NI PXI-2586 Specifications
10-SPST Relay Module

This document lists specifications for the NI PXI-2586 general-purpose relay module. All specifications are subject to change without notice. Visit ni.com/manuals for the most current specifications.

Topologies ............................... 10-SPST
5-DPST

Refer to the NI Switches Help for detailed topology information.

About These Specifications

Specifications characterize the warranted performance of the instrument under the stated operating conditions.

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

All voltages are specified in DC, AC rms, or a combination unless otherwise specified.

Caution Refer to the Read Me First: Safety and Electromagnetic Compatibility document for important safety and electromagnetic compatibility information. To obtain a copy of this document online, visit ni.com/manuals, and search for the document title.

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

Input Characteristics

All input characteristics are DC, AC rms, or a combination unless otherwise specified.

Maximum switching voltage ........... 300 V
Channel-to-ground ................. 300 V, CAT II

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 switching power is limited by the maximum switching current and the maximum voltage. For AC systems, switching power must not exceed 3 kVA. For maximum DC switching power, refer to Figure 1.

Maximum switching power (per channel)
AC systems ......................... 3 kVA (up to 60 Hz)
DC systems ..................... Refer to Figure 1

Note Switching inductive loads (for example, motors and solenoids) can produce high voltage transients in excess of the module’s rated voltage. Without additional protection, these transients can interfere with module operation and impact relay life. For more information about transient suppression, visit ni.com/info and enter the Info Code induct.

Maximum current
(switching or carry, per channel or common)
Ambient temperature ≤45 °C ...... 12 A
Ambient temperature >45 °C .... Refer to Figure 2

Simultaneous channels
at maximum current .................. 2
Figures 1 and 2 show the maximum switching power for DC loads and maximum current for ambient temperatures, respectively.

**Figure 1.** Maximum Switching Power for DC Loads (per channel)

**Figure 2.** Maximum Current for Ambient Temperatures

DC path resistance
- Initial ............................................. ≤ 50 mΩ
- End-of-life ..................................... > 100 mΩ

DC path resistance typically remains low for the life of the relay. At the end of relay life, the path resistance rapidly rises above 100 mΩ. Load ratings apply to relays used within the specification before the end of relay life.

Minimum switch load ............... 12 V or 100 mA

Bandwidth (~3 dB, typical at 23 °C)
- 50 Ω termination .......................... ≥ 20 MHz

Crosstalk (typical at 23 °C, 50 Ω termination)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Crosstalk (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 kHz</td>
<td>≤ -85 dB</td>
</tr>
<tr>
<td>100 kHz</td>
<td>≤ -65 dB</td>
</tr>
<tr>
<td>1 MHz</td>
<td>≤ -45 dB</td>
</tr>
<tr>
<td>10 MHz</td>
<td>≤ -25 dB</td>
</tr>
</tbody>
</table>

Isolation (typical at 23 °C, 50 Ω termination)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Isolation (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 kHz</td>
<td>≥ 90 dB</td>
</tr>
<tr>
<td>100 kHz</td>
<td>≥ 70 dB</td>
</tr>
<tr>
<td>1 MHz</td>
<td>≥ 50 dB</td>
</tr>
<tr>
<td>10 MHz</td>
<td>≥ 30 dB</td>
</tr>
</tbody>
</table>

**Module Load Derating**

**Caution** A total power load greater than 400 A² × channels will damage the NI PXI-2586 under certain conditions.

Load derating is dependent on the sum of the current squared of each channel simultaneously carrying a signal. The result must be less than 400 A² × channels. The following formula represents this calculation:

\[
\sum_{N=0}^{9} I_{\text{channel}}^2 N \leq 400 A^2 \times \text{channels}
\]

**Note** When operating at ambient temperatures >45 °C, refer to the derating chart in Figure 2 for the maximum allowed current per channel.

Example 1:
- 1 channel carries 8 A while 5 channels carry 6 A

\[
(1 \times 8^2) + (5 \times 6^2) = 244 A^2 \times \text{channels}
\]

The module in Example 1 is acceptable since the result of the calculation is less than 400 A² × channels.

