RUGGED MONITORING
MONITORING SIMPLIFIED

REFINERY

Powering the Future of Intelligent Refinery Monitoring.

RUGGED | ROBUST | RELIABLE

Challenges in the Refinery Industry with Electrical Assets

Refineries rely on a network of high-voltage electrical infrastructure to power complex processes such as distillation, cracking, and hydrogenation. However, electrical failures caused by insulation breakdown, overheating, overload conditions, or arc flash incidents can result in:

- Revenue loss from unplanned shutdowns
- Fire hazards from electrical faults
- Higher costs due to energy inefficiencies
- Cascading failures from aging infrastructure

Reactive maintenance strategies often result in costly downtime, emergency repairs, and unexpected failures, making them unsustainable for refinery operations. Electrical asset condition monitoring is essential to mitigate these risks, ensuring uninterrupted performance and operational safety. Rugged Monitoring's AI-powered predictive maintenance solutions provide real-time diagnostics, early fault detection, and advanced performance analytics, enabling refineries to:

DETECT ASSET DETERIORATION EARLY

preventing catastrophic failures

REDUCE MAINTENANCE COSTS

through predictive interventions

ENSURE CONTINUOUS RELIABILITY

with 24/7 condition monitoring

OPTIMIZE PLANNED DOWNTIMES

minimizing production disruptions

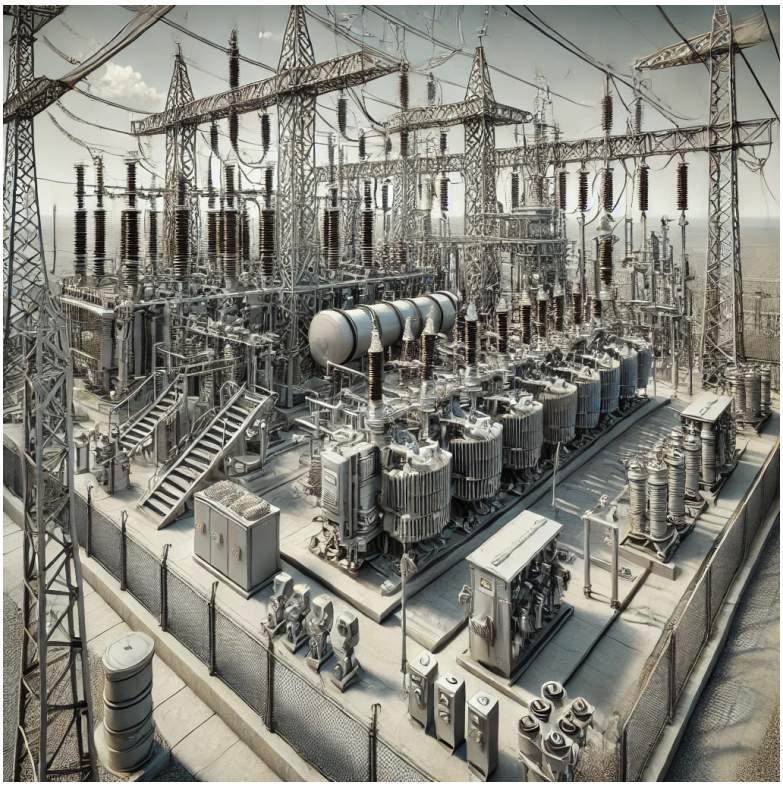
Refineries can transition from reactive to proactive maintenance by integrating real-time monitoring with AI-driven insights, enhancing efficiency, safety, and asset longevity.

RM Solutions

Advanced Condition Monitoring for Refinery Electrical Assets

Rugged Monitoring provides highly specialized AI-driven condition monitoring solutions for transformers, switchgear, cables, rotating machines, and circuit breakers in refinery operations. Our solutions leverage fiber optic sensors, partial discharge monitoring, vibration analysis, and advanced AI-powered asset performance management to prevent failures, reduce downtime, and optimize energy efficiency.

What can be monitored?



TRANSFORMERS

- Hotspot & Winding Temperature
- Dissolved Gas Analysis
- Bushings
- Load Tap Changer
- Partial Discharge Activity
- Cooling System

ROTATING MACHINES

- Current Signature Analysis
- Partial Discharge Activity
- Bearing Temperature & Oil Condition
- Field Current & Torque Fluctuations
- Thermal & Mechanical Misalignment
- Vibration Analysis

CIRCUIT BREAKERS

- Breaker Operation Time & Coil Current
- Partial Discharge Activity
- Contact Resistance Trends & Arc Erosion Analysis
- Insulation Breakdown & Dielectric strength loss
- Thermal Stress & Mechanical wear

SWITCHGEAR

- Partial Discharge Activity
- Temperature Monitoring
- Circuit Breaker Timing & Contact Resistance
- Insulation resistance & dielectric strength degradation

CABLES

- Partial Discharge Activity
- Temperature Variations
- Thermal Stress
- Insulation Resistance Degradation
- Dielectric loss factor
- Load Imbalance

ASSETS WE MONITOR

TRANSFORMERS

Real-Time Thermal and Electrical Monitoring

Transformers play a pivotal role in voltage regulation and power distribution within refineries. The constant high load, fluctuating operating conditions, and environmental stressors contribute to winding insulation degradation, partial discharges, and thermal stress, leading to failure risks and power disruptions.

