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Nuvation Energy Battery Control Panel

NUVBCP Datasheet

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1. System Overview

The Nuvation Energy Battery Control Panel aggregates all battery stacks within a multi-stack energy storage system. It enables operation of the overall system as a single unified battery, while still providing stack-level control.

This product functions as a central battery-control hub for all other energy control systems. These may include power conversion systems and/or energy controllers. Through this hub, such control systems can obtain and respond to battery data and send control commands to the battery system.

The Battery Control Panel can be used to manage up to 36 battery stacks in parallel, and will bring up stacks in the sequence best suited to the immediate use-case requirement, i.e. power, energy, or capacity.

The Battery Control Panel provides two crucial battery-level software interfaces for large, multi-stack battery applications:

1. Modbus TCP:
    - Unified view of the entire battery conforming to open energy standards.
    - Conforms to MESA (Draft 3) Models: S801, S802 and S803
    - Used directly by inverters and other grid infrastructure implementing the MESA (Draft 3) standard
2. Web-based configuration and diagnostics:
    - Hosts web-based tools that can be accessed from common web browsers
    - Used to provision firmware upgrades, configure settings and view diagnostic information for the entire battery system

A few key system-level features that are also provided are:

- System-wide statistics for voltages, temperature and currents
- Current limiting algorithms for multi-stack battery systems
- State-of-Charge algorithms for multi-stack battery systems
- NTP client for BMS time synchronization

Figure 1. Nuvation Energy Battery Control Panel

1.1. Multi-Stack System Architecture

A typical multi-stack system, equipped with Nuvation Energy's suite of BMS products, is illustrated in Figure 2. There is a hierarchy of battery management involved, each product fulfilling its role at a different level:

- At the cell level, a Nuvation Energy Cell Interface module measures voltage/temperature and balances cells as required.
- At the stack level, a Nuvation Energy Stack Switchgear unit measures current and connects/disconnects its stack as required, as well as incorporates other stack safety features. Battery safety is handled at the stack level.
- At the system level, a Nuvation Energy Battery Control Panel unit manages all stacks as described above.

For a given stack, the daisy-chained Cell Interface modules report data to and receive direction from the Stack Switchgear. In turn, the Stack Switchgear reports data to and receives direction from the Battery Control Panel. Here, a unified view and central control of the multi-stack system is provided to the user as well as any external devices.

Nuvation Energy Cell Interface modules and Nuvation Energy Stack Switchgear units are sold separately. Datasheets, along with product manuals, are available online at https://www.nuvationenergy.com/technical-resources.

