SWB-2834 Specifications

2025-03-10

Contents

NI 2834A/B Specifications

These specifications apply to the NI 2834A/B matrix relay card.

Topology	2-wire 8 × 32 matrix

About These Specifications

Specifications characterize the warranted performance of the instrument under the stated operating conditions. Data in this document are ***Specifications*** unless otherwise noted.

Typical Specifications are specifications met by the majority of the instrument under the stated operating conditions and are tested at 23 °C ambient temperature. Typical specifications are not warranted.

All voltages are specified in DC, AC_{pk}, or a combination unless otherwise specified.

Clean devices and terminal blocks by brushing off light dust with a soft, nonmetallic brush. Remove other contaminants with a soft, lint-free, dampened cloth. Do not use detergent or chemical solvents. The unit must be completely dry and free from contaminants before returning to service.

Cautions

Caution This module is rated for Measurement Category I and intended to carry signal voltages no greater than 100 V_{rms}//100 VDC. This module can withstand up to 800 V impulse voltage. Do not use this module for connection to signals or for measurements within Categories II, III, or IV. Do not connect to MAINS supply circuits (for example, wall outlets) of 115 VAC or 230 VAC. Refer to the ***Read Me First: Safety and Electromagnetic Compatibility*** document for more information on measurement categories.

Caution In systems that include cards with different maximum voltages, the lowest safety voltage rating as specified on the front of the card applies for the entire system. The system can include all cards in the carrier, and all cards in other carriers that are connected with the NI 2806 expansion bridge.

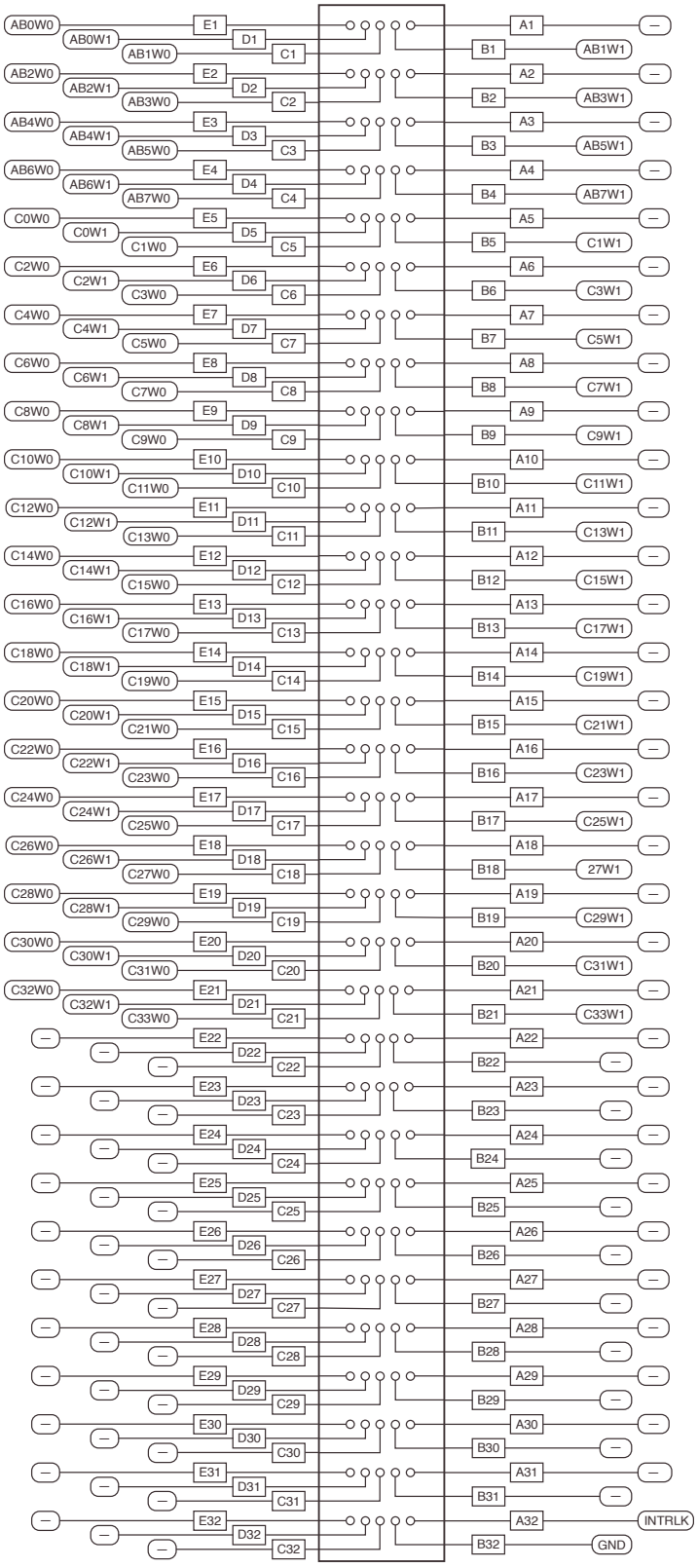
Caution When hazardous voltages (>42.4 Vpk/60 V DC) are present on any channel, safety low-voltage (≤42.4 Vpk/60 V DC) cannot be connected to any other channel.

Caution Always disconnect or turn off power sources before powering on a chassis.

NI 2834A/B Pinout

Use the pinout to connect to terminals on the NI 2834A/B .

Figure 1. NI 2834A/B Connector Pinout



Accessories

Refer to ni.com for more information about the following accessories.

