

# REFINERY

## Electrical Asset Condition Monitoring

Refineries form the critical downstream sector of the oil and gas industry, refining crude oil into essential fuels and petrochemical products. These facilities operate under highly demanding conditions where electrical assets like transformers, switchgear, motors, pumps, and compressors are crucial for continuous production. Failure in any of these assets can result in significant operational disruptions, production losses, and safety risks.



Rugged Monitoring offers advanced solutions for condition monitoring of electrical assets, aiming to boost refinery efficiency, minimize downtime, and enhance overall asset reliability.

# 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.



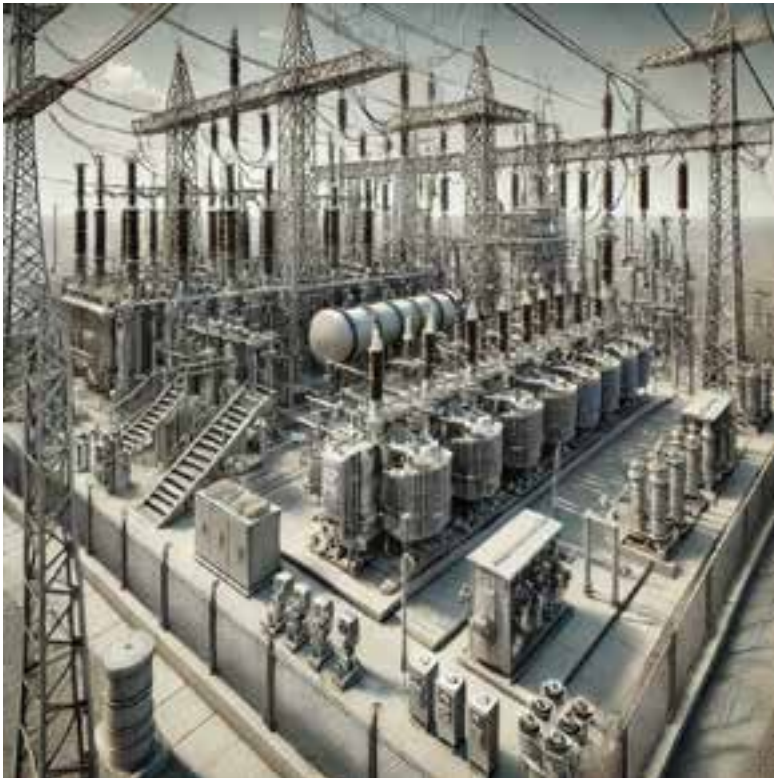
# RM Solutions

## 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.

# RM EYE Enterprise APM Suite

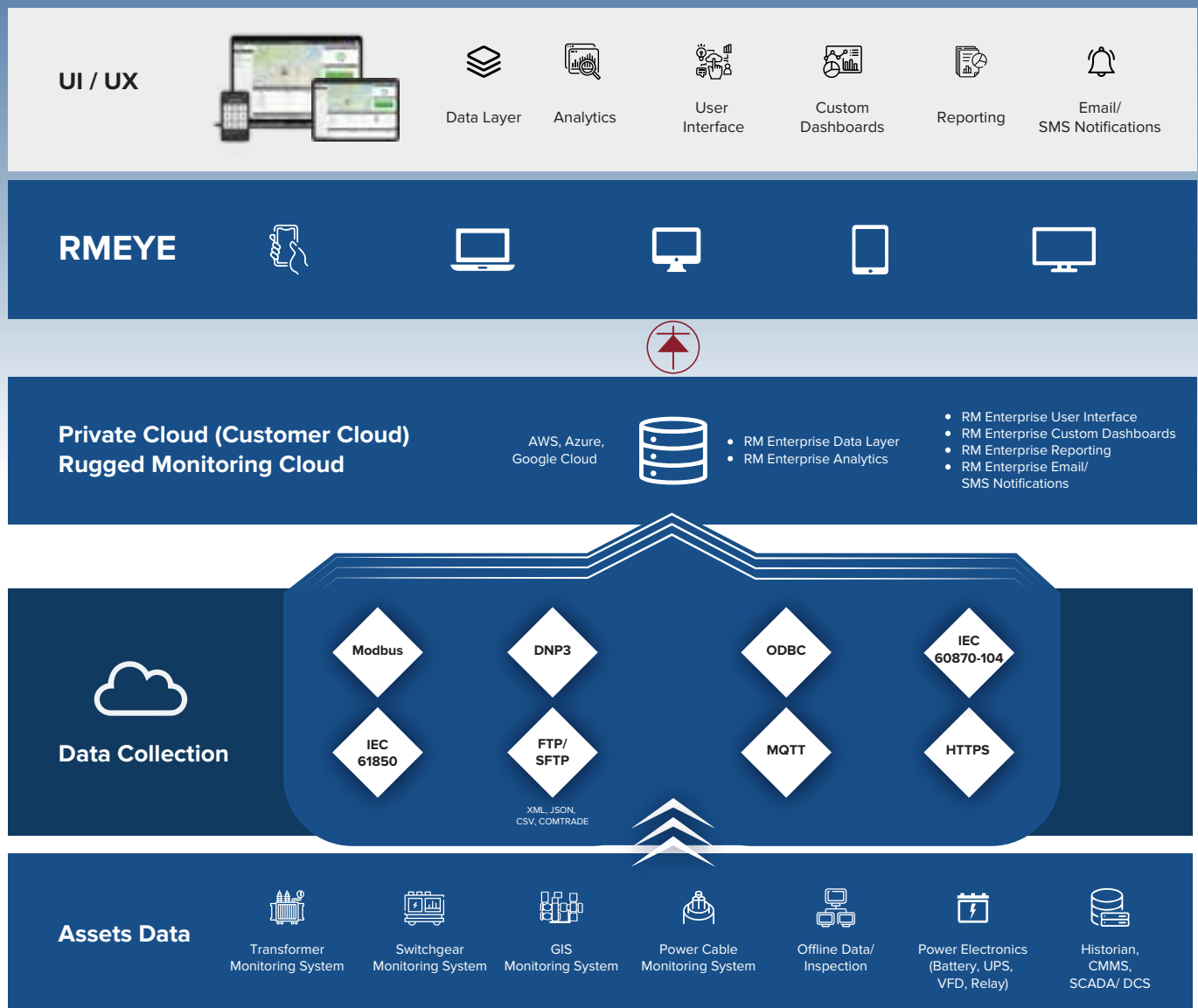
RM EYE is our advanced Asset Performance Management (APM) system designed to provide a scalable and future-ready solution for refineries undergoing digital transformation.

With AI-powered data intelligence, it offers comprehensive health indices for various assets across multiple locations. RM EYE surpasses traditional condition monitoring and facilitates a shift from reactive maintenance to predictive maintenance, maximizing asset lifespan and boosting ROI.

With its real-time remote monitoring capabilities, RM EYE equips experts, operators, SMEs, and engineers with real-time insights that support more informed, data-driven decisions. Through a combination of offline, periodic, and online assessments, it effectively lowers maintenance costs, helps avert unexpected failures, and enhances overall operational efficiency.



## RM EYE' Architecture





## Features of RM's Refinery Monitoring Solutions



AI-based Fault  
Detection &  
Prediction



Risk Mitigation  
