



NUVATION BMS™

Grid Battery Controller

Installation Guide

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Important Safety Information



The content in this document must be followed in order to ensure safe operation of the Nuvation BMS™

Do NOT energize the system until all connections to the Cell Interface and Power Interface modules have been made.

Properly insulate or remove any unused wires. Unused wires can couple excessive system noise into the BMS which can disrupt communication and lead to undesirable behaviors.

Insulated handling is required of any connector carrying potentials over 600Vdc relative to chassis.

Please be aware of high voltages present in your system and follow all necessary safety precautions.

NOTE: The provided module enclosures are not fire enclosures.

WARNING: Depending on battery chemistry, there might be a nominal voltage per cell which adds up in series and is always present. There are many different battery chemistries with different current capacities, and so high voltage with high current capacity may be present while connecting the Nuvation BMS. You must use proper electrical safety precautions when handling any part of the Nuvation BMS. Neither Nuvation Energy or any of its employees shall be liable for any direct, indirect, incidental, special, exemplary, personal or consequential harm or damages (including, but not limited to, procurement or substitute goods or services; loss of use, data, or profits; or business interruption) however caused and on any theory of liability, whether in contract, strict liability, or tort (including negligence or otherwise) arising in any way out of the use of this product.

IMPORTANT NOTE: The Nuvation BMS relies on your system charger to charge the battery cells; do **not** leave your charger off while the BMS is powered from the stack for prolonged periods of time. The BMS should be shut down when the system is in storage to minimize the drain on the cells.



Introduction

Thank you for choosing the Nuvation BMS™ Grid Battery Controller.

The Nuvation BMS™ is an enterprise-grade battery management system with features that extend battery life, ensuring pack-level safety, data-analytics, and remote management.

The Grid Battery Controller aggregates information and provides a unified interface to a large multi-stack battery system.

You can take advantage of the highly configurable browser-based user interface and custom-tune the Nuvation BMS™ to your specific target application.

About this Guide

This installation guide provides instructions to connect your Nuvation BMS™ Grid Battery Controller to your Nuvation BMS™ system.

Once you have successfully completed the installation process, please follow instructions in the *Nuvation BMS Grid Battery Controller Firmware Reference Manual* for accessing and configuring the user interface.

We thrive on your feedback and what we build is driven by your input.
Please submit support tickets to support@nuvationenergy.com.

System Overview

Nuvation BMS™ Grid Battery Controller is used to aggregate information in systems where multiple stacks are connected in parallel. An example configuration is shown below.

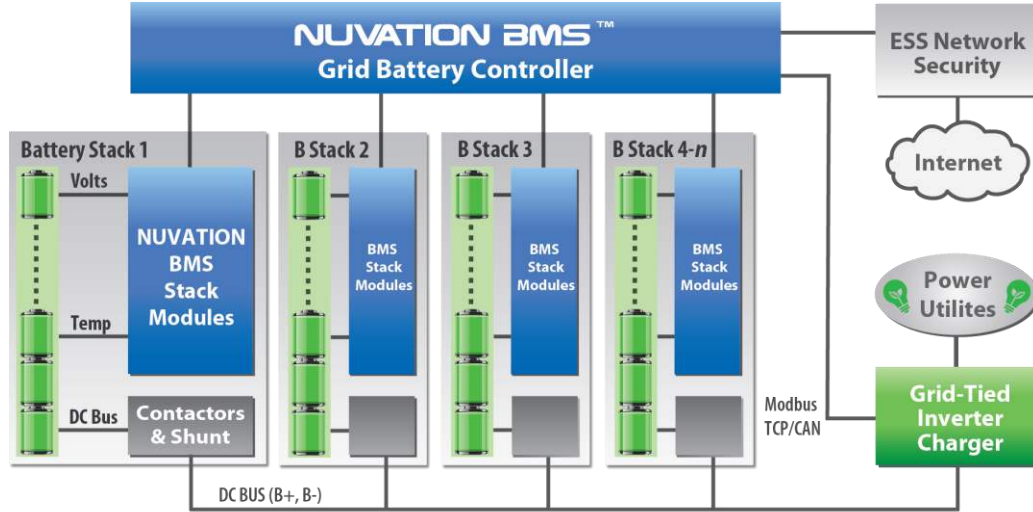


Figure 1: Grid Battery Controller Example System Diagram

Depending on the system, the individual stacks will be managed by either a Nuvation BMS™ High-Voltage Stack Controller or a Nuvation BMS™ Low-Voltage Battery Controller.

