  - *NI PXIe-4353 User Manual*
  - PXIe chassis user manual

You can download needed documents from `ni.com/manuals`.

Installation

Step 1. Install the Software

📝 **Note** You must be an administrator to install NI software and devices on your computer.

Before installing the NI SC Express hardware, make sure the following are installed in the order indicated:

1. Your application software, such as LabVIEW, LabWindows™/CVI™ or .NET.
2. NI-DAQmx 9.1 or later.

📝 **Note** When installing NI application software, such as NI LabVIEW, refer to the *NI-DAQmx Readme* on the software media for supported software versions. Back up any applications before upgrading software or modifying the application.

💡 **Tip** Using an NI-DAQmx simulated device, you can test NI-DAQmx applications without installing hardware. Refer to the *Create a Simulated Device* section for instructions for creating NI-DAQmx simulated devices.

Step 2. Unpack and Install the Module

Remove the packaging and inspect the module. Contact NI if the module is damaged. Do not install a damaged module.

⚠️ **Caution** The module is static sensitive. Always properly ground yourself and the equipment when handling or connecting to the module.

Complete the following steps to install the NI SC Express module while referring to Figures 1 and 2:

1. Power off the NI PXI Express chassis. Refer to the chassis manual for chassis installation and configuration instructions.

⚠️ **Caution** Refer to the *Read Me First: Safety and Electromagnetic Compatibility*, included with your module, before connecting or disconnecting signal wires.

2. Identify a supported PXI Express slot in the chassis. NI SC Express devices can be placed only in PXI Express Peripheral slots, PXI Express Hybrid Peripheral slots, and PXI Express System Timing slots. Refer to the chassis documentation for details.
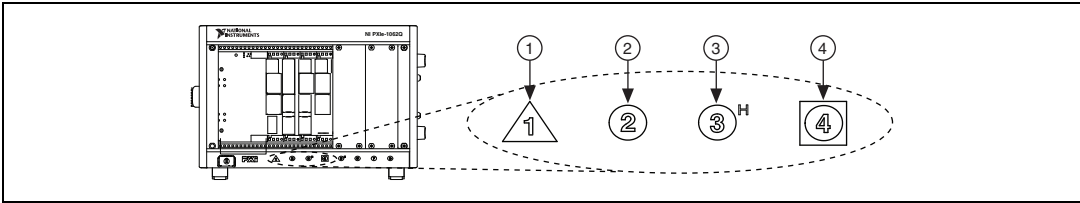
| 1 | PXI Express System Controller Slot | 3 | PXI Express Hybrid Peripheral Slot |
| 2 | PXI Peripheral Slot | 4 | PXI Express System Timing Slot |

Figure 1. Symbols for PXI Express/ PXI Express Hybrid/ PXI Slots

3. Remove the filler panel and touch any metal part of the chassis to discharge static electricity.

4. Place the module edges into the module guides at the top and bottom of the slot.

⚠ **Caution** When installing the module, make sure both edges are positioned inside the guides and that the module components do not come into contact with adjacent modules.

5. Slide the module along the guides until it reaches the rear connector, then seat the module by pushing the front panel until it is flush with the front panel of the chassis.

6. Secure the module to the chassis using the front-panel captive screws, shown in Figure 2. Tighten the screws to 0.31 N · m (2.7 lb · in.).
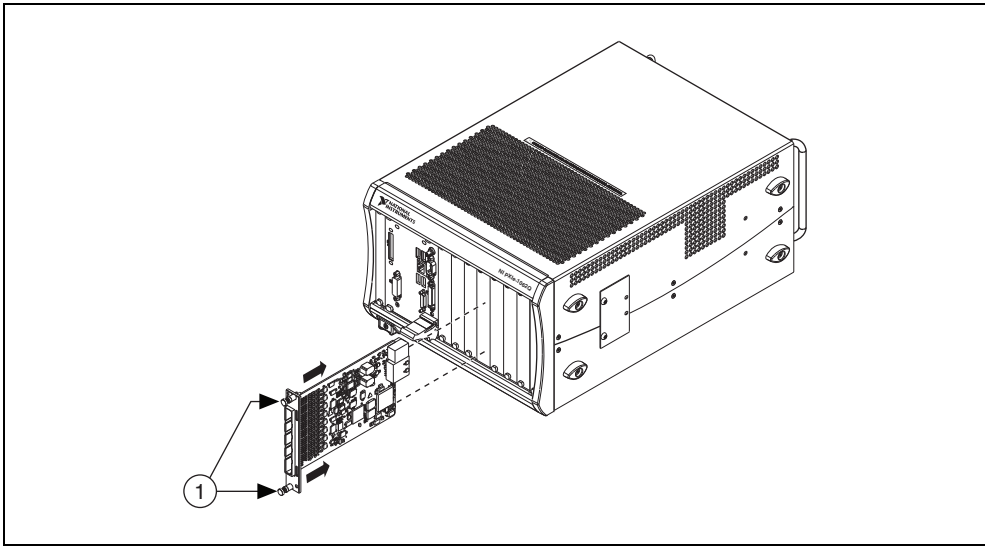
| 1 | Captive Screws |

Figure 2. Installing NI SC Express Modules

Step 3. Connect the Signals

⚠️ **Caution** To ensure the specified EMC performance, operate this product only with shielded cables and accessories.

📝 **Note** Refer to the *Read Me First: Safety and Electromagnetic Compatibility* document before removing equipment covers or connecting or disconnecting any signal wires.

To connect signals to the terminal block, refer to Figures 3 and 4 while completing the following steps:

📝 **Note** You can find the pinout names and locations in MAX at any time by right-clicking the device name under **Devices and Interfaces** and selecting **Device Pinouts**.

1. Loosen the captive top cover screws and remove the top cover.
2. Loosen the strain-relief screws and remove the strain-relief bar.
3. Prepare the signal wire by stripping the insulation no more than 7 mm (0.28 in.).
4. Run the signal wires through the strain-relief opening.

