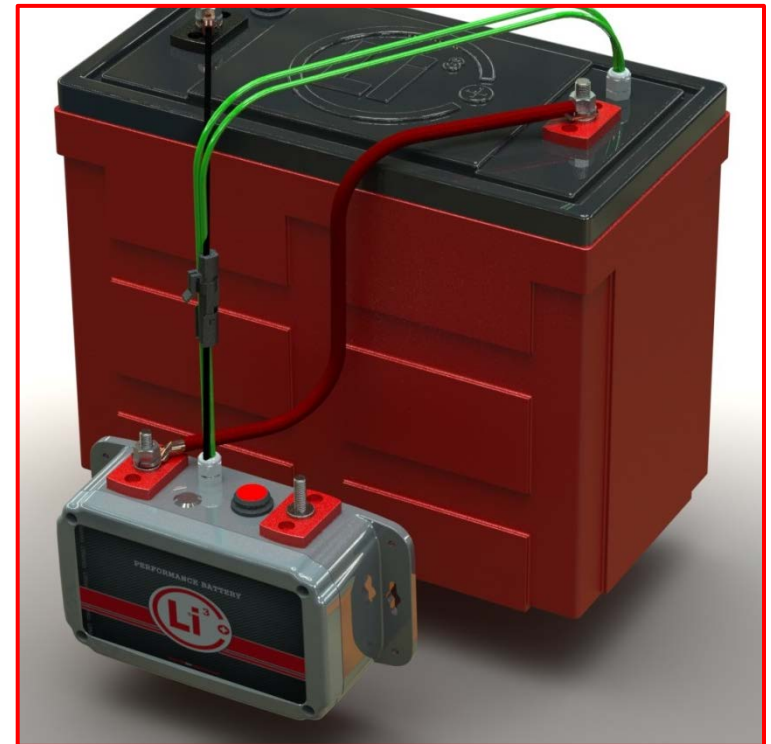


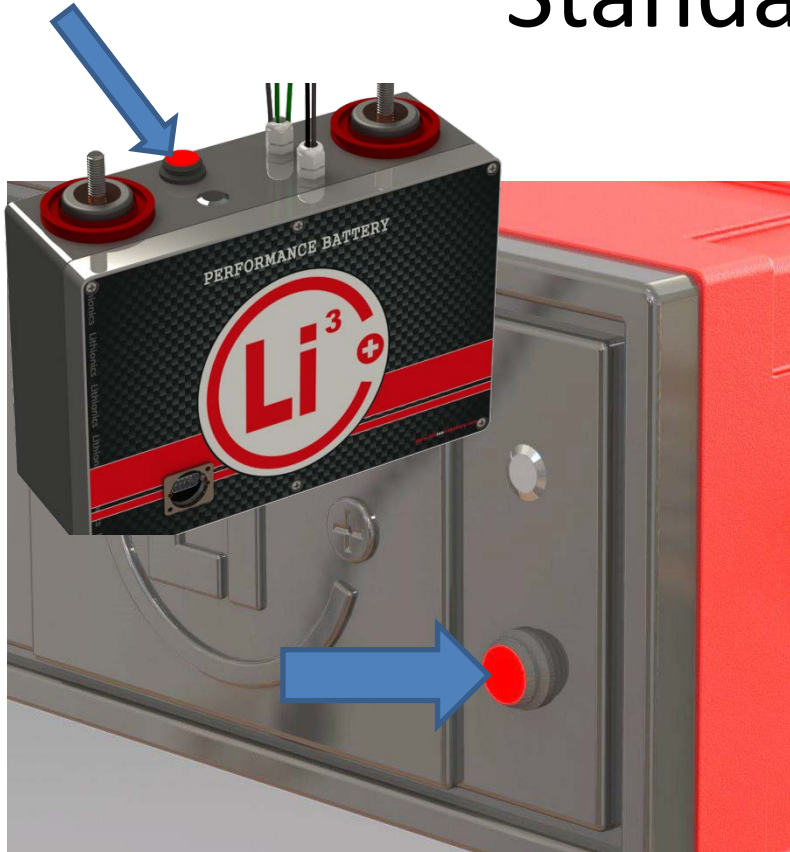
User Guide to Battery Management System Switch Functions: Lithionics Battery CTRL-Type NeverDie® System* Read This Entire Manual (8 Pages)