Table 1. NI Accessories for the NI 2834A/B

Accessory	Part number
SH160F-160M-NI SwitchBlock Cable	153028-01
NI TBX-2808 screw terminal accessory for NI SwitchBlock (unshielded)	781420-08

Input Characteristics

Maximum switching voltage	
Row/column-to-ground	100 V, CAT I
Row-to-column	100 V
Maximum switching current	2.0 A (per channel)
Maximum carry current	2.0 A (per channel)
Maximum switching power	60 W, 62.5 VA (per channel)
Maximum switching power	60 W (per crosspoint)
Simultaneous channels at maximum current	8
DC path resistance	

Initial	1 Ω
End-of-life	≥2 Ω
Open channel	>10 GΩ

Note DC path resistance typically remains low for the life of the relay. At the end of relay life, the path resistance rises rapidly above the specified value. Load ratings apply to relays used within the specification before the end of relay life.

Thermal EMF, typical	<10 µV
Bandwidth, typical (-3 dB, 50 Ω termination, column-row-column)	≥10 MHz
Crosstalk, typical (50 Ω termination) channel-to-channel	
10 kHz	<-75 dB
100 kHz	<-70 dB
1 MHz	<-50 dB
Isolation, typical (50 Ω termination) open channel	
10 kHz	>80 dB

100 kHz	>65 dB
1 MHz	>45 dB
Minimum switching load[1]	20 mV/10 mA
Analog bus line connections	AB <0...15> (16 Lines)

Dynamic Characteristics

Relay operate/release time, typical[2]	<5 ms

Note Certain applications may require additional time for proper settling. Refer to NI Switches Help for information about including additional settling time.

Expected relay life, mechanical (no load)	1×10^8 cycles
Expected relay life, electrical (resistive, <10 pF load)	
10 V, 100 mA	2.5×10^6 cycles
10 V, 1 A	1×10^6 cycles

1. The minimum switch load is not recommended for 2-wire resistance measurements.
2. Relay operate and release times depend on PC and PXI bus performance and application software. For more information about NI SwitchBlock relay operate times, visit ni.com/info and enter the Info Code exa9ee.

30 V, 1 A	5×10^5 cycles
60 V, 1 A	1×10^5 cycles
100 V, 0.3 A	5×10^5 cycles
30 V, 2 A	1×10^5 cycles

Note Relays are field replaceable. Refer to NI Switches Help for information about replacing failed relays.

Related reference:

- Module Load Derating at >40 °C

Physical Characteristics

Relay type	Electromechanical, latching
Relay contact material	Palladium-ruthenium, gold covered
I/O connectors	160 position, DIN
Power requirement, carrier	20 W at 5 V, 5 W at 3.3 V
Dimensions (L × W × H)	11.2 cm × 1.2 cm × 17.1 cm(4.4 in. × 0.5 in. × 6.7 in.)

Weight	373 g (13.2 oz)

Related reference:

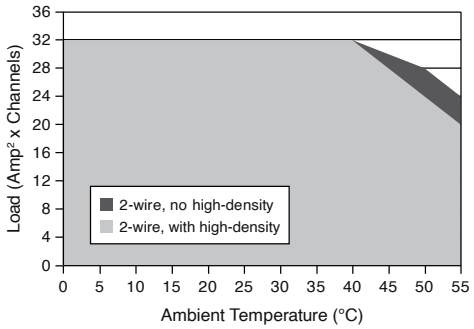
- Module Load Derating at >40 °C

Derating NI 2834A/B Load at >40 °C

To verify you are operating the NI 2834A/B within supported 2-wire derating conditions, complete the following steps:

1. Use the following equation to calculate the load:
   $\text{Load} = \text{Channels}_1 \times (\text{Current}_1)^2 + \text{Channels}_2 \times (\text{Current}_2)^2 + \ldots + \text{Channels}_n \times (\text{Current}_n)^2$
   where Channels is the number of channels that simultaneously carry a signal, Current, for 1, ... , n.
2. Verify that the load at your ambient operating temperature falls within the shaded region of the following figure.
   - If a high-density card is not installed in the carrier, verify the load falls in the 2-wire, ***no high-density*** shaded region.
   - If a high-density card (NI 2815/NI 2816) is installed in the carrier, verify the load falls in the 2-wire, ***with high-density*** shaded region.

Figure 2. NI 2834A/B Load Derating



Module Load Derating at >40 °C

The following examples calculate supported derating conditions for the NI 2834A/B .

Example 1

$\left(3 \times 2^2\right) + \left(4 \times 1.7^2\right) = 23.6A^2 \times \text{channels}$ $\left(3 \times 2^2\right) + \left(4 \times 1.7^2\right) = 23.6A^2 \times \text{channels}$

where	3 channels carry 2 A
	4 channels carry 1.7 A

You can use this module at ambient temperatures between 0 °C and 55 °C.

Example 2

$\left(8 \times 2^2\right) = 32A^2 \times \text{channels}$ $\left(8 \times 2^2\right) = 32A^2 \times \text{channels}$

where	8 channels carry 2 A

You can use this module at ambient temperatures between 0 °C and 50 °C.

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
Relative humidity range	10% to 90%, noncondensing

Storage Environment

Ambient temperature range	-20 °C to 71 °C
Relative humidity range	5% to 95%, noncondensing

Shock and Vibration

Operating shock	30 g peak, half-sine, 11 ms pulse
Random vibration	
Operating	5 Hz to 500 Hz, 0.3 g_{rms}
Nonoperating	5 Hz to 500 Hz, 2.4 g_{rms}

Compliance and Certifications

Safety Compliance Standards

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.

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, 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. 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.

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`。(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)