Smart Battery Hub
User & Installation Manual
v1.0

CE

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Important

BEP strives to ensure all information is correct at the time of printing. However, the company reserves the right to change without notice any features and specifications of either its products or associated documentation.

Translations: In the event that there is a difference between a translation of this manual and the English version, the English version should be considered the official version.

FCC Statement: This device complies with the limits for a Class B digital device, pursuant to part 15 of FCC rules. These rules pertain to reasonable protection from harmful interference in a normal installation. This equipment generates extremely low levels of radio frequency energy which should not interfere with normal radio equipment if installed properly. If interference is detected and attributed to this device, you could try to:

- re-orient or relocate the receiving antenna

- separate the equipment and the receiver

- isolate circuit output between the device and the radio

- contact an experienced technician or dealer to help.

It is the owner's sole responsibility to install and operate the device in a manner that will not cause accidents, personal injury or property damage.

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1   General Information

1.1   Use of This Manual

This manual serves as a guideline for the safe and effective operation of the following Smart Battery Hub models:

Description	Part number
SMART BATTERY HUB TWIN ENGINE	80-716-0030-00
SMART BATTERY HUB TRIPLE ENGINE	80-716-0031-00

1.2   Liability

Advanced Systems Group can accept no liability for:
- Consequential damage resulting from the use of the Smart Battery Hub.
- Possible errors in the included manual and the consequences of these.
- Use that is inconsistent with the purpose of the product.

Disclaimer: Our products are subject to continual development and improvement. Therefore, additions or modifications to the products may cause changes to the technical data and functional specifications. No rights can be derived from this document. Please consult our most current Terms & Conditions of Sale.

1.3   Warranty

The BEP product warranty covers the Smart Battery Hub for the first five years after the purchase date, on the condition that the product is installed and used according to the instructions in this manual. Installation or use that does not comply with these instructions may result in under performance, damage or failure of the product and may void this warranty. The warranty is limited to the cost of repair and/or replacement of the product. Costs of labor or shipping are not covered by this warranty.

1.4   Identification Label

Important information required for service or maintenance can be derived from the identification label. The identification label is located on the right hand side of the Smart Battery Hub.

BEP   Part No : 80-716-0031-00
Type : SBH TRIPLE

SN: 3666122-001
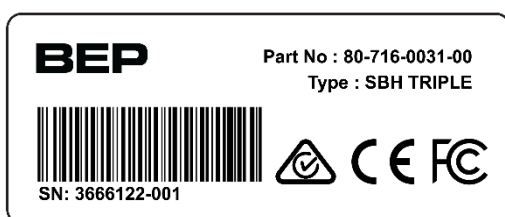
CAUTION
Never remove the identification label, this will void the warranty.

2   Overview

2.1   Description

BEP Smart Battery Hub is your all in one battery management system. Designed to simplify the installation of your battery management components. With state-of-the-art internal components combined with decades of refined software algorithms, the Smart Battery Hub delivers battery monitoring of all batteries including full state of charge calculation of the house battery with an advanced internal current sensor. Battery information is seamlessly transmitted over NMEA2000 for integration with CZone® and compatible marine displays. Packaged into an extremely robust Ignition Protected IPX7 waterproof enclosure suitable for any marine application.

2.2   Features

- Remotely activated battery switches with safety manual override for <u>all</u> battery switches
- Dual-direction voltage sensitive switching
- Configurable dual direction voltage sensitive switches
- Battery monitoring with house battery State of Charge monitoring
- NMEA2000 compatible and Works with CZone®
- Automatic detection of 12V or 24V systems, all batteries must be the same voltage
- Ultra-low power consumption with manual and automatic sleep states

2.3   Smart Battery Hub Overview

1. Main cover
2. Fuse cover
3. 10A fuse spare
4. 10A fuse x 2
5. Main switches
6. Cover clips and retainers
7. Smart Battery Hub
8. Serial number label
9. Spring washer
10. Terminal nut
11. Stud cover x 1
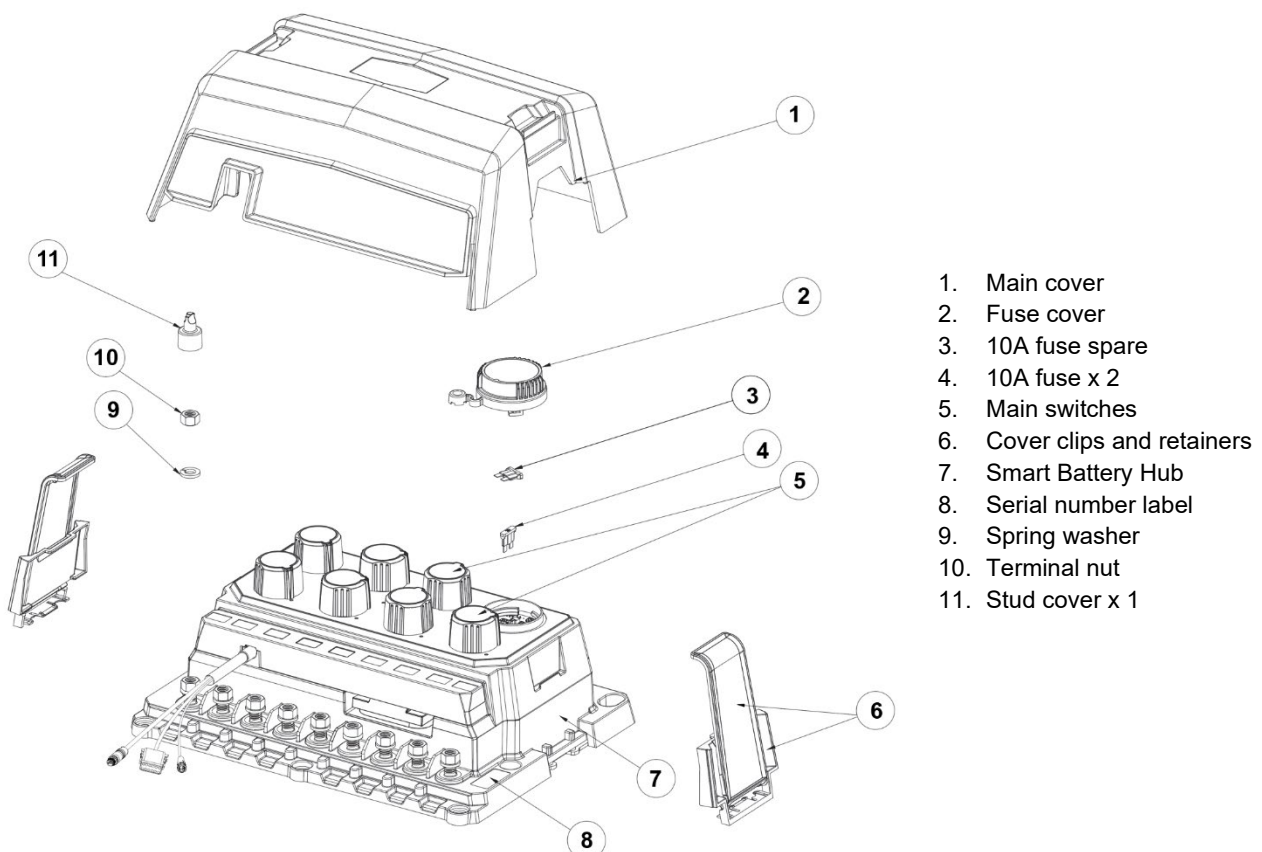
Figure 1. SBH Smart Battery Hub Overview

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2.4   **LED Indicators**
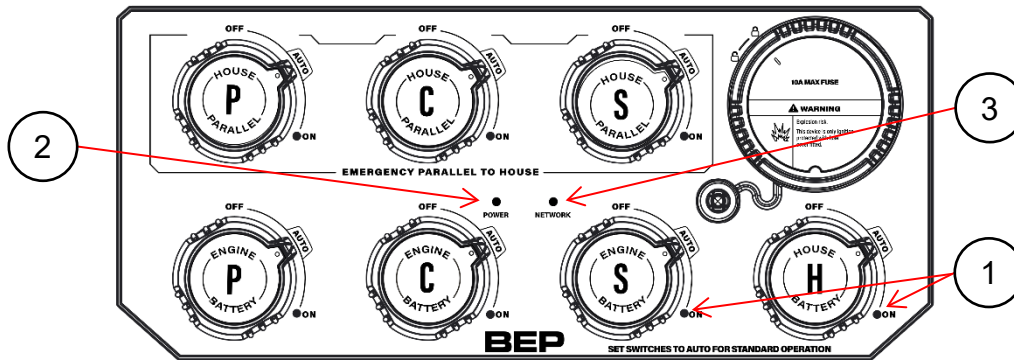
1. Switch Status LED's

Colour	Description
Off	Switch Off
Green Solid On	Switch On
Green Slow Flash	Voltage Sensitive Switch active
Green Rapid Flash	Configuration is being written to the Smart Battery Hub
Red Solid On	Switch in manual override / not able to be controlled by software
Red Flash	Switch fault
1 Red Flash	Module Not Configured
2 Red Flash	Configuration Conflict
3 Red Flash	DIP Switch Conflict
4 Red Flash	Memory Failure
5 Red Flash	No Modules Detected
9 Red Flash	Missing Commander

2. Power LED

Colour	Description
Off	Power Disconnected or in low power sleep mode
Green	Power available and SBH is ON
Red	Reverse Polarity Fault (Check Battery Inputs)

3. Network Status LED

Colour	Description
Off	Network Power Disconnected
Green	Network Power Connected
Red Flash	Network traffic

3   USB PORT

The USB port on the Smart Battery Hub allows system software updates and configuration files to be loaded from a USB Memory Stick. The Smart Battery Hub can also be used to update firmware on connected CZone® modules.

