KAVOSH

MCM1

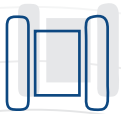
Motor Condition Monitoring

Induction Motors: Essential for Industry

Minimizing Failures, Maximizing Efficiency

Three–phase induction motors are significant investments, with costs increasing as their operating voltage rises, such as in medium–voltage motors. These motors are typically integrated into larger process chains, meaning that any failure can disrupt part or all of the production process, leading to substantial costs. Even a brief period of downtime can impose a significant financial burden on the organization, with the possibility that entire or partial products may need to be discarded.

Reports indicate that over 80% of faults in induction motors develop gradually. If not identified early, these minor faults can escalate into major failures. Moreover, addressing and repairing faults in the early stages can be up to 50% less expensive than dealing with severe motor failures. This does not even factor in the additional costs caused by halting production. Detecting issues early allows for more cost–effective maintenance and minimizes disruptions to the entire operation.



COUPLING

BALLBEARING

ECCENTRICITY

STATOR WINDING

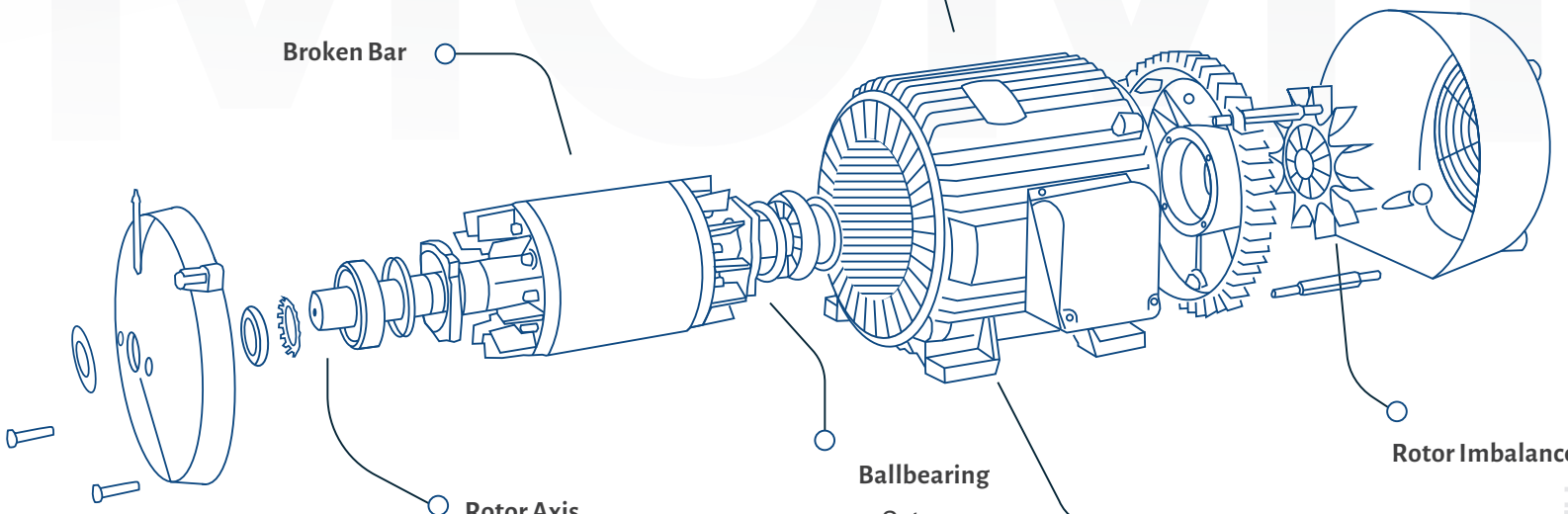
LOOSNESS

BROKEN ROTOR BAR

Internal Stator Winding Fault

- Inter–turn fault
- Winding (coil) fault
- Phase–to–phase fault
- Phase–to–ground fault

