Battery Monitoring for NERC Compliance

Monitoring Solution for NERC

The Vigilant-NERC system is Eagle Eye's complete battery monitoring solution for NERC PRC-005-6 Compliance. This standard requires utilities to document and implement programs for the maintenance of all protection systems affecting the reliability of the bulk electric system (BES).

Under NERC PRC-005-6, battery maintenance falls under Table 1-4(f) "Exclusions for Protection System Station DC Supply Monitoring Devices and Systems" with no maximum maintenance interval. This table outlines the monitoring and alarming requirements needed to alleviate periodic on-site maintenance activities. See below for how the Vigilant meets the attribute requirements of this table.

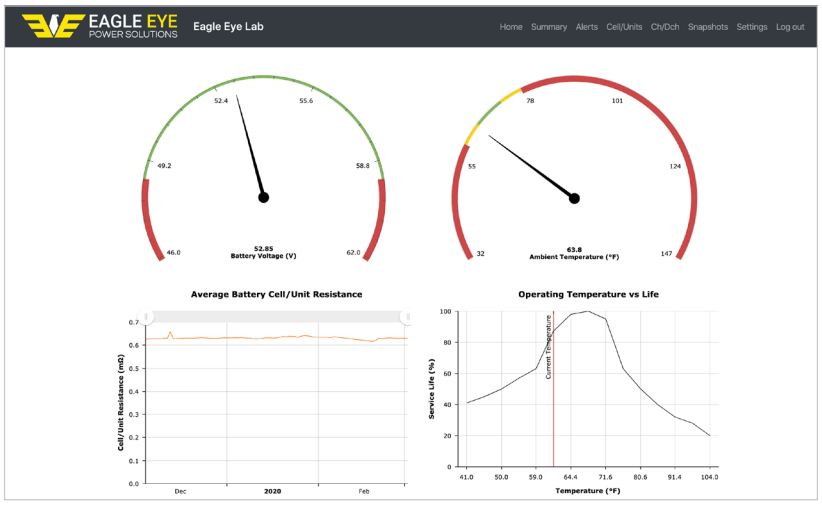
NERC PRC-005-6 -Table 1-4(f)

"Exclusions for Protection System Station DC Supply Monitoring Devices and Systems"
*Maximum Maintenance Interval: No periodic maintenance specified

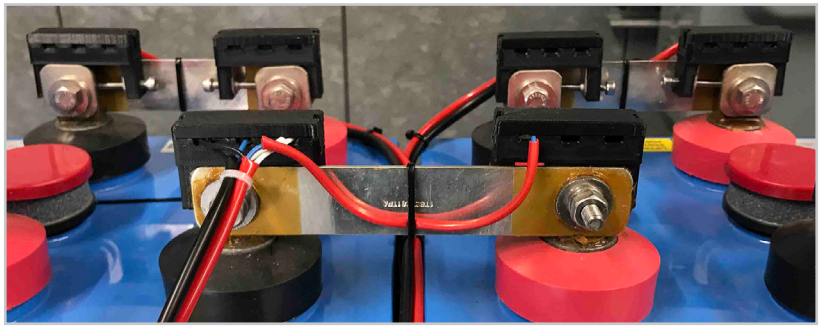
Vigilant Solution	NERC Requirement Attribute	Maintenance Activities
✓ Satisfies	Any station dc supply with high and low voltage monitoring and alarming of the battery charger voltage to detect charger overvoltage and charger failure.	No periodic verification of station dc supply voltage is required.
✓ Satisfies	Any battery based station DC supply with electrolyte level monitoring and alarming in every cell.	No periodic inspection of the electrolyte level for each cell is required.
✓ Satisfies	Any station DC supply with unintentional DC ground monitoring and alarming.	No periodic inspection of unintentional DC grounds is required.
✓ Satisfies	Any station DC supply with charger float voltage monitoring and alarming to ensure correct float voltage is being applied on the station DC supply.	No periodic verification of float voltage of battery charger is required.
✓ Satisfies	Any battery based station DC supply with monitoring and alarming of battery string continuity.	No periodic verification of the battery continuity is required.
✓ Satisfies	Any battery based station DC supply with monitoring and alarming of the intercell and/or terminal connection detail resistance of the entire battery.	No periodic verification of the intercell and terminal connection resistance is required.
✓ Satisfies	Any VRLA or VLA station battery with internal ohmic value or float current monitoring and alarming, and evaluating present values relative to baseline internal ohmic values for every cell/unit.	No periodic evaluation relative to baseline of battery cell/unit measurements indicative of battery performance is required to verify the station battery can perform as manufactured.
✓ Satisfies	Any VRLA or VLA station battery with monitoring and alarming of each cell/unit internal ohmic value.	No periodic inspection of the condition of all individual units by measuring battery cell/unit internal ohmic values of a station VRLA or VLA battery is required.

Key Features

- **State of Health:** Patented machine learning algorithms incorporating new electrochemical parameters calculate cell State of Health and accurately predict in-service deterioration much earlier than current Ohmic methods of testing
- **Battery Risk Factor:** A total of 12 separate parameters and five algorithms predict risk of battery failure
- **True Float Current:** Vigilant's Advanced Multi-Function (AMF) sensors measure true float current without the remanence and temperature problems of Hall-effect transducers
- **Charge & Discharge Current:**The AMF sensors automatically monitor charge & discharge current, additional current sensors are not normally required



Vigilant Web-Server



Battery Post Connections

Sensor Performance	
Working Voltage	0.05 – 18.5VDC
Voltage Resolution	± 1mV
Post Temperature Resolution	± 1°C
Cell Resistance Resolution	± 7μΩ
Strap Resistance Resolution	At 100μΩ strap r: ± 2μΩ
Float Current Resolution	At 100μΩ strap r: ± 1mA
Charge/Discharge Current	Max 800μΩ strap r: ± 0.1% Max 400μΩ strap r: ± 0.1%

Communication	
Onboard Storage	SSD
Memory Capacity	20 years of battery data average, expandable for larger systems
Local Data Download	Via USB port
External Protocols	Modbus TCP/IP, DNP3
Network Interface	RJ45 Ethernet

Electrical Data	
Electrical Supply (from DC supply)	36 – 72VDC 90 – 300VDC 280 – 580VDC
Other Power Options	24V mains supply
System Internal Power	via comms system
Operating Power (from charger)	@ 60 cells: 25W
Operating Temp Range	-4 – 70 °C (25 – 158°F)
Isolation I/P to O/P	1000VDC
Test current @ 2.5V	20A

General	
Dimensions (L x W x H)	Monitor: 50 x 50 x 25 mm (2 x 2 x 1 in.) Sensor: 242 x 200 x 65 mm (9.5 x 8 x 2.6 in)
Certification	CE

Ordering Information

Model No.	Description
Vigilant-NERC	Next Generation Battery Monitoring Solution to Meet NERC Compliance