ACC-4162-1/ ACC-4163-1 Accessory User Manual

2025-03-20

Contents

PXIe-416x Current and Open-Sense Protection Accessory

This document explains how to install and use the following accessories with a corresponding PXIe-4162/PXIe-4163 precision source measure unit (SMU):

- **ACC-4162-1**—PXIe-4162 Current and Open-Sense Protection Accessory (part number 788403-01)
- **ACC-4163-1**—PXIe-4163 Current and Open-Sense Protection Accessory (part number 788404-01)

In addition, this document contains accessory specifications.

The ACC-4162-1 and ACC-4163-1 modify the behavior of the corresponding PXIe-416x SMU to provide the following benefits:

- Output regulation provided by a high-impedance connection between force and sense lines for scenarios where the sense lines disconnect from the DUT.
- Enhanced protection for the module, system, and DUT by limiting fast transient current spikes in the following scenarios:
  - The DUT shorts to ground
  - The DUT is charged to a voltage that does not match the SMU output voltage

Notice This device is intended for use only with the corresponding PXIe-4162/PXIe-4163 SMU.

Read this document before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

The Additional Resources section describes how to locate more information about your product, including specifications, pinouts, and instructions for connecting, installing, and configuring your system.

Caution Observe all instructions and cautions in the user documentation. Using the product in a manner not specified can damage the product and compromise the built-in safety protection.

Attention Suivez toutes les instructions et respectez toutes les mises en garde de la documentation d'utilisation. L'utilisation du produit de toute autre façon que celle spécifiée risque de l'endommager et de compromettre la protection de sécurité intégrée.

Icons

	**Notice** Take precautions to avoid data loss, loss of signal integrity, degradation of performance, or damage to the model.
	**Caution** Take precautions to avoid injury. Consult the model documentation for cautionary statements when you see this icon printed on the model. Cautionary statements are localized into French for compliance with Canadian requirements.

Kit Contents and Other Equipment

You need the following additional items to install and use a ACC-4162-1 or ACC-4163-1 Current and Open-Sense Protection Accessory.

- PXIe-4162/PXIe-4163
- Number 1 Phillips-head screwdriver

Verifying the Accessory Model

Verify the correct accessory model is attached to ensure proper operation of all channels.

SMU Model	Accessory Model	Accessory Part Number
PXIe-4162	ACC-4162-1	788403-01
PXIe-4163	ACC-4163-1	788404-01

Installing the Accessory

Complete the following steps to install a ACC-4162-1 or ACC-4163-1 with a corresponding PXIe-4162/PXIe-4163 SMU.

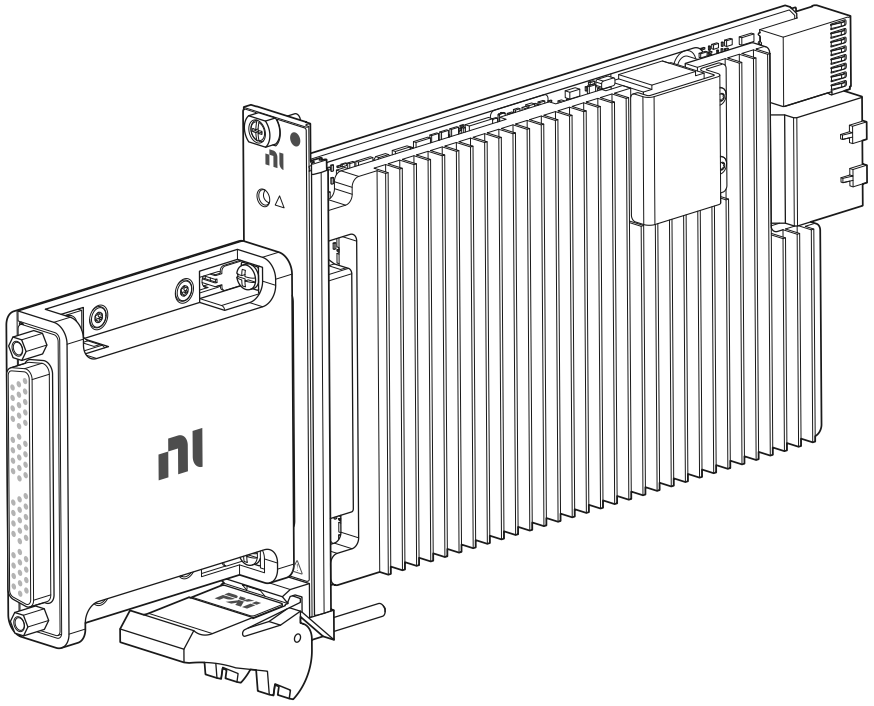
Notice This accessory is intended for use only with the corresponding PXIe-4162/PXIe-4163 SMU. Verify the correct accessory model is attached to the corresponding PXIe-4162/PXIe-4163 SMU to ensure proper operation of all channels. Do not connect the accessory to other device models.