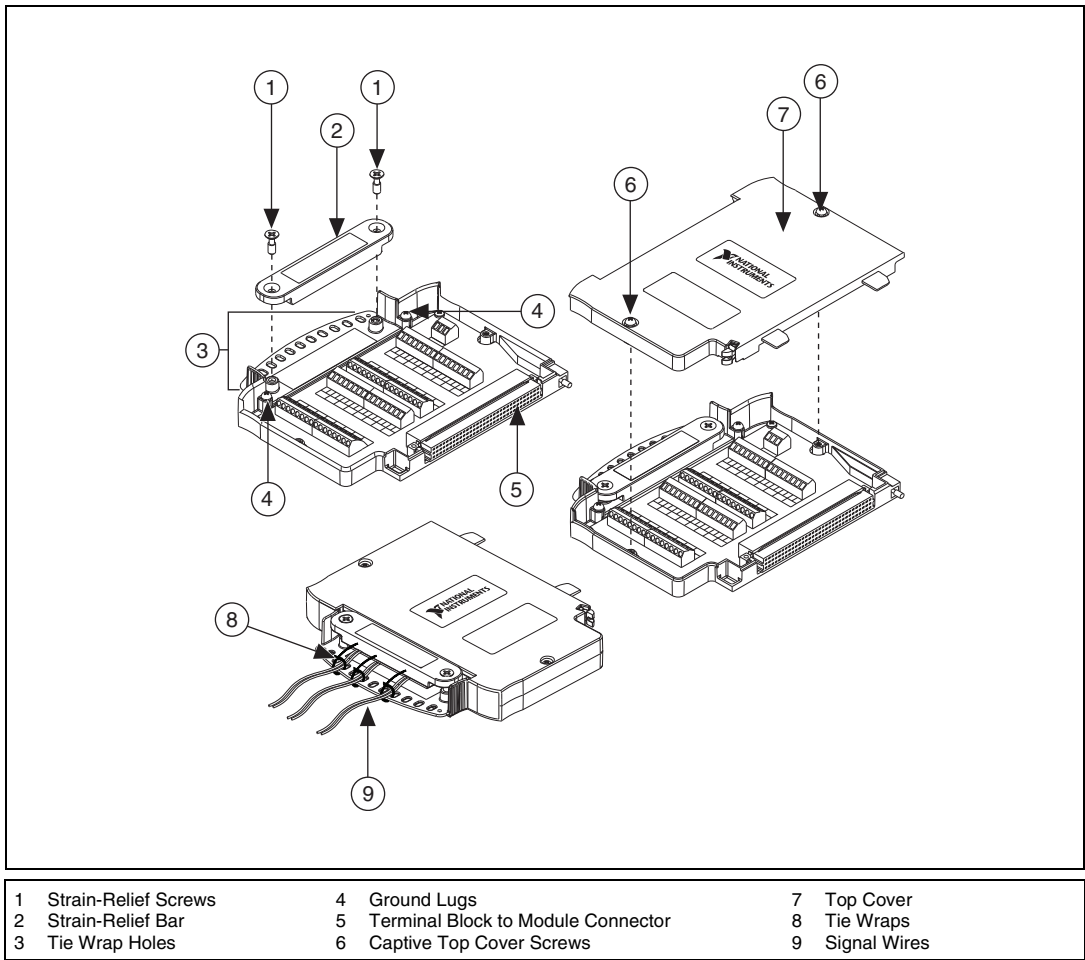| 1	Strain-Relief Screws	4	Ground Lugs	7	Top Cover
2	Strain-Relief Bar	5	Terminal Block to Module Connector	8	Tie Wraps
3	Tie Wrap Holes	6	Captive Top Cover Screws	9	Signal Wires

Figure 3. TB-4353 Parts Locator Diagram

5. Insert the stripped end of the signal wires fully into the appropriate terminal. Refer to the label next to each screw terminal to determine the function of the terminal. The *NI PXIe-4353 User Manual* provides more detailed wiring information. Make sure no exposed wire extends past the screw terminal. Exposed wire increases the risk of a short circuit that can cause circuit failure.

| 1 | Thermistors | 2 | Screw Terminals |
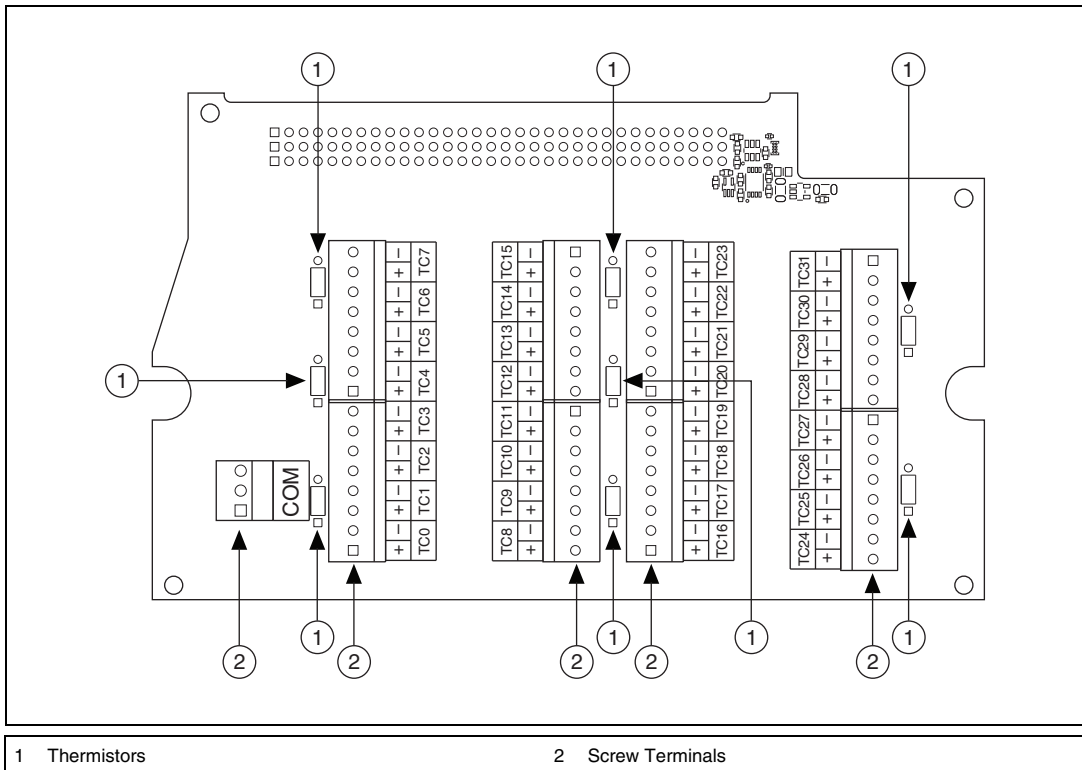
Figure 4. TB-4353 Circuit Board Parts Locator Diagram

