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BROCHURE

BPM-Series

Dynamic Ratings

Distributed by AKRIBIS

DYNAMIC RATINGS

Breaker Performance Monitor

- Continuous Asset Management
- Condition Based Maintenance
- Improved System Reliability

RESPONSIVE

ASSET HEALTH SOLUTIONS

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Take Control of your Assets

High voltage circuit breakers are critical to the safety and effective operation of the electrical system. A circuit breaker must react quickly when a fault occurs to isolate fault currents from the rest of the system. A circuit breaker that fails to open on command or is slow to react exposes the rest of the system to excessive fault currents, resulting in premature aging and potentially dangerous and costly failures of transformers and related equipment.

While much attention is given to the monitoring of transformer condition, circuit breakers are by far the largest contributor to the occurrence of substation events. Circuit breaker mis-operation is often identified as the root cause of transformer and other equipment failure. Without an electronic monitoring system in place, utilities are forced to rely on cyclic maintenance and offline testing to determine breaker condition. Due to aging infrastructure, decreasing operating budgets and a decline in craft specialists, the ability to properly maintain breaker performance through the sole use of time-based inspections is becoming increasingly less effective, reducing both the reliability and safety of the bulk electric system.

Continuous Asset Management

A complete diagnosis occurs with every operation of the breaker's mechanical and electrical systems. Smart Capture uses a waveform analysis for 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.

Condition Based Maintenance

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

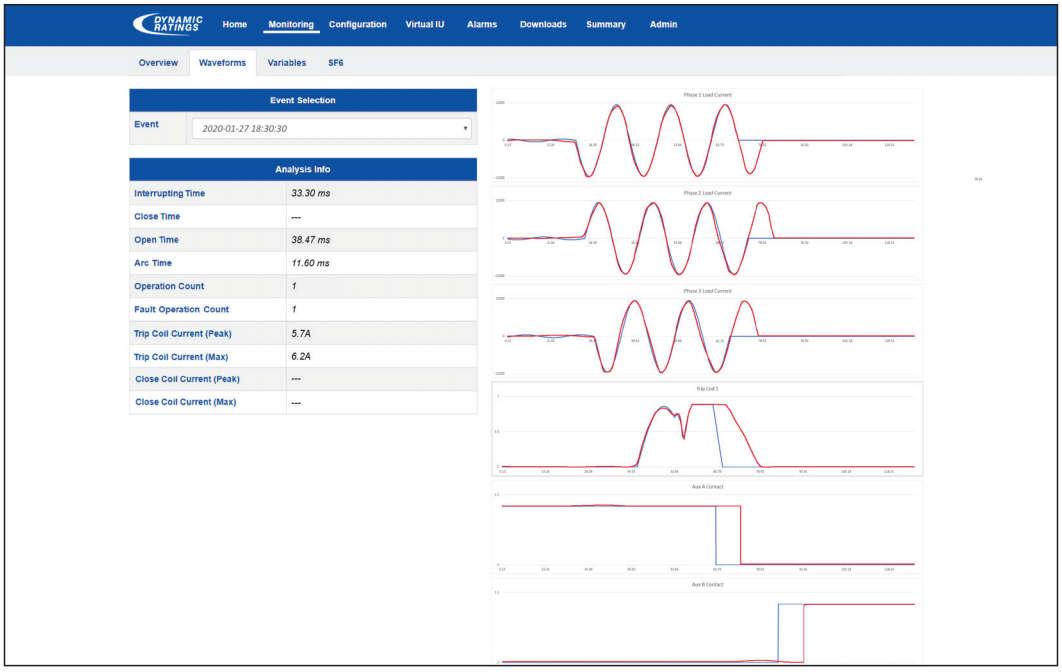
Improved System Reliability

The Breaker Performance Monitor provides data concerning the condition of the stored energy system allowing the BPM to detect failures before the apparatus is called to operate. Information such as this cannot be obtained from reactive logging devices such as microprocessor based protective relays.

Continuous Asset Management

Smart Capture Technology

Dynamic Ratings Breaker Performance Monitor (BPM) is the most comprehensive breaker monitoring solution available. With the inclusion of high-speed waveform capture, the BPM 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 circuit breaker problems. The waveform overlay feature will graphically show performance variances of each circuit breaker operation compared to first trip baseline making diagnosis of circuit breakers problems easy to rectify before system failures occur.

