
NI-9375

Getting Started

2023-08-02



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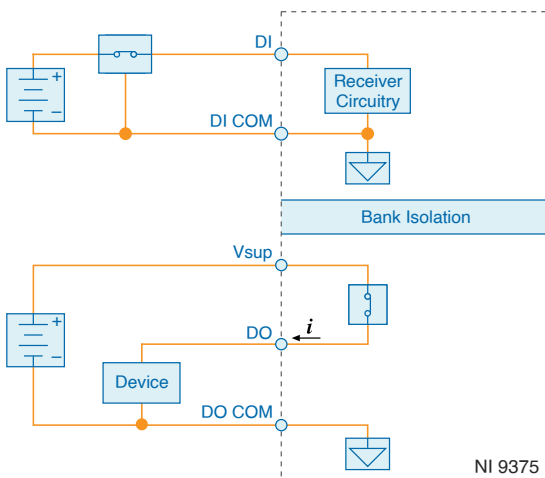
NI-9375 Getting Started

Connector Types

The NI-9375 has more than one connector type: NI-9375 with spring terminal and NI-9375 with DSUB. Unless the connector type is specified, NI-9375 refers to all connector types.

The NI-9375 with spring terminal is available in two types: push-in spring terminal and spring terminal. The push-in type spring terminal connector is black and orange. The spring terminal connector is black. NI-9375 with spring terminal refers to both types unless the two types are specified. Differences between the two types of spring terminal connectors are noted by the connector color.

NI-9375 Block Diagram



- The bank of 16 digital input channels and the bank of 16 digital output channels on the NI-9375 are isolated from each other and isolated from earth ground.
- The NI-9375 internally limits current signals connected to DI.

- The NI-9375 has sinking inputs. Sinking inputs provide a path to COM when the sourcing device connected to the NI-9375 drives current or applies voltage to DI.
- The NI-9375 has sourcing outputs. Sourcing outputs drive current from Vsup to DO when the channel is on.



Tip For more information about sinking inputs and sourcing outputs, visit ni.com/r/sinksources.

Allowable Current Per Module

The NI-9375 has a per module continuous output current specification. Use the following equation to determine whether the total module current of your loads for channels that are turned on are within the specification.

Figure 1. Total Module Current Equation

$$(I_{DO0})^2 + (I_{DO1})^2 + \dots + (I_{DO15})^2 = \text{Total Module Current}$$

For example, an NI-9375 with spring terminal with two channels at 250 mA, six channels at 125 mA, and eight channels at 62 mA has the following per module continuous output current.

Figure 2. Total Module Current Example

$$\{(250 \text{ mA})^2 * 2\} + \{(125 \text{ mA})^2 * 6\} + \{(62 \text{ mA})^2 * 8\} = 0.25 \text{ A}^2$$

NI-9375 with Spring Terminal (Black Connector) Pinout

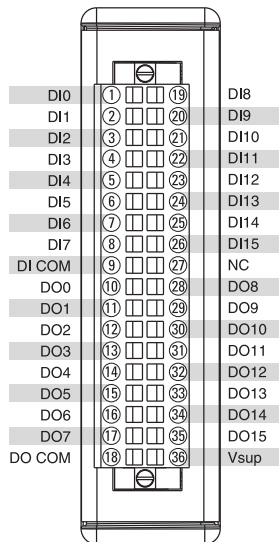


Table 1. Signal Descriptions

Signal	Description
DI	Digital input signal connection
DI COM	Common reference connection for the digital inputs
DO	Digital output signal connection
DO COM	Common reference connection for the digital outputs
NC	No connection
V _{sup}	Voltage supply connection

NI-9375 with Push-in Style Spring Terminal (Black/Orange Connector) Pinout

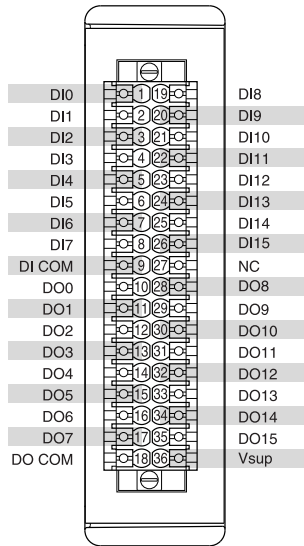


Table 2. Signal Descriptions

Signal	Description
DI	Digital input signal connection
DI COM	Common reference connection for the digital inputs
DO	Digital output signal connection
DO COM	Common reference connection for the digital outputs
NC	No connection
V_{sup}	Voltage supply connection

NI-9375 with DSUB Pinout

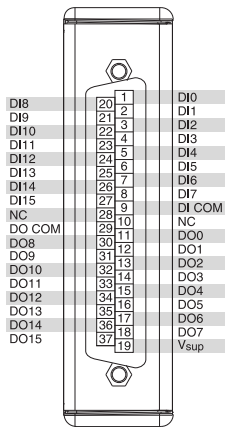
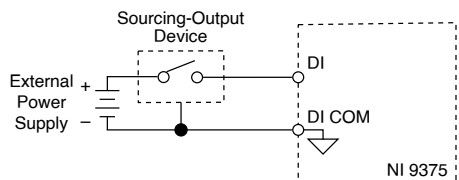


Table 3. Signal Descriptions

Signal	Description
DI	Digital input signal connection
DI COM	Common reference connection for the digital inputs
DO	Digital output signal connection
DO COM	Common reference connection for the digital outputs
NC	No connection
V _{sup}	Voltage supply connection

Sourcing-Output Connections

You can connect 2- and 3-wire sourcing-output devices to the NI-9375.