6. Tighten the terminal screws to a torque of 0.3 N · m (2.7 lb · in.).

Note In most applications, connection to the COM terminal is not necessary. However, its proper connection will improve common-mode rejection performance when two or more channels are connected to different common-mode voltages. In this case, connect COM to earth ground or a fixed reference voltage, depending on your isolation requirements. All thermocouple channels with respect to COM on the NI PXIe-4353 *must* remain within ±10 V. Refer to the *NI PXIe-4353 User Manual* for more information about proper connection of the COM terminal.

Caution Any wires connected to the ground must be sufficiently insulated from high voltage.

7. Attach cable shields to the ground lugs to connect them to chassis ground.

Note Refer to the *NI PXIe-4353 User Manual* for details about shielding the signals.

8. Reinstall the strain-relief bar and tighten the strain-relief screws.

9. Use tie wraps to connect the signal wires to the tie-wrap holes for additional strain relief when necessary.

10. Reinstall the top cover and tighten the captive top cover screws.

For information about CJC and accuracy considerations refer to the *Cold-Junction Compensation* section.

> ✎ **Note** For information about sensors, go to `ni.com/sensors`.

Step 4. Install the Terminal Block

> ⚠ **Caution** Do not supply hazardous voltages (>30 V_{rms}/42.4 V_{pk}/60 VDC) to the terminal block without the terminal block being connected to the NI PXIe-4353.

> ✎ **Note** The chassis can be powered on or off when installing the terminal block.

Refer to Figure 5 to install the terminal block on the module while completing the following steps:

1. Move the TB-4353 into position in front of the NI PXIe-4353 and engage the alignment feature with the guide on the associated module.

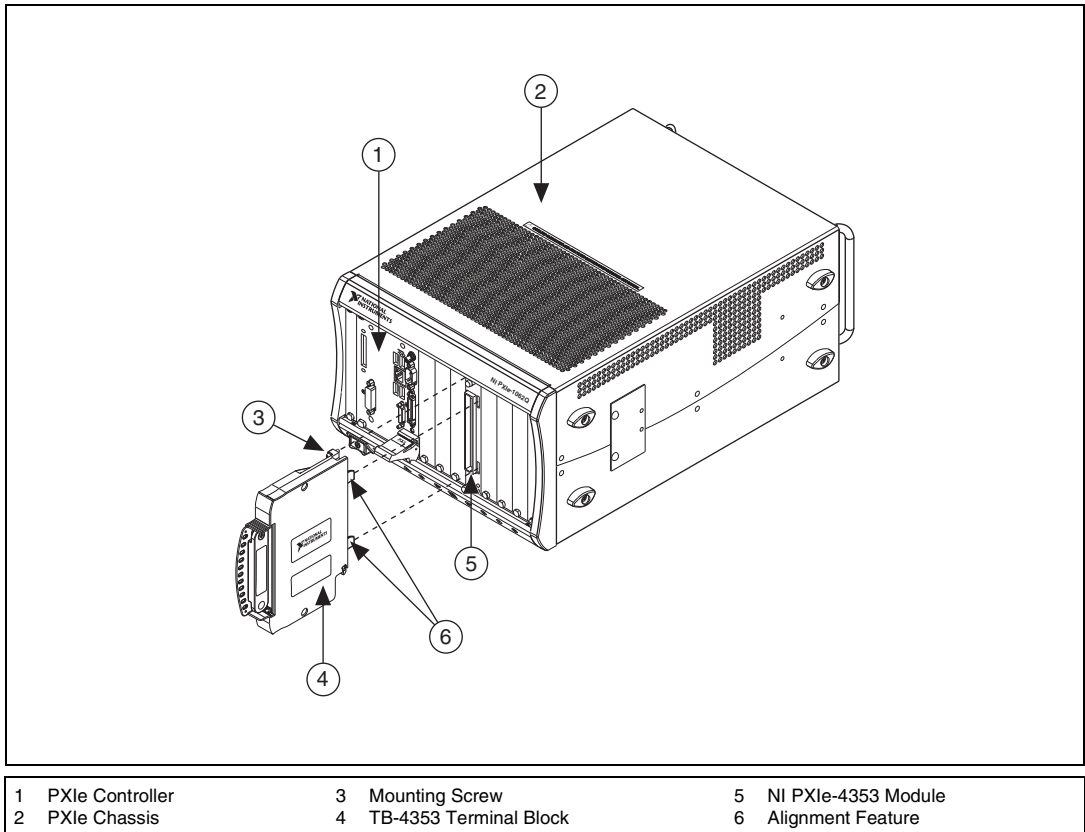| 1 | PXIe Controller | 3 | Mounting Screw | 5 | NI PXIe-4353 Module |
| 2 | PXIe Chassis | 4 | TB-4353 Terminal Block | 6 | Alignment Feature |

Figure 5. Installing the TB-4353 on the NI PXIe-4353 Module

2. Attach the TB-4353 to the NI PXIe-4353 module by pushing the terminal block straight into the module. A spring mechanism will lock in the bottom of the terminal block.

