NI ELVIS™ II Series Specifications

The specifications in this document refer to both the NI ELVIS II and the NI ELVIS II+ unless otherwise noted. These specifications are typical after a 30 minute warm-up time, at 25 °C, unless otherwise noted.

**Analog Input**

- Number of channels: 8 differential or 16 single ended
- ADC resolution: 16 bits
- DNL: No missing codes guaranteed
- INL: 60 ppm max
- Absolute accuracy: Refer to the AI Absolute Accuracy Table

**Sample Rate**

- Maximum: 1.25 MS/s single channel, 1.00 MS/s multi channel (aggregate)
- Minimum: No minimum
- Timing accuracy: 50 ppm of sample rate
- Timing resolution: 50 ns

**Settling Time for Multichannel Measurements**

<table>
<thead>
<tr>
<th>Range</th>
<th>10 LSB for full scale</th>
<th>1 LSB for full scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 V, 5 V, 2 V, 1 V, 0.5 V</td>
<td>1 µs</td>
<td>2 µs</td>
</tr>
<tr>
<td>0.2 V, 0.1 V</td>
<td>2 µs</td>
<td>8 µs</td>
</tr>
</tbody>
</table>

- Input coupling: DC
- Input range: ±10 V, ±5 V, ±2 V, ±1 V, ±0.5 V, ±0.2 V, ±0.1 V
- Maximum working voltage for analog inputs (signal + common mode): ±11 V of AIGND
- CMRR (DC to 60 Hz): 90 dB
- Crosstalk @ 100 kHz
  - (adjacent channel): −70 dB
  - (non-adjacent channel): −80 dB
- Input Impedance
  - Device on
    - A1+ or A1− to AIGND: >10 GΩ || 100 pF
  - Device off
    - A1+ or A1− to AIGND: 820 Ω
- Input bias current: ±100 pA
- Small signal bandwidth (−3 dB): 1.2 MHz
- Input FIFO size: 4095 samples
- Scanlist memory: 4095 entries
- Data transfers: USB signal stream, programmed I/O

**Overvoltage Protection (AI±, AISENSE)**

- Device on: ±25 V for up to four lines
- Device off: ±15 V for up to four lines
- Input current during overvoltage condition: ±20 mA max per line

**Analog Triggers**

- Number of triggers: 1
- Source: AI<0..15>, ScopeCH0, ScopeCH1
- Functions: Start Trigger, Reference Trigger, Pause Trigger, Sample Clock, Convert Clock, Sample Clock Timebase
- Source level: ± Full scale
- Resolution: 10 bits
Accuracy..............................................1%

Modes..............................................Analog edge triggering,
analog edge triggering
with hysteresis, and
analog window triggering

**Arbitrary Waveform Generator/Analog Output**

- Number of channels...............2
- DAC resolution.........................16 bits
- DNL............................................±1 LSB
- Monotonicity..............................16 bit guaranteed
- Accuracy.................................Refer to the *AO Absolute Accuracy (No Load)*

Maximum update rate
- 1 channel .........................2.8 MS/s
- 2 channels .........................2.0 MS/s

Timing accuracy ......................50 ppm of sample rate
Timing resolution ....................50 ns
Output range ................................±10 V, ±5 V
Output coupling .........................DC
Output impedance ......................1 Ω

Maximum output drive current ......±5 mA
Overdrive protection ...................±25 V
Maximum overdrive current ..........20 mA
Power-on state .........................±1 mV

Output FIFO size .......................8191 samples shared among channels used

Data transfer ....................USB signal stream,
programmed I/O

AO waveform modes..................Non-periodic waveform,
periodic waveform regeneration from
onboard FIFO, periodic
waveform regeneration
from host buffer
including dynamic update

Slew rate........................................20 V/μs
### AI Absolute Accuracy Table

