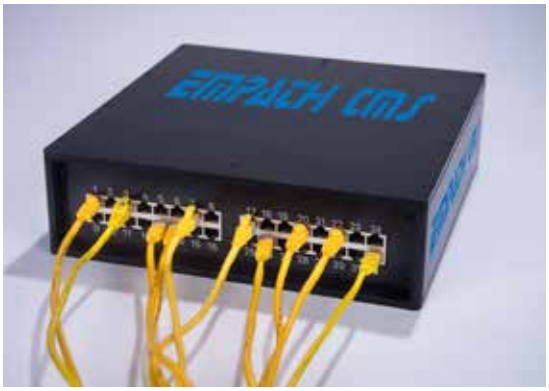
framatome

EMPATH Continuous Monitoring System (ECMS)

Enhance your motor reliability program while lowering testing costs



Challenge

Electric motors and mechanical systems are subject to deterioration and damage that can impact operations, leading to expensive repairs and downtime. Electrical Signature Analysis (ESA) methodology is an additional tool to be used in the plant's motor reliability maintenance program (RMP). The fully-automated, remotely-operated ECMS platform can improve motor testing efficiency and reduce the cost of current testing methods.

Solution

Framatome's proven product, EMPATH, enables users to detect potential motor problems early, enabling timely repairs while avoiding serious damage. The EMPATH Continuous Monitoring System (ECMS) is designed to automatically test multiple motors from a remote location.

EMPATH Continuous Monitoring System ECMS-32 & ECMS-E1

ECMS-32 hardware consists of a 32-channel multiplexer and signal conditioner. The inputs to ECMS-32 are provided by the E-Plug modules, which are permanently installed inside the Motor Control Centers (MCCs).

ECMS-E1 is single channel hardware, which includes a built-in E-Plug module. ECMS-E1 is designed to be permanently installed inside the MCCs.

ECMS systems automatically pulse motors at user-defined intervals, collect and analyze the data, and then store that data in various locations, including cloud servers. In cases where critical performance parameters are out of tolerance, ECMS will automatically flag those items and send notification via SMS, emails and on-screen indications.

The acceptances/tolerances can be set by the operator or automatically using statistics created by collected data.

Customer benefits

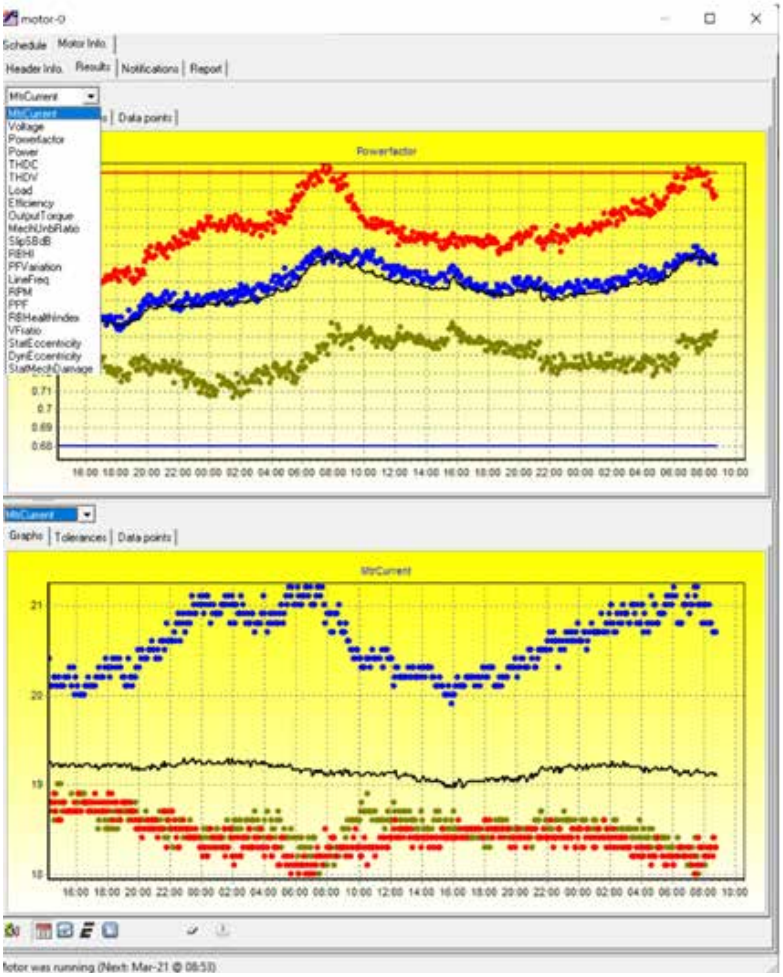
- Continuous monitoring of power quality, machine condition and efficiency, and driven equipment
- Detects stator defects including winding stresses, missing wedges, rotor defects such as broken rotor bars or wye rings, static and dynamic eccentricity, which identify driven equipment and alignment faults, bearing defects, coupling faults, fans/pumps/gearbox/belt issues
- Detects issues in AC/DC motors, AC/DC generators, machine tool and robot motors and steppers, VFD, transformers, hybrid vehicles, wind generation and powertrain, DC drives, and more
- Sends warnings and alarms via email, SMS, or other conditions and can be linked to SCADA, PI and similar systems for inclusion in complete solutions
- Automatically test multiple motors from a remote location
- Detects on and off-shore wind turbine control, transformer, generator, gearbox, main bearing and blade defects automatically

Technical design

- ECMS-32 — 32 channels (each channel consists of three phases of current and voltage)
- Up to 3,200 motors/generators/transformers monitored per server
- ECMS-E1 — Single channel (three phases of voltage and current)
- Sample rate: 12,000 samples/sec/channel
- TCP/IP data transmission
- Windows-XP, 7, 10 and 11 compatible
- MS-Access database compatible output
- Compatible with wireless VPN routers for WiFi and cellular systems
- Built-in motor and bearing database
- Outputs in text format for easy mapping to monitoring systems
- Fully compatible with Electric Motor Performance & Analysis Trending Hardware (EMPATH) software

ECMS lets user choose combination of parameters to monitor, such as:

- Current and voltage
- Power factor and power load
- Total Harmonic Distortion Current (THDC) and Total Harmonic Distortion Voltage (THDV)
- Efficiency
- Output torque
- Motor unbalance ratio
- Slip sideband amplitudes
- Power factor variation
- Line frequency
- Motor RPM
- Rotor bar health index
- VF ratio (for Variable Frequency Drives)



ECMS showing the collected motor current data (with the upper and lower limits)

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