Notice To ensure that the accessory is detected accurately in configuration software you must reboot the chassis after installing or uninstalling the accessory.

- Install the PXIe-416x in a chassis. Refer to the getting started guide for your module at ni.com/docs for installation instructions.
- Ensure that all signals are disconnected from the PXIe-416x.

1. Turn off the chassis using the power switch.
2. Connect the ACC-416x-1 accessory to the PXIe-416x.
   a. Align the male D-SUB connector on the ACC-416x-1 accessory and the female D-SUB connector on the front of the PXIe-416x and attach.
   b. Tighten the screws on the front of the ACC-416x-1 accessory until it is secured to the PXIe-416x.

Figure 1. Current and Open-Sense Protection Accessory connected to a PXIe-416x



3. Connect a compatible cable or connectivity accessory to the ACC-416x-1 accessory. Refer to your cable or accessory documentation for more information.
   Refer to the following pinouts for your respective module to make the appropriate connections for your application.

Figure 2. PXIe-4162 Pinout with ACC-4162-1

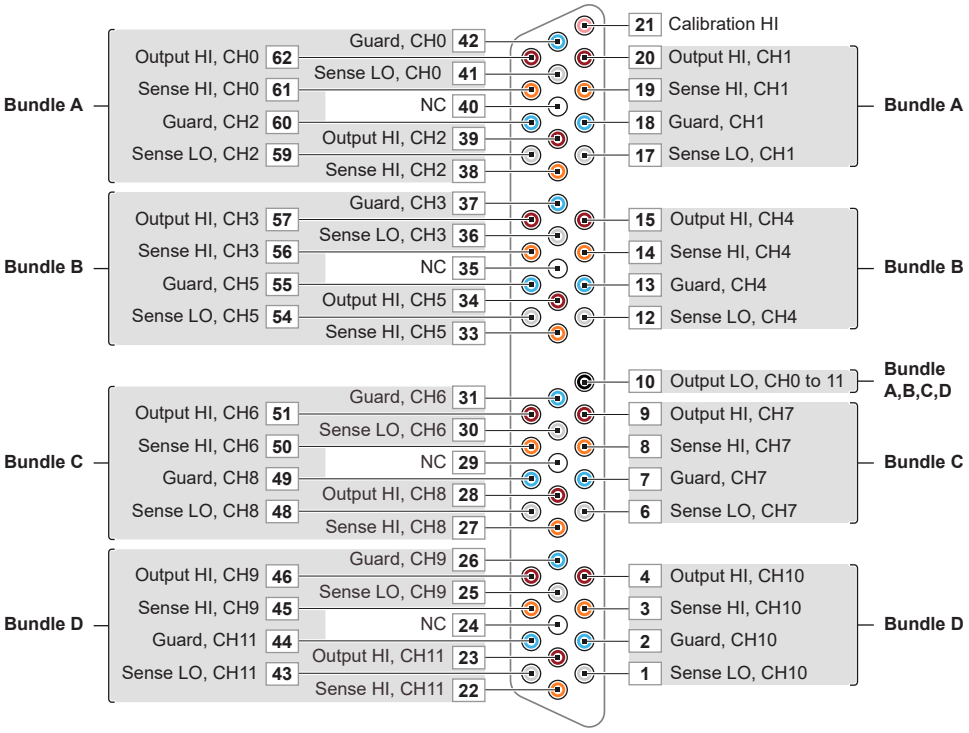
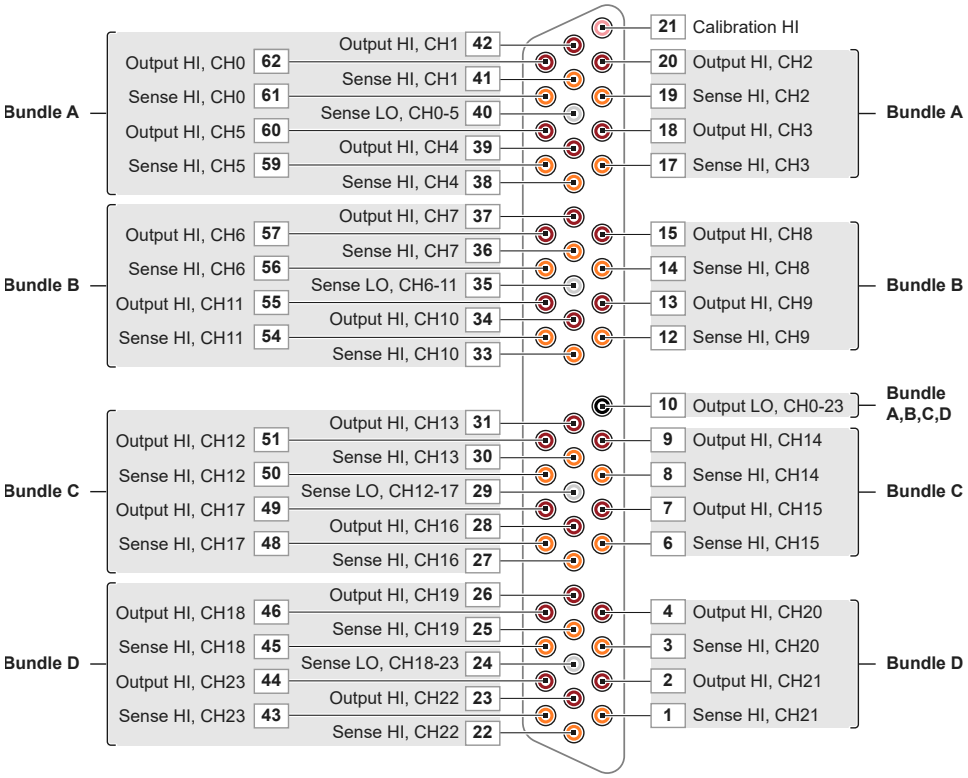