<table>
<thead>
<tr>
<th>Nominal Range</th>
<th>Residual Gain Error (ppm of Reading)</th>
<th>Gain Tempco (ppm/°C)</th>
<th>Reference Tempco (ppm/°C)</th>
<th>Residual Offset Error (ppm of Range)</th>
<th>Offset Tempco (ppm of Range/°C)</th>
<th>INL Error (ppm of Range)</th>
<th>Noise (μVrms)</th>
<th>Absolute Accuracy at Full Scale (μV)</th>
<th>Sensitivity (μV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Full Scale</td>
<td>-10</td>
<td>60</td>
<td>13</td>
<td>1</td>
<td>20</td>
<td>21</td>
<td>60</td>
<td>280</td>
<td>1,920</td>
</tr>
<tr>
<td>Negative Full Scale</td>
<td>-5</td>
<td>70</td>
<td>13</td>
<td>1</td>
<td>20</td>
<td>21</td>
<td>60</td>
<td>140</td>
<td>1,010</td>
</tr>
<tr>
<td>Positive Full Scale</td>
<td>-2</td>
<td>70</td>
<td>13</td>
<td>1</td>
<td>20</td>
<td>24</td>
<td>60</td>
<td>57</td>
<td>410</td>
</tr>
<tr>
<td>Negative Full Scale</td>
<td>-1</td>
<td>80</td>
<td>13</td>
<td>1</td>
<td>20</td>
<td>27</td>
<td>60</td>
<td>32</td>
<td>220</td>
</tr>
<tr>
<td>Positive Full Scale</td>
<td>0.5</td>
<td>90</td>
<td>13</td>
<td>1</td>
<td>40</td>
<td>34</td>
<td>60</td>
<td>21</td>
<td>130</td>
</tr>
<tr>
<td>Negative Full Scale</td>
<td>0.2</td>
<td>130</td>
<td>13</td>
<td>1</td>
<td>80</td>
<td>55</td>
<td>60</td>
<td>16</td>
<td>74</td>
</tr>
<tr>
<td>Positive Full Scale</td>
<td>0.1</td>
<td>150</td>
<td>13</td>
<td>1</td>
<td>150</td>
<td>90</td>
<td>60</td>
<td>15</td>
<td>52</td>
</tr>
</tbody>
</table>

Absolute Accuracy = Reading · (Gain Error) + Range · (Offset Error) + Noise Uncertainty

Gain Error = Residual Gain Error + Gain Tempco · (Temp Change From Last Internal Cal) + Reference Tempco · (Temp Change From Last External Cal)

Offset Error = Residual Offset Error + Offset Tempco · (Temp Change From Last Internal Cal) + INL Error

Noise Uncertainty = \( \frac{\text{Random Noise} \cdot 3}{\sqrt{100}} \) For a coverage factor of 3σ and averaging 100 points.

For example, on the 10 V range, the absolute accuracy at full scale is as follows:

Gain Error = 60 ppm + 13 ppm · 1 + 1 ppm · 10 = 83 ppm
Offset Error = 20 ppm + 21 ppm · 1 + 60 ppm = 101 ppm

Noise Uncertainty = \( \frac{280 \mu V \cdot 3}{\sqrt{100}} \) = 84 μV

Absolute Accuracy = 10 V · (Gain Error) + 10 V · (Offset Error) + Noise Uncertainty

Absolute Accuracy = 1920 μV

1 Absolute accuracy at full scale on the analog input channels is determined using the following assumptions:

Temp Change From Last External Cal = 10 °C
Temp Change From Last Internal Cal = 1 °C
Number of readings = 100
Coverage Factor = 3σ

For example, on the 10 V range, the absolute accuracy at full scale is as follows:

Gain Error = 60 ppm + 13 ppm · 1 + 1 ppm · 10 = 83 ppm
Offset Error = 20 ppm + 21 ppm · 1 + 60 ppm = 101 ppm

Noise Uncertainty = \( \frac{280 \mu V \cdot 3}{\sqrt{100}} \) = 84 μV

Absolute Accuracy = 10 V · (Gain Error) + 10 V · (Offset Error) + Noise Uncertainty

Absolute Accuracy = 1920 μV

2 Sensitivity is the smallest voltage change that can be detected. It is a function of noise.
AO Absolute Accuracy (No Load) Table

