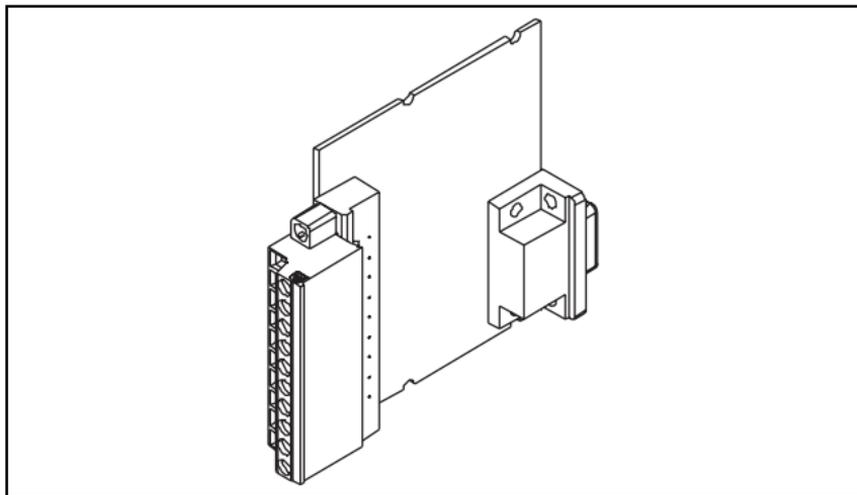


# OPERATING INSTRUCTIONS AND SPECIFICATIONS

## NI 9265E

4-Channel, 0–20 mA, 16-Bit Analog Current Output Module



This document describes how to use the National Instruments 9265E and includes dimensions, terminal assignments, and specifications for the NI 9265E. Visit [ni.com/info](http://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](http://ni.com/info) and enter `cseriesdoc` for information about C Series documentation.



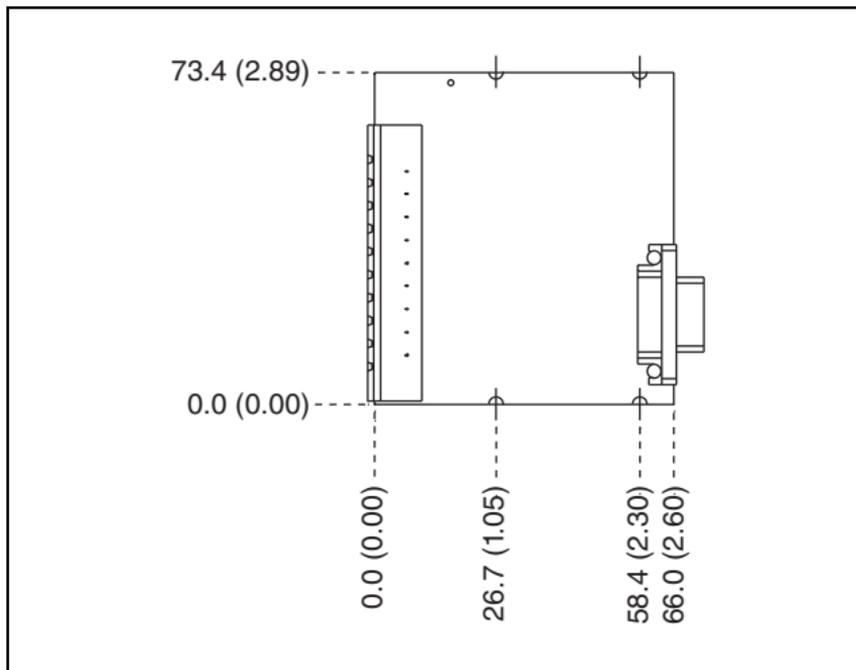
**Caution** National Instruments makes no electromagnetic compatibility (EMC) or CE marking compliance claims for the NI 9265E. The end-product supplier is responsible for conformity to any and all compliance requirements.