Figure 3. PXIe-4163 Pinout with ACC-4163-1



Uninstalling the Accessory

Notice To ensure that the accessory is detected accurately in configuration software you must reboot the chassis after installing or uninstalling the accessory.

1. Disconnect any attached cable or connectivity accessory from the ACC-416x-1 accessory.
2. Loosen the screws on the front of the ACC-416x-1 accessory.
3. Detach the accessory from the PXIe-416x.

Accessory Specifications

These specifications apply to the ACC-4162-1 or ACC-4163-1 while in use with the corresponding the PXIe-4162/PXIe-4163 SMU. These specifications supercede the relevant device specifications while the accessory is attached.

Notice You must verify that the correct accessory model is attached to ensure that these specifications are in effect. You can determine the connected accessory model with NI Measurement & Automation Explorer or the NI Systems Configuration API.

Notice To ensure that the accessory is detected accurately in configuration software you must reboot the chassis after installing or uninstalling the accessory.

- The PXIe-4162 is a 12-Channel, ±24 V, 100 mA SMU.
- The PXIe-4163 is a 24-Channel, ±24 V, 50 mA SMU.

For complete device specifications refer to the PXIe-4162/PXIe-4163 specifications available at ni.com/docs.

Definitions

Warranted specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

Characteristics describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- ***Typical*** specifications describe the performance met by a majority of models.
- ***Nominal*** specifications describe an attribute that is based on design, conformance testing, or supplemental testing.

Specifications are ***Typical*** unless otherwise noted.

Remote Sense

Maximum sense lead resistance	100 Ω
Maximum force lead drop	1 V
Nominal resistance between force and sense lines	1 MΩ
Voltage accuracy	Add 200 µV to the corresponding PXIe-4162/PXIe-4163 SMU accuracy specification when using a ACC-416x-1 accessory.

