

Smart Battery Monitor

User Manual



SBM-01



Designed & Manufactured by



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PROformance Add-On Device User Manual



Applicable Models

Model	Part Number
U1LiFePRO™ Smart Battery Monitor Kit	903-09472-001
PROTRXion™ 48V60-TRX-HD Smart Battery Monitor Kit	903-09472-002
PROTRXion™ Smart Battery Monitor Kit	903-09472-003
PROTRXion™ 12V100 24V60 Smart Battery Monitor Kit	903-09472-004
PROTRXion™ 48V60 (Old Pinout) Smart Battery Monitor Kit	903-09472-005

Release Date	Revision	Scope of Change
2023-08-04	V1.9	Minor edits to V1 release

Document Information

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Technical Support

If you have any technical questions regarding the PROformance Add-On Device, please contact our technical support team at:

Phone: **+1.877.423.4242**

E-mail: **tech_support@inventuspowers.com**

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Thank you for choosing Inventus Power, the leading provider of advanced battery and power systems for global OEMs.

The SBM-01 is a intelligent battery monitor, specifically designed to complement Inventus Power PROformance batteries with an operating voltage range between 9 - 60VDC. With integrated intelligence, the Smart Battery Monitor can receive data from the battery system to communicate battery health, critical battery data, as well as indicate low battery capacity (Limp Home Notification), so the system can return safely back to a charging station.

We've made the SBM-01 easy to install and intuitive to setup.

- Quick installation and set up
- For step-by-step instructions, refer to this manual for easy-to-follow directions
- Need more help? Contact **Tech_Support@inventuspower.com** or **+1.877.423.4242**

Safety and Tools



Before working with any electrical products or where electricity is present, the following guidelines are required:

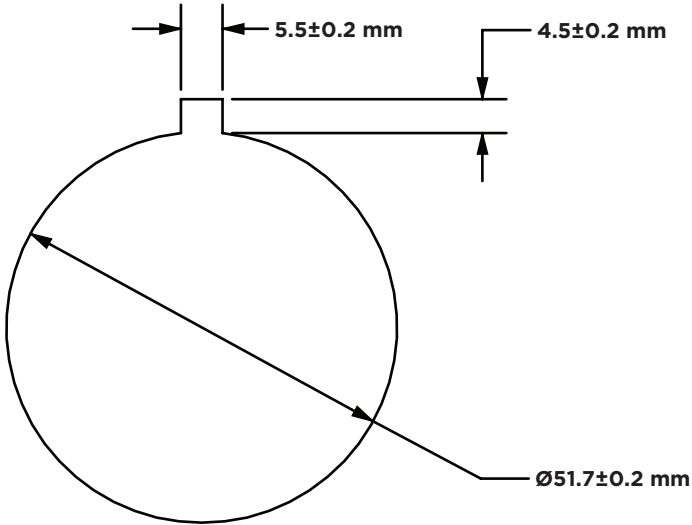
- Turn off system power, disconnect battery, and place battery in ship mode
- Proper PPE (Personal Protective Equipment)
 - Rubber gloves
 - Safety glasses
- Removal of any jewelry



Tools Needed

- Drill and 51mm hole cutter
- Hand saw
- Insulated torque wrench
- Insulated Philips Screwdriver (optional)
- Sandpaper