<table>
<thead>
<tr>
<th>Nominal Range</th>
<th>Residual Gain Error (ppm of Reading)</th>
<th>Gain Tempco (ppm/°C)</th>
<th>Reference Temperature</th>
<th>Residual Offset Error (ppm of Range)</th>
<th>Offset Tempco (ppm of Range/°C)</th>
<th>INL Error (ppm of Range)</th>
<th>Absolute Accuracy at Full Scale 1 (μV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Full Scale</td>
<td>Negative Full Scale</td>
<td>75</td>
<td>17</td>
<td>1</td>
<td>40</td>
<td>2</td>
<td>64</td>
</tr>
<tr>
<td>10</td>
<td>–10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>–5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>8</td>
<td>1</td>
<td>40</td>
<td>2</td>
<td>64</td>
<td>1,045</td>
<td></td>
</tr>
</tbody>
</table>

1 Absolute Accuracy at Full Scale is valid immediately following internal calibration and assumes the device is operating within 10 °C of the last external calibration. Accuracies listed are valid for up to one year from the device external calibration.

Absolute Accuracy = OutputValue · (GainError) + Range · (OffsetError)
GainError = ResidualGainError + GainTempco · (TempChangeFromLastInternalCal) + ReferenceTempco · (TempChangeFromLastExternalCal)
OffsetError = ResidualOffsetError + AOOffsetTempco · (TempChangeFromLastInternalCal) + INL_Error

Digital I/O and PFI

Number of channels.........................24 DIO (Port 0), 15 PFI (Ports 1 and 2)

Direction control..........................Each line individually programmable as input or output

Pull-down resistor...................................50 kΩ typ, 20 kΩ min

Input voltage protection...................±20 V on up to two pins

Note Stresses beyond those listed under Input voltage protection may cause permanent damage to the device.

DIO/PFI Recommended Operation Conditions

<table>
<thead>
<tr>
<th>Level</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input high voltage (Vin)</td>
<td>2.2 V</td>
<td>5.25 V</td>
</tr>
<tr>
<td>Input low voltage (Vin)</td>
<td>0 V</td>
<td>0.8 V</td>
</tr>
<tr>
<td>Output high current (IOL)</td>
<td>—</td>
<td>–24 mA</td>
</tr>
<tr>
<td>P0.&lt;0..23&gt;</td>
<td>—</td>
<td>–16 mA</td>
</tr>
<tr>
<td>Output low current (IOL)</td>
<td>P0.&lt;0..23&gt;</td>
<td>24 mA</td>
</tr>
<tr>
<td>PFI &lt;0..14&gt;</td>
<td>—</td>
<td>16 mA</td>
</tr>
</tbody>
</table>

DIO/PFI Electrical Characteristics

<table>
<thead>
<tr>
<th>Level</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive-going threshold (VT+)</td>
<td>—</td>
<td>2.2 V</td>
</tr>
<tr>
<td>Negative-going threshold (VT–)</td>
<td>0.8 V</td>
<td>—</td>
</tr>
<tr>
<td>Delta VT hysteresis (VT+ – VT–)</td>
<td>0.2 V</td>
<td>—</td>
</tr>
<tr>
<td>IIL input low current (Vin = 0 V)</td>
<td>—</td>
<td>–10 μA</td>
</tr>
<tr>
<td>IIH input high current (Vin = 5 V)</td>
<td>—</td>
<td>250 μA</td>
</tr>
</tbody>
</table>

PFI / Port 1 / Port 2 Functionality

Functionality.......................................Static digital input, static digital output, timing input, timing output

Debounce filter settings.........................125 ns, 6,425 μs, 2.56 ms, disable; high and low transitions; selectable per input
### General Purpose Counter/Timers

