NI 6040E Family Specifications

This document lists the I/O terminal summary and specifications for the devices that make up the NI 6040E family of devices. This family includes the following devices:

- NI PCI-MIO-16E-4 (NI 6040E)
- NI PXI-6040E

I/O Terminal Summary

Note: With NI-DAQmx, National Instruments revised its terminal names so they are easier to understand and more consistent among NI hardware and software products. The revised terminal names used in this document are usually similar to the names they replace. For a complete list of Traditional NI-DAQ (Legacy) terminal names and their NI-DAQmx equivalents, refer to Terminal Name Equivalents of the E Series Help.

Table 1. I/O Terminals

<table>
<thead>
<tr>
<th>Terminal Name</th>
<th>Terminal Type and Direction</th>
<th>Impedance Input/Output</th>
<th>Protection (V) On/Off</th>
<th>Source (mA at V)</th>
<th>Sink (mA at V)</th>
<th>Rise Time (ns)</th>
<th>Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI &lt;0..15&gt;</td>
<td>AI</td>
<td>100 GΩ in parallel with 100 pF</td>
<td>25/15</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>±200 pA</td>
</tr>
<tr>
<td>AI SENSE</td>
<td>AI</td>
<td>100 GΩ in parallel with 100 pF</td>
<td>25/15</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>±200 pA</td>
</tr>
<tr>
<td>AI GND</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>AO 0</td>
<td>AO</td>
<td>0.1 Ω</td>
<td>Short-circuit to ground</td>
<td>5 at 10</td>
<td>5 at –10</td>
<td>20 V/µs</td>
<td>—</td>
</tr>
<tr>
<td>AO 1</td>
<td>AO</td>
<td>0.1 Ω</td>
<td>Short-circuit to ground</td>
<td>5 at 10</td>
<td>5 at –10</td>
<td>20 V/µs</td>
<td>—</td>
</tr>
<tr>
<td>AO EXT REF</td>
<td>AI</td>
<td>10 kΩ</td>
<td>25/15</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>AO GND</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>D GND</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>+5 V</td>
<td>—</td>
<td>0.1 Ω</td>
<td>Short-circuit to ground</td>
<td>1 A</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>P0.&lt;0..7&gt;</td>
<td>DIO</td>
<td>—</td>
<td>V_{CC} + 0.5</td>
<td>13 at (V_{CC} – 0.4)</td>
<td>24 at 0.4</td>
<td>1.1</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>Terminal Name</td>
<td>Type and Direction</td>
<td>Impedance (V)</td>
<td>Protection (V) On/Off</td>
<td>Source (mA at V)</td>
<td>Sink (mA at V)</td>
<td>Rise Time (ns)</td>
<td>Bias</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>--------------------</td>
<td>---------------</td>
<td>------------------------</td>
<td>-----------------</td>
<td>---------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>AI HOLD COMP</td>
<td>DO</td>
<td>—</td>
<td>—</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>EXT STROBE*</td>
<td>DO</td>
<td>—</td>
<td>—</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>PFI 0/ (AI START TRIG)</td>
<td>AI/DIO</td>
<td>10 kΩ</td>
<td>VCC + 0.5 ±35</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>9 kΩ pu, 10 kΩ pd</td>
</tr>
<tr>
<td>PFI 1/ (AI REF TRIG)</td>
<td>DIO</td>
<td>—</td>
<td>VCC + 0.5</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>PFI 2/ (AI CONV CLK)*</td>
<td>DIO</td>
<td>—</td>
<td>VCC + 0.5</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>PFI 3/ CTR 1 SOURCE</td>
<td>DIO</td>
<td>—</td>
<td>VCC + 0.5</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>PFI 4/CTR 1 GATE</td>
<td>DIO</td>
<td>—</td>
<td>VCC + 0.5</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>CTR 1 OUT</td>
<td>DO</td>
<td>—</td>
<td>—</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>PFI 5/ (AO SAMP CLK)*</td>
<td>DIO</td>
<td>—</td>
<td>VCC + 0.5</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>PFI 6/ (AO START TRIG)</td>
<td>DIO</td>
<td>—</td>
<td>VCC + 0.5</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>PFI 7/ (AI SAMP CLK)</td>
<td>DIO</td>
<td>—</td>
<td>VCC + 0.5</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>PFI 8/ CTR 0 SOURCE</td>
<td>DIO</td>
<td>—</td>
<td>VCC + 0.5</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>PFI 9/CTR 0 GATE</td>
<td>DIO</td>
<td>—</td>
<td>VCC + 0.5</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>CTR 0 OUT</td>
<td>DO</td>
<td>—</td>
<td>—</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
<tr>
<td>FREQ OUT</td>
<td>DO</td>
<td>—</td>
<td>—</td>
<td>3.5 at (VCC – 0.4)</td>
<td>5 at 0.4</td>
<td>1.5</td>
<td>50 kΩ pu</td>
</tr>
</tbody>
</table>

* Indicates active low.

