nexoDAQ

Product Datasheet

Description

***nexo*DAQ** is a wireless data acquisition platform designed for many different applications, ranging from high-speed measurements to low-power monitoring. It is modular, versatile and highly configurable.

***nexo*DAQ** is equipped with three 24-bit data acquisition channels that can be software configured to interface various types of sensors: IEPE/ICP® accelerometers, charge mode sensors, low-voltage differential and single-ended, high voltage single-ended, and 4–20 mA sensors.

Multiple ***nexo*DAQ** units form a wireless star network centered on the **Inertia Gateway** and stream the sensor data live at data rates reaching **10kHz per channel**. The synchronization across all channels and units is better than **100ns**. Additionally, the sensor data can also be stored on the on-board SD card and retrieved later over USB or wirelessly.

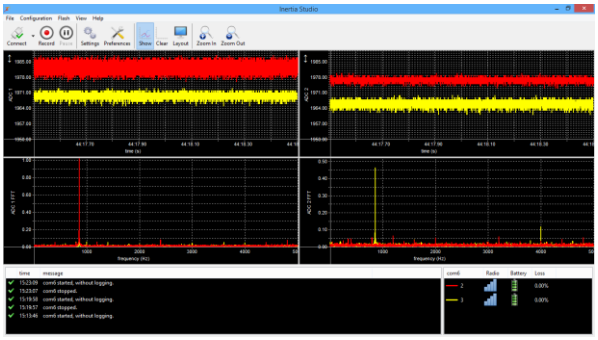
***nexo*DAQ** operates on an internal rechargeable battery with industrial operating range. Alternatively, it can be powered from external sources: 5V standard USB charger or 7–24VDC external source. The enclosure is rugged IP67.

Key Features

- High-speed data sampling and wireless streaming up to 10kHz per channel
- Tight sampling synchronization <100ns
- Plug and use - automatic wireless star network formation centered on Inertia Gateway
- Over-the-air setup and reconfiguration
- Three 24-bit simultaneously-sampled inputs
- Five highly configurable interface modes:
  1. IEPE/ICP®: 6–24V compliance voltage, 0.1–4mA excitation current
  2. Charge mode: differential and single-ended, maximum sensitivity 10pC/V
  3. Low voltage: differential and single-ended signals up to ±10V max
  4. High voltage single ended signals up to ±100V
  5. 4–20mA sensors
- Full-scale DC bias adjustment with 19µV max. resolution
- Gain adjustable from 1 to 1024 with steps of 1
- Per-channel powering of external sensors up to ±12V, ±20mA
- One actuator output per channel for signaling to external sensor
- TEDS Class I and Class II
- Internal rechargeable battery with industrial operating range
- 2h running time at highest power mode (continuous sampling and communication)
- Powerful on-board micro controller with signal processing features
- On-board micro-SD card for data storage
- 7–24VDC power connector (3A max, electrically isolated)
- USB 2.0 FS (12Mbps, electrically isolated)
- IP67 rating and rugged design
- Bridge Completion accessories available
- Various low power monitoring modes with up to 100days of standby time
- Configurable tradeoff of Dynamic Range vs Power Consumption
- Wakeup from Threshold or Wakeup Periodically

Inertia Studio

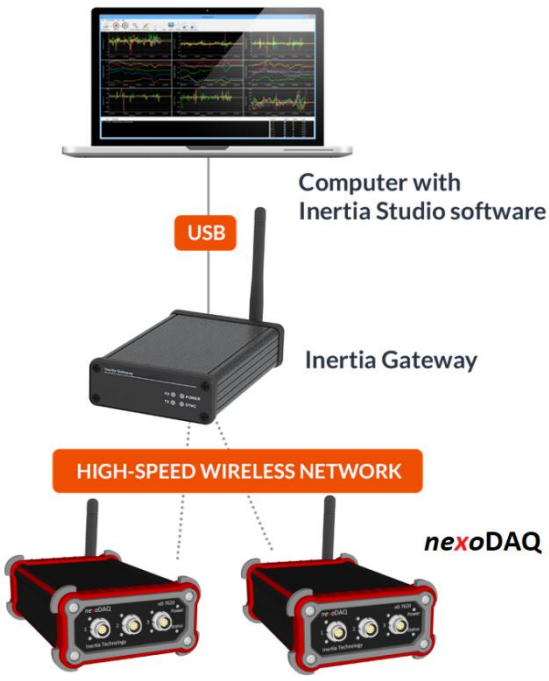
Inertia Studio enables real-time visualization of the sensor data, as well as over-the-air reconfiguration of the sensors and wireless parameters. All data retrieved by Inertia Studio is logged for post-analysis and optionally made available for remote TCP/IP connections.



Wireless Network

The wireless network of Inertia operates in the 2.4 GHz and has a speed of 4Mbps. It provides network-wide synchronization with an accuracy bettern than 100 ns. This means that all sensors are sampled at the same time instance across the network.

Inertia Gateway connects through USB to a computer running Inertia Studio, where the data can be visualized and logged.



Nevertheless, raw sensor data does not always represent the end goal of a measurement session. Specialized data processing is often required to get a meaningful representation of the measured process. The users can develop their own custom applications based on the C++ and Java SDKs made available on our website.

