Predictive manintenance and Energy Efficiency Solutions

e-MCM is a powerful online condition monitoring, predictive maintenance and power meter tool intended for critical AC rotating equipment. The patented machine learning algorithm of e-MCM enables comprehensive fault detection up to 6 months in advance. Thanks to around the clock monitoring and real-time model-based voltage and current analysis, e-MCM can detect electrical, mechanical as well as process faults of fixed, variable speed motors and generators. This allows the Artesis system to provide concise information by answering the following key questions:

What's wrong?

What do I have to do?

How soon do I have to do it?

Ease of Use

Automated fault diagnosis feature of e-MCM makes it very simple to use by the maintenance personnel. Rather than overwhelming the user with raw signals and data, e-MCM provides processed data results in an actionable form. The system requires minimal operator intervention for operation and provides clear indication of the nature and severity of developing faults.

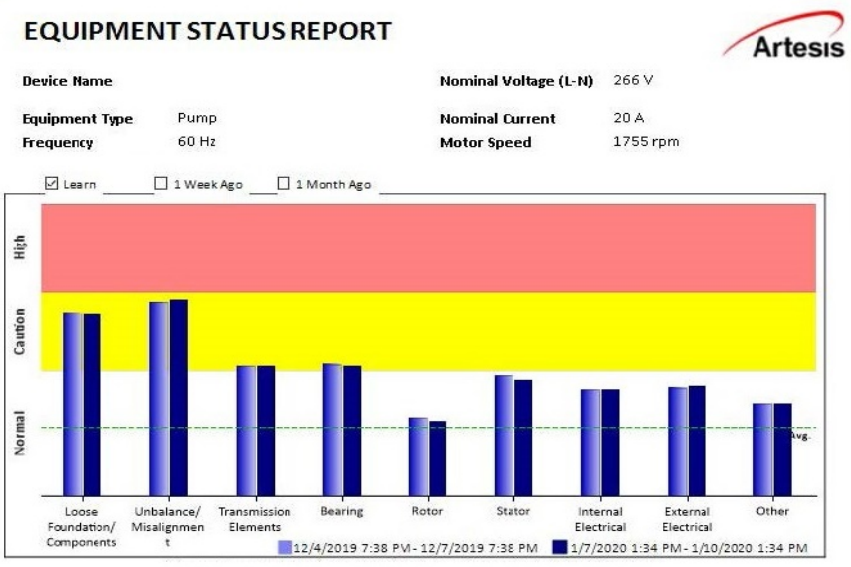
Real Time Monitoring

e-MCM constantly takes measurements and compares them with its reference condition, in order to assess the severity and type of any developing fault. It is able to recognize abnormalities in a wide range of operating states, and is even able to extend its self-learning process when it recognizes that it has moved beyond its original learning limits. This allows e-MCM to achieve very sensitive detection of faults without false alarms.

Simple Installation

e-MCM installation requires only three-phase voltage and current connection split-core current transformers (CT) and voltage transformers (VT) (if needed). It is mounted in to the motor control panel, eliminating the need to install sensors on the motor or driven equipment. When comissioned, e-MCM goes through an automatic learning process to create a digital twin of the motor. The learning covers all operation conditions of the motor by taking the speed, load, and power factor into account. The powerful e-MCM technology also ensures the detection of existing faults when learning is completed.

- IoT based condition monitoring
- Simplified predictive maintenance
- Machine learning technology
- On premise monitoring software
- Cloud monitoring software
- Multi language support
- Advanced trending tools
- Mail tool for diagnostic alerts
- OPC support
- Power spectral density analysis
- 6 channels waveform capture feature



Artesis

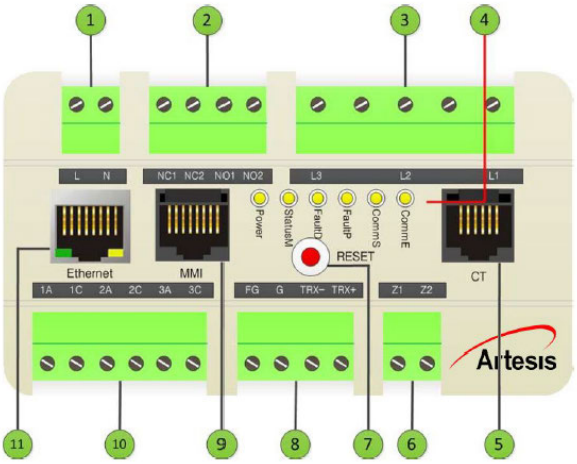
Motor fault diagnosis + Energy management
Predictive Diagnosis of Electrical and Mechanical Faults
(3-phase AC motor) Power meter function
Measuring parameters : V (L-N, L-L), A, Hz, PF, THD Unbalance, Power
Support Panel display monitor (4.3 "TFT LCD monitor)
RS485 serial communication and Ethernet communication support
EN 60255-26: 2013, EN61010-1: 2010, EN61326-1: 2006
Compact size (3.7 x 2.48 x 3.93 in)
DIN rail and wall mount available

