BLUE SEA SYSTEMS

DC M2 OLED Meter Instructions
PN 1830 / PN 1832 / PN 1833

Installation Checklist
☑ Check for components included
☑ Read Warning and Cautions
☑ Read Meter Functions and Connections
☑ Read Initial System Setup, Detailed Wiring, and
   Mounting Considerations
☑ Prepare materials
☑ Follow Initial System Setup instructions to install meter
☑ Configure Displays
☑ Configure Alarms
☑ Configure Relays

Display Size	55mm x 28mm
Power Supply	7V–70V DC
Power Consumption	0.3W–1.0W*

Regulatory
Monitor face is IP66 – protected against powerful water jets
when installed according to instructions

1830 Specifications
Voltage
Voltages	12V, 24V, 36V, 48V
Range	0V–70V DC
Resolution	0.01V DC

Current
Shunt Included	8255 (500A /50mV)
Range	−500A to 500A
Resolution** (100 to 500)	1A
Resolution (0.0 to 99.9)	0.1A
Alarm / Relay Activation	High and Low Voltage, High Current, and Low Battery
Shunt Signal Range	-50 mV to 50 mV

1832 Specifications
Current
Shunt Included	8255 (500A /50mV)
Range	−500A to 500A
Resolution** (100 to 500)	1A
Resolution (0.0 to 99.9)	0.1A
Alarm / Relay Activation	High Current
Shunt Signal Range	-50 mV to 50 mV

1833 Specifications
Voltage
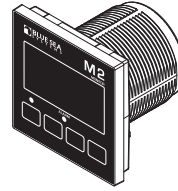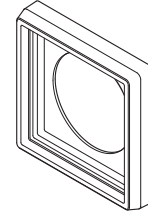|	
Range	0V–70V DC
Resolution	0.01V DC
Alarm / Relay Activation	High and Low Voltage

*   Variable with voltage, display intensity, and sleep mode

** Can display up to +/- 5000A. Requires 5000A/50mV shunt, not included.
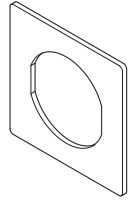
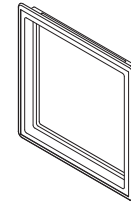## Components Included

M2 Head Unit
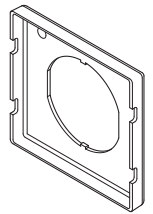
Surface Mount Bezel and Seal

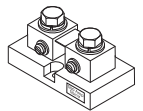Surface Mount Gasket

Surface Mount Cover

Flat Mount Bezel

Flat Mount Clamp

Mounting Ring

Mounting Nut

8255 Shunt
1830 & 1832 only
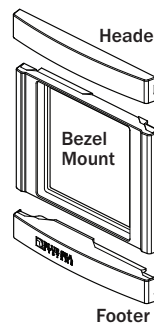
Connectors

Screwdriver
Retail Package Only

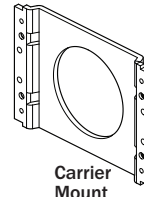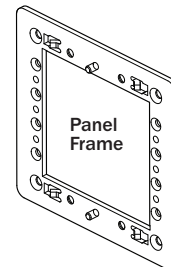## 360 Panel Mounting Kit (1525 sold separately)

Header

Bezel Mount

Footer

Carrier Mount

Panel Frame

#6-32 x 1/4"
Flat Head
Machine Screws
(4X)

#6-32 x 3/8"
Flat Head
Machine Screws
(4X)

Resource Information

State of Charge (SoC) http://bluesea.com/viewresource/1324

Warning and Caution Symbols

WARNING: The ⚠ symbol refers to possible injury to the user or significant damage to the meter if the user does not follow the procedures.

CAUTION: The ⚠ symbol refers to restrictions and rules with regard to preventing damage to the meter.

WARNING ⚠

• If you are not knowledgeable about electrical systems, have an electrical professional install this unit. The diagrams in these instructions are specific to the installation of M2 Digital Meters and not to the overall wiring of the vessel.
• If an inverter is installed on the vessel, its power leads must be disconnected at the battery before the meter is installed.
• If an AC generator is installed on the vessel, it must be stopped and rendered inoperable before the meter is installed.
• Verify that no other DC or AC sources are connected to the vessel's wiring before installing the meter.

CAUTION ⚠

• The back of the unit is not waterproof. Do not install where the back of the meter is exposed to water.