with Customizable  
Alarms & Alerts



Comprehensive  
Multi-Asset  
Monitoring



Real-time SCADA  
& IoT Data



Modular & Scalable  
Architecture

## Benefits of RM's Refinery Monitoring Solutions

### Failure Prevention

Early fault detection mitigates  
unplanned outages



### Optimized Downtimes

Predictive analytics enable  
scheduled maintenance



### Improved Safety

Prevents arc flash incidents  
and insulation failures



1

3

5

2

4

### Energy Efficiency

Reduces unnecessary power  
consumption and losses

### Data-Driven Decisions

Converts raw data into  
actionable maintenance insights

Rugged Monitoring's innovative Refinery Monitoring System delivers real-time insights at operators' fingertips, enabling proactive decision-making for optimized asset health and performance. With remote monitoring capabilities, refineries can enhance safety, prevent unexpected shutdowns, and ensure electrical reliability, all while driving operational excellence.

Take control of your refinery's  
performance today

connect with us to learn more!

### A plan for Success

Our Customers are well satisfied with the advisory services that we offer to help them with best in class technological performance and a long durable life.



#### Experts only

We bring-in our diversified experienced team with over 100+ years of experience in Asset Monitoring

## Why Customers Choose Us?

RM solution, the trusted monitoring solution for over 10000+ assets across 50+ countries. We are a leading High Value Electrical Asset Monitoring Company integrating fibre optic technology to the assets.



#### Money Matters

We protect you against currency fluctuation with competitive and fair market prices



#### Meeting Deadlines

Work with us, and you'll work with seasoned professionals – vigilant of deadlines, and committed to exceeding client expectations.



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