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SPECIFICATIONS

PXIe-4154

2-Channel, 8 V, ±3 A PXI Programmable Power Supply

These specifications apply to the PXe-4154.

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Definitions

Warranted specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

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Characteristics describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- *Typical* specifications describe the expected performance met by a majority of the models.
- *Nominal* specifications describe parameters and attributes that may be useful in operation.

Specifications are *Warranted* unless otherwise noted.

Conditions

Specifications are valid under the following conditions unless otherwise noted.

- Ambient temperature[1] of 23 °C ± 5 ºC
- Calibration interval of 1 year
- 30 minutes warm-up time
- Self-calibration performed within the last 24 hours
- **niDCPower Samples to Average** property or `NIDCPOWER_ATTR_SAMPLES_TO_AVERAGE` attribute set to 20,000

Device Capabilities

The following table and figure illustrate the voltage and the current source and sink ranges of the PXe-4154.

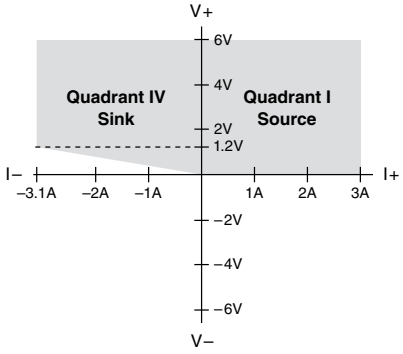
Table 1. Current Source and Sink Ranges

Channel	DC voltage ranges	DC Current Source Ranges[2]	DC Current Sink Limits, Typical[3]
Channel 0 (Battery Simulator)	0 V to +6 V	30 mA	31 mA
		3 A[4]	3.1 A
Channel 1 (Charger Simulator)	0 V to +8 V	1.5 A[4]	0.1 A

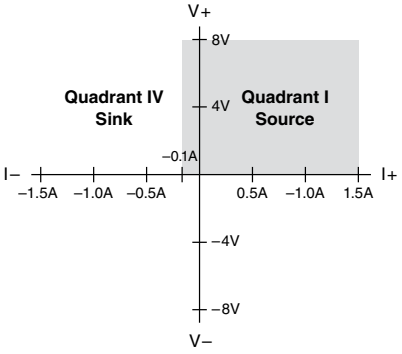
[1] The ambient temperature of a PXI system is defined as the temperature at the chassis fan inlet (air intake).
[2] Current source limits are programmable in Quadrant I (source).
[3] Current sink limits are fixed (not programmable) in Quadrant IV (sink).
[4] Total combined output current from all channels cannot exceed 3.1 A.

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Figure 1. Quadrant Diagram, Characteristic[5]



Channel 0: Battery Simulator



Channel 1: Charger Simulator

Channel 0 (Battery Simulator) Specifications

Programming and Measurement Accuracy/Resolution

Table 2. Voltage Programming Accuracy/Resolution

Range	Minimum Programmable Value, Nominal	Resolution, Nominal	Accuracy (23 °C ± 5 °C) ± (% of voltage + offset)
+6 V	0 V	2.3 mV	0.04% + 5 mV

Table 3. Current Programming Accuracy/Resolution

Range	Minimum Programmable Value, Nominal	Resolution, Nominal	Accuracy (23 °C ± 5 °C) ± (% of current + offset)
30 mA	100 µA	10 µA	0.12% + 35 µA
3 A[6]	10 mA	1 mA	0.12% + 3.5 mA[7]

[5] For channel 0 in Quadrant IV (sink) when the terminal voltage drops below 1.2 V (sensing at the connector), the maximum sink current derates linearly from -3.1 A.