DC FUNCTIONS

1830 DC SoC Monitor measures the voltages of up to three battery banks and current draw on one battery bank.
Provides battery State of Charge (SoC), capacity, amp hours (Ah) remaining, and charge cycles on Battery 1.
1832 DC Ammeter measures current draw of up to two battery banks.
1833 DC Voltmeter measures the voltages of up to four battery banks.

Memory

All M2 meter store settings in flash memory that will remember your settings while powered off.

The 1830 M2 SoC Monitor saves the current State of Charge and Charge Cycles value every 15 minutes. If the meter reboots or loses power, it will restore these values to their last saved value.

IMPORTANT! The 1830 M2 SoC Monitor cannot monitor battery state while the meter is off. If the meter has been off for an extended amount of time, you should sync the battery state with the meter, by fully charging the battery, and checking to see if the meter is displaying 100% State of Charge. If not, you can manually set the meter to Full by using the Set SoC to Full option under Setup > DC1 Setup. See page 12 for more information.

Connections

IMPORTANT! The DC Current section of this manual gives important details to the location of sensors in the DC electrical systems of the boat. Improper location and configuration of sensors can result in erroneous readings and possible damage to components.

Meter Power Supply Connections

All meters must have Pins 1 (DC Neg.) and 2 (DC Pos.) connected. These Pins are used to provide power to the meter. Connect Pin 1 to Ground and Pin 2 to a 12V to 48V power source through a recommended 5A fuse. Note on some DC meters Pin 2 is also used to monitor additional voltages.

DC Connections

DC Current

Meters 1830 and 1832 require use of a shunt. For the 1830, the shunt must be connected between the negative terminal on Battery 1 and the main negative bus. All loads and charge sources should have their negative terminals on the main negative bus, with the exception of the M2 negative source which must be connected directly to the battery side of the shunt. Shunt sense wires must be a twisted pair from shunt to the M2 Meter for proper calculation of State of Charge (SoC). Twisted pair wire can be purchased from electrical supply companies, or made by twisting by hand or with an electric drill motor. The current (Amperage) reading for Battery 1 should be negative when it is not being charged and DC power is being used (loads are active). If not, reverse the twisted pair DC shunt sense leads.

It is possible to connect the DC shunt on the positive side of the circuit without a Shunt Shifter (8242), (for example on the output side of an alternator) however the measurements will only be accurate to +/- 4%, as opposed to +/-1% on the negative side.

DC Voltage

DC positive (+) voltage supply wires for M2 Meters should be directly connected to the positive battery terminal with a dedicated wire before any other connections. This will ensure correct voltage and SoC monitoring. Use an appropriate in-line fuse (5A suggested) on the positive wire. A twisted pair should be used for Battery 1 (1830, 1833) and for Battery 2 (1833).

Relay Connection

⚠️ M2 Meters contain an internal MOSFET relay that can drive external DC loads up to 0.5A. The input is protected with a thermally activated auto-re-setting fuse that will protect against shorts. In addition, and inline 5A fuse should be used to protect the wire to the Relay Supply. In typical applications, a power source is connected to the Relay Supply (pin 4) and a load is connected to the Relay Output (pin 3). For more information see page 5.

INITIAL SYSTEM SETUP

NOTE: The 1830 M2 State of Charge (SoC) Monitor must be connected to a 24 hour, non-switched circuit to ensure accurate and consistent State of Charge monitoring.

NOTE: If you have any questions regarding the installation of your M2 meter, or any Blue Sea System product, please contact the technical support team.

Email: **techsupport@bluesea.com**

Phone: **1.800.307.6702**. Select option 2 for Technical Support. Select Blue Sea Systems from the brand menu.