Broken Bar



Rotor Axis

- Misalignment
- Rotor bent
- Air gap eccentricity

Ballbearing

- Outer race
- Ball
- Inner race
- Cage

Looseness

Rotor Imbalance

MCM1

KAVOSH

MCM1

MCM

Motor condition monitoring based on analysing current and vibration signatures

MCM1 General Specifications

Features and Capabilities

AI based fault detection algorithm

Current signature analysis

Vibration analysis

Online signal monitoring time and frequency domain

More than 1000 motors database

USB and WIFI connection

Voltage and current up to 50th harmonic and THD

Motor aging alerts

Test history and motor fault trends

Electromagnetic interface resistivity

Replaceable battery packs

Comparative test analysis

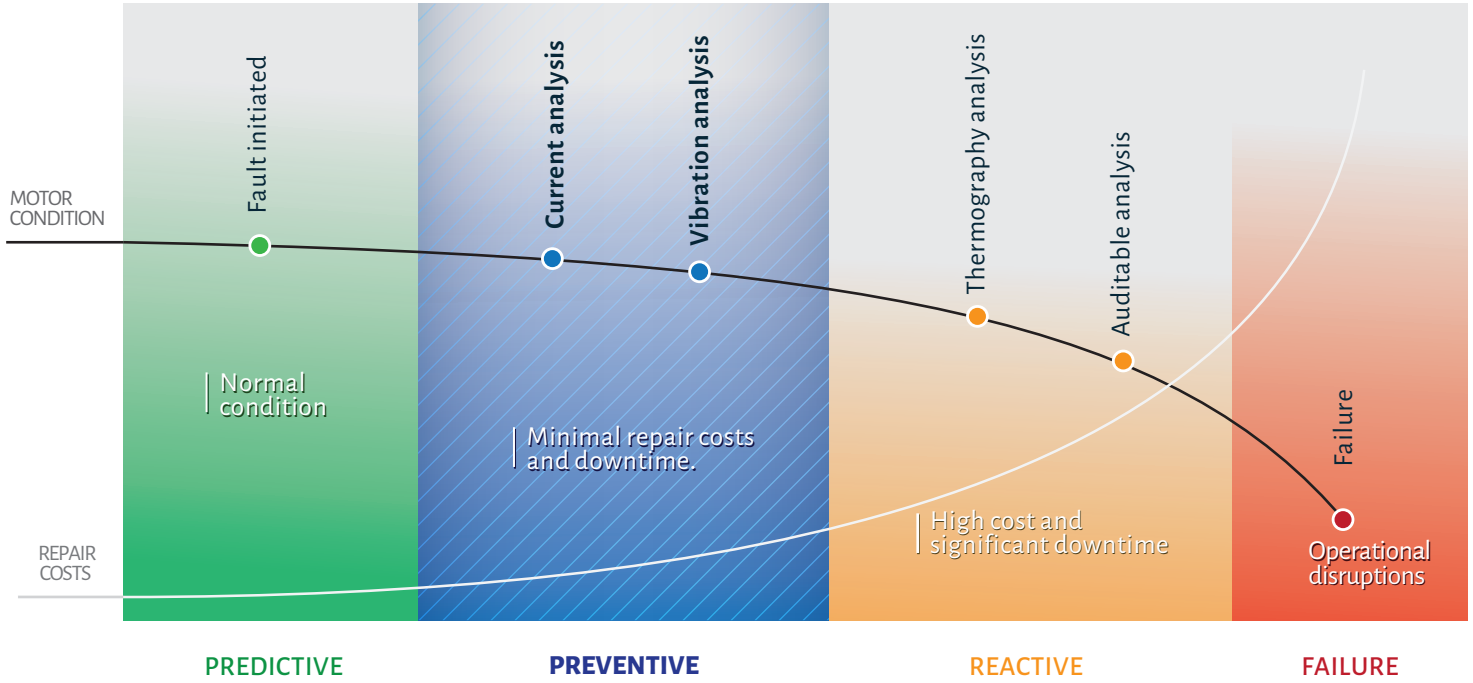
Amplitude and phase display voltage and current

KAVOSH

The Prevention–Failure Curve

A Roadmap to Predictive Maintenance

This chart demonstrates the shift from reactive to predictive maintenance strategies, emphasizing the importance of proactive monitoring. By leveraging advanced techniques such as current and vibration analysis, industries can detect early warning signs of potential faults, thereby preventing unexpected failures and significantly reducing repair costs. The chart highlights critical indicators at different stages of motor health, enabling more informed decision–making and enhancing overall operational efficiency. This transition not only helps optimize maintenance schedules but also improves the reliability and longevity of motor systems.