The Grid Battery Controller aggregates information from the Stack Controller or Battery Controller in the system and provides a unified interface to the large battery system.

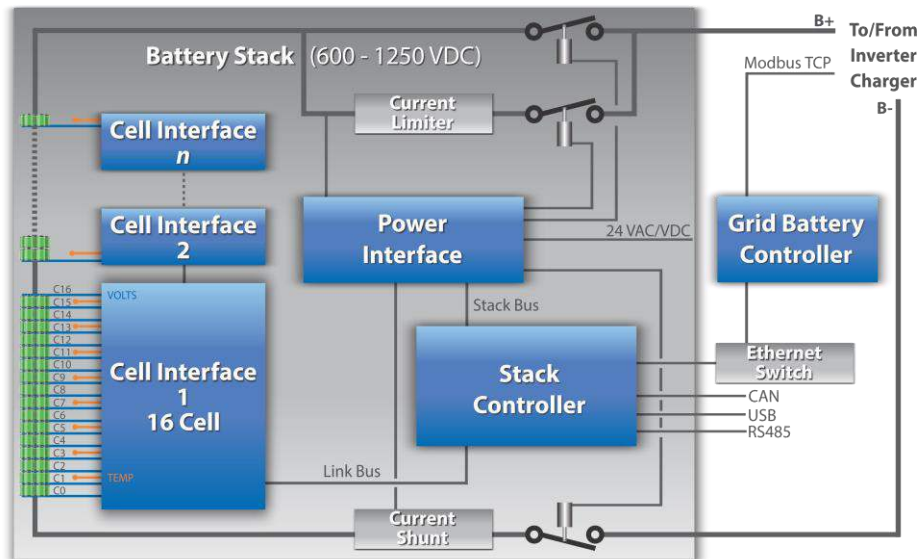


Figure 2: Nuvation BMS™ Example System Diagram

Grid Battery Controller

The Grid Battery Controller (GBC) 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 Models: S801, S802 and S803
 - Used directly by inverters and other grid infrastructure implementing the MESA 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 tapering algorithms for multi-stack battery systems
- SOC/SOH algorithms for multi-stack battery systems
- NTP client for BMS time synchronization

The GBC uses a Linux-based operating system with special provisions in place to guarantee the performance and responsiveness required for real-time inverter control.

Mechanical Dimensions

The overall dimensions of the GBC are 210mm X 140mm X 58mm. It comes standard with DIN clips that enable the GBC to be securely mounted to EN50022-compliant DIN rails. A keep-out area is required around the unit to provide adequate air flow for cooling purposes. Extra space should be provided around the connectors to allow for easy installation and maintenance.

A more detailed mechanical drawing of the GBC is provided in [Appendix A: Detailed Mechanical Drawings](#).

Electrical Connections

The GBC has standard connectors excluding the DC power connector.

DC Power Connector

The DC power connector provides power to the GBC. The power supply tolerates an input voltage between 19.2V and 28.8V. At 24V, it will consume no more than 2.5A. Connect an external power supply to this connector.

Note: the external supply will have its negative input connected to earth ground through the GBC's chassis.

