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# PXI-4130

# Specifications

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# Contents

PXI-4130 Specifications..... 3

# PXI-4130 Specifications

These specifications apply to the PXI-4130 with APS-4100 auxiliary power supply and to the PXI-4130 without auxiliary power supply.

## Definitions

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

**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 performance met by a majority of models.
- **Nominal** specifications describe an attribute that is based on design, conformance testing, or supplemental testing.

Specifications are **Warranted** unless otherwise noted.

## Conditions

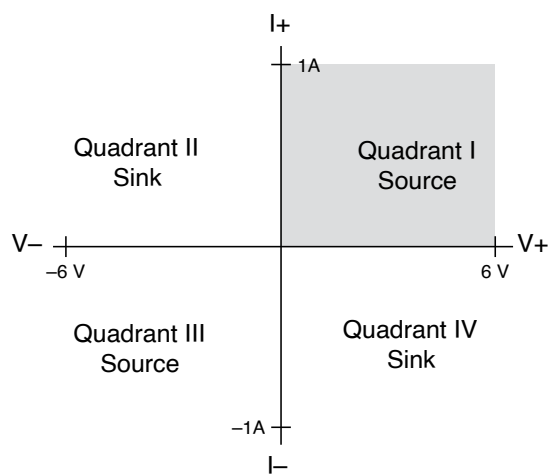
Specifications are valid under the following conditions unless otherwise noted.

- Ambient temperature<sup>[1]</sup> of  $23\text{ °C} \pm 5\text{ °C}$
- 30 minutes warm-up time
- niDCPower Samples to Average property or NIDCPOWER\_ATTR\_SAMPLES\_TO\_AVERAGE attribute set to 300 for optimal 50 Hz and 60 Hz rejection

## Device Capabilities

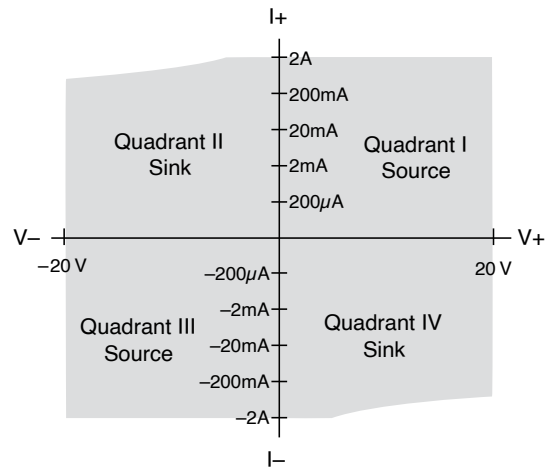
Channel	DC Voltage Ranges	Isolation	DC Current Source and Sink Ranges
SMU Channel (1)	<ul style="list-style-type: none"> <li>■ -20 V to +20 V</li> <li>■ -6 V to +6 V</li> </ul>	60 VDC, CAT I	<ul style="list-style-type: none"> <li>■ 200 <math>\mu</math>A</li> <li>■ 2 mA</li> <li>■ 20 mA</li> <li>■ 200 mA</li> <li>■ 2 A <u>[2]</u></li> </ul>
Utility Channel (0)	<ul style="list-style-type: none"> <li>■ 0 V to 6 V</li> </ul>	N/A	<ul style="list-style-type: none"> <li>■ 1 A (6 W)</li> </ul>

Figure 1. Channel 0 Quadrant Diagram



Channel 0: 6W in Quadrant I

Figure 2. Channel 1 Quadrant Diagram



Channel 1: 40W in Quadrants I and III,  
10W in Quadrants II and IV

## SMU Channel Specifications (Channel 1)

### Voltage Programming Accuracy/Resolution

Range	Resolution	Accuracy ± (% of Output + Offset)
		1 Year 23 °C ± 5 °C
±20 V	0.33 mV	0.034% + 1.8 mV
±6 V	0.1 mV	0.034% + 1.5 mV

### Current Programming Accuracy/Resolution<sup>[3]</sup>

Range	Resolution	Accuracy ± (% of Output + Offset)
		1 Year 23 °C ± 5 °C
200 μA	10 nA	0.03% + 0.1 μA
2 mA	100 nA	0.03% + 1 μA
20 mA	1 μA	0.03% + 10 μA
200 mA	10 μA	0.03% + 100 μA
2 A <sup>[4]</sup>	100 μA	0.12% + 1 mA

