TRIO® Machine Data Acquisition

Powerful vibration data collectors, controllers, sensors, and field analyzers
POWERFUL, ERGONOMIC, AND SAFE MACHINE DATA ACQUISITION WITH THE TRIO® SERIES

TRIO C-Series
COMMERCIAL INDUSTRIAL VIBRATION DATA COLLECTOR / FIELD ANALYZER
✓ Modular system with rugged IP-65 rated Windows tablet PC
✓ 7” and 10” screen size options available
✓ Full-day, hot-swappable battery

TRIO H-Series
HAZLOC-RATED VIBRATION DATA COLLECTOR / FIELD ANALYZER
✓ Modular system with Class 1, Division 2 HAZLOC approvals
✓ 10” Ultra-rugged Windows tablet PC
✓ Full-day, hot-swappable battery

TRIO Feature Highlights
✓ Modular, Bluetooth® connectivity, separates tablet from instrumentation
✓ 4 simultaneous channels of data plus dedicated tachometer channel
✓ Large touchscreen, sunlight readable, brilliant screen resolution
✓ Safest vibration field device on the market

TRIO Model Options
✓ ExpertALERT™ / Collector X applications for full automated diagnostic functions
✓ ViewALERT™ / Collector application for simple in field data collection
✓ ALERT RTA™ - Real-time Analyzer application for advanced troubleshooting
✓ ALERT™ Multi-plane Balance application for multi-plane, multi-speed balance

CHOOSE THE PERFECT HARDWARE DESIGN SUITED FOR YOU

TRIO CA6 / CX7
TRIO CA10 / CX10
TRIO HA10 / HX10
BRAUN, BRAINS AND BEAUTY

TOTAL TRIO

TOTAL TRIO IS COMPLETE PACKAGE INCLUSION

Total TRIO ensures your equipment is operational, hardware and software is up-to-date, and technical and analytical support is there if needed.

With Total TRIO, the TRIO Controller is renewed every 3 years which keeps the technology always fresh.

Analysts have access to Azima’s domain experts to get second opinions on tough recommendations.

Support will give you head-of-line for repairs and provide loaners if repair will take longer than 2 weeks.

TRIO EMBRACED THE INDUSTRIAL INTERNET OF THINGS

Total TRIO includes the WATCHMAN Data Center for database management and security. No IT capital expenses are required.

An included use license of ExpertALERT-Cloud is provided to work through Azima’s cloud application.

Key decision makers and program contributors can all gain insights into your PdM program through the included WATCHMAN Reliability Portal.

WATCHMAN DATA CENTER IN THE CLOUD

PORTAL | WEB TOOLS | ANALYTICS

EXPERT ASSISTANCE

BIG DATA ANALYTICS

PLANT OWNERS, OPERATORS, MANAGERS, CUSTOMERS

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**TRIO® Machine Data Acquisition**

**Powerful User Interface**

The TRIO® line of data acquisition products includes the powerful, Windows® industrial tablet computers. TRIO uses a robust Bluetooth® connection and includes a solid-state hard drive, bright sunlight readable touch screen and Wi-Fi access allowing TRIO to communicate with your desktop or networked PCs and servers. TRIO’s user interface provides you more capabilities, better ease of use, and allows you to bring your other Windows PDM and Office productivity applications into the field.

**Improved Ergonomics and Safety**

There is no safer vibration data collector on the market. TRIO’s ergonomic design allows more efficient and safe use of the data collector around dangerous and difficult to access machinery. Machines can be tested from safe and secure distances from rotating machine locations using the integral Bluetooth® communication. Its modular design helps keep technicians hands-free and untethered from the machine for improved safety.

**Collection Automation**

TRIO automatically queues multiple frequency ranges of FFT, time, overall and demodulated vibration tests for a single machine location and collects X, Y, and Z axis data simultaneously with a single command. You will collect more quality data in less time with TRIO.

**Automated Diagnostics**

ALERT provides critical machinery health information in addition to vibration data, by rapidly screening vibration measurements and applying over 6000 unique rules to identify over 1200 individual faults in a wide variety of machine types.