- Example: Internal BMS
- Example: External BMS



*** Note: This Guide Covers the Full-Range CTRL200, CTRL400, CTRL550, CTRL600 and CTRL1000 Series NeverDie® BMS. Does Not Apply to the 4M, 6M and 8M Series BMS Series Used on Engine Starting Batteries.**

Switch Functions for a NeverDie[®] Standard BMS

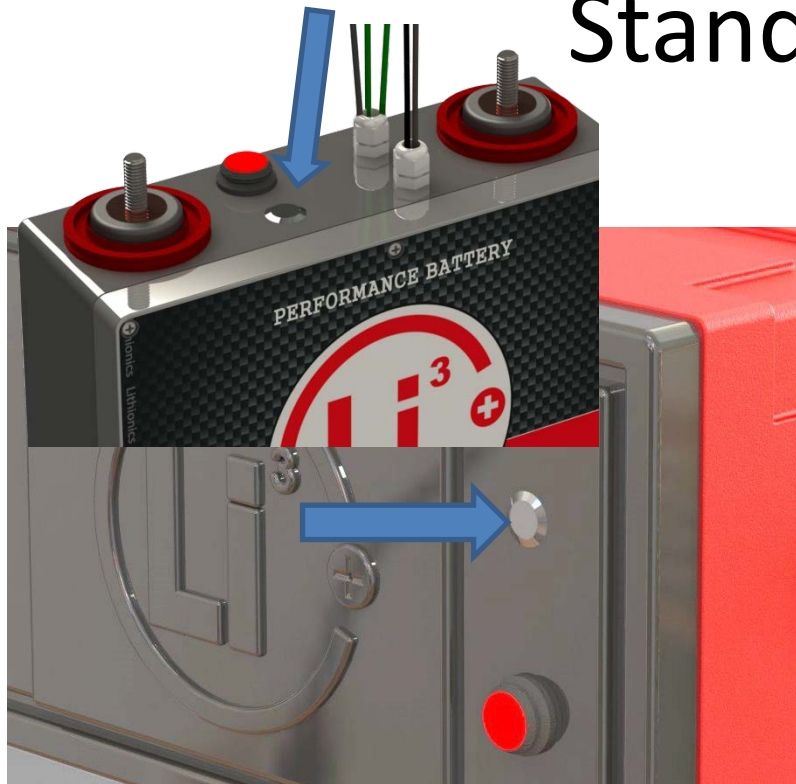


- Switch Definitions:

Power-On-Off

- Pushbutton Latching Type, Illuminated (Normally Red) via a Low Current LED
 - Press Down to Latched Position to Turn Battery ON, LED Light Illuminates
 - Press Down and Release to UP Position to Turn Battery OFF. LED Turns OFF also.
 - Controls the Power to the Main ECU
 - Must be in the ON Position to Enable Charging
 - A BMS Trigger Event (Low Voltage Cut-Off/LVC, High Voltage Cut-Off/HVC or Excessive Shunting-Balancing at End of Charge Cycle Will Turn Red LED to OFF even though the button is DOWN/ON
-
- In Daily Use, the Red Power Button Stays Latched (On). See Additional On-Off Functions on the “RESET BUTTON” Section.
 - Long Term Storage: If the Battery is to Remain Unused for a Period Longer Than 1 Week, Power-Down the Entire System and Electronics Using the Red On-Off Switch. This Greatly Reduces the Quiescent or Parasitic Drain of Power from the BMS Computers and Sensors.

Switch Functions for a NeverDie[®] Standard BMS



- Switch Definitions:

Reset Button Use: Part 1

- A Momentary Pushbutton (Non-Latching) Stainless Steel Round Button
- Used to “Wake Up” the Battery After a “BMS Trigger Event” Such as Over Discharge (LVC or Low Voltage Cutoff) or Over-Charge (HVC or High Voltage Cut-off) Protection is Enabled.
- Requires the Red Power Switch to Be ON.
- The BMS is an “Intelligent Circuit Breaker” and Disconnects Power from the Lithium Pack (Inside) from the LOAD or Positive Terminal.
- OPERATION: Press-and-Hold DOWN for 1 Full Second then Release the Switch. The BMS will Latch to the ON Stage and React According to the Battery State-of-Charge as Follows:
 - LVC or Depleted Battery: Activate the Reset Switch to Power-On the Battery for 30 FULL SECONDS to Enable Charging. If the BMS Does Not “See” a Charge Voltage Rise, the BMS will Turn OFF After 30 Seconds to Protect the Battery from Further Discharge. Most Chargers WILL NOT Send in a Charge Current if the Battery is OFF or in SLEEP MODE Because the Charger “SEES” Zero Volts! Therefore, the Reset Button Must be Pressed and the Charger Must Activate Within 30 Seconds.
 - Press the RESET Button Per Above to Obtain an Additional 30 Seconds of BATTERY-ON to Initiate Charging.
 - NOTE: Our BMS has “LIVE VOLTAGE SENSING” or an Automatic Wake-Up if your Charger has a Pre-Charged Capacitor/Voltage Pulse, Thus Avoiding the Need to Press the RESET Button to Initiate Charging.