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of counter/timers</td>
<td>2</td>
</tr>
<tr>
<td>Resolution</td>
<td>32 bits</td>
</tr>
<tr>
<td>Counter measurements</td>
<td>Edge counting, pulse, semi period, period, two-edge separation</td>
</tr>
<tr>
<td>Position measurements</td>
<td>X1, X2, X4 quadrature encoding with Channel Z reloading; two-pulse encoding</td>
</tr>
<tr>
<td>Output applications</td>
<td>Pulse, pulse train with dynamic updates, frequency division, equivalent time sampling</td>
</tr>
<tr>
<td>Internal base clocks</td>
<td>80 MHz, 20 MHz, 0.1 MHz</td>
</tr>
<tr>
<td>External base clock frequency</td>
<td>0 MHz to 20 MHz</td>
</tr>
<tr>
<td>Base clock accuracy</td>
<td>50 ppm</td>
</tr>
<tr>
<td>Maximum frequency</td>
<td>1 MHz</td>
</tr>
<tr>
<td>Inputs</td>
<td>Gate, Source, HW_Arm, Aux, A, B, Z, Up_Down</td>
</tr>
</tbody>
</table>

**Default Routing**
- CTR0_SOURCE: PFI8
- CTR0_GATE: PFI9
- CTR0_OUT: PFI12
- CTR1_SOURCE: PFI3
- CTR1_GATE: PFI4
- CTR1_OUT: PFI13

**FIFO**
- 2 samples

**Data transfers**
- USB signal stream, programmed I/O

### Digital Frequency Generator

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of channels</td>
<td>1</td>
</tr>
<tr>
<td>Base clocks</td>
<td>10 MHz, 100 kHz</td>
</tr>
<tr>
<td>Divisors</td>
<td>1 to 16</td>
</tr>
<tr>
<td>Maximum frequency</td>
<td>1 MHz</td>
</tr>
<tr>
<td>Base clock accuracy</td>
<td>50 ppm</td>
</tr>
</tbody>
</table>

**Default output line**
- PFI 14 / FREQ_OUT

### External Digital Triggers

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>TRIG BNC or any PFI</td>
</tr>
<tr>
<td>Polarity</td>
<td>Software selectable for most signals</td>
</tr>
<tr>
<td>Analog input function</td>
<td>Start trigger, reference trigger, pause trigger, sample clock, convert clock, sample clock timebase</td>
</tr>
<tr>
<td>Analog output function</td>
<td>Start trigger, pause trigger, sample clock, sample clock timebase</td>
</tr>
<tr>
<td>Counter/timer function</td>
<td>Gate, Source, HW_Arm, Aux, A, B, Z, Up_Down</td>
</tr>
</tbody>
</table>

### DMM

**Isolated functions**
- DC voltage, AC voltage, DC current, AC current, resistance, diode

**Isolation level**
- 60 VDC / 20 Vrms

**Installation Category**
- I

**Connectivity**
- Banana jacks

**Resolution**
- 5.5 digits

**Input impedance**
- 11 MΩ

**Input coupling**
- DC (DC voltage, DC current, resistance, diode) AC (AC voltage, AC current)

**Non-isolated functions**
- Capacitance, inductance

**Connectivity**
- Prototyping board terminals

### Voltage Measurement

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Ranges</td>
<td>100 mV, 1 V, 10 V, 60 V</td>
</tr>
<tr>
<td>AC Ranges</td>
<td>200 mV_{rms}, 2 V_{rms}, 20 V_{rms}</td>
</tr>
</tbody>
</table>

**Input frequency range**
- (AC voltage) 40 Hz to 20 kHz
DC Voltage Measurement Accuracy
±(ppm or reading + ppm of range)

<table>
<thead>
<tr>
<th>Range</th>
<th>1 Year (Tcal ±5 °C)</th>
<th>Tempco/°C (15 to 35 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 mV</td>
<td>225 +280</td>
<td>33 + 50</td>
</tr>
<tr>
<td>1 V</td>
<td>225 + 60</td>
<td>33 + 5</td>
</tr>
<tr>
<td>10 V</td>
<td>225 + 40</td>
<td>33 + 0.5</td>
</tr>
<tr>
<td>60 V</td>
<td>1250 + 150</td>
<td>125 + 7</td>
</tr>
</tbody>
</table>