Installation

1. Review installation instructions and have all material prepared before beginning.
2. You may need the following in addition to the meter and its included contents:
    * Minimum of one, and up to four, 5A fuses
    * Minimum of one, and up to four Inline Fuse holders, one for each 5A fuse.
    * Common connection point such as a Bus Bar.
    * Second Current input on 1832 will require a second shunt (PN 8255, not included)
    * Wire, terminals, and tools needed for electrical installation.
3. Choose mounting style from the Quick Start Guide and use the provided cutout templates to prepare the installation location
    * Mounting options can also be found on pages 16 and 17 of this manual.
    * Cutout template for the 1525 mounting panel is provided with the 1525.
4. Ensure all Power Sources (both DC and AC) are disconnected before wiring meter.
5. Using Wiring Diagrams on page 5 and 6 install shunts and busbars, ensuring proper location.
    * 1830: Shunt placement is critical for proper State of Charge monitoring. See DC Connections, DC Current on page 2 for details.
6. Make all connection to the meter's terminal block before connecting terminal block to meter.
    * See Wiring Diagram and Pin-out Tables on pages 5 and 6
    * 5A Fuses should be installed within seven (7) inches of the source of power if possible, do not put fuses in fuse holders at this time.
    * Pin 3 is optional. If you are not using the relay output feature, then pin 3 does not need to be wired.
    * See page 14 for details about using the meter relay out feature.
    * Pin 4 is optional. For 1830 is it Battery 3 (DC3) voltage sense, for the 1833 it is Battery 4 (DC4) voltage sense. Pin 4 is also the power input for the pin 3 relay output.
    * See Detailed Wiring section on page 14 for different wiring options.
7. Plug wired terminal block into the back of the meter.
8. Keeping hands away from the terminal block, insert all 5A fuses into the fuse holders, inserting the fuse to pin 2 last. This will power the meter.
9. Go to next section "Basic Meter Setup" to properly setup your meter.

BASIC METER SETUP

NOTE: Meters running firmware revision SW014 or higher have the ability to read and write a configuration file, allowing you to save your settings to a thumb drive. This can be used to restore previous settings or to quickly set up additional meters.
Please see the firmware update and configuration instruction on our website: www.bluesea.com

1830 M2 State of Charge (SoC) Monitor Setup:

1. Ensure Battery 1 (typically the House battery) is fully charged before beginning the setup process.
2. You will need the following information to properly setup the 1830 M2 Meter:
   - Nominal Voltage of the House Battery Bank   _____V
   - Battery Type (chemistry) for the House Bank   _____
   - Capacity in Amp-hours (Ah) for the House Bank   _____Ah
   - Shunt Ratio   _____A/mV
   - Meter is preprogrammed to use the 500A/50mV shunt included with the 1830 and 1832 meters.
3. Optionally, you can also program in charging parameters from your main charging source which is usually your battery charger. These settings help determine when your battery bank is full.
   - Battery Charger Absorption Voltage   _____V
   - Battery Charger End Absorption Amps   _____A
4. When you have all the House Battery Bank information go into the **Setup Menu** by pressing any button to bring up the button labels, then press the right button labeled **Menu**.
5. Use the middle buttons to highlight Setup and press **Select**.
6. Scroll down to DC1 Setup
7. The House Battery label can be customized at this time, see Changing System Labels on page 11 for details.
8. If Battery 1 is fully charged, the select Set SoC to Full. This will set the meters State of Charge to 100%.
   If battery 1 is not fully charged, see step 14.
9. Enter in House Bank information.
   - Enter the Nominal Voltage under Battery Voltage
   - Enter the Battery Type under Battery Type
   - Enter the Capacity under Battery Capacity.
   - If using a shunt other than a 500A/50mV shunt, you will need to enter a new Shunt Value. See Shunt Values on page 13 for details on calculating a new shunt value.
10. If desired, enter battery charger parameters.
    - Enter Absorption voltage minus 0.1V under Full Chrg Volts
    - Enter End Absorption Amps plus 0.2% under Full Chrg Amps
    - See page 12 for details on the Full Chrg Volts and Full Chrg Amps settings.
11. Use the Back button to exit out of the DC1 Setup menu.
12. If desired, you can now go into DC2 and DC3 Setup Menus and customize the channel label.
    a. By default, DC2 is labels Start 1 and DC3 is labeled Start 2
13. For setups where you are not using DC2 and/or DC3 inputs to monitor voltage on additional banks, you can go into the respective setup menus and set Enable to OFF. This will prevent unused inputs from being displayed.
14. If Battery 1 is not fully charged, the charge Battery 1. Preferably using a shore powered battery charger with full 3 stage charging, like the Blue Sea Systems P12 Battery Charger (7531 25A or 7532 40A). After charging, if the meter is not displaying Battery 1 at 100% SoC, then go into the setup menu, DC1 Setup, and select Set SoC to Full, to manually set Battery 1's SoC to 100%.

