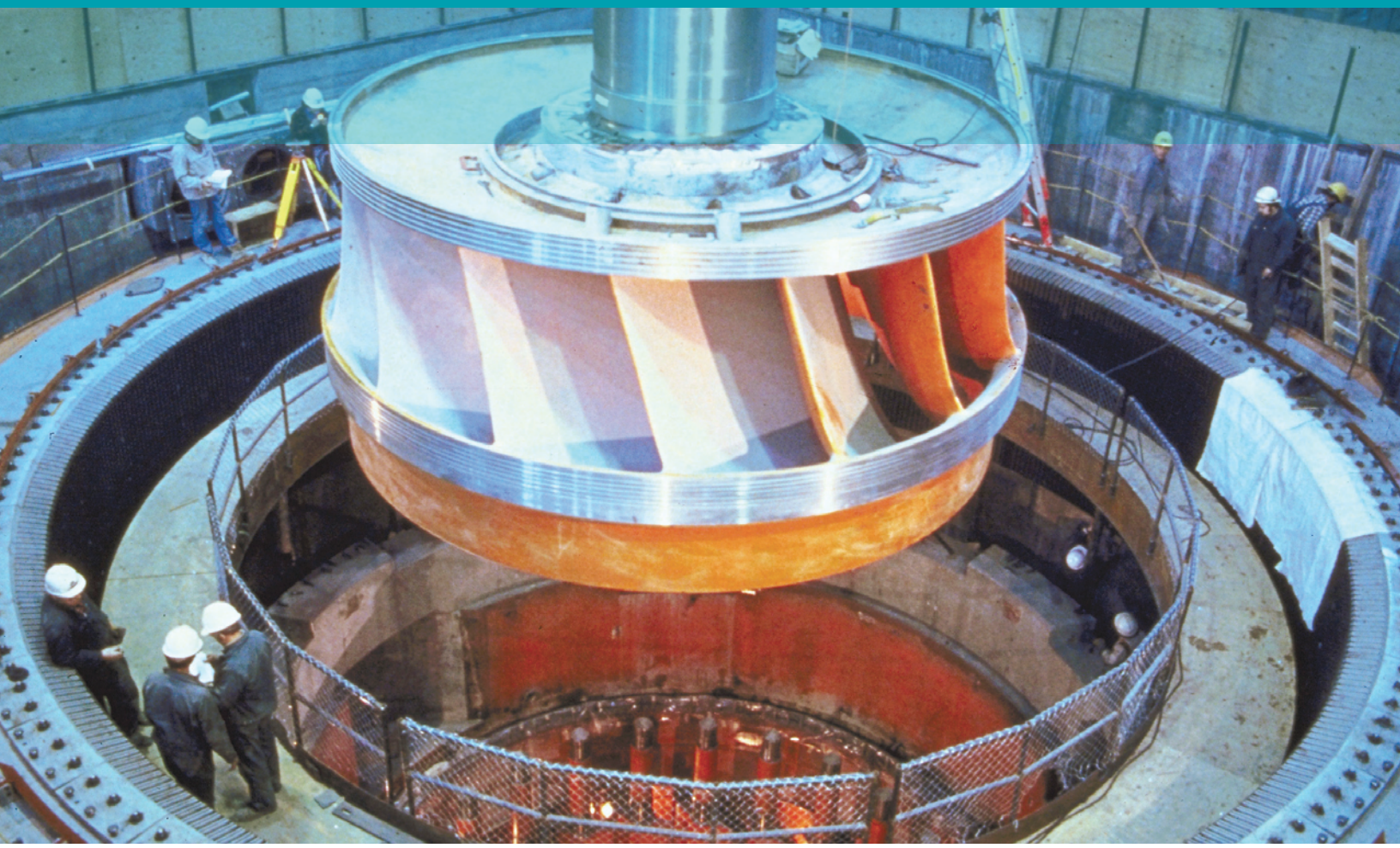
Vibration Measurement and Analysis Solutions

