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Loose Parts Monitoring System (LPMS-VI)

Challenge

As energy suppliers invest substantially in major components to enhance the long-term performance of their utilities, Framatome provides an innovative and cost-effective solution to help protect major component assets.

Solution

Framatome's Loose Parts Monitoring System (LPMS-VI) combines a highly successful track record of field-proven technical performance and reliability with the industry's most responsive service teams to help keep your plant components operating safely and efficiently. LPMS-VI can give you peace of mind to quickly identify loose parts issues that can interfere with the output of your plant.

LPMS-VI features an on-demand digital recorder and analysis capability with an analog front end. This means you always have a working loose parts monitoring system – even if your computer fails. Plus, it enables you to upgrade the digital features without the hassle of redesign. If you run into issues, Framatome also provides 24/7 support and services.

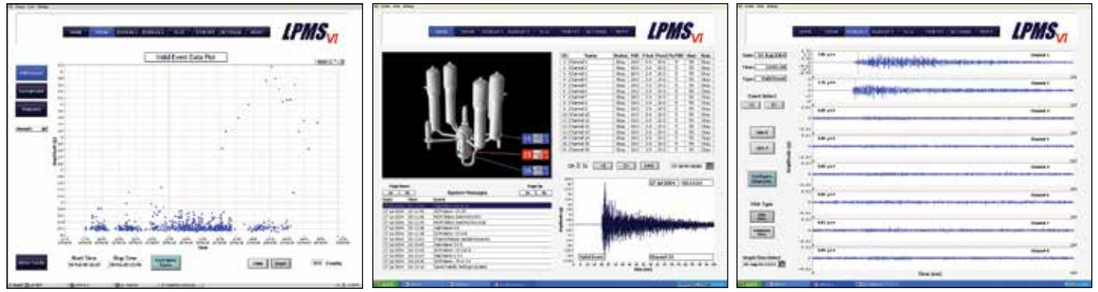
Signal Conditioning Precludes False Alarms

Sensor signals are input to the analog signal module, which also provides power to the remote charge converter. The input signal to the computer is separated into two signals: one signal is band-pass filtered and is used for analysis, and the second is a wide-band signal. Moreover, two alarm circuits preclude false alarms, preventing unnecessary operator distractions. Plus, the wide-band signal evaluates the sensor's condition to protect against a faulty or failed accelerometer or remote charge converter.

Customer benefits

- Protects your components to help keep your plant online and ensures the timely delivery of power to the grid.
- Framatome has a highly successful track record of field-proven technical performance and reliability.
- Framatome has one of the world's largest installed bases of loose parts monitoring systems.
- Long-term support is tailored to the specific needs of your plant.
- Our enhanced capabilities improve data analysis and decision-making.

Your performance
is **our** everyday **commitment**



Data Acquisition Captures the First Event

LPMS-VI uses high-speed data acquisition cards for loose parts monitoring. The data acquisition card acts as a transient recorder. This method of data acquisition captures the first event and eliminates the need for a first-event recorder. As subsequent alarms occur, they are analyzed and stored on hard disk. In the normal scan mode, a time window of 101 milliseconds is continuously monitored. In addition, the data card provides a pre-trigger to save information prior to an impact, and data acquisition proceeds independently of tasks being performed by the computer.

Alarm Handling Identifies the Exact Channel

Each signal is examined to see if a loose part signature is present. The computer takes the time signal and runs a series of tests to determine if the event could be a loose part, then calculates the time delay between channels and identifies the first channel to alarm. Valid and false alarm data are stored in separate files on the hard disk.

Data Analysis Enables Ease of Operation

The operator can conveniently examine previously recorded data at any time using simple PC function buttons. Time plots showing data prior to the event taking place are displayed for all channels. A NSSS diagram can be displayed showing the approximate locations of the sensors and the location of the first-to-alarm sensor with the zero time delay. This sensor is generally the sensor located closest to the actual impact point. A time domain and frequency domain plot can be displayed for each sensor.

Trend Plots Show Event History

Each time a valid alarm occurs, the system records the date, time and peak amplitude for all channels. This data can be displayed as a time plot showing the history of the event. A background noise plot is also available with user-selectable bands.