1832 M2 Ammeter Setup

1. If using the 8255 500A/50mV shunt (one is included), no setup is required.
   - If you are using a shunt with a different ratio, see page 13 for instructions on how to set the correct Shunt Value.
   - The Shunt Value setting will be found under DC1 and DC2 in the setup menu.
2. If you are only monitoring one DC source, you may want to turn off the unused input to prevent it from being displayed.
3. To do this, go to the Setup Menu by pressing any button to bring up the button labels, then pressing the right button labeled **Menu**.
4. Use the middle buttons to highlight Setup and press the **Select** Button.
5. Scroll down to unused inputs (DC1 or DC2) and press the **Select** Button.
6. Set Enabled to OFF. This will prevent the unused inputs from being displayed on the meter.

1833 M2 Voltmeter Setup:

1. No special setup is required for the 1833. However, you may want to turn off unused inputs to prevent them from being displayed.
2. To do this, go to the **Setup Menu** by pressing any button to bring up the button labels, then pressing the right button labeled **Menu**.
3. Use the middle buttons to highlight Setup and press the **Select** Button.
4. Scroll down to unused inputs (DC1, DC2, DC3, DC4) and press the **Select** Button.
5. Set Enabled to OFF. This will prevent the unused inputs from being displayed on the meter.

DETAILED WIRING

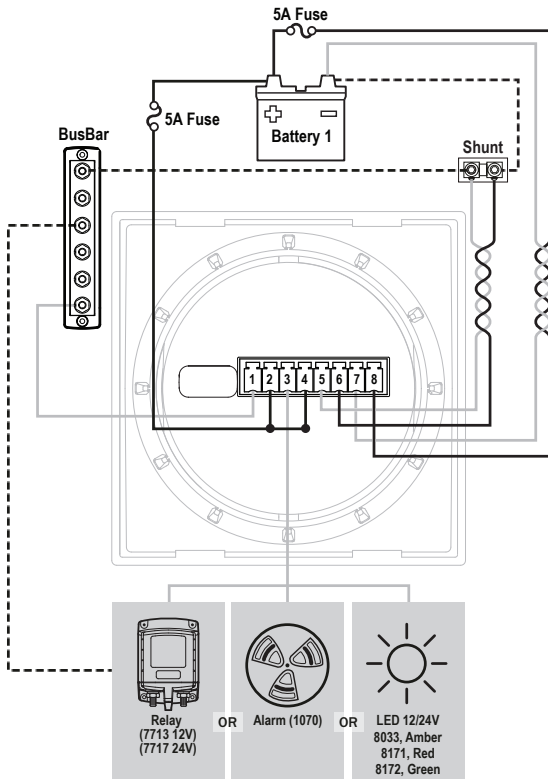## 1830 DC SoC Monitor
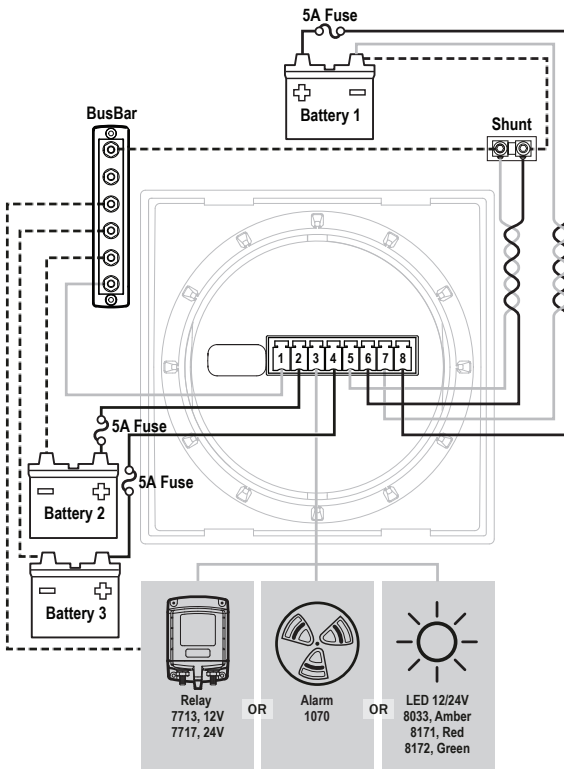
1832 DC Ammeter
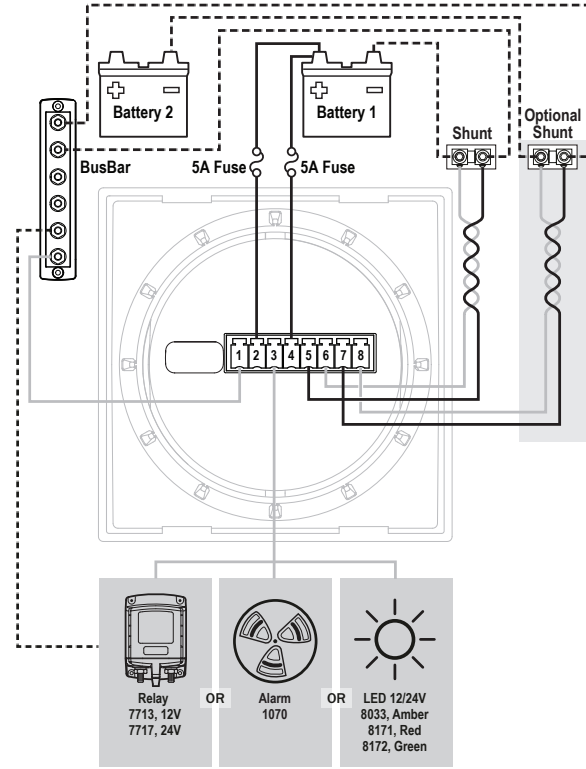
1830 Single Battery