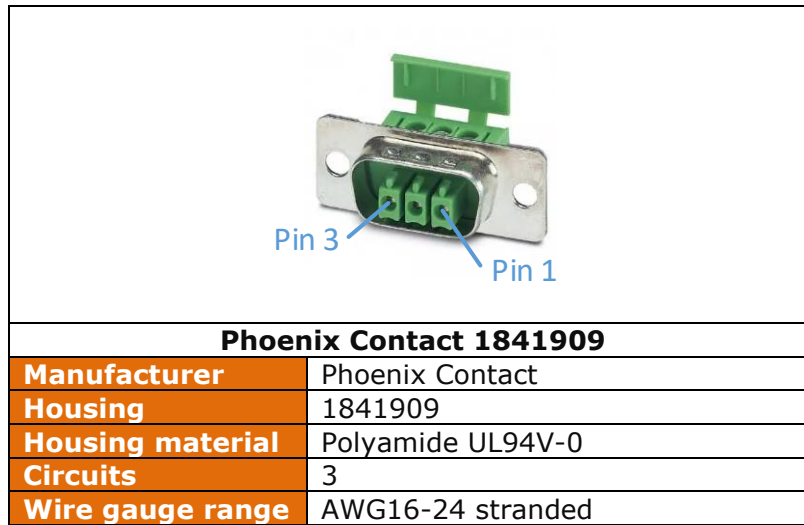


Figure 3: MINI-COMBICON DSUB Connector for Connection to DC Power

Table 1: DC Power Connector Pin Assignment

Pin	Connection	Description	Connected to Device
1	+24V	External Power Supply Input Positive	Connect to external 24Vdc power supply positive
2	No Connect	Not Connected	No Connect
3	GND	External Power Supply Input Negative	Connect to external 24Vdc power supply negative

