

# NI PXI-4110 Specifications

## Triple-Output Programmable DC Power Supply

This document lists specifications for the NI PXI-4110 triple-output programmable DC power supply. All specifications are subject to change without notice. For the most current specifications, visit [ni.com/manuals](http://ni.com/manuals).

### DC Specifications

Channel	DC Voltage	Isolation <sup>*</sup>	DC Current (Power)			
			Auxiliary Power		Internal Power	
			20 mA Range	1 A Range	20 mA Range	1 A Range
0	0 V to +6 V	N/A	N/A	1 A (6 W)	N/A	1 A (6 W)
1	0 V to +20 V	60 VDC, CAT I	20 mA	1 A (20 W)	20 mA	100 mA (2 W) <sup>†</sup>
2	0 V to -20 V	60 VDC, CAT I	20 mA	1 A (20 W)	20 mA	100 mA (2 W) <sup>†</sup>

<sup>\*</sup> Channels 1 and 2 are isolated from ground but not from each other.  
<sup>†</sup> When internally powered, the combined outputs of channels 1 and 2 must not exceed 3 W total.



**Note** The NI PXI-4110 is a single-quadrant power supply with three output channels. In this document, channel 0 refers to the 0 V to +6 V output, channel 1 refers to the 0 V to +20 V output, and channel 2 refers to the 0 V to -20 V output.

### Voltage Programming Accuracy/Resolution

Channel	Range	Resolution	Accuracy $\pm$ (% of output + offset)	
			1 Year 23 °C $\pm$ 10 °C	Tempco/ <sup>°</sup> C 0 °C to 55 °C
0	+6 V	0.12 mV	0.05 + 4 mV	0.005 + 0.3 mV
1	+20 V	0.40 mV	0.05 + 10 mV	0.005 + 1 mV
2	-20 V	0.40 mV	0.05 + 10 mV	0.005 + 1 mV

Tempco = temperature coefficient

## Current Output Accuracy/Resolution<sup>1</sup>

Channel(s)	Range*	Resolution	Accuracy ± (% of output + offset)	
			1 Year 23 °C ± 10 °C	Tempco/°C 0 °C to 55 °C
0	1 A	0.02 mA	0.15 + 4 mA	0.02 + 0.2 mA
1 and 2	20 mA	0.40 µA	0.15 + 35 µA	0.01 + 3 µA
	1 A	0.02 mA	0.15 + 4 mA	0.02 + 0.2 mA
Tempco = temperature coefficient * Minimum programmable current limit is 1% of range.				

## Voltage Measurement Accuracy/Resolution<sup>2</sup>

Channel	Range	Resolution	Accuracy ± (% of reading + offset)	
			1 Year 23 °C ± 10 °C	Tempco/°C 0 °C to 55 °C
0	+6 V	0.06 mV	0.05 + 4 mV	0.005 + 0.2 mV
1	+20 V	0.20 mV	0.05 + 5 mV	0.005 + 0.5 mV
2	-20 V	0.20 mV	0.05 + 5 mV	0.005 + 0.5 mV
Tempco = temperature coefficient				

## Current Measurement Accuracy/Resolution<sup>3</sup>

Channel(s)	Range	Resolution	Accuracy ± (% of reading + offset)	
			1 Year 23 °C ± 10 °C	Tempco/°C 0 °C to 55 °C
0	1 A	0.01 mA	0.15 + 4 mA	0.02 + 0.2 mA
1 and 2	20 mA	0.20 µA	0.15 + 35 µA	0.01 + 3 µA
	1 A	0.01 mA	0.15 + 4 mA	0.02 + 0.2 mA
Tempco = temperature coefficient				

<sup>1</sup> Calibrated at half of voltage range on channel. Applies to current limits greater than 2% of range. Applies to output current up to 500 mA. For output current greater than 500 mA, refer to the derating information in Figure 1.

<sup>2</sup> Using the niDCPower **Samples to Average** property/attribute set to 300.

<sup>3</sup> Using the niDCPower **Samples to Average** property/attribute set to 300. Applies to output current up to 500 mA. For output current greater than 500 mA, refer to the derating information in Figure 1.

## Voltage Output Speed<sup>1</sup>

Channel(s)	Auxiliary Power				Internal Power			
	Rise Time*		Fall Time <sup>†</sup>		Rise Time*		Fall Time <sup>†</sup>	
	Full Load	No Load	Full Load	No Load	Full Load	No Load	Full Load	No Load
0	<1 ms	<1 ms	<1 ms	<25 ms	same as auxiliary power			
1 and 2	<1 ms	<1 ms	<2 ms	<56 ms	<20 ms	<10 ms	<15 ms	<56 ms

\* Rise time is from 10% to 90% of programmed voltage change at maximum current.  
<sup>†</sup> Fall time is from 90% to 10% of programmed voltage change at maximum current.