[6] Total output current for both channels combined cannot exceed 3.1 A

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Table 4. Output Resistance Programming Accuracy/Resolution

Maximum Programmable Value, Nominal	Minimum Programmable Value, Nominal	Resolution, Nominal	Accuracy (23 °C ± 5 °C) ± (% of reading + offset)
1 Ω	-0.04 Ω	1 mΩ	0.3% + 3 mΩ

Table 5. Voltage Measurement Accuracy/Resolution

Range	Resolution, Nominal	Accuracy (23 °C ± 5 °C) ± (% of voltage + offset)
+6 V	100 µV	0.025% + 2 mV

Table 6. Current Measurement Accuracy/Resolution

Range	Resolution, Nominal	Accuracy (23 °C ± 5 °C) ± (% of current + offset)
30 mA	1 µA	0.04% + 7 µA
3 A	100 µA	0.04% + 0.7 mA[7]

Related Information

Current Programming/Measurement Accuracy Derating on page 7

Channel 0 General Specifications

Temperature coefficient	10% of accuracy specification per °C
Settling time	500 µs (settled to 1%, 1 V step, 50% of current range at final value), typical
Rise or fall time (10%–90%)	<200 µs (current limit ≥1% of range), typical
Maximum sampling rate	200 kS/s, characteristic
Transient response time after change in load current from 0.1 A to 1.5 A[8]	
Device configured for normal transient response	Recovers to <± 20 mV within 40 µs, typical
Device configured for fast transient response	Recovers to <± 20 mV within 20 µs

[7] For current output ≥1 A, accuracy is derated.
[8] Tested with 1 meter 18 AWG cables.

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Transient voltage dip after a change in load current from 0.1 A to 1.5 A[8]	
Device configured for normal transient response	<250 mV, typical
Device configured for fast transient response	<70 mV
RMS normal mode noise	<1 mV RMS (<6m V_{p-p}) into resistive load (20 Hz to 20 MHz bandwidth), typical
Load regulation, output resistance set to 0 Ω	
Voltage	3 mV max per amp of output load using remote sense and sensing at the connector
Current	0.01% of range per volt of output change
Remote sense	Add 2 µV to voltage accuracy specification per mV of lead drop
Maximum remote sense lead drop	Up to 1 V drop per lead
Overvoltage protection	Output disconnected if the voltage at the Output + terminal exceeds the programmed voltage by 2.5 V, typical

Channel 1 (Charger Simulator) Specifications

Programming and Measurement Accuracy/Resolution

Table 7. Programming Accuracy/Resolution

Output Function	Range	Minimum Programmable Value, Nominal	Resolution, Nominal	Accuracy ± (% of output + offset), 23 °C ± 10 °C
Voltage	+8 V	0 V	3 mV	0.04% + 6 mV
Current	1.5 A[9]	10 mA	1 mA	0.16% + 3.5 mA[10]

[9] Total output current for both channels combined cannot exceed 3.1 A

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Table 8. Measurement Accuracy/Resolution

Measurement Type	Range	Resolution, Nominal	Accuracy ± (% of output + offset), 23 °C ± 10 °C
Voltage	+8 V	150 µV	0.05% + 2.5 mV
Current	1.5 A	50 µA	0.12% + 0.35 mA[10]

Related Information

Current Programming/Measurement Accuracy Derating on page 7

Channel 1 General Specifications

Temperature coefficient	10% of accuracy specification per °C
Settling time	500 µs (settled to 1%, 1 V step, 50% of current range at final value), typical
Rise or fall time (10%–90%)	<200 µs (current limit ≥ 1% of range), typical
Maximum sampling rate	200 kS/s, characteristic
Transient response time after change in load current from 0.75 A to 1.5 A	Recovers to <±20 mV within 45 µs, typical
RMS normal mode noise	<2 mV RMS (<10 mV_{p-p}) into resistive load (20 Hz to 20 MHz bandwidth), typical
Load regulation	
Voltage	1 mV max per amp of output load using remote sense and sensing at the connector
Current	0.01% of range per volt of output change
Remote sense	Add 2 µV to voltage accuracy specification per mV of lead drop
Maximum remote sense lead drop	Up to 1 V drop per lead for voltage output from 0 V to 6 V. For voltage output >6 V, linearly derate from 1 V to 0.4 V
Overvoltage protection	Output disconnected if the voltage at the Output + terminal exceeds the programmed voltage by 2.5 V, typical

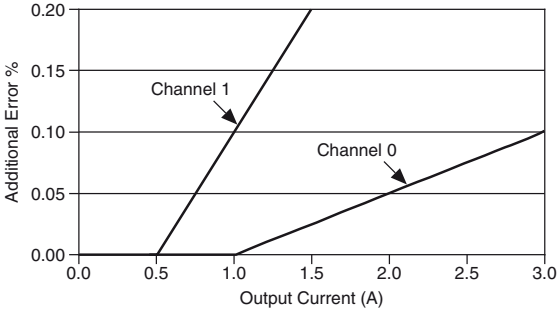
[10] For current output ≥500 mA, accuracy is derated.

