

Sentry-NB4

All-in-One Battery Health Monitor
For Critical Backup Power Systems

- ✓ **Telecommunication/Cable/Broadband**
- ✓ **Traffic Light Control Cabinets**
- ✓ **HPMS - Highway Performance Monitoring Systems**
- ✓ **Solar Powered Radio Stations/Cell Sites**



www.batterydaq.com



Microwave Site



Broadband Cabinet



Cell Site



Substation Support System

Key Features

- **Precise IR** - Internal Resistance/Conductance measurement is performed on each battery with *advanced DC method*, user selectable internal resistance or conductance data display.
- **SOH Evaluation** - Internal resistance and on-going charging/discharging data are utilized to evaluate battery deterioration and failure.
- **SOC and Runtime Calculation** – Proprietary method to calculate state-of-charge percentage and estimate the remaining runtime during a power outage.
- **Equalization/Voltage Balancing** –Two stages auto-balancing to keep all batteries in the optimal charging condition. (This function can be turned off.)
- **Thermal Runaway Prevention** – Intelligent thermal runaway detection at the early stage. Alarm output can be connected to the rectifier/charger to prevent excessive charging.
- **Compact Design** – All-in-one solid design. Permits convenient installation inside or outside of the battery cabinet.
- **Easy to Install** - Simplified premade harness for efficient installation. Plug and play for large scale implementation.
- **Reliable Solid-State Scanning** - (rather than mechanical relays) provides the highest reliability for industrial applications.
- **Access Data/Alarm from Anywhere** - Firewall friendly communication, plug and play, simplified management over large number of sites from anywhere via internet or private network.
- **Supports Site/Building Management Systems** - The system fully supports 3rd party SCADA or site management systems with Modbus-TCP, API and hyperlink to real-time data.

Introduction

The **Sentry-NB4** is an industrial grade battery health monitor designed for 48V (or 24V) systems with single string of 4x12V (or 2x12V, 4x6V) applications. This compact unit combines superior data quality with flexible and streamlined installation, making it suitable for large scale remote cabinets/stations in telecommunication, broadband and substation.

For existing or future 2 strings of 4x12V, please choose [Sentry-NB8](#).

Functions

Sentry-NB4 is designed to automate recommended measurements in IEEE standards for VRLA batteries to ensure safe operation, efficient battery maintenance, and optimal battery service life.

- 1) Continuously monitors Voltage, Current, Ambient and Battery Temperatures to ensure batteries are in the correct float charging condition.
- 2) Detects thermal risk at early stage and generates alarm to prevent battery thermal runaway.
- 3) Online Internal Ohmic monitoring to detect premature or normal deterioration such as **Dryout / Loss of Compression / Swelling and Expansion / Grid or Strap Corrosion / Loss of Active Material / Negative Plate Discharge / and Other Capacity Losing Mechanisms**.
- 4) Provides actionable data and graph via Web and/or PC software for weak battery identification, alarm handling, preventative battery service and battery replacement.
- 5) Enables user to efficiently manage a large number of battery banks and sites nationwide or worldwide.

String Voltage	54.74 V	String High	54.76 V	String Low	54.71 V
Remaining	463 min	Current	-0.1 A	-	-
Total Runtime	463 min	Ambient(Max)	26.2°C (26.2°C)	Pilot(Max)	25.4°C (25.8°C)
SOH(Health)	96.6%	SOC(Charge)	100.0%	ThermalRisk(Max)	0 (0)
Discharge Counter	0	Deep Discharge	0	Full Discharge	0

Batt#	Voltage(V)	IR(mohm)
#1	13.706	4.53
#2	13.730	4.57
#3	13.585	4.52
#4	13.721	4.83

Voltage(V)	IR(mohm)	Resistance(mohm)
13.706	4.53	4.53
13.730	4.57	4.57
13.585	4.52	4.52
13.721	4.83	4.83