2009

IOtech 600 Series | ZonicBook/618E | eZ-Series Software



IOtech®

Out-of-the-Box Measurement Solutions

Vibration
Measurement & Analysis Solutions

The Smart Choice

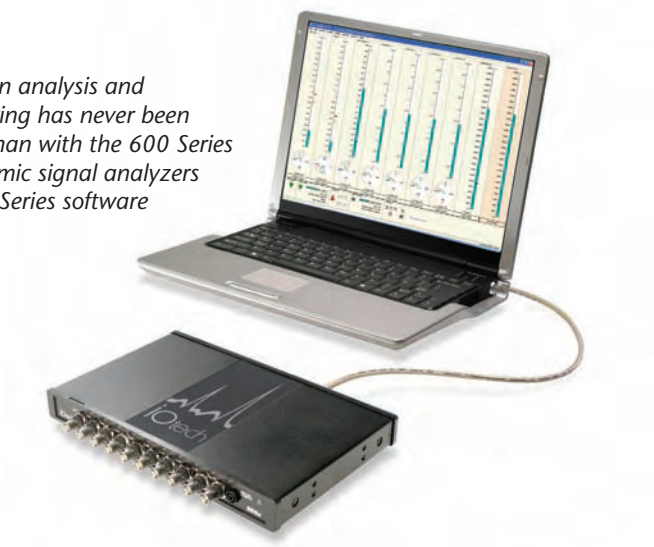
IOtech leverages 30+ years of experience in providing vibration measurement and analysis solutions. From low-channel count, portable modules, to large distributed systems, IOtech has cost effective solutions to fit a variety of needs.

Out-of-the-Box Solutions

IOtech solutions combine PC-based hardware with easy-to-use application specific software. Multiple eZ-Series software packages are offered for the 600 Series and ZonicBook/618E, each tailored to a particular application. 600 Series systems feature a USB or Ethernet interface, 24-bit ADC's per channel, and built-in signal conditioning for accelerometers, tachometers, proximity sensors, temperature,and more.

Your time is valuable, and that's why all IOtech systems feature *Out-of-the-Box* eZ-Series software which allows you to start taking measurements in minutes. We recognize our users don't have weeks to devote to software programming, so you won't spend hours learning to program or developing custom applications, allowing you to spend minimal time configuring your system.

Choose the solution that best meets your application needs. Contact IOtech today for configuration assistance, complete product specifications, pricing, and accessory information.



Vibration analysis and monitoring has never been easier than with the 600 Series of dynamic signal analyzers and eZ-Series software

IOtech offers software packages designed specifically for a variety of applications including:

- Vibration Analysis
- Rotating Machine Analysis
- Acoustics
- Machine Condition Monitoring
- Predictive Maintenance
- Balancing
- NVH
- NDT (non-destructive test)
- Resonance analysis

For more information visit iotech.com/sales

Support & Training

Your Success is Our Success. IOtech offers a worldwide network of sales and support offices. Training can be provided at your facility or ours, and each session is customized to address the specific goals and requirements of your applicaton. Applications engineers will provide a comprehensive foundation for using your IOtech system. In addition to optional on-site training, IOtech provides free technical support for the life of your product.

Countless engineers and technicians depend on IOtech vibration monitoring and analysis solutions. Whether it's our on-site training and education, or through our range of support options, we're dedicated to supporting our customers and making sure they get the most out of their IOtech solution.

For more information visit iotech.com/training

Vibration
Measurement & Analysis Solutions

For more information visit iotech.com/consultants

Vibration Analyzers the Pros Use

Vibration consultants around the world have standardized on IOtech's vibration measurement and analysis solutions. They utilize IOtech's systems to solve the most complex vibration related problems. Having a system that is flexible, cost effective, and easy-to-use is a must.