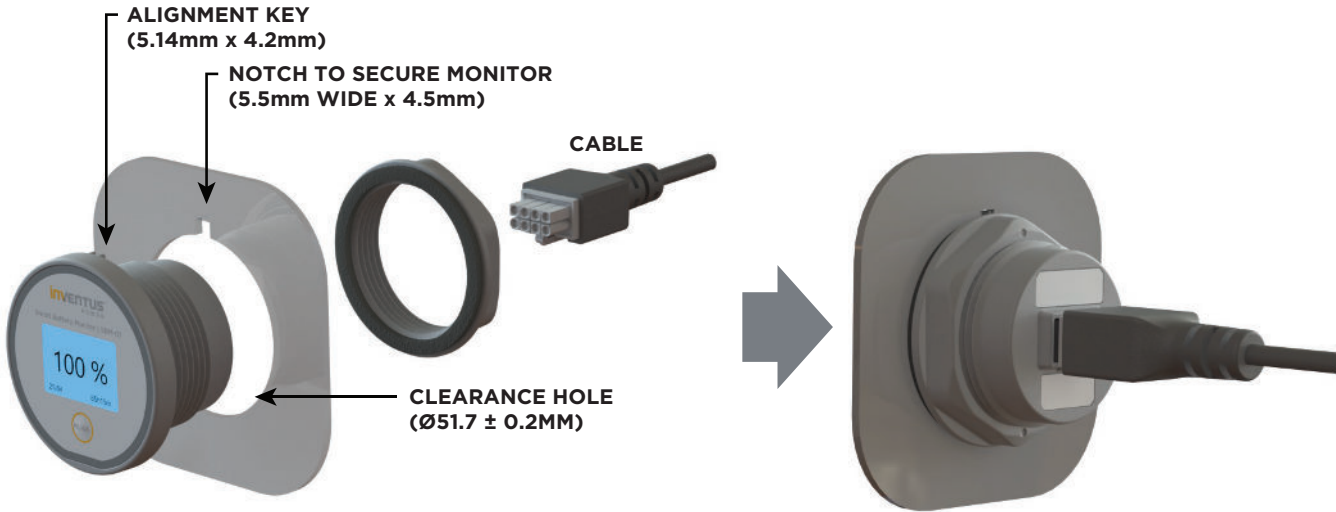
Mounting Hole



Note: A hole will need to be cut if the existing panel does not include a 51.7mm diameter hole.

1. Using a drill with a 51mm hole cutter, cut hole (Note: if the SBM-01 cannot be inserted through the clearance hole easily, the hole can be increased using the sandpaper)
2. Locate top of hole, mark desired location to cut alignment notch
3. Using a handsaw, cut a 5.5mm x 4.5mm notch as shown in above figure

Installation



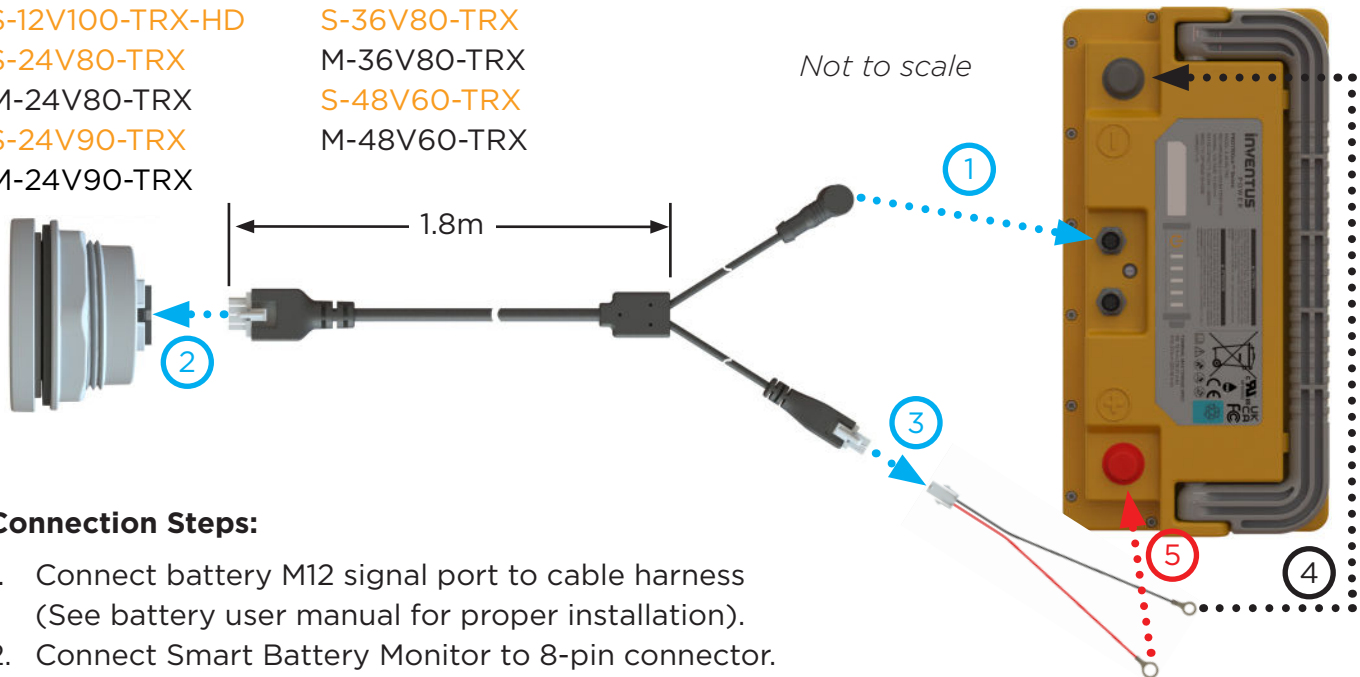
1. Insert Smart Monitor threaded body through clearance hole ($51.7 \pm 0.2 \text{ mm}$) using alignment key with notch (reference note above for creating clearance hole)
2. Secure monitor with nut and tighten to 3 Nm torque
3. Attach 8-pin Cable to Rear of Smart Monitor (reference pages 6-8 for specific battery model and wire harness part number)