In this configuration pin 2 and pin 4 must be connected to the Battery positive terminal and pin 1 is connected to ground

Pin-out Tables

1830 Connector Pin Assignment Table

USB	Micro USB Port
8 Pin Connector*	**Function**
1 *Required Connection*	DC Negative
2 *Required Connection*	DC Supply/Battery 2 +
3	Relay Output
4	Relay Supply/Battery 3 +
5	Shunt 1 –
6	Shunt 1 +
7	Battery 1 –
8	Battery 1 +

*The 8 pin low voltage connector supports wire sizes from 16-26 AWG

1832 Connector Pin Assignment Table

USB	Micro USB Port
8 Pin Connector*	**Function**
1 *Required Connection*	DC Negative
2 *Required Connection*	DC Supply
3	Relay Output
4	Relay Supply
5	Shunt 1 –
6	Shunt 1 +
7	Shunt 2 –
8	Shunt 2 +

*The 8 pin low voltage connector supports wire sizes from 16-26 AWG

1833 DC Voltmeter
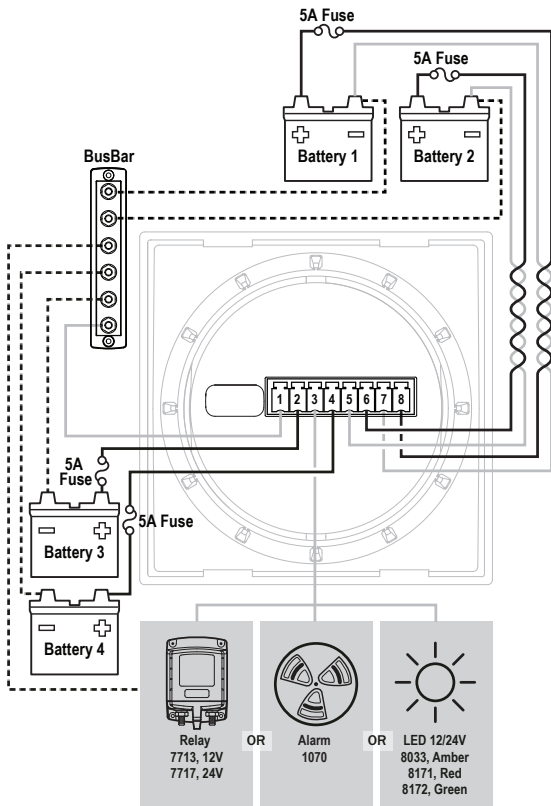
5A Fuse

5A Fuse

Battery 1   Battery 2

BusBar

1 2 3 4 5 6 7 8

5A Fuse

5A Fuse

Battery 3

Battery 4

Relay
7713, 12V
7717, 24V   OR   Alarm
1070   OR   LED 12/24V
8033, Amber
8171, Red
8172, Green

1833 Single Battery

In this configuration pin 2 and pin 4 must be connected to the Battery positive terminal and pin 1 is connected to ground.

