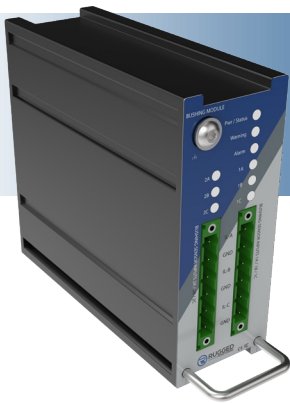


BM201

Transformer Bushing Monitor

BM201 Advanced Bushing Monitoring Module for Industry Applications



Rugged Monitoring BM201 is an online bushing monitoring module designed compactly to monitor real time condition of the Bushings.

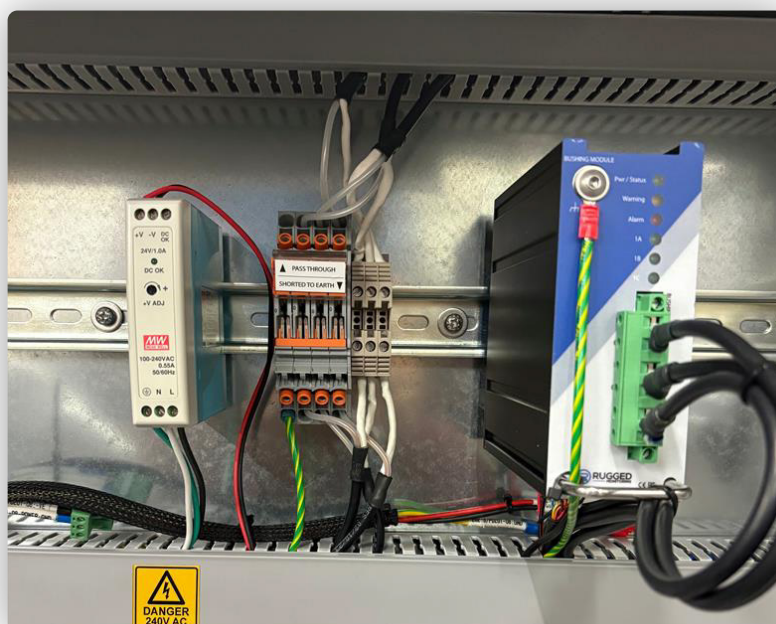
Rugged Monitoring's BM201 bushing monitor detects insulation deterioration and other faults early on, ensuring accuracy and dependability in high-voltage substation environments. It measures power factor/tan delta and capacitance for precise early fault analysis, reducing transformer outages caused by bushing failures.

Providing a comprehensive view of the transformers bushing conditions BM201 combines accuracy and easy to use software which can further be expanded to additional transformers. It is available as a stand-alone or comprehensive system integrated with other transformer monitoring solutions and can stably monitor maximum upto 6 bushings.

Using custom-made adapters connected at the bushing test taps, the BM201 employs a balanced-current (Sum-of-Currents) method to monitor leakage currents across all three phases. It continuously measures:

- The variation in leakage current relative to baseline values derived from the bushing's nameplate data, enabling detection of changes in capacitance or insulation condition (i.e., Tan δ).
- The phase-angle differences between the leakage currents of the three bushing phases (i.e., the timing discrepancies) reflect subtle shifts in power factor, providing insight into insulation deterioration.

These key measurements (leakage current magnitude changes and inter-phase phase angle shifts) are used to infer early-stage bushing faults. The BM201 then transmits the calculated parameters (Tan δ rate-of-change, capacitance, and voltage metrics) to third-party systems via Modbus RTU over RS-485 for real-time monitoring. The BM201 also captures the hourly average of the Tan δ , Capacitance, and Voltage (absolute and rate of change). It has the capability for data integration across multiple monitoring platforms.



» Benefits

- Minimize asset outages due to bushing failure
- Efficient to avoid most dangerous catastrophic failures of bushings
- Optimize bushing replacement planning: RoC of Tan δ and capacitance
- Cost optimized solution for different types of electrical asset
- Faster integration with SCADA or Cloud

» Applications

- Monitoring of condensing/ capacitive type bushings
- Monitoring of Transformer Bushings

» Features

- More than 45+ customizable bushing tap adaptors
- Highly accurate measurement for Tan δ and Capacitance
- Double protection for earthing link breakage
- Easy to install and commission



» Technical Specifications

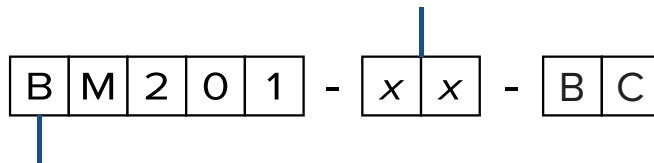
ELECTRICAL SPECIFICATIONS	Measurement Range Leakage Current	1 to 280 mA, with minimum resolution of 0.1 mA
	Sampling Rate	3kS/s
	Bandwidth	2-90Hz
	Resolution	16 bits
	System Accuracy	
	- Leakage Current	± 0.5%
	- Tan Delta/Power Factor	± 0.1%
	- Capacitance	± 0.5%
	- Voltage	± 0.5%
	Amplitude measurement error	± 0.5%
	Phase angle measurement error	0.05°
	Scan Rate	1 sec/channel
	Input Voltage	24 V / 48 V _{DC} (Vdc)
Maximum Power Input	10 W	
# of Relays Outputs	01 x Fail Safe Relay for System Failure	
COMMUNICATION	Serial Port	RS-485 with Modbus RTU
	Configuration Port	USB (to use with RM Connect windows software)
ENVIRONMENTAL SPECIFICATIONS	Operating Temperature	-25 °C to + 75 °C
	Storage Temperature	-40 °C to + 85 °C
	Humidity	95% Non-Condensing
MECHANICAL SPECIFICATIONS	Dimensions	4.92" x 4.92" x 1.89" (125mm x 125mm x 48mm)
	Number of input Channels	3 or 6 channels

» Ordering Code

Number of Channels

03 = 3 Channels

06 = 6 Channels



Bushing Monitoring Module

CERTIFICATIONS



ISO 9001:2015



ISO 14001:2015



ISO 45001:2018

Canada

1415 Frank-Carrel, Sulte , 230, Quebec, QC-G1N , 4N7, CANADA

Asia Pacific | China | India | Middle East & Africa | Europe | North America | Latin America

+1-418-767-0111

info@ruggedmonitoring.com

www.ruggedmonitoring.com