AC Voltage Measurement Accuracy
±(% of reading + % of range)

<table>
<thead>
<tr>
<th>Range (rms)</th>
<th>1 Year (Tcal ±5 °C)</th>
<th>Tempco/°C (15 to 35 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 mV</td>
<td>0.3 + 0.05</td>
<td>0.015 + 0.003</td>
</tr>
<tr>
<td>2 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Current Measurement
DC range.........................2 A
AC ranges .........................500 mA<brms, 2 A<brms
Shunt resistance..................0.1 Ω
Voltage burden .......................<0.6 V
Input frequency range
(AC current) .........................40 Hz to 5 kHz
Input protection .......................F 3.15 A 250 V,
Fast-acting
user-replaceable fuse

DC Current Measurement Accuracy
±(ppm of reading + ppm of range)

<table>
<thead>
<tr>
<th>Range</th>
<th>1 Year (Tcal ±5 °C)</th>
<th>Tempco/°C (15 to 35 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 A</td>
<td>1350 + 180</td>
<td>85 + 2.5</td>
</tr>
</tbody>
</table>

AC Current Measurement Accuracy
±(% of reading + % of range)

<table>
<thead>
<tr>
<th>Range (rms)</th>
<th>1 Year (Tcal ±5 °C)</th>
<th>Tempco/°C (15 to 35 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 mA</td>
<td>0.5 + 0.07</td>
<td>0.025 + 0.003</td>
</tr>
<tr>
<td>2 A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Resistance Measurement
Ranges: ............................................. 100 Ω, 1 kΩ, 10 kΩ, 100 kΩ, 1 MΩ, 100 MΩ

Resistance Measurement Accuracy ±(ppm of Reading + ppm of Range)

<table>
<thead>
<tr>
<th>Range</th>
<th>Test Current</th>
<th>Max Test Voltage</th>
<th>1 Year (Tcal ±5 °C)</th>
<th>Tempco/°C (15 to 35 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Ω</td>
<td>1 mA</td>
<td>100 mV</td>
<td>450 + 310</td>
<td>70 + 55</td>
</tr>
<tr>
<td>1 kΩ</td>
<td>1 mA</td>
<td>1 V</td>
<td>450 + 100</td>
<td>70 + 12</td>
</tr>
<tr>
<td>10 kΩ</td>
<td>100 μA</td>
<td>1 V</td>
<td>450 + 100</td>
<td>70 + 12</td>
</tr>
<tr>
<td>100 kΩ</td>
<td>10 μA</td>
<td>1 V</td>
<td>450 + 100</td>
<td>70 + 12</td>
</tr>
<tr>
<td>1 MΩ</td>
<td>5 μA</td>
<td>5 V</td>
<td>450 + 100</td>
<td>70 + 8</td>
</tr>
<tr>
<td>100 MΩ</td>
<td>500 nA</td>
<td>5 V</td>
<td>8000 + 75</td>
<td>400 + 4</td>
</tr>
</tbody>
</table>

Capacitance Measurement
Range: ............................................. 50 pF to 500 μF
Accuracy: ............................................. 1%
Test voltage: ............................................. 1 Vpk

Test Frequency
50 pF to 500 pF: ......................... 10 kHz
500 pF to 5 nF: ............................. 1 kHz
5 nF to 50 nF: .............................. 1 kHz
50 nF to 1 μF: .............................. 1 kHz
1 μF to 500 μF: ......................... 100 Hz

Inductance Measurement
Range: ............................................. 100 μH to 100 mH
Accuracy: ............................................. 1%
Test voltage
100 μH to 1 mH: ......................... 0.5 Vpk
1 mH to 10 mH: ............................. 0.5 Vpk
10 mH to 100 mH: ....................... 1 Vpk

Test frequency
100 μH to 1 mH: ......................... 10 kHz
1 mH to 10 mH: ............................. 1 kHz
10 mH to 100 mH: ....................... 1 kHz