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Channel 0 and Channel 1 Specifications

Current Programming/Measurement Accuracy Derating

Figure 2. Accuracy Derating Versus Output Current



Triggers

Input triggers	
Types	Start, Source, Sequence Advance, Measure
Sources (PXI trigger lines 0 to 7)[11]	
Polarity	Configurable
Minimum pulse width	100 ns, nominal
Destinations[12] (PXI trigger lines 0 to 7)[11]	
Polarity	Active high (not configurable)
Minimum pulse width	250 ns
Output triggers (events)	
Types	Source Complete, Sequence Iteration Complete, Sequence Engine Done, Measure Complete

[11] Pulse widths and logic levels are compliant with *PXI Express Hardware Specification Revision 1.0 ECN 1*.

[12] Input triggers can come from any source (PXI trigger or software trigger) and be exported to any PXI trigger line. This allows for easier multi-board synchronization regardless of the trigger source.

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Destinations (PXI trigger lines 0 to 7)[11]	
Polarity	Configurable
Pulse width	Configurable between 250 ns and 1.6 µs, nominal

Isolation

Isolation voltage, characteristic	
Channel-to-ground or channel-to-channel	60 VDC, CAT I, verified by dielectric withstand test, 5 s, continuous

Note Measurement Categories CAT I and CAT O (Other) 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.

Maximum Measurement Speed

Maximum source update rate[13]	1,850 Updates/s, characteristic
Trigger in to source delay	15 µs, characteristic

Power Characteristics

PXI Express power requirement	5 W at 3.3 V, 46 W at 12 V, typical

Physical Characteristics

Dimensions	3U, two-slot, PXI Express/CompactPCI Express module 4.0 cm × 13.0 cm × 21.6 cm (1.6 in. × 5.1 in. × 8.5 in.)
Weight	565 g (19.9 oz), nominal
Front panel connectors	Phoenix Contact COMBICON, 5.08 mm (5 position), nominal

Cleaning Statement

Caution Clean the hardware with a soft, nonmetallic brush. Make sure that the hardware is completely dry and free from contaminants before returning it to service.

[13] Maximum source update rate is performed with the source delay set to 500 µs. This is sufficient for the output to settle within 1% of the requested level with a simple resistive load. As you adjust the source delay for your application's requirements, maximum rates may vary.

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Calibration Interval

Recommended calibration interval	1 year

Environment

Maximum altitude	2,000 m (800 mbar) (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. Meets MIL-PRF-28800F Class 3 low temperature limit and MIL-PRF-28800F Class 2 high temperature limit.)
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. Meets MIL-PRF-28800F Class 3 limits.)
Relative humidity range	5% to 95%, noncondensing (Tested in accordance with IEC 60068-2-56.)

Shock and Vibration

Storage Shock	50 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC 60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.)
Operating shock	30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC 60068-2-27. Meets MIL-PRF-28800F Class 2 limits.)

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Random vibration	
Operating	5 Hz to 500 Hz, 0.3 g_{rms} (Tested in accordance with IEC 60068-2-64.)
Nonoperating	5 Hz to 500 Hz, 2.4 g_{rms} (Tested in accordance with IEC 60068-2-64. Test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

Compliance and Certifications

Caution You can impair the protection provided by the PXe-4154 if you use it in a manner not described in this document.

Caution To ensure the specified EMC performance, operate this product only with shielded cables and accessories.

Safety

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

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 electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- EN 55022 (CISPR 22): Class A emissions
- EN 55024 (CISPR 24): Immunity
- AS/NZS CISPR 11: Group 1, Class A emissions
- AS/NZS CISPR 22: Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia, and New Zealand (per CISPR 11), Class A equipment is intended for use only in heavy-industrial locations.

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Note Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

Note For EMC declarations, certifications, and additional information, refer to the *Online Product Certification* section.

CE Compliance CE

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)

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.

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*.

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