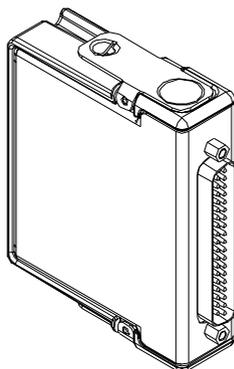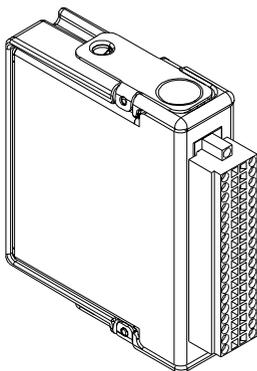# NI 9264

16 AO, ±10 V, 16 Bit, 25 kS/s/ch Simultaneous



- DSUB or spring-terminal connectivity
- 250 Vrms, CAT II, channel-to-earth isolation (spring terminal); 60 VDC, CAT I, channel-to-earth isolation (DSUB)

The NI 9264 is a C Series module for NI CompactDAQ and CompactRIO systems that accommodates higher-channel-count systems in either chassis type. Higher-density modules conserve chassis space and leave room for other measurement types. Each channel can update at up to 25 kS/s because each channel has its own digital-to-analog converter. The spring-terminal version of the NI 9264 uses a 36-position connector for the 16 channels of output, each of which has a ground connection. The DSUB version of the NI 9264 module was designed to accommodate standard 37-pin DSUB components.

| | Kit Contents | • NI 9264<br>• NI 9264 Getting Started Guide<br>• Flathead Screwdriver (Spring Terminal) |
|---|---|---|
| | Accessories | • NI 9940 Backshell Connector Kit (Spring Terminal)<br>• NI 9923 Screw-Terminal Block (DSUB) |

| C SERIES ANALOG OUTPUT MODULE COMPARISON | | | | | | | |
|---|---|---|---|---|---|---|---|
| Product Name | Module Type | Signal Ranges | Channels | Sample Rate | Simultaneous | Resolution | Connectivity |
| NI 9260 | Voltage Output | 3 Vrms | 2 | 51.2 kS/s/ch | Yes | 24-Bit | BNC, mini XLR |
| NI 9263 | Voltage Output | ±10 V | 4 | 100 kS/s/ch | Yes | 16-Bit | Screw-Terminal, Spring-Terminal |
| NI 9264 | Voltage Output | ±10 V | 16 | 25 kS/s/ch | Yes | 16-Bit | Spring-Terminal, 37-Pin DSUB |
| NI 9265 | Current Output | 0 mA to 20 mA | 4 | 100 kS/s/ch | Yes | 16-Bit | Screw-Terminal |
| NI 9269 | Voltage Output | ±10 V | 4 | 100 kS/s/ch | Yes | 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
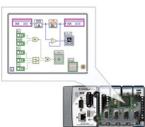
- Design FPGA applications for NI RIO hardware
- Program with the same graphical environment used for desktop and real-time applications
- Execute control algorithms with loop rates up to 300 MHz
- Implement custom timing and triggering logic, digital protocols, and DSP algorithms
- Incorporate existing 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**
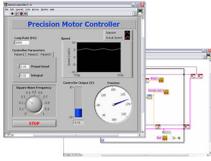
- Design deterministic real-time applications with LabVIEW graphical programming
- Download to dedicated NI or third-party hardware for reliable execution and a wide selection of I/O
- Take advantage of built-in PID control, signal processing, and analysis functions
- Automatically take advantage of multicore CPUs or set processor affinity manually
- Take advantage of real-time OS, development and debugging support, and board support
- Purchase individually or as part of a LabVIEW suite

# Circuitry
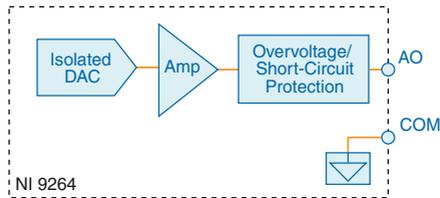


Each channel has a digital-to-analog converter (DAC) that produces a voltage signal. Each channel also has overvoltage and short-circuit protection.

# NI 9264 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 9264 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 | 16 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 range | |
|     Nominal | ±10 V |
|     Minimum | ±10.35 V |
|     Typical | ±10.5 V |
|     Maximum | ±10.65 V |
| Current drive | ±16 mA all channels maximum; ±4 mA per channel typical |
| Output impedance | 2.0 Ω |

**Table 1.** Accuracy

| | Measurement Conditions | Percent of Reading (Gain Error) | Percent of Range[3] (Offset Error) |
|---|---|---|---|
| Calibrated | Maximum (-40 °C to 70 °C) | 0.15% | 0.15% |
| | Typical (25 °C) | 0.05% | 0.05% |
| Uncalibrated[4] | Maximum (-40 °C to 70 °C) | 0.6% | 1.0% |
| | Typical (25 °C) | 0.2% | 0.25% |

| Stability | |
|---|---|
|     Gain drift | 6 ppm/°C |
|     Offset drift | 80 μV/°C |
| Protection | |
|     Overvoltage | ±27 V at 25 °C |
|     Short-circuit | Indefinitely |

---

[1] When the module powers on, a glitch occurs for 20 μs peaking at 500 mV.
[2] The power-down voltage peaks at 1.7 V, then exponentially discharges to 0 V in 200 ms. You can add a load to reduce peak voltage.
[3] Range equals 10.5 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.