5A Fuse

Battery 1

BusBar

5A Fuse

Pin 4 is only
required if the internal
MOSFET Relay is used

1 2 3 4 5 6 7 8

Relay
(7713 12V)
(7717 24V)   OR   Alarm (1070)   OR   LED 12/24V
8033, Amber
8171, Red
8172, Green
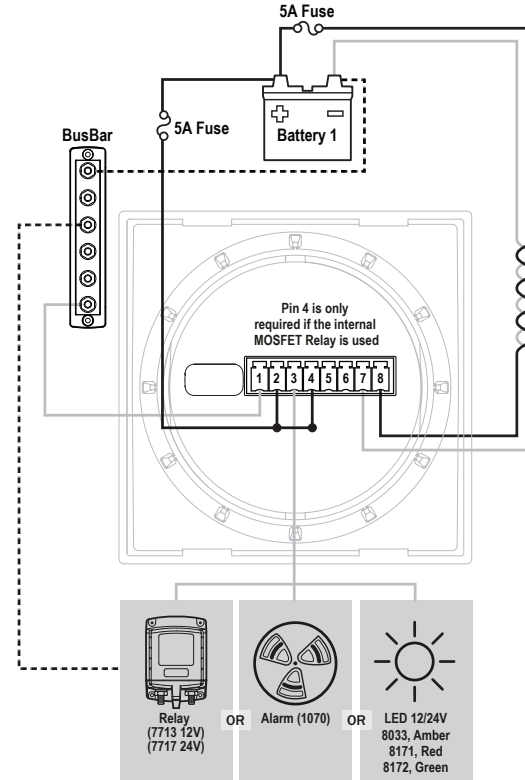
1833 Connector Pin Assignment Table

| USB	Micro USB Port
8 Pin Connector*	**Function**
1 *Required Connection*	**DC Negative**
2 *Required Connection*	**DC Supply/Battery 3 +**
3	Relay Output
4	Relay Supply/Battery 4 +
5	Battery 2 –
6	Battery 2 +
7	Battery 1 –
8	Battery 1 +

*The 8 pin low voltage connector supports wire sizes from 16-26 AWG

USING THE METERS

Example Screens From 1830 SoC Monitor

When an M2 Meter is initially powered up, it will display the Blue Sea Systems logo, its serial number and its software revision.
After a couple of seconds, the unit will display a high-level System Summary screen.
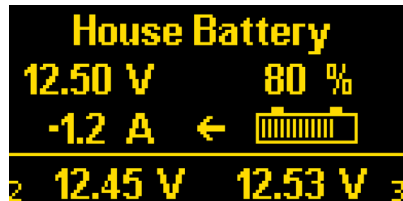
Pressing any button will display a temporary pop-up menu. Select an option by pressing the button beneath it. The pop-up menu will disappear after the first button is pressed.
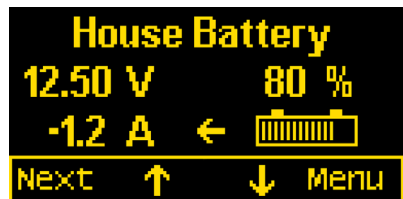
The menu system is a two dimensional matrix. Pressing the **UP** or **DOWN** arrow buttons will transition the display between the System Summary screen which displays summary information for each of the "voltage" or "current" channels.