AI = Analog Input
AO = Analog Output
DIO = Digital Input/Output
pd = pull-down
pu = pull-up
AI/DIO = Analog Input/Digital Input/Output

Note: The tolerance on the 50 kΩ pull-up and pull-down resistors is large. Actual value might range between 17 kΩ and 100 kΩ.
Specifications

The following specifications are typical at 25 °C unless otherwise noted.

Analog Input

Input Characteristics

Number of channels .................................. 16 single-ended
or 8 differential
(software-selectable per channel)

Type of A/D converter (ADC) ...................... Successive approximation

Resolution ........................................ 12 bits, 1 in 4,096

Maximum sampling rate
- Single-channel scanning .................. 500 kS/s
- Multiple-channel scanning ............... 250 kS/s

Input signal ranges

<table>
<thead>
<tr>
<th>Range (Software-Selectable)</th>
<th>Input Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bipolar</td>
</tr>
<tr>
<td>20 V</td>
<td>±10 V</td>
</tr>
<tr>
<td>10 V</td>
<td>±5 V</td>
</tr>
<tr>
<td>5 V</td>
<td>±2.5 V</td>
</tr>
<tr>
<td>2 V</td>
<td>±1 V</td>
</tr>
<tr>
<td>1 V</td>
<td>±500 mV</td>
</tr>
<tr>
<td>500 mV</td>
<td>±250 mV</td>
</tr>
<tr>
<td>200 mV</td>
<td>±100 mV</td>
</tr>
<tr>
<td>100 mV</td>
<td>±50 mV</td>
</tr>
</tbody>
</table>

Input coupling ............................... DC

Maximum working voltage
(signal and common-mode) ............ Each input should remain within ±11 V of ground

Overvoltage protection
- Powered on .................................. ±25 V
- Powered off .............................. ±15 V

Inputs protected ........................... AI <0..15>, AI SENSE

FIFO buffer size ............................ 512 samples (S)

DMA

Channels........................................ 3
Data sources/destinations .............. Analog input, analog output, counter/timer 0, or counter/timer 1
Data transfers ................................ Direct memory access (DMA), interrupts, programmed I/O
DMA modes .................................... Scatter-gather (single-transfer, demand-transfer)

Configuration memory size .......... 512 words
(1 word = 8 bits)
## Accuracy Information

<table>
<thead>
<tr>
<th>Nominal Range (V)</th>
<th>% of Reading</th>
<th>Absolute Accuracy</th>
<th>Relative Accuracy Resolution (mV)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 Hours</td>
<td>1 Year</td>
<td>Noise + Quantization (mV)</td>
</tr>
<tr>
<td>±10</td>
<td>0.0672</td>
<td>0.0714</td>
<td>7.38</td>
</tr>
<tr>
<td>±5</td>
<td>0.0272</td>
<td>0.0314</td>
<td>3.70</td>
</tr>
<tr>
<td>±2.5</td>
<td>0.0672</td>
<td>0.0714</td>
<td>1.86</td>
</tr>
<tr>
<td>±1</td>
<td>0.0672</td>
<td>0.0714</td>
<td>0.757</td>
</tr>
<tr>
<td>±0.5</td>
<td>0.0672</td>
<td>0.0714</td>
<td>0.389</td>
</tr>
<tr>
<td>±0.25</td>
<td>0.0672</td>
<td>0.0714</td>
<td>0.205</td>
</tr>
<tr>
<td>±0.1</td>
<td>0.0672</td>
<td>0.0714</td>
<td>0.095</td>
</tr>
<tr>
<td>±0.05</td>
<td>0.0672</td>
<td>0.0714</td>
<td>0.058</td>
</tr>
<tr>
<td>0 to 10</td>
<td>0.0272</td>
<td>0.0314</td>
<td>3.70</td>
</tr>
<tr>
<td>0 to 5</td>
<td>0.0672</td>
<td>0.0714</td>
<td>1.86</td>
</tr>
<tr>
<td>0 to 2</td>
<td>0.0672</td>
<td>0.0714</td>
<td>0.757</td>
</tr>
<tr>
<td>0 to 1</td>
<td>0.0672</td>
<td>0.0714</td>
<td>0.389</td>
</tr>
<tr>
<td>0 to 0.5</td>
<td>0.0672</td>
<td>0.0714</td>
<td>0.205</td>
</tr>
<tr>
<td>0 to 0.2</td>
<td>0.0672</td>
<td>0.0714</td>
<td>0.095</td>
</tr>
<tr>
<td>0 to 0.1</td>
<td>0.0672</td>
<td>0.0714</td>
<td>0.058</td>
</tr>
</tbody>
</table>