Maximize Motor Performance

With Condition Monitoring

Studies have shown that condition–based maintenance offers significant advantages, such as reducing repair and maintenance costs by 50–80%, increasing revenue by 30%, cutting spare parts inventories by 30%, and boosting overall plant profitability by 20–60%. By closely monitoring the progression of motor health, industries can shift from a reactive to a predictive maintenance approach, thereby minimizing unplanned downtime and reducing associated costs. This proactive strategy not only optimizes resource allocation but also enhances operational efficiency and long–term asset reliability.

Reduced downtime

Maintenance cost up to 50% less

Extended motor lifespan

Improved safety

Plant revenue up to 30% increased

Applicable Industries

Serving Diverse Industrial Needs

- Pharmaceutical Industry
- Automotive Industry
- Water and Wastewater
- Transportation Sector
- Oil and Gas
- Cement Industry
- Metallurgical Industry
- Food Industry
- Construction and Tile Industry
- Mining Industry
- Energy Sector

Condition Monitoring for Various Equipment

- Generators

- Fans

- Mixers

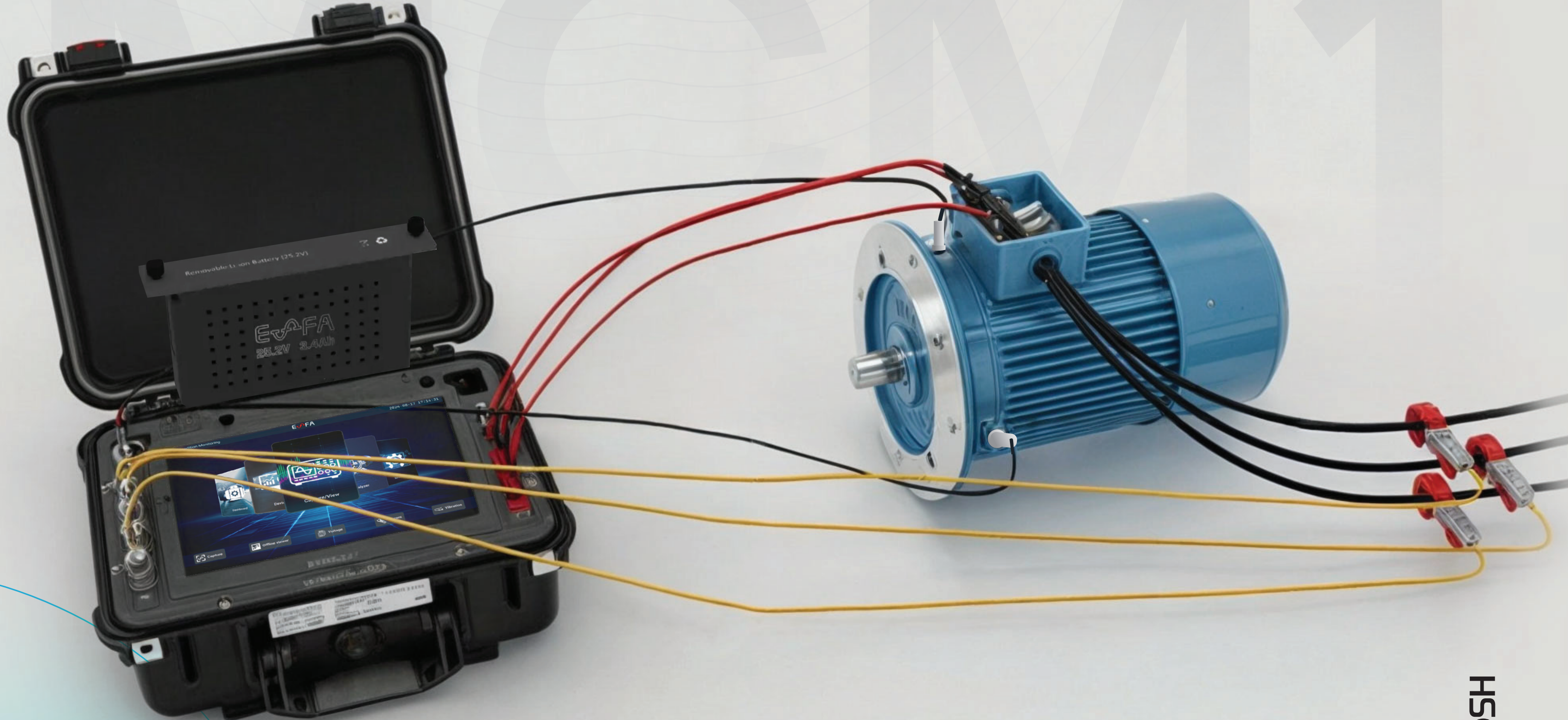
- Equipment with Electric Motors

- Pumps

- Air Handlers and Coolers

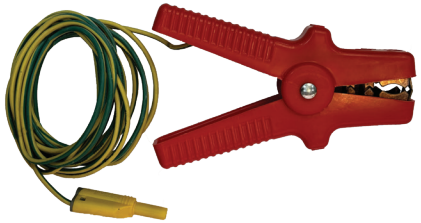
- Conveyors

MCM1



MCM1
Accessories

