

BROCHURE

SWGM-Series

Dynamic Ratings

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**DYNAMIC
RATINGS**



Switchgear Monitor

Comprehensive Switchgear Monitoring



Improves System Reliability



Easy-to-Interpret Data



Effective Monitoring

RESPONSIVE

ASSET HEALTH SOLUTIONS

Take Control Of Your Assets

Medium voltage switchgear is critical to the design of a safe and reliable electrical power system. This equipment provides over current protection for critical power systems and acts as an isolation point for electrical equipment maintenance. Switchgear is critical to the performance of the whole power system and must be maintained in an optimal state of performance.



Slow switchgear operation can cause increased aging rate for other critical assets such as power transformers. The failure of any critical asset will lead to unplanned outages, loss of revenue and potential worker safety concerns. Due to the high investment in power transformers, they are typically viewed as ideal candidates for condition monitoring. Medium voltage switchgear and circuit breakers are by far the largest contributor to the occurrence of substation events, and switchgear misoperation is often identified as the root cause of transformer and other equipment failure. Without an electronic monitoring system in place, equipment operators are forced to rely on cyclic maintenance and offline testing to determine switchgear condition. Due to aging infrastructure, decreasing operating budgets and a decline in craft specialists, the ability to properly maintain switchgear performance through the sole use of time-based inspections is becoming increasingly less effective, reducing both the reliability and safety of the power system.

The Dynamic Ratings Switchgear Monitor (SWGM) is the most comprehensive switchgear monitoring solution available. With the inclusion of high-speed waveform capture, the SWGM combines the most effective offline and online testing methods into a highly customized online monitoring package, resulting in a monitor capable of performing the advanced analytics required to detect operating deficiencies well in advance of switchgear failure. The SWGM can monitor up to six bays of switchgear using a single monitor. In this configuration, the monitor performs waveform capture for each individual bay's trip and close coils, providing open, close, arcing, and interrupting times. Motor starts, currents and runtimes are also monitored individually.

The switchgear monitor configuration may also be combined with Dynamic Ratings SCM to provide partial discharge monitoring of the switchgear bus and connectors, allowing tracking or faulty connections to be detected.

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Improves System Reliability

The failure of critical assets leads to unplanned outages, lost revenue and potential worker safety concerns. Medium voltage switchgear and circuit breakers are by far the largest contributor to substation events, and switchgear misoperation often identifies as the root cause of transformer and other equipment failures. Without monitoring, equipment operators must rely on cyclic maintenance and offline testing to determine switchgear conditions. The ability to properly maintain switchgear through time-based maintenance is becoming less effective because of aging infrastructure, decreasing operating budgets and a decline in specialists.



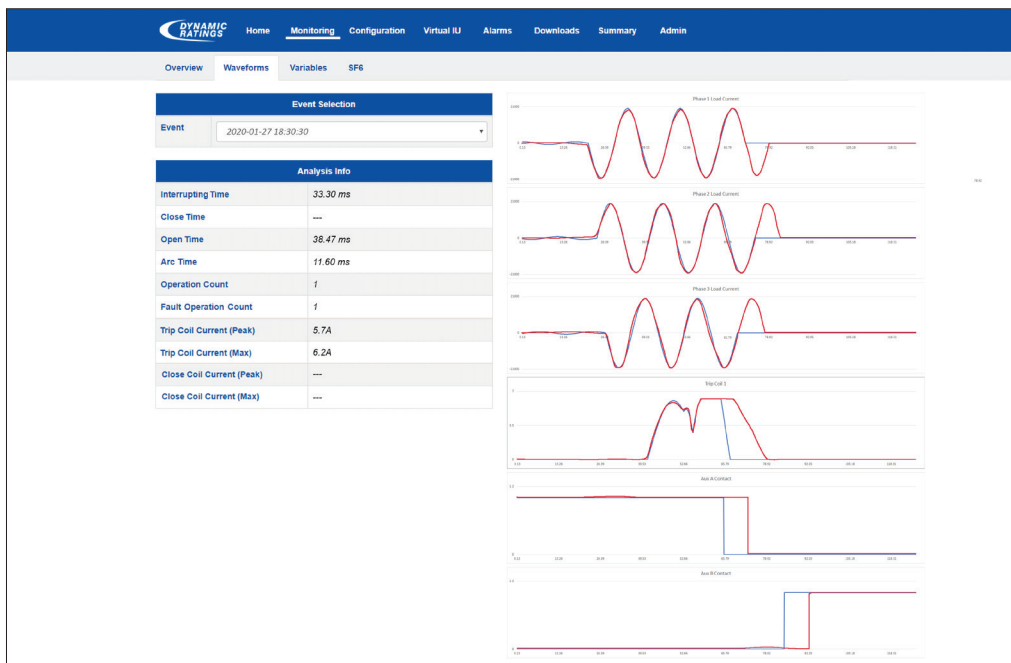
Easy-To-Interpret Data

Our waveform overlay allows for an intuitive and easy-to-interpret visual diagnosis of performance degradation in switchgear mechanics. By comparing the waveform signature with memorized reference, waveform deviations are visually apparent and can direct maintenance crews to the problem of performance degradation.



