DEVICE SPECIFICATIONS

NI PXIe-4340

4 Ch, 24-bit, 25.6 kS/s Simultaneous AC LVDT Input Module

This document lists specifications for the NI PXIe-4340 simultaneous AC LVDT input module. All specifications are subject to change without notice. Visit `ni.com/manuals` for the most current specifications and product documentation.

📋 **Note** To maintain forced air cooling in the PXI Express system, refer to the *Maintain Forced-Air Cooling Note to Users*.

Terminology

Maximum and *minimum* specifications characterize the warranted performance of the instrument within the recommended calibration interval and under the stated operating conditions. These specifications are subject to production verification or guaranteed by design.

Typical specifications are specifications met by the majority of the instruments within the recommended calibration interval and under the stated operating conditions, based on measurements taken during production verification and/or engineering development. The performance of the instrument is not warranted.

Supplemental specifications describe the basic function and attributes of the instrument established by design and are not subject to production verification. They provide information that is relevant for the adequate use of the instrument that is not included in the previous definitions.

All performance specifications are *typical* unless otherwise noted. These specifications are valid within the full operating temperature range. Accuracy specifications are valid within ±5 °C of the calibration or over the full operating range as specifically noted.

Input Characteristics

Number of channels..4 analog input channels

ADC resolution...24 bits

Type of ADC...Delta-Sigma

NATIONAL INSTRUMENTS™

Sampling mode ....Simultaneous

Sample rates (f_s)

      Range ....1 S/s to 25.6 kS/s

      Resolution ....$\leq$181.9 uS/s

Maximum working voltage
(signal + common mode) ....4 V_{rms}

AI absolute input range.....................................7 V_{rms}

Differential input impedance ....200 kΩ

Linearity...0.01%

Crosstalk ....-100 dB

Input protection..±30 V

FIFO buffer size...1,023 samples

Data transfers ....Direct memory access (DMA), programmed I/O

Excitation Characteristics

Excitation selection...Software selectable, per channel

Excitation type ....Constant differential voltage (balanced)

Excitation protection..±30 V

Output impedance ....3 Ω

Excitation current drive ....30 mA

Excitation voltage progammability...................1 V_{rms} to 7 V_{rms}, 0.5 V_{rms} steps

Excitation frequency progammability ....400 Hz to 10 kHz, 10 Hz steps

Excitation gain accuracy...................................5%, max

Excitation DC offset ....±10 mV, max

Open Coil Detection

Detection time...200 ms

AI/RS open coil threshold voltage....................±12 V

Excitation open coil threshold impedance ....>5 kΩ

Accuracy

Nominal Full-Scale range .... $7V_{rms}/V_{ex}$

> **Note** V_{ex} is the excitation voltage.

Maximum remote-sense lead drop .... 10% of V_{ex}

CMRR .... -60 dB
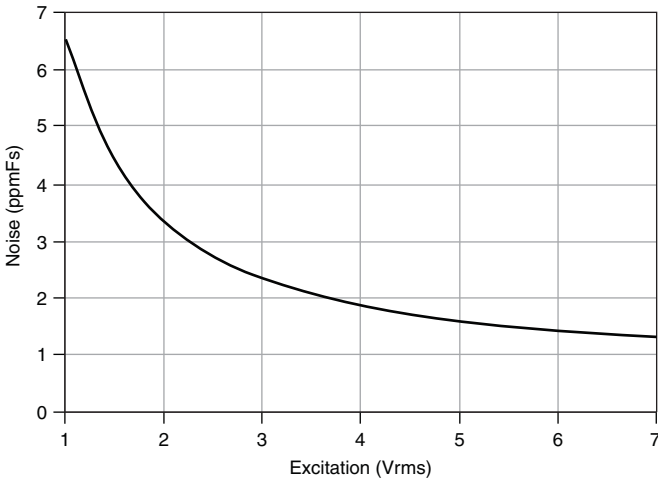
Self-cal performed within the last 24 hours

Typical Accuracy ±(% of reading + % of full-scale) Tcal ± 5 °C	Maximum Accuracy ±(% of reading + % of full-scale) Tcal ± 5 °C
0.007% + 0.003%	0.025% + 0.015%

Input Noise

Figure 1. Input Noise

> **Note** ppmFs denotes ppm of full scale.

> **Note** Noise may increase for inputs below 10 mV$_{rms}$.