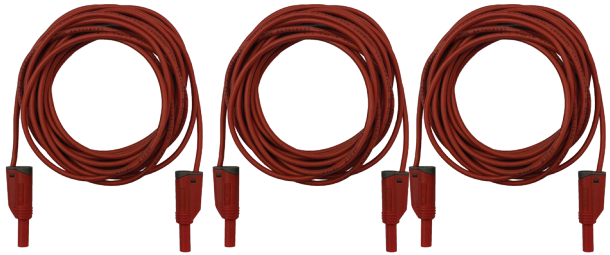
- 2 Vibration Sensors
- 3 Current Measurement Clamps up to 1000A
- 4 Crocodile Clamps
- 2 Rechargeable Battery Packs
- Carry Bag for MCM1 Accessories
- Power Cable
- 4 Voltage Measurement Wires
- Rogowski Coil (by order)
- 3 Current Measurement Clamps up to 10A (by order)
- Grounding Cable




EVAFA
GROUP


EVAFA
GROUP
Motor Condition Monitoring Solution


Removable Li-ion Battery (25.2V)
Motor Condition Monitoring

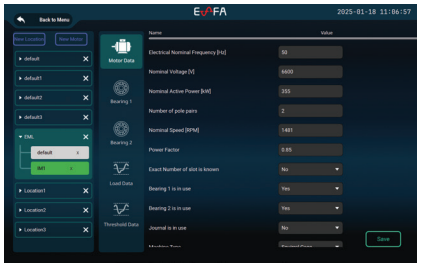


Motor Condition Monitoring Methods

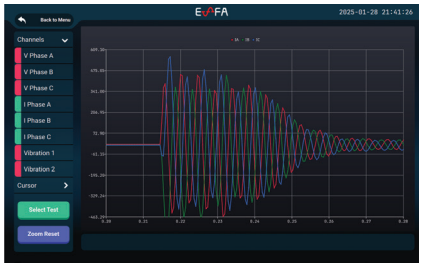
FAULT METHOD	MOTOR CURRENT SIGNATURE ANALYSIS	MOTOR VIBRATION SIGNATURE ANALYSIS	OIL ANALYSIS	PARTIAL DISCHARGE ANALYSIS	THERMO GRAPHY	ACOUSTIC NOISE ANALYSIS
Broken Rotor Bar	High	Medium	High	—	—	Medium
Air–gap Eccentricity	High	Medium	Medium	—	—	Medium
Stator Winding Fault	High	Low	—	High	Medium	Low
Current and Voltage Unbalance	High	—	—	—	—	—
Power Quality Issues	High	—	—	—	—	—
Overload	High	Low	Low	—	Low	Low
Blade Fault	High	High	Low	—	Low	Low
Gear Fault	High	High	Low	—	Low	Low
Journal Fault	Medium	High	High	—	Medium	Low
Bearing Fault	Medium	High	High	—	Medium	Medium
Misalignment	Medium	High	—	—	Low	—
Mass Imbalance	Medium	High	—	—	—	Low
Looseness	Medium	High	—	—	Low	Medium
Coupling	Medium	High	—	—	Low	—
Bent Shaft	Medium	High	—	—	Low	—