3. Tighten the mounting screw at the top of the TB-4353 to a maximum torque of 0.55 N · m (4.9 lb · in.) to attach it to the NI PXIe-4353 module.

Note For safety purposes and to prevent damage to equipment when high voltages are present, all NI SC Express modules and terminal blocks are keyed to prevent connection between incompatible terminal blocks, modules, and/or cables.

4. Power on the chassis if it is powered off.

Figure 6 shows an example NI SC Express system setup.

| 1 | Terminal Block | | 2 | Signal Input |

Figure 6. Sample NI SC Express System

Step 5. Confirm NI SC Express Module Recognition

To confirm module recognition, complete the following steps:

Note Make sure you are using the most recent version of NI-DAQmx. If you are using an older version of the driver software, the NI SC Express terminal block may work only in basic functionality mode. Unsupported terminal blocks appear in Measurement & Automation Explorer (MAX) with an X next to them.

1. Launch MAX.
2. Expand **Devices and Interfaces»NI-DAQmx Devices** to confirm that MAX detects the module and terminal block. The terminal block should appear beneath its associated module. If your module or terminal block is not listed, press <F5> to refresh MAX. If the module is still not recognized, go to `ni.com/support/daqmx`.

> **Tip** Using an NI-DAQmx simulated device, you can test NI-DAQmx applications without installing hardware. Refer to the *Create a Simulated Device* section for instructions for creating NI-DAQmx simulated devices.
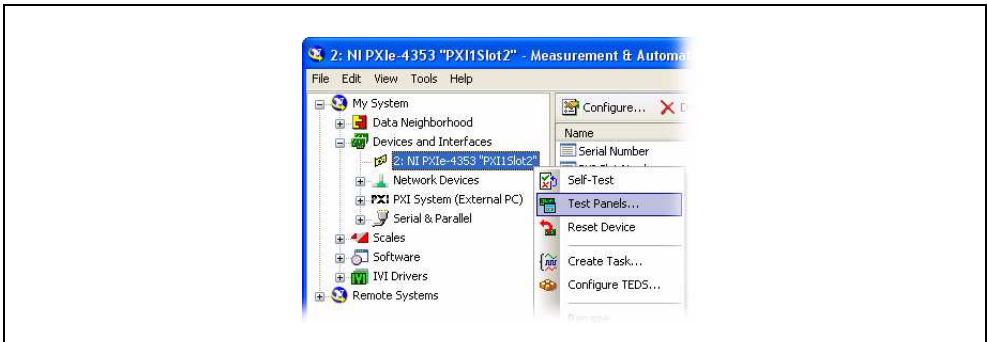
3. Right-click the module name and select **Self-Test**. When the self-test completes, a verification message appears. If an error occurs, refer to `ni.com/support/daqmx`.

For information about sensors, go to `ni.com/sensors`.

Step 6. Run Test Panels

1. In MAX, expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Right-click the device, and select **Test Panels**.

3. Click **Start** to test device functions, or **Help** for operating instructions.

To troubleshoot errors, refer to the *NI-DAQmx Help*, or go to `ni.com/support`.

Step 7. Take an NI-DAQmx Measurement

NI-DAQmx Channels and Tasks

Refer to the *NI-DAQmx Help* for complete information about channels and tasks.

Use the DAQ Assistant to configure virtual channels and tasks in MAX or in your application.

Configure a Task Using the DAQ Assistant from MAX

Complete the following steps to create a task using the DAQ Assistant in MAX:

1. In MAX, right-click **Data Neighborhood** and select **Create New** to open the DAQ Assistant.

2. Select **NI-DAQmx Task** and click **Next**.

3. Select **Acquire Signals**.

> **Note** The NI PXIe-4353 cannot generate signals.

4. Select **Analog Input** and the measurement type, such as **Temperature»Thermocouple** or **Voltage**.

5. Select the physical channel(s) to use and click **Next**.

6. Name the task and click **Finish**.

7. Configure the individual channel settings. Each physical channel you assign to a task receives a virtual channel name. To modify the input range or other settings, select the channel. Click **Details** for physical channel information. Configure the timing and triggering for your task. Click **Run**.

Step 8. Use Your NI SC Express 4353 in an Application

For NI software version compatibility, refer to the NI-DAQmx Readme, available from **Start» All Programs»National Instruments»NI-DAQmx**.

To get started with data acquisition in your application software, refer to the tutorials listed in Table 1.

Table 1. DAQ Assistant Tutorial Locations

Application	Tutorial Location
LabVIEW	Go to **Help»Search the LabVIEW Help**. Next, go to **Getting Started with LabVIEW» Getting Started with DAQ»Taking an NI-DAQmx Measurement in LabVIEW**.
LabWindows/CVI	Go to **Help»Contents**. Next, go to **Using LabWindows/CVI»Data Acquisition»Taking an NI-DAQmx Measurement in LabWindows/CVI**.
Measurement Studio	Go to **NI Measurement Studio Help»Getting Started with the Measurement Studio Class Libraries»Measurement Studio Walkthroughs»Walkthrough: Creating a Measurement Studio NI-DAQmx Application**.
LabVIEW SignalExpress[*]	Go to **Help»Taking an NI-DAQmx Measurement in SignalExpress**.
[*] LabVIEW SignalExpress, an easy-to-use configuration-based tool for data logging applications, is at **Start» All Programs»National Instruments»LabVIEW SignalExpress**.	

Programming Examples

NI-DAQmx includes example programs to help you get started developing an application. LabVIEW and CVI examples are located at **Help»Find Examples** in your application software. Text-based code examples are located at **All Programs»National Instruments»NI-DAQ»Text-Based Code Support» ANSI C Examples**. Modify example code and save it in an application, or use examples to develop a new application or add example code to an existing application.