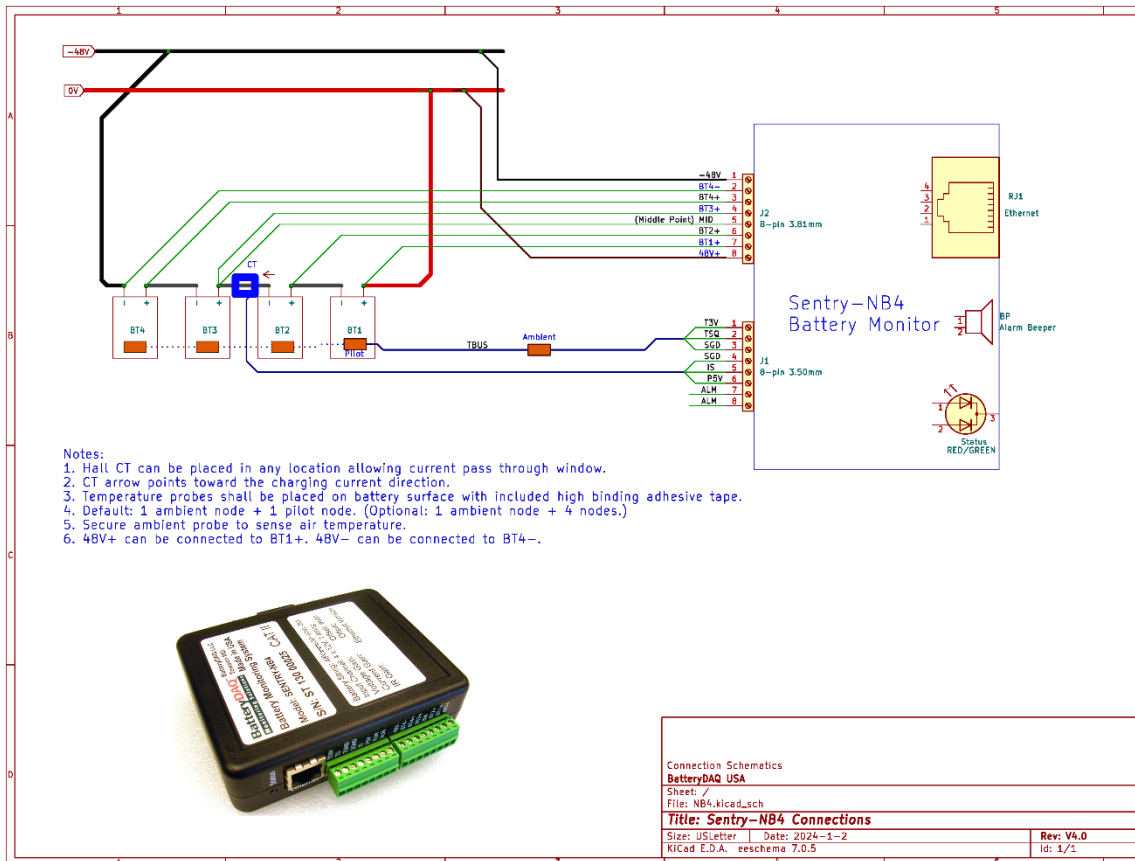
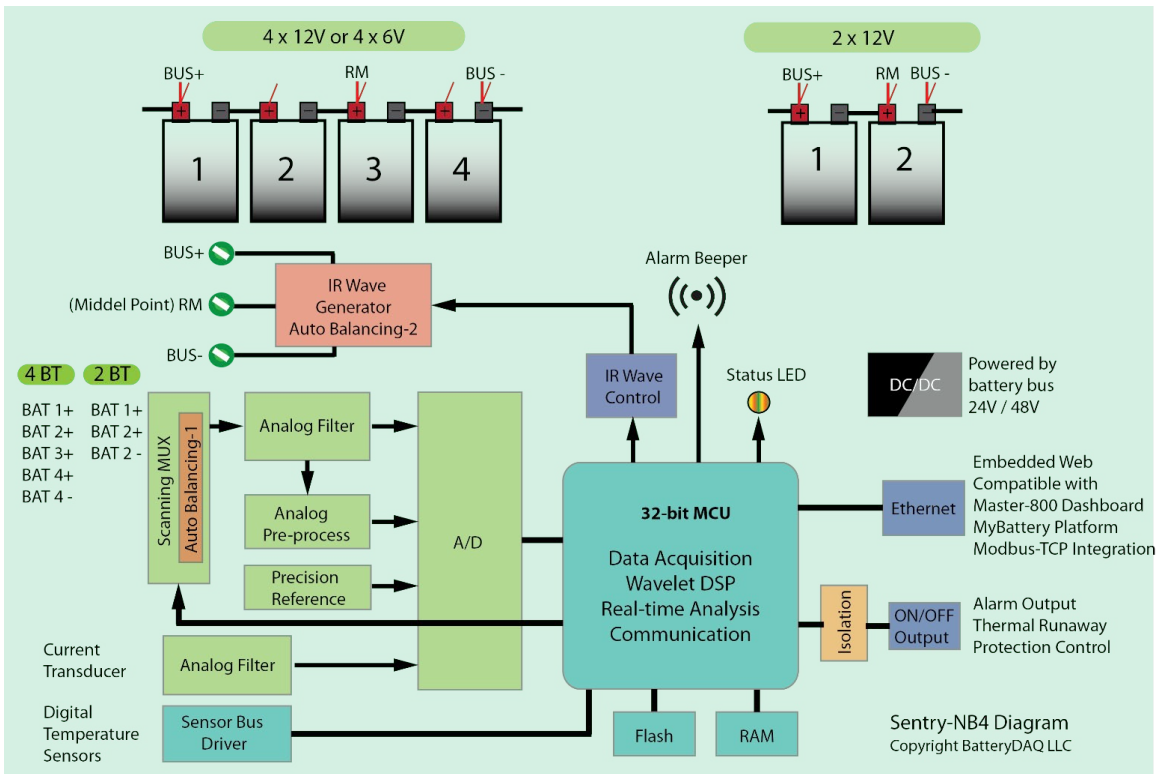
IEEE Standard Reference

