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**SCXI-1366**

# NI SCXI™-1166 Specifications

## 32-Channel SPDT Relay Module

このドキュメントには、日本語ページも含まれています。

This document lists specifications for the NI SCXI-1166 general purpose relay module. All specifications are subject to change without notice. Visit [ni.com/manuals](http://ni.com/manuals) for the most current specifications.

Topology ..... 32-channel SPDT, nonlatching

Refer to the *NI Switches Help* for detailed topology and pinout information.

## Input Characteristics

Maximum switching voltage

Channel-to-channel ..... 150 VDC, 125 VAC

Channel-to-ground ..... 150 VDC, 125 VAC, CAT I



**Caution** This module is rated for Measurement Category I and intended to carry signal voltages no greater than 150 V. 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 or 230 VAC. Refer to the *Read Me First: Safety and Electromagnetic Compatibility* document for more information about measurement categories.



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



**Caution** The switching power is limited by the maximum switching current, the maximum voltage, and must not exceed 60 W, 62.5 VA.

Maximum switching power ..... 60 W, 62.5 VA (DC to 60 Hz)  
(per channel, not to exceed 2 A per channel)

Maximum switching current ..... 2 ADC, 2 AAC  
(per channel)

|                                                                                               |              |
|-----------------------------------------------------------------------------------------------|--------------|
| Simultaneous channels at maximum switching current ( $\leq 25\text{ }^{\circ}\text{C}$ )..... | 32           |
| Maximum carry current .....(per channel)                                                      | 5 ADC, 5 AAC |
| Simultaneous channels at maximum carry current ( $\leq 25\text{ }^{\circ}\text{C}$ ) .....    | 8            |



**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](http://ni.com/info) and enter the Info Code `induct`.

## Module Load Derating at $>25\text{ }^{\circ}\text{C}$

Load derating is dependent on the ambient temperature and the sum of the current squared of each channel simultaneously carrying a signal. The result must fall within the shaded region of Figure 1. The following examples represent this calculation.

Example 1:

5 channels carry 3 A, while 15 channels carry 1 A

$$(5 \times 3^2) + (15 \times 1^2) = 60\text{ A}^2 \times \text{channels}$$

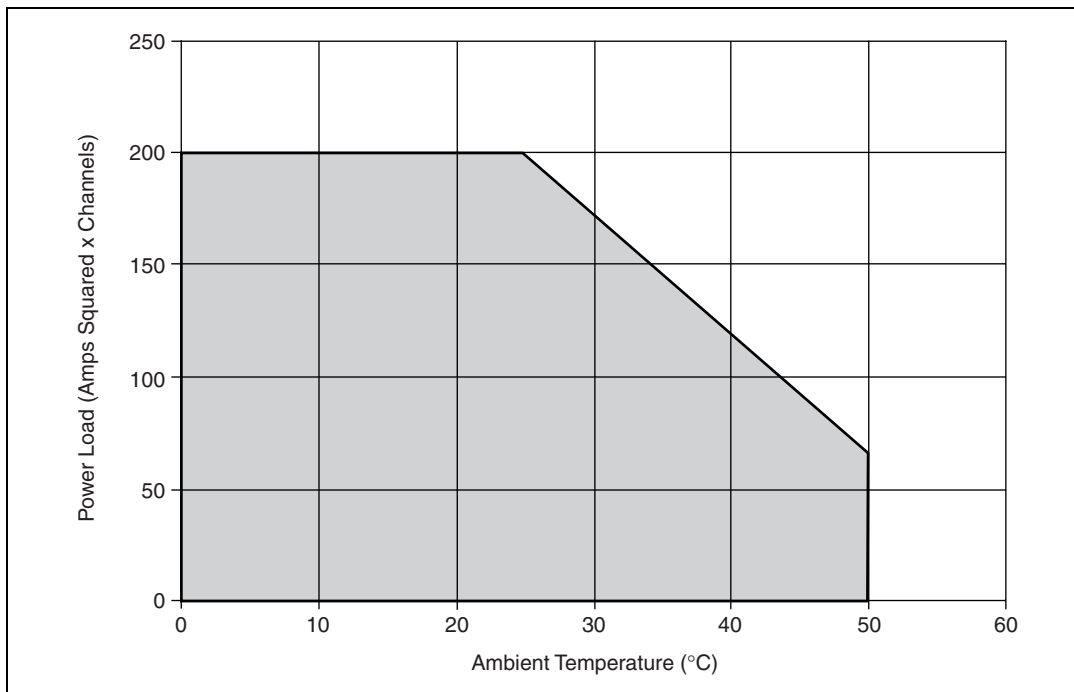
Example 1 can be used at ambient temperatures between  $0\text{ }^{\circ}\text{C}$  and  $50\text{ }^{\circ}\text{C}$ .