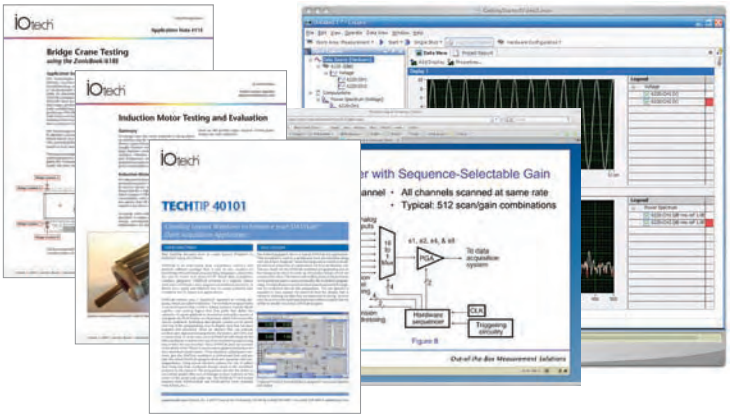
"The 600 Series has become an integral part of my advanced testing services."

– Nelson Baxter P.E. ABM Technical Services
Certified Vibration Analyst Category IV

Application Resources

Our online Resource Center provides tech tips, videos, and application notes describing real world applications solved with IOtech products. Actual customer applications include: compressor and turbine vibration testing, bridge crane testing, steam turbine rotor testing, hydroelectric generator maintenance, and many more.

For more information visit iotech.com/resources



Vibration Measurement Selection Guide

Features	640, 650	652u, 655u	ZonicBook/618E
Channel Capacity	4 or 5	10	8 to 56
A/D Resolution (bits)	24	24	16
IEPE Current Source	2.1 mA	4 mA	4 mA
Programmable Input Ranges	10V or 40V	40V	25 mV to 25V
Accelerometer Inputs	yes	yes	yes
Anti-Alias Filter	3 pole*	3 pole*	8 pole
Filter Type	Linear Phase	Linear Phase	Butterworth
Programmable Corner Frequency	—	—	12
Coupling	AC, DC	AC, DC	AC, DC
Maximum Sample Rate	105 kHz/ch	105 kHz/ch	1 MHz
Simultaneous Sampling	yes	yes	yes
Excitation Output Source	sine, swept-sine, pseudo-random, chirp, burst	—	sine, swept-sine
Analog Trigger Source	single-channel	single-channel	single-channel, volts or spectrum
Digital I/O - Included	8	8	—
Tachometer Inputs (Counter/Timer)	4 or 5**	10**	4
Temperature inputs	—	5 (655u only)	—
Other Supported I/O	volts	volts	volts
PC Connectivity	USB or Ethernet	USB	Ethernet

* 3-pole analog with software selectable FIR filtering
** Any analog input can be configured as a tach input

600 Series

Dynamic Signal Analyzers – 10 channels

652u: 10 analog inputs – 655u: 10 analog inputs, 5 temperature inputs

Solution Highlights

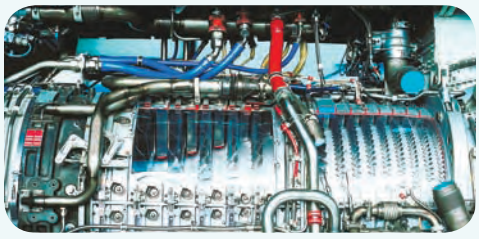
- 10 analog channels
- 5 temperature inputs (655u model)
- Direct accelerometer, proximity probes, and tachometer inputs
- 24-bit, 105.4 kS/s delta-sigma ADC per analog input
- Spurious-free dynamic range of 108 dB (typical)
- AC/DC coupling, software selectable per channel
- TEDS support for accelerometers
- 8-bit digital I/O port
- USB interface to PC
- eZ-Series software for Rotating Machine Analysis, Acoustics, Vibration Analysis, Machine Condition Monitoring, Balancing, Resonance Testing, and NVH

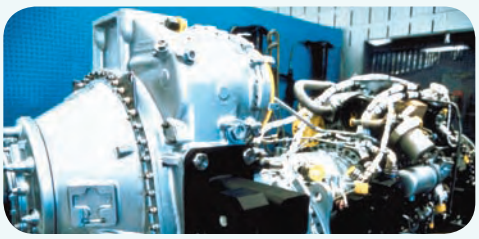
For complete information visit iotech.com/600series

Bearing Failure Analysis. With the 655u and eZ-TOMAS software, predictive maintenance can be performed on various types of bearings. With this data, users can predict failure and help establish proper maintenance schedules. The module offers accelerometer and tachometer inputs, as well as 5 temperature inputs – important predictors in determining upcoming failures.