Example 2:
- 5 channels carry 5 A while 4 channels carry 9 A

\[
(5 \times 5^2) + (4 \times 9^2) = 449 A^2 \times \text{channels}
\]

The module in Example 2 is *not* acceptable and will damage the module under certain conditions.
Dynamic Characteristics

Maximum relay operate time............. 15.4 ms

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

Expected relay life
Mechanical ................................. $1 \times 10^7$ cycles
Electrical
30 VDC, 10 ADC resistive .... $1 \times 10^5$ cycles
30 VDC, 12 ADC resistive .... $3 \times 10^4$ cycles

Note The relays used in the NI PXI-2586 are field replaceable. Refer to the NI Switches Help for information about replacing a failed relay.

For AC load contact lifetime, refer to Figure 3.

Output trigger
Destinations ................................... PXI trigger lines 0–7
Pulse width .................................... Programmable
(1 μs to 62 μs)

Physical Characteristics

Relay type..................................... Electromechanical, single-side stable
Relay contact material .................... Silver-Nickel
I/O connector .................................. 20 position, Positronic GMCT series plug
PXI power requirement .................... 5 W at 5 V, 2.5 W at 3.3 V
Dimensions (L x W x H) ................... 3U, one slot, PXI/ePCI module
21.6 x 2.0 x 13.0 cm
(8.5 x 0.8 x 5.1 in.)

Weight ....................................... 400 g (14 oz)

Environment

Operating temperature .................... 0 °C to 55 °C

Note Refer to Figure 2 for operating temperatures >45 °C.

Storage temperature ....................... ~20 °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 to 500 Hz, 0.3 gms
Nonoperating ............................... 5 to 500 Hz, 2.4 gms
( Tested in accordance with IEC 60068-2-64. Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

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Figure 4 shows the NI PXI-2586 power-on state.

![NI PXI-2586 Power-On State](image1)

Figure 4. NI PXI-2586 Power-On State

Figure 5 shows the NI PXI-2586 connector pinout.

![NI PXI-2586 Connector Pinout](image2)

Figure 5. NI PXI-2586 Connector Pinout

**Note** Letters in parentheses reference the pin designators of the connector.

**Note** For topology-specific connection information, refer to your device in the *NI Switches Help*.

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**Accessories**

Visit ni.com for more information about the following accessories.

<table>
<thead>
<tr>
<th>Table 1. NI Accessories for the NI PXI-2586</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accessory</strong></td>
</tr>
<tr>
<td>Connector and backshell for PXI-258X switches</td>
</tr>
<tr>
<td>GMCT20 to GMCT20 switch cable</td>
</tr>
<tr>
<td>GMCT20 to bare wire switch cable</td>
</tr>
</tbody>
</table>

**Caution** You *must* install mating connectors according to local safety codes and standards and according to the specifications provided by the connector manufacturer. You are responsible for verifying 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>
<thead>
<tr>
<th>Table 2. Third-Party Accessories for the NI PXI-2586</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accessory</strong></td>
</tr>
<tr>
<td>Mating pins to front connector*</td>
</tr>
<tr>
<td>Connector and backshell\†</td>
</tr>
<tr>
<td>Polyimide kapton tape</td>
</tr>
</tbody>
</table>

* Additional cover or enclosure required. See the previous safety caution.

\† The Positronic Connector and backshell require Mating pins to front connector. Mating pins to front connector must be purchased separately.

**Note** When using third-party accessories with the NI PXI-2586, always observe safety guidelines. For information about how to safely build a third-party connector and backshell, refer to the *NI PXI-2585/2586 Connector and Backshell Kit Installation Guide* located at ni.com/manuals.
Compliance and Certifications

Safety
This product meets 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 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
- AS/NZS CISPR 11: Group 1, 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 generates radio frequency energy for the treatment of material or inspection/analysis purposes.

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

CE Compliance
This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification
To obtain product certifications and the Declaration of Conformity (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 NI and the Environment 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 products must be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste Electrical and Electronic Equipment, visit ni.com/environment/weee.

Chinese Customers National Instruments 符合中国电子和信息化产品中限制使用某些有害物质指令 (RoHS)。关于 National Instruments 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.)