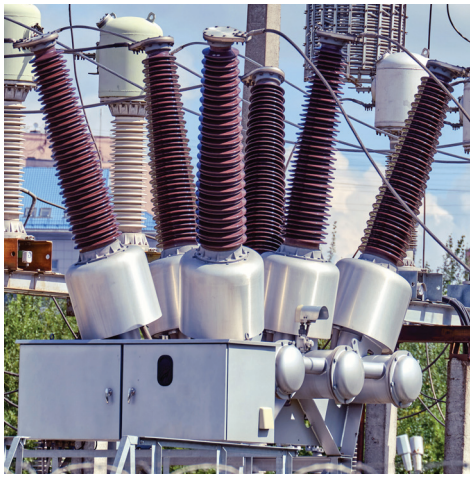


Waveform Capture Analytics

Condition Based Maintenance

Gas Monitoring for SF_6 and Dry Air

Multi-parameter sensors monitor density, temperature and humidity in insulating gases. Then 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 I^2T 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 allowing the Breaker Performance Monitor to detect failures before the apparatus is called to operate. Information such as this cannot be obtained from reactive logging devices such as microprocessor based protective relays.

While much attention is given to monitoring a circuit breaker's timing and integrity of SF_6, a better understanding of how the breaker's charging motor is performing can provide critical information as to the condition of the stored energy system. These stored energy systems can be susceptible to adverse effects in cold weather environments. The breaker performance offers several unique features designed specifically for cold weather events such as monitoring motor runtime and adapting in real time to changes with viscosity of hydraulic fluid due to temperature changes. The system can also monitor for excessive moisture and system pressure in pneumatics systems which are a symptom of freezing air lines. Regardless of stored energy system used in circuit breaker design, monitoring of charging motor will improve reliability of system in cold weather events.

Environmental Temperature Monitoring

Provides temperature for ambient, control cabinets and SF_6 gas. SF_6 (sulfur hexafluoride) gas is commonly used as an insulating medium in high-voltage circuit breakers and other electrical equipment. It offers excellent electrical insulation properties and high thermal stability, making it suitable for use in these applications.

Monitoring SF_6 gas on a circuit breaker is important for several reasons:

- **Safety**
  SF_6 gas is a potent greenhouse gas and has a high global warming potential. Monitoring its levels helps prevent leaks, minimize emissions, and reduce the environmental impact. By monitoring SF_6 gas regularly, any leaks can be detected promptly, and appropriate actions can be taken to prevent potential hazards.

- **Equipment Performance**
  SF_6 gas is critical for the proper functioning of high-voltage circuit breakers. Monitoring SF_6 pressure helps ensure the integrity of the insulation and the overall performance of the equipment. A decrease in SF_6 pressure may indicate a leak, which can affect the interruption capability of the circuit breaker. Timely detection and resolution of such issues are crucial to maintaining the reliability and safety of the electrical system.

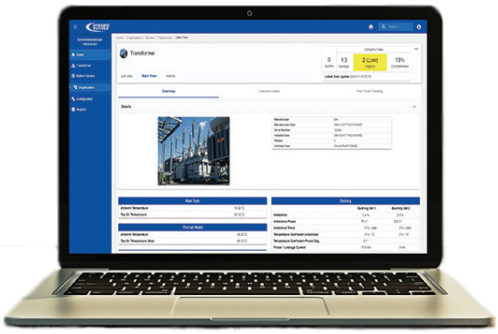
- **Maintenance Planning**
  Monitoring SF_6 gas levels allows for proactive maintenance planning. By tracking the gas levels over time, it is possible to identify trends and patterns that can help predict potential failures or maintenance requirements. Scheduled maintenance activities can be optimized based on the gas condition, which can reduce downtime and minimize the risk of unexpected failures.

- **Regulatory Compliance**
  Many countries and regions have regulations in place to control and reduce SF_6 emissions due to its environmental impact. Monitoring SF_6 gas levels ensures compliance with these regulations and facilitates the reporting of accurate data.

Improved System Reliability

Fleet Data Management with DynamicMetrix™

DynamicMetrix® Desktop is included with the purchase of the BPM. This program allows engineering access to your monitor to view data and perform diagnostics. Upgrade to DynamicMetrix® Fleet to pull data from all of your monitors: transformer, circuit breaker, or third party. This allows users to easily analyze data trends to make educated decisions about maintenance and risk management.



NERC Reporting

What is NERC?