**Note:** Accuracies are valid for measurements following an internal E Series calibration. Averaged numbers assume dithering and averaging of 100 single-channel readings. Measurement accuracies are listed for operational temperatures within ±1 °C of internal calibration temperature and ±10 °C of external or factory-calibration temperature. NI recommends a one-year calibration interval. The Absolute Accuracy at Full Scale calculations were performed for a maximum range input voltage (for example, 10 V for the ±10 V range) after one year, assuming 100 points of averaged data. Go to ni.com/info and enter info code rdspec for example calculations.
**Transfer Characteristics**

Relative accuracy
- Dithered: ±0.5 least significant bits (LSB) typ
- Undithered: ±1.5 LSB max

Differential nonlinearity (DNL): ±0.5 LSB typ, ±1 LSB max

No missing codes: 12 bits, guaranteed

Offset error
- Pregain error after calibration: ±16 µV max
- Pregain error before calibration: ±4.0 mV max
- Postgain error after calibration: ±0.8 mV max
- Postgain error before calibration: ±200 mV max

Gain error (relative to calibration reference)
- After calibration (gain = 1): ±0.02% of reading max
- Before calibration: ±2.5% of reading max
- Gain ≠ 1 with gain error adjusted to 0 at gain = 1: ±0.02% of reading max

**Amplifier Characteristics**

Input impedance
- Normal powered on: 100 GΩ in parallel with 100 pF
- Powered off: 820 Ω min
- Overload: 820 Ω min

Input bias current: ±200 pA

Input offset current: ±100 pA

CMRR, all input ranges, DC to 60 Hz

<table>
<thead>
<tr>
<th>Range</th>
<th>CMRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 to 20 V</td>
<td>85 dB</td>
</tr>
<tr>
<td>5 V</td>
<td>95 dB</td>
</tr>
<tr>
<td>100 mV to 2 V</td>
<td>100 dB</td>
</tr>
</tbody>
</table>

**Dynamic Characteristics**

Bandwidth
- Small signal (-3 dB): 600 kHz
- Large signal (1% THD): 350 kHz

Settling time to full-scale step

<table>
<thead>
<tr>
<th>Range</th>
<th>±0.012% (±0.5 LSB)</th>
<th>±0.024% (±1 LSB)</th>
<th>±0.098% (±4 LSB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>4 µS typ, 8 µS max</td>
<td>4 µS max, 8 µS max</td>
<td>4 µS max</td>
</tr>
</tbody>
</table>

* Accuracy values are valid for source impedances <1 kΩ. Refer to *Multichannel Scanning Considerations of the E Series Help* for more information.

System noise (LSB_rms, not including quantization)

<table>
<thead>
<tr>
<th>Range</th>
<th>Dither Off</th>
<th>Dither On</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 20 V</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>500 mV</td>
<td>0.25</td>
<td>0.5</td>
</tr>
<tr>
<td>200 mV</td>
<td>0.5</td>
<td>0.7</td>
</tr>
<tr>
<td>100 mV</td>
<td>0.9</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Crosstalk (DC to 100 kHz)
- Adjacent channels: -75 dB
- All other channels: -90 dB

**Stability**

Offset temperature coefficient
- Pregain: ±5 µV/°C
- Postgain: ±240 µV/°C

Gain temperature coefficient: ±20 ppm/°C
Analog Output

Output Characteristics
Number of channels..........................2 voltage
Resolution......................................12 bits, 1 in 4,096

Max update rate (waveform generation)

<table>
<thead>
<tr>
<th>FIFO Mode</th>
<th>Non-FIFO Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internally</td>
<td>Externally</td>
</tr>
<tr>
<td>Timed</td>
<td>Timed</td>
</tr>
<tr>
<td>1 MS/s</td>
<td>950 kS/s</td>
</tr>
<tr>
<td>800 kS/s,</td>
<td>400 kS/s,</td>
</tr>
<tr>
<td>system-dependent</td>
<td>system-dependent</td>
</tr>
</tbody>
</table>