**Caution** The NI 9265E must be installed inside a suitable enclosure prior to use. Hazardous voltages may be present.

# NI 9265E Dimensions

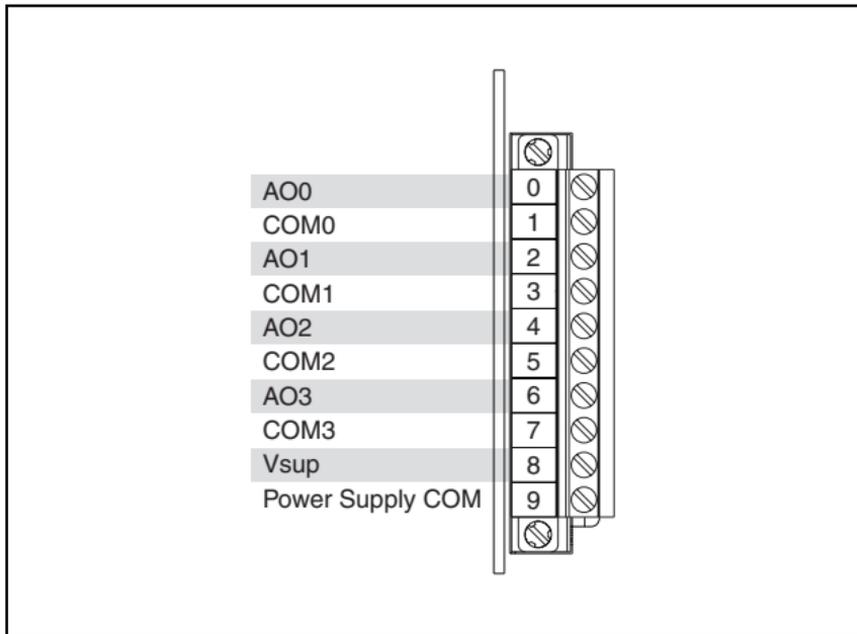
The following figure shows the dimensions of the NI 9265E.



**Figure 1.** NI 9265E Dimensions in Millimeters (Inches)

## Connecting the NI 9265E

The NI 9265E has a 10-terminal, detachable screw-terminal connector that provides connections for 4 analog output channels.

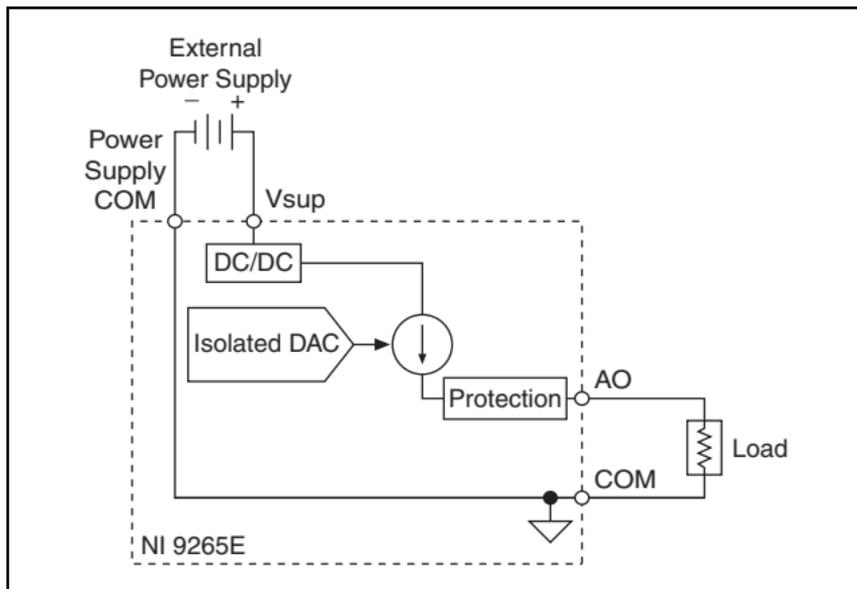


**Figure 2.** NI 9265E Terminal Assignments

The NI 9265E has four analog output channels, AO. Each channel has a common terminal, COM, that is internally connected to the isolated ground reference of the module. The NI 9265E also has a terminal for an external power supply,  $V_{\text{sup}}$ , and an external power supply common terminal, Power Supply COM.

Each AO channel has a digital-to-analog converter (DAC) that produces a current 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 3 for an illustration of the output circuitry for one channel of the NI 9265E.

You can connect a load to each channel of the NI 9265E. Connect the positive lead of the load to the AO terminal. Connect the ground of the load to the corresponding COM terminal. Refer to Figure 3 for an illustration of how to connect a load to the NI 9265E.



**Figure 3.** Connecting a Load to the NI 9265E

You must connect an external power supply to the NI 9265E. This power supply provides the current for the devices you connect to the module. Connect the positive lead of the power supply to the supply terminal,  $V_{sup}$ , and the negative lead of the power supply to Power Supply COM.



**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 9265E.

When the module powers on, the channels output the startup current. Refer to the *Specifications* section for more information about startup current. Refer to the software help for information about configuring startup output states in software. Visit [ni.com/info](http://ni.com/info) and enter `cseriesdoc` for information about C Series documentation.

## Sleep Mode

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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](http://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.