Appendix A: Detailed Mechanical Drawings

Weight: 2.5kg

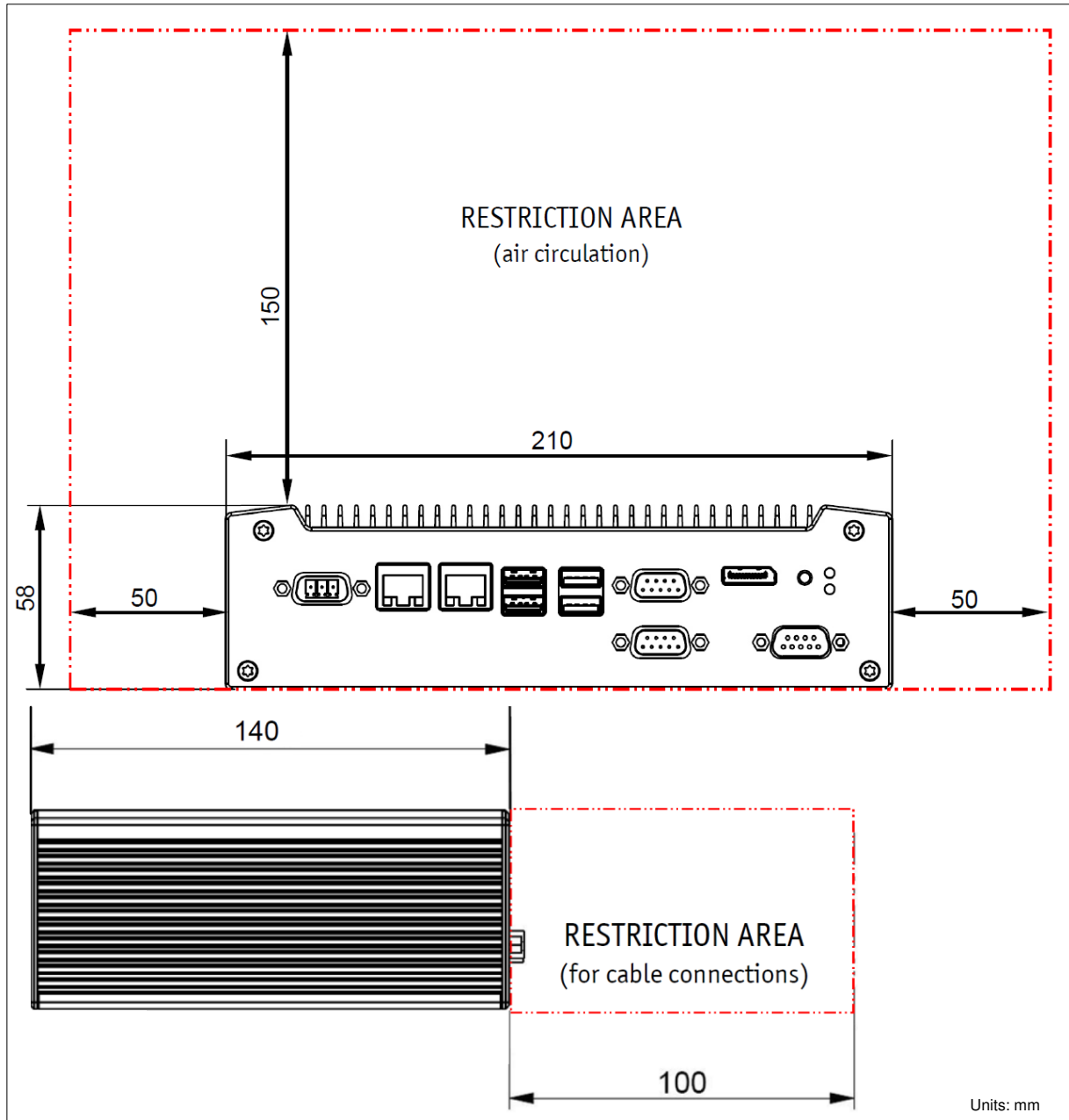


Figure 4: Nuvation BMS™ Grid Battery Controller Mechanical Drawing

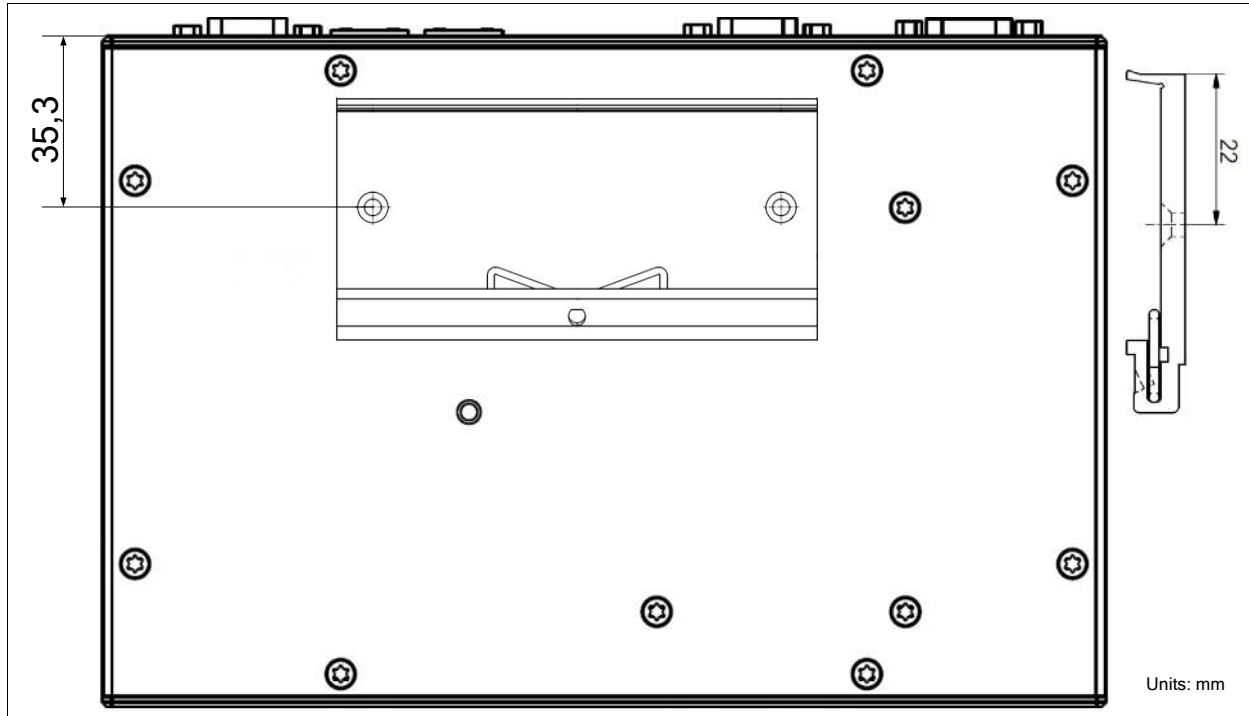


Figure 5: Nuvation BMS™ Grid Battery Controller DIN Clip Location