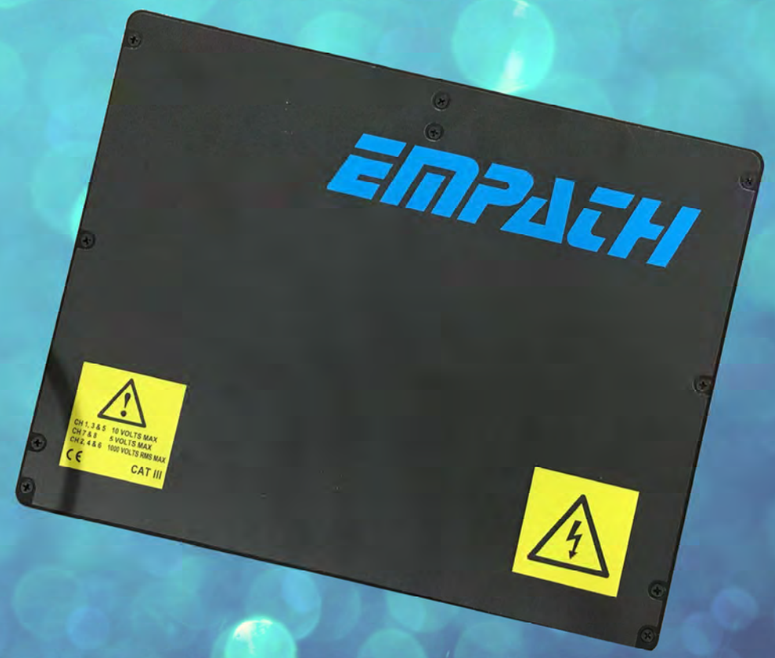

Manage your motor system from the inside out.
EMPATH
The EMPATH ™ line will help you
Go Past Proactive into
Innovative Maintenance practices.
Take control of your complete motor and generator system with the EMPATH line of products, designed to monitor and test AC induction, wound rotor, synchronous, variable frequency drive, and DC motors and generators.
MotorDoc® LLC
Doing what everyone else just talks about
www.motordoc.com • 800 919-0156 ext. 102

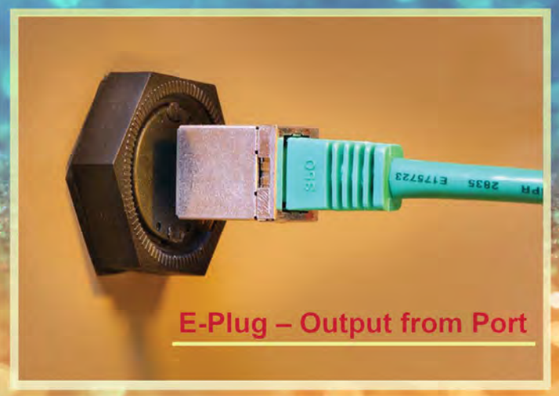
Applications:

- Troubleshooting of complete motor systems from incoming power to driven equipment;
- Condition-Based and Predictive Maintenance testing and trending for electrical and mechanical systems;
- Evaluation of energy use and efficiency including before and after maintenance activities;
- Baseline information before modifications;
- Quality Assurance of new and repaired electric motors and generators.



Equipment that can be analyzed includes:

- AC induction motors of all sizes and voltages
- AC synchronous motors of all sizes and voltages
- AC wound rotor motors of all sizes and voltages
- Machine tool motors
- Variable Frequency Drive motors of all sizes and voltages
- Hybrid Vehicle motor-generators
- AC Generators of all types
- Wind Generators and powertrain
- DC Motors and Generators
- AC and DC elevator motors
- AC and DC traction motors
- Transformers
- Gearboxes
- Fans
- Pumps
- Compressors
- Other electrically driven equipment.


E-Plug – Output from Port

Capabilities:

- Auto fault detection upon download completion
- Default custom plots
- English/Metric unit selection
- FFT block size to 65536
- Averages 2-10
- Custom power quality variations
- Ignore list of detectable faults
- Custom colors
- Trending database and export
- Multiple spectra can be directly compared on-screen
- Download length selectable
- Download trigger based on current level
- Continuous monitoring with data collection from a minimum of 15 minute increments
- Rotor bar and stator slot database for 8400+ motors
- Bearing database of over 40,000 bearings selectable by manufacturer and size

EMPATH™ Electrical Signature Analyzers identify not only generic problems in a complete motor system, from incoming power to driven equipment, but also detect specific faults and severity. This can be performed through periodic testing with EMPATH, or through continuous monitoring with EMPATH CMS™ (ECMS), whether the motor and driven equipment are variable speed, variable load, or constant speed and load.

