PXIe-2515 Specifications

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Contents

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This document lists specifications for the PXIe-2515 (PXIe-2515) high-speed digital signal insertion switch. The NI 2515 is intended for use with compatible single-ended NI high-speed DIO devices. Refer to the NI Switches Help for a list of supported NI high-speed DIO devices. These specifications are valid within the operating temperature range. All specifications are subject to change without notice. Visit ni.com/manuals for the most current specifications.

The minimum software requirements are:

- NI-SWITCH 4.0
- NI-DAQmx 9.0

Topology	Independent

Refer to the NI Switches Help for detailed topology information.

Caution The protection provided by the PXIe-2515 can be impaired if it is used in a manner not described in this document.

About These Specifications

Maximum and ***minimum*** specifications are warranted not to exceed these values within certain operating conditions and include the effects of temperature and uncertainty unless otherwise noted.

Typical specifications are unwarranted values that are representative of a majority (90%) of units within certain operating conditions and include the effects of temperature and uncertainty unless otherwise noted.

Characteristic specifications are unwarranted values that are representative of an

average unit operating at room temperature.

All specifications are ***characteristic*** unless otherwise specified.

Nominal specifications are unwarranted values that are relevant to the use of the product and convey the expected performance of the product.

Input Characteristics

All input characteristics are DC, AC_{pk}, or a combination unless otherwise specified.

Maximum switching voltage	
Channel-to-ground	30 V, CAT I[1]

Caution When hazardous voltages (>42.4 V_{pk}/60 VDC) are present on any relay terminal, safety low-voltage (<42.4 V_{pk}/60 VDC) cannot be connected to any other relay terminal.

Caution The maximum switching power is limited by the maximum switching current and the maximum voltage, and must not exceed 3 W.

Maximum switching power (per channel)	3 W
Maximum switching current	0.25 A
Maximum carry current	0.3 A

Typical skew	
Channel-to-channel	<130 ps (across all data channels)

Channel-to-control	<290 ps (across all data and control channels)
Maximum DC path resistance (at 25 °C)	
Initial (CH x - DUT x)	<2 Ω
End-of-life (CH x - DUT x)	≥3 Ω
Initial (Analog bus)	<5 Ω
End-of-life (Analog bus)	≥6 Ω

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

Characteristic analog bus offset voltage	<50 µV
Characteristic analog bus leakage current	<2 nA
Characteristic analog bus bandwidth (3 dB, 50 Ω termination)	50 MHz
Characteristic crosstalk (50 Ω termination)<600 MHz	<-10 dB
Characteristic open channel isolation (50 Ω termination)<600 MHz	>20 dB

Dynamic Characteristics

Maximum simultaneous drive limit for PXI/PXI Express	48 relays
Nominal relay operate time	0.25 ms
Nominal release time	0.05 ms
Nominal expected relay life, electrical (resistive)	
1 V, 10 mA	1×10^9 cycles
5 V, 10 mA	1×10^8 cycles

Trigger

Input trigger	
Sources	PXI trigger lines <0...7>
Minimum pulse width[2]	150 ns
Output trigger	
Destinations	PXI trigger lines <0...7>
Pulse width	Software-selectable: 1 µs to 62 µs

Physical Characteristics

Relay type	Reed

Note NI advises against installing reed relay modules directly adjacent to an embedded controller with a magnetic hard drive because of the sensitivity of reed relays and the possibility of interference from magnetic hard drives.

Relay contact material	Rhodium
I/O connectors	2, BNC female and 2, VHDCI female
Characteristic power requirement	
PXI	
5 V	9.1 W
3.3 V	0.45 W
PXI Express	
12 V	8.4 W
3.3 V	0.8 W

Note The maximum power requirements depend on how many relays are closed at the same time.

Dimensions (L × W × H)	3U, one slot, PXI/cPCI module, PXI Express compatible 21.6 cm × 2.0 cm × 13.0 cm (8.5 in. × 0.8 in. × 5.1 in.)
Weight	248 g (8.7 oz)

Estimating Reed Relay Life

Complete the following steps to estimate relay lifetimes using the nomograph:

1. Determine the peak voltage experienced across the relay while switching and mark this value on the ***Volts*** line.
2. Determine the sum of the DUT, cable, and instrumentation capacitances and mark this value on the ***Load Capacitance*** line.
3. Draw a straight line between both values.
   The intersection points of this line and the ***No Protection*** and ***50 Ω Protection*** axes are the corresponding estimated relay lifetimes in cycles.

Estimating Reed Relay Life Example

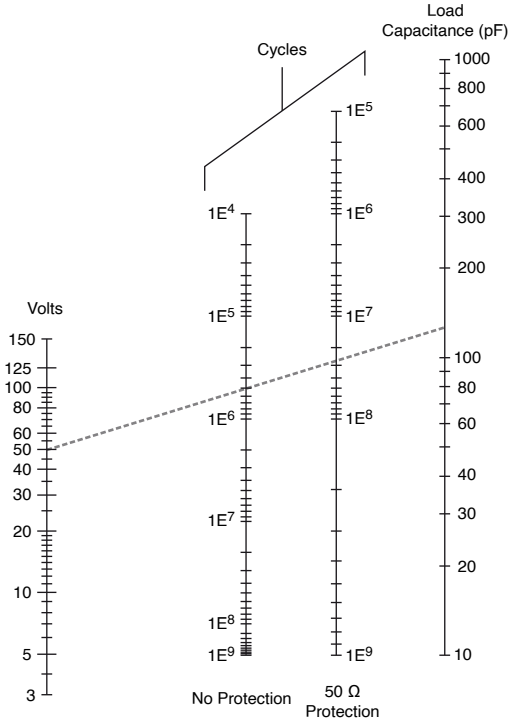
The reed relay module is connected to a DMM through 1 meter of cable. The DMM and cable capacitances are 100 pF and 30 pF respectively. The maximum voltage switched across the relay is 50 V. Determine the estimated number of relay cycles with and without protection resistance.

Solution

The total load capacitance is the sum of the cable and DMM capacitance, which is 130 pF. Draw a line between the 50 V point on the ***Volts*** axis and 130 pF on the ***Load Capacitance*** axis.

The line drawn intersects the ***Cycles*** axes at approximately 500,000 on the ***No Protection*** axis and about 25,000,000 on the ***50 Ω Protection*** axis, as shown in the following figure. This series resistance should be placed as close as possible to the relay for maximum effect.

Figure 1. Reed Relay Lifetime Nomograph



Environment

Operating temperature	0 °C to 55 °C
Storage temperature	-40 °C to 70 °C
Relative humidity	5% to 85%, noncondensing
Pollution Degree	2
Maximum altitude	2,000 m

Indoor use only.

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

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.

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)
- 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, 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`.)