Benefits

- High-quality data acquisition
- Synchronized sampling
- High data rates
- Less cables
- Modular and configurable
- Measures in hard-to-reach places
- One device for all sensor types

Applications

- Measurement and testing
- Industrial vibration monitoring
- Structural health monitoring
- Predictive maintenance
- Condition monitoring
- Active vibration control

Contact information

E-mail info@inertia-technology.com

Phone +31 53 711 3408

Address Hengelosestraat 583,
7521 AG Enschede
The Netherlands

TECHNICAL SPECIFICATIONS

- PRELIMINARY -

PARAMETER	Conditions	Min	Typical	Max	Unit
General characteristics					
ADC			24-bit, Delta-Sigma		**Bits**
Data Rate range (f_s)				10	**kHz**
-3dB Bandwidth			0.49 f_s		**Hz**
Passband flatness	DC – 5 kHz	20		40	**mdB**
Phase nonlinearity	DC – 5 kHz			0.1	**deg**
Input delay			$42/f_s$ +16.4e^{-6}		**s**
Stopband frequency			0.547 f_s		**Hz**
Stopband attenuation			100		**dB**
Oversample rate			256 f_s		**Hz**
Attenuation at oversample rate	f_s = 10 kHz		100		**dB**
Gain range		1		1024	
DC Bias Adjust range	Gain = 1	-FS		FS	
DC Bias Adjust resolution	Gain = 1		19		**µV**
Power output voltage (V_{EXT})		±5		±12	**V**
Power output current source/sink	V_{EXT} = ±10 V			±20	**mA**
Differential Low Voltage Mode Characteristics					
Measurement range		±5		±10	**V**
Input coupling (selectable)			AC, DC		
Input Impedance (selectable)			10M, >1G		**Ω**
AC -3dB cutoff frequency	Z_{INP} = 10MΩ		0.048		**Hz**
Gain error	Calibrated, 25 °C ±10 °C		0.1		**%**
Input noise			36		**µV_{RMS}**
Total Harmonic Distortion (THD)	1 kHz, -1 dBFS, Gain = 1		-115		**dBc**
Spurious Free Dynamic Range (SFDR)	1 kHz, 1 Vrms, Gain = 1		120		**dB**
Single Ended High Voltage Mode Characteristics					
Measurement range			±100		**V**
Input coupling (selectable)			AC, DC		
Input Impedance			1M		**Ω**
AC -3dB cutoff frequency	Z_{INP} = 1MΩ		0.5		**Hz**
Gain error	Calibrated, 25 °C ±10 °C		0.1		**%**
Input noise			3		**µV_{RMS}**
Total Harmonic Distortion (THD)	1 kHz, 10 Vrms, Gain = 1		-92		**dBc**
Spurious Free Dynamic Range (SFDR)	1 kHz, 1 Vrms, Gain = 1		94		**dB**
IEPE Mode Characteristics					
Compliance Voltage range (V_{IEPE})		6		24	**V**
Measurement range		0		V_{IEPE}	**V**
Excitation current range		0.1		10	**mA**
Input coupling (selectable)			AC, DC		
AC -3dB cutoff frequency			0.5		**Hz**
Input Impedance			1M		**Ω**
Gain error	Calibrated, 25 °C ±10 °C		0.1		**%**

TECHNICAL SPECIFICATIONS

- PRELIMINARY -

PARAMETER	Conditions	Min	Typical	Max	Unit
Input noise			3		μV_{RMS}
Total Harmonic Distortion (THD)	1 kHz, -1 dBFS, Gain = 1		-92		dBc
Spurious Free Dynamic Range (SFDR)	1 kHz, 1 V_{RMS}, Gain = 1		94		dB
Charge Mode Characteristics					
Supported Charge interface types		Differential, Single-ended			
Measurement range (selectable)		100p		100n	C
AC -3dB cutoff frequency (selectable)		0.16m		1600	Hz
Gain error	Calibrated, 25 °C ±10 °C		0.1		%
Input noise			0.1		mV_{RMS}
Total Harmonic Distortion (THD)	100pC Range, f_C *15Hz,* 1 kHz, -1 dBFS, Gain = 1		-104		dBc
4 – 20mA Mode Characteristics					
Measurement range		-25		25	mA
Input coupling			DC		
Input Impedance			200		Ω
Gain error	Calibrated, 25 °C ±10 °C		0.5		%
Total Harmonic Distortion (THD)	1 kHz, -1 dBFS, Gain = 1		-100		dBc
Wireless communication					
Frequency band			2.4		GHz
Data rate				4	Mbps
TX Power				10	dBm
Range	Line-of-sight, max. TX power			30	m
Software					
Visualization software	Inertia Studio	Runs on Windows Vista, 7, 8, 8.1, 10, both 32 and 64 bits, Ubuntu Linux			-
Connectivity					
Micro-USB		USB interface for configuration, reprogramming, SD card downloading and battery recharging			-
Analog inputs		Circular push-pull connector			-
External power input	S10 connector	24			V
Electrical characteristics					
Power consumption	Max. TX power, High-performance IEPE mode		3.9		W
Internal battery capacity	3.75V Li-Ion rechargeable		2.6		Ah
Internal battery operating temperature	Charge / Discharge	-20 / -50		+60	°C
Miscellaneous					
Dimensions	Without antenna	147 x 96 x 50.5			mm
Weight	With antenna	481			g
Enclosure material		Aluminum and shock-proof plastic covers			-
Waterproof	IP rating	IP67			-