## Specifications

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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/Startup/ Power-down current .....	0.0 mA
Full-scale output current	
Nominal .....	20.0 mA
Minimum .....	20.1 mA

Typical .....	20.6 mA
Maximum .....	21.0 mA
Output range .....	0 to 20 mA
Compliance voltage .....	12 VDC max
Maximum load.....	600 $\Omega$

### Accuracy

<b>Measurement Conditions</b>	<b>Percent of Reading (Gain Error)</b>	<b>Percent of Range* (Offset Error)</b>
Calibrated, typ (25 °C, $\pm 5$ °C)	0.11%	0.19%
Calibrated, max (-40 to 85 °C)	0.25%	0.4%
Uncalibrated, typ (25 °C, $\pm 5$ °C)	0.35%	1.4%
Uncalibrated, max (-40 to 85 °C)	0.85%	2.5%
* Range equals 0 to 20.6 mA		

### Stability

Gain drift .....	30 ppm/°C
Offset drift .....	45 ppm/°C

External power supply  
voltage range ( $V_{\text{sup}}$ ) ..... 9–36 VDC

Protection (AO,  $V_{\text{sup}}$ )

Overvoltage .....  $\pm 40$  V

Short-circuit ..... Indefinitely

Update time

<b>Number of Channels</b>	<b>Update Time for R Series Expansion Chassis</b>	<b>Update Time for Any Other Chassis</b>
1	3.5 $\mu\text{s}$	3 $\mu\text{s}$
2	6.5 $\mu\text{s}$	5 $\mu\text{s}$
3	9 $\mu\text{s}$	7.5 $\mu\text{s}$
4	12 $\mu\text{s}$	9.5 $\mu\text{s}$

Noise ..... 600 nA<sub>rms</sub>

Crosstalk ..... -90 dB

Settling time (to 1 LSB)

Full-scale step ..... 10  $\mu\text{s}$

1 mA step ..... 5  $\mu\text{s}$

Glitch energy .....	Unmeasurable
Monotonicity.....	16 bits
DNL.....	1 LSB max
INL.....	±16 LSB
MTBF .....	1,014,487 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.

## Power Requirements

Power consumption from chassis

Active mode ..... 230 mW max

Sleep mode ..... 25  $\mu$ W max

Thermal dissipation (at 85 °C)

Active mode ..... 1.5 W max

Sleep mode ..... 10 mW max

Power consumption from external power supply

Active mode ..... 1.4 W max

Sleep mode ..... 10 mW

## 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](http://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

Ferrules ..... 0.25 mm<sup>2</sup> to 2.5 mm<sup>2</sup>

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

Weight ..... 67 g (2.4 oz)

# Safety

## Maximum Voltage<sup>1</sup>

Connect only voltages that are within the following limits.

Channel-to-COM or  $V_{\text{sup}}$ -to-COM ...  $\pm 40$  V max

## Isolation Voltages

Channel-to-channel..... None

Channel-to-earth ground,  $V_{\text{sup}}$ -to-earth ground,  
or COM-to-earth ground

Continuous ..... 250  $V_{\text{rms}}$ ,

Measurement Category II,  
(Double insulation)

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

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<sup>1</sup> The maximum voltage that can be applied between any channel or  $V_{\text{sup}}$  terminal and a COM terminal without damaging the module or other devices.

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 9265E 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](http://ni.com/certification), search by module number or product line, and click the appropriate link in the Certification column.

## 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 (IEC 60664) ..... 2

## 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 to the environment and to NI customers.

For additional environmental information, refer to the *NI and the Environment* Web page at [ni.com/environment](http://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 life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit [ni.com/environment/weee](http://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](http://ni.com/environment/rohs_china)。(For information about China RoHS compliance, go to [ni.com/environment/rohs\\_china](http://ni.com/environment/rohs_china).)

## Calibration

You can obtain the calibration certificate and information about calibration services for the NI 9265E at [ni.com/calibration](http://ni.com/calibration).

Calibration interval ..... 1 year

## Where to Go for Support

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The National Instruments Web site is your complete resource for technical support. At [ni.com/support](http://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](http://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:

Australia 1800 300 800, Austria 43 662 457990-0,  
Belgium 32 (0) 2 757 0020, Brazil 55 11 3262 3599,  
Canada 800 433 3488, China 86 21 5050 9800,  
Czech Republic 420 224 235 774, Denmark 45 45 76 26 00,  
Finland 358 (0) 9 725 72511, France 01 57 66 24 24,  
Germany 49 89 7413130, India 91 80 41190000,  
Israel 972 3 6393737, Italy 39 02 41309277, Japan 0120-527196,

Korea 82 02 3451 3400, Lebanon 961 (0) 1 33 28 28,  
Malaysia 1800 887710, Mexico 01 800 010 0793,  
Netherlands 31 (0) 348 433 466, New Zealand 0800 553 322,  
Norway 47 (0) 66 90 76 60, Poland 48 22 328 90 10,  
Portugal 351 210 311 210, Russia 7 495 783 6851,  
Singapore 1800 226 5886, Slovenia 386 3 425 42 00,  
South Africa 27 0 11 805 8197, Spain 34 91 640 0085,  
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