For other examples, go to ni.com/info and enter the Info Code daqmxexp. For additional examples, refer to zone.ni.com.

Removal

Step 1. Remove the Terminal Block

Later TB-4353 revisions include a latch release that you can use to remove the terminal block from the module. You can remove any TB-4353 revision by tilting the terminal block down and away from the module.

⚠ **Caution** Do not supply hazardous voltages (>30 V_{rms}/42.4 V_{pk}/60 VDC) to the terminal block without the terminal block being connected to the NI PXIe-4353.

Refer to Figure 7 to remove the terminal block from the module while completing the following steps:

📝 **Note** The chassis can be powered on or off when removing the terminal block.

1. Loosen the mounting screw located at the top of the terminal block.

2. To remove the terminal block using a latch release:

    a. Raise the latch release using a flathead screwdriver to disengage the latch.

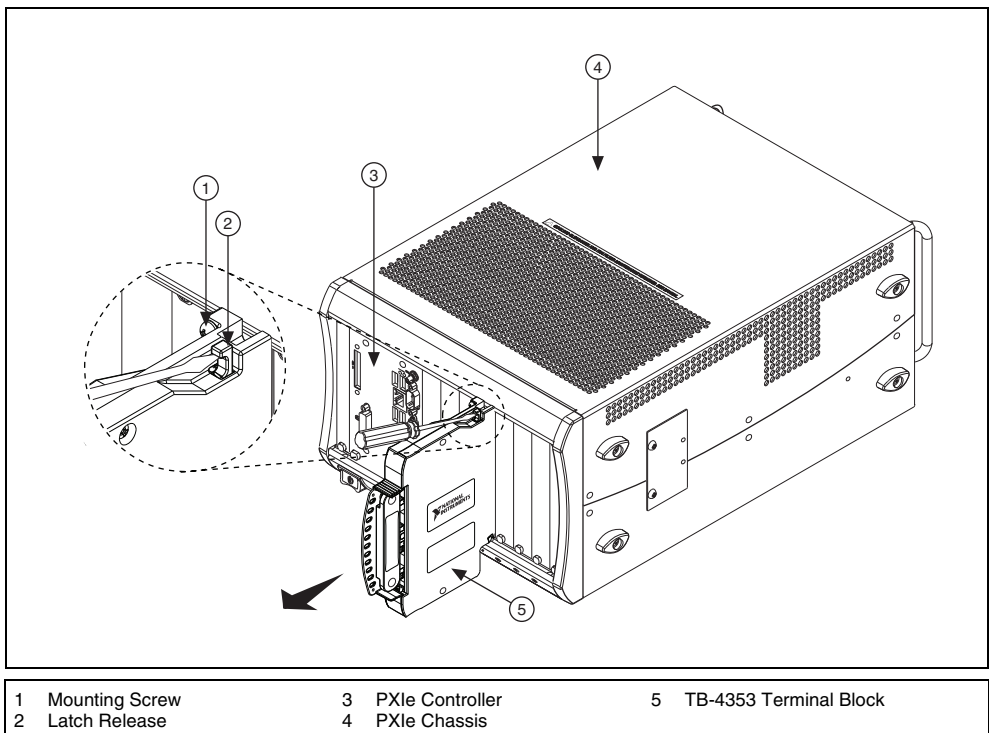   b. With the latch release raised, grasp the terminal block and pull it away from the module.

1	Mounting Screw	3	PXIe Controller	5	TB-4353 Terminal Block
2	Latch Release	4	PXIe Chassis		

Figure 7. Removing the TB-4353 from the NI PXIe-4353 Module (Latch Release Method)

Refer to Figure 8 to remove the terminal block from the module while completing the following steps:

To remove the terminal block without using a latch release:

    a. Tilt the terminal block down and away from the module to disengage the latch.

    b. Grasp the terminal block and pull it away from the module.
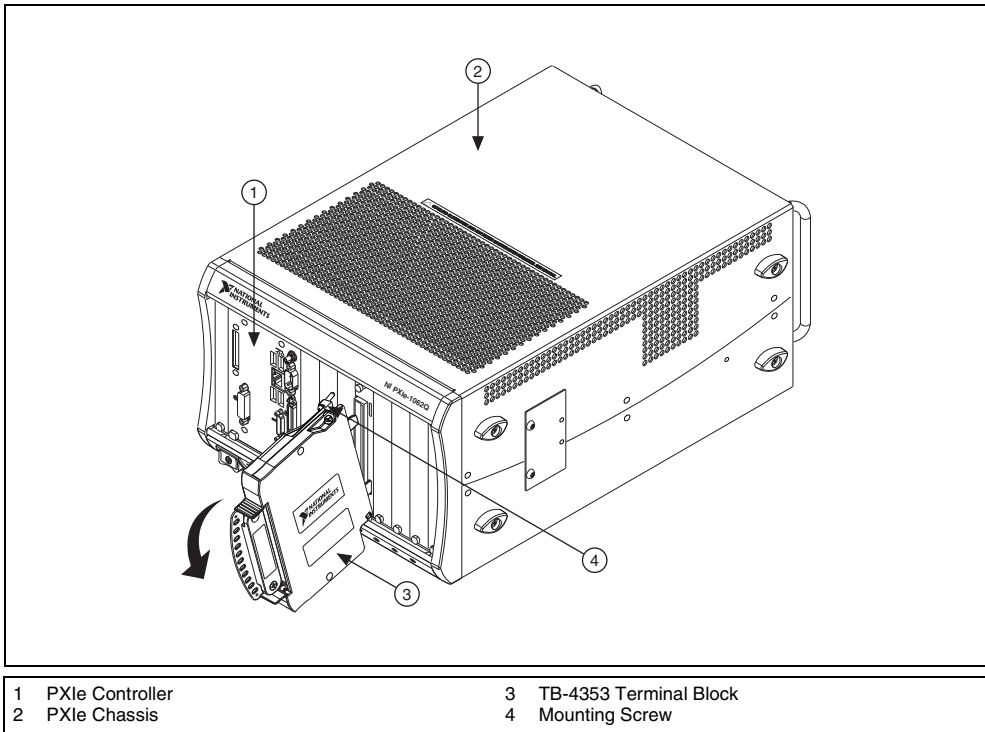
| 1 | PXIe Controller | 3 | TB-4353 Terminal Block |
| 2 | PXIe Chassis | 4 | Mounting Screw |

Figure 8. Removing the TB-4353 from the NI PXIe-4353 Module (Tilt-Down Method)

3. Store the terminal block in an antistatic protective bag.

Step 2. Remove the Module

⚠ **Caution** Do *not* remove a module with the power on. Doing so can damage the module.