Both EMPATH and EMPATH CMS™ systems utilize the same software, which works with Windows 7.0 or later. The software comes with a database of motors, including rotor bars, stator slots, and a complete bearing database, in order to make setup and accurate data analysis simple. Even if that information is not present when faults are detected, EMPATH will automatically calculate rotor bars, stator slots, and bearings, with a high degree of confidence.

The EMPATH system's extremely powerful ability to track data by speed and load allows users to trend regardless of load, speed, and frequency.

The EMPATH data collector operates on USB power from a laptop using a standard USB printer cable. It utilizes standard BN test leads for voltage and BNC connections for current transformers and two additional channels. For continuous monitoring utilizing the EMPATH E-Plug, a Cat 5e cable is used. Users are not limited to components provided by MotorDoc® LLC for data collection. There are no annual software license fees and multiple users can utilize the same software for viewing and analysis. Data may be stored in any location, and data sets are as small as 333k for low resolution and 2.2MB for high resolution.

Type of data collected (both startup and running):

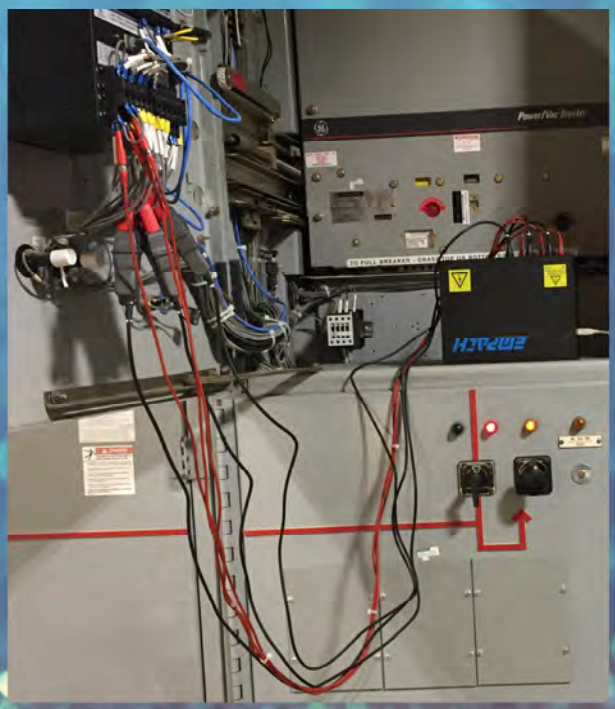
- RMS Voltage
- RMS Current
- Voltage Spectra (linear and dB)
- Current Spectra (linear and dB)
- Demodulated Voltage
- Demodulated Current
- High Frequency Voltage Waveform
- High Frequency Current Waveform
- Voltage Spectra
- Current Spectra
- Power (kW) Linear
- Power (kW) Spectra
- Torque Time Domain
- Torque Spectra
- Voltage Balance
- Current Balance
- Power Factor
- Harmonics (>50th)
- Impedance
- Losses due to electrical unbalance
- True Load

Seeing your electrical signature analysis data in real time allows you to measure system performace, identify waste stream, and make verifiable energy and reliability improvements to increase efficiency and productivity.

EMPATH

Fault	AC Machine	DC Machine
Power Factor	X	X
Harmonics	X	X
VFD or Soft Start	X	
Efficiency	X	X
Running Speed	X	X
Connections	X	X
Current Conditions	X	X
Voltage Conditions	X	X
Voltage to Ground	X	X
Rotor Bars	X	
Mechanical Unbalance	X	X
Bent Shaft	X	X
Wound Rotor Winding Shorts	X	
Rotor Slip Rings	X	
Slip Ring Brushes	X	
Slip Ring Brush Assembly	X	
Stator Coil Movement	X	
Stator Winding Shorts	X	
Missing Stator Wedges	X	
Static Eccentricity	X	X
Dynamic Eccentricity	X	
Machine Bearings	X	X
Sheave Defects	X	X
Belt too tight	X	X
Belt too loose	X	X
Cavitation and Turbulence	X	X
Misalignment	X	X
Gear Defects	X	X
Driven Equipment Bearings	X	X
Gearbox Bearings	X	X
Turbine Blades	X	
Loose Base	X	X
DC Drive Components		X
Armature Faults		X
Commutator Faults		X

Let's say, for instance, in the wind industry; I walk into the base of a wind turbine and we grab data from the base of the wind turbine. I can tell you what's going on in all of the moving components: the generator; the coupling; every component in the gear box, which has a high speed, mid speed, and planetary gear set; the main shaft; main bearings; and even blade pass frequencies, in about a minute-long test.
-- Dr. Howard Penrose



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