

EMPATH™ 2000

Electric Motor Performance Analysis & Trending Hardware

Electric motors and mechanical systems are subject to deterioration and damage that can suspend operations, leading to expensive repair and downtime.

Framatome ANP now offers the **Electric Motor Performance Analysis & Trending Hardware (EMPATH™ 2000)** system to conveniently measure and analyze electric motor current and voltage to obtain information on critical processes and equipment. EMPATH helps owners detect potential motor problems early, enabling timely repairs and avoiding serious damage.

The key to EMPATH 2000's successful track record is its utilization of Motor Current Signature Analysis (MCSA) technology.

The theory of MCSA

When an electric motor drives a mechanical system, it experiences variations in load caused by gears, pulleys, friction, bearings, and other conditions that may change over the life of the motor. The variations in load caused by each of these factors in turn causes a variation in the current supplied to the motor. These variations modulate the carrier frequency (normally 60Hz) and appear as sidebands in the spectral plot.

EMPATH 2000 utilizes a unique process to demodulate the signal from the carrier and present an unambiguous spectral display. Using normal and demodulated data permits analysis of not only the motor but also the driven equipment and the supplied power.

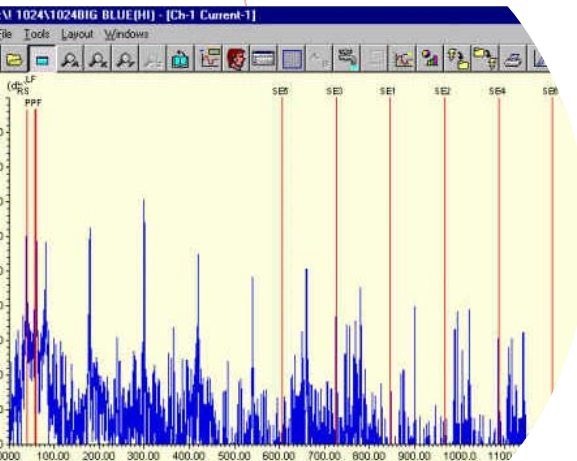
The EMPATH 2000 System

The EMPATH system consists of a laptop computer with our exclusive signal conditioning board, a 16-channel, 16-bit A/D card, and analysis software to store data and give a readout of the time and frequency signatures. The signal conditioning hardware contains isolating circuits for the voltage inputs.

The signal conditioning board collects data on all three phases of voltage and current, and provides MCSA-filtered signals. Also, two general-purpose voltage channels give the customer the option of collecting other data simultaneously with MCSA data.



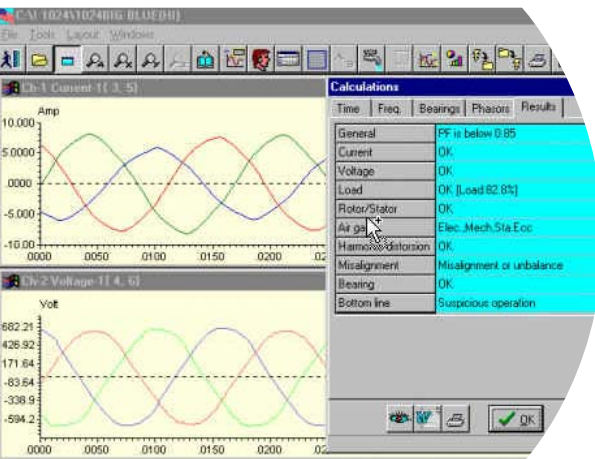
Portable Motor Current Signature Analysis system provides early rotor failure detection.



EMPATH 2000 automatically finds numerous motor parameters including static eccentricity which is indicated by the cursors labeled SE1, SE2, etc.



FRAMATOME ANP



In the HI data, EMPATH 2000 provides three phases of current and voltage and their associated spectra. An automatic on screen assessment of the motors health is also available for view immediately after the data is acquired.

EMPATH indicates:

- Rotor bar deterioration
- Rotor eccentricity
- Stator phase imbalance
- Motor speed and slip
- Gear and belt imperfections
- Average running current, an indicator of motor torque
- Stroke time on assemblies with defined start and stop points
- Changing friction forces
- Torsional vibration and dynamic loading
- Bearing Degradation

The EMPATH software provides spectral analysis of all inputs using a Fast Fourier Transform, and the system provides flexibility by allowing data to be collected periodically using a portable PC, or continuously with a permanent installation.

Inputs

- Three Phases of Current (A,B,C)
- Three Phases of Voltage (A,B,C)
- Two Auxiliary Inputs

Outputs

- Three Conditioned Currents (A,B,C)
- Three Conditioned Voltages (A,B,C)
- Phase A RMS Current Level
- Phase A RMS Demodulated MCSA Signal
- Two Isolated Auxiliary Signals

Sample Data

- 16 Channel, 16 bit Analog to Digital Converter
- Sample Rates Up To 100,000 samples per second

Software

- Automatically marks traces
- Automatically Adjusts gain and filter parameters on the EMPATH card
- Adjusts sampling frequency and length of input sample
- Displays time and frequency data with cursors to read actual values
- Retrieves past data and compares with present data via plot overlays
- Prints out each of the displays to a hard copy device

B E N E F I T S

- EMPATH provides unique algorithms that can reliably detect the early stages of rotor bar failures in induction motors.
- EMPATH saves time and precludes plant walk-downs by monitoring plant motors and driven machinery from a central motor control center
- Auxiliary channels allow acquisition and analysis of data from a variety of other sources such as accelerometers, proximity probes, or process measurements. This information, properly analyzed, can greatly enhance a predictive maintenance program.
- The EMPATH 2000 System permits data acquisition and analysis of not only AC induction motors but also DC motors, synchronous motors, generators and transformers. Efficient energy utilization is also indicated by the EMPATH 2000 analysis routines.



For more information contact:

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