



ENGING

MAKE SOLUTIONS

ONLINE PREDICTIVE MAINTENANCE

**EMS MCM
ELECTRICAL MOTORS CONDITION MONITORING**



How it works?

Enging's MCM system is a fully integrated solution to monitor the most valuable asset in an industrial installation: **Electrical Motors**.

The developed system is able to perform an early fault detection and the condition monitoring of these assets. It is a system based on innovative diagnosis methods to detect faults in all motor system: motor power supply, stator, rotor, air gap and in the load coupled.

The diagnostic is achieved by the acquiring and processing electrical variables such as voltages and currents, available in the electrical board that provides the motor supply, to provide a clear indication of the fault scenario and the identification of the faulty component. The electrical variables are acquired through a very sensitive and non-invasive sensors.








This approach makes the system very sensitive to internal and external motor's variations, allowing therefore to make an early detection of faults to provide alarms and recommendations to the operator in order to take an action and avoid an early expensive outage due a fault. Through a dedicated software, the operator can easily visualize all data in real-time, alarms, maintenance recommendations and the actual motor status. Moreover, it allows to have access to an historical trend analysis in order to easily correlate different information.

This system is independent of the motors voltages or current and it is applicable to all type of three-phase motors.









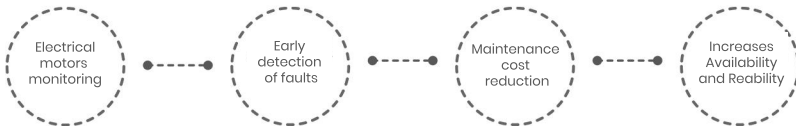
Benefits

Enging's electrical motors condition monitoring solution have several benefits, such as:

-  Monitor the availability and health of electrical motors
-  Real-time remote monitoring
-  Non-Invasive technology
-  Smart Algorithm with self-learning
-  Direct analysis of electrical variables in an electrical machine
-  Detect the potential intermittent faults
-  Detect manufacturing defects, improper installation and improper maintenance of new or

recently repaired motors

-  Identify faults at unload and load conditions
-  Detect, evaluate and track the fault evolution all time
-  Simple and intuitive platform for non-expert users
-  Maintenance costs reduction
-  Decrease of the probability of a catastrophic failure
-  Increase safety



This high-sensitivity diagnostic approach method is based on the latest innovative techniques with smart algorithms to monitor electrical assets' health. That allows fault diagnosis and asset condition monitoring and management.

Applications

Enging's motor condition monitoring solution can be applied to low and medium voltage three-phase motors (induction, synchronous or permanent magnet motors) and generators.



Electrical
Motors



Generators

Main faults detected

Supply:

Voltage unbalance

Power converters, variable speed drives and soft-starters problems

Stator:

Winding short-circuits/degradation

Magnetic core problems

Rotor:

Rotor broken bars

Magnetic core problems

Startup resistances unbalance

Slip-ring/contact problems

Eccentricity/Mechanical Problems

Eccentric rotor

Misalignment

Bended shafts

Cocked Bearings

Load:

