

Using the Orion BMS with 3rd Party Thermistors

The Orion BMS, Orion BMS 2, Orion Jr BMS and thermistor expansion modules can be interfaced with many 3rd party thermistors such as those that may be found already embedded within a battery module or cell. All BMS models and thermistor expansion modules can be directly interfaced with 10K NTC thermistors with a B 25/50 value of 3380K. The Orion Jr BMS, Orion BMS 2 and Thermistor Expansion Module support 10K NTC thermistors with B values other than 3380K (values must be programmed into the device.) If thermistors with a B value other than 3380K are required on a standard original Orion BMS (black metal enclosure with integrated heatsink), an external thermistor expansion is usually required. All thermistors connected to any one BMS unit or thermistor expansion module must all have the same B value (i.e. a battery pack can consist of thermistors all with a B value of 3380K or all thermistors with a value of 4500K, but the values cannot be mixed and connected to the same BMS unit or thermistor expansion module. Thermistors must be properly electrically isolated from the battery pack.

Different B values on standard Orion BMS

While the standard original Orion BMS unit is designed and calibrated to operate with thermistors with a B value of 3380K, a thermistor with a slightly different B value may cause an inaccurate temperature reading by only a few degrees celsius. This is not recommended, but may still be suitable for certain applications when more restrictive temperature limits are used. Temperature differences from thermistors with a different B value may appear fairly normal at room temperature and will become most pronounced at the most extreme temperatures (i.e. -40C and +80C) This must be calculated by the user to determine if temperature limits will be sufficiently accurate in worst case scenarios. We recommend using the Orion BMS 2 or using an external thermistor expansion module for thermistors with B values other than 3380K.

Use with 100K Thermistors

The BMS and thermistor expansion modules are not directly compatible with 100K thermistors, however they can be special ordered in larger volumes to support thermistors with a nominal resistance of 100K. Minimum order sizes and additional costs apply for special orders.

Non-compatible thermistors & diodes

None of our BMS products or thermistor expansion modules are directly compatible with thermocouples, diodes (used as temperature measurement devices, such as ones found in "Energius" battery modules) or powered thermal monitoring devices. Likewise, none of our BMS products or thermistors are compatible with thermistors that are not sufficiently electrically isolated from the battery pack. In those cases, a customized thermal monitoring system may be needed. In many cases it may be more cost effective to embed compatible thermistors in the pack rather than attempting to use built in thermistors.

Electrical Isolation & Use with integrated thermistors

It is absolutely essential that thermistors connected to any of our BMS products or thermistor expansion modules are electrically isolated from the battery pack with sufficient isolation. The isolation must be safety rated and must be large enough to prevent arcing even in the event of large transients. For many battery packs, this often means at least 2.5kVrms or 5.0kVrms rated isolation (always consult any applicable standards, regulations, codes or laws for your application.) While some battery packs have integrated thermistors, not all batteries are designed with isolation for high voltage operation. (i.e. a battery pack made for a 48V application may have isolation for 48v which may fail if multiple modules are used in series.)

Even though thermistors may be potted in a ring terminal and have a rated isolation voltage, we do not recommend attaching thermistors to electrically live components such as busbars or terminals due to the risk of shorting. Damage to or a failure of a thermistor's isolation in this configuration can lead to a catastrophic short.

Extending Thermistor Wires

The thermistor wires can be lengthened or shortened if necessary since the additional resistance of the wire is very small compared to the resistance of the thermistor.

Thermistor Details

The following thermistors are sold with the Orion BMS:

1 or 2 Meter Thermistors:

Cantherm part number: CWF1B103F3380

Datasheet:

http://www.cantherm.com/wp-content/uploads/2017/05/CWF_11x17_OCT_2014_1.pdf

Wire size: 26AWG

0.2 Meter Thermistors:

Cantherm part number: MF52C1103F3380

Datasheet: http://www.cantherm.com/wp-content/uploads/2017/05/cantherm_mf52_1.pdf