KAVOSH MCM1

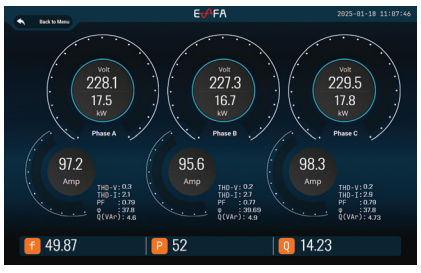
MCM1 Software Feathures



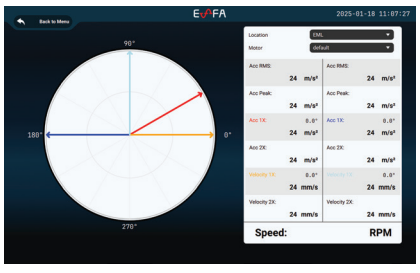
- Database Manager



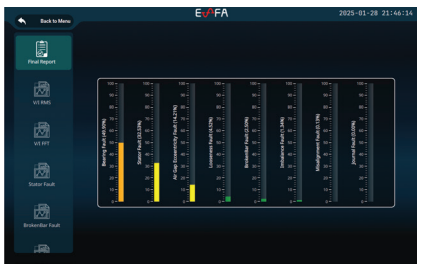
- Online Voltage, Current and Vibration View



- Online Power Quality Display



- Mechanical Quality Analysis



- Fault Probability Analysis

- Motor Condition Trends

Technical Specifications

Parameter	Amplitude Range	Accuracy	Frequency
Voltage	10v ~ 500v	1% + 1V	3Hz ~ 10kHz
Current	100mA ~ 1000A	1% + 10mA	3Hz ~ 10kHz
Vibration	–2g ~ +2g	1%	3Hz ~ 10kHz

Equipment Type	
Motor Type	3 Phase Asynchronous Motors with or without Speed Controller
Voltage Level	Low and Medium Voltage
Test Duration	1min (Typical) (up to 200s)
Current Measurement Inputs	
Number of Terminals	3
Connector Type	Circular Connector
Sensor Type	Split Core CT or Rogowski Coil (by order)
Current Measurement	Directly or From the CT Secondary
Voltage Measurement Inputs	
Number of Terminals	3
Connector Type	Banana Socket
Voltage Measurement	Directly or From the PT Secondary
Vibration Measurement Inputs	
Number of Terminals	2
Connector Type	Circular Connector

Hardware	
Display	10 .1" Color Touchscreen
Internal Memory	128 GB
Communication	Wi–Fi, USB
Power Supply	
Input Connector	IEC 60320_C13
Input Voltage	220V AC 50/60 Hz
Maximum Power Consumption	150W
Battery Pack	
Type	Li–ion
Capacity	3400mAh
Nominal Voltage	25.2V
Maximum Charging Current	1A
Physical Data	
MCM1 Dimension	34.5x30x15cm
MCM1 Weight	6.3 kg
Accessories Dimension	32x22x42cm
Accessories Weight	8.5 kg
Operating Temperature	–10 ~ +55 °C

CE

MCM1

ESFA Group comprises three technology-driven companies: Electronic Sazan Fan Aria, Kia Electronic Faraz, and Pishtaz Sanat Nam Ashna, as well as the electrical system failure analysis laboratory at the university of Tehran. ESFA Group has successfully designed and manufactured wide range of essential devices for the electrical industry, including protective relays, high-voltage equipment testing devices, smart measurement centers, and software systems.

ESFA GROUP

EVOLUTION IS COMING ...

SCAN ME

ESFAgroup.com
info@esfagroup.com