The North American Electric Reliability Corporation (NERC) is the Reliability Organization (ERO) for North America. They are an international regulatory authority whose mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid. NERC develops and enforces reliability standards, annually assesses seasonal and long-term reliability, monitors the bulk power system through system awareness, and educates, trains, and certifies industry personnel. NERC's area of responsibility spans the continental United States, Canada, and the northern portion of Baja California, Mexico.

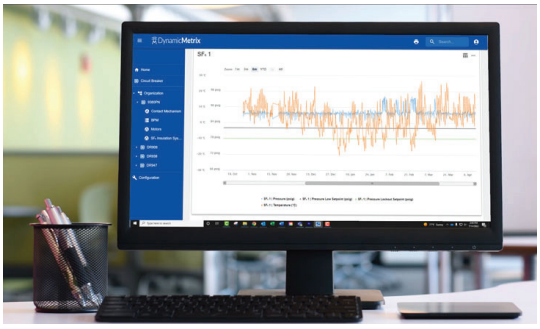
NERC Reliability Standards define the reliability requirements for planning and operating the North American bulk power system and are developed using a results-based approach that focuses on performance, risk management, and entity capabilities.

What are NERC Requirements for Circuit Breakers?

Breakers are required to be tested on a maximum of a six-year maintenance period. This test must verify that the breaker can interrupt current through the energization of both trip coils. For this test to be valid, testing must provide evidence of which trip coil operated the breaker. This is evident by providing the amperage drawn by the trip coil initiating the operation. It must also be apparent that the electromechanical part of the breaker can successfully interrupt current within specified limits when the trip coil becomes energized.

Monitoring and How it Helps You Meet NERC Requirements

Dynamic Ratings Breaker Performance Monitor provides the following parameters with each breaker operation in order to comply with NERC requirements:



- If the breaker trip was initiated through trip coil 1 or trip coil 2 of the breaker.
- The amps drawn through the trip coil during the operation.
- The interrupting time of the circuit breaker during the operation.
- Printable graphs and tables of the operation which provide verification of these properties.
- The BPM also provide a cumulative gas loss to satisfy the mandatory EPA Green House Gas report.

Benefits of LIFESTREAM® Support Services

Asset management is more than just installing a monitor. Successful asset management is a process flow of planning, designing, managing, implementing, verifying, and supporting. Dynamic Ratings offers LIFESTREAM® Support Services to ensure successful monitoring throughout the entire life cycle of an asset.

Advantages of Online Breaker Monitoring

The biggest obstacle facing asset management concerning breaker maintenance is the tendency of circuit breakers to sit for extended periods of time in a static state. This presents two major problems in the maintaining of this equipment. First, these long intervals between operations lead to a breakdown of lubrication and corrosion of contact surfaces. The result of these issues can range from slow tripping times, failure to operate, or misoperation of auxiliary contacts. The second challenge presented, due to these long periods of inactivity, is that often failure can be easily missed during cyclic maintenance, even something as simple as a heater thermostat or leaks developing within a stored energy system. This is largely due to conditions during cyclic testing by service technicians not being conducive to the detection of these issues. However, using online monitoring, even slight changes in a breaker's physical, mechanical or electrical properties can easily be detected.

The Dynamic Ratings Breaker Performance Monitor has become the most comprehensive monitoring solution available when managing the circuit breaker's health. The BPM combines offline and online testing methods in smart capture, allowing for a detailed analysis of first trip open and close times, auxiliary contact condition, and more. The BPM also comes with DynamicMetrix® platform for in-depth analytics. This allows users to easily analyze data trends, like stored energy or gas monitoring, to make educated decisions about maintenance and risk management. Even slight changes in a breaker's properties can be easily detected through online, condition-based monitoring.

