Orion 2 BMS Migration Guide

Ewert Energy Systems is pleased to announce the release of the **Orion 2** series of lithium ion battery management products. This document serves as an overview of the major distinctions and notable changes between the existing Orion BMS and the new Orion 2 product line as they pertain to the installer.

For purposes of clarity, the existing older Orion BMS product will be referred to as **Orion 1** to differentiate it from the newly released Orion 2 products.

Wiring Harness Changes

- **New Cell Tap Harnesses - Now Gold Plated:** Orion 2 now uses gold plated cell tap harness connectors which typically will last longer in high temperature and high vibration environments. **The older Orion 1 wiring harnesses were tinned instead of gold and CANNOT be plugged into the new Orion 2 units, despite them physically appearing identical and fitting in the same slot. Please see the Purchasing Guide to ensure the correct harnesses are purchased.** Using the older tinned connectors with the Orion 2 will result in long term reliability issues as the contacts inside the connector may break down because they are mating with dissimilar metals. The Orion 2 can be special ordered with older tinned connectors installed instead for use in legacy applications (already wired with older tinned connectors). There may be additional lead times or costs associated with this.
- **New Current Sensor / Thermistor Harness:** The current sensor / thermistor wiring harness is now a larger 28 pin connector that supports up to 8 thermistors (the old harness only supported 4 thermistors). The new 28 pin connector is not backwards compatible with the old current sensor / thermistor harness.

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- **New Current Sensors:** Orion 2 units use the newer DHAB S/100 series current sensors which are more accurate than the previous DHAB sensors. The new DHAB S/100 sensors have a different mating connector (which is included with the pre-wired harnesses sold with the BMS) and a different physical size / mounting arrangement. Please see the DHAB S/100 series datasheets for details.
- **Additional Main I/O Harness Wire Added:** The Main IO harness has 1 additional wire inserted (pin 26) for use with the Multi Purpose Enable output. The physical connector itself remains the same connector as used on the older Orion 1 hardware.
- **Power On Signal Removed:** Orion 2 no longer has the Power On Signal output functionality (pin 14). This pin has been re-purposed and its new function is Multi Purpose Input 2 / J1772 Proximity Detect. The Orion 2 unit now features an LED built directly into the unit indicating the status.
- **Amperage (0-5v) Analog Output Signal Removed:** Orion 2 no longer has the Amperage 0-5v analog output functionality (pin 15). This pin has been repurposed its new function is Multi Purpose Output 2. Additionally the color of this wire has been changed to black / white stranded (was previously solid white).
- **New Multi-Unit Series (Master / Slave) Connection System:** Orion 2 uses a new dedicated high speed communication network to link multiple units together in series. Unlike the old Orion 1 multi-unit series system which used CANBUS to connect multiple units, the new Orion 2 method provides galvanic isolation between units (to break ground loops), operates considerably faster and eliminates the need for multiple current sensors. All settings are now stored strictly on the master (primary) BMS unit which eliminates the need to connect to multiple BMS units with the software utility. **NOTE:** Because of this new arrangement, the Orion 2 BMS is available in multiple packages: those that support remote unit communication and those that do not. Additionally the remote BMS modules are scaled down versions of the BMS that simply relay the data to the master unit. **Please see the Purchasing Guide for more details on ordering units with remote capabilities.**

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Software Changes

- **New Utility For Orion 2:** Orion 2 has a new software utility dedicated to it and is not compatible with the older Orion 1 software utility. Please see the Downloads page on the main Orion BMS website to download it.
- **New Profile Format For Orion 2:** Orion 2 profiles are not compatible with older Orion 1 profiles. Profiles made with the Orion 2 BMS utility now have a new filename extension ".o2bms" to differentiate them from Orion 1 profiles (which have a ".obms" file extension). **NOTE: <u>Older Orion 1 profiles can be imported into the new Orion 2 utility</u>**, however Orion 2 profiles cannot be exported back to the older Orion 1 profile format. Because of differences in features, carefully check all parameters after importing settings from an Orion 1 profile.
- **Firmware Updates Possible on CAN1 and CAN2:** Firmware updates can now be performed over CAN1 or CAN2 on Orion 2 (previously on Orion 1 this could only be performed over CAN1). Additionally, the Orion 2 firmware update process retains the programmed CANBUS baud-rate for the connected interface during the update process (previously on Orion 1 the update process required the BMS to be operating at 500Kbps).
- **Charger Safety Timer Operation:** The Charger Safety timer function (settable on the Relays tab -> Charger Safety -> "Max time [minutes] that relay can stay on") now only counts down while the Charger Safety relay is active (enabled). Previously on Orion 1 this counter would count down whenever Charge Power was present, regardless of whether the output was enabled or not.
- **Thermistor Expansion Module Operation:** The interaction between the BMS and Thermistor Expansion Module has been overhauled for Orion 2. There is now a great deal more data shared between the BMS and the thermistor module, including highest and lowest thermistor ID, number of thermistors actively loaded and average temperature. Additionally the setup process has been significantly streamlined. **Because of these improvements, the Orion 2 requires any connected Thermistor Expansion Modules to be running Firmware Version 1.1 or newer (the BMS will not be able to communicate with expansion modules running older firmware).** The BMS utility should prompt the user to update the firmware on the expansion module (and provide links to the relevant instructions) should a firmware update be needed.

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Hardware Specification Changes

- **User Selectable Isolation Fault Circuit:** The Isolation fault circuit can now be toggled off and on internally without the need to special order the BMS without the circuit loaded. **NOTE: Some applications may still require the isolation detection circuit to be physically unloaded due to isolation requirements. Please see the Wiring Manual for details or contact support.** The isolation fault detection is now measured from cell 1- to the 12v/24v negative on Orion 2. On Orion 1, the isolation fault detection had been measured from the pack negative on the total pack sensor. **The order of the connectors is now important because the isolation fault detection is taken from cell 1-.**
- **New Enclosure Design:** The Orion 2 enclosure has been reworked from the ground up to decrease weight and size and improve reliability. The new enclosure has different mounting hole locations, connector locations, flange size, height, width and length. Additionally the heatsink is now removable (minimum heat dissipation requirements still apply). Please see the Mechanical Drawing documents for the Orion 2 product for more details on the new enclosure dimensions.
- **Total Pack Voltage Sensor Removed:** The total pack voltage sensor, which was a dedicated full stack voltage sensor on Orion 1, has been removed on Orion 2 as it is no longer necessary. Orion 2 will still produce the total stack voltage value by summing up all the connected cells. This produces a much more accurate total stack voltage value than the dedicated total stack voltage sensor did on Orion 1.

Many Additional Improvements And Features Added: Please see the “What’s New In O2” document for a more extensive list of additional features and changes.

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