



Vigilant Battery Monitoring System for NERC Compliance



Product Overview

The Vigilant Battery Monitoring System is Eagle Eye's complete solution for meeting NERC PRC-005-6 Compliance. Within this standard, battery maintenance falls under *Table 1-4(f): "Exclusions for Protection System Station DC Supply Monitoring Devices and Systems."* This table outlines the monitoring and alarming requirements needed to alleviate periodic on-site maintenance activities. The Vigilant is designed to meet and exceed all of these requirements. With a built in web-server, the Vigilant system is equipped to monitor and store all required battery parameters for the life of the battery.

Meeting Compliance

The Vigilant system monitors and alarms for the following battery parameters as required in PRC-005-6:

- **Float Voltage:** Monitoring & alarming of battery float voltage measured at the battery terminals.
- **Electrolyte Level:** Monitoring & alarming of electrolyte level for every cell with infrared sensors.
- **Ground Fault:** Monitoring & alarming for unintentional DC ground fault by measuring earth potential relative to battery voltage.
- **String Continuity:** Monitoring & alarming for continuity by measuring of float current and ohmic values.
- **Cell/Unit Voltage:** Monitoring & alarming of float voltage for each cell/unit.
- **Intercell & Terminal Connection Resistance:** Monitoring each of battery terminal resistance and *each* intercell connection resistance as independent values.
- **Internal Ohmic Value:** Monitoring & alarming of each cell or unit internal resistance by DC pulse.
- **Cell/Unit Temperature:** Monitoring & alarming of each cell/unit temperature monitored at the negative post.

Key Features

- **One-Click Reporting:** Remove guesswork in reporting by easily creating NERC-compliant reports.
- **TPL-001-5 Compliance:** Monitoring of continuity and DC supply voltage for compliance to this standard.
- **Unobtrusive:** System does not affect battery performance in any way.
- **Battery Alarming:** Alarm against user-defined battery thresholds via Modbus, dry contact, or proprietary software.
- **Watchdog Alarming:** The system performs self-checks with a dedicate watchdog circuit and will alarm upon CPU failure, lockup, or loss of power.
- **Fleet Management Software:** Aggregate a fleet of systems on a single interface with bird's eye view alarming.

The screenshot shows the Eagle Eye Power Solutions web interface. At the top is a navigation bar with links: Home, Summary, Alerts, Battery, Discharge, Diagnostics, Reports, Settings, Logout. The main content area is titled 'NERC Report' and 'Station DC Supply PRC-005-6 Compliance Summary'. It contains several status indicators: Battery Float Voltage (Pass), Cell Voltage (Fail), Continuity (Pass), Cell Resistance (Pass), Post Temperature (Pass), Electrolyte Level (Pass), Ground Fault (Pass), and Station DC Supply (Pass). Below this is a 'Station DC Supply TPL-001-5 Compliance Summary' showing Battery Continuity (Pass) and Station DC Supply (Pass). A 'Summary Data' section shows Battery Voltage (V) as 28.24, Battery Current (A) as 0.10, Ambient Temp (°F) as 74.5, and Ground Fault as Pass. A 'Battery & Strap Data' table follows with columns for Max, Average, Min, Cell ID, Cell Voltage (V), Cell Resistance (mΩ), Post Temperature (°F), and Strap Resistance (μΩ). The table lists data for two cells, showing values like 1.37 (Cell 16), 0.17 (Cell 2), 70.77 (Cell 15), 62.28 (Cell 3), etc.

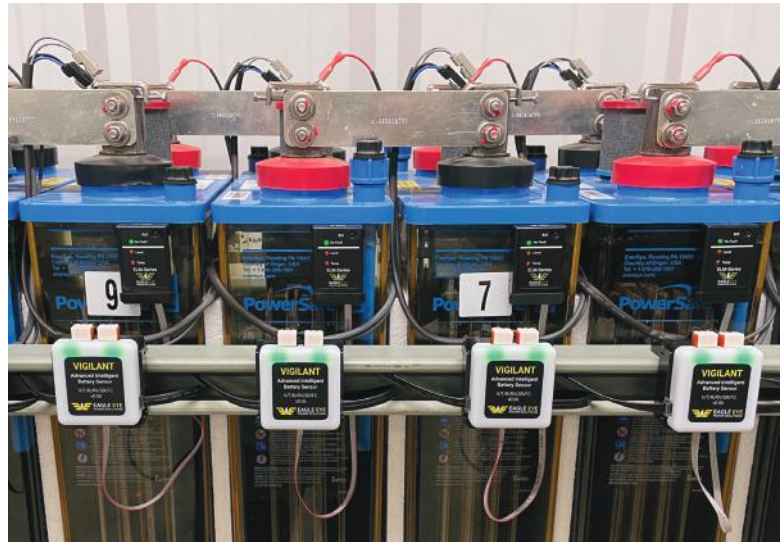
Max	Average	Min	Cell ID	Cell Voltage (V)	Cell Resistance (mΩ)	Post Temperature (°F)	Strap Resistance (μΩ)
1.37 (Cell 16)	1.42	1.48 (Cell 18)	1	1.45	0.36	74.61	cable connection
0.17 (Cell 2)	0.30	0.43 (Cell 18)	2	1.37	0.17	73.27	49.48

One-Click NERC Report

Vigilant System Components

Each Vigilant has the following main components:

- **Monitor:** 1 per battery bank. Records and stores measurement data, interfaces with network. Powered by the charger or external supply.
- **Sensors:** 1 per cell/unit. Pulses battery to record voltage, resistance, and temperature. Powered by the monitor.
- **Wiring Harness:** 2 per cell/unit. Wired connection from sensor to battery posts.
- **Connection Hardware:** 2 per cell/unit. Tab washer or clamp for physical connection of wiring harness to battery posts.
- **Electrolyte Level Sensor (optional):** 1 per cell. Measures electrolyte level.



Vigilant Components Installed



Monitor



Sensor



Wiring Harness



Connection Hardware



Electrolyte Sensor

Technical Specifications

Sensor Performance	
Voltage Measurement Range	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

Communication	
Onboard Storage	SSD
Memory Capacity	20 years of battery data average for 60-cell battery
Local Data Download	Via RJ45 network connection
External Protocols	Modbus TCP, DNP3 (in development)
Alarm Relays	(2) Dry contact output (300V, 1A)
Network Interface	RJ45 Ethernet

Electrical Data	
Monitor Electrical Supply (from DC supply)	36 – 72VDC 90 – 300VDC 280 – 580VDC
Other Power Options	24VDC mains input (for other voltages w/adaptor)
Sensor Electrical Supply	From Monitor (via comms)
Sensor Supply Current	Operating: 6mA With ELM: 10mA
Isolation I/P to O/P	1,000VDC
Test current @ 2.5V	20A

General	
Dimensions (W x H x D)	Sensor: 2 x 2 x 1 in. (50 x 50 x 25 mm) Monitor: 10 x 8.3 x 3.2 in. (255 x 210 x 80 mm)
Operating Temp. Range	-4 – 70 °C (25 – 158°F)