NI-9263 Specifications

Contents

NI-9263 Datasheet

- Screw Terminal or spring terminal connectivity
- 250 V RMS, CAT II, channel-to-earth isolation

The NI-9263 is an analog output module for any CompactDAQ and CompactRIO systems. It also features ±30 V overvoltage protection, short-circuit protection, low crosstalk, fast slew rate, high relative accuracy, and NIST-traceable calibration. The NI-9263 module includes a channel-to-earth ground double isolation barrier for safety and noise immunity.

	Kit Contents	• NI 9263 • NI 9263 Getting Started Guide
	Accessories	• NI 9927 backshell connector kit (screw terminal) • NI 9981 backshell connector kit (spring terminal)

C SERIES ANALOG OUTPUT MODULE COMPARISON							
Product Name	Module Type	Signal Ranges	Channels	Update Rate	Isolation	Resolution	Connectivity
NI 9260	Voltage Output	3 V RMS	2	51.2 kS/s/ch	None	24-Bit	BNC, mini XLR
NI 9262	Voltage Output	±10 V	6	1 MS/s/ch	60 V DC Ch-Earth	16-Bit	37-Pin DSUB
NI 9263	Voltage Output	±10 V	4	100 kS/s/ch	250 V RMS Ch-Earth	16-Bit	Screw Terminal, Spring Terminal
NI 9264	Voltage Output	±10 V	16	25 kS/s/ch	250 V RMS Ch-Earth (Spring) 60 V DC Ch-Earth (DSUB)	16-Bit	Spring Terminal, 37-Pin DSUB
NI 9265	Current Output	0 mA to 20 mA	4	100 kS/s/ch	250 V RMS Ch-Earth, Vsup-Earth, COM-Earth	16-Bit	Screw Terminal
NI 9266	Current Output	0 mA to 20 mA	8	24 kS/s/ch	250 V RMS Ch-Earth (Screw) 60 V DC Ch-Earth (DSUB)	16-Bit	Screw Terminal, 37-Pin DSUB
NI 9269	Voltage Output	±10 V	4	100 kS/s/ch	250 V RMS Ch-Ch 250 V RMS Ch-Earth	16-Bit	Screw Terminal

NI C Series Overview

NI provides more than 100 C Series modules for measurement, control, and communication applications. C Series modules can connect to any sensor or bus and allow for high-accuracy measurements that meet the demands of advanced data acquisition and control applications.

- Measurement-specific signal conditioning that connects to an array of sensors and signals

- Isolation options such as bank-to-bank, channel-to-channel, and channel-to-earth ground
- -40 °C to 70 °C temperature range to meet a variety of application and environmental needs
- Hot-swappable

The majority of C Series modules are supported in both CompactRIO and CompactDAQ platforms and you can move modules from one platform to the other with no modification.

CompactRIO

CompactRIO combines an open-embedded architecture with small size, extreme ruggedness, and C Series modules in a platform powered by the NI LabVIEW reconfigurable I/O (RIO) architecture. Each system contains an FPGA for custom timing, triggering, and processing with a wide array of available modular I/O to meet any embedded application requirement.

CompactDAQ

CompactDAQ is a portable, rugged data acquisition platform that integrates connectivity, data acquisition, and signal conditioning into modular I/O for directly interfacing to any sensor or signal. Using CompactDAQ with LabVIEW, you can easily customize how you acquire, analyze, visualize, and manage your measurement data.

Software

## LabVIEW Professional Development System for Windows

- Use advanced software tools for large project development
- Generate code automatically using DAQ Assistant and Instrument I/O Assistant
- Use advanced measurement analysis and digital signal processing
- Take advantage of open connectivity with DLLs, ActiveX, and .NET objects
- Build DLLs, executables, and MSI installers

NI LabVIEW FPGA Module
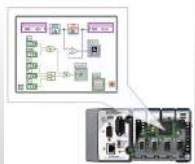
- Design FPGA applications for NI RIO hardware
- Program with the same graphical environment used for desktop and real-time applications
- Execute control algorithms with loop rates up to 300 MHz
- Implement custom timing and triggering logic, digital protocols, and DSP algorithms
- Incorporate existing HDL code and third-party IP including Xilinx IP generator functions
- Purchase as part of the LabVIEW Embedded Control and Monitoring Suite

NI LabVIEW Real-Time Module
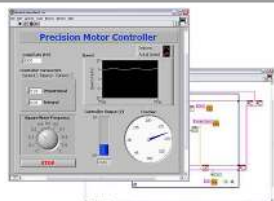
- Design deterministic real-time applications with LabVIEW graphical programming
- Download to dedicated NI or third-party hardware for reliable execution and a wide selection of I/O
- Take advantage of built-in PID control, signal processing, and analysis functions
- Automatically take advantage of multicore CPUs or set processor affinity manually
- Take advantage of real-time OS, development and debugging support, and board support
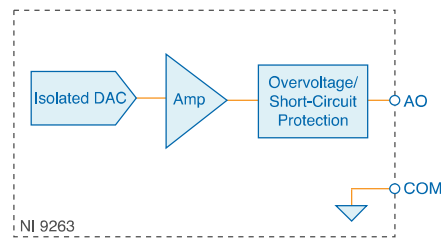
NI LabVIEW Real-Time Module	
	▪ Purchase individually or as part of a LabVIEW suite

Circuitry

Each channel has a digital-to-analog converter (DAC) that produces a voltage signal. Each channel also has overvoltage and short-circuit protection.