Press the **Next** button to display more detailed information about an input channel or to show a single parameter, such as "voltage" in the display (see example below).
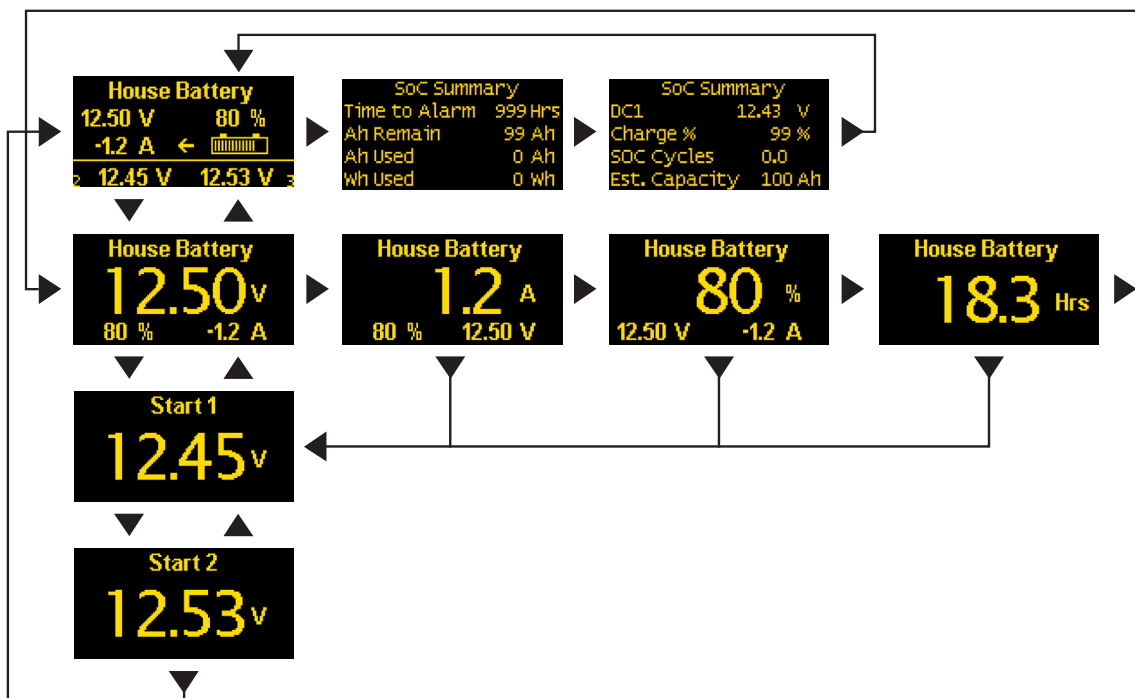

SoC Summary Screens (1830 Only)

The 1830 provides summary information about the State of Charge (SoC) of the main battery (DC1).
• **Time to Alarm** - If a SoC alarm is set then this displays the estimated time before the alarm goes off (exclusive of delays). If no alarm is set then this is the estimated time until the battery is completely empty.
• **Ah Remain** - Estimated remaining capacity of the battery.
• **Ah Used** - Actual Amp-hours removed from the battery since the last full charge including all discharge and charge cycles. Note that Ah Used and Ah Remain will add up to be less than the capacity of the battery since the efficiency of removing energy from a battery varies depending on the rate of discharge.
• **Wh Used** - Watt-hours used.
• **SoC Cycles** - The number of times that a battery has been charged and discharged. A discharge to 50% only counts as 0.5 cycles.
• **Est. Capacity** - Beta - If a battery is discharge below 80% and allowed to rest (current < 0.1A for 3 hours), the M2 can estimate the capacity of the battery. This feature is still experimental and works well for some installations. For best results, set the temperature to the actual battery temperature.
  Note: The M2 will not automatically update the user's capacity setting.

7

Menu

Press the **Menu** button to bring up a shortcut menu to for additional summary screens as well as to access the Setup menus.
Press the **UP** and **DOWN** arrow buttons to move the cursor over the options and press the **Select** button to see a selected
display. To return to the previous display, press the **Back** button.

```
Summary  SoC
Volts
Amps     Setup
Back  ↑     ↓ Select
```
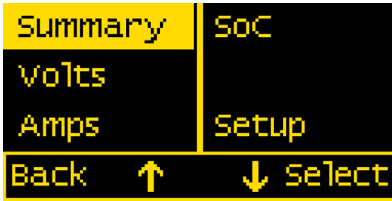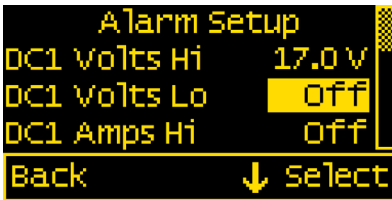
CONFIGURING THE METER

Meter settings can be configured from the Setup menu. This menu can be accessed by pressing the **Menu** button and then scrolling to and selecting
Setup. Press the **UP** and **DOWN** arrow buttons to move the cursor. The different setup options are described below.

```
Alarm Setup
Relay Setup
Display Setup
DC1 Setup
Back       ↓ Select
```

ALARM SETUP & CONTROL

The meter's alarm can be set to trigger under certain conditions of battery voltage, current, or state of charge. Alarms can be set from the Alarm Setup
menu. To get there, first navigate to the Setup menu. Then scroll to Alarm Setup and press the **Select** button.

```
        Alarm Setup
DC1 Volts Hi     17.0 V
DC1 Volts Lo      Off
DC1 Amps Hi       