



Vigilant Expert

Utilities

Distribution

Data Centers

UPS



Vigilant Monitor & Sensor

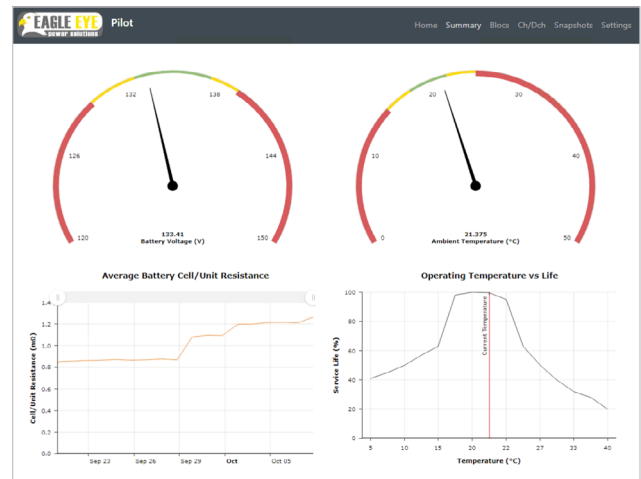
Advanced Intelligent Battery Management System

The ground-breaking Vigilant Battery Management System (BMS) with Advanced Multi-Function (AMF) sensors employs several new ground-breaking battery parameters to predict battery condition. Included in these critical parameters are cell **State of Health (SoH)**, battery **Risk of Failure (RoF)**, and **True Float Current**.

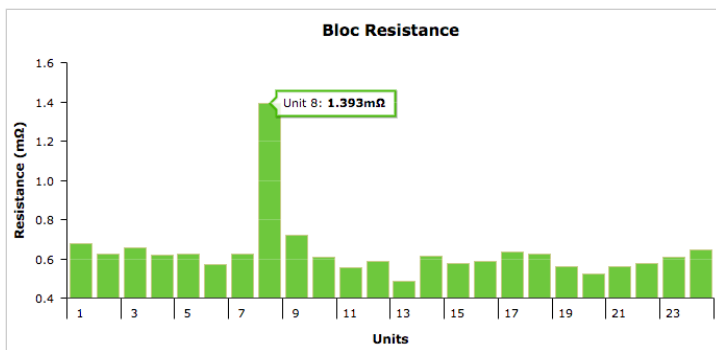
The Vigilant also monitors key parameters outlined in **Table 1-4(f) of NERC PRC 005-6**. This includes String Voltage, Cell Voltage, Cell Ohmic values, Connection Resistance, Negative Post Temperature, Ground Fault, and Ambient Temperature. Battery electrolyte level can be monitored with add-on sensors.

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-Manager Dashboard



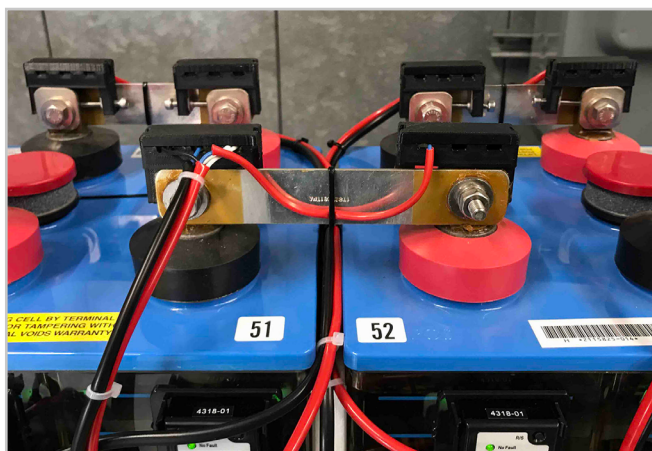
Charts for All Measured Parameters

Web-Based Battery Management

- A key advantage of the Vigilant is how it processes measurement data.
- Rather than simply read and display measured parameters, the Vigilant also uses Artificial Intelligence to calculate the SoH of the battery.
- Measurement data and analysis is done via a built in web-server, which can be accessed with any browser.
- The web-based software eliminates the need for a standalone software package and is viewable on a desktop or mobile environment.

Advantages

- Simple and quick installation, up to 240 cells & 8 strings per monitor
- Can be installed to online battery, without interruption to DC
- On-board web server can be used simultaneously with other protocols (TCP/IP, Modbus, or DNP3)
- Watchdog circuits for notification of hardware failure
- Optional integrated electrolyte level sensors
- Battery connection/strap resistance measured separately from internal resistance
- The Web Manager utilizes proprietary algorithms to provide a complete risk factor analysis with projected end of life



Battery Post Connections



Vigilant Expert Installation

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 Expert	Battery Monitoring Solution