## Voltage Measurement Accuracy/Resolution

Range	Resolution	Accuracy ± (% of Reading + Offset)
		1 Year 23 °C ± 5 °C
±20 V	0.10 mV	0.03% + 1.5 mV
±6 V	0.10 mV	0.03% + 1.5 mV

## Current Measurement Accuracy/Resolution

Range	Resolution	Accuracy ± (% of Reading + Offset)
		1 Year 23 °C ± 5 °C
200 µA	1.0 nA	0.03% + 0.02 µA
2 mA	10 nA	0.03% + 0.2 µA
20 mA	0.1 µA	0.03% + 2 µA
200 mA	1 µA	0.03% + 40 µA
2 A <input type="checkbox"/>	10 µA	0.12% + 200 µA

## Channel 1 Additional Specifications

Settling time <sup>[5]</sup>	500 µs, typical
<b>Output capacitance</b>	
Low setting	10 nF, typical
High setting	6.8 µF, typical
Slew rate	0.08 V/µs, typical

Transient response	Recovers to <0.1% of voltage range within 200 $\mu$ s after a change in load current from 10% to 90% of current range, typical
Normal Mode noise (Source only)	15 mV <sub>p-p</sub> into resistive load <5 mV RMS 20 Hz to 20 MHz bandwidth, typical
Remote sense	Up to 1 V drop per lead using internal power or $\geq$ 12 V auxiliary power supply; Add 120 $\mu$ V to accuracy specification per volt of lead drop.
<b>Load regulation</b>	
Voltage	20 mV per amp of output load using Local Sense
Current	0.01% of range per volt of output change
<b>Line regulation (% of output + offset, per volt of change in auxiliary power input)</b>	
Voltage	0.01 + 1 mV
Current	0.01 + 0.02% of range

Temperature coefficient (Tempco) is 10% of accuracy specification per °C.

## Utility Channel Specifications (Channel 0)

### Programming Accuracy/Resolution<sup>[6]</sup>

Output Function	Range	Resolution	Accuracy $\pm$ (% of output + offset)
			1 Year 23 °C $\pm$ 10 °C
Voltage	+6 V	0.12 mV	0.05% + 4 mV
Current	1 A <sup>[7]</sup>	0.02 mA	0.15% + 4 mA

## Measurement Accuracy/Resolution

Measurement Type	Range	Resolution	Accuracy ± (% of reading + offset)
			1 Year 23 °C ± 10 °C
Voltage	+6 V	0.06 mV	0.05% + 4 mV
Current	1 A $\square$	0.01 mA	0.15% + 4 mA

## Channel 0 Additional Specifications

Settling time	<1 ms, 10% to 90% of range, measured with full load, typical
Output capacitance	33 $\mu$ F, typical
Transient response	Recovers to <0.1% of voltage range within 50 $\mu$ s after a change in load current from 50% to 100% of current range, typical
Normal Mode noise and ripple (source only, voltage)	<1.5 mV RMS, 20 Hz to 20 MHz bandwidth, typical
<b>Load regulation</b>	
Voltage	0.42% of range per amp of output load
Current	0.02% of range per volt of output change

Temperature coefficient (Tempco) is 15% of accuracy specification per °C.

## Programming and Measurement Timing<sup>[8]</sup>

Maximum output update rate	3000 Updates/s, nominal
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Maximum measurement rate (samples to average = 1)	3 kS/s, nominal
Single point update latency	600 $\mu$ s, typical

## Protection

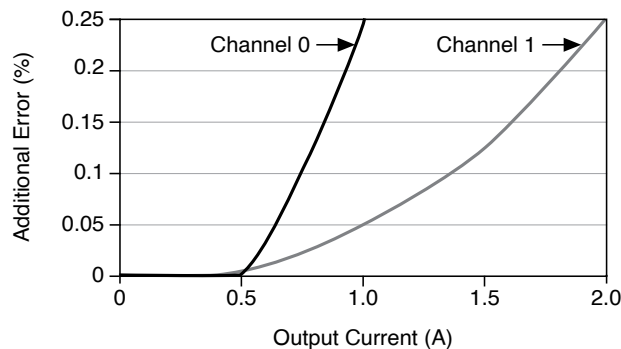
### Auxiliary power input protection

Overvoltage	>15.5 VDC shut-off; >20 VDC crowbar (fused)
Overcurrent or reverse voltage	Fused

