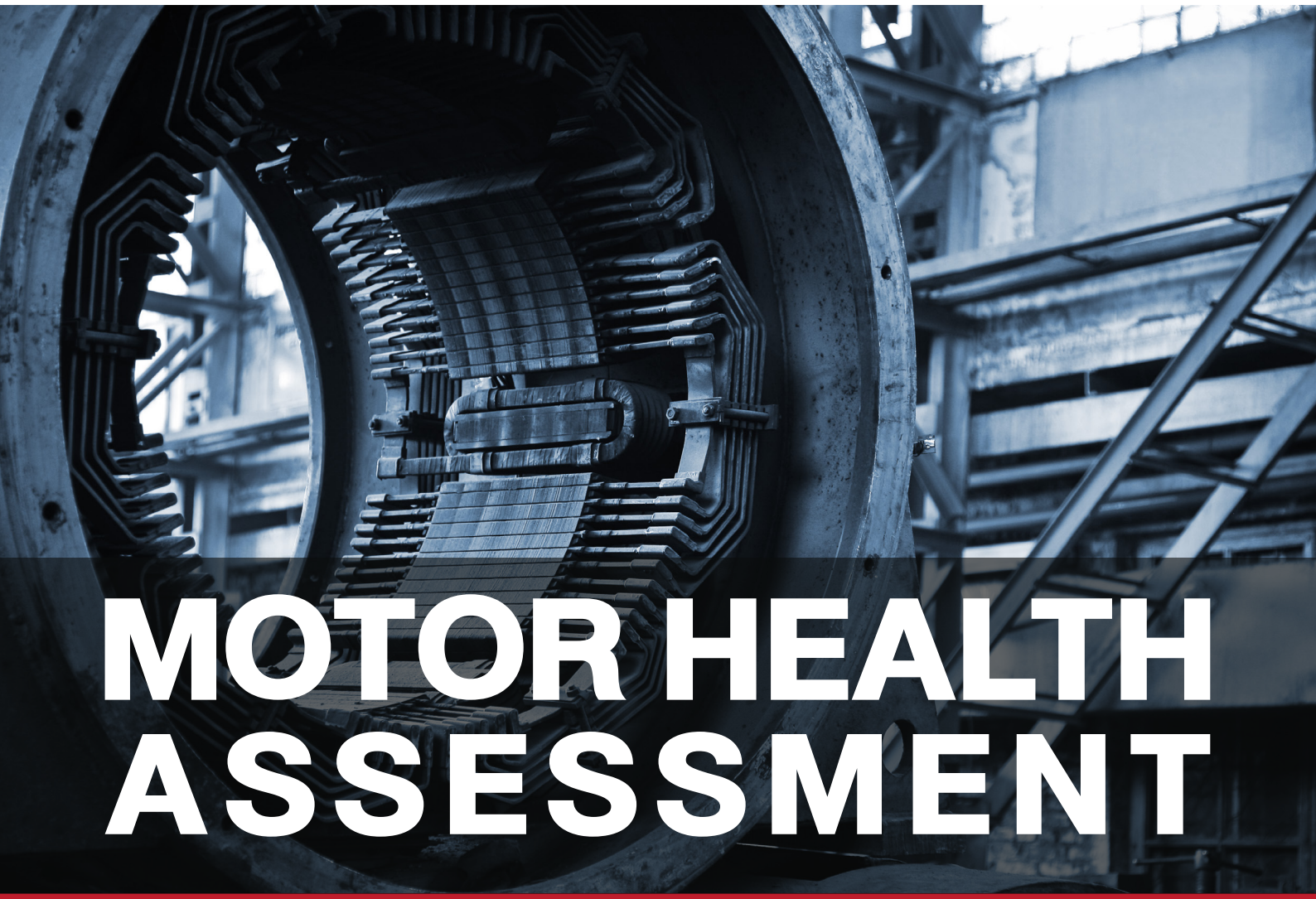
TECHPRO PLUS

Condition Monitoring and Diagnostics of Machine System



MOTOR HEALTH ASSESSMENT

Assist in ensuring that electric motors do not have inconsistencies or stop working abruptly.

Protect	Save	Diagnose	Improve and Modernism
Your plant breakdown from motor damage and failure.	Stop wasting time, manpower, and money because of motor damage.	Quickly diagnosing motor health issues to ensure electric motor reliability	Transform data's power into "Industry 4.0" to boost modern manufacturing's profitability and efficiency.

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Field Service Motor Testing

We offer complete online and offline tests for Motor and Generator combine the power of Motor Circuit Analysis (MCA) and Electrical Signature Analysis (ESA) to evaluate and trend your entire motor and generator system. The carries with it our promise of true predictive maintenance capabilities so that you can detect motor and generator health conditions before they cost you time and money.