## Line<sup>2</sup> and Load Regulation

Channel(s)	Line Regulation* ± (% of output + offset)		Load Regulation ± % of range selected	
	Voltage	Current	Voltage <sup>†</sup> (per amp of output load)	Current (per volt of output change)
0	N/A	N/A	0.42	0.02
1 and 2	0.01 + 1 mV	0.01 + 0.02% of range	0.1	0.007 (0.003 for 20 mA range)

\* Per volt of change in auxiliary power input  
<sup>†</sup> Measured at output channel terminals.

## Ripple and Noise

Channel(s)	RMS Normal-Mode Voltage*	RMS Normal-Mode Current <sup>†</sup> (20 mA into 500 Ω load)
0	<1.5 mV	<8 μA
1 and 2	<1 mV	<8 μA (<3 μA for 20 mA range)

\* Voltage noise measured from 20 Hz to 20 MHz.  
<sup>†</sup> Current noise bandwidth is limited to 10 kHz for 1 A range and 400 Hz for 20 mA range.

<sup>1</sup> Current limit set to 1 A for auxiliary power or 100 mA for internal power, resistive load. For 20 mA range, all voltage output speeds are <80 ms.

<sup>2</sup> Line regulation applies to the auxiliary power input only.

## General Specifications

Sampling rate

Default .....300/s  
(10 samples averaged)

Maximum.....3,000/s

Transient response (typical) .....Recovers to <0.1% of voltage range within 50  $\mu$ s after a change in load current from 50% to 100% of current range.

### Output channel protection

Overvoltage.....Tolerates 14 VDC over rated output

Overcurrent or reverse voltage....Fused

Overtemperature .....Automatic shutdown

### Auxiliary power input protection

Overvoltage.....>15.5 VDC shut-off;  
>20 VDC crowbar (fused)

Overcurrent or reverse voltage....Fused

Warm-up.....15 minutes

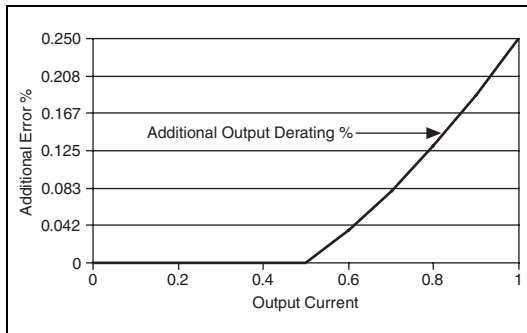


Figure 1. Accuracy Derating versus Load Current

## Physical Characteristics

Dimensions .....3U, one-slot, PXI/cPCI module;  
2.0 cm  $\times$  13.0 cm  $\times$  21.6 cm  
(0.8 in.  $\times$  5.1 in.  $\times$  8.5 in.)

Weight .....323 g

### User-replaceable fuses

Output channels  
(internally-socketed) .....3, Littelfuse 045301.5  
(F 1.5 A 125 V)



**Note** A spare output channel fuse is located near the rear PXI connector of the NI PXI-4110.

Auxiliary power input  
(front panel-mount) ..... 1, 5  $\times$  20 mm glass fuse  
(T 6.3 A L 250 V)



**Note** NI recommends Littelfuse 21806.3.

### I/O connectors

Output channels ..... MINI-COMBICON,  
3.81 mm (6 position)

Auxiliary power input ..... MINI-COMBICON,  
3.5 mm (2 position)