Cable Installation

Smart Battery Monitor SKU P/N: 903-09472-003

Applicable Battery Models:

S-12V100-TRX-HD S-36V80-TRX
S-24V80-TRX M-36V80-TRX
M-24V80-TRX S-48V60-TRX
S-24V90-TRX M-48V60-TRX
M-24V90-TRX



Connection Steps:

1. Connect battery M12 signal port to cable harness (See battery user manual for proper installation).
 2. Connect Smart Battery Monitor to 8-pin connector.
- *Proceed to steps 3-5 only if applicable (for 36V and 48V batteries only).
3. Connect 4-pin connector on wire harness to 4-pin connector on ring terminal harness.
 4. Connect black wire M8 ring terminal to negative terminal on the battery (See battery user manual for proper installation).
 5. Connect red wire M10 ring terminal to positive terminal on the battery (See battery user manual for proper installation).

CAN termination (120 Ω) included across System and Battery CANbus for this SKU.

Smart Battery Monitor SKU P/N: 903-09472-005

Reference above image

Applicable Battery Models:

M-48V60-TRX[†]
S-48V60-TRX[†]

1. Connect battery M12 signal port to cable harness (See battery user manual for proper installation).
2. Connect Smart Battery Monitor to 8-pin connector.
3. Connect 4-pin connector on wire harness to 4-pin connector on ring terminal harness.
4. Connect black wire M8 ring terminal to negative terminal on the battery (See battery user manual for proper installation).
5. Connect red wire M10 ring terminal to positive terminal on the battery (See battery user manual for proper installation).

CAN termination (120 Ω) included across System CANbus for this SKU.