Diode Measurement
Ranges: ............................................. 1 V, 10 V
Nominal test current: ............................. 1 mA (1 V range)
............................................. 100 μA (10 V range)

Function Generator
Channels: ............................................. 1

Output waveform type: .................. Sine, square, triangle
Frequency range: ......................... 0.186 Hz to 5 MHz (sine)
............................................. 0.186 Hz to 1 MHz (square and triangle)

Frequency resolution: ................. 0.186 Hz
DDS resolution: ............................. 10 bits
Waveform amplitude range: .......... 10 Vp-p
Waveform amplitude resolution: ....... 10 bits
Waveform amplitude accuracy: ...... ±15 mV
Waveform offset range: .................. ±5 V
Waveform offset resolution: .......... 10 bits
Waveform offset accuracy: ............ ±15 mV
Duty cycle range: ......................... 0 to 100%
Duty cycle resolution: ............... 10 bits
Duty cycle accuracy: .................... 1%
Output impedance: ....................... 50 Ω

---

1 The Two-Wire Current Voltage Analyzer SFP is the recommended instrument for diode measurement.
Maximum output current.................100 mA
Sine total harmonic distortion (THD).................................−50 dB max @ 1 MHz
−40 dB max @ 5 MHz
Sine Flatness................................−0.5 dB to 3 MHz
−3 dB to 5 MHz

**Modulation**
Inputs......................................................2 (AM and FM)
Modulation input range ...................±10 V
Modulation factor
AM ..............................................10%/V
FM...............................................20%/V

**Oscilloscope**
Channels ..........................................2
Sampling mode
NI ELVIS II ................................Scanned
NI ELVIS II*...............................Simultaneous
Input coupling
NI ELVIS II ................................AC, DC
NI ELVIS II*...............................AC, DC, GND
Input impedance
NI ELVIS II ................................1 MΩ || 25 pF
NI ELVIS II*...............................1 MΩ || 21 pF
Bandwidth (~3 dB)
NI ELVIS II ................................1.7 MHz
NI ELVIS II*...............................35 MHz (±0.4 mVp-p)
50 MHz (all other ranges)
Optional noise filter
NI ELVIS II ................................None
NI ELVIS II*...............................20 MHz
AC coupling cutoff frequency (~3 dB)
NI ELVIS II ................................10 Hz
NI ELVIS II*...............................12 Hz
Resolution
NI ELVIS II ................................16 bits
NI ELVIS II*...............................8 bits
Maximum sample rate
NI ELVIS II
Single channel .....................1.25 MS/s
Two channels......................500 kS/s
NI ELVIS II*...............................100 MS/s

Minimum sample rate
NI ELVIS II..............................0.00465 S/s
NI ELVIS II*...............................1.526 kS/s
Timebase accuracy.........................50 ppm
Waveform memory depth
NI ELVIS II..............................Streaming to host
NI ELVIS II*...............................16384 samples per channel

**Triggering**
**BNC TRIG Input**
Input impedance.........................1 MΩ
V_{in} min ...........................................2.4 V
V_{in} max ...........................................400 mV
Minimum pulse width ..................20 ns
NI ELVIS II
Refer to the Analog Input section.

NI ELVIS II*

<table>
<thead>
<tr>
<th>Type</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge, Hysteresis</td>
<td>CH 0, CH 1</td>
</tr>
<tr>
<td>Digital</td>
<td>BNC TRIG Input (PFI 15), FGEM SYNC</td>
</tr>
<tr>
<td>Immediate</td>
<td>—</td>
</tr>
</tbody>
</table>

**DC Accuracy**

NI ELVIS II

<table>
<thead>
<tr>
<th>Range</th>
<th>Gain Error (% of reading)</th>
<th>Offset Error (% of range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(±) 10 V, 5 V</td>
<td>0.15</td>
<td>0.1</td>
</tr>
<tr>
<td>(±) 2 V</td>
<td>0.15</td>
<td>0.15</td>
</tr>
<tr>
<td>(±) 1 V, 0.5 V</td>
<td>0.1</td>
<td>0.15</td>
</tr>
<tr>
<td>(±) 0.2 V</td>
<td>0.1</td>
<td>0.5</td>
</tr>
<tr>
<td>(±) 0.1 V</td>
<td>0.2</td>
<td>0.5</td>
</tr>
</tbody>
</table>
**Dynamic Signal Analyzer**

- Frequency resolution: Software controllable (200, 400, 800, 1600, 3200 lines)

- Accuracy:
  - NI ELVIS II: Refer to the Analog Input section.
  - NI ELVIS II+: Refer to the Oscilloscope section.