**Variety of Configurations**

TRIO offers several ergonomic-designed, in-field carrying options, including the convenient utility belt, shoulder-worn soft case and the shoulder strap/belt configurations. Depending on your specific use model, you can wear it, carry it or sling it over your shoulder.

**TRIO® and WATCHMAN™ Reliability Services**

Our combination of TRIO and WATCHMAN Reliability Services offers a new level of efficiency and capability to the predictive maintenance market. WATCHMAN provides business class performance metrics for transparent visibility. Advanced dashboards ensure managers and executives are informed on maintenance decisions, risks to production and readiness of operations.

**Proof Comes from the Field Experts**

Azima’s WATCHMAN users prefer using the TRIO systems. They have found that route-based data collection is easier and more productive. Also, whether your predictive maintenance program is implemented in-house, outsourced or hybrid in-between, TRIO can be integrated with online and other service platforms for flexibility and sustainability.

**TRIO Data Acquisition / Processor (DP-2, DP-2H)**

**Inputs**

- 4 simultaneous sampled, full-phase matched, I/P configurable
- Other Coupling: AC for proximity probe connection
- AC Input Voltage Range: 110V
- AC Bandwidth: 0.5Hz to 40kHz
- DC Bias/Gain Measurement: -25V for DC current/voltage and proximity probe gap measurement
- Measurement Acceleration: quickly (by field integration), bearing damage, 10x/meter acceleration (proportional)
- Gain Range: Gain steps: 1, 2, 4, 10, 20, 50
- Digital trigger input: External trigger (function speed: ordered data by phase-lock loop)

**Overview**

- Total vibration data collector system
- Industrial Windows Tablet PC Controllers
- Wireless Bluetooth® IP-ES ряд Data Processing Unit (TRIO DP)
- Optional HARDCORE rated North American Class 1, Division 2
- Portable-enabled connectivity to the handheld WATCHMAN Data Center
- Handheld laser tachometer for speed and phase measurement optional
- Flexible carrying options including utility belt, shoulder straps, counter bags, hard transit case
- SyncSlice I/O database onboard: full PID database to be mobile on unit
- Database synchronization for collaboration with multiple TRIOs or analysis
- Ergonomic designs allow more efficient and safer use
- 4 plane balancing and advanced real-time analysis software options
- HA- or CA-Series includes embedded ExpertALERT onboard analysis software (no host software required)
- HA- or CA-Series includes embedded ViewEXPERT Onboard software (Requires host system: ExpertALERT client, embedded, cloud subscription) or Standard(ExpertALERT)

**ALERT® Capabilities**

- Interactive graphical user interface that is simple to learn and operate
- Setup wizards reduce set up time and increase configuration accuracy
- Enhanced management and visualization of dynamic data
- Automated vibration data screening using narrow-band vibration techniques for early fault detection
- Automated bearing fault identification without requiring bearing inner and outer ring numbers
- Multi-level severity and prioritized repair recommendations improves repair planning
- Advanced reporting tools produce professional reports
- Included 75,000 bearing asset library and 15,000 motor asset library
- Better machine performance determination through ALERT’s calculated points failure
- Integration of multiple PdM technologies, reports, documents, spreadsheets, inspections, and data
- Online monitoring, real-time vibration collection and operating log collection in one system
- Close loop reporting with ALERT’s Event Tracker

**TRIO® and WATCHMAN™ Reliability Services**

- Automatic fault triggering
- Impact Derived Spectra and Waveform
- Overall Vibration
- Spectrum
- Waveform
- Automated Peak Locator
- Harmonics
- Order Normalization
- Sift bands
- Average Baseline Comparison
- Synchronized Average
- Average plus sigma
- Bode Plot
- Fast Tool
- Equipment ID
- Equipment DIF
- Customized Real-time Setup
- Graphical Remote Control Window
- Horizons & Hotspots
- Integration & Differentiation
- Long-time Data Capture
- Markers
- Reference Cursor Delta
- Harmonics
- Sift bands
- Fault Frequencies
- Amplitude Alarm
- Frequency Alarm
- Order Tracking