1. Make sure that the chassis is powered off before removing the module.
2. Loosen the captive screws on the top and bottom of the module.

⚠ **Caution** Do *not* pull the front panel to remove the module. Doing so may cause module components to come into contact with adjacent modules, causing damage to the modules.

3. Pull the captive screws to unseat the module and slowly slide the module along the guides, as shown in Figure 9.
4. Replace the filler panel in the empty slot.
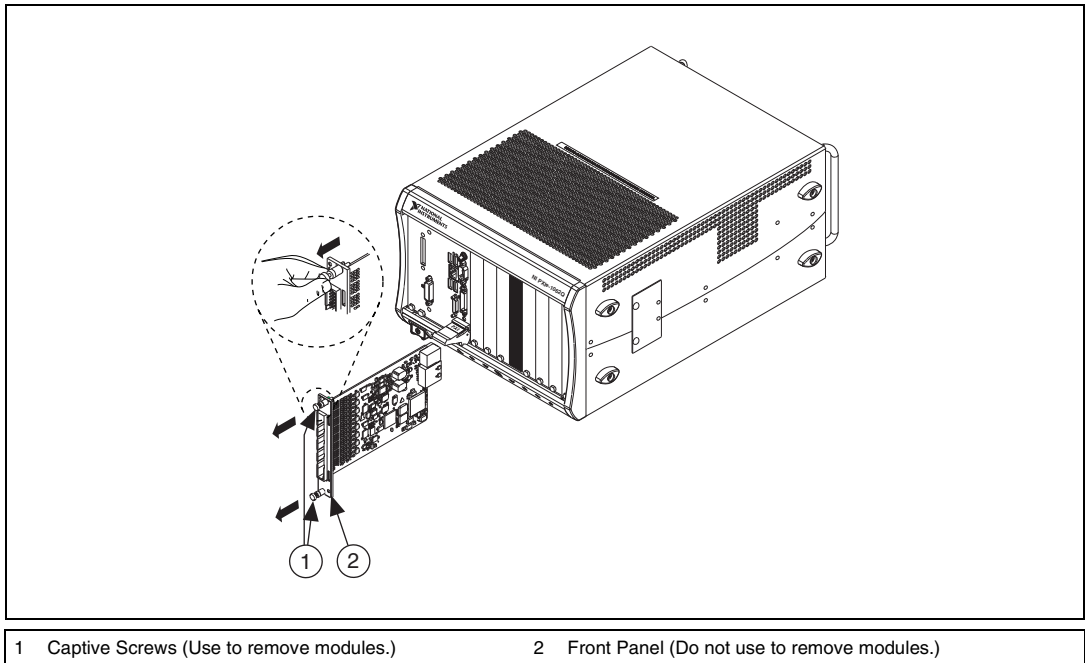5. Store the module in an antistatic protective bag.

| 1 | Captive Screws (Use to remove modules.) | 2 | Front Panel (Do not use to remove modules.) |

Figure 9. Removing NI SC Express Modules

Create a Simulated Device

To run examples without the hardware installed, use an NI-DAQmx simulated device. To create a simulated device in MAX:

1. Launch MAX.
2. Right-click **Devices and Interfaces»Create New**.
3. From the dialog, select **Simulated NI-DAQmx Device or Modular Instrument**.
4. Type 4353 in the text box at the top of the window.
5. Select the device from the list provided.
6. Click **OK**.

Cold-Junction Compensation

Cold-junction compensation is the process of measuring the temperature of the screw terminal junction for the thermocouple and applying a representative compensating voltage to the voltage measured by the thermocouple channel. The accuracy of the cold-junction temperature measurement is a key part of the accuracy of the overall thermocouple temperature measurement. The TB-4353 is carefully designed to ensure high-accuracy cold-junction temperature measurements, under a variety of conditions; however, care must be taken to ensure the best possible accuracy. Refer to the *Minimizing Thermal Gradients* section for guidelines to minimize thermal gradients that could impact the CJC accuracy. Refer to the *Specifications* section for the CJC accuracy specifications.

The TB-4353 contains eight thermistors that are used to measure the temperature of the adjacent screw terminal junctions for the CJC that is performed when computing the thermocouple temperature measurement. These eight thermistors are measured using the CJC channels on the NI PXIe-4353 module. Each thermistor measures the CJC temperature for a subset of associated thermocouple channels as shown in Figure 10. The dashed lines indicate the channel to CJC associations. NI-DAQmx automatically associates the correct thermistor with the thermocouple measurements when you use the **Thermocouple Channel-Type** and select **built-in** for the CJC source.

