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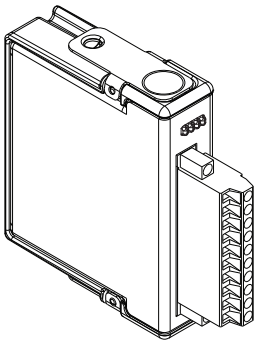
USER MANUAL AND SPECIFICATIONS

NI 9482

4-Channel SPST Electromechanical Relay Module

Français Deutsch 日本語 한국어 简体中文

ni.com/manuals



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This document describes how to use the National Instruments 9482 and includes specifications and pin assignments for the NI 9482.

Note The safety guidelines and specifications in this document are specific to the NI 9482. The other components in the system might not meet the same safety ratings and specifications. Refer to the documentation for each component in the system to determine the safety ratings and specifications for the entire system.

Related Information



NI CompactDAQ & NI CompactRIO Documentation
ni.com/info ⇨ cseriesdoc



Chassis Compatibility
ni.com/info ⇨ compatibility



Software Support
ni.com/info ⇨ softwareversion



Services
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Safety Guidelines

Operate the NI 9482 only as described in these operating instructions.



Hot Surface This icon denotes that the component may be hot. Touching this component may result in bodily injury.



Warning This icon denotes a warning advising you to take precautions to avoid electrical shock.



Caution Do not operate the NI 9482 in a manner not specified in this user manual. Product misuse can result in a hazard. You can compromise the safety protection built into the product if the product is damaged in any way. If the product is damaged, return it to National Instruments for repair.

Safety Guidelines for Hazardous Voltages

If hazardous voltages are connected to the module, take the following precautions. A hazardous voltage is a voltage greater than 42.4 V_{pk} or 60 VDC to earth ground.

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Caution Ensure that hazardous voltage wiring is performed only by qualified personnel adhering to local electrical standards.

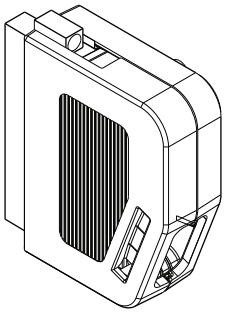
Caution Do not mix hazardous voltage circuits and human-accessible circuits on the same module.

Caution Make sure that devices and circuits connected to the module are properly insulated from human contact.

Caution When module terminals are hazardous voltage LIVE (>42.4V_{pk}/60 VDC), you must ensure that devices and circuits connected to the module are properly insulated from human contact. You must use the NI 9927 connector backshell kit to ensure that the terminals are not accessible.

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Figure 1. NI 9927



Electromagnetic Compatibility Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) as stated in the product specifications. These requirements and limits are designed to provide reasonable protection against harmful interference when the product is operated in its intended operational electromagnetic environment.

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This product is intended for use in industrial locations. There is no guarantee that harmful interference will not occur in a particular installation, when the product is connected to a test object, or if the product is used in residential areas. To minimize the potential for the product to cause interference to radio and television reception or to experience unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any changes or modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.

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

Caution The I/O port pins of this product can be damaged if subjected to Electrostatic Discharge (ESD). To prevent damage, industry-standard ESD prevention measures must be employed during installation, maintenance, and operation.

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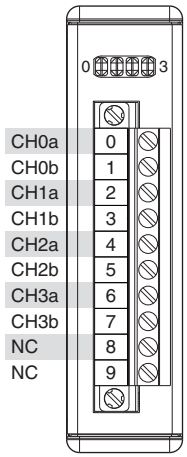
Caution The I/O port of this product is rated for Measurement Category II; however, it is neither designed nor tested for compliance with the transient immunity requirements for Electrical Fast Transients or lightning Surge, which are normally applied to ports intended for connection to the electrical distribution system. For applications where connection to the electrical distribution system is desired, ensure that the I/O port is provided with appropriate transient protection.

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Connecting the NI 9482

The NI 9482 provides connections for four electromechanical relay channels.

Figure 2. NI 9482 Pinout



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Connector

The NI 9482 has a 10-terminal, detachable screw-terminal connector.

Signals

Each channel has two interchangeable pins, CHa and CHb, to which you can connect a load.

Note You must use 2-wire ferrules to create a secure connection when connecting more than one wire to a single terminal on the NI 9482.

LEDs

Each channel has an LED that indicates the state of the channel. A channel LED is lit when the channel is on and dark when the channel is off. The LEDs are disabled when the chassis is in sleep mode.

Related Information

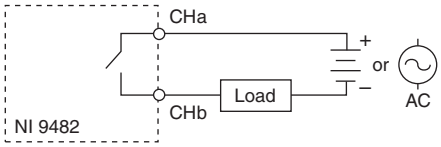
Sleep Mode on page 12

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Connecting a Load

You can connect loads to the NI 9482. Connect the positive lead of the load to CHa or CHb, the ground of the load to the power supply, and the remaining CHa or CHb to the other lead of the power supply.

Figure 3. Connecting a Load



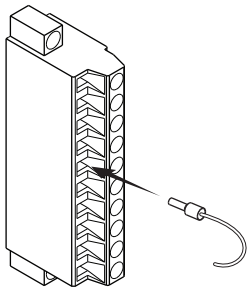
When the channel is turned on, the terminal connected to the load drives current or applies voltage to the load. When the channel is off, the terminal does not drive current or apply voltage to the load.