Accessory Specifications

Current Slew Rate Limit	
ACC-4162-1	11–15 mA/µs
ACC-4163-1	5–7 mA/µs
Leakage resistance[1]	
23 °C	>500 GΩ, typical

1. Applies between HI and LO terminals. Leakage performance may be degraded for operation above 70% relative humidity. When transitioning a device from a storage or operation environment with operating humidity above 70%, allow the device to stabilize in the lower humidity environment for several hours before use.

Table 1. Force Series Resistance

Accessory	Typical	Maximum[2]
ACC-4162-1	12 Ω	17 Ω
ACC-4163-1	25 Ω	32 Ω

Load Regulation

For remote sense voltage accuracy (with the accessory attached), the lead drop is measured from the accessory output to the load.

For local sense voltage accuracy, consult the following table.

Table 2. Voltage Load Regulation with Local Sense

Accessory	Typical Voltage	Maximum Voltage
ACC-4162-1	12 mV/mA	17 mV/mA
ACC-4163-1	25 mV/mA	32 mV/mA

Physical

Dimensions	75 mm × 81 mm × 19 mm (3.0 in. × 3.2 in. × 0.7 in.)
Weight	141 g (4.97 oz)

Safety Voltage and Current

DC voltage	
Range	±24 V

2. Maximum resistance includes variation over operating temperature range.

Functional isolation, any pin to earth ground	60 V DC

Note Pins are functionally isolated from chassis ground to prevent ground loops, but do not meet IEC 61010-1 for safety isolation.

Environmental Guidelines

Notice This model is intended for use in indoor applications only.

Environmental Characteristics

Temperature	
Operating	0 °C to 55 °C
Storage	-40 °C to 71 °C
Humidity[3]	
Operating	10% to 90%, noncondensing
Storage	5% to 95%, noncondensing
Pollution Degree	2
Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient temperature)

3. When transitioning a device from a storage or operation environment with relative humidity above 70%, device should be allowed to stabilize in the lower humidity environment for several hours before use. Refer to the ACC-416x-1 accessory Voltage, Current, and Resistance specifications for additional performance derating when operating above 70% relative humidity.

Shock and Vibration	
Operating vibration	5 Hz to 500 Hz, 0.3 g RMS
Non-operating vibration	5 Hz to 500 Hz, 2.4 g RMS
Operating shock	30 g, half-sine, 11 ms pulse

Compliance and Standards

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 ***Engineering a Healthy Planet*** 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.

EU and UK Customers

- **Waste Electrical and Electronic Equipment (WEEE)**—At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit ni.com/environment/weee.

电子信息产品污染控制管理办法（中国RoHS）

- **中国RoHS**— NI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NI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`.)

Export Compliance

This product is subject to control under the U.S. Export Administration Regulations (15 CFR Part 730 et. seq.) administered by the U.S. Department of Commerce's Bureau of Industry and Security (BIS) (www.bis.doc.gov) and other applicable U.S. export control laws and sanctions regulations. This product may also be subject to additional license requirements of other countries' regulations.

Additionally, this product may also require export licensing before being returned to NI. The issuance of a Return Material Authorization (RMA) by NI does not constitute export authorization. The user must comply with all applicable export laws prior to exporting or re-exporting this product. See ni.com/legal/export-compliance for more information and to request relevant import classification codes (e.g. HTS), export classification codes (e.g. ECCN), and other import/export data.

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.

Additional Resources

For best practices when using NI SMUs with IC test sockets, visit ni.com/r/ni-smus-test-ic-in-sockets.

Visit ni.com/docs and search for your SMU model to view additional information about the PXIe-4162/PXIe-4163, including:

- Getting started information
- Device specifications
- Calibration procedures
- Using SMUs with the NI-DCPower instrument driver

Visit ni.com and search to locate the safety, environmental, and regulatory information for your module:

- ***PXIe-4162 Safety, Environmental, and Regulatory Information***
- ***PXIe-4163 Safety, Environmental, and Regulatory Information***

NI Services

Visit ni.com/support to find support resources including documentation, downloads, and troubleshooting and application development self-help such as tutorials and examples.

Visit ni.com/services to learn about NI service offerings such as calibration options, repair, and replacement.

Visit ni.com/register to register your NI product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

NI corporate headquarters is located at 11500 N Mopac Expwy, Austin, TX, 78759-3504, USA.