| 1 | CJC0 | 3 | CJC2 | 5 | CJC4 | 7 | CJC6 |
| 2 | CJC1 | 4 | CJC3 | 6 | CJC5 | 8 | CJC7 |

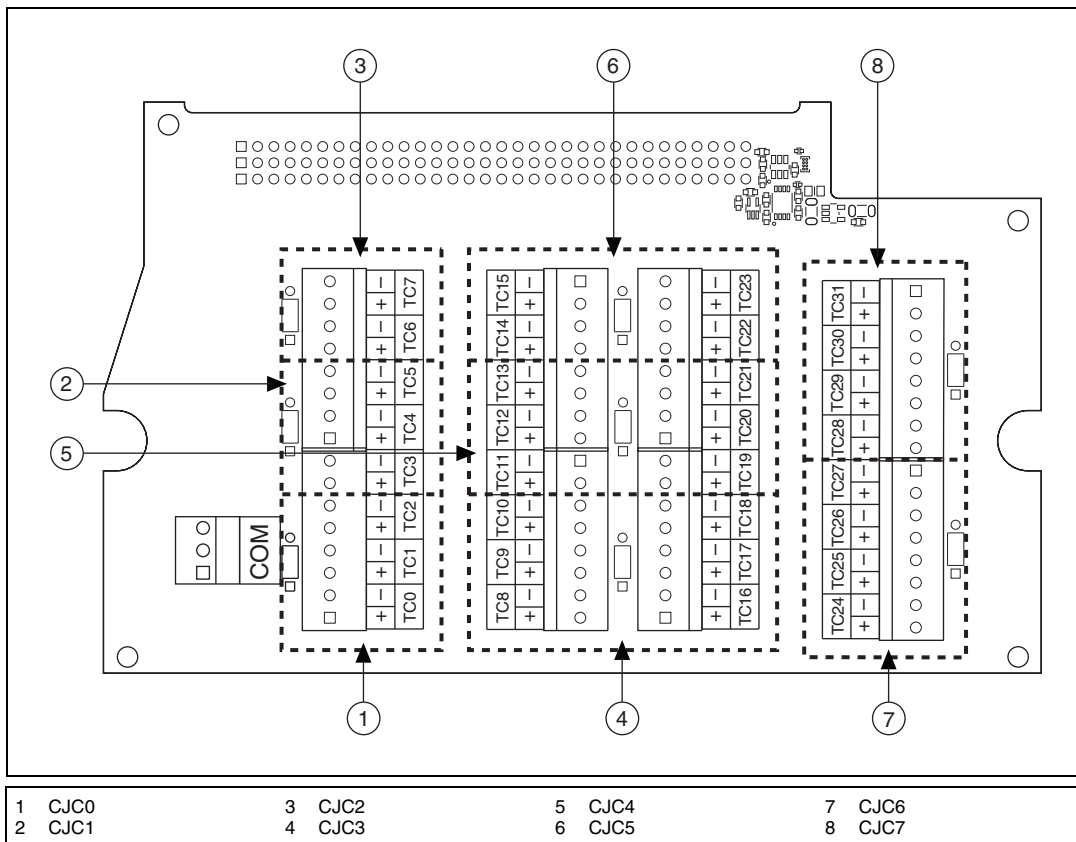**Figure 10.** TB-4353 CJC Grouping Locations

Table 2. CJC to Thermocouple Channels Associations

CJC	Associated Thermocouples	CJC	Associated Thermocouples
CJC0	AI <0..2>	CJC4	AI <11..13>, AI <19..21>
CJC1	AI <3..5>	CJC5	AI <14, 15>, AI <22, 23>
CJC2	AI <6, 7>	CJC6	AI <24..27>
CJC3	AI <8..10>, AI <16..18>	CJC7	AI <28..31>

Minimizing Thermal Gradients

Thermal gradients can be caused by changes in the ambient air temperature near the terminal block, heat sources from other devices near the terminal block, or by the thermocouple wire if it conducts heat to or away from the terminal junctions. For optimal CJC accuracy performance, ensure that changes in ambient temperature and temperature gradients near the terminal block are kept to a minimum. Follow these guidelines to minimize thermal gradients that could impact the CJC accuracy:

- Use the smallest gauge thermocouple wire suitable for the application. Smaller wire transfers less heat to or from the terminal junction.

- Run thermocouple wiring together near the terminal block to keep the wires at the same temperature.

- Avoid running thermocouple wires near hot or cold objects.

- If you connect any extension wires to thermocouple wires, use wires made of the same conductive material as the thermocouple wires.

- Minimize adjacent heat sources and air flow across the terminal block.

- Keep the ambient temperature as stable as possible.

- Keep the terminal block, module, and chassis in a stable and consistent orientation.

- Install the PXIe filler panels in any unused slots.

- When stacking the system, avoid stacking above a heat source as heat rises and can introduce error.

- Allow the thermal gradients to settle after a change in system power or in ambient temperature. A change in system power can happen when the system powers on. Refer to the warm-up time in the *NI PXIe-4353 Specifications* for more information.

- Replace the fan filters in the PXIe chassis regularly to ensure proper system cooling.

Calibrate the Module and Terminal Block

To download available external calibration documents, visit the National Instruments Web site at `ni.com/info` and enter the Info Code `manualcal`. For external calibration of products not listed there, Basic Calibration Service or Detailed Calibration Service is recommended. You can get information about both of these calibration services at `ni.com/calibration`. NI recommends performing an external calibration once a year.

More Information

After you install NI-DAQmx, the NI-DAQmx documentation is available from **Start»All Programs» National Instruments»NI-DAQ**. Additional resources are online at `ni.com/gettingstarted`.

You can access online device documentation by right-clicking your module in MAX and selecting **Help»Online Device Documentation**. A browser window opens to `ni.com/manuals` with the results of a search for relevant documents. If you do not have Web access, documents for supported modules are included on the NI-DAQmx media.

Troubleshooting

- Go to `ni.com/support/install` or `ni.com/kb`.

- If you need to return your National Instruments hardware for repair or device calibration, go to `ni.com/info` and enter `rdsenn` to start the Return Merchandise Authorization (RMA) process.

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.

A Declaration of Conformity (DoC) is our claim of compliance with the Council of the European Communities using the manufacturer's declaration of conformity. This system affords the user protection for electromagnetic compatibility (EMC) and product safety. You can obtain the DoC for your product by visiting `ni.com/certification`. If your product supports calibration, you can obtain the calibration certificate for your product at `ni.com/calibration`.

