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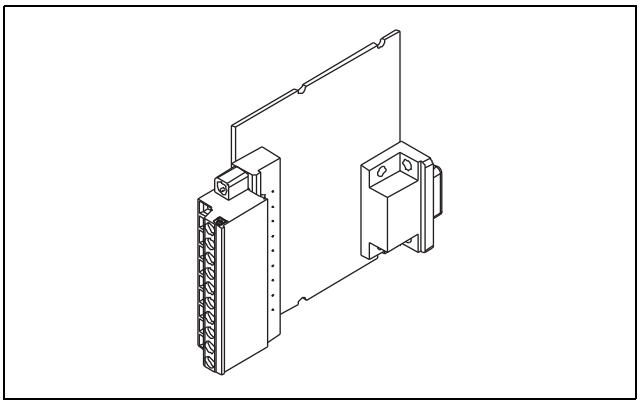
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Find the *National Instruments sbRIO-9236* at our website: *Click HERE*

OPERATING INSTRUCTIONS AND SPECIFICATIONS

NI 9263E

4-Channel, ±10 V, 16-Bit Analog Voltage Output Module



NATIONAL INSTRUMENTS

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This document describes how to use the National Instruments 9263E and includes dimensions, terminal assignments, and specifications for the NI 9263E. Visit `ni.com/info` and enter `rdsoftwareversion` to determine which software you need for the modules you are using. For information about installing, configuring, and programming the system, refer to the system documentation. Visit `ni.com/info` and enter `cseriesdoc` for information about C Series documentation.

Caution National Instruments makes no electromagnetic compatibility (EMC) or CE marking compliance claims for the NI 9263E. The end-product supplier is responsible for conformity to any and all compliance requirements.

Caution The NI 9263E must be installed inside a suitable enclosure prior to use. Hazardous voltages may be present.

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NI 9263E Dimensions

The following figure shows the dimensions of the NI 9263E.

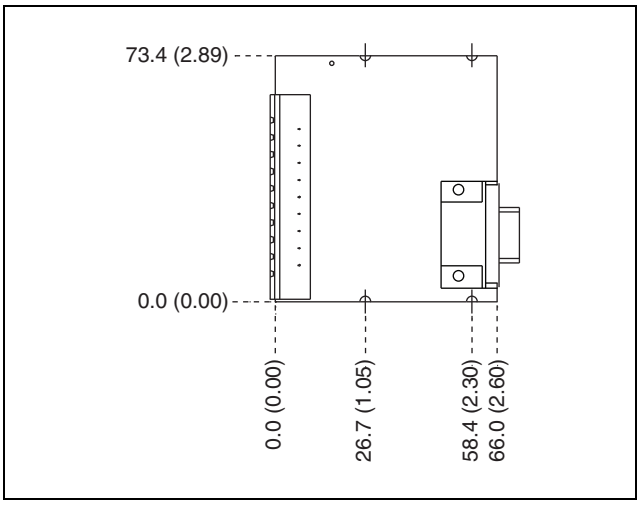


Figure 1. NI 9263E Dimensions in Millimeters (Inches)

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Connecting the NI 9263E

The NI 9263E has a 10-terminal, detachable, screw-terminal connector that provides connections for 4 analog output channels.

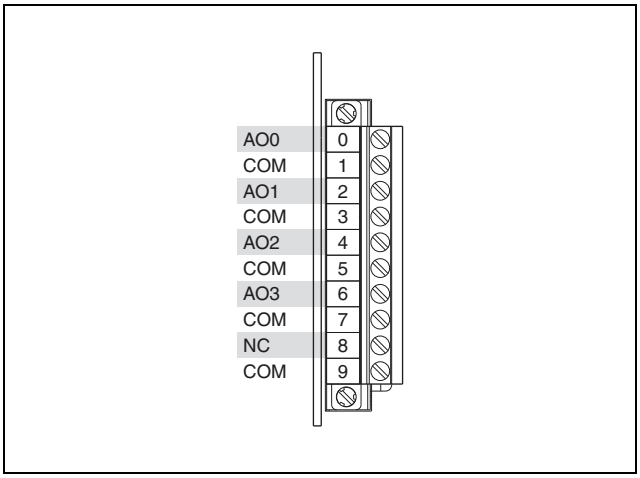


Figure 2. NI 9263E Terminal Assignments

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Each channel of the NI 9263E has an AO terminal and a common terminal, COM, and there is an additional COM terminal at the bottom of the connector. All of the COM terminals are internally connected to the isolated ground reference of the module. You can connect a load to each channel of the NI 9263E. Connect the positive lead of the load to the AO terminal, and the ground of the load to the corresponding COM terminal. Refer to Figure 3 for an illustration of connecting a load to the NI 9263E.

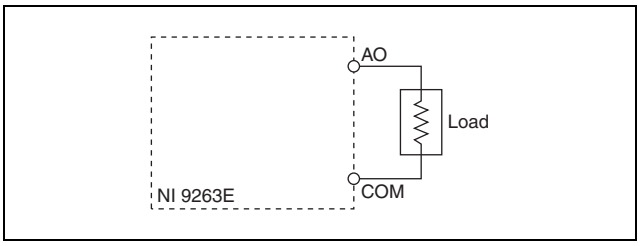


Figure 3. Connecting a Load to the NI 9263E

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 9263E.

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Each channel has a digital-to-analog converter (DAC) that produces a voltage signal. Each channel also has overvoltage and short-circuit protection. Refer to the *Specifications* section for more information about the overvoltage and short-circuit protection. Refer to Figure 4 for an illustration of the output circuitry for one channel of the NI 9263E.