3.1   General Requirements & Tips

- Make sure the USB drive is FAT32 formatted.
- USB drive sizes up to 32GB are recommended.
- It is best, but not necessary, to use an empty USB drive for these operations.
- Most USB brands have been verified up to 32GB in size, including Strontium, SanDisk, Toshiba, Verbatim, Kingston, Samsung, Apacer etc.
- For USB drives 64GB and above only a limited number of devices from Kingston have been verified for operation.

3.2   Updating Software

To keep the Smart Battery Hub up to date with the latest software refer to https://downloads.czone.net/. It is recommended to update the entire CZone system when updating the Smart Battery Hub to ensure the system operates correctly.

To update the Smart Battery Hub firmware, you must:

1. Copy the Smart Battery Hub firmware file (extension .swu, previously downloaded from the CZone portal) on the root directory of a USB Flash Drive.
2. Insert the USB Flash Drive un the USB Port of the Smart Battery Hub.
3. Press and hold the function button for 5 seconds located under the fuse cover.
4. The Smart Battery Hub will start installing the new software, this process may take a few minutes.
5. When complete the Smart Battery Hub will restart and the USB LED will stop flashing.

3.3   Updating Other Devices Firmware

To update firmware of devices on the network you must:

1. Insert a USB drive with the following files in the root folder:
    a) *.czfwp - A single CZone firmware update file to be used to update devices in the system.
    b) No configuration files (*.zcf).
2. Press the USB button for 5sec or until the LED starts flashing RED.
3. Wait for the USB LED to turn solid green before removing it, this operation can take 10-40 minutes depending on the number of different module types in the system.
4. Once the firmware has been updated the following files will be created/updated:
    a) *.csv - A basic spreadsheet listing information about the system and modules connected to the network.
    b) CZone USB Result.txt - A text file describing the result of the last operation performed, as well as these instructions.

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4   NMEA 2000

4.1   PGNs Transmitted

PGN NUMBERS	DESCRIPTION	FIELDS
127506	DC Detailed Status	State of Charge
127508	Battery Status	Battery Voltage, Battery Current
127505	Fluid Level	Fluid Level
130312	Temperature	Actual Temperature
130314	Pressure	Pressure
130316	Temperature, Extended Range	Actual Temperature

4.2   Instances

NMEA 2000 Instances are used to differentiate between multiple monitoring sources. Battery instances are assigned by default in standalone mode. If different instances are required, they can be configured using the CZone Configuration Tool.

Data	Instance	PGNs
House Battery	20	Battery Volts, State of Charge.
Centre Engine Battery	21	Battery Volts
Port Engine Battery	22	Battery Volts
Starboard Engine Battery	23	Battery Volts

4.3   NMEA 2000 Data Switching

The Smart Battery Hub can be configured to react to data on the NMEA2000 network. This can be used to switch on or off the switches on the Smart Battery Hub itself, or it can be used to switch other modules on the CZone® network.

An example of utilizing NMEA2000 data is not allowing the user to turn of the engine batteries if RPM on the network is above a configurable limit.

A list of supported NMEA2000 PGN's that can be used for switching are below.

PGN NUMBERS	DESCRIPTION	FIELDS
127503	AC Input Status	Voltage, Current, Frequency, Real Power
127504	AC Output Status	Voltage, Current, Frequency, Real Power
127505	Fluid Level	Fluid Level
127506	DC Detailed Status	State of Charge, State of Health, Time Remaining
127507	Charger Status	Operating State, Charger Mode, Charger Enable/Disable
127508	Battery Status	Battery Voltage, Battery Current, Battery Case Temperature
127509	Inverter Status	Operating State, Inverter Enable/Disable
127488	Engine Parameters	Engine Speed, Boost Pressure, Tilt/Trim
127489	Engine Parameters	Oil Pressure, Oil Temp, Engine Temp, Alternator Potential, Fuel Rate, Total Engine Hours, Coolant Pressure, Fuel Pressure, Engine Load, Engine Torque
129026	SOG	SOG
130312	Temperature	Actual Temperature
130314	Pressure	Pressure
128267	Water Depth	Depth

5 Sleep Mode

The Smart Battery Hub has an ultra-low current draw sleep mode, using less than 5mA of power while continuing to monitor the internal shunt for current draw on the house bank for state of charge calculating. Sleep mode is enabled automatically when certain criteria is met or can be manually activated through a circuit configured in the CZone® configuration tool.

Automatic Sleep Mode

The Smart Battery Hub will automatically go to sleep when the following criteria are met:

1. All switches have been remotely turned off, including the emergency parallel switches
2. There is no power consumption through the internal shunt (+/- 1A)
3. There is no network traffic on the NMEA2000 bus
4. All three criteria are met for more than 1 minute

Manual Sleep Mode

The Smart Battery Hub supports the Sleep mode CZone message allowing the Smart Battery Hub to be put into Sleep mode from a CZone waterproof keypad or configured CZone sleep circuit.

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Once the SBH is in sleep mode, it will wake from any network traffic on the NMEA2000 bus. If there are no CZone control messages sent, the Smart Battery Hub will automatically go back to sleep once the CAN traffic goes away. Any modules on the NMEA2000 network that cannot be switched off, should be powered from a switched power supply to stop them transmitting on the NMEA2000 bus if the NMEA2000 network is powered by a 24hour circuit.

6   INSTALLATION

6.1   DESIGN

When selecting a location for the Smart Battery Hub it is important to consider the following factors:

- Find an appropriate location that minimises all battery cable lengths but remains easily accessible for servicing and emergency situations
- Ensure SBH is mounted in a location that allows proper routing, support, and connection of cables
- Ensure all cables are appropriately rated for length and maximum current draw
- Ensure mounting wall thickness is adequate to support the weight of the SBH and any additional weight from the connected battery cables
- Ensure SBH is mounted in a location where it will not be subjected to excessive vibration
- Terminal studs are 3/8" and supports up to 2 x 120mm2 back to back terminal lugs
- Decide if you will control the SBH with physical switches or via NMEA2000

6.2   Things You Need

- Smart Battery Hub
- Mounting screws (not supplied)
- Mounting Template (supplied)
- NMEA2000 drop cable and T-connector
- Battery cable and terminals
- Screwdriver and drill bits
- Electrical Tools
- 12way Deutsch connector and appropriate terminals (not supplied)