SWITCHGEAR

Arc Flash and Insulation Failure Prevention

Switchgear is responsible for power distribution, protection, and fault isolation in refinery substations. Failures in switchgear insulation can lead to arc flash incidents, dielectric breakdown, and catastrophic short circuits.

CABLES

Thermal and Insulation Degradation Analysis

Power cables in refineries operate under extreme conditions, including high-temperature environments, mechanical stress, and exposure to oil and chemical vapors. Over time, insulation breakdown can lead to faults, short circuits, and dielectric failures.

ROTATING MACHINES

Predictive Diagnostics for Motors, Compressors, and Pumps

Rotating machines, including compressors, pumps, generators, and cooling tower motors—are critical for refinery operations. Bearing wear, thermal sensitivity, and electrical imbalance lead to frequent failures, which impact process stability.

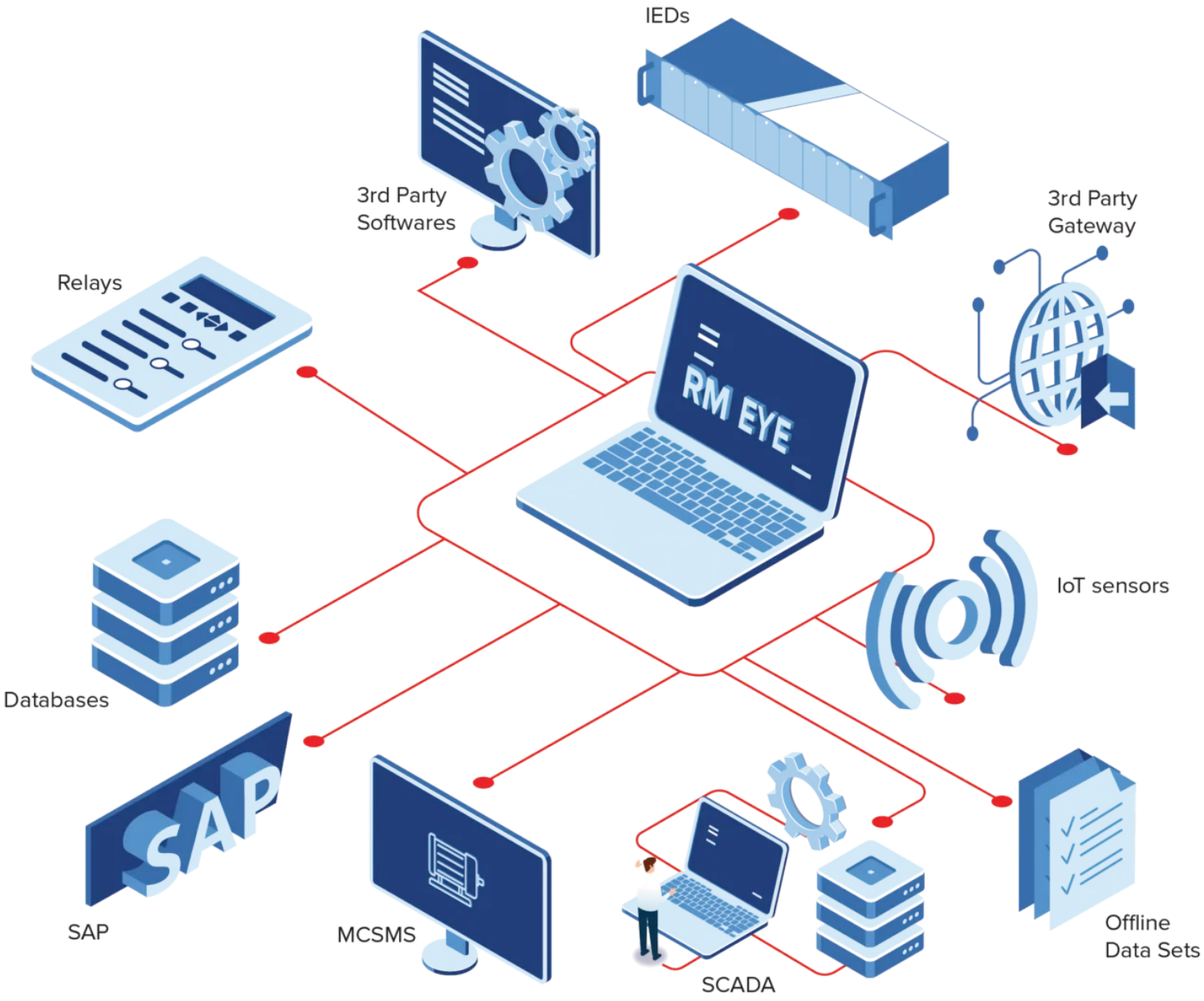
CIRCUIT BREAKERS

Contact Wear and Arc Flash Prevention

Circuit breakers protect refinery electrical networks from overloads and short circuits. Aging breaker contacts, insulation failure, and improper tripping times can lead to power outages and arc flash risks.

Enterprise APM Suite: RM EYE

RM EYE represents a paradigm shift in enterprise asset performance management through the condition monitoring of electrical assets. It uses an AI-driven approach to assess the health and performance of diverse assets, delivering transformative and sustainable outcomes related to their health, performance, energy efficiency, and integrity.



Rugged Monitoring's RM EYE transforms traditional time-based maintenance into a proactive approach, equipping businesses with real-time insights into the health of their electrical assets. By detecting potential issues early on it helps create a dependable and efficient predictive maintenance system.

RM EYE Architecture

Multi-Asset

Multi-Site Monitoring

RM EYE

UI/UX

- Real-time/ Historical Trends
- Analytics
- User Interface
- Custom Dashboards
- Reporting
- Email/ SMS Notifications
- Mobile - Progressive Web Access

Cloud

Private (Customer)
Rugged Monitoring
On-Premises (Optional)

AWS, Azure
Google Cloud

- RM Enterprise Data Layer
- RM Enterprise Analytics

CYBER SECURITY

ISA IEC 62443

NERC CIP-5 NERC CIP-5

Data Collection

Modbus | DNP 3 | IEC 61850 | FTP/ SFTP | ODBC | IEC 60870-104 | MQTT | HTTPS

XML, JSON,
CSV, COMTRADE/OPC

Assets Data

- Transformer Monitoring System
- Switchgear Monitoring System
- GIS Monitoring System
- Power Cable Monitoring System
- Generator Monitoring System