**Bode Analyzer**

- Amplitude accuracy:
  - NI ELVIS II: Refer to the Analog Input section.
  - NI ELVIS II+: Refer to the Oscilloscope section.

- Frequency range:
  - NI ELVIS II: Up to 625 kHz
  - NI ELVIS II+: Up to 50 MHz

**Two-Wire Current-Voltage Analyzer**

- Current range: ±40 mA
- Voltage sweep range: ±10 V

**Three-Wire Current-Voltage Analyzer**

- Supported devices: NPN and PNP transistors
- Minimum base current step: 0.48 µA
- Maximum collector current: ±40 mA
- Maximum collector voltage: ±10 V

**Impedance Analyzer**

- Excitation frequency: 1 Hz to 35 kHz
- Resistance measurement range: 5 Ω to 3 MΩ
- Capacitance measurement range: Refer to the DMM, Capacitance Measurement section.
- Inductance measurement range: Refer to the DMM, Inductance Measurement section.
Power Supplies

+15 V Supply
Output voltage (no load)..................+15 V ±5%
Maximum output current.................500 mA
Ripple and noise ..............................1% peak-to-peak max.
Load regulation................................5%
Short circuit protection....................Resettable circuit breaker

−15 V Supply
Output voltage (no load)..................–15 V ±5%
Maximum output current.................500 mA
Ripple and noise ..............................1% peak-to-peak max.
Load regulation................................5%
Short circuit protection....................Resettable circuit breaker

+5 V Supply
Output voltage (no load)..................+5 V ±5%
Maximum output current.................2 A
Ripple and noise ..............................1% peak-to-peak max.
Load regulation................................5%
Short circuit protection ....................Resettable circuit breaker

Positive Variable Supply
Output voltage2...............................0 to +12 V
Voltage setpoint resolution..............10 bits
Voltage accuracy (no load)..............100 mV
Maximum output current.................500 mA
Ripple and noise ..............................25 mV
Short circuit protection ....................Self-resetting current limiter

Negative Variable Supply
Output voltage...............................0 to −12 V
Voltage setpoint resolution..............10 bits
Voltage accuracy (no load)..............100 mV
Maximum output current.................500 mA
Ripple and noise ..............................25 mV
Short circuit protection ....................Self-resetting current limiter

Calibration
Recommended warm-up time..............30 minutes
Calibration interval .........................1 year

Communication
Bus interface ...................................USB 2.0 Hi-Speed
USB signal stream ..........................4 streams; can be used for analog input, analog output, and counter/timers

Physical
Dimensions .....................................34.3 × 28.0 × 7.6 cm
                                              (14.5 × 11.0 × 3 in.)
Weight.............................................1.9 kg (4.2 lb)

Environmental
Operating temperature......................10 to 35 °C
Storage temperature........................−20 to 70 °C
Humidity .......................................10 to 90% relative humidity, noncondensing
Maximum altitude.............................2,000 m
Pollution Degree
(indoor use only).........................2

1 Total output power of all DC and variable power supplies is 30 W.
2 At least 1 mA of load current is required for voltage setpoints lower than +250 mV.

NI ELVIS II Specifications 10 ni.com
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 (IEC 61326): 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 For the standards applied to assess the EMC of this product, refer to the Online Product Certification section.

Note For EMC compliance, operate this product according to the documentation.

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
Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the 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 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.

电子信息产品污染控制管理办法（中国 RoHS）

中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指 (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.)

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