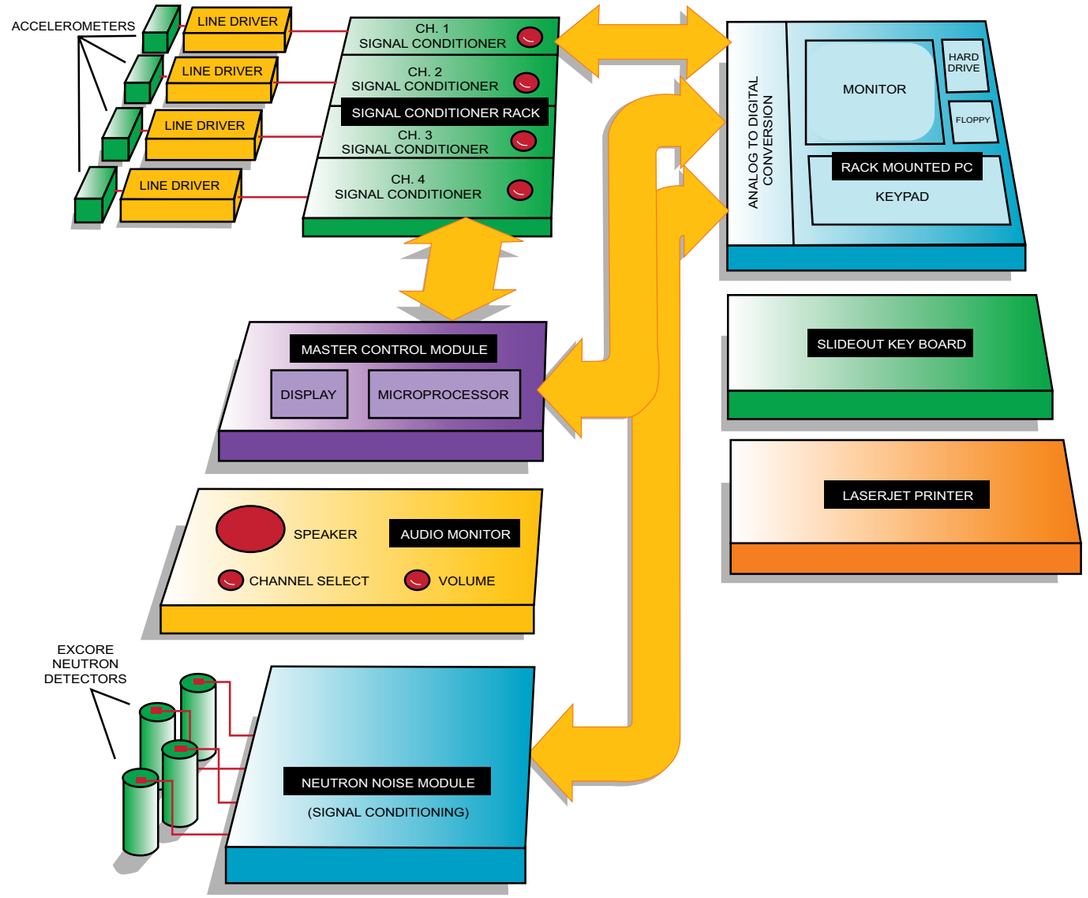
No Loose Ends

Framatome developed the PC-based LPMS-VI to provide utilities with a cost-effective option for the upgrade or replacement of older monitoring equipment. LPMS-VI offers noise analysis capabilities, which now allow plant personnel to perform sophisticated diagnostics usually relegated to consultants. Data are presented in a user-friendly manner to the operator to help when making key decisions to minimize plant damage and subsequent repair expenses. The system includes an industrial grade PC and Framatome-designed signal conditioning modules. The signal conditioning modules and mounting rack are compatible with existing accelerometric sensors, permitting wiring and sensors from older systems to be left in place, simplifying retrofit. With the resources of a worldwide team, we stand behind LPMS-VI with more than 20 years of experience in loose parts monitoring systems. We are committed to provide long-term support tailored to the specific needs of your plant — leaving you with no loose ends.

Additional Options and Services:

Ask your Framatome representative about the following options and services to further enhance your LPMS-VI:

- Calibrated impact hammer kit
- Initial setup and calibration
- Training
- Advice and consultation
- Spare parts

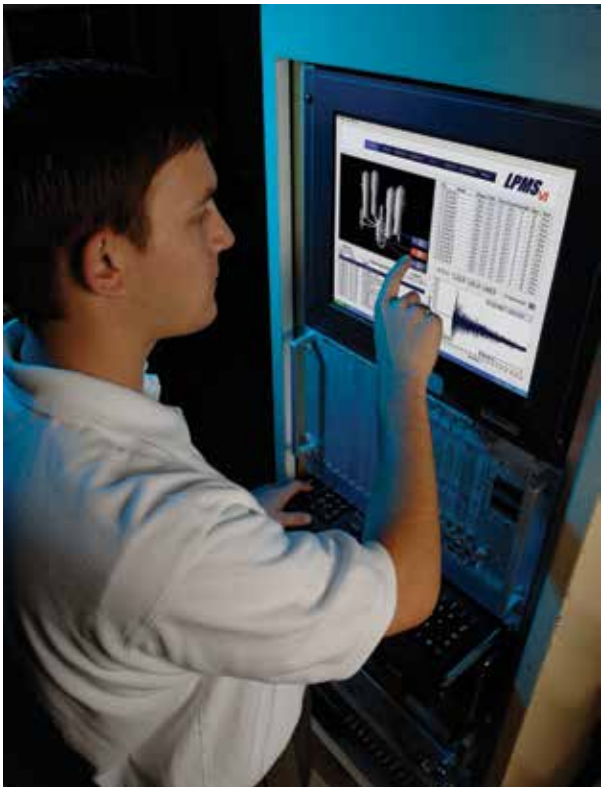


LPMS-VI comes fully equipped

1. Computer (PC)
2. Slide-out keyboard
3. Signal-conditioning rack
4. Audio monitor
5. Neutron noise module
6. Power supply

Features

- Reg. Guide 1.133 compliance
- Modular architecture
- Neutron noise – Core Barrel Vibration Monitoring (CBVM)
- Sensitivity and false alarm minimization
- Fixed and floating alarm thresholds
- Rod motion inhibit
- Selective band-pass filtering
- Time-delay discrimination logic
- Rejection of infrequent alarms
- Plant shutdown alarm inhibit
- Waveform discrimination
- System health checks
- Continuous monitoring of bias voltage to the line driver
- Test inputs for the alarm functions



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