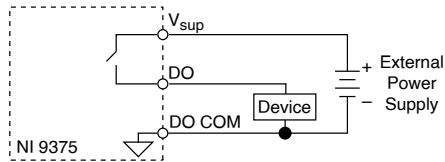


The NI-9375 channel registers as ON when the sourcing-output device drives enough current or applies enough voltage to DI. If no device is connected to DI, the channel registers as OFF.

Connecting Digital Devices

You can connect a variety of industrial devices, such as solenoids, motors, actuators, relays, and lamps to the NI-9375. You must connect an external power supply to the NI-9375. The power supply provides the current for the output channels.

Figure 3. Connecting an Industrial Device to the NI-9375



Caution Do not install or remove C Series modules from your system if any external power supplies connected to the V_{sup} and COM pins are powered on.



Attention Ne pas installer ou retirer les modules de la Série C de votre système si une alimentation externe connectée aux broches V_{sup} et COM est sous tension.

Ensure that the devices you connect to the NI-9375 are compatible with the output specifications of the NI-9375. Refer to the device specifications at ni.com/docs for output specifications.

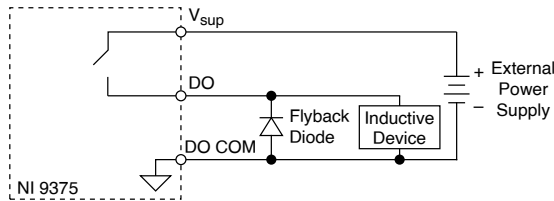


Note When the industrial device is off, DO is not connected to COM. For large source impedances, you must use a pull-down resistor between DO and COM. Go to ni.com/r/cseriesdopulsegen for more information.

Protecting the Digital Outputs from Flyback Voltages

If the channel is switching an inductive or energy-storing device such as a solenoid, motor, or relay, and the device does not have flyback protection, install an external flyback diode.

Figure 4. Connecting a Flyback Diode



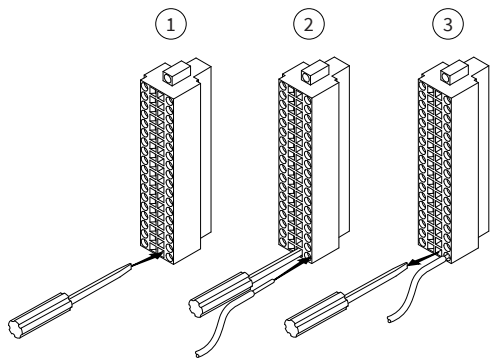
Connecting Wires to the NI-9375 with Spring Terminal (Black Connector)

What to Use

- NI-9375 spring terminal black connector
- 0.08 mm to 1.0 mm (28 AWG to 18 AWG) copper conductor wire with 7 mm (0.28 in.) of insulation stripped from the end
- Flathead screwdriver with a 2.3 mm x 1.0 mm (0.09 in. x 0.04 in.) blade, included with the NI-9375

What to Do

Complete the following steps to connect wires to the spring terminal connector.



1. Insert the screwdriver into a spring clamp activation slot to open the corresponding connector terminal.

2. Press a wire into the open connector terminal.
3. Remove the screwdriver from the activation slot to clamp the wire into place.

Connecting Wires to the NI-9375 with Push-in Style Spring Terminal (Black/Orange Connector)

What to Use

- NI-9375 spring terminal black/orange connector
- 0.14 mm to 1.5 mm (26 AWG to 16 AWG) copper conductor wire with 10 mm (0.394 in.) of insulation stripped from the end
- Ferrules (optional)

What to Do

Refer to the following table for how to insert a wire into a terminal depending on what type of wire you are using or if you are using a ferrule.

Option	Description
When using a solid wire or stranded wire with a ferrule	Push the wire into the terminal when using a solid wire or stranded wire with a ferrule
When using a stranded wire without a ferrule	Press the push button and then push the wire into the terminal



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

High-Vibration Application Connections

If your application is subject to high vibration, NI recommends that you use the NI-9940 backshell kit to protect connections to the NI-9375 with spring terminal.

I/O Protection

Each DO channel on the NI-9375 has circuitry that protects it from overcurrents resulting from a short-circuit or faulty loads.



Notice Overvoltage and reverse bias voltage conditions can damage the NI-9375. Check the voltage specifications for all devices that you connect to the NI-9375.

When a short circuit is present on a digital output channel, the DO channel cycles off and on until the short circuit is removed or the current returns to an acceptably low level. An overcurrent state can affect the performance of the NI-9375 and other modules in the system. To ensure safe and proper operation, the digital outputs should not exceed the maximum continuous output current specification.