6.3   Mounting Instructions

1. Drill mounting holes
2. Mount Smart Battery Hub
3. Install battery cables
4. Instal washers and nuts and torque to 13.5 Nm
5. Install cover
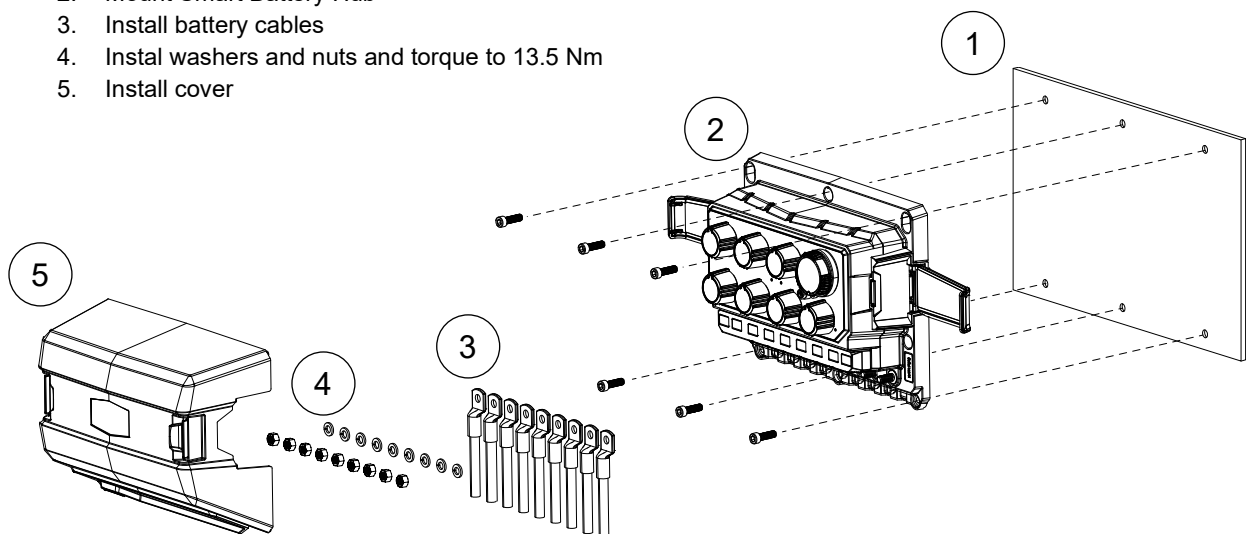
Figure 2. Exploded Mounting View

7   Connections

7.1   Smart Battery Hub Twin Engine

1.   Port engine
2.   Port battery
3.   Starboard engine
4.   Starboard battery
5.   House loads
6.   House battery
7.   24-hour house loads
8.   NMEA2000 network
9.   Main harness connector
10. External temperature sensor (optional)
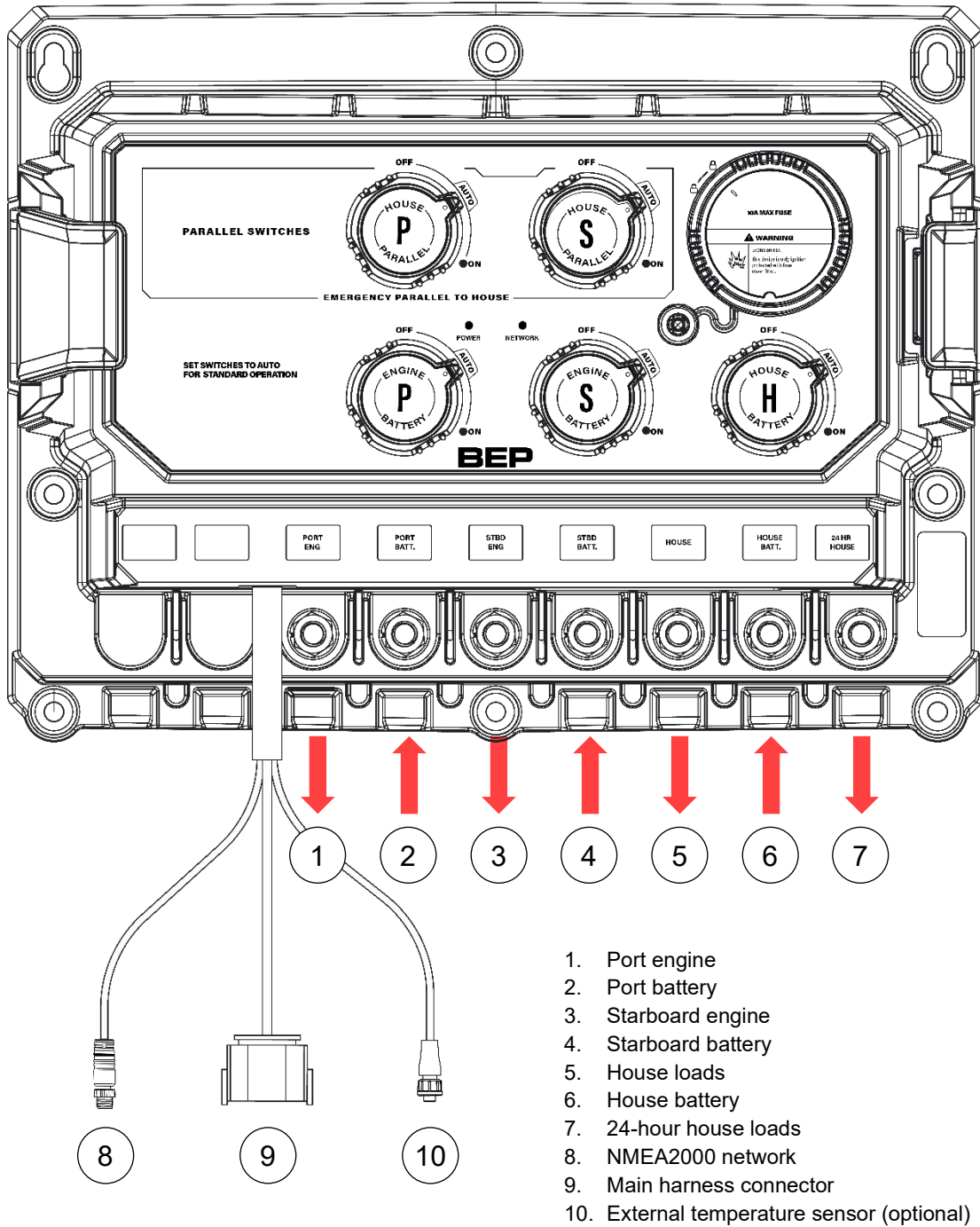
Figure 3 Twin Engine Connections

7.2 Smart Battery Hub Triple Engine

1. Port engine
2. Port battery
3. Centre engine
4. Centre battery
5. Starboard engine
6. Starboard battery
7. House loads
8. House battery
9. 24-hour house loads
10. NMEA2000 network
11. Main harness connector
12. External temperature sensor (optional)