High/abnormal oscillations

Problems in belt/pulley systems



Electrical power
supply



Power
Electronic
Converter



Electrical
Motor



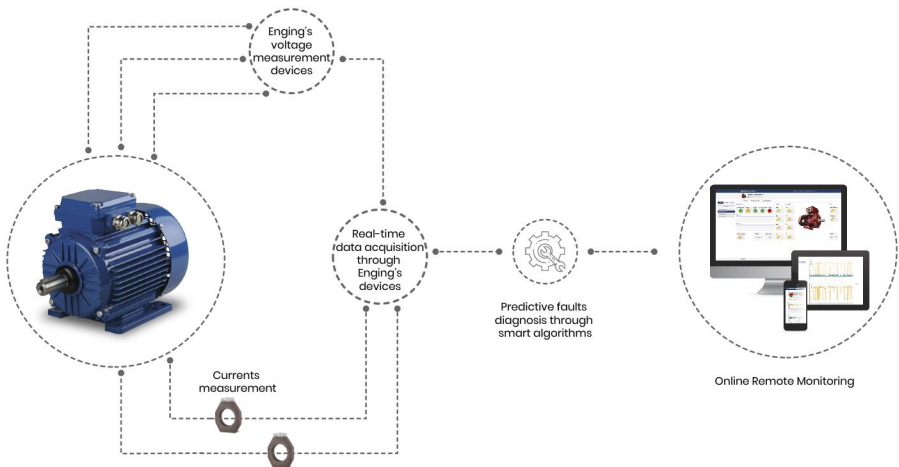
Load



Installation

Enging devices only need to get access to the electrical motor supply currents and voltages, easily available at the electric board where the motor supply is, through the installation of non-invasive sensors. These voltage and current signals are then acquired and sent to a server, where the data is processed and all motor's parameters are computed.

During an initial commissioning period, the platform is adjusted according the motor application and operating conditions. Specific fault indexes are calculated according to the several fault types in the electrical drive system, being therefore very easy to track the healthy state of the drive system.

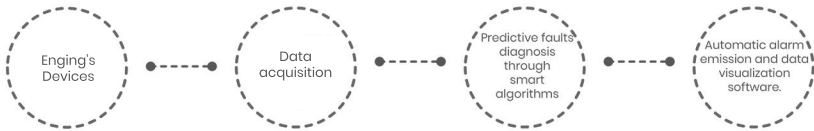


MCM Installation

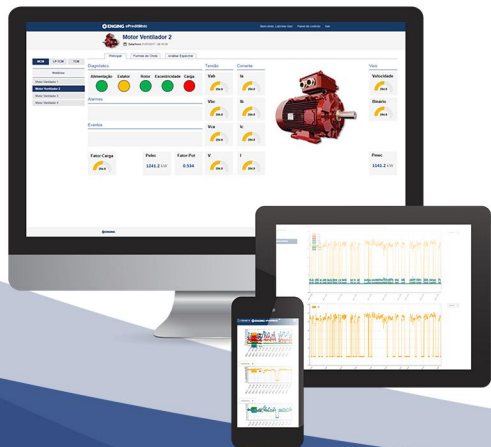
An highly innovative software for any computer system, capable to provide information about different variables related to the operation of electrical motors and power transformers, through an intelligent diagnosis based on the electrical analysis of voltage and current signals.

Benefits

1. Real-time data visualization
2. Historical data
3. Trend analysis
4. Automatic alarms emission due to incipient faults
5. Data load and download
6. Detailed information about the operational conditions of assets
7. Equipment configuration
8. Events and alarms visualization



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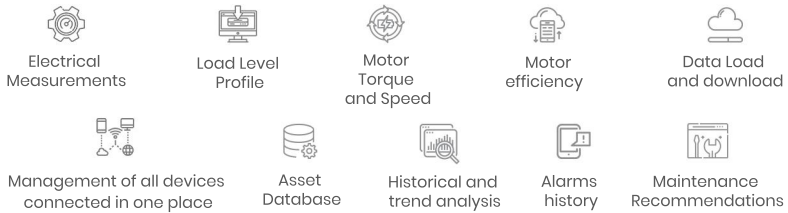




Additional Features

Enging's solution presents additional features, such as:

- Identifies the fault component
- Robustness to the grid disturbances
- Robustness to the grid and load unbalances
- Independent of the load level
- Independent of the motor power supply
- Could work as a standalone unit
- Independent of motor age or type
- Data visualization with a dedicated software:



Optional Features:

- Evaluation of the energy quality through parameters such as active, reactive powers, power factor, harmonic distortion, voltage and current imbalances;
- Data integration of others instruments (eg. vibration sensors, temperature probes, etc.)



ENGING

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"Enging is committed to making a difference to its customers by its quality, efficiency and professionalism, being a reliable partner for solving its problems through engineering solutions."

– CEO

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