

DEVICE SPECIFICATIONS

NI PXIe-4340

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

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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

Sampling mode	Simultaneous
Sample rates (f_s)	
Range	1 S/s to 25.6 kS/s
Resolution	$\leq 181.9 \mu\text{S/s}$
Maximum working voltage (signal + common mode)	4 V _{rms}
AI absolute input range	7 V _{rms}
Differential input impedance	200 k Ω
Linearity	0.01%
Crosstalk	-100 dB
Input protection	$\pm 30 \text{ V}$
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	$\pm 30 \text{ V}$
Output impedance	3 Ω
Excitation current drive	30 mA
Excitation voltage programmability	1 V _{rms} to 7 V _{rms} , 0.5 V _{rms} steps
Excitation frequency programmability	400 Hz to 10 kHz, 10 Hz steps
Excitation gain accuracy	5%, max
Excitation DC offset	$\pm 10 \text{ mV}$, max

Open Coil Detection

Detection time	200 ms
AI/RS open coil threshold voltage	$\pm 12 \text{ V}$
Excitation open coil threshold impedance	$> 5 \text{ k}\Omega$

Accuracy

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



Note V_{ex} is the excitation voltage.

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

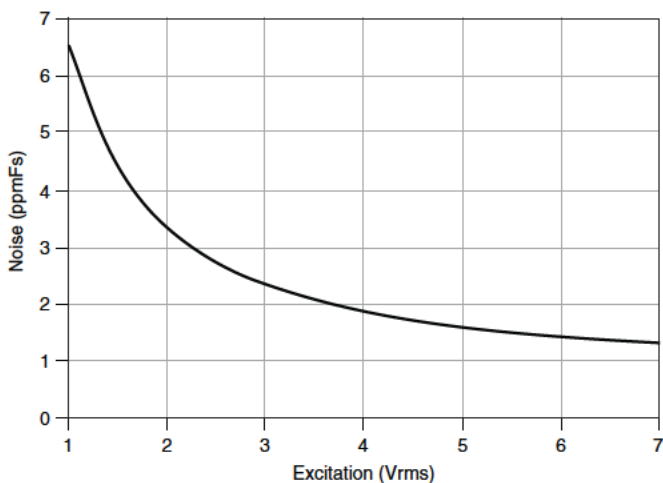
CMRR..... -60 dB

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/°C
AI offset±5 ppm/°C
Excitation gain±150 ppm/°C
Excitation DC offset±150 μV/°C

Filter Group Delay

Analog delay0.7 μs
Compensated digital filter group delay¹ Base Filter Group Delay + Variable Filter Delay

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

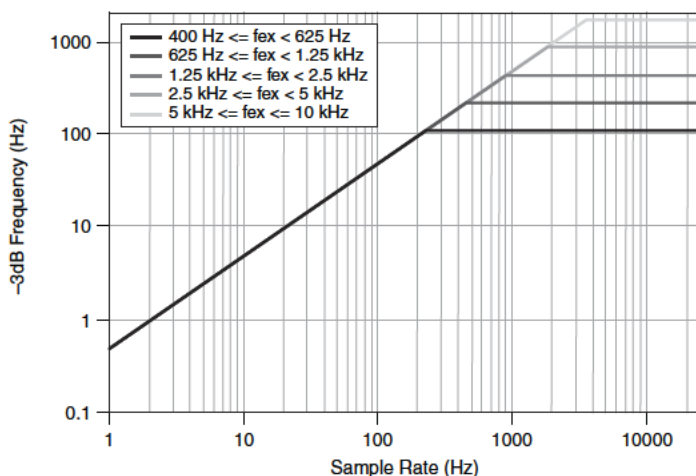
¹ The compensated digital filter group delay is a result of digital filtering in buffered mode. Hardware automatically compensates for this group delay when synchronizing.

Sample Rate* (f_s)	Variable Filter Delay (Samples)
$1 \text{ S/s} \leq f_s < 25 \text{ S/s}$	3.999
$25 \text{ S/s} \leq f_s \leq 47.7 \text{ S/s}$	57.970
$47.7 \text{ S/s} < f_s \leq 95.4 \text{ S/s}$	57.943
$95.4 \text{ S/s} < f_s \leq 190.7 \text{ S/s}$	57.887
$190.7 \text{ S/s} < f_s \leq 381.5 \text{ S/s}$	57.773
$381.5 \text{ S/s} < f_s \leq 762.9 \text{ S/s}$	57.547
$762.9 \text{ S/s} < f_s \leq 1525.9$	57.094
$1525.9 \text{ S/s} < f_s \leq 3051.8 \text{ S/s}$	56.188
$3051.8 \text{ S/s} < f_s \leq 6103.5 \text{ S/s}$	54.375
$6103.5 \text{ S/s} < f_s \leq 12207.0 \text{ S/s}$	50.750
$12207.0 \text{ S/s} < f_s \leq 24414.1 \text{ S/s}$	43.500
$24414.1 \text{ S/s} < f_s \leq 25600 \text{ S/s}$	29.000
<p>*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 $100,000,000/2^{12} = 24414.0625$.</p>	

Bandwidth

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

Figure 2. Aggregate Digital Filter Bandwidth



Hardware-Timed Single Point Sample Mode

Acquisition rate¹

Min..... 1 S/s

Max 25.6 kS/s

HWTSP latency 63.68 μ s + Demodulation Latency

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

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_DSTARC<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 k Ω

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 \times 10 cm (6.3 in. \times 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

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）



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