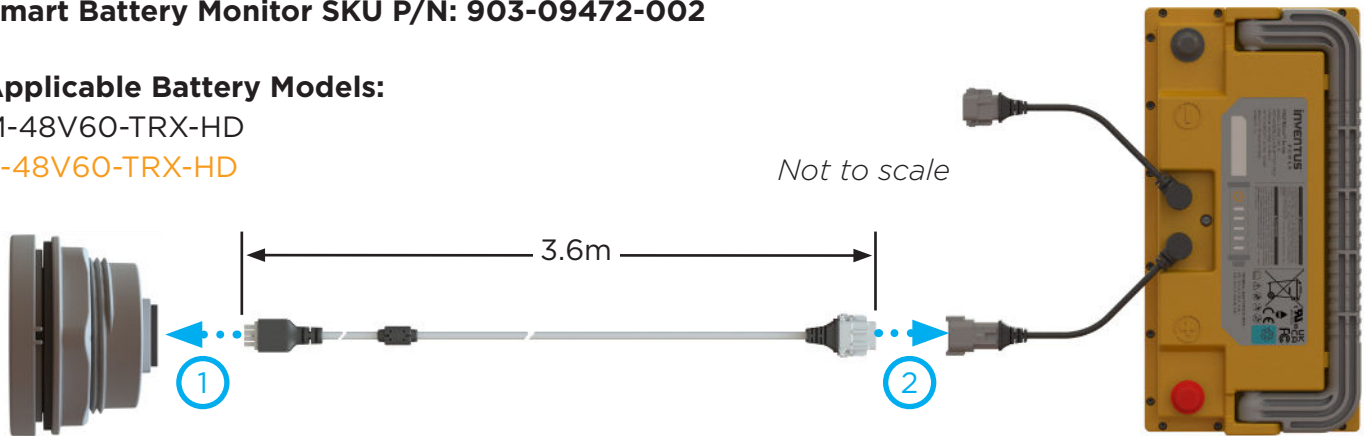
[†] This SKU is compatible only with older models of S/M-48V60-TRX (MFG Date before March 1, 2023) where pin 6 is auxiliary power

Smart Battery Monitor SKU P/N: 903-09472-002

Applicable Battery Models:

M-48V60-TRX-HD

S-48V60-TRX-HD



1. Connect battery signal port to cable harness (See battery user manual for proper installation).
 2. Connect Smart Battery Monitor to 8-pin connector
- CAN termination (120 Ω) included across System and Battery CANbus for this SKU.