Motor Circuit Analysis (MCA™)

DE-ENERGIZED TEST RESULTS	FAULT DETECTION
• Resistance • Inductance • Capacitance • Impedance • (Fi) Phase angle • (I/F) Current frequency respond • (DF) Dissipation factor • Test value static (TV)™ • Dynamic Stator and Rotor signature™ • Resistance to ground	• Turn faults • Coil faults • Phase faults • Ground faults • Cable faults • Connection resistance • Rotor eccentricity • Broken rotor bars • Casting voids • Stator loose

Electrical Signature Analysis (ESA)

is an energized test method where voltage and current waveforms are captured while the motor system is running, to assess the health of the motor system.

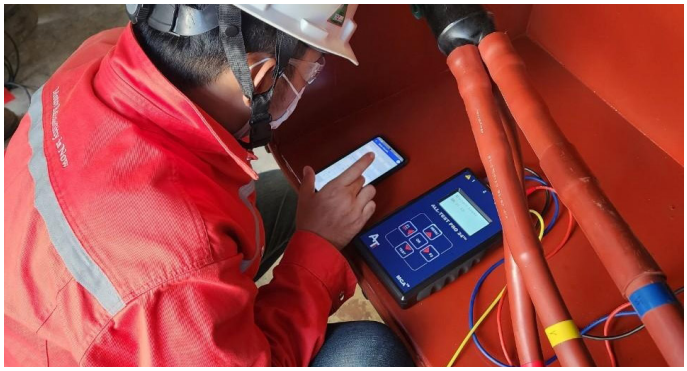
ENERGIZED TEST RESULTS	FAULT DETECTION
■ Power quality • Over/Under Current and Voltage • Voltage and current unbalance • Harmonic distortion • Power factor • In-Rush/Startup current profile y ■ Current signature FFT graphs	• Poor power quality • Broken rotor bars • Eccentricity air gap • Mechanical fault

Motor Testing Quality Control Program

Question?

Have you requested repairs for the good motors?
Have you received the defective motors after paying the repair costs?
Have you ever considered your own motor health?

- Quality control saves time
- Quality control saves money
- To assure the quality of repairs
- Testing increases confidence in the product
- Quality control prevents breakdowns
- Quality control increases safety level of the equipment
- Testing new motor inventory to verify condition before installing into service



Our typical inspection scope includes the description as following

ACTIVITY DESCRIPTION	INSPECTION CONTENT
Material Verification	• Visual and dimension inspection • Identification and marking • Review material & Welding certificate
Measurement	• Resistance • Inductance • Capacitance • Impedance • (Fi) Phase angle • (I/F) Current frequency respond • (DF) Dissipation factor • Test value static (TVS)™ • Dynamic Stator and Rotor signature™ • Resistance to ground
Performance Test	• No-load test • Temperature rise test • Vibration measurement • Noise
Pre-Shipment Inspection	• Visual inspection general condition

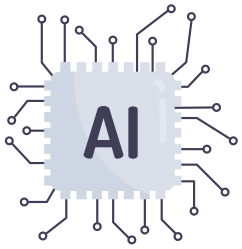
Meet the successful solution

Online continuous monitoring motor systems help eliminate unplanned downtime and provide data necessary to make and confirm production and maintenance modifications.

24/7
Continue asset monitoring

Detects motor component and system faults

Evaluate reliability, production, energy waste stream in real-time.



AI-DRIVEN ELECTRICAL SIGNATURE ANALYSIS (*ESA*)

ESA is based on the fact that subtle changes in a machine's operation affect the connected motor's magnetic field, which then affects the supply voltage and operating current Using a variety of analytical techniques

ESA provides a detailed picture of what's going on across the drive train from motor to transmission to load.

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Detect electrical and mechanical failures in each stage of the transmission path.

ELECTRIC MOTOR	POWER ANALYSIS	VFD	DRIVEN EQUIPMENT	PROCESS
• Bearing failure • Mechanical unbalance • Misalignment • Broken rotor bars • Static and Dynamic Eccentricity • Stator Mechanical Conditions • Inrush Conditions • Torque	• Efficiency and Circuit Impedance • Voltage Over, Under and Unbalance • Current Over, Under and Unbalance • Power and Power Factor • Voltage and Current Harmonic Distortion	• VFD component failures through power quality indicators and increases in spectral energy	• Direct Drive • Belted • Pump • Fan • Gearboxes	• Clogging • Cavitation • Process change

Analyzes current and voltage signals to detect electrical and mechanical faults. The real-time information provided about the condition of the motor system allowed for scheduling maintenance before breakdowns occur

Maximize return on investment

Improve machine performance and lifespan

Cut down on routine inspections and time-based maintenance