Temperature Stability

AI gain ....±5 ppm/ºC

AI offset ....±5 ppm/ºC

Excitation gain ....±150 ppm/ºC

Excitation DC offset ....±150 µV/ºC

Filter Group Delay

Analog delay ....0.7 µs

Compensated digital filter group delay[1] ....Base Filter Group Delay + Variable Filter Delay

Excitation Frequency (f_{ex})	Base Filter Group Delay (ms)
400 Hz $\leq$ f_{ex} < 625 Hz	14.73664
625 Hz $\leq$ f_{ex} < 1.25 kHz	7.89632
1.25 kHz $\leq$ f_{ex} < 2.5 kHz	4.47616
2.5 kHz $\leq$ f_{ex} < 5 kHz	2.76608
5 kHz $\leq$ f_{ex} $\leq$ 10 kHz	1.88544

---

[1] The compensated digital filter group delay is a result of digital filtering in buffered mode.
Hardware automatically compensates for this group delay when synchronizing.

Sample Rate* (f_s)	Variable Filter Delay (Samples)
1 S/s ≤ f_s < 25 S/s	3.999
25 S/s ≤ f_s ≤ 47.7 S/s	57.970
47.7 S/s < f_s ≤ 95.4 S/s	57.943
95.4 S/s < f_s ≤ 190.7 S/s	57.887
190.7 S/s < f_s ≤ 381.5 S/s	57.773
381.5 S/s < f_s ≤ 762.9 S/s	57.547
762.9 S/s < f_s ≤ 1525.9	57.094
1525.9 S/s < f_s ≤ 3051.8 S/s	56.188
3051.8 S/s < f_s ≤ 6103.5 S/s	54.375
6103.5 S/s < f_s ≤ 12207.0 S/s	50.750
12207.0 S/s < f_s ≤ 24414.1 S/s	43.500
24414.1 S/s < f_s ≤ 25600 S/s	29.000

*Sample rate range shown is rounded to 0.1 S/s.
Precise numbers can be calculated at $100,000,000/2^n$ where n is in the range of 12 to 21.
For example, the full number for 24414.1 is $100,000,000/2^{12}$ =24414.0625.

Bandwidth

Excitation Frequency (f_{ex})	Demodulation Filter (-3 dB Bandwidth)
400 Hz ≤ f_{ex} < 625 Hz	110 Hz
625 Hz ≤ f_{ex} < 1.25 kHz	219 Hz
1.25 kHz ≤ f_{ex} < 2.5 kHz	438 Hz
2.5 kHz ≤ f_{ex} < 5 kHz	876 Hz
5 kHz ≤ f_{ex} ≤ 10 kHz	1750 Hz

Figure 2. Aggregate Digital Filter Bandwidth
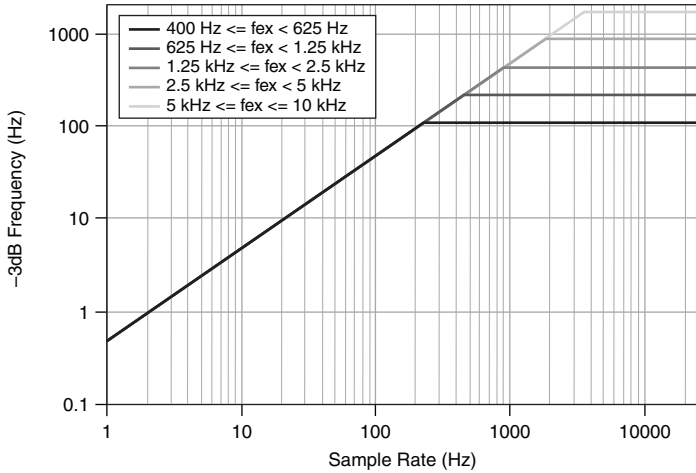
Hardware-Timed Single Point Sample Mode

Acquisition rate[1]

    Min .... 1 S/s

    Max .... 25.6 kS/s

HWTSP latency .... 63.68 μs + Demodulation Latency

Excitation Frequency (f_{ex})	Demodulation Latency
400 Hz $\leq f_{ex} <$ 625 Hz	9661.44 μs
625 Hz $\leq f_{ex} <$ 1.25 kHz	4787.20 μs
1.25 kHz $\leq f_{ex} <$ 2.5 kHz	2350.08 μs
2.5 kHz $\leq f_{ex} <$ 5 kHz	1131.52 μs
5 kHz $\leq f_{ex} <$ 10 kHz	496.64 μs

Internal Frequency Timebase

Frequency .... 100 MHz

Accuracy .... ±50 ppm

---

[1] Dependent upon system setup and application.