Example 2:

3 channels carry 5 A, while 25 channels carry 2 A

$$(3 \times 5^2) + (25 \times 2^2) = 175\text{ A}^2 \times \text{channels}$$

Example 2 can be used at ambient temperatures between  $0\text{ }^{\circ}\text{C}$  and  $30\text{ }^{\circ}\text{C}$ .



**Figure 1.** Module Load Derating

DC path resistance (worst case, over temperature)

Initial ..... <0.1  $\Omega$

Initial, with NI SCXI-1366<sup>1</sup> ..... <0.22  $\Omega$

End of life .....  $\geq 1.0 \Omega$

DC path resistance typically remains low for the life of the relay. At the end of relay life, the path resistance rises rapidly above 1  $\Omega$ . Load ratings apply to relays used within the specification before the end of relay life.

DC isolation (typical at 23 °C)

Open channel,  
with NI SCXI-1366<sup>1</sup> ..... 100 G $\Omega$

Channel-to-channel,  
with NI SCXI-1366<sup>1</sup> ..... 100 G $\Omega$

Thermal EMF (typical at 23 °C) ..... <13  $\mu$ V

Minimum switching capacity ..... 10  $\mu$ A at 10 mV DC

<sup>1</sup> Specifications including the NI SCXI-1366 accessory are characterized from screw terminal to screw terminal for the applicable path or paths.

Bandwidth (–3 dB, 50  $\Omega$  system, typical at 23 °C)  
with NI SCXI-1366<sup>1</sup> .....≥10 MHz

Crosstalk (50  $\Omega$  system, typical at 23 °C)

Channel-to-channel, with NI SCXI-1366<sup>1</sup>

10 kHz .....≤–75 dB

100 kHz .....≤–65 dB

1 MHz.....≤–45 dB

## Dynamic Characteristics

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Relay operate time

Typical.....2 ms

Maximum .....4.4 ms



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

Maximum cycle speed .....115 cycles/s

Expected relay life

Mechanical .....1 × 10<sup>8</sup> cycles

Electrical

30 VDC, 1 ADC resistive.....5 × 10<sup>5</sup> cycles

30 VDC, 2 ADC resistive.....1 × 10<sup>5</sup> cycles

125 VAC, 0.2 AAC resistive....3 × 10<sup>5</sup> cycles

125 VAC, 0.5 AAC resistive....1 × 10<sup>5</sup> cycles



**Note** The relays used in the NI SCXI-1166 are field replaceable. Refer to the *NI Switches Help* for information about replacing a failed relay.

## Trigger Characteristics

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Input trigger

Sources .....SCXI trigger lines 0–7,  
Front panel,  
Rear connector

Minimum pulse width.....200 ns

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<sup>1</sup> Specifications including the NI SCXI-1366 accessory are characterized from screw terminal to screw terminal for the applicable path or paths.