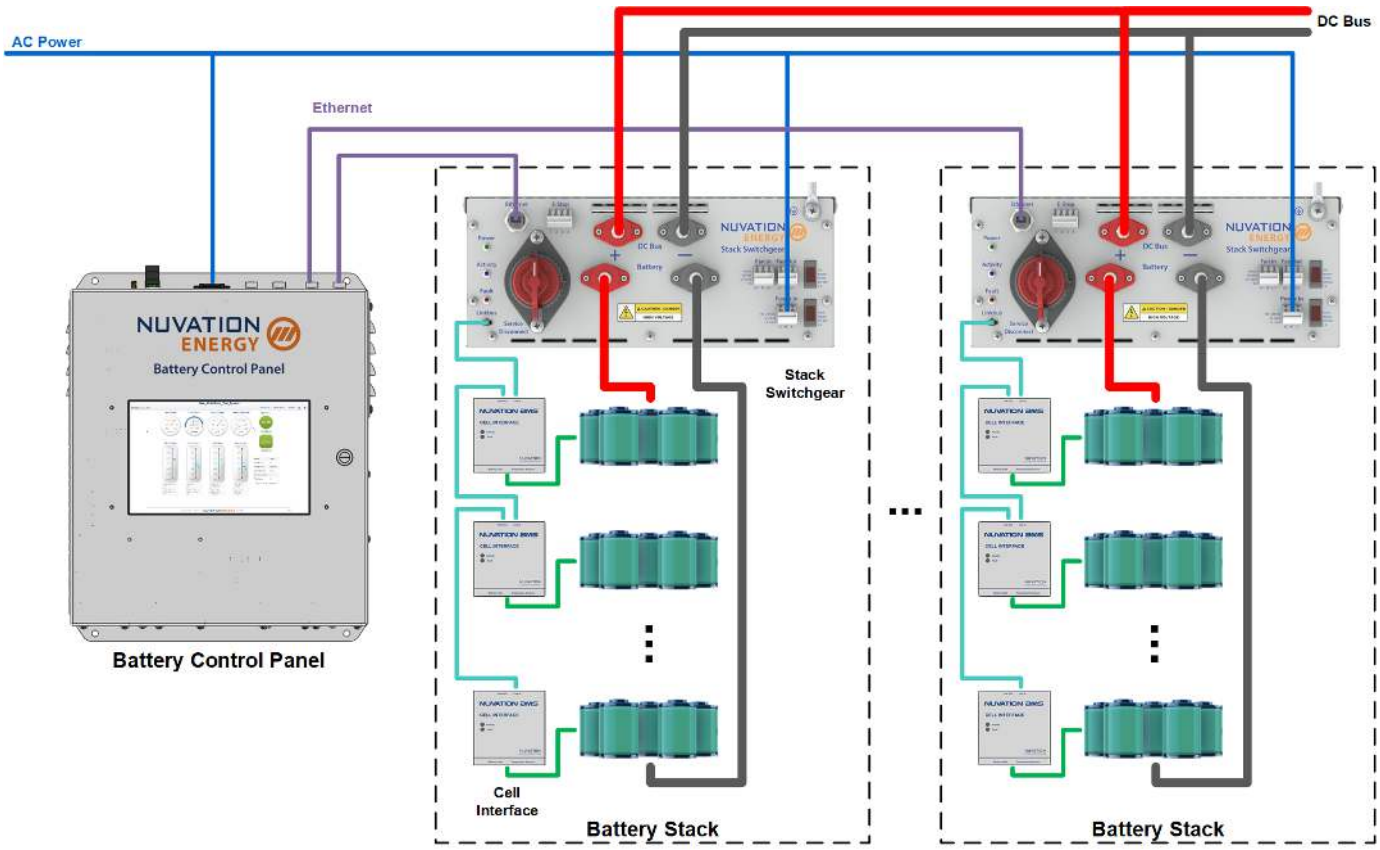

Figure 2. Battery Control Panel multi-stack diagram

Battery Control Panel is offered in variants based on the number of battery stacks to which it will be connected. Variants are available in 4-stack increments, up to a maximum of 36 stacks.

Designed in compliance with MESA (Modular Energy Storage Architecture) Open Standards for Energy Storage (mesastandards.org, draft 3), the Nuvation Energy Battery Control Panel was created specifically for integration with a wide range of batteries and inverters, and is designed to work with Nuvation Energy Stack Switchgear, Nuvation Energy High-Voltage BMS and Nuvation Energy Low-Voltage BMS.

Orderable part numbers are listed in Section 4.

2. Operating Limits

This section outlines the operating limits of the Battery Control Panel.

Exceeding these ratings may damage the system.

2.1. Input AC Power Specifications

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{supply}	Supply Voltage	60 Hz	85	120	132	V AC
	Supply Voltage	50 Hz	187	240	264	V AC
I_{inrush}	Inrush Current (Max)	115 V AC	-	-	13	A AC
	Inrush Current (Max)	230 V AC	-	-	25	A AC
P_{supply}	Supply Power	-	-	115	144	W
f_{supply}	Supply Frequency	-	47	50/60	63	Hz

2.2. Ethernet Specifications

Parameter	Min	Typ	Max	Units
Data Speeds	10	-	1000	Base-T
Jack Rating	-	Cat5e	-	-

2.3. Cellular Specifications

Parameter	Min	Typ	Max	Units
3G HSPA+ Bands	-	850, 1900	-	MHz
4G LTE Cat 1 Bands	-	B2, B4, B5, B12, B13	-	-
Data Rate (Up/Down)	-	-	5/10	Mbps
Coverage Area	-	USA, CAN	-	-

2.4. Environmental Conditions

Symbol	Parameter	Min	Typ	Max	Units
	Thermal Specifications				
T_a	Operating Temperature	10	-	40	°C
	Storage Temperature	10	-	40	°C
	Humidity Specifications				
RH	Operating Relative Humidity	25	-	85	%
	Storage Relative Humidity	25	-	85	%

3. Mechanical Overview

The Nuvation Energy Battery Control Panel is designed to be vertically wall-mounted indoors. It mounts using the flanges that extend out its rear, at the top and bottom of the unit. The suggested hardware for mounting the unit is an M6 bolt with a washer.

The unit weighs approximately 10.43 kg [23 lbs]. A dimensioned drawing is presented in Figure 3. It is recommended to leave 300 mm [12 in] of space below, above, and to either side of the mounted unit. This facilitates airflow through the Battery Control Panel for better thermal performance.