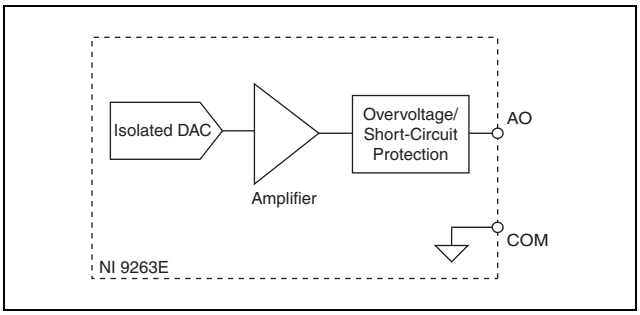


Figure 4. Output Circuitry for One Channel of the NI 9263E

When the module powers on, the channels output the startup voltage. Refer to the *Specifications* section for more information about startup voltage. Refer to the software help for information

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about configuring startup output states in software. Visit `ni.com/info` and enter cseriesdoc for information about C Series documentation.

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. Visit `ni.com/info` and enter `cseriesdoc` for information about C Series documentation.

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. Refer to the *Specifications* section for more information about power consumption and thermal dissipation.

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Specifications

The following specifications are typical for the range –40 to 85 °C internal to any enclosures unless otherwise noted. All voltages are relative to COM unless otherwise noted.

Output Characteristics

Number of channels ..... 4 analog output channels

DAC resolution ..... 16 bits

Type of DAC ..... String

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

Startup voltage ..... 0 V[1]

Power-down voltage ..... 0 V[2]

[1] When the module powers on, a glitch occurs for 20 µs peaking at –1.5 V.

[2] The power-down voltage peaks at 1.8 V before exponentially discharging to 0 V in 100 µs. You can add a 10 kΩ load to reduce the peak voltage.

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Output voltage range

- Nominal ..... ±10 V
- Minimum ..... ±10.4 V
- Typical ..... ±10.7 V
- Maximum ..... ±11 V

Current drive ..... ±1 mA per channel max

Output impedance ..... 2 Ω

Accuracy

Measurement Conditions	Percent of Reading (Gain Error)	Percent of Range* (Offset Error)
Calibrated, max (–40 to 85 °C)	0.35%	0.75%
Calibrated, typ (25 °C, ±5 °C)	0.03%	0.1%
Uncalibrated, max (–40 to 85 °C)	2.2%	1.7%
Uncalibrated, typ (25 °C, ±5 °C)	0.3%	0.25%
* Range equals ±10.7 V		

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Stability

Gain drift ..... 14 ppm/°C

Offset drift ..... 110 µV/°C

Protection

Overvoltage ..... ±30 V

Short-circuit ..... Indefinitely

Update time

Number of Channels	Update Time for NI cRIO-9151 R Series Expansion Chassis	Update Time for All Other Chassis
1	3.5 µs min	3 µs min
2	6.5 µs min	5 µs min
3	9 µs min	7.5 µs min
4	12 µs min	9.5 µs min

Noise

Updating at 100 kS/s ..... 600 μV_{rms}

Not updating ..... 260 μV_{rms}

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Slew rate ..... 4 V/µs

Crosstalk ..... 76 dB

Settling time (100 pF load, to 1 LSB)

- Full-scale step..... 20 µs
- 1 V step..... 13 µs
- 0.1 V step..... 10 µs

Capacitive drive ..... 1,500 pF min

Monotonicity..... 16 bits

DNL ..... ±1 LSB max

INL (endpoint)..... ±12 LSB max

MTBF ..... 1,732,619 hours at 25 °C; Bellcore Issue 2, Method 1, Case 3, Limited Part Stress Method

Note Contact NI for Bellcore MTBF specifications at other temperatures or for MIL-HDBK-217F specifications.

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Power Requirements

Power consumption from chassis

Active mode (at –40 °C) ..... 500 mW max

Sleep mode ..... 25 µW max

Thermal dissipation (at 85 °C)

Active mode ..... 750 mW max

Sleep mode ..... 25 µW max

Physical Characteristics

Use a dry, low-velocity stream of air to clean the module. If needed, use a soft-bristle brush for cleaning around components.

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

Screw-terminal wiring ..... 12 to 24 AWG copper conductor wire with 10 mm (0.39 in.) of insulation stripped from the end

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Torque for screw terminals ..... 0.5 to 0.6 N · m (4.4 to 5.3 lb · in.)

Ferrules ..... 0.25 mm^2 to 2.5 mm^2

Weight ..... 63 g (2.2 oz)

Safety

Isolation Voltages

Connect only voltages that are within the following limits.

Channel-to-channel ..... None

Channel-to-earth ground

- Continuous ..... 250 V_{rms}, Measurement Category II, (Double insulation)
- 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.

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Caution Do *not* connect the NI 9263E to signals or use for measurements within Measurement Categories III or IV.

Safety Standards

This product meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use when installed in a suitable enclosure:

- 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.

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 module number or product line, and click the appropriate link in the Certification column.

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Environmental

National Instruments C Series modules are intended for indoor use only but may be used outdoors if installed in a suitable enclosure. 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 to 85 °C

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

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

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

Maximum altitude..... 2,000 m

Pollution Degree 2

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Environmental Management

National Instruments is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial not only to the environment but also 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`.

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Calibration

You can obtain the calibration certificate and information about calibration services for the NI 9263E at `ni.com/calibration`.

Calibration interval ..... 1 year

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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.

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, contact your local branch office:

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