DYNAMIC RATINGS

RMM

Rotating Machine Monitor

- **Optimal Design**
- **Effective Communication**
- **Easy Implementation**

RESPONSIVE

ASSET HEALTH SOLUTIONS

Your System's Uptime Matters

Dynamic Ratings' Rotating Machine Monitor (RMM) helps industrial facilities improve reliability, leading to increased uptime and maintenance savings. It is a continuous partial discharge monitor, which also monitors, stores, and correlates operating dynamics. All industry accepted partial discharge graphical results and IEC defined quantities are measured, calculated and recorded.

Motors are critical assets in the industrial manufacturing process. Studies by IEEE and EPRI (Electric Power Research Institute) indicate that up to 40% of electrical origin failures on HV motors are attributable to rotating machine failures in the stator insulation systems. Motor failures are caused primarily through winding circuit and cable faults caused by partial discharge.

The RMM provides infor-mation as to the health of the stator winding insulation in medium and high voltage motors and generators, and can be used on variable frequency drives (VFD). It's communication options provide timely access to information and notifications to assist asset management and maintenance personnel in their decision making process.

Features & Functions

The RMM is designed, manufactured and integrated with innovative sensors, monitors, and controls for data collection, analysis, and diagnostics. With the use of the asset management tools, customers realize the maximum benefit from online and partial discharge monitoring.

- Features a full range of advanced noise cancellation capabilities, including the elimination of cross coupled signals
- Common operating characteristics are: ambient and winding temperatures, humidity and load sensing

Optional Hazardous Location Enclosure

- 316 Stainless Steel: The best material solution for challenging environmental conditions
- Gasketed Flange : O-ring gasket is located inside the cover bolts sealing the enclosure

Optimal Design

The RMM features a minimum of fifteen independent (concurrently monitored), highly sensitive, user configurable input channels; delivering the industry's best signal-to-noise ratio and allowing connection to any brand of PD sensor. The RMM is more than just a partial discharge (PD) monitor. Inputs are available for six RTD winding temperatures, three load currents, three voltages and six user defined (4 – 20 mA) inputs. It has the capability to perform motor current signature analysis for the detection of broken rotor bars in induction machines. The RMM will store up to two years of data using a first-in, first-out (FIFO) method.

Effective Communication

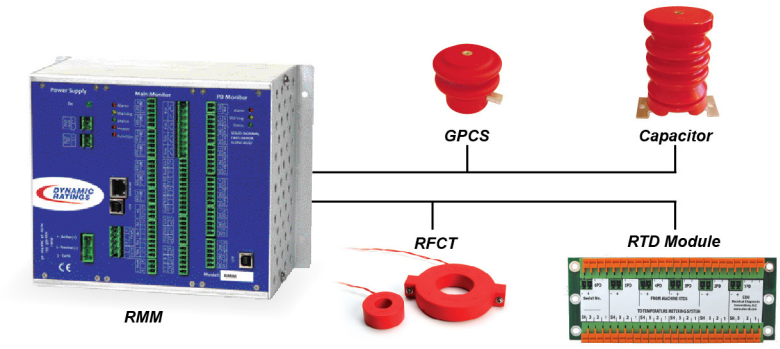
The RMM's communication options provide timely access to information and notifications to assist asset management. The design allows for independent operation (without a connected PC), but also features a wide variety of built-in communication abilities including Ethernet, USB and RS-485 with a standard communication protocol using ModBus. DNP-3 is available upon request.

Easy Implementation

The RMM is designed to operate with existing or already installed PD sensors. This saves the purchasing, engineering and installation costs of new sensors. When placed inside of an approved enclosure, the RMM can also be used in many different locations.

Applications

Coupling capacitors can only detect partial discharge (PD) close to the rotating equipment terminals. The Dynamic Ratings Resistive Temperature Detector Partial Discharge (RTD-PD) Module is designed to detect PD that occurs deep within the windings of motors and generators. The RTDs placed in the windings of rotating machinery are sensitive to the high frequency component of partial discharge. When coupling capacitors and the RTD-PD module are used in conjunction, the detection zone is increased. No matter the application, winding temperature, ambient temperature, percent humidity, and load current are four parameters recommended to monitor for data correlation with partial discharge.



Compatible with Partial Discharge Sensors

A common configuration for turbos, small hydro generators, and motors is to use two sets of coupling capacitors to detect partial discharge. One at the line terminals, and one in the isolated-phase bus duct (IPB) set up at least two meters apart in a time of arrival configuration. Due to their large size, hydro generators often require multiple sets of coupling capacitors to detect partial discharge. Often two to four sets are required to place a set in each parallel phase group. Coaxial cable lengths are then adjusted for the signals to arrive at the monitor at the correct times, called time of arrival calibration.

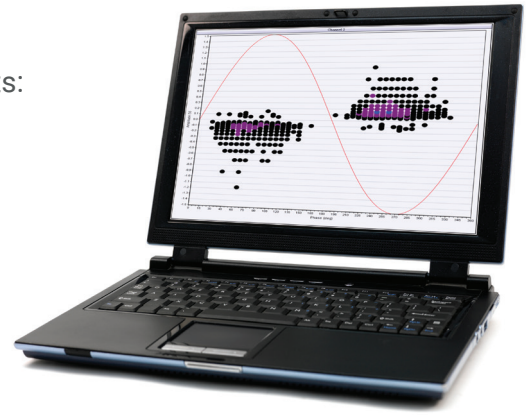
Software Package

The supplied application software is intended to run on PC's with Microsoft Windows™ software. Our RMM application software is a versatile product supporting Dynamic Ratings portable and continuous insulation monitoring systems that may be found on generators, motors, switchgear, cables, bus duct, and transformers. The software allows the user to configure the instrumentation, download and store the data and provides tools for data presentation and analysis.