Type of D/A converter (DAC) .......Double-buffered, multiplying

FIFO buffer size .................512 Samples (S)
Data transfers......................DMA, interrupts, programmed I/O
DMA modes .......................Scatter-gather
(single-transfer, demand-transfer)

Accuracy Information

<table>
<thead>
<tr>
<th>Nominal Range (V)</th>
<th>Absolute Accuracy</th>
<th>Absolute Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>Negative</td>
<td>% of Reading</td>
</tr>
<tr>
<td>Full Scale</td>
<td>Full Scale</td>
<td>24 Hours</td>
</tr>
<tr>
<td>10</td>
<td>–10</td>
<td>0.0177</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>0.0177</td>
</tr>
</tbody>
</table>

Note: Accuracies are valid for measurements following an internal E Series calibration. Averaged numbers assume dithering and averaging of 100 single-channel readings. Measurement accuracies are listed for operational temperatures within ±1 °C of internal calibration temperature and ±10 °C of external or factory-calibration temperature. NI recommends a one-year calibration interval. The Absolute Accuracy at Full Scale calculations were performed for a maximum range input voltage (for example, 10 V for the ±10 V range) after one year, assuming 100 points of averaged data. Go to ni.com/info and enter info code rdspec for example calculations.

Transfer Characteristics

Relative accuracy, or integral nonlinearity (INL)
After calibration ..................±0.3 LSB typ, ±0.5 LSB max
Before calibration ..............±4 LSB max

DNL
After calibration ..................±0.3 LSB typ, ±1.0 LSB max
Before calibration ..............±3 LSB max

Monotonicity...........................12 bits, guaranteed after calibration
Offset error
After calibration ..............±1.0 mV max
Before calibration ..............±200 mV max

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Gain error (relative to internal reference)
    After calibration ......................... ±0.01% of output max
    Before calibration ....................... ±0.5% of output max
Gain error (relative to external reference)...... 0 to 0.67% of output max, not adjustable

Voltage Output
Ranges............................................. ±10 V, 0 to 10 V, ±AO EXT REF, 0 to AO EXT REF (software-selectable)
Output coupling .............................. DC
Output impedance ........................... 0.1 Ω max
Current drive ................................. ±5 mA max
Protection ...................................... Short-circuit to ground
Power-on state .............................. 0 V (±200 mV)
External reference input
    Range......................................... ±11 V
    Overvoltage protection
        Powered on .......................... ±25 V
        Powered off ........................ ±15 V
    Input impedance ......................... 10 kΩ
    Bandwidth (–3 dB) ...................... 1 MHz

Dynamic Characteristics
Settling time for full-scale step...... 3 μs to ±0.5 LSB accuracy
Slew rate ..................................... 20 V/μs
Noise ........................................... 200 μVrms, DC to 1 MHz
Glitch energy (at mid-scale transition)
    Reglitching disabled.................... ±20 mV
    Reglitching enabled .................... ±4 mV
    Duration ................................. 1.5 μs

Stability
Offset temperature coefficient .......... ±50 μV/°C
Gain temperature coefficient
    Internal reference ...................... ±25 ppm/°C
    External reference ..................... ±25 ppm/°C

Digital I/O
Number of channels .................... 8 input/output
Compatibility .............................. 5 V TTL
Digital logic levels on P0.<0..7>

<table>
<thead>
<tr>
<th>Level</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input low voltage</td>
<td>0 V</td>
<td>0.8 V</td>
</tr>
<tr>
<td>Input high voltage</td>
<td>2.0 V</td>
<td>5.0 V</td>
</tr>
<tr>
<td>Input low current (V in = 0 V)</td>
<td>—</td>
<td>–320 μA</td>
</tr>
<tr>
<td>Input high current (V in = 5 V)</td>
<td>—</td>
<td>10 μA</td>
</tr>
<tr>
<td>Output low voltage (IOL = 24 mA)</td>
<td>—</td>
<td>0.4 V</td>
</tr>
<tr>
<td>Output high voltage (IOL = –13 mA)</td>
<td>4.35 V</td>
<td>—</td>
</tr>
</tbody>
</table>

Power-on state ...................... Input (high-impedance)
Data transfers ...................... Programmed I/O
Transfer rate (1 word = 8 bits)
Maximum with NI-DAQ, system-dependent ............ 50 kwords/s
Constant sustainable rate .......... 1 to 10 kwords/s, typ