Machine Condition Monitoring. Use the 652u and eZ-TOMAS software for collecting and analyzing machine vibration data. By learning what is normal for a given machine and maintaining accurate trend data, maintenance professionals can predict impending failures with a high degree of accuracy. Maintenance can then be scheduled to accommodate production.

Production Test Verification. Rotating machinery production test verification can easily be completed using the 652u with eZ-TOMAS software. Vibration amplitude and phase values are compared against defined set points at different machine conditions. Remote data displays and alarm notification provide the test engineer with machine condition information.





600 Series

Dynamic Signal Analyzers – 4 or 5 channels

650 models: 5 analog inputs – 640 models: 4 analog inputs, one analog output

Solution Highlights

For complete information visit iotech.com/600series

- Small, portable design
- 4 or 5 analog channels
- Direct accelerometer, proximity probes, and tachometer inputs
- 24-bit, 105.4 kS/s delta-sigma ADC per analog input
- ±40V input range (650 models)
- Spurious-free dynamic range of 108 dB (typical)
- AC/DC coupling, software selectable per channel
- TEDS support for accelerometers
- 8-bit digital I/O port
- Analog output channel which can drive audio or shaker table amplifiers and can be used for NVH testing (640e and 640u only)
- USB or Ethernet interface to PC
- eZ-Series software for Rotating Machine Analysis, Acoustics, Vibration Analysis, Machine Condition Monitoring, Balancing, Resonance Testing, NVH, and NDT analysis

Motor & Turbine Testing. Use the 650 models for two pedestal testing on motors, fans, turbines, and more. The 650's five analog inputs allow two bearing pairs of accelerometers and a tachometer input. eZ-TOMAS software provides Time Waveform, Orbit, Spectrum, Waterfall, Polar, Bode, Shaft Center Line, and Trend displays, and much more.

Modal Analysis. Measure the dynamic response of structures using the 640u module. Collect data with eZ-Analyst software and export data to a Modal Analysis package such as Vibrant Technology's ME'scope™. The bus-powered 640u and 650u are small and portable with easy connectivity to an impact hammer and triaxial accelerometer.

NVH. Perform NVH, Resonance, and Bump Testing with the 640 or 650 models and eZ-Analyst software. eZ-Analyst supports multiple reference and response inputs, and provides typical force/response calculations inluding FRF and Cross Spectrum, Transfer Functions, and Coherence functions. The 640e also includes an analog output channel for shaker table reference.

ZonicBook/618E

Dynamic Signal Analyzer – up to 56 channels

8 dynamic input channels, expandable up to 56 channels

Solution Highlights

- 8 to 56 analog channels
- Direct accelerometer, proximity probes, and tachometer inputs
- 16-bit ADC
- 1-MHz sampling
- TEDS support for accelerometers
- 8-bit digital I/O port
- Ethernet interface to PC
- eZ-Series software for Rotating Machine, Acoustic, Vibration, Machine Condition Monitoring, Balance, Resonance Testing, NVH, and NDT

For complete information visit iotech.com/zonicbook

Structural Testing. IOtech's ZonicBook is used by structural dynamics engineers who frequently retrofit military helicopters and fixed-wing aircraft with a variety of weapons and electronic systems that could potentially alter the dynamic behavior of the platform structure and generate unacceptable vibrations. [Photo Courtesy of U.S. Army]

Bearing Analysis. ZonicBooks are used to monitor the bearings in reactor coolant pump simulators. Thermocouples measure the bearing temperature, proximity sensors measure vibrations, and the software generates Bode plots, which give the vibration specialist a means to detect and analyze bearing failures easily and repair them quickly.