Switch Functions for a NeverDie[®] Standard BMS

- Switch Definitions:

Reset Button Use: Part 2

- The Reset Button will also force-on a battery in the event of an over-charge (HVC) event, or, an excessive Cell-Balancing (Shunting) Event. Press-and-Hold for 1 Full Second then Release. If the battery does not stay ON, then, it means the cells are over-charged and still shunting. The Cell Balancers have PTC resetting fuses built in, and if the temperature inside is excessive, the battery will remain OFF until the fuses re-set.
- Once the Battery Shunting has subsided and the PTC fuses have automatically re-set, then, the BMS has “Automatic Re-Enable” firmware and will automatically turn itself to ON when the conditions are safe.
- BMS “Behavior” patterns are normally a sign of perfect working order, although many users assume the BMS is defective. Please contact Lithionics Battery with questions you may have before concluding the electronics are faulty.
- POWER RESERVE: Customers who order the BMS with our NeverDie[®] Power Reserve will press the reset button for 1 second and release to activate a “fuel reserve” of 10 percent.
- All BMS units have a small NeverDie[®] Power Reserve that when activated by the reset button per above, will permit an additional 30 seconds of battery activation to permit emergency engine starting along with re-charging.
- BUILT-IN SAFETY FEATURE: In normal use, the Red Power Button remains latched in the ON state. It is often necessary to power-down the system to de-power the positive discharge terminal on a battery with an Internal NeverDie[®] or the LOAD SIDE terminal of an External NeverDie[®] BMS for purposes such as a lock-out/tag-out service event. It is not necessary to de-power the battery from the Red Power Switch as this would disconnect power from an optionally installed State of Charge Meter Kit. You may temporarily power-down the battery as follows: PRESS-AND-HOLD the RESET Button down for FIVE FULL SECONDS, then RELEASE. Using a Volt Meter, safety confirm the battery terminals have gone to ZERO Volts. The BMS ECU remains active. When your service event is completed, press the reset button for 1 full second and release, and the BMS will turn the battery to the ON state. This feature will only work if the Red Power Switch is latched to the down-and-on position.

Switch Functions for a NeverDie[®] Standard BMS

Supplement: Troubleshooting and Helpful Facts

If your BMS does not come out of sleep mode, i.e., does not respond to the re-set switch function, it may be the result of over-discharge and a natural self-discharge that reduced battery power reserves to the point where the BMS will not function. It will become necessary to apply a **LITHIONICS APPROVED Lithium Ion Charger** as follows:

Part 1: Internal BMS Batteries These are Supplied with a **SERVICE TAP**

View 1 Below: NORMAL CHARGING, Power Button is Down/On/Illuminated



Switch Functions for a NeverDie[®] Standard BMS

Supplement: Troubleshooting and Helpful Facts

Part 1: Internal BMS Batteries These are Supplied with a SERVICE TAP

View 2 Below: Charging to the SERVICE TAP or SERVICE PORT

The Service Port is Normally Covered with a Red Plastic Protection Boot. Remove the Boot by Cutting Off the ZIP-TIE.



Switch Functions for a NeverDie® Standard BMS

Supplement: Troubleshooting and Helpful Facts

Part 2: BMS By-Pass Charging an External NeverDie® BMS

System Example

See Next Page...



Switch Functions for a NeverDie[®] Standard BMS

Supplement: Troubleshooting and Helpful Facts

Part 2: BMS By-Pass Charging an External NeverDie[®] BMS

INSTRUCTION: 1) Attach a Lithionics-Approved Charger That Matches the Voltage of your MODULE. In this example, use a 12 Volt Charger, NOT a 24 Volt Charger. Apply/Attach/Install the Charger to the PLUS and MINUS Terminals On the Module Only 2) ALL Modules Must Be Charged to 100% State of Charge

Note: BMS By-Pass Charging Will Void Your Warranty Unless You First Contact Lithionics Battery for Support and Approval

Normal 24V Charger Installation Points