Figure 4. Triple engine connections

7.3   **Internal wiring overview**

Smart Battery Hub Twin Engine

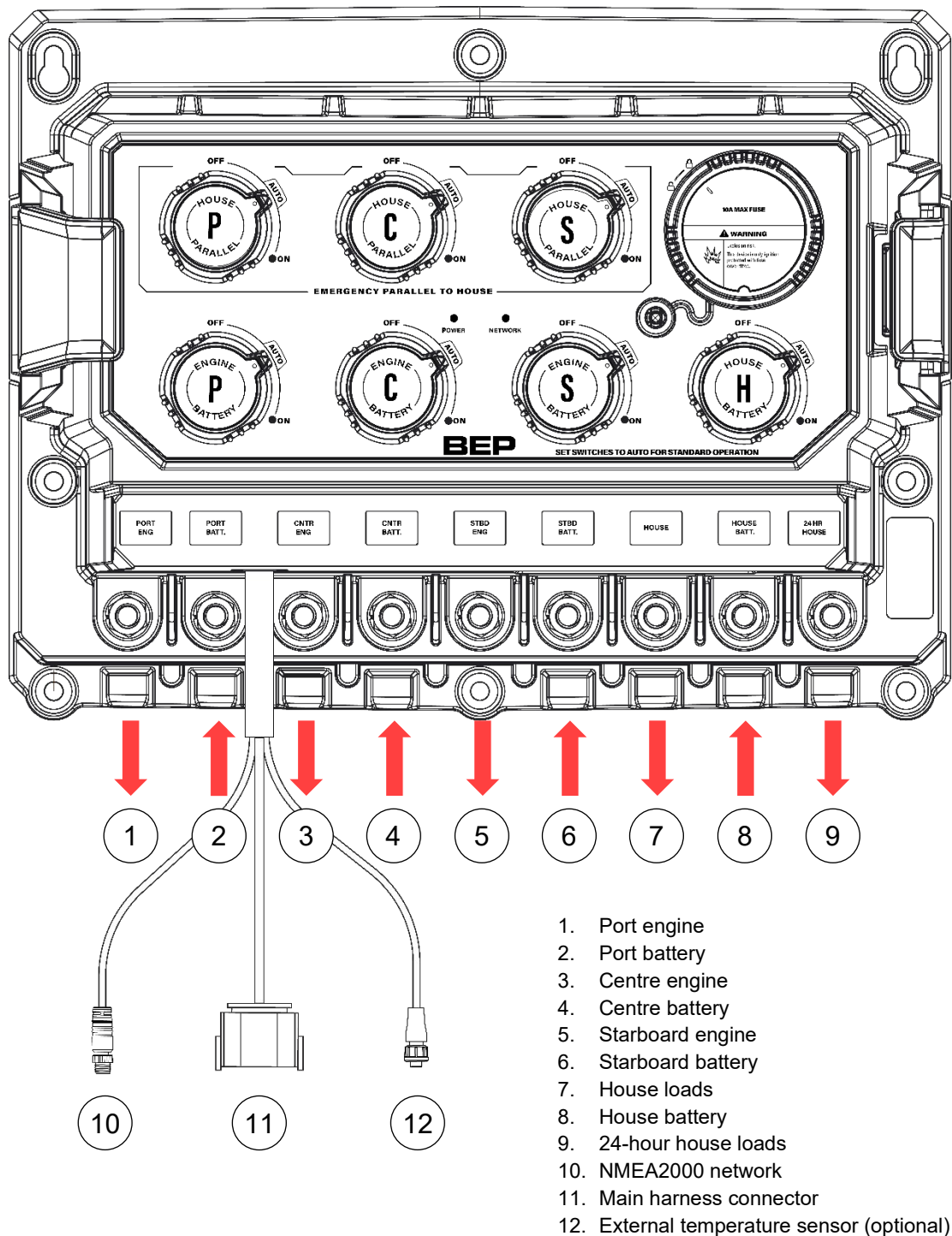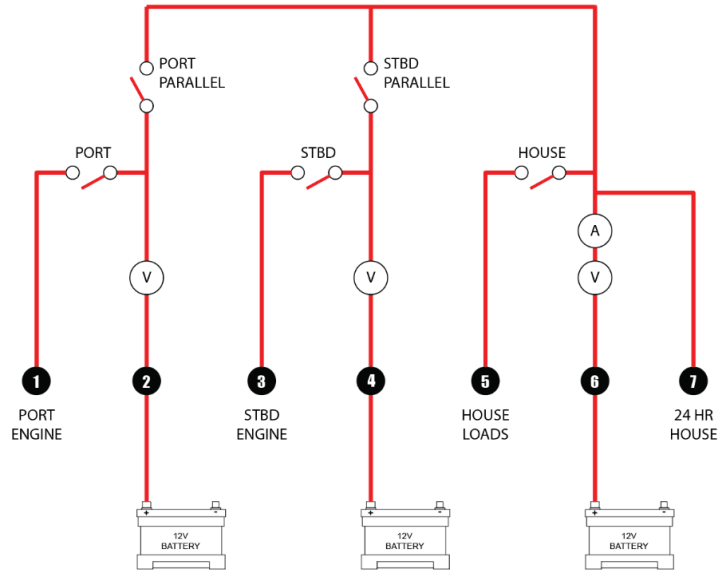**Figure 5. Twin engine internal wiring**
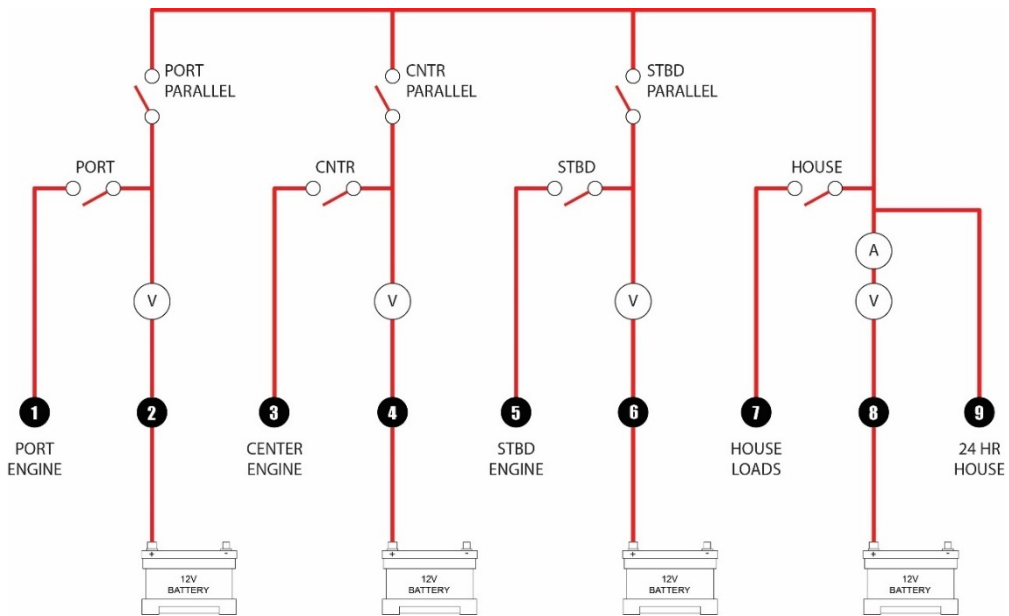
Smart Battery Hub Triple Engine

Figure 6. Triple engine internal wiring

(V) = Voltmeter   (A) = Shunt   (1) = Terminal

7.4   **Temperature Sensor**

The Smart Battery Hub has an internal temperature sensor to monitor the ambient temperature of the environment. This data is used to assist with the calculation of battery state of charge. Note: The data transmitted over NMEA2000 is with the Battery Temp PGN.

If the house battery bank is not located in the Smart Battery Hub vicinity it is recommended to add an external temperature sensor. The external sensor can be fixed with screws, adhesive tape or cable tied to a loom. The external temperature sensor allows for a more accurate state of charge calculation when the battery is located away from the is Smart Battery Hub.
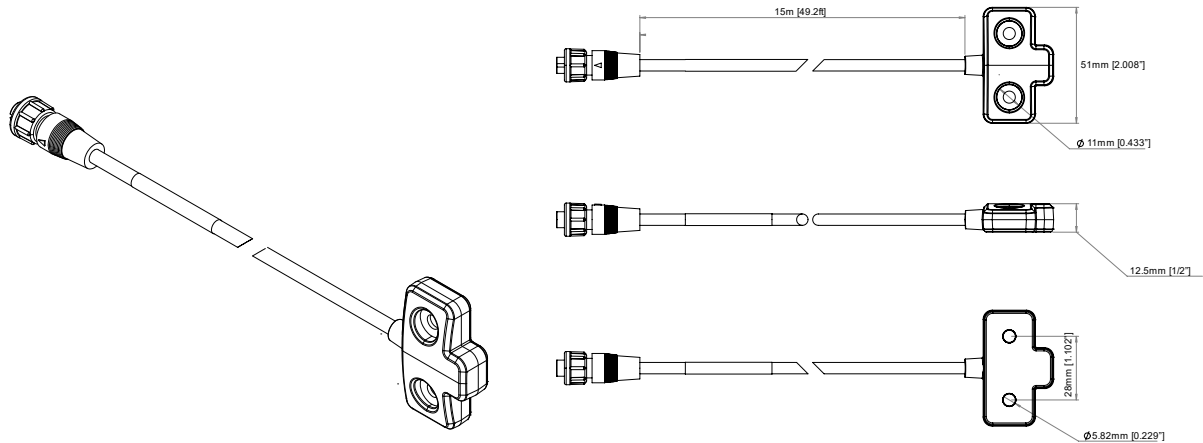

Figure 7. External Temperature Sensor

PART #	DESCRIPTION
80-716-0032-00	SMART BATTERY HUB TEMP SENSOR (15m)

7.5   **24 Hour Loads**

The Smart Battery Hub has a 24hr stud for connecting loads to the house battery bank. This allows for connecting loads such as a battery charger or critical circuits like automatic bilge pumps. All loads connected to the 24hr stud are monitored by the internal shunt in the Smart Battery Hub. Failure to connect 24hr loads through the SBH will result in inaccurate state of charge calculation of the house battery bank. The 24hr load stud is unfused, adequate fusing of loads is required.

7.6   **Battery Charger Connections**

Battery charger connections to the house battery bank must be done through the 24hr stud of the Smart Battery Hub, this ensures the house battery state of charge monitoring stays correct whilst charging. Ensure adequate fusing of charger connections is used.

7.7   Connector pin out

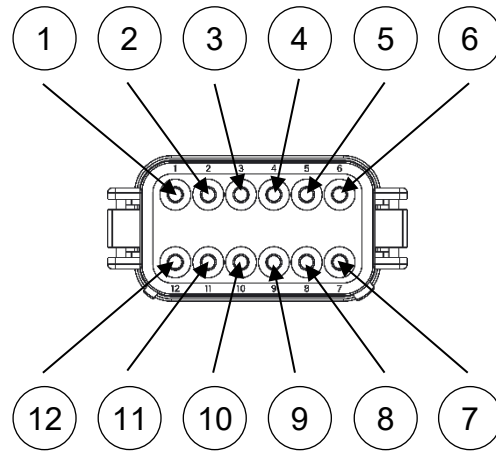The Smart Battery Hub main connector requires a DT06-12SA 12-way Deutsch connector.