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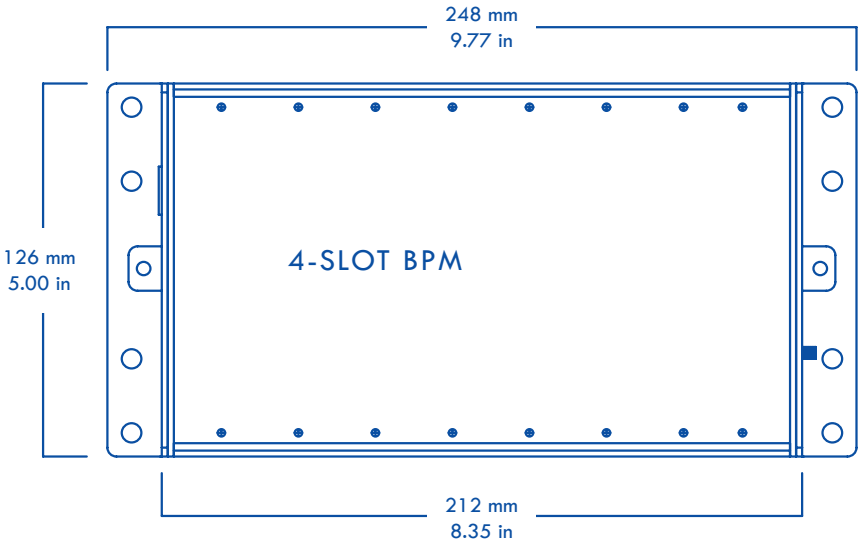
Features & Specifications

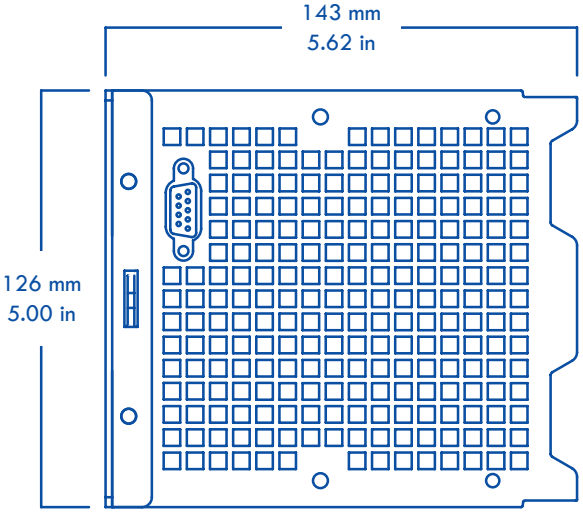
Features

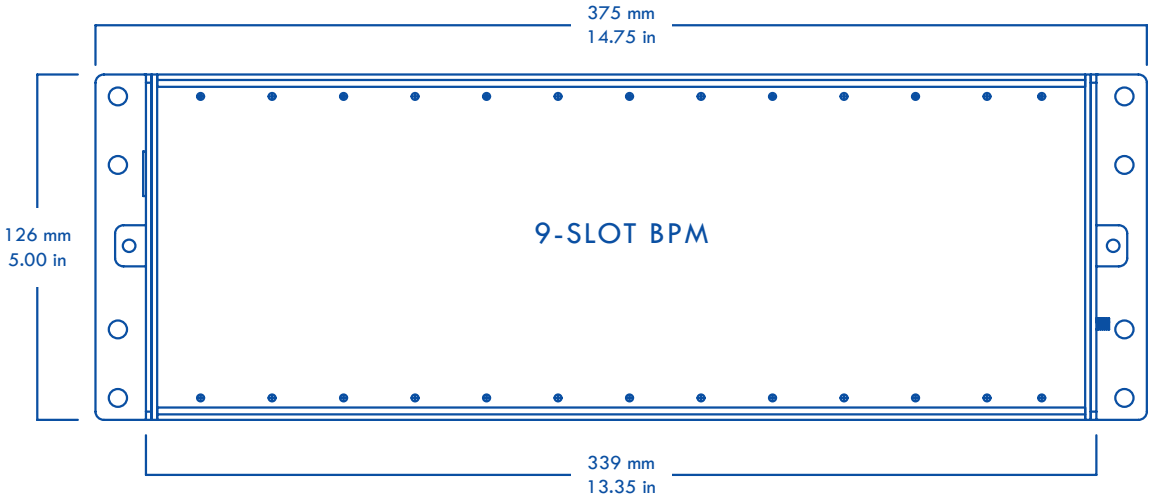
Smart Capture	Complete diagnosis of the breakers' mechanical and electrical systems with every operation. Smart Capture uses a waveform analysis for automated graphical comparison of breaker operations, providing a detailed analysis of first trip open and close times, identification of latch and bearing performance, lubrication issues, auxiliary contact condition and fault current values.
Gas Monitoring for SF_6 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 I^2T 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 SF_6 gas.
Modular Construction	Configure your monitor with only those modules required for your 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 (-104°F to 158°F)
Communications:	DNP3, Modbus, IEC 61850







DYNAMIC RATINGS

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

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