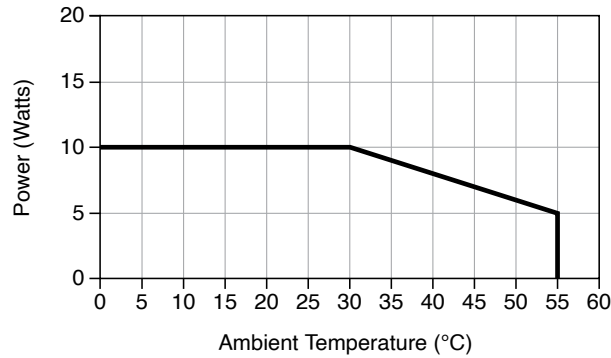
## Calibration Interval

Recommended calibration interval	1 year
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## Accuracy Specification Derating versus Load Current



## Maximum Sinking Power versus Ambient Temperature for Channel 1



## Physical Characteristics

Dimensions	3U, one-slot PXI/cPCI module  2.0 cm × 13.0 cm × 21.6 cm  (0.8 in. × 5.1 in. × 8.5 in.), nominal
Weight	312 g (11 oz), typical
<b>User-replaceable fuses</b>	
Channel 0 (internally-socketed)	1, Littelfuse 045301.5  (F 1.5 A125 V), characteristic
Auxiliary power input (front panel mount)	1, 5 × 20 mm glass fuse  (T 6.3 A L 250 V), characteristic

**Note** NI recommends Littelfuse 21806.3 for Auxiliary Power Input fuse.

### Front panel connectors

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

Auxiliary power input	MINI-COMBICON, 3.5 mm (2 position), nominal
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**Note** Front panel connectors can accept wire gauges from 16 AWG to 28 AWG.

## Power Requirements

PXI power requirement	10 W at 5 V 1 W at 3.3 V 6 W at 12 V 2.5 W at -12 V, typical
Auxiliary power source <sup>[9]</sup> input requirements	11 VDC to 15.5 VDC 5 A max

## 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.)
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Relative humidity range	10% to 90%, noncondensing (Tested in accordance with IEC 60068-2-56.)
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## 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.)
<b>Random vibration</b>	
Operating	5 Hz to 500 Hz, 0.3 g <sub>rms</sub> (Tested in accordance with IEC 60068-2-64.)
Nonoperating	5 Hz to 500 Hz, 2.4 g <sub>rms</sub> (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 PXI-4130 if you use it in a manner not described in this document.

**Caution**

## Safety

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

### Isolation Voltage

Channel-to-earth ground, continuous 60 VDC, CAT I<sup>[10]</sup>, verified by dielectric withstand test, 5 s

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 safety certifications, refer to the product label or the [Product Certifications and Declarations](#) 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.

**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 [Product Certifications and Declarations](#) section.

## CE Compliance

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)
- 2011/65/EU; Restriction of Hazardous Substances (RoHS)
- 2014/53/EU; Radio Equipment Directive (RED)
- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

## Product Certifications and Declarations


Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit [ni.com/product-certifications](http://ni.com/product-certifications), search by model number, and click the appropriate link.

## 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 **Engineering a Healthy Planet** 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.

### EU and UK Customers

-  **Waste Electrical and Electronic Equipment (WEEE)**—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](http://ni.com/environment/weee).

### 电子信息产品污染控制管理办法（中国 RoHS）

-  **中国 RoHS**—NI 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 NI 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).)

<sup>1</sup> The ambient temperature of a PXI system is defined as the temperature at the chassis fan inlet (air intake).

<sup>2</sup> Current input/output for channel 1 is limited to 2 W or 300 mA when operating under internal power. Continuous sinking power for channel 1 is limited to 10 W, subject to derating above 30 °C. Refer to the figure **Maximum Sinking Power versus Ambient Temperature for Channel 1**.

<sup>3</sup> Minimum programmable current limit/level is 2% of range.

<sup>4</sup> For currents  $\geq 500$  mA, refer to the additional derating information in the figure **Accuracy Specification Derating versus Load Current**.

<sup>5</sup> Settled to 1%, 1 V step, 50% of current range at final value, output capacitance set to low, using auxiliary power supply.

<sup>6</sup> Minimum programmable current limit/level is 2% of range.

<sup>7</sup> For currents  $\geq 500$  mA, refer to the additional derating information in the figure **Accuracy Specification Derating versus Load Current**.

<sup>8</sup> Does not include load dependent settling time.

<sup>9</sup> Optional; Channel 1 only.

<sup>10</sup> 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, III, or CAT IV.