Figure 8. Connector Pin Out

PIN	FUNCTION	COLOR	
1	Signal interface input 1	White with Gray	Monitor external sensors and transmit data over NMEA2000. Signal interface inputs can also be used as additional switch to positive or negative inputs
2	Signal interface return	Gray	Optional ground return for SI input 1
3	Signal interface input 2	White with Orange	Monitor external sensors and transmit data over NMEA2000. Signal interface inputs can also be used as additional switch to positive or negative inputs
4	Signal interface return	Orange	Optional ground return for SI input 2
5	Master signal input 1	Brown	Switch to ground master signal input. (Default - Engine Batteries ON/OFF)
6	Master signal input 2	Brown with White	Switch to ground master signal input (Default - House Batteries ON/OFF)
7	Master signal input 3	White with Black	Switch to ground master signal input. (Default - Parallel Switches ON/OFF)
8	Master signal return	Yellow	Optional ground return for master signal inputs
9	Master status output	Green	Drives an external LED indicator and is ON when any battery switch is in the ON position. The status output is a switch to ground circuit and will turn on an LED with an externally fused power supply to the LED
10	Negative	Black	Smart Battery Hub ground
11	Left fuse #1 (10A)	Red	Fused 24hr output from the house bank
12	Right fuse #2 (10A)	Yellow	Fused 24hr output from the house bank

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8 Inputs and outputs

8.1 Master signal inputs

The Smart Battery Hub has 3 master signal inputs for remote activation. Each master signal input can be assigned to control any switch on the Smart Battery Hub, or any circuit on a CZone network. Switches can be grouped together so one master signal input can control multiple switches. Master signal inputs are switched to ground only inputs. The Smart Battery Hub comes pre-configured with some standalone switch controls.

Default standalone settings for the master signal inputs are:

Pin	Function	Color	
5	Master signal input 1	Brown	All Engine Battery Switches Toggle ON/OFF
6	Master signal input 2	Brown with White	House Battery Switch Toggle ON/OFF
7	Master signal input 3	White with black	All Emergency Parallel Switches Toggle ON/OFF

If you need more than 3 master signal inputs, the 2x Signal interface inputs can be reconfigured as additional master signal inputs and support switch to positive or negative inputs. If different functionality than the default configuration is required, you can configure this with the CZone configuration tool.

8.2 Master status output

The master status output is used to drive an external LED indicator and shows if the Smart Battery Hub is active or in Sleep mode. The status output is a switch to ground circuit and is designed to work with an LED with an externally fused power supply to the LED status indicator.

8.3 Signal interface inputs

The two signal interface inputs on the Smart Battery Hub can be used to connect additional mechanical switches to control circuits or can be used for connecting external analogue sensors and senders (0-30V, 0-1000Ω or 4-20mA). The Smart Battery Hub will convert the analogue sensor values and transmit them over NMEA 2000 network as digital sentences. Connected sensors will need to be configured with the CZone configuration tool.

8.4 24hr Fused Outputs

The Smart Battery Hub has two additional 10A 24hr fused outputs, these outputs can be used for such tasks as powering the NMEA2000 bus or suppling power for Master Status Output LEDs.

10A Fuses
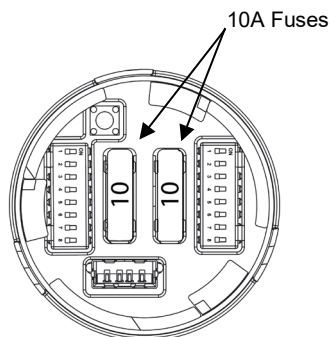
Pin	Function	Color	
11	Left fuse #1 (10A)	Red	Fused 24hr output from the house bank
12	Right fuse #2 (10A)	Yellow	Fused 24hr output from the house bank

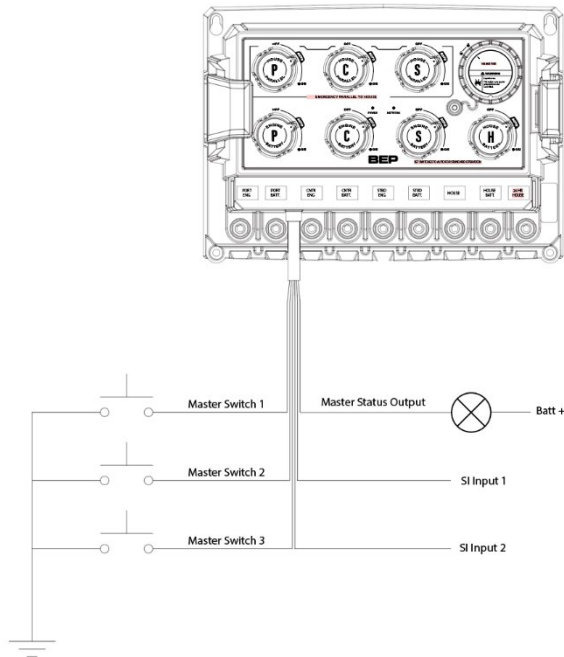8.5   **Switch input and SI input Wiring**

Default configuration:

Figure 9. Default Switch / SI Input
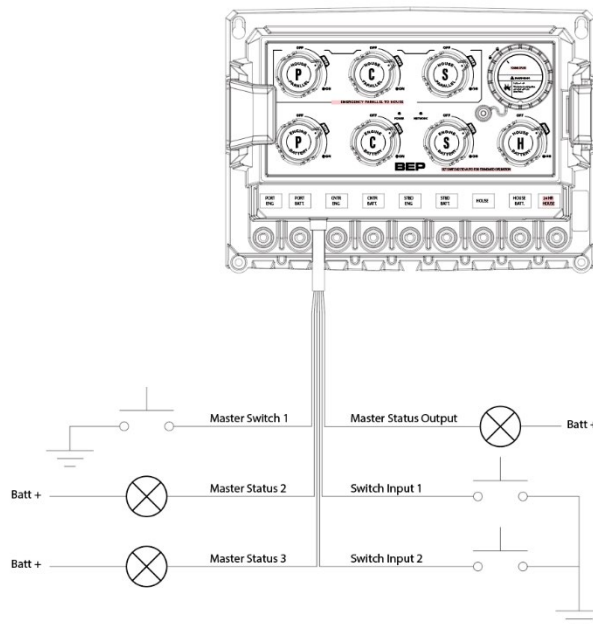
Optional configuration example:

Figure 10. Optional Switch / SI Input

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9   Settings

9.1   Voltage Sensitive Switch Settings

The Voltage Sensing Switch (VSS) allows the charging of the house battery bank from any engine battery charging source. When the voltage of an engine battery reaches the set threshold, the VSS engages allowing the house battery bank to charge. When charging stops and voltage falls, the VSS automatically isolates the battery banks, ensuring that engine start batteries are kept fully charged. If the default VSS functionality is not desired, you can disable this via the SBH dipswitches, or write a configuration using the CZone configuration tool.

Default VSS thresholds:

- Engage: 13.3v
- Disengage: 12.7v.

   The default Voltage Sensitive Switch thresholds can be changed with the CZone Configuration Tool.

Bi-directional Voltage Sensitive Switching:

This monitors the voltage on the house battery and allows a house battery charger to charge engine batteries when in storage. Once the house battery is fully charged, VSS switches will be sequentially turned on every 20 minutes. The bidirectionality voltage sensing is disabled in default standalone mode, so if this is required, this can be configured with the CZone Configuration Tool.

Lithium House Batteries:

For an installation that has mixed chemistries, (e.g. lithium house with lead acid cranking), we recommend disabling bi-directional VSS settings. This is to protect the cranking batteries from sustained higher voltage of the lithium batteries for long periods when on shore power.

The VSS settings for the Smart Battery Hub are configurable using the dipswitches below or the CZone Configuration Tool.