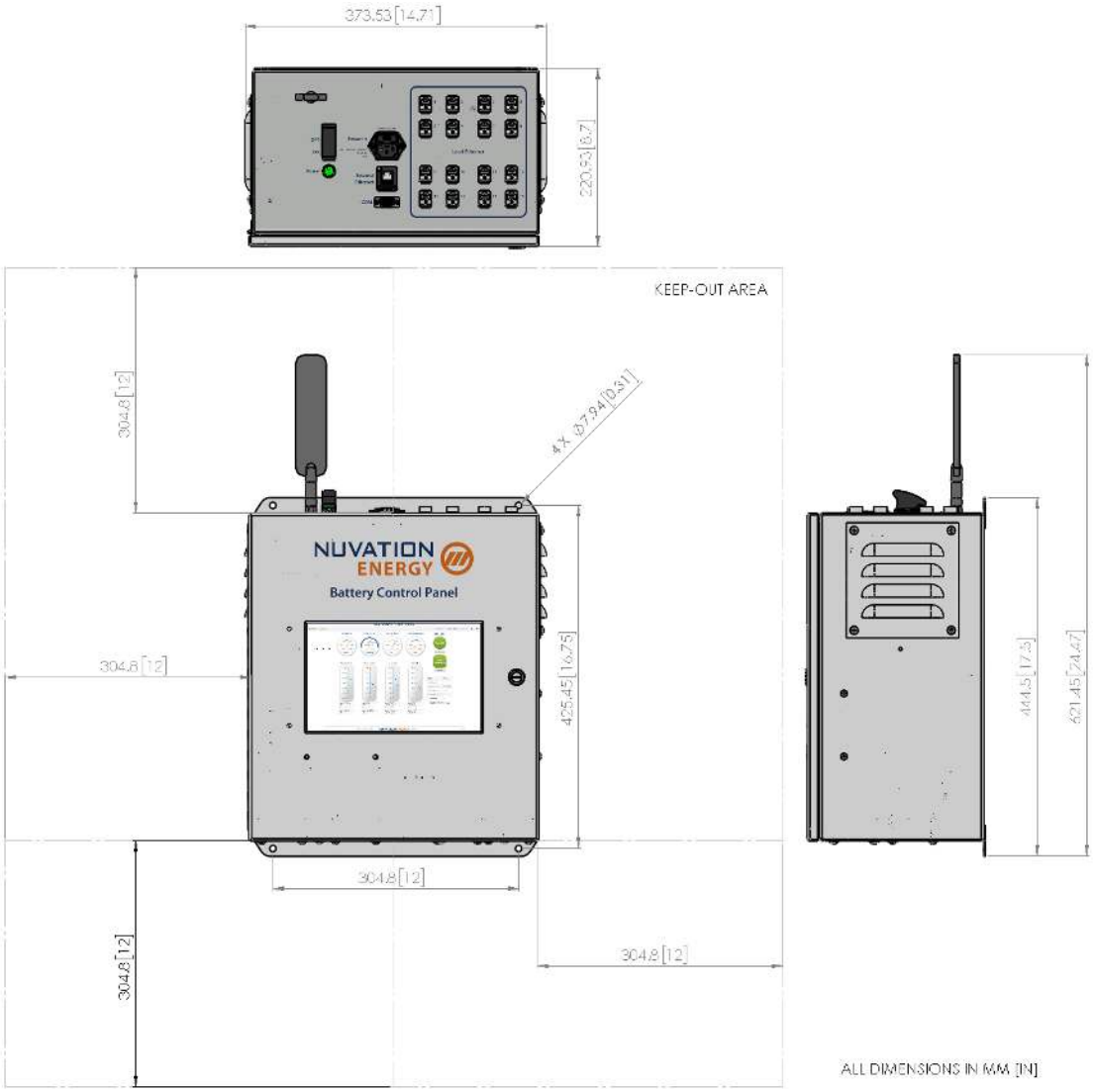

Figure 3. Nuvation Energy Battery Control Panel Dimensions

4. Ordering Information

This section provides orderable part numbers for Nuvation Energy's offerings of Battery Control Panel units.

4.1. Battery Control Panel - Base Product Variants

Battery Control Panel Variant	Part Number
Battery Control Panel, up to 4 Stacks	NUVBCP-4S
Battery Control Panel, up to 8 Stacks	NUVBCP-8S
Battery Control Panel, up to 12 Stacks	NUVBCP-12S
Battery Control Panel, up to 16 Stacks	NUVBCP-16S
Battery Control Panel, up to 20 Stacks	NUVBCP-20S
Battery Control Panel, up to 24 Stacks	NUVBCP-24S
Battery Control Panel, up to 28 Stacks	NUVBCP-28S
Battery Control Panel, up to 32 Stacks	NUVBCP-32S
Battery Control Panel, up to 36 Stacks	NUVBCP-36S

Systems involving more than 16 battery stacks will require an external network (Ethernet) switch to be connected to the Battery Control Panel. This external switch is not provided; an industrial grade, unmanaged switch is recommended.

4.2. Battery Control Panel - Options

Option	Part Number
Cellular Modem: Removal	NUVBCP-OPT-M

The 'Cellular Modem: Removal' option should be specified for site locations outside the USA and Canada.

From time to time Nuvation Energy will make updates to Nuvation Energy BMS in response to changes in available technologies, client requests, emerging energy storage standards, and other industry requirements. The product specifications in this document, therefore, are subject to change without notice.