

SensorDAQ Specifications

The specifications listed below are typical at 23 °C, unless otherwise noted.

Operating System Support

Operating system support..... Windows 2000/XP

Vernier Sensor Connectors

Analog (BTA)

Number of BTA connectors..... 3

Number of channels per connector..... 1 single-ended channel,
Selectable range: ± 10 V, 0 to 5 V

Input resolution..... 13-bit

Vernier autoID support Resistor and I²C EEPROM

Digital (BTD)

Number of BTD connectors..... 1

Vernier autoID support Resistor

Analog Input

Number of channels 2 single-ended or 1 differential,
software-selectable

Input range

Single-ended ± 10 V

Differential..... ± 20 V, ± 10 V, ± 5 V, ± 4 V,
 ± 2.5 V, ± 2 V, ± 1.25 V, ± 1 V

Input resolution..... 13 bits, single-ended
14 bits, differential

Converter type.....	Successive approximation
Max sampling rate	
Single channel.....	48 kS/sec
Multiple channels	
3 Vernier & 1 differential general-purpose analog input	10 kS/sec per channel
3 Vernier & 2 single-ended general-purpose analog inputs.....	8 kS/sec per channel
AI FIFO.....	1024 bytes
Timing resolution.....	41.67 ns (24 MHz timebase)
Input impedance.....	>1 M Ω
System noise	
Single-ended.....	< 5 mVrms
Differential.....	< 10 mVrms (+/- 20 V range)
	< 5 mVrms (all other ranges)
Absolute Accuracy ¹	
+5 V Sensor Channels.....	3.15 mV
+/- 10 V Sensor Channels.....	10.5 mV
Single-ended.....	10.5 mV
Differential	
+/- 20 V Range.....	11.8 mV
+/- 10 V Range.....	6.6 mV
+/- 5 V Range.....	3.78 mV

¹ Absolute accuracy includes offset and gain errors, nonlinearity, and noise. Presented values assume averaging of 100 points and an ambient temperature range of 18°C to 28°C.

+/- 4 V Range.....	3.21 mV
+/- 2.5 V Range.....	2.21 mV
+/- 2 V Range.....	1.89 mV
+/- 1.25 V Range.....	1.52 mV
+/- 1 V Range.....	1.41 mV
Bandwidth (-3dB)	> 100 kHz
Recommended warm-up time	5 minutes
Calibration Interval.....	1 year

Analog Output

Analog outputs	1
Output resolution	12 bits
Maximum update rate	150 Hz, software-timed
Output range.....	0 to +5 V
Output impedance	35 Ω
Output current drive.....	5 mA
Power-on state.....	0 V
Slew rate	1 V/ μ s
Short circuit current	50 mA
Absolute accuracy (no load) ²	7 mV typical, 12 mV maximum

Digital I/O

Direction control	Each line individually
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² Analog output absolute accuracy does not include voltage drop across the output impedance.

programmable as input or output

Output driver type Open-drain with pull-up to +5V /
push-pull 3.3 V (line
configurable)

Compatibility TTL, LVTTL, CMOS

Absolute maximum voltage range -0.5 to 5.8 V with respect to
GND

Pull-up resistors 4.7 kΩ to 5 V

Power-on state Input (pull-up)

Digital logic levels

Level	Min	Max	Units
Input low voltage	---	0.8	V
Input high voltage	2.0	---	V
Output low voltage (I = 8 mA)	—	0.4	V
Output high voltage in push-pull mode (I = 8 mA)	2.5	---	V

Digital I/O at Screw Terminals

Number of lines 4

General Purpose Counter/Timers

Resolution 32 bits (16 bits for output)

Counter measurements Event counting, two-pulse
encoder

Timer measurements Semi-period, frequency, period,
two-edge separation, pulse-width

Output applications	Pulse generation, pulse-train generation
Internal base clocks.....	24MHz
Base clock accuracy.....	100 ppm
Pulldown resistor on PFI0.....	4.7 k Ω to GND
Pullup resistor on PFI1.....	4.7 k Ω to 5 V
Maximum counter input frequency	5 MHz
Maximum timer input frequency.....	10 kHz
Maximum pulse-train gen. frequency.....	366 Hz

External Digital Triggers

Source	PFI0 or BTD connector
Polarity.....	Software selectable
Analog input function	Start trigger, pause trigger, reference trigger
Counter/timer function	Event counter gate

External Voltage Source

+5 V Output Voltage.....	+5.08 V typical, +4.85 V Min,+5.25 V Max.
+5 V Output Current	200 mA maximum, including Vernier sensor and external loads

Bus Interface

USB specification USB 2.0 full-speed

USB bus speed 12 Mb/s

Power Requirements

USB current:

Active..... 500 mA max

Suspend..... 500 μ A max

Physical Characteristics

Dimensions 9.07 cm · 10.45 cm · 3.30 cm
(3.6 in. · 4.1 in. · 1.3 in.)

I/O connectors..... USB series B receptacle,
3 Analog Vernier Connectors
(BTA),
1 Digital Vernier Connector
(BTD),
1 12-position screw terminal
block

Weight

With screw terminal connector 84 g (3 oz)

Without screw terminal connector .. 54 g (1.9 oz)

Screw terminal wiring 16 to 28 AWG

Torque for screw terminals 0.22 – 0.25 N · m
(2.0 – 2.2 lb · in.)

Safety

Standards

SensorDAQ 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

- CAN/CSA-C22.2 No. 61010-1

For UL and other safety certifications, refer to the product label, or visit ni.com/certification, search by model number or product line, and click the appropriate link in the Certification column.

Environmental

SensorDAQ is intended for indoor use only.

Operating temperature
(IEC 60068-2-1 and IEC 60068-2-2)..... 0 to 55 °C

Operating humidity
(IEC 60068-2-56) 10 to 95% RH, noncondensing

Maximum altitude..... 2,000 m (at 25 °C ambient temperature)

Storage temperature
(IEC 60068-2-1 and IEC 60068-2-2)..... -40 to 85 °C

Storage humidity
(IEC 60068-2-56) 5 to 90% RH, noncondensing

Pollution Degree (IEC 60664)..... 2

Electromagnetic Compatibility

Emissions..... EN 55011 Class A at 10 m
FCC Part 15A above 1 GHz

Immunity..... Industrial levels per
EN 61326:1997 + A2:2001,
Table 1

EMC/EMI..... CE, C-Tick, and FCC Part 15
(Class A) Compliant

SensorDAQ may experience temporary variations in analog input readings when exposed to radiated and conducted RF noise. The device returns to normal operation after RF exposure is removed.

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

RoHS Compliance

SensorDAQ is designed and manufactured to be RoHS compliant.