Figure 1. Output Circuitry for One Channel of the NI 9263

NI-9263 Specifications

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

> **Caution** Do not operate the NI-9263 in a manner not specified in this document. 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 NI for repair.

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[1]	0 V

Power-down voltage[2]	0 V

Output voltage range	
Nominal	±10 V
Minimum	±10.4 V
Typical	±10.7 V
Maximum	±11 V

Current drive	±1 mA per channel maximum
Output impedance	2 Ω

Measurement Conditions		Percent of Reading (Gain Error)	Percent of Range[3] (Offset Error)
Calibrated	Maximum (-40 °C to 70 °C)	0.35%	0.75%
	Typical (25 °C, ±5 °C)	0.03%	0.1%
Uncalibrated[4]	Maximum (-40 °C to 70 °C)	2.2%	1.7%
	Typical (25 °C, ±5 °C)	0.3%	0.25%

Table 1. Accuracy

Stability	
Gain drift	11 ppm/°C
Offset drift	110 µV/°C

Protection	
Overvoltage	±30 V
Short-circuit	Indefinitely

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

Number of Channels	Update Time for All Other Chassis	Update Time for NI cRIO-9151 R Series Expansion Chassis
4	9.5 µs min	12 µs min

Table 2. Update Time

Noise		
Updating at 100 kS/s		600 µVrms
Not updating		260 µVrms

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 minimum
Monotonicity	16 bits
DNL	±1 LSB maximum
INL (endpoint)	±12 LSB maximum
MTBF	1,732,619 hours at 25 °C; Bellcore Issue 2, Method 1, Case 3, Limited Part Stress Method

Power Requirements

Power consumption from chassis		
Active mode (at -40 °C)		500 mW maximum
Sleep mode		25 µW maximum

Thermal dissipation (at 70 °C)		

| Active mode | 750 mW maximum |
| Sleep mode | 25 µW maximum |

Physical Characteristics

Spring-terminal wiring

Gauge	0.2 mm^2 to 2.5 mm^2 (30 AWG to 12 AWG) copper conductor wire
Wire strip length	10 mm (0.39 in.) of insulation stripped from the end
Temperature rating	90 °C, minimum
Wires per spring terminal	

Connector securement

| Securement type | Screw flanges provided |
| Torque for screw flanges | 0.2 N · m (1.80 lb · in.) |

Weight

| NI-9263 with screw terminal | 150 g (5.3 oz) |
| NI-9263 with spring terminal | 139 g (4.9 oz) |

Safety 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 |
| Withstand | 2,300 V RMS, verified by a 5 s dielectric withstand test |

Hazardous Locations

U.S. (UL)	Class I, Division 2, Groups A, B, C, D, T4; Class I, Zone 2, AEx nA IIC T4 Gc
Canada (C-UL)	Class I, Division 2, Groups A, B, C, D, T4; Ex nA IIC T4 Gc
Europe (ATEX) and International (IECEx)	Ex nA IIC T4 Gc DEMKO 07 ATEX 0626664X IECEx UL 14.0089X

Safety Compliance and Hazardous Locations Standards

This product is designed to meet the requirements of the following electrical equipment safety standards for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA C22.2 No. 61010-1
- EN 60079-0, EN 60079-7
- IEC 60079-0, IEC 60079-7
- UL 60079-0, UL 60079-7
- CSA C22.2 No. 60079-0, CSA C22.2 No. 60079-7

> **Note** For safety certifications, refer to the product label or the Product Certifications and Declarations section.

Electromagnetic Compatibility

- EN 61326 (IEC 61326): Class A emissions; Industrial immunity

CE Compliance $C \in$

- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

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.

Shock and Vibration

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

Operating vibration	
Random	5 g RMS, 10 Hz to 500 Hz
Sinusoidal	5 g, 10 Hz to 500 Hz
Operating shock	30 g, 11 ms half sine; 50 g, 3 ms half sine; 18 shocks at 6 orientations

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	IP40
Operating humidity (IEC 60068-2-30)	10% RH to 90% RH, noncondensing
Storage humidity (IEC 60068-2-30)	5% RH to 95% RH, noncondensing
Pollution Degree	2
Maximum altitude	2,000 m

Indoor use only.

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.)

Calibration

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

Calibration interval	1 year

[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.

[3] Range equals ±10.7 V

[4] Uncalibrated accuracy refers to the accuracy achieved when acquiring in raw or unscaled modes where the calibration constants stored in the module are not applied to the data.