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, visit the Worldwide Offices section of `ni.com/niglobal` to access the branch office Web sites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

Specifications

Note NI PXIe-4353 module specifications are located in the *NI PXIe-4353 Specifications* document.

All specifications are typical for the range of 0 °C to 55 °C unless otherwise specified.

Electrical

Cold-junction sensors

    Sensor type...NTC thermistor, 10 kΩ nominal

    Steinhart-Hart scaling coefficients[1]

        A...1.1288643×10^{-3}

        B...2.3414908×10^{-4}

        C...8.7706554×10^{-8}

CJC accuracy[2]

	Typical		Maximum	
Terminal Block	**23 °C ±5 °C**	**0 °C to 55 °C**	**23 °C ±5 °C**	**0 °C to 55 °C**
TB-4353	0.20 °C	0.35 °C	0.30 °C	0.45 °C

Input voltage range ....Refer to the *NI PXIe-4353 Specifications* document.

Calibration

Calibration interval ....1 year

Mechanical

Screw terminal wire gauge.....................................14 AWG max

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[1] Refer to the software documentation for details about scaling the thermistor readings.

[2] This includes the combined effects of the thermistor accuracy and the temperature difference between the screw terminal and its associated thermistor.
This represents performance for wire gauges of 24 AWG and smaller.
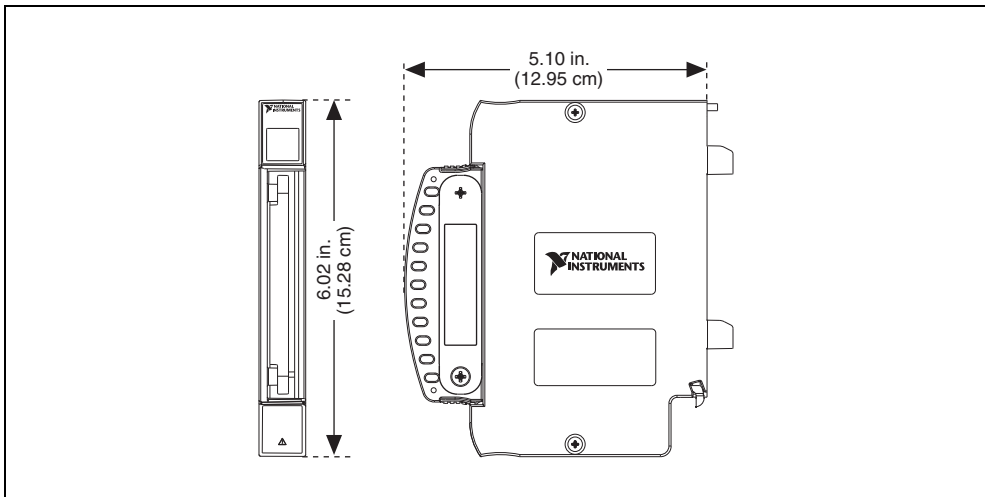
Physical

Figure 11. TB-4353 Dimensions

Weight ....660 g (23.3 oz)

Environmental Specifications

Maximum altitude..2,000 m (800 mbar)

Pollution degree 2

Indoor use only

Operating Environment

Ambient temperature range ....0 °C to 55 °C
(Tested in accordance with IEC-60068-2-1
and IEC-60068-2-2. Meets MIL-PRF-28800F
Class 3 low temperature limit and MIL-PRF-28800F
Class 2 high temperature limit.)

Relative humidity range..10% to 90%, noncondensing
(Tested in accordance with IEC-60068-2-56.)

Storage Environment

Ambient temperature range ....−40 °C to 71 °C
(Tested in accordance with IEC-60068-2-1 and
IEC-60068-2-2. Meets MIL-PRF-28800F Class 3
limits.)

Relative humidity range..5% to 95%, noncondensing
(Tested in accordance with IEC-60068-2-56.)

Shock and Vibration

Operating shock ....30 g peak, half-sine, 11 ms pulse
(Tested in accordance with IEC-60068-2-27.
Meets MIL-PRF-28800F Class 2 limits.)

Random vibration

Operating ....5 Hz to 500 Hz, 0.3 g_{rms}

Nonoperating ....5 Hz to 500 Hz, 2.4 g_{rms}
(Tested in accordance with IEC-60068-2-64.
Nonoperating test profile exceeds the requirements
of MIL-PRF-28800F, Class 3.)

Safety Voltages

Refer to the *NI PXIe-4353 Specifications* document for maximum voltage limits.

Isolation

Channel-to-channel.......................................None

Channel-to-earth ground ....300 V_{rms}, Measurement Category II

Measurement Category II is for measurements performed on circuits directly connected to the electrical distribution system. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet, for example, 115 V for U.S. or 230 V for Europe.

⚠ **Caution** Do *not* connect the TB-4353 to signals or use for measurements within Measurement Categories III or IV.

⚠ **Caution** The protection provided by the TB-4353 can be impaired if it is used in a manner not described in this document.

Safety Standards

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

📝 **Note** For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

Electromagnetic Compatibility

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

*   EN 61326-1 (IEC 61326-1): 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

📝 **Note** In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia and New Zealand (per CISPR 11) Class A equipment is intended for use only in heavy-industrial locations.

Note Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generates radio frequency energy for the treatment of material or inspection/analysis purposes.

Note For EMC declarations and certifications, refer to the *Online Product Certification* section.

Note For EMC compliance, operate this product with shielded cables.

CE Compliance C E

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and 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.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *NI and the Environment* Web page at ni.com/ environment. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers At the end of the product life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste and Electronic Equipment, visit ni.com/environment/weee.

电子信息产品污染控制管理办法 （中国 RoHS）

中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。 关于 National Instruments 中国 RoHS 合规性信息，请登录 ni.com/environment/rohs_china。 (For information about China RoHS compliance, go to ni.com/environment/rohs_china.)