IEEE-1188, IEEE Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications

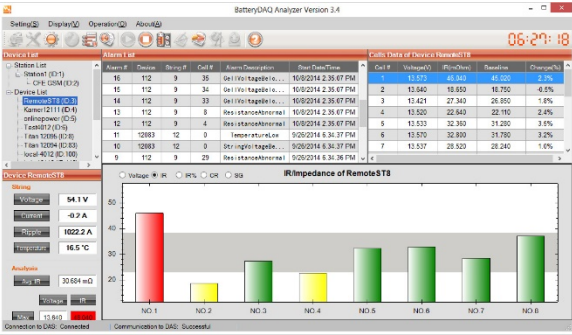
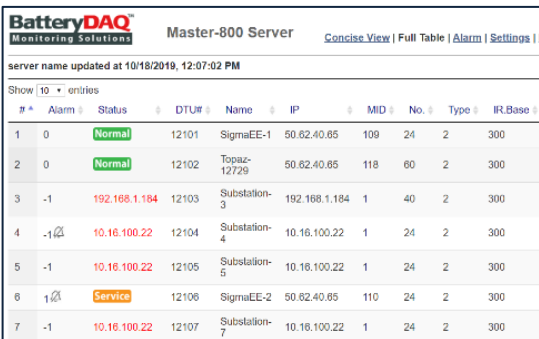
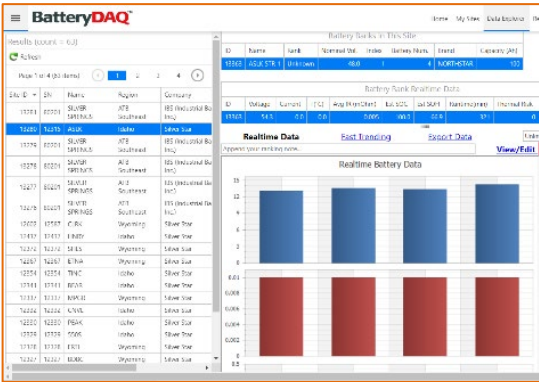
IEEE 1491-2012 IEEE Guide for Selection and Use of Battery Monitoring Equipment in Stationary Applications



