WAITES WIRELESS
SENSOR TECHNOLOGY

# OVERVIEW

The Waites Wireless system allows for the wireless condition monitoring of plant equipment. The system is comprised of sensors, battery-powered wireless nodes, line powered (mesh-networked) wireless routers, and a communication hub that manages the system. Taking 10,000"s of data samples per day (customizable) allows the user to quickly identify unique terends for each point being monitored. Potential deviations from these historical trends are easily alarmed, and identified automatically as they occur.

The Waites Wireless system empowers Operations and Maintenance personnel to invest prognostication efforts on self-identified "sick" equipment, instead of taking route based data samples on healthy equipment. It also provides Management with accurate, documented, timely data on which to make equipment run decisions.

Developed over 5 years in various real plant environments, Waites Wireless Sensor Technology was uniquely designed for the scaled (1,000+ sensor) environment. Due to the significant IT expense to maintain historical data for each sensor, combined with the inefficiency of a location-based equipment monitoring system, Waites Wireless automatically encrypts, processes, and presents data to the user via a simple, yet robust, web interface. With the neccessary approved security protocols, individuals can access sensor data from any internet-connected computer or device. Users are able to view data trends and set alarms as needed. When newly arrived data triggers the previously set alarms, users can be notified via email or text message.

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## OPERATIONAL FEATURES

- Highly secure, web based hardware and software platform for wirelessly monitoring machine vibration and temperature.
- 18 channels available per node; 6 Dual axis (12 total) vibration data collection and 4 RTD temperature.
- Spectrum and waveform displays
- 120,000 CPM (2 KHz) Maximum frequency range
- Standard 800 lines of resolution from 2048 waveform data points, however, easily customizable by user
- Line powered or battery power with 2+ year expected battery life
- Data acquisition interval customizable from every 60 seconds to 24 hours for 12 signal node (4 temp and 8 vibration sensors)
- 2.4 Ghz, 802.15.4 communications Protocol
- Communication distance: Sensor node to repeater up to 1,500 ft, line of sight
- Communication distacne: Sensor to node up to 40'
- Communications to highly secure web based server via cell phone network or hard-wired LAN connection.

## TECHNICAL SPECIFICATIONS

| | |
|---|---|
| • Sample Rate | 5kHz |
| • Maximum FFT Frequency | 2kHz |
| • Frequency Response | (3dB)- 2Hz-2kHz |
| • Dynamic Range | 18g (peak) |
| • Resonant Frequency | 10kHz |
| • Temperature Sensor Range | -67F to +257F |
| • Sensor Enclosure Material | 316 Stainless |
| • Waveform Data Points | 2048 |
| • Waveform Lines of Resolution | 1600 Spectral Lines |
| • Sensor Max Temperature Range | -67F to +257F |
| • Wireless Node Temperature Range | -20F to +185F |

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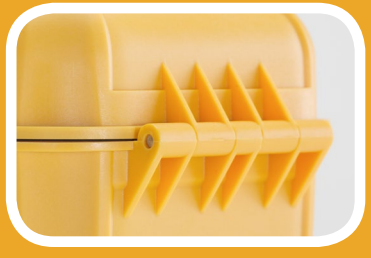
# NODE



ACTIVATION LIGHT


INFORMATION GATHERING PRONGS

INDUSTRIAL LOCK



INDUSTRIAL HINGE

STABILIZING BRACKET


2 YEAR BATTERY LIFE

WAITES WIRELESS
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**QUOTE #:**
**DATE:**
**CUSTOMER:**
**SALESMAN:**

| ITEM | QTY | P/N | DESCRIPTION | PRICE | EXT |
|---|---|---|---|---|---|
| 1 | | CH572 | Communication Hub System Controller | | |
| 2 | | LPNR 812-C | 900 MHz Line Powered Network Router w/ Power Cord and Plug | | |
| 3 | | B718 C-TB | 18 Channel Battery Powered Sensor Node | | |
| | | LIBAT 3.6 | 3.6 Volt Lithium SOCL2 Battery Pack (2 Batteries) | | |
| | | | | | |
| | | | | | |
| 4 | | RTW 18G-HT | Nanocrystal 18g Duel Axis Accelerometer w/ Integrated Temperature Nickel Coated RTD | | |
| 5 | | LLW 765 | Integrated 7' Sensor Cable w/IP65 Rated Connector | | |
| 6 | | | | | |
| 7 | | A417 SA | WWST Sensor Adhesive (enough for 6 sensors) | | |
| 8 | | SC0 100A | Monthly Software Contract and Data Storage with Web Subscription for "standard" (1 Time per hr. RMS, 1 Time per 24 hr time wave form adn FFT) data intervals for up to 100 sensors with 2 accelerometers and 1 temperature RTD | | |
| | | | | | |