Pump & Turbine Testing. Petrochemical companies in the U.S. are increasingly using IOtech's ZonicBook to monitor and analyze vibrations in high capacity process pumps and turbine generators. Vibration experts monitor some critical machines continuously while others share a portable data acquisition system among them.

eZ-Analyst

real-time vibration and acoustic analysis

For complete information visit iotech.com/ezanalyst

eZ-Analyst is a full-featured spectrum analysis software package. It supports multiple reference and response inputs, and provides typical force/response calculations including FRF and Cross Spectrum (Magnitude, Phase, Real, Imaginary & Nyquist), Transfer Functions (Inertance, Mobility, Compliance, Apparent Mass, Impedance, and Dynamic Stiffness), and Coherence functions.

- Real-time continuous and transient data acquisition and analysis
- FFT analysis up to 40-kHz, resolution to 25,600 spectral lines
- Supports acceleration, velocity, displacement, force, and pressure
- Multiple Windowing and Averaging selections, Acoustic Weighting Filters
- Supports tachometer inputs for Order Tracking and Time Synchronous Averaging
- Ideally suited to NVH, Resonance, and Bump Testing
- Export data to Excel, Vibrant Technology's ME'scope™, SMS Star, UFF type 58 ASCII or Binary, and RPC III

eZ-TOMAS & eZ-TOMAS Remote

rotating machine monitoring and analysis

For complete information visit iotech.com/eztomas

eZ-TOMAS software provides a powerful tool for rotating machinery condition monitoring and fault evaluation. eZ-TOMAS Remote allows up to 32 networked eZ-TOMAS server installations to be simultaneously monitored or controlled from a central client.

Predictive maintenance (PdM) programs track the health of a machine. A key component of this approach includes vibration analysis. eZ-TOMAS software and IOtech Dynamic Signal Analyzer hardware combine to give accurate machine diagnosics.

- Multichannel, simultaneous vibration data acquisition and analysis for portable machine condition monitoring applications
- Steady State and Transient Rotating Machinery Monitoring and Analysis
- Automatic, unattended event recording, including machine startup, shutdown, and alarm capture
- Remote diagnostics and alarm notification
- Spectral Analysis frequency of up to 40 KHz, Resolution up to 25,600 spectral lines
- Ideal for rotating machine analysis, machine condition monitoring, predictive maintenance, and bearing failure analysis

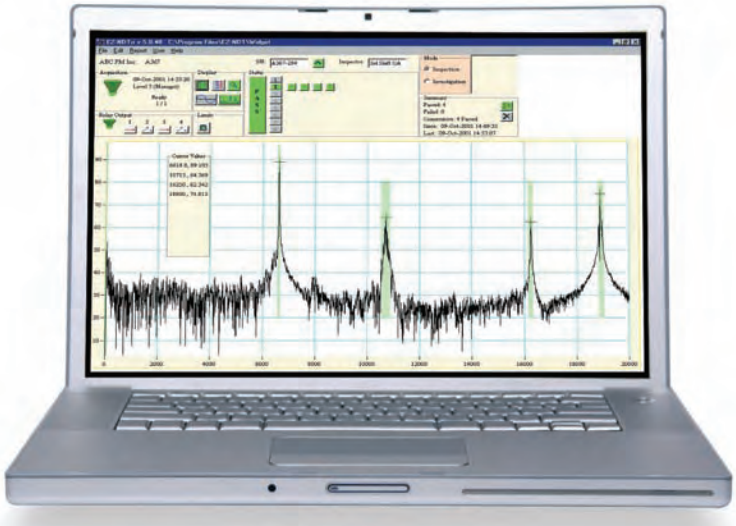
eZ-Balance
machine balancing

For complete information visit iotech.com/ezbalance

eZ-Balance is a multiplane balance software package that computes the optimal balance weights and weight locations based on vibration data. Trial and trim balancing can occur both in real-time or by interactively entering values to determine balance results. The software integrates seamlessly with IOtech's ZonicBook/618E or 600 Series DSA platforms, providing a compact, easy-to-use application for shop or field balancing operations.