Front panel/terminal block input voltage

|                 |        |
|-----------------|--------|
| Minimum .....   | –0.5 V |
| VL maximum..... | +0.7 V |
| VH minimum..... | +2.0 V |
| Nominal .....   | +3.3 V |
| Maximum.....    | +5.5 V |

Output trigger

|                                   |                                                           |
|-----------------------------------|-----------------------------------------------------------|
| Destinations .....                | SCXI trigger lines 0–7,<br>Front panel,<br>Rear connector |
| Pulse width.....                  | Programmable (1 $\mu$ s to 62 $\mu$ s)                    |
| Front panel nominal voltage ..... | 3.3 V TTL, 8 mA                                           |

## Physical Characteristics

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|                                            |                                                                           |
|--------------------------------------------|---------------------------------------------------------------------------|
| Relay type .....                           | Electromechanical, nonlatching                                            |
| Relay contact material.....                | Gold-clad silver alloy                                                    |
| I/O connectors .....                       | Two 62-pin D-SUBs, male                                                   |
| Power requirement .....                    | 6.3 W at $\pm 18.5$ V<br>200 mW at 5 V                                    |
| Dimensions (L $\times$ W $\times$ H) ..... | 19.8 $\times$ 3.0 $\times$ 17.3 cm<br>(7.8 $\times$ 1.2 $\times$ 6.7 in.) |
| Weight.....                                | 720 g<br>(1 lb 10 oz)                                                     |

## Environment

|                            |                                     |
|----------------------------|-------------------------------------|
| Operating temperature..... | 0 $^{\circ}$ C to 50 $^{\circ}$ C   |
| Storage temperature .....  | –20 $^{\circ}$ C to 70 $^{\circ}$ C |
| Relative humidity .....    | 5% to 85% noncondensing             |
| Pollution Degree .....     | 2                                   |
| Maximum altitude .....     | 2,000 m                             |
| Indoor use only            |                                     |

# Accessories

Visit [ni.com](http://ni.com) for more information about the following accessories.

**Table 1.** Accessories Available for the NI SCXI-1166

| Accessory                   | Part Number |
|-----------------------------|-------------|
| NI SCXI-1366 terminal block | 777687-66   |
| Backshell and connector kit | 778720-01   |



**Note** The module and accessory kit connectors are keyed and have pins removed for safety isolation.



**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.

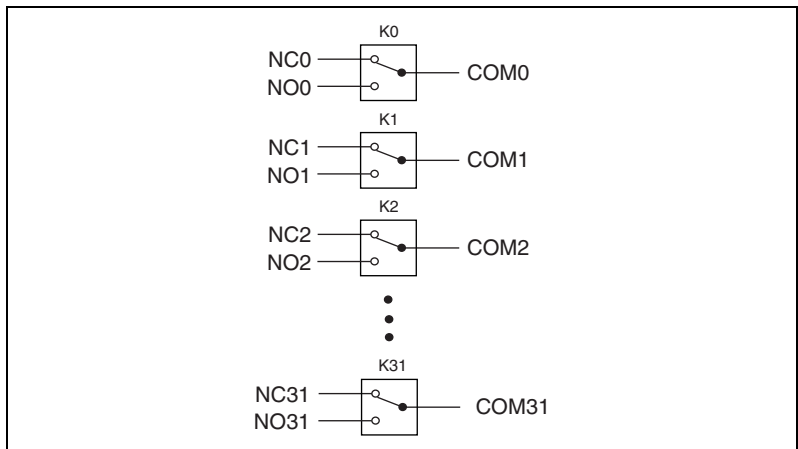
**Table 2.** Third-Party Accessory for the NI SCXI-1166

| Accessory                                  | Manufacturer |
|--------------------------------------------|--------------|
| 62-pin D-SUB connector, female, solder cup | Any          |

# Glossary

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|         |                                                                                                                        |
|---------|------------------------------------------------------------------------------------------------------------------------|
| channel | a single SPDT (form C) relay. Each channel has three terminals—common (COM), normally closed (NC), normally open (NO). |
| cycle   | actuate an SPDT relay twice, leaving it in its original state.                                                         |
| operate | actuate an SPDT relay once, leaving it in the opposite state.                                                          |



**Figure 2.** NI SCXI-1166 Power-On State

## Compliance and Certifications

### Safety

This product is designed to meet 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 visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

### Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A



**Note** For EMC compliance, operate this device with shielded cables.

## CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

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



**Note** Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

## Environmental Management

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For additional environmental information, refer to the *NI and the Environment* 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.

## Waste Electrical and Electronic Equipment (WEEE)



**EU Customers** At the end of their life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit [ni.com/environment/weee.htm](http://ni.com/environment/weee.htm).

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