Motor fault diagnosis

	Name	Description
Electrical diagnosis	Internal Electrical Fault	Internal electrical fault : rotor / stator, short circuit, insulation, winding looseness
	External Electrical Fault	External electrical fault: Check cable, MC, MCCB accessories and motor wiring
Mechanical diagnosis	Loose Foundation, Component	Loose motor foundation, loose motor components,looseness or excessive tolerances in driven components
	Unbalance, Misalignment	Misalignment, unbalance, bearing, coupling, and motor shaft
	Transmission Element, Driven Equipment	Transmission element(s) coupling, driven equipment, belt, pulley, gear box, and fan / pump impeller
	Bearing	Check bearing
	Rotor	Cracking of the rotor or loosening of the rotor / rotor bar
	Stator related problem	Stator, short circuit, winding looseness, insulation, partial discharge
Load diagnosis	Other Watch Line	Temporary changes in supply voltage cause this alarm. If alarm is persistent check for harmonic levels,capacitors, isolation of cables, motor connector or terminal slackness, loose contactors, etc.
	Watch Load	If the process load has not been altered deliberately, check for leakage, valve & vane adjustment, pressure gauge faults, manometer, dirty filters (fans, compressors). If the process is altered deliberately, device should be updated.

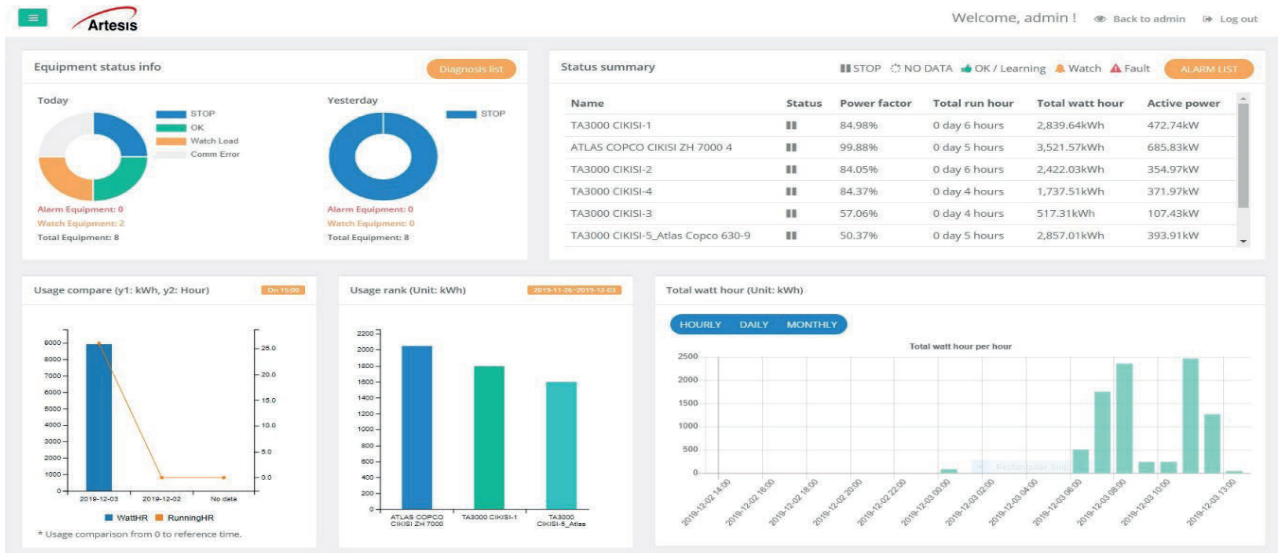
Power meter

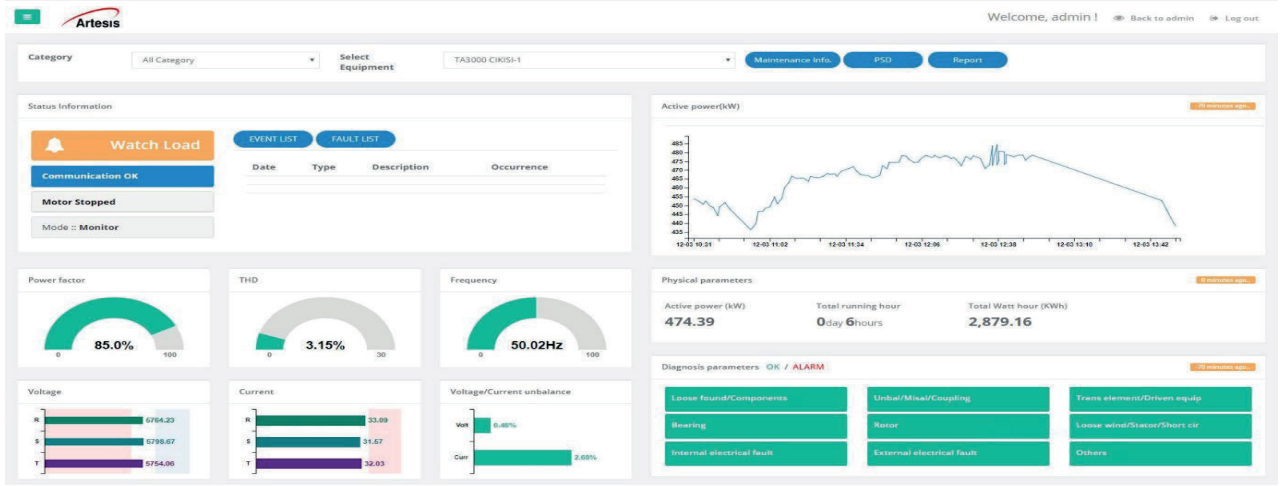
	Item	Description
Measurement	Voltage(V) Current (A) Power Factor Frequency (Hz) Power (W) Energy (Wh) Unbalance Leakage Current Sag/Swell THD Harmonic	690V Line-to-line voltage (L1-L2, L2-L3, L3-L1) L1. L2, L3 -99.9 to 100% (PF) 45 - 65 Hz Active/Reactive/Apparent Power Active/Reactive/Apparent Energy Voltage/Current unbalance Leakage current monitoring Min. 1/2 cycle Voltage/Current THD Up to 31 harmonics
Analysis	Equipment efficiency Anomaly notification Consumption pattern	Detailed monitoring Total consupmtion analysis Usage forecasting Predictive usage analysis Peak power analysis Cumulative usage analysis Comparative graph Performance report