Timing I/O
Number of channels .................... 2 up/down counter/timers, 1 frequency scaler
Resolution
    Counter/timers .................... 24 bits
    Frequency scaler .................... 4 bits
Compatibility .............................. 5 V TTL/CMOS
Base clocks available
    Counter/timers .................... 20 MHz, 100 kHz
    Frequency scaler .................... 10 MHz, 100 kHz
Base clock accuracy .................... ±0.01%
Max source frequency up/down counter/timers .......... 20 MHz
Min source pulse duration .......... 10 ns
Min gate pulse duration .......... 10 ns, edge-detect mode
Data transfers ............................ DMA, interrupts, programmed I/O
Data transfers..........................DMA, interrupts, programmed I/O
DMA modes..........................Scatter-gather
( single-transfer, demand-transfer)

**Triggers**

**Analog Trigger**
Source..................................AI <0..15>, external trigger (PFI 0/AI START TRIG)
Purpose
Analog input .....................Start, reference, and pause trigger, sample clock
Analog output .....................Start and pause trigger, sample clock
Counter/timers ....................Source, gate
Level
Internal.............................±Full-scale
External............................±10 V
Slope.................................Positive or negative (software-selectable)
Resolution..........................8 bits, 1 in 256
Hysteresis..........................Programmable
Bandwidth (~3 dB).............650 kHz, internal; 3 MHz, external
External input (PFI 0/AI START TRIG)
Impedance..........................10 kΩ
Coupling............................DC
Protection
When configured as a digital signal ..........−0.5 to VCC + 0.5 V
When configured as an analog trigger signal or disabled ........±35 V
Powered off ......................±35 V

**Digital Trigger**
Purpose
Analog input .....................Start, reference, and pause trigger, sample clock
Analog output .....................Start and pause trigger, sample clock
Counter/timers ....................Source, gate
External sources ..................PFI <0..9>, RTSI <0..6>
Compatibility .....................5 V TTL
Response .....................Rising or falling edge
Pulse width .....................10 ns min

RTSI Bus (PCI Only)
Trigger lines.....................7

PXI Trigger Bus (PXI Only)
Trigger lines.....................6
Star trigger .....................1

**Calibration**
Recommended warm-up time .......15 minutes
Calibration interval ...............1 year
External calibration reference ....>6 and <10 V
Onboard calibration reference
DC level............................5.000 V (±3.5 mV), over full operating temperature, actual value stored in EEPROM
Temperature coefficient ........±5 ppm/°C max
Long-term stability ................±15 ppm/√1,000 h

**Bus Interface**
Type ..................................Master, slave

**Power**

**Bus Requirement**
+5 VDC (±5%) .....................1.0 A

Excludes power consumed through +5 V available at the I/O connector.

**I/O Connector Power**
Power available at I/O connector ....+4.65 to +5.25 VDC at 1 A

**Physical**
Dimensions (not including connectors)
NI PXI-6040E ....................16 cm × 10 cm
(6.3 in. × 3.9 in.)
NI PCI-MIO-16E-4 .............17.5 cm × 10.7 cm
(6.9 in. × 4.2 in.)

Weight
NI PXI-6040E ....................218 g (7.7 oz)
NI PCI-MIO-16E-4 .............116 g (4.1 oz)

I/O connector ..................68-pin male 0.050 D-type
**Maximum Working Voltage**

Maximum working voltage refers to the signal voltage plus the common-mode voltage.

- Channel-to-earth ........................................ 11 V,
  Installation Category I
- Channel-to-channel ..................................... 11 V,
  Installation Category I

**Environmental**

- Operating temperature ...................... 0 to 55 °C
- Storage temperature .......................... –20 to 70 °C
- Relative humidity ......................... 10 to 90%,
  noncondensing
- Maximum altitude ......................... 2,000 m
- Pollution Degree
  (indoor use only) .......................... 2

**Safety**

The NI 6040E devices 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
- CAN/CSA-C22.2 No. 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**

- Emissions ...................................... EN 55011 Class A at 10 m
  FCC Part 15A above
  1 GHz
- Immunity ............................... EN 61326:1997
  A2:2001, Table 1

CE, C-Tick, and FCC Part 15 (Class A) Compliant

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

**CE Compliance**

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

- Low-Voltage Directive (safety) ............ 73/23/EEC
- Electromagnetic Compatibility
  Directive (EMC) ................................. 89/336/EEC

**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.
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**Figure 1.** NI PXI-6040E/PCI-MIO-16E-4 Pinout