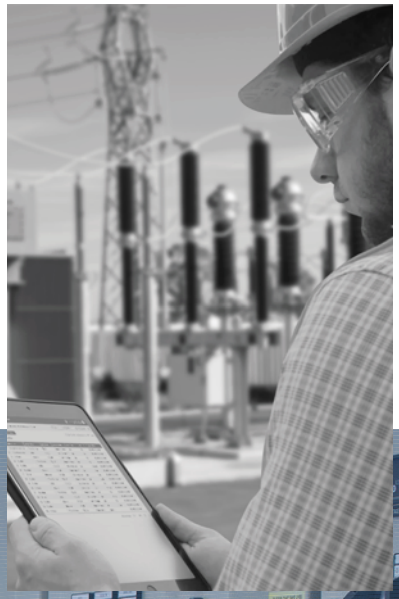
RUGGED MONITORING

MONITORING SIMPLIFIED



MV Panel Switchgear Monitoring Solution

Designed for Diverse Utility and Industry Applications

Achieve increased asset value with improved productivity and utilization

Electrical switchgear plays an important role in operating the electrical power system safely with high reliability. Malfunction in switchgear operations can lead to severe failures in transformers and other connected electrical assets. The switchgear failures may lead to damage of electrical assets, unplanned outages, as well as cost and resources. Monitoring and tracking their performance are important for an efficient and increased asset lifetime.

Rugged Monitoring offers an advanced comprehensive condition monitoring solution for various switchgear systems from; sensors, monitors to software which can monitor and analyze the performance of switchgear equipment. Depending on specific operating requirements and application, we customize our condition monitoring solutions for MV Panel Switchgear.

Our condition monitoring system can be installed and integrated in new installations as well as in existing switchgears. Our advanced condition monitoring solution provides operators with valuable insights about switchgear systems enabling them to increase asset effectiveness.

Temperature Monitoring

The increasing demand for electric power and growing renewable energy sources call for the need to protect power systems from huge failures that could lead to a prolonged shortage of power supply. To ensure a continuous supply of power, condition monitoring of Switchgears becomes utmost important.

Overheating caused by uneven loads on circuits, or loose or damaged connections will lead to catastrophic failure's and thereby reduce the life span of the equipment. Temperature rises in switchgear and switchboard components can occur suddenly, often causing thermal run-away, resulting in burning, melting and destruction of components. Periodic visual inspections are always expensive and require special safety considerations and are unlikely to detect these conditions in time.

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What Can Be Monitored

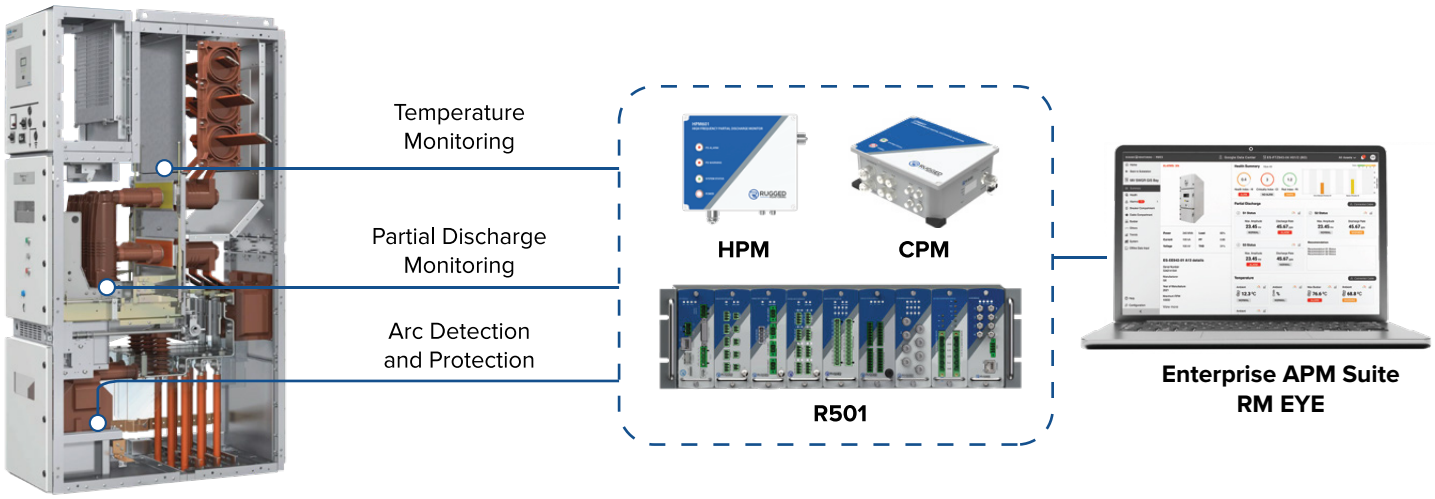
- **Temperature**
- **Power**
- **Partial Discharge**
- **Humidity**
- **Trip Close Characteristics**
- **SF6 Analysis**
- **Stored Energy Analysis**
- **Contact Wear**

Partial Discharge Monitoring

We at Rugged Monitoring offer an advanced comprehensive condition monitoring solution for various switchgear system from; sensor, monitor to software which can monitor and analyze the performance of switchgear equipment. Depending on specific operating requirements and application, we customize our condition monitoring solutions for.