- Offline Data/ Inspection
- Power Electronics (Battery, UPS, VFD, Relay)
- Historian CMMS, SCADA/DCS

One Solution for Multi-Site
Multi Asset Monitoring

RM Eye - Unified platform to monitor entire network of electrical assets

Features

- **Advanced asset health monitoring** with analysis and recommendations to increase asset effectiveness in addition to maximizing equipment uptime
- **Modern remote monitoring solutions** provide valuable insights to Multiple Assets at Multiple Sites from time to time
- **Establish a real time and consistent monitoring** by getting the right information into right hands
- **Simple and user-friendly interface** providing easy and fast access to all the features
- **Everything about the asset at one place** The raw data, analysis and recommendations
- **Advanced asset algorithms** for electrical assets to evaluate asset health
- **Advanced reporting technology with automated alerts**
- **An efficient, reliable partial discharge monitoring for all the assets**
- **A detailed comprehensive DGA analysis**
- **Built on well-established remote and cloud-based monitoring technology**
- **Quick configuration** so that you are not required to configure separately.
- **Protocols: IEC 61850, MODBUS, MQTT**
- **Robust integration with 3rd party systems and devices** with industry standard protocols
- **Bulk configuration imports for fast deployment**
- **Encompasses a secure access to data and configuration**
- **QR code scanner on mobile devices**
- **Accessible on web browser and mobile app**
- **Historical data storage and on demand access** via export feature
- **Extended multilingual support** to handle product inquires or troubleshoot problems proactively
- **Systematic fleet management analysis**
- **Offline test data integration and analysis**

Why Customers Choose Us ?

Expertise You can Trust

Backed by 100+ years of experience. we understand the unique demands of critical asset management across diverse industries.

Focus on Sustainability

Our Solutions are designed to help you reduce energy consumption, minimize waste, and align with your sustainability goals.

Money Matters

We offer competitive and transparent market pricing to protect you from currency fluctuations.

Customer Centric Approach

From consultation to deployment and beyond, we are committed to delivering exceptional support, personalized service, and timely project completion.

CERTIFICATIONS

ISO 9001:2015 | ISO 14001:2015 | ISO 45001:2018 | Lloyd's Register | Atex Certification | NIST Certification

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