Effective Monitoring

Using a comprehensive monitoring system provides a true measure of equipment performance and mitigates maintenance induced problems. Routine maintenance means that switchgear is operated and de-energized. This action alone often masks performance degradation issues by exercising the mechanics of switchgear. This may prevent crews from truly understanding the state of the equipment between maintenance schedules. The maintenance itself is extremely invasive and often leads to the introduction of new problems that were not previously present.



Waveform Capture Analytics

Product Features

Smart Capture

Complete diagnosis of the breaker's mechanical and electrical systems with every operation. Smart Capture uses a waveform analysis for automated graphical comparison of breaker operations, providing a detailed analysis of first trip open and close times, identification of latch and bearing performance, lubrication issues, auxiliary contact condition and fault current values.

Gas monitoring for SF6 and dry air

Multi-parameter sensors monitor density, temperature and humidity in insulating gasses. Alarms alert asset owners of leakage rates, trending of time till lock out and mass gas loss.

Trip coil integrity monitoring

Monitoring of trip coil integrity provides the ability to detect changes in the trip circuit resistance, indicative to the condition of the trip coil and related components.

Interrupter condition

Precise cumulative I²T calculations allow internal inspections to be scheduled on an as needed basis. Reducing both the cost and manpower associated with time based cyclic maintenance schedule.

Cabinet heater monitoring and environmental conditions monitoring

Current and voltage monitoring of heaters to detect failures which can often occur between maintenance cycles, leading to condensation in control cabinets which causes corrosion of control wiring, short circuits, and premature aging of electrical components.

Charging motor starts, currents and runtimes

Provides data concerning the condition of the stored energy system.

Environmental

Provides temperature for ambient, control cabinets and SF6 gas.

Modular construction

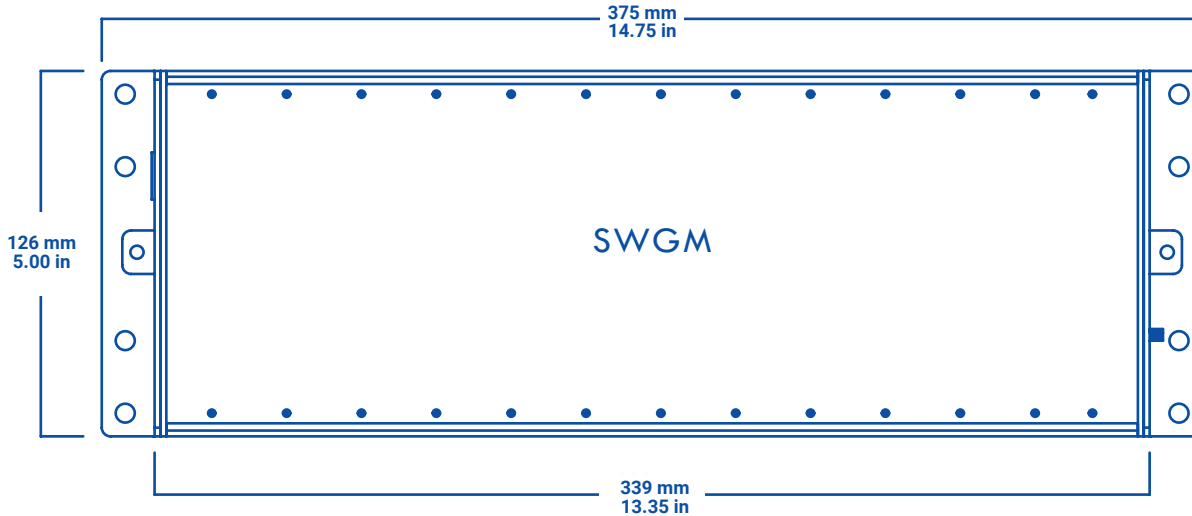
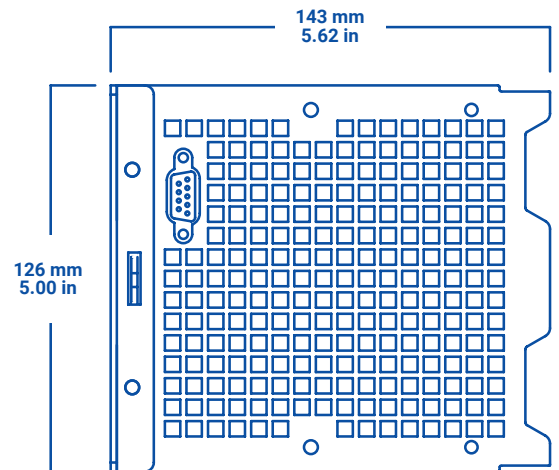
Monitor is configured with only those modules required for the application.

Multiple communication options

DNP, Modbus or IEC 61850 using Ethernet (Fiber & Copper).
(Optional) Serial Fiber, RS485 & RS232 ports.

Product Specifications

Power Supply:	110 - 240 VAC (50 – 60 Hz), 110 - 250 VDC
Temperature Range:	-40°C to 70°C (-40°F to 158°F)
Communications:	DNP3, Modbus, IEC 61850



An ISO 9001, ISO 14001, ISO 27001, ISO 45001 Certified Company.

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