Smart Battery Monitor SKU P/N: 903-09472-004

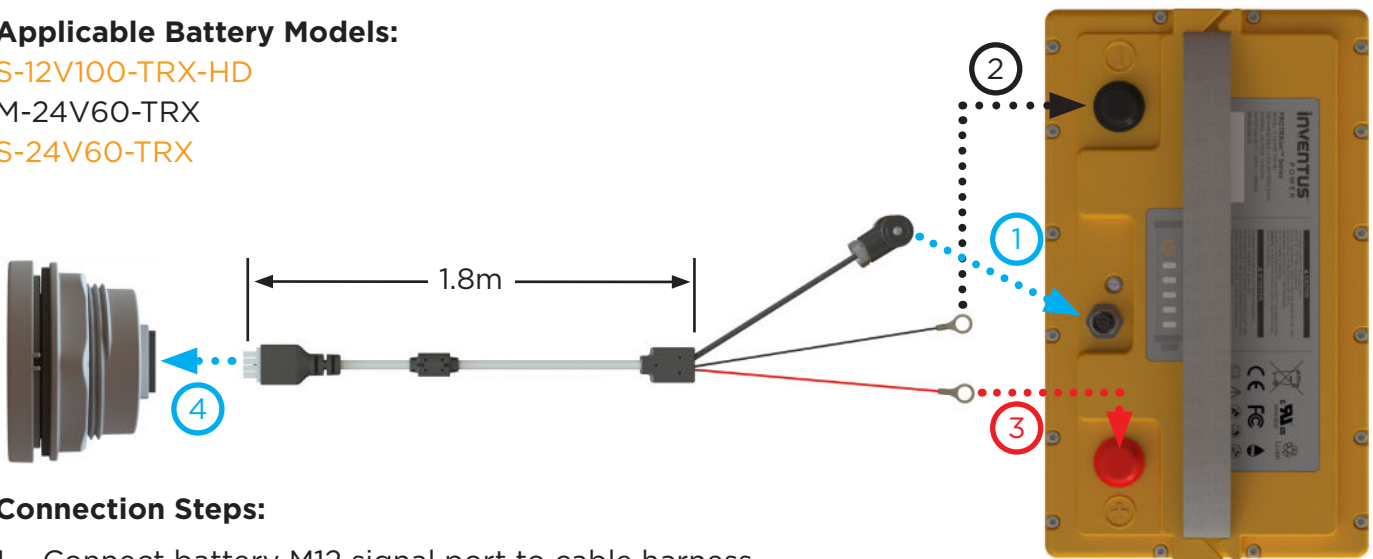
Not to scale

Applicable Battery Models:

S-12V100-TRX-HD

M-24V60-TRX

S-24V60-TRX



Connection Steps:

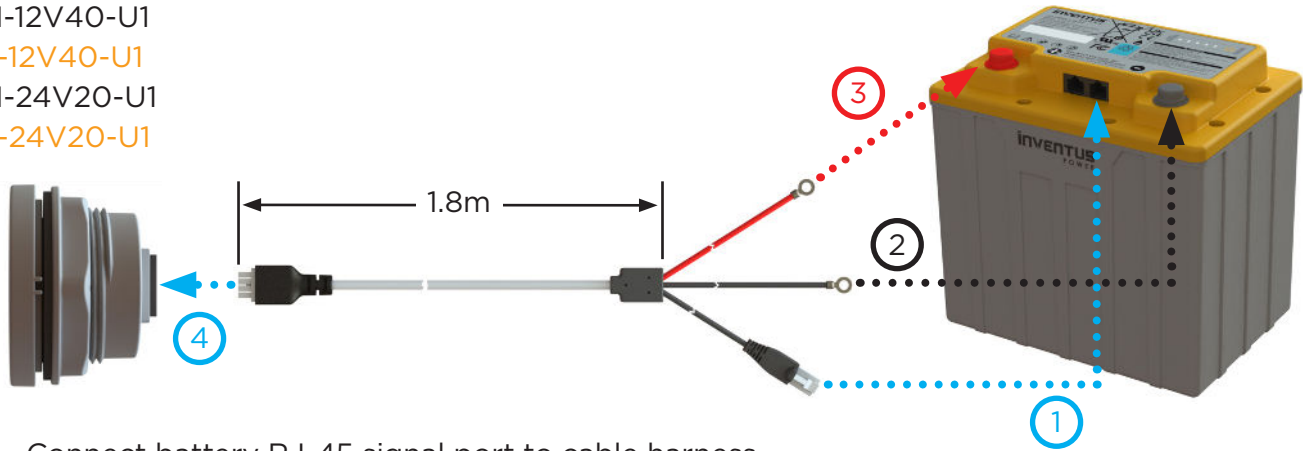
1. Connect battery M12 signal port to cable harness (See battery user manual for proper installation).
 2. Connect black wire M8 ring terminal to negative terminal on the battery (See battery user manual for proper installation).
 3. Connect red wire M8 ring terminal to positive terminal on the battery (See battery user manual for proper installation).
 4. Connect Smart Battery Monitor to 8-pin connector.
- CAN termination (120 Ω) included across System CANbus for this SKU.

Smart Battery Monitor SKU P/N: 903-09472-001

Not to scale

Applicable Battery Models:

- M-12V40-U1
- S-12V40-U1
- M-24V20-U1
- S-24V20-U1

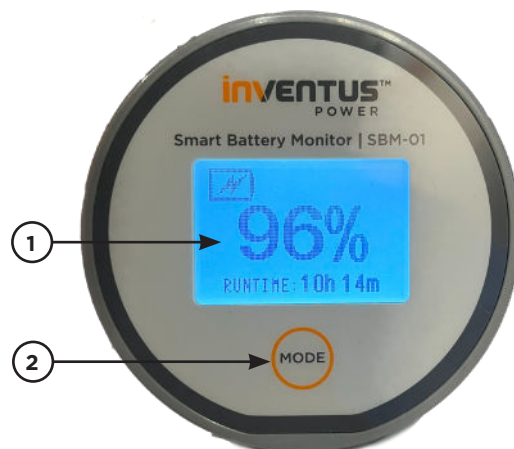


1. Connect battery RJ-45 signal port to cable harness (See battery user manual for proper installation).
 2. Connect black wire M6 ring terminal to negative terminal on the battery (See battery user manual for proper installation).
 3. Connect red wire M6 ring terminal to positive terminal on the battery (See battery user manual for proper installation).
 4. Connect Smart Battery Monitor to 8-pin connector.
- CAN termination (120 Ω) included across System CANbus for this SKU.

Operating SBM-01

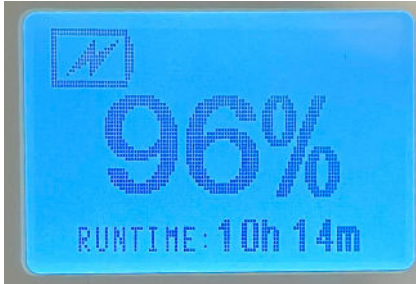

1. Display
2. MODE Button
 - Activates display while in shutdown or sleep mode
 - Shuts down monitor when pressed and held for 3 secs
 - Toggle between Home Screen and Status Screens

Once the monitor is installed, powered up, and establishes communication with the battery, the Startup Screen will be displayed for 3 seconds, followed by the Home Screen. To shutdown the monitor, hold the MODE button for 3 seconds.

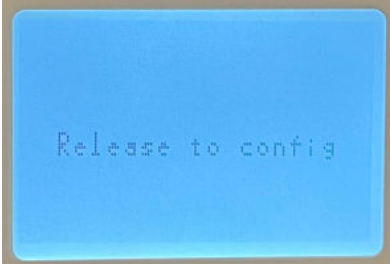




The monitor will go to sleep after 5 minutes of battery inactivity and the display will turn off. To activate the display, tap the MODE button. See Page 10 for temperature units configuration process. **Note: Reference Battery User Manual and Battery Software User Guide for more information on fault codes displayed by the Smart Battery Monitor.**

Get To Know Your Smart Monitor Display Settings

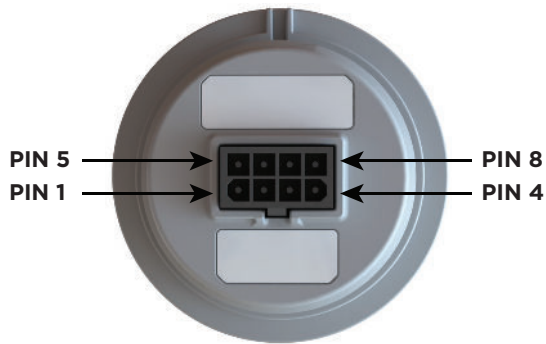
Startup Screen	Home Screen	Status Screen 1
		
<p>Enter Startup Screen after monitor establishes connection for the first time. Power down and turn on again to see the Startup Screen.</p> <ul style="list-style-type: none"> Battery State of Health displayed for 3 seconds 	<p>Toggle to Home Screen by pressing MODE button.</p> <ul style="list-style-type: none"> Battery charging icon (only appears in charge mode) State of Charge (%) Battery Runtime Remaining Battery Fault Alert (only appears when there is a fault) 	<p>Toggle to Status Screen 1 by pressing MODE button.</p> <ul style="list-style-type: none"> ERROR: Battery Fault Code BATT TEMP: Battery Temperature (°C or °F) LIFE AH USED: Cumulative lifetime discharge capacity (Ah) CURRENT: Charge/Discharge Current (A) VOLTAGE: Voltage (V)
Status Screen 2	Sleep Mode Screen	Limp Home Screen
		
<p>Toggle to Status Screen 2 by waiting for 5 seconds from Status Screen 1.</p> <ul style="list-style-type: none"> SW VERSION: Software version of the battery pack and Smart Battery Monitor [BQ, ATSAM, SBM-01] 	<ul style="list-style-type: none"> Indicates the battery is in Sleep Mode. Operate the system to wake up the battery and re-establish communication with the Smart Battery Monitor. 	<ul style="list-style-type: none"> Indicates the battery has low State of Charge and should be charged.

