



AT-8300 Rotor Health Monitor

Continuous On-Line Monitoring
Temperature and Ground Fault Resistance Trending for Motor and Generator Rotors

Applications

- Rotor Protection through Condition Based Maintenance
- Predictive Maintenance for large motors and generators
- Increasing production throughput control by improved overtemperature monitoring

Highlights

- RTD monitoring for specific location temperatures
- Temperature monitoring of the field winding (via field voltage/ current calculation)
- Continuous on-line resistance trending of ground faults
- Fault location indication
- Field voltage and current monitoring
- Alarm relay and trending outputs
- Location-specific temperature measurements with RTDs, allowing greater control of motor/generator rotor temperature
- Average winding temperature determined from winding resistance as computed from field voltage and field current measurements
- Quantitative values of fault severity (continuous ground fault resistance measurements on the rotor) for trending or alarms
- Winding resistance measurements that may be useful in diagnosing the presence of shorted turns
- Continuous monitoring for ground faults (the telemetry is always operational – even at 0 RPM when off-line)
- Fault location indicator for ease of diagnosis and repair
- Alarm relay contact outputs



Combining advanced innovations in measurements with digital telemetry for brushless synchronous generators/motors, the Rotor Health Monitor provides predictive maintenance trending data for temperature measurements and rotor field ground fault resistance for condition based monitoring (CBM).

Temperature Measurement:

If the motor or generator has installed RTD's (PT100 style), then the AT-8300 can monitor up to 12 of 3-wire RTD's, with readings updated every 10 seconds. Up to 24 of 2-wire RTD's can alternatively be measured (contact Accumetrics at time of order). If a current shunt is installed at the field negative potential, then the system can measure field current. Using the ratio of the field voltage to the field current, a calculated average copper temperature is then provided. (The shunt is not included.)

Ground Resistance Measurement Technology:

By using 16 bit digital rotor telemetry technology, Accumetrics allows users to monitor fault resistance trends over time and track the progression of ground faults from their onset. This provides the possibility of early warning of impending failure and allows for predictive maintenance. Two adjustable-threshold alarm relay contacts, 4/20mA, and digital data output of all measured parameters are provided, allowing warning, shutdown, and predictive maintenance tracking for ground faults.



Specifications		
RTD Measurements	General Information	PT100 RTD's (installed by user) Up to 12 RTD 3-wire sensors (Also available: 24 of 2-wire RTD's) Approximate 10 second duration to read all RTDs
	Measurement range	-50 °C to +300 °C
	Accuracy	± 1.5 °C
Average Field Winding Temperature	Calculated from directly measured field voltage divided by directly measured field current	
Field Voltage	Measurement Range	0 to 500 VDC. (Contact factory for other ranges)
	Maximum Transient without damage	1000 Volts for 5 seconds
Field Current	Measurement range	Measured by a low level differential voltage from a customer supplied 0-100mV current shunt installed at the negative terminal so that common mode voltage is within ± 0.75 Volts of Vf Negative connection. Two redundant channels are provided.
Ground Fault Resistance Measurement	Measurement Range	0 to 80 MegOhms
	Accuracy	± 250 Ohms ± 2% of reading 0 to 500 KOhms (exclusive of AC content and noise effects from the excitation system)
Ground Fault Location Factor	Range	0 to 100% representing the ratio of the potential at the ground fault to that of the total field voltage (0 if the fault is at negative terminal; 100% at positive terminal)
	Accuracy	+/-1% for a 10KOhm fault and field excitation >= 25V
Receiver Alarm Outputs	Outputs	Two independent relay alarm contacts with user programmable configurations and thresholds. Alarm 1 is always ground fault resistance threshold. Alarm 2 is user selectable for either ground fault resistance threshold or for average field winding temperature.
	Malfunction	Active upon detection of a malfunction in monitor operation or loss of receiver power.
	Alarm Interfaces	Form C relay; 6A, 250 VAC
Receiver Analog Outputs	Standard Outputs	Two channels of 4/20mA current loop, configurable for scale and parameter. Parameters: Earth Fault Resistance (log scale), Field V, Shunt Field I, Field Resistance, Field average Temperature, Shunt mV
Receiver Digital Interface	Computer Interfaces	RS232, Ethernet interfacing to PC based RHM Console Software; full documentation provided for user-developed software
	Output Data	.CSV data and Ethernet streamed readings of Ground fault resistance, RTD readings, field voltage and currents, field winding resistance and resultant winding temperature, ground fault location factor, alarm status.
	User Settings	Earth Fault Alarm Resistance Thresholds, Alarm Dwell Time, Field Current Settings, Analog output 1 and 2 configuration, Alarm 2 threshold settings (Earth fault or Field Temp), Network Settings, Archive setup.
RHM Console Software	Features	<ul style="list-style-type: none"> Control of User Settings (see above) Fault resistance trend graph; numeric display of fault resistance & location, Field voltage, currents, resistance & average winding temperature; RTD temperatures; system status Archival data storage in .csv files for importing into MS Excel.
Rotor Connections	Field positive and negative terminals, rotor ground, RTD inputs, and connections to current shunts (located at the field negative terminal)	
Transmitter Mounting Information	End of shaft mounted transmitter, approximately 150mm diameter, contact Accumetrix for special adapters or other mounting requirements.	
Environment	Ambient Temperature	0 to 85 °C at rotor transmitter 0 to 50 °C maximum at receiver
	Rotor Speed	4320 RPM max (3600 RPM with up to 20% overspeed)
Receiver Power	85 to 250VAC 50/60Hz, <20W	
Receiver Ambient Temperature	0 to 50 °C; thermoelectric cooling is available as an option	



Rear view of transmitter

Connections (front and rear):

RTDs and VF Negative Connections

- Mating connector is included
- Cable is not included

VF Positive feedthrough to topline of transmitter is provided.



Serial RS232 cable for initial setup;
(Ethernet cable not included)

Receiver, with relay
contacts, 4-20mA output,
and Ethernet/ RS232
output

Transmitter

RG58 coaxial cable (tuned length)

Stationary pickup coil



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About Accumetrics:

Accumetrics Inc., was founded in 1992, and became a part of the PCB Group in 2013. The company designs and assembles digital telemetry systems that transmit sensor data from rotating structures using wireless techniques, preserving the integrity of the data even in environments with high levels of electromagnetic interference.

We can provide a range of solutions from single channel products, such as strain gage torque measurements, to advanced multichannel systems that transmit data from hundreds of sensors.

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