#### Table 2. Update Time

| Number of Channels | Update Time for NI cRIO-9151 R Series Expansion Chassis | Update Time for All Other Chassis |
| --- | --- | --- |
| 1 | 3.7 µs minimum | 3.1 µs minimum |
| 2 | 6.6 µs minimum | 5.3 µs minimum |
| 3 | 9.4 µs minimum | 7.5 µs minimum |
| 16 | 47 µs minimum | 37 µs minimum |

| | |
| --- | --- |
| Noise[5] | 500 µVrms |
| Slew rate | 4 V/µs |
| Crosstalk at 1 kHz sine wave | 85 dB |
| Settling time (100 pF load, to 1 LSB) | |
|     20 V step | 20 µs |
|     1 V step | 15 µs |
|     0.1 V step | 13 µs |
| Capacity drive | 1,500 pF maximum |
| Monotonicity | 16 bits |
| DNL | ±1 LSB maximum |
| INL (endpoint) | ±12 LSBs maximum |
| MTBF | 595,509 hours at 25 °C; Bellcore Issue 2, Method 1, Case 3, Limited Part Stress Method |

## Power Requirements

| | |
| --- | --- |
| Power consumption from chassis | |
|     Active mode | 1 W maximum |
|     Sleep mode | 25 µW maximum |
| Thermal dissipation (at 70 °C) | |
|     Active mode | 1 W maximum |
|     Sleep mode | 25 µW maximum |

---

[5] The noise specification includes the glitch energy.

# 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 connectors, visit *ni.com/dimensions* and search by module number.

| Spring-terminal wiring | |
|---|---|
| Gauge | 0.08 mm$^2$ to 1.0 mm$^2$ (28 AWG to 18 AWG) copper conductor wire |
| Wire strip length | 7 mm (0.28 in.) of insulation stripped from the end |
| Temperature rating | 90 °C minimum |
| Wires per spring terminal | One wire per spring terminal |
| Connector securement | |
| Securement type | Screw flanges provided |
| Torque for screw flanges | 0.2 N · m (1.80 lb · in.) |
| Weight | |
| NI 9264 with spring terminal | 156 g (5.5 oz) |
| NI 9264 with DSUB | 146 g (5.2 oz) |

# NI 9264 with Spring Terminal Safety Voltages

| Isolation | |
|---|---|
| Channel-to-channel | None |
| Channel-to-earth ground | |
| Continuous | 250 Vrms, Measurement Category II |
| Withstand | 2,300 Vrms, 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 9264 to signals or use for measurements within Measurement Categories III or IV.

# NI 9264 with DSUB Safety Voltages

| Isolation | |
|---|---|
| Channel-to-channel | None |

| Channel-to-earth ground | |
|---|---|
| Continuous | 60 VDC, Measurement Category I |
| Withstand | 1,000 Vrms, verified by a 5 s dielectric withstand test |

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as *MAINS* voltage. MAINS is a hazardous live electrical supply system that powers equipment. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.

⚠ **Caution** Do not connect the NI 9264 to signals or use for measurements within Measurement Categories II, III, or IV.

📝 **Note** Measurement Categories CAT I and CAT O are equivalent. These test and measurement circuits are not intended for direct connection to the MAINS building installations of Measurement Categories CAT II, CAT III, or CAT IV.

# Hazardous Locations

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

# Safety 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 61010-1
- EN 60079-0:2012, EN 60079-15:2010
- IEC 60079-0: Ed 6, IEC 60079-15; Ed 4
- UL 60079-0; Ed 5, UL 60079-15; Ed 3
- CSA 60079-0:2011, CSA 60079-15:2012

📝 **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 sensitive electrical equipment for measurement, control, and laboratory use:

• EN 61326 (IEC 61326): Class A emissions; Industrial 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** For the standards applied to assess the EMC of this product, refer to the *Online Product Certification* section.

# CE Compliance $C\,E$

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

• 2014/35/EU; Low-Voltage Directive (safety)
• 2014/30/EU; Electromagnetic Compatibility Directive (EMC)
• 94/9/EC; Potentially Explosive Atmospheres (ATEX)

# 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.

# Shock and Vibration

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

| | |
|---|---|
| Operating vibration | |
| Random (IEC 60068-2-64) | 5 $g_{rms}$, 10 Hz to 500 Hz |
| Sinusoidal (IEC 60068-2-6) | 5 g, 10 Hz to 500 Hz |
| Operating shock (IEC 60068-2-27) | 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 60068-2-78) | 10% RH to 90% RH, noncondensing |
| Storage humidity (IEC 60068-2-78) | 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 *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.

# Waste Electrical and Electronic Equipment (WEEE)

**EU Customers** 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.）

# Calibration

You can obtain the calibration certificate and information about calibration services for the NI 9264 at *ni.com/calibration*.

| | |
|---|---|
| Calibration interval | 1 year |