The major concern is to extract useful diagnostic data from noisy measurements (this holds especially for PD) and get global health condition/residual life algorithms. For noise recognition, while techniques are available for filtering out noise under AC sinusoidal voltage, that are based on the capability to distinguish noise from PD pulses in measurement records and, particularly, resorting to phase-resolved PD (PRPD) patterns, the same does not apply for DC and pulse-modulated (PWM) voltage waveforms.

Sample System Architecture for MV Panel Switchgear.



Temperature Monitoring

- Busbar Hot Spots
- Cable Terminations Temperature
- Breaker Mechanism
- Busbar Joints

Partial Discharge Monitoring

- PD Detection
- Fault Characterization
- PD Localization
- PD Severity Analysis
- PD Test and Measurement Services

Arc Detection and Protection

- Arc Detection
- Arc Localization
- Fault Protection
- HV Testing and Monitoring

Features

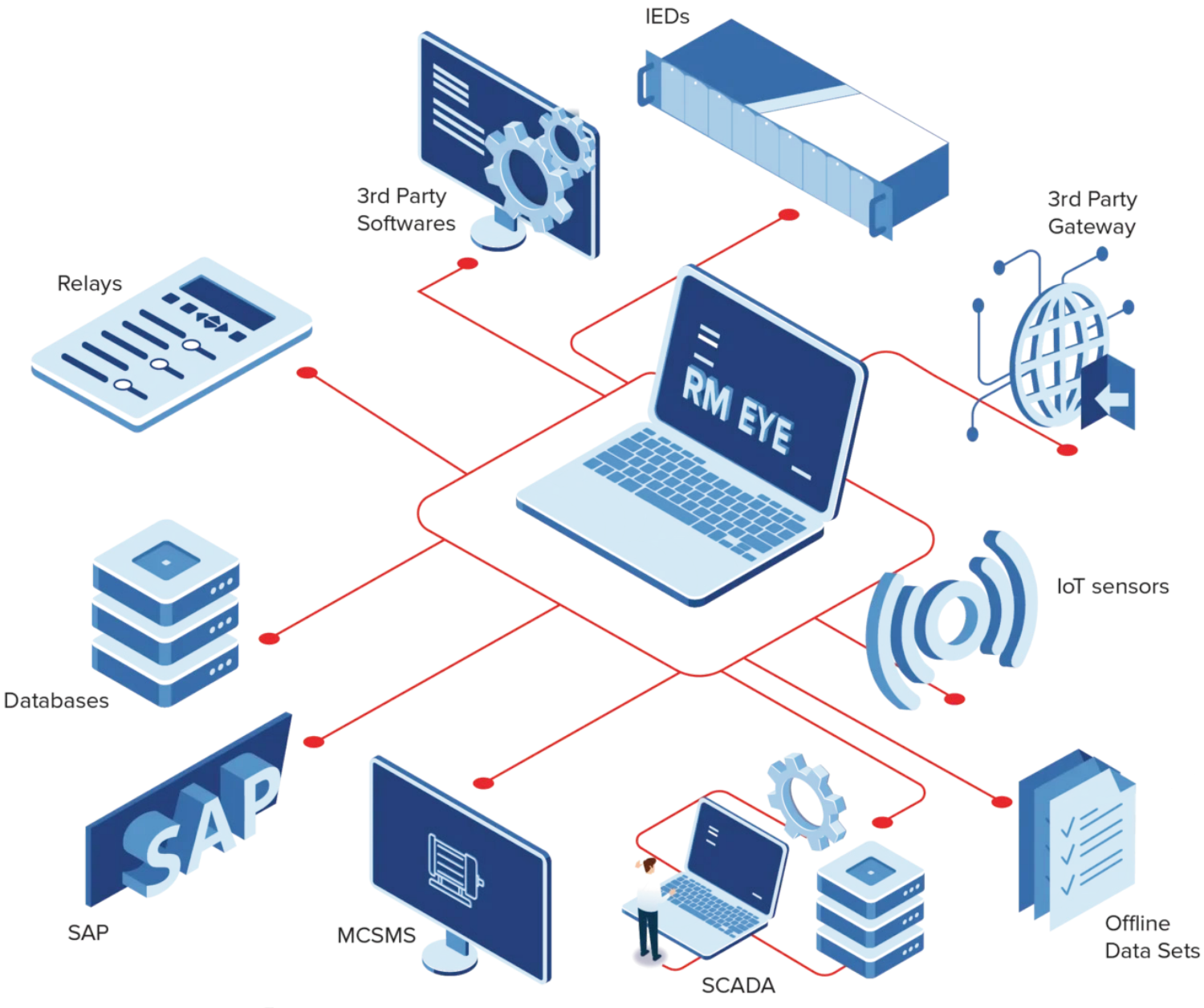
- Most advanced remote monitoring solution with contact wear analysis
- Trip & Close Operations Time Monitoring and Analysis
- SF6 Monitoring & Analysis with versatile and scalable operation
- Get Switchgear & Bay Level Information with Quick and flexible configuration options
- Realtime and consistent monitoring solution
- Built on well-established remote and cloud-based monitoring technology
- Robust and highly reliable

Benefits

- Increased asset life with reduced unplanned outages
- Accurate alarm and alert system
- Greater diagnostic capability
- Increased ROI with reduced operation cost
- Precise fault identification
- Ability to monitor multiple switchgear systems with one software

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

IEC 62443

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: MODBUS, MQTT, IEC61850**
- **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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