System Diagram & Wiring



Centralized Management

Option	Description	Note
<p>Embedded Web Page</p>	<p>Immediate access to battery data/graph with web browser</p>	
<p>Battery Analyzer</p>	<p>PC software to manage multiple systems. Email/SMS alarm. Powered by Microsoft® SQL Server® Express database.</p> 	<p>PC software</p>
<p>Master-800 Dashboard</p>	<p>Effectively manage multiple remote systems nationwide or worldwide in private network, without PC software and IT security concerns. Email/SMS alarm.</p> 	<p>One Master-800 can manage hundreds of remote sites</p>
<p>MyBattery Platform</p>	<p>Secured cloud/public platform for unlimited (1,000,000+) sites and batteries. Access data worldwide with smart phone and/or laptop.</p> 	<p>Subscription to MyBattery Platform</p> <p>Cloud function can be disabled by user for sensitive applications.</p>
<p>SCADA</p>	<p>Modbus-TCP</p>	



Specifications

Power Supply	
Power Input	Internal DC/DC converter, 18-60V input; Maximum Consumption: 3W
Current/Temperature Measurement	
Current Sensor	Supports LEM HASS current sensor with internal +5V power supply. (Default range +/- 50A, window size 20mmx10mm)
Accuracy	0.1% + sensor accuracy
Temperature Sensing	Precision digital sensors, daisy chain nodes for ambient, pilot, or individual batteries. Intelligent thermal runaway detection algorithm
Temperature Range	Measurement range: -40 to 105°C Operating range: -40°C to 65°C (-40°F to 149°F)
Accuracy	1 °C
Voltage Measurement	
Battery Configuration	48V system, 4 x 12V batteries [Default] 24V system, 2 x 12V or 4 x 6V batteries [Factory Customized] Caution: if your NB4 unit is customized for 24V, do not use it for 48V.
Bus Voltage	Range: 18 – 60V; Accuracy: 0.1%
Input Range for Each Channel	+/- 18V for 12V batteries
Accuracy	0.1%
Internal Resistance	
Range and Resolution	0 to 30mΩ, 0.01mΩ resolution
Wire Mode	1-wire mode Internal Resistance for each battery block
Communication	
Ethernet	Onboard Ethernet DTU Embedded web pages for real-time data and configuration/calibration Compatible with Master-800 centralized dashboard and MyBattery Platform™
Indication and Output	
LED Indication	Dual-color LEDs for status and alarm
Audio Alarm	
Control Output	Default Normal Close, 0.1A capacity (Optional setting for Normal Open) Can be used to control charger/rectifier ON/OFF for thermal runaway protection
Dimensions	
Unit Dimensions	115mm(H) x 90mm(D) x 32mm(W), 4.50 x 3.50 x 1.25 in.
Mounting	Two strong magnetic cups Optional DIN-35 rail (a versatile clip included)
Regulatory Approval	
UL Certified E358960-A1	UL 61010-1, 3 rd Edition (Electrical Equipment for Measurement, Control, and Laboratory Use)
Flame Rating	Flame-retardant ABS enclosure, UL94 5VA

***Specifications subject to change without notice**



Ordering Information

Part Number	Name	Description
Sentry-NB4	Sentry-NB4 unit	Default for 4 x 12V, 1 string, up to 200Ah
Sentry-NB4-24	Sentry-NB4 unit, 24V	Customized for 24V system. 2 x 12V, 1 string or 4 x 6V, 1 string
TP107-2N1S-5	Temperature Nodes	Default , 2 digital temperature nodes, 5FT (Ambient and Pilot)
TP107-5N1S-6	Temperature Nodes	Optional, 5 digital temperature nodes, 6FT (Ambient and each individual battery)
CT-HASS-50	Current transducer	Current transducer with 5ft cable
CA-8P-5-1S4-xx	Battery connection harness	Default for 1 string of 4 batteries, 5ft [Specify O-ring size, default 6mm.]
CA-8P-5-1S2-xx	Battery connection harness	Harness for 1 string of 2 batteries, 5ft [Specify O-ring size, default 6mm.]
Master-800	Centralized Web Dashboard	Manage multiple remote sites/battery banks



Application Example

A power company with 300 substations.

Voltage	Battery Configuration	Number of Banks	BMS Selection
48V	4x12V, 1 string	200	200 units of Sentry-NB4
48V	4x12V, 2 strings	50	50 units of Sentry-NB8
48V	2x24V, 1 string	50	50 units of Sentry-2402
125V	60x2V, 2 strings in parallel	300	600 units of Sentry-6002NEMA

Two (1+1 redundancy) Master-800 centralized dashboards aggregate data and alarms from all remote BMS units.

SCADA integration to AVEVA PI system.



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