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Wiring for High-Vibration Applications

If an application using the NI 9482 is subject to high vibration, National Instruments recommends that you either use ferrules to terminate wires to the detachable screw-terminal connector or use the NI 9927 backshell kit to protect the connections.

Figure 4. Wiring a Screw-Terminal Connector with a Ferrule



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Sleep Mode

This module supports a low-power sleep mode. Support for sleep mode at the system level depends on the chassis that the module is plugged into. Refer to the chassis manual for information about support for sleep mode. If the chassis supports sleep mode, refer to the software help for information about enabling sleep mode.

Typically, when a system is in sleep mode, you cannot communicate with the modules. In sleep mode, the system consumes minimal power and may dissipate less heat than it does in normal mode.

Related Information

Power Requirements on page 14

Specifications

The following specifications are typical for the range -40 °C to 70 °C unless otherwise noted.

Caution Using the NI 9482 in a manner not described in this document may impair the protection the NI 9482 provides.

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Output Characteristics

Number of channels ..... 4 electromechanical relay channels

Relay type ..... Single pole single throw (SPST)

Power-on output state ..... Channels off

Switching capacity (resistive load)

- Switching voltage ..... 60 VDC max, 250 V_{rms} max
- Switching current, per channel
  - One channel on ..... 2.5 A max at 30 VDC,
1 A max at 60 VDC,
2.5 A max at 250 V_{rms}
  - Two channels on ..... 2 A max at 30 VDC,
1 A max at 60 VDC,
2 A max at 250 V_{rms}
  - All channels on ..... 1.5 A max at 30 VDC,
1 A max at 60 VDC,
1.5 A max at 250 V_{rms}

Resistance per channel, channel on ..... 0.2 Ω

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Switching rate ..... 1 operation per second
Relay release time ..... 10 ms max
Relay operate time ..... 15 ms max
Relay bounce time ..... 3 ms
Off state leakage ..... 10 µA max
Life expectancy
  Mechanical (no load) ..... 20,000,000 operations
  Electrical (connecting to load) ... 100,000 operations
MTBF ..... Contact NI for Bellcore MTBF or MIL-HDBK-217F specifications

Power Requirements

Power consumption from chassis
  Active mode ..... 580 mW max
  Sleep mode ..... 10 mW max
Thermal dissipation (at 70 °C)
  Active mode ..... 1.5 W max
  Sleep mode ..... 10 mW max

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Physical Characteristics

If you need to clean the module, wipe it with a dry towel.

Tip For two-dimensional drawings and three-dimensional models of the C Series module and connector, visit ni.com/dimensions and search by the module number.

Screw-terminal wiring	0.511 mm diameter (24 AWG) to 2.053 mm diameter (12 AWG) copper conductor wire with 10 mm (0.39 in.) of insulation stripped from the end
Torque for screw terminals	0.5 N · m to 0.6 N · m (4.4 lb · in. to 5.3 lb · in.)
Ferrules	0.25 mm^2 to 2.5 mm^2
Weight	150 g (5.3 oz)

Safety Voltages

Connect only voltages that are within the following limits.

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CHa-to-CHb ..... 250 V_{rms} max, Measurement Category II

Isolation

Channel-to-channel

Continuous ..... 250 V_{rms}

Withstand ..... 1,400 V_{rms}, verified by a 5 s dielectric withstand test

Channel-to-earth ground

Continuous ..... 250 V_{rms}

Withstand ..... 2,300 V_{rms}, verified by a 5 s dielectric withstand test

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 NI 9482 to signals or use for measurements within Measurement Categories III or IV.

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

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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.

CE Compliance CE

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)

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Online Product Certification

To obtain product certifications and the Declaration of Conformity (DoC) for this product, visit ni.com/certification, search by module number or product line, and click the appropriate link in the Certification column.

Shock and Vibration

To meet these specifications, you must panel mount the system.

Operating vibration,
sinusoidal (IEC 60068-2-6) ..... 5 g, 40 Hz to 500 Hz;
0.062 in. double amplitude,
10 Hz to 40 Hz

Note The shock and vibration rating for the NI 9482 is limited, in comparison to other NI CompactDAQ and CompactRIO devices, due to the mechanical relays on the module.

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Environmental

Refer to the manual for the chassis you are using for more information about meeting these specifications.

Operating temperature
(IEC 60068-2-1, IEC 60068-2-2) ..... -40 °C to 70 °C

Storage temperature
(IEC 60068-2-1, IEC 60068-2-2) ..... -40 °C to 85 °C

Ingress protection

- NI 9482 ..... IP 30
- NI 9482 with screw-terminal connector attached ..... IP 40

Operating humidity
(IEC 60068-2-56) ..... 10% to 90% RH, noncondensing

Storage humidity
(IEC 60068-2-56) ..... 5% to 95% RH, noncondensing

Pollution Degree 2

Maximum altitude ..... 5,000 m

Indoor use only.

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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 *Minimize Our Environmental Impact* 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.

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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.

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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.

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