Other display settings: Below are some additional screens such as the process for changing the units that battery temperature is displayed in and the Establishing Connection Screen.

Enter Configure Temperature Units Mode	View Existing Units	Keep Units As Is
		
<ul style="list-style-type: none"> If the MODE button is held for 1-2.9 seconds and released before the Monitor shuts down, the Monitor will enter Temperature Units Configuration Mode where the user can toggle between °C and °F. 	<ul style="list-style-type: none"> Once entered into Temperature Units Configuration Mode, the display will show the existing temperature units saved. 	<ul style="list-style-type: none"> To keep existing units saved, wait for 7 seconds.

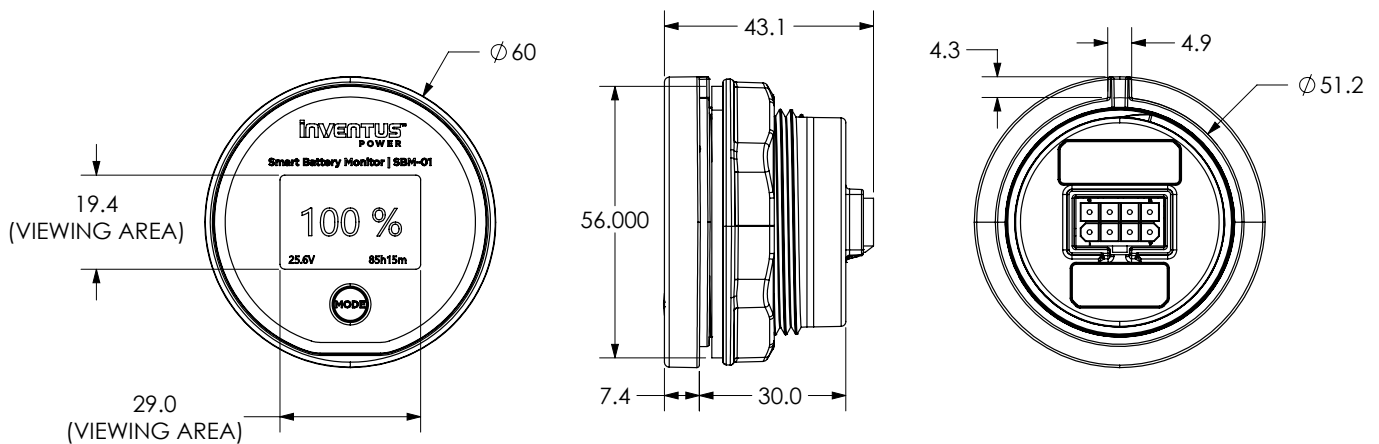
Change Units		Establishing Connection
		
<ul style="list-style-type: none"> To change/toggle between °C and °F units, press the MODE button. Once screen shows desired units, wait for 3-5 seconds and new units selected will save. 		<ul style="list-style-type: none"> Screen indicates Monitor is establishing connection with the battery pack.

Connector Pin Definition



Pin	Signal	Description
1	CANH	CANbus high signal
2	CANL	CANbus low signal
3	Aux Power	Auxiliary Power
4	Ground	Ground
5	B+	Battery Positive
6	B-	Battery Negative
7	Sense -	Sense Negative
8	Sense +	Sense Positive

Mechanical Dimensions (SBM-01)



All dimensions are in millimeters. For tolerances and inches, please reference datasheet.

Need More Help?

Contact Tech_Support@inventuspower.com

+1.877.423.4242