**Graphical Capabilities**

- Amplitude Alarm triggering
- Impact Derived Spectra and Waveform
- Overall Vibration
- Spectrum
- Waveform
- Automated Peak Locator
- Harmonics
- Order Normalization
- Sift bands
- Average Baseline Comparison
- Synchronized Average
- Average plus sigma
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- Amplitude Alarm
- Frequency Alarm
- Order Tracking

**Analysis Capabilities**

- Dynamic Analysis: Overview, Spectra, Waveform, and Phase Speed
- Cross-channel: Cross-power, Function, Coherence, Phase and Magnitude
- Demodulation Function: Digital amplitude-demodulator and Impact Demodulation for low speed detection
- Averaging: RMS, Exponentail, Peak Hold, Order Tracking, Synchronous Time, and Negative Averaging
- Number of averages: 1 – 200
- FFT Window Function: Hanning, Hamming, Rectangular, Flat Top filters
- Micro-volts per root Hz from 0.5 to 100kHz

**Technical Specifications**

- 1200 individual faults in a wide variety of machine types
- FFT, time, overall and demodulated vibration tests for a single machine location and collects X, Y and Z axis data simultaneously with a single command. You will collect more quality data in less time with TRIO.

**Power**

- Charging rate: 0.5A from USB PC input (4 hrs), 1.0A from USB wall power adapter (2 hrs)
- Battery life: 8 hours, continued use

**Physical**

- Dimensions: 6.8” x 3.25” x 1.18”
- Weight: 1.0 lb (0.45 kg)
- Power: AC-DC, 12V, 50 Hz
- Humidity: MIL-STD-810G
- Dust: MIL-STD-810G
- haze: MIL-STD-810G
- Rain: MIL-STD-810G
- Shocking: 85-707, polyurethane and nylon
- Compliance: CE, EN 55022
- CE, EN 55022
- Nominal, Integrate, Double-Integrated
- Integrated
- Time Synchronized Averaging
- Waveform
- Automation
- Single Axis
- Triaxial
- Double-Triaxial
- Grid, Fibergrid Grid
- Process Map
- Single Circle Graph
- Triaxial Circle Graph
- Waterfall with Confusion Filter
- Native, Integrated, Double-Integrated
- Bump Test Equipment (running or non-operational)
- Hard Transit Case
- Utility Belt, Shoulder Strap/Belt Tote, Shoulder Strap Carrier Case
- Power
- 4 simultaneous sampled, full-phase matched, I/P configurable
- Other Coupling: AC for proximity probe connection
- AC Input Voltage Range: 110V
- AC Bandwidth: 0.5Hz to 40kHz
- DC Bias/Gain Measurement: -25V for DC current/voltage and proximity probe gap measurement
- Measurement Acceleration: quickly (by field integration), bearing damage, 10x/meter acceleration (proportional)
- Gain Range: Gain steps: 1, 2, 4, 10, 20, 50
- Digital trigger input: External trigger (function speed: ordered data by phase-lock loop)
- **AC MEASUREMENTS**
  - ADC: 64x4 signed sinograms, simultaneous on four AC channel inputs, better than 104 dB dynamic range
  - Sampling Rates: 64kHz to 102.4kHz
  - Bandwidth Ranges: 0.5Hz to 20kHz, protected by anti-alias filters
  - Data Block Length: 64 to 400,000 samples
  - Spectral Lines: Up to 25,600
  - Noise Floor: Less than 0.2
  - PPT Window Function: Hanning, Hamming, Triangular, Flat Top
  - Cross Channel: Cross-power, Function, Coherence, Phase and Magnitude

**Communications with TRIO Tablet Controller**

- Wireless: Bluetooth 2.0 with EDR (5.1Mbps max)
- Wired: USB user port (includes data stream and remote power to DP)

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**HOW COULD TRIO® BE SO MUCH BETTER, YOU ASK?**

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Azima, Inc.
300 TradeCenter, Suite 4610
Woburn, MA 01801 USA
toll free 800-482-2290
P 781-938-0707
azimaglobal.com