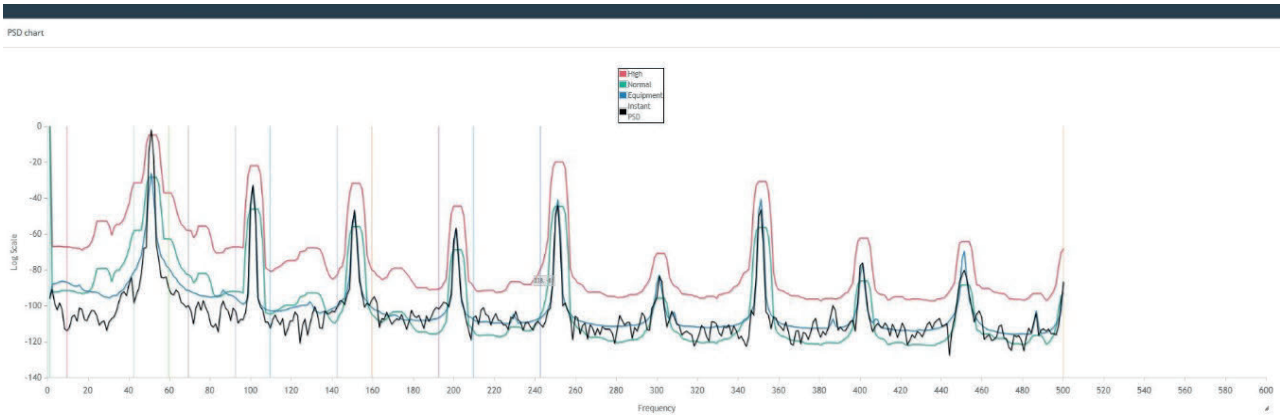


No	Name	Function
1	Supply voltage terminal	Terminal for operational power (AC100~240V)
2	Empty terminal	No Function
3	Motor voltage input	Terminal for motor input voltage
4	Status LED	Indicates Power status, Module status, etc.
5	CT connection port	Terminal for 3 phase CT connection (RJ11)
6	ZCT connection port	Terminal for ground CT connection
7	Reset button	Trip Relay Reset Button
8	RS-485 terminal	Terminal for RS-485 communication
9	HMI terminal	Terminal for connecting with HMI (RJ45)
10	Empty terminal	No Function
11	Ethernet port	Terminal for ethernet communication (RJ45)

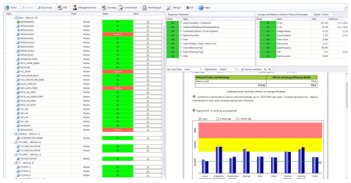
Artesis IOT platform







Products

ITEM	e-MCM	AMT
Product	  	
Monitoring Type	Online Real time continuous monitoring	Portable Diagnostic Tool
Application	*Low voltage (up to 690V), High voltage (690V - 12000V), Inverter*	
Function	Online Motor condition montioring + Analysis S/W + Power monitoring	Motor diagnosis + Analysis S/W
Monitor	LED Alarm (Normal, Fault), Communication Alarm, Software - Trend Viewer	AMT S/W Report
Feature	Predictive maintenance and fault diagnosis at economical price Energy-saving monitor with power analysis function	Easy Portable diagnostic tool Compatible with Low Voltage, High Voltage, inverter driven motors
Detectable faults	Mechanical unbalance/misalignment Loose foundation Gearbox, belt, coupling Bearing Cavitation, air flow disturbance Stator and rotor faults Motor electrical faults Energy Measurement : V (L-N, L-L) , A, Hz, PF, Unbalance, Power(P,Q,S),	Mechanical unbalance/misalignment Loose foundation Gearbox, belt, coupling Bearing Cavitation, air flow disturbance Stator and rotor faults

ARTESIS

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