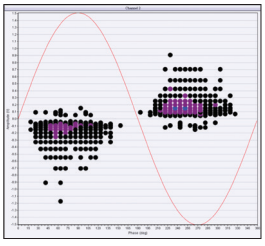
Graphic Results

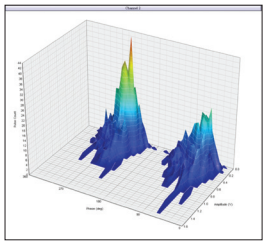
Test results can be presented in all industry accepted formats:

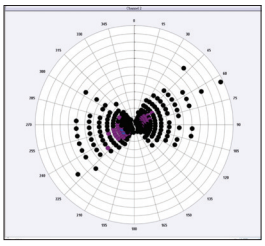
- 2D Phase Resolved
- 3D Phase Resolved
- Polar Phase Resolved
- Pulse Height Distribution
- Trend

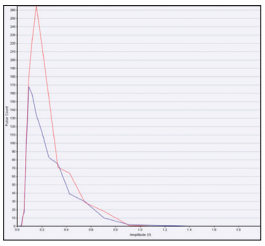


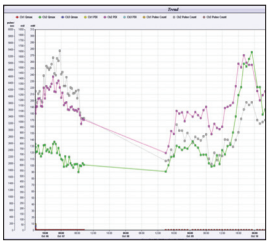
The software allows for the trending of all standard quantities of magnitudes, pulse counts, PD Intensity as well as operating dynamics. Multiple channels can be presented on the same screen for easy comparison and analysis.


2D Phase Resolved


3D Phase Resolved


Polar Phase Resolved

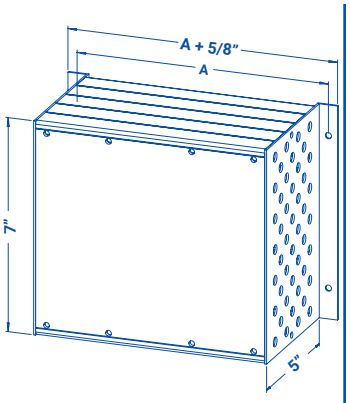

Pulse Height Distribution


Trend

Product Specifications

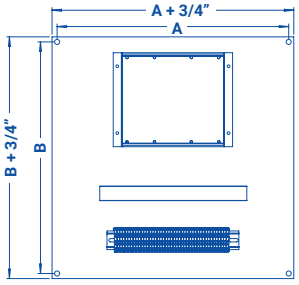
PD Channels:	15 channels per module with concurrent data acquisition
Dynamic Range:	70 dB, 3 mV to 10 V, with no gain adjustment
Power Frequency Phase Resolution:	7.5°
Power Requirement:	90 - 264 VAC line voltage (47 - 63Hz), 100 - 300 VDC
Internal Memory:	8 MB
Magnitude Windows:	32
Measurement Frequency Bandwidth:	1 MHz to 20 MHz
Temperature Range:	-40°C to 70°C (-40°F to 158°F) *Hazardous Location Enclosure certified to: -20°C to 40°C (-4°F to 104°F)
User Interface:	PC

Standalone (S)



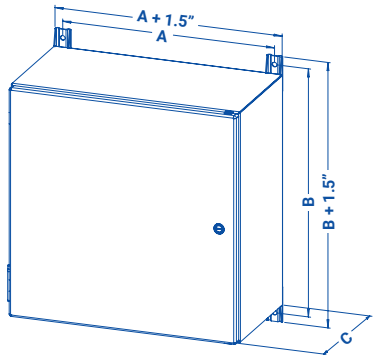
# of Optional Modules	Dimension "A" (Mounting Hole Dimension)
1	20.64 cm / 8.125 in.
2	25.72 cm / 10.125 in.
3	30.80 cm / 12.125 in.
4	35.88 cm / 14.125 in.

Panel Mounted (P)



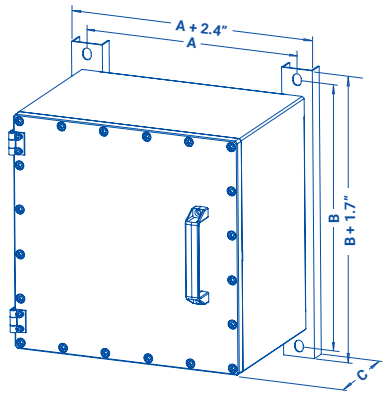
# of Optional Modules	Mounting Hole Dimensions "A x B"
1	31.12 cm x 36.20 cm (12.25 in. x 14.25 in.)
2	43.50 cm x 43.50 cm (17.125 in. x 17.125 in.)
3	Consult Factory
4	

Enclosure Mounted (E)



# of Optional Modules	Mounting Hole Dimensions "A x B x C"
1	31.75 cm x 35.56 cm x 22.86 cm (12.5 in. x 14.0 in. x 9 in.)
2	46.99 cm x 54.61 cm x 27.94 cm (18.5 x 21.5 in. x 11 in.)
3	Consult Factory
4	

Hazardous Location Enclosure (H)



# of Optional Modules	Mounting Hole Dimensions "A x B x C"
1	48 cm x 48 cm x 36 cm (18.89 in. x 18.89 in. x 14.17 in.)
Certifications	
Class I, Division 1, Groups B,C,D	
Class II, Division 1, Groups E,F,G	
Class I, Zone 1, IIB T4	

DYNAMIC RATINGS

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

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