Synchronization

Reference clock source .... Onboard 100 MHz clock, Backplane
PXIe_CLK100

Triggers

Analog trigger

    Purpose .... Reference trigger only

    Source .... AI <0..3>

    Level .... Full scale (depending on input range),
programmable

    Mode .... Rising-edge, Rising-edge with hysteresis,
Falling-edge, Falling-edge with hysteresis,
Entering Window, Leaving Window

    Resolution .... 24 bits

Digital trigger

    Purpose .... Start or reference trigger

    Source .... PFI0, PXI_TRIG<0..7>, PXI_STAR,
PXIe_DSTAR<A..B>

    Polarity.. Software-selectable

    Minimum pulse width.............................. 100 ns for PXI_TRIG<0..7>, 20 ns for others

Output Timing Signals

Sources.. Sample Clock, Start Trigger Out,
Reference Trigger Out

Destinations .... PFI0, PXI_TRIG<0..7>, PXIe_DSTARC

Polarity... Software-selectable

PFI Characteristics

Input

    Logic compatibility.................................. 3.3 V to 5 V

    High, V_{IH} .... 2.40 V

    Low, V_{IL}... 0.95 V

    Input impedance .... 10 kΩ

Output

    High, V_{OH} .... 3.46 V max

    Sourcing 5 mA .... 2.61 V min

    Low, V_{OL} sinking 5 mA .... 0.38 V max

    Output impedance .... 50 Ω

    Output current .... ±5 mA min

Bus Interface

Form factor .... x1 PXI Express peripheral module, Specification rev 1.0 compliant

Slot compatibility .... PXI Express or PXI Express hybrid slots

DMA channels .... 4, analog input

Calibration

You can obtain the calibration certificate and information about calibration services for the PXIe-4340 at ni.com/calibration.

Recommended warm-up time .... 15 minutes

Calibration interval .... 1 year

Power Requirement

12 V .... 0.9 A

3.3 V .... 0.9 A

Physical Characteristics

Dimensions .... Standard 3U PXIe, 16 cm × 10 cm (6.3 in. × 3.9 in.)

Weight .... 168 g (5.9 oz)

I/O connector .... 96-pin male DIN 41612/IEC 60603-2 connector

⚠ **Caution** Clean the hardware with a soft, nonmetallic brush. Make sure that the hardware is completely dry and free from contaminants before returning it to service.

Environmental

Maximum altitude .... 2,000 m (800 mbar)

Pollution Degree 2

Indoor use only.

Operating Environment

Ambient temperature range .... 0 °C to 55 °C
(Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2. Meets MIL-PRF-28800F Class 3 low temperature limit and MIL-PRF-28800F Class 2 high temperature limit.)

Relative humidity range................................... 10% to 90%, noncondensing
(Tested in accordance with IEC 60068-2-56.)

Storage Environment

Ambient temperature range .... -40 °C to 71 °C
(Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2. Meets MIL-PRF-28800F Class 3 limits.)

Relative humidity range................................... 5% to 95%, noncondensing
(Tested in accordance with IEC 60068-2-56.)

Shock and Vibration

Operating shock .... 30 g peak, half-sine, 11 ms pulse
(Tested in accordance with IEC 60068-2-27. Meets MIL-PRF-28800F Class 2 limits.)

Random vibration

Operating .... 5 Hz to 500 Hz, 0.3 g_{rms}
Non-operating... 5 Hz to 500 Hz, 2.4 g_{rms}
(Tested in accordance with IEC 60068-2-64. Non-operating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

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.

Caution The protection provided by the PXIe-4340 can be impaired if it is used in a manner not described in this documents.

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 and certifications, and additional information, refer to the *Online Product Certification* section.

CE Compliance $\mathsf{C}\,\mathsf{E}$

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)

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 *Minimize Our Environmental Impact* 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 and Electronic Equipment, 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`.)

World Wide Support and Services

The National Instruments website is your complete resource for technical support. At `ni.com/support` you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

Visit `ni.com/services` for NI Factory Installation Services, repairs, extended warranty, and other services.

Visit `ni.com/register` to register your National Instruments product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. National Instruments also has offices located around the world. For telephone support in the United States, create your service request at `ni.com/support` or dial 1 866 ASK MYNI (275 6964). For telephone support outside the United States, visit the Worldwide Offices section of `ni.com/niglobal` to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.