- Influence coefficient computation saved with project for "One Shot" Trim balancing
- Graphic displays for Polar, Time, and Spectrum data
- Balancing Toolkit aids in calculating typical balance equations for trial weights , resolving weights, split weights, stock and arc weights, cord and arc dimensions, drill bit mass removal calculations, and balance grade tolerance calculations
- Compatible with displacement, velocity, and acceleration sensors

eZ-NDT
resonance inspection and analysis



For complete information visit iotech.com/ezndt

eZ-NDT (non destructive test) systems provide a fast and inexpensive solution for 100% inspection of production parts and assemblies. The system compares the Spectral Resonance characteristic of the test item against acceptance criteria to determine the item's quality.

A manual or automated hammer is used to excite the production part, and a microphone or accelerometer measures the resultant signature. The measured spectral resonance is compared to a known good signature. Production part defects will cause a change in the resonance spectrum, and are utilized as pass/fail criterion.

- Resonance Signature Analysis to determine product quality
- Suitable for powdered metal components, castings, welded assemblies, ceramic parts, and composite materials
- Up to ten spectral pass/fail bands can be programmed
- Automation capability for 100% high throughput inspection
- No special part preparation, fixtures, or pre-treating is required

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Data Acquisition
& Mixed Signal Measurement Solutions

IOtech also offers a large selection of *Out-of-the-Box* data acquisition solutions designed to measure a variety of signal types including:

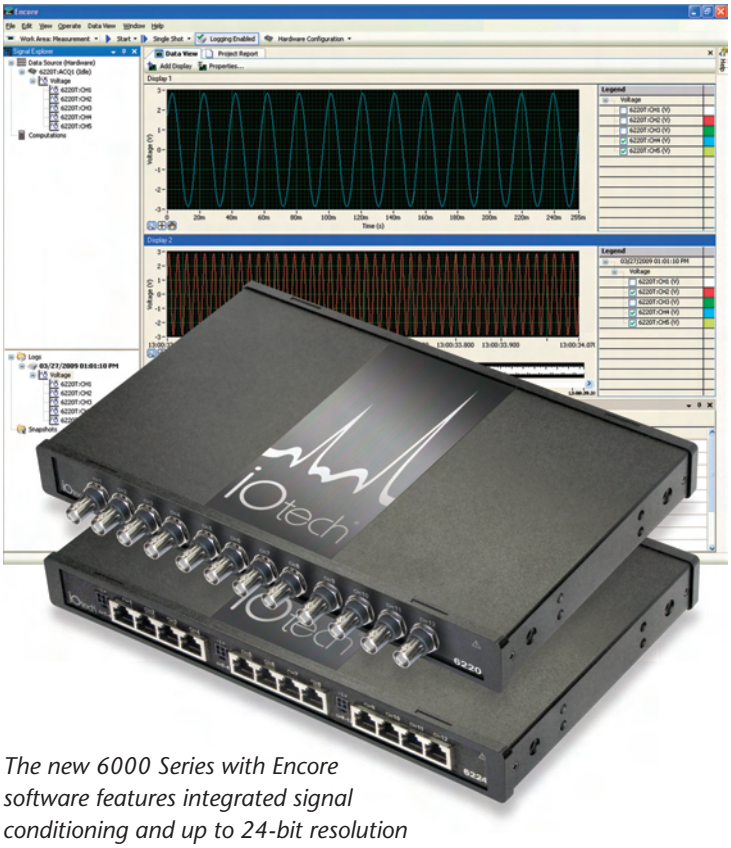
- Strain
- Temperature
- Pressure
- Voltage
- Current
- Frequency
- Encoders
- Digital I/O

Our Ethernet, USB, and PCI-based systems as well as our and stand-alone loggers meet a wide range of applications and signal requirements. All IOtech data acquisition solutions include *Out-of-the-Box* measurement software. We also offer support for programming languages and applications including LabVIEW® and DASYLab®.

IOtech data acquisition solutions are used in a broad range of industry applications, including:

- Aerospace, avionics, and aviation
- Automotive and transportation
- Biomedical and medical
- Building materials
- Energy
- Petrochemical exploration
- Manufacturing and quality control
- *and many more!*

For complete information visit iotech.com/products



The new 6000 Series with Encore software features integrated signal conditioning and up to 24-bit resolution

IOtech®
Out-of-the-Box Measurement Solutions