**Note** I/O connectors can accept wire gauges from 16 AWG to 28 AWG. NI recommends 18 AWG or lower.

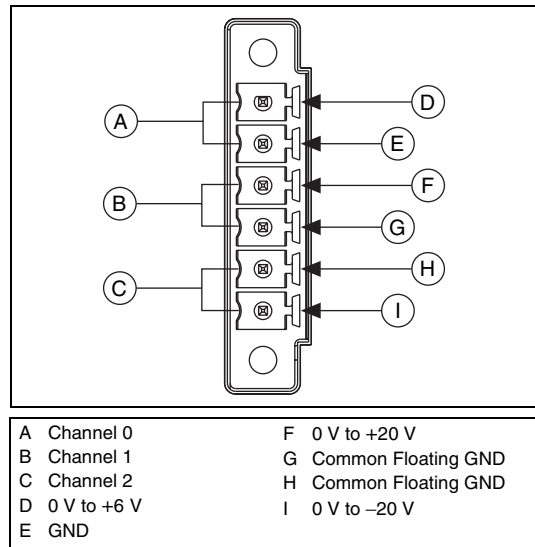


Figure 2. NI PXI-4110 Output Connector

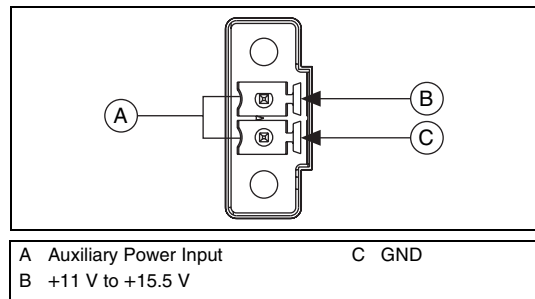


Figure 3. NI PXI-4110 Auxiliary Power Input Connector

## Power Requirements

Auxiliary power source (optional; channels 1 and 2 only)  
 Input requirements..... 11 VDC to 15.5 VDC,  
 5 A max



**Note** For information about cascading multiple NI PXI-4110 devices, refer to the *NI DC Power Supplies Help* at [ni.com/manuals](http://ni.com/manuals).

## Environment

Maximum altitude..... 2,000 m (at 25 °C  
 ambient temperature)

Pollution Degree ..... 2

Indoor use only.

## Operating Environment

Ambient temperature range ..... 0 °C to 55 °C (Tested  
 in accordance with  
 IEC-60068-2-1 and  
 IEC-60068-2-2.)

Relative humidity range..... 10% to 90%,  
 noncondensing (Tested  
 in accordance with  
 IEC-60068-2-56.)

## Storage Environment

Ambient temperature range ..... -40 °C to 70 °C (Tested  
 in accordance with  
 IEC-60068-2-1 and  
 IEC-60068-2-2.)

Relative humidity range..... 5% to 95%,  
 noncondensing (Tested  
 in accordance with  
 IEC-60068-2-56.)

## Shock and Vibration

Operational shock ..... 30 g peak, half-sine,  
 11 ms pulse (Tested  
 in accordance with  
 IEC-60068-2-27. Test  
 profile developed in  
 accordance with  
 MIL-PRF-28800F.)

Random vibration

Operating ..... 5 Hz to 500 Hz, 0.3 g<sub>rms</sub>

Nonoperating ..... 5 Hz to 500 Hz, 2.4 g<sub>rms</sub>  
 (Tested in accordance  
 with IEC-60068-2-64.  
 Nonoperating test profile  
 exceeds the requirements  
 of MIL-PRF-28800F,  
 Class 3.)

## Accessories

Visit [ni.com](http://ni.com) for more information about the following accessory.

**Table 1.** NI Accessories for the NI PXI-4110

Accessory	Description	Part Number (P/N)
NI APS-4100	Auxiliary power source for NI DC power supplies	779671-01



**Caution** You *must* install mating connectors according to local safety codes and standards and according to the specifications provided by the manufacturer. You are responsible for verifying the safety compliance of third-party connectors and their usage according to the relevant standard(s), including UL and CSA in North America and IEC and VDE in Europe.

**Table 2.** Third-Party Accessories for the NI PXI-4110

Accessory	Description	Manufacturer	P/N
MINI-COMBICON, 3.81 mm (6 position)	Mating connector for output channels	Phoenix Contact	1714964
MINI-COMBICON, 3.81 mm (6 position) backshell	Backshell for output channels mating connector	Phoenix Contact	1714993
MINI-COMBICON, 3.5 mm (2 position)	Mating connector for auxiliary power input	Phoenix Contact	1714977
MINI-COMBICON, 3.5 mm (2 position) backshell	Backshell for auxiliary power input	Phoenix Contact	1714980
Chip fuse (F 1.5 A 125 V)	Output channel fuse	Littelfuse	045301.5
5 × 20 mm, glass fuse (T 6.3 A L 250 V)	Auxiliary power input fuse	Littelfuse	21806.3

# Compliance and Certifications

## Safety

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



**Caution** Connect only voltages that are within these limits.

Channel-to-COM.....14 VDC over rated output, CAT I



**Caution** Do not connect to signals or use for the measurements within CAT II, III, or IV.

Cascading multiple channels

Channel-to-GND.....60 VDC max

### Isolation Voltage

Channels 1- and 2-to-earth ground

Continuous .....60 VDC, CAT I, verified by dielectric withstand test, 5 s

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

- 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 visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

### Electromagnetic Compatibility

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

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions, Class A



**Note** For EMC compliance, operate this device with shielded cabling.

## CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 73/23/EEC; Low-Voltage Directive (safety)
- 89/336/EEC; Electromagnetic Compatibility Directive (EMC)



**Note** Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

## Waste Electrical and Electronic Equipment (WEEE)



**EU Customers** At the end of their 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.htm](http://ni.com/environment/weee.htm).

<sup>1</sup> The maximum voltage that can be applied or output between any port or V<sub>SUP</sub> terminal and a COM terminal without creating a safety hazard.

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