9.2   **Dipswitches**

Dipswitch Location
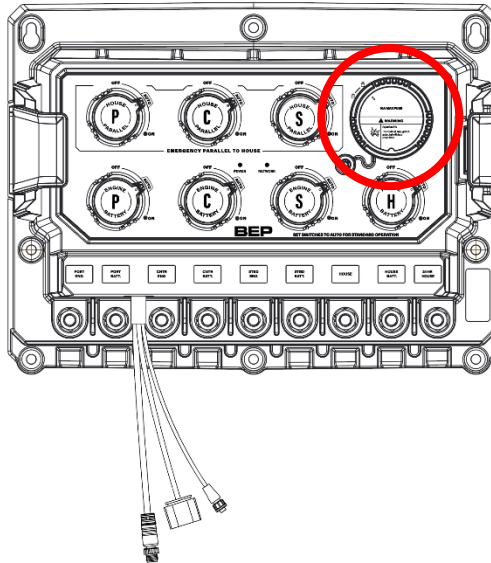
Dipswitch Functions

- Dipswitch 1 - Safety lockouts for VSS and emergency parallel functionality
- Dipswitch 2 - Standalone house battery configuration or CZone® device address.
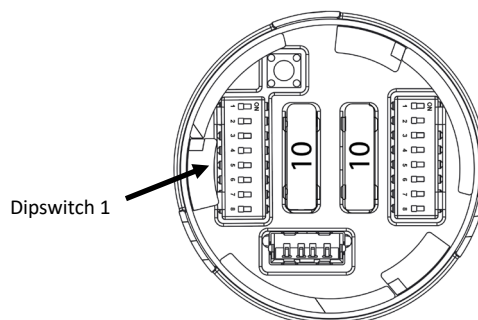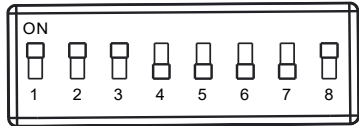
Dipswitch 1 Settings

Safety Lockouts: Safety lockouts of VSS and remotely activating parallel switches can be disabled by setting the appropriate switches to ON. Any VSS or parallel switch with the dipswitch set on safety lockout will not be able to be turned on remotely or automatically by the SBH.

CZone Enabled: For the SBH to work as a CZone module the CZone enabled switch must be turned ON. This enables the SBH to work as part of a larger CZone network and allows for advanced sensor configuration of signal inputs and battery calibration via the CZone Configuration Tool.

Leaving the CZone Enabled switch off will leave Smart Battery Hub in standalone mode. The SBH will transmit simple DC Status messages over NMEA2000 for each battery. In standalone mode, you will need to configure the house battery type and capacity via dipswitch 2.

DIPSWITCH	FUNCTION (↑ ON)
1	Disable Port VSS
2	Disable Center VSS
3	Disable Starboard VSS
4	Disable Port Parallel
5	Disable Center Parallel
6	Disable Starboard Parallel
7	Reserved
8	CZone® Enabled

Dipswitch 1

Example:
Shows VSS functionality disabled for all engines, and CZone® functionality turned ON.

Note:
Check Dipswitch 1 (No.8) for function of Dipswitch 2.
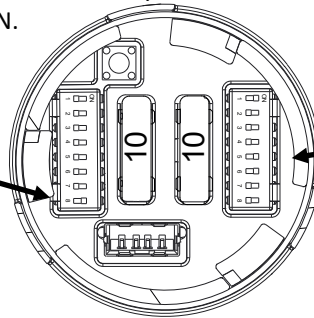
Dipswitch 2

Dipswitch 2 Settings

If dipswitch 1 has CZone® enabled ON, dipswitch 2 is used for the CZone® device address. This will allow for configuration of the device from the CZone Configuration Tool.

If dipswitch 1 has CZone® disabled OFF, dipswitch 2 sets the battery type for state of charge calculation of the house bank. The left 3 switches are used for the battery type, the right 5 switches are used for the battery capacity.

Battery Type:

Battery Capacity:

Battery Type	Dipswitch:	1	2	3
FLStd - Standard Flooded Lead Acid Batteries		0	0	0
AGM - Standard Absorbed Glass Mat (AGM) Batteries		0	0	1
TPPL - Thin Plate Pure Lead AGM Batteries		0	1	0
GEL - Gel Batteries		0	1	1
FLRsv - Flooded Acid Reserve. Premium Flooded Lead Acid Batteries		1	0	0
FLLoM - Flooded Low Maintenance. Sealed Flooded Lead Acid Batteries		1	0	1
FFFL - Firefly AGM Batteries		1	1	0

Battery Capacity	Dipswitch:	4	5	6	7	8	Battery Capacity	Dipswitch:	4	5	6	7	8
25		0	0	0	0	0	425		1	0	0	0	0
50		0	0	0	0	1	450		1	0	0	0	1
75		0	0	0	1	0	475		1	0	0	1	0
100		0	0	0	1	1	500		1	0	0	1	1
125		0	0	1	0	0	525		1	0	1	0	0
150		0	0	1	0	1	550		1	0	1	0	1
175		0	0	1	1	0	575		1	0	1	1	0
200		0	0	1	1	1	600		1	0	1	1	1

| 225	0	1	0	0	0	625	1	1	0	0	0
250	0	1	0	0	1	650	1	1	0	0	1
275	0	1	0	1	0	675	1	1	0	1	0
300	0	1	0	1	1	700	1	1	0	1	1
325	0	1	1	0	0	725	1	1	1	0	0
350	0	1	1	0	1	750	1	1	1	0	1
375	0	1	1	1	0	775	1	1	1	1	0
400	0	1	1	1	1	800	1	1	1	1	1

9.3 CZone Configuration

Configuration of the Smart Battery Hub is possible via the CZone Configuration Tool. You can configure switch inputs, signal inputs, change engine configuration and change voltage sensitive switching settings. This can be done with a USB to CAN adapter or via the Smart Battery Hub's USB Port.

9.4 CZone Configuration Tool

Below shows the steps to create a basic configuration of the Smart Battery Hub, for advanced features, refer to the CZone Configuration Tool Instruction Manual found on the CZone Portal, https://downloads.czone.net.

To configure the Smart Battery Hub via the CZone Configuration Tool you must:

1. Give the Smart Battery Hub a unique device address via Dipswitch 2. Ensure the enable CZone switch/Dipswitch 1 (No.8) is set to ON.
2. Using a USB to CAN adapter, connect PC to the Smart Battery Hub / NMEA2000 network.
3. Open CZone Configuration Tool.
4. Create 'New System Configuration' or if part of existing network, 'Read Config from Network'.
5. Under 'Modules' tab, 'Add' a new module.
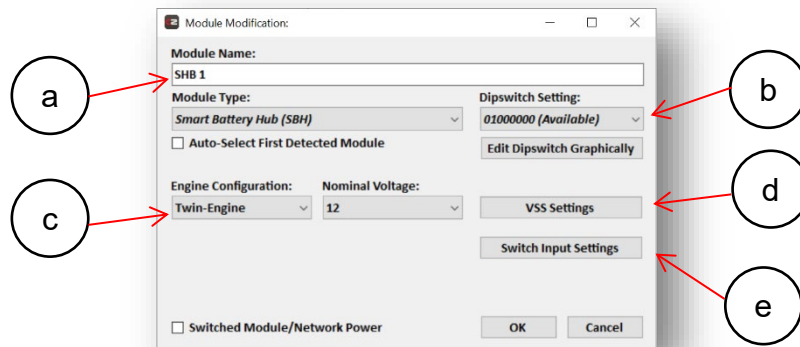
a. Give module a name.
b. Set dipswitch setting to match dipswitch on device.
c. Change 'Engine Configuration' and 'Nominal Voltage' if required.
d. Change VSS settings as needed. E.g. change the engage / disengage voltage thresholds and whether you want Dual sense (bi-directional) VSS functionality.

e.   Change Master Signal settings as needed and configure which battery switches turn on/off.
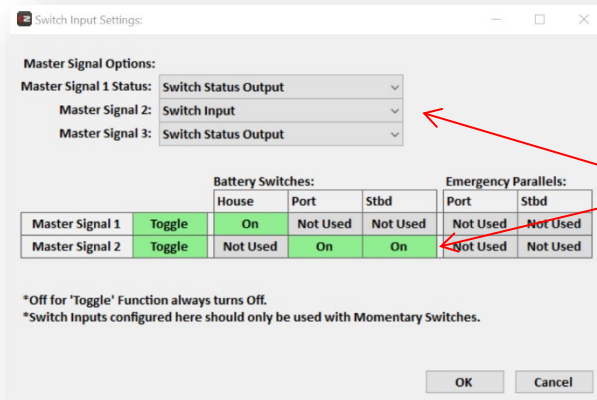

Set the Master Signals as switch inputs, then configure each of the switches on the Smart Battery Hub. Each Master Signal can be configured to toggle, turn on, turn off or do nothing to all switches on the SBH. Configured circuits here will be automatically populated here on the circuits tab.

6.   To configure the battery monitoring features of the Smart Battery Hub, under the 'Meters' tab, 'Add' a new DC Meter.
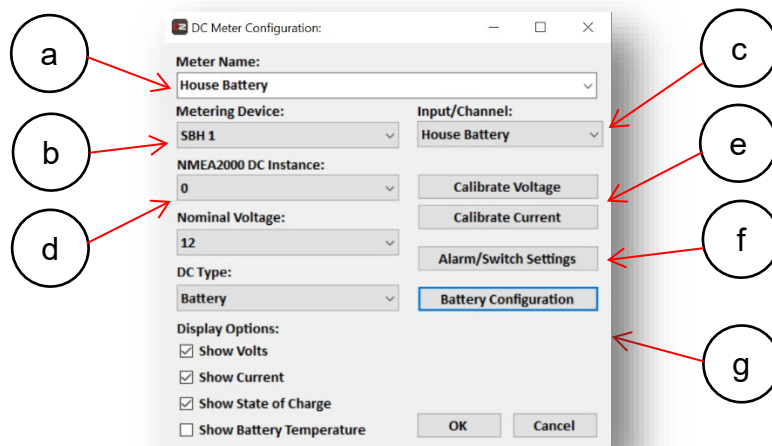
a.   Give the new meter a name.
b.   Select the Smart Battery Hub as the device.
c.   Select the Input/Channel. Note: Only the House Battery will get full state of charge monitoring, engine battery monitoring is limited to voltage only.
d.   Set the NMEA2000 Instance. This is the DC instance communicated over NMEA2000 to devices capable of displaying the information.
e.   Calibrate the DC Voltage and Current of meter. These shouldn't need to be calibrated as the Smart Battery Hub is factory calibrated.
f.   Alarm/Switch Settings allows the user to set alarms or switches triggered by events of the monitored battery. E.g. set an alarm at 15% SOC and trigger a switch to turn off loads at 5% SOC.
g.   Set Battery Configuration, this sets the parameters for monitoring the battery.

7. To configure signal inputs, under the 'Inputs' tab, 'Add' a new Signal Input.
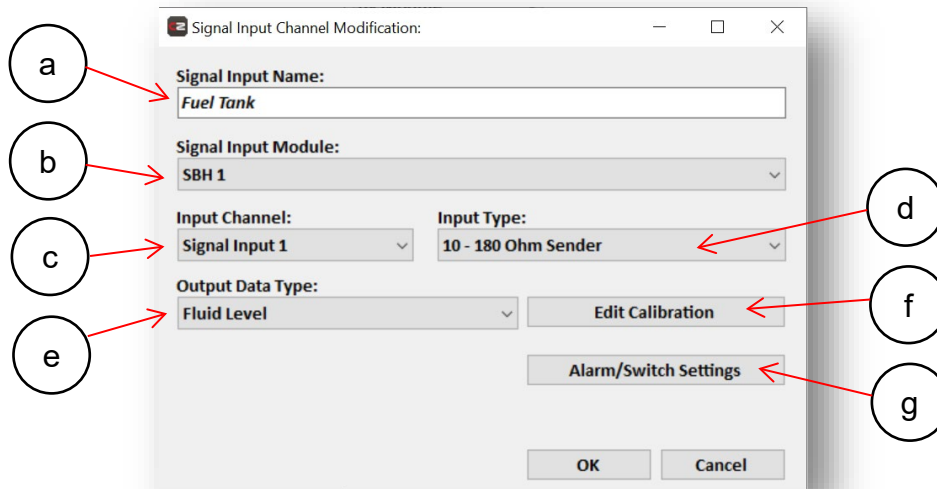
a. Give the signal input a name.
b. Select the Smart Battery Hub as the module.
c. Select the input channel. Smart Battery Hub has two signal inputs, ensure you are wired to the correct input.
d. Select the Input Type, (10-180 Ohm Sender, 240-33 Ohm Sender, 0-5V Sender, 4-20mA Sender, Switch to Battery +, Switch to Battey - / Open Circuit)
e. If the input type is a sender, select the Output Data Type that will be output on the NMEA 2000 network. (Fluid level, Pressure, Temperature or Trim)
f. Edit Sender Calibration, set data type, unit, NMEA2000 instance, and edit calibration table.
g. Alarm/Switch Settings allows the user to set alarms or switches triggered by events of monitored signal inputs.

8. When configuration is complete, 'Write Config to Network'.

For further feature instruction refer to CZone Configuration Tool Instruction Manual on the CZone Portal.

9.5   Configuration via USB

The configuration can be written to the Smart Battery Hub via a USB drive directly into the Smart Battery Hub. The process is slightly different for loading new configurations versus updating existing configurations already on the unit. For updating an existing configuration via USB, the configuration will first need to be read from the Smart Battery Hub.

New System Configuration

A CZone configuration can be written to a new Smart Battery Hub that does not have a CZone configuration installed via the USB port. To write a new system configuration via the USB you must:

1. Save the CZone configuration to a USB drive
2. Insert the USB drive into the unconfigured SBH. The following files must present in the root folder:
    a) *.zcf - A single configuration file to be written to the network. If more than one file is present, no update will occur.
    b) No firmware update files (*.czfwp).
3. Press the function button for 5 seconds or until the USB LED indicator starts flashing RED.
4. Wait for the USB indicator LED to turn solid green, this should take less than 20sec.At his point the USB drive can be removed.

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5. Once the system configuration has been updated the following files will be created/updated:

    a) *.csv - A basic spreadsheet listing information about the system and modules connected to the network.
    b) CZone USB Result.txt - A text file describing the result of the last operation performed, as well as these instructions.

Reading Existing System Configuration

To update an existing configuration, you first need to read the configuration from the unit. To read the existing configuration from the network to the USB drive you must:

1. Insert a USB drive with NO existing (*.zcf or *.czfwp) files in the root folder.
2. Press the function button for 5 seconds or until the USB LED indicator starts flashing RED.
3. Wait for the USB LED to turn solid green before removing it. This should take less than 20sec. Once done it will create/update 4 files:

    i   *.zcf - The configuration file read from the network
    ii   *.csv - A spreadsheet listing information about the system and modules connected to the network
    iii   CZone.bak - A backup copy of the configuration file. This needs to be present when writing updated configuration back to the network
    iv   CZone USB Result.txt – A text file describing the result of the last operation performed, as well as these instructions

Writing New System Configuration

To write the system configuration from the USB to the network you must:

6. Insert a USB drive into the SBH. The following files must present in the root folder:
    c) CZone.bak - This config file backup must match the existing system config before a config update can occur. This file is generated by copying the existing configuration to the USB as above.
    d) *.zcf - A single configuration file to be written to the network. If more than one file is present, no update will occur.
    e) No firmware update files (*.czfwp).
7. Press the function button for 5 seconds or until the USB LED indicator starts flashing RED.
8. Wait for the USB LED to turn solid green before removing it. This should take less than 20sec.
9. Once the system configuration has been updated the following files will be created/updated:

    c) *.csv - A basic spreadsheet listing information about the system and modules connected to the network.
    d) CZone USB Result.txt - A text file describing the result of the last operation performed, as well as these instructions.

10 Multiple Smart Battery Hub Installations

Multiple Smart Battery Hubs can be configured for installations that have 4 or more engines. In a multiple SBH installation it's important to note the house battery studs for one of the SBH's will not be used, this is to ensure all house current goes through one shunt and the house bank state of charge monitoring is kept accurate. Connect the 24hr feeds together with an adequate battery cable to allow voltage sensitive charging and emergency paralleling of battery banks from the second unit.

Figure 11. Multiple Engine Installation

Quad Engine Recommended
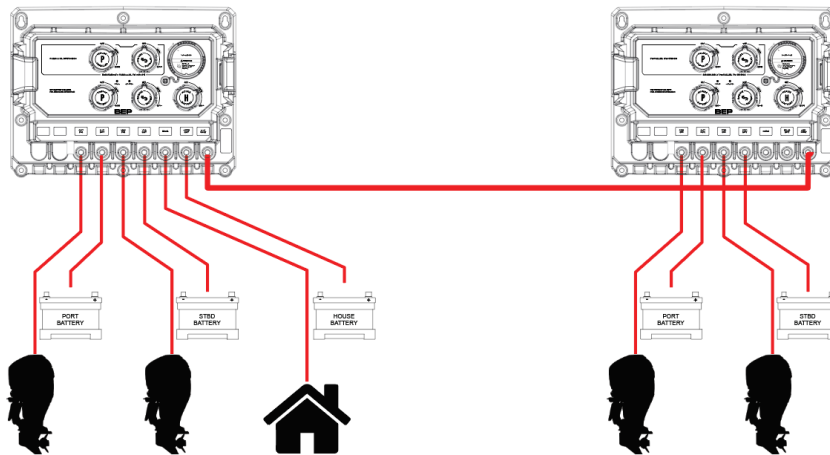
11 Ordering Information

Smart Battery Hub Part Numbers and Accessories

Part Number	Description
80-716-0030-00	BEP SMART BATTERY HUB TWIN ENGINE
80-716-0031-00	BEP SMART BATTERY HUB TRIPLE ENGINE
80-716-0032-00	SMART BATTERY HUB TEMP SENSOR (15m)

12 Specifications

12.1 Technical Specifications

Weight	Triple Engine 8.4kg (18.5lb), Twin Engine 7.6kg (16.7lb)
Power consumption max	92mA
Power consumption sleep	<5mA
NMEA2000 connectivity	1 x NMEA 2000 Micro-C port, 1 LEN
Warranty period	5 years
Operating temperature range	-15C to +55C (-5F to +131F)
Storage temperature range	-40C to +85C (-40F to +185F)

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| Dimensions W x H x D	363.5 x 275.4 x 159.5mm (14.310 x 10.841 x 6.280")
NMEA2000 PGN output	Fluid Level, Pressure, Temperature, Battery Volts, State of Charge
Monitoring	Battery voltage, House current draw, House state of charge
Ingress protection	IPX7
Compliance	CE, ABYC, NMEA, ISO8846/SAEJ1171 Ignition Protected
Nominal Voltage	12 or 24V, power harvested from all batteries
Continuous rating	300A
Intermittent rating	700A
Cranking rating	1450A

Additional inputs	3 x Master switch to ground inputs
	2 x Analogue Inputs:
	    Positive or Negative Switching
	    0-30 Volt
	    0-1000 Ohm Resistance
	    4-20mA Current
	1 x Battery temperature sensor

12.2   Dimensions
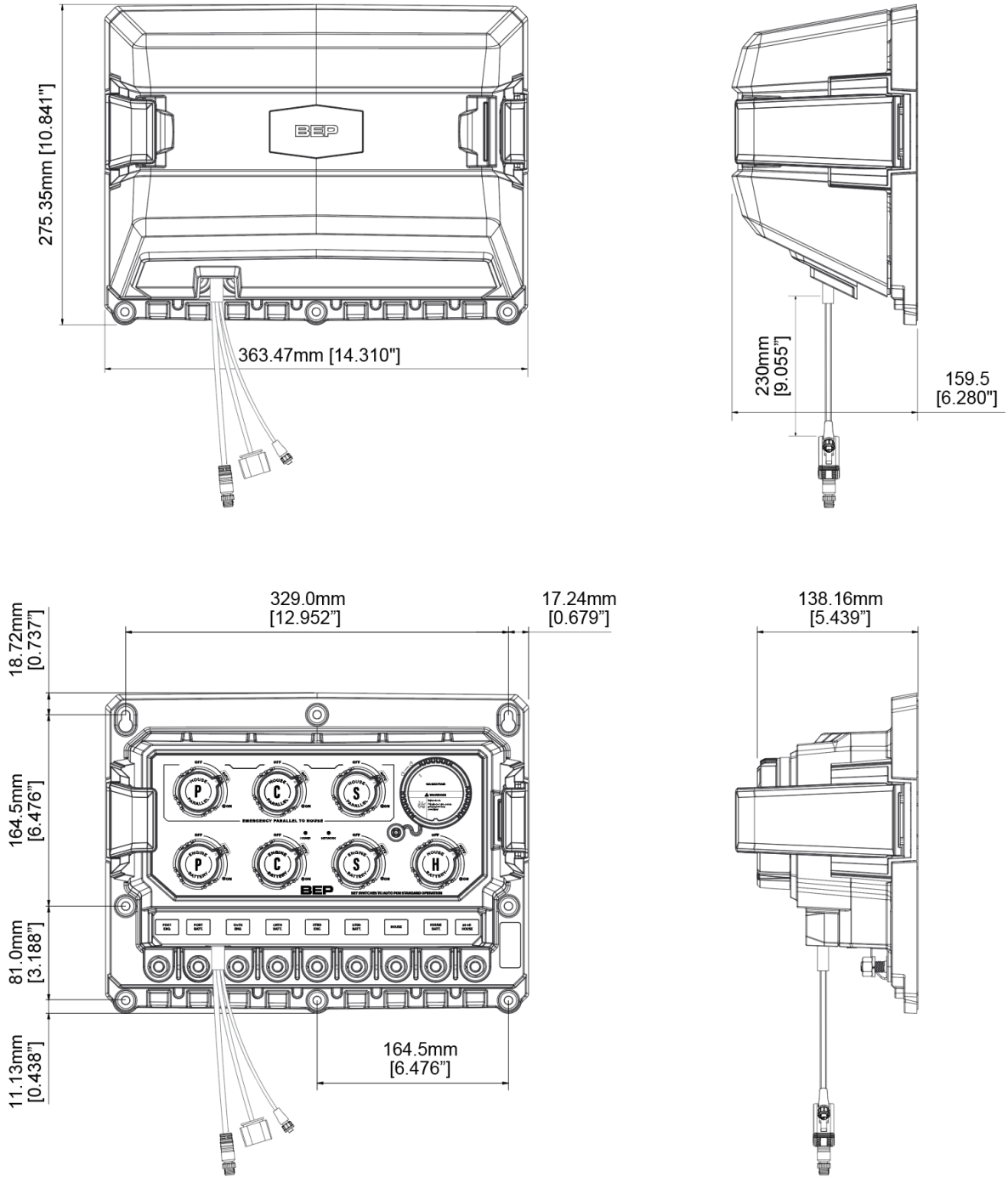
Figure 12. Dimensions

13 CE DELCARATION OF CONFORMITY

EU declaration of conformity
EU-conformiteitsverklaring
EU-Konformitätserklärung
Déclaration UE de conformité
Declaración UE de conformidad
Dichiarazione di conformità UE

Name and address of the manufacturer: **BEP Marine Ltd**
Naam en adres van de fabrikant: **42 Apollo Drive, Rosedale**
Name und Anschrift des Herstellers: **Auckland 0632**
Nom et adresse du fabricant: **PO Box 101 739 NSMC**
Nombre y dirección del fabricante :   **New Zealand**
Nome e indirizzo del fabbricante

This declaration of conformity is issued under the sole responsibility of the manufacturer.
Deze conformiteitsverklaring wordt verstrekt onder volledige verantwoordelijkheid van de fabrikant.
Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.
La presente declaración de conformidad se expide bajo la exclusiva responsabilidad del fabricante.
La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante

Object of the declaration: **SBH (Smart Battery Hub) Twin**
Voorwerp van de verklaring: **SBH (Smart Battery Hub) Triple**
Gegenstand der Erklärung:
Objet de la déclaration :
Objeto de la declaración
Oggetto della dichiarazione:

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:
Het hierboven beschreven voorwerp is in overeenstemming met de desbetreffende harmonisatiewetgeving van de Unie:
Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:
L'objet de la déclaration décrit ci-dessus est conforme à la législation d'harmonisation de l'Union applicable :
El objeto de la declaración descrita anteriormente es conforme con la legislación de armonización pertinente de la Unión:
L'oggetto della dichiarazione di cui sopra è conforme alla pertinente normativa di armonizzazione dell'Unione:

- **2011/65/EU (RoHS directive)**
- **2013/53/EU (Recreational Craft Directive)**
- **2014/30/EU (Electromagnetic Compatibility Directive)**

References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:
Vermelding van de toegepaste relevante geharmoniseerde normen of van de overige technische specificaties waarop de conformiteitsverklaring betrekking heeft:
Angabe der einschlägigen harmonisierten Normen, die zugrunde gelegt wurden, oder Angabe der anderen technischen Spezifikationen, in Bezug auf die die Konformität erklärt wird:
Références des normes harmonisées pertinentes appliquées ou des autres spécifications techniques par rapport auxquelles la conformité est déclarée:
Referencias a las normas armonizadas pertinentes utilizadas, o referencias a las otras especificaciones técnicas respecto a las cuales se declara la conformidad:
Riferimento alle pertinenti norme armonizzate utilizzate o riferimenti alle altre specifiche tecniche in relazione alle quali è dichiarata la conformità:

- **EN 60945:2002** Maritime navigation and radiocommunication equipment and systems
- **ISO 8846:2017** Small craft – Electrical devices – Protection against ignition of surrounding flammable gasses (ISO 8846:1990)
  EU Type Examination certificate # HPiVS-iR1217-010-I-01-00

Auckland, New Zealand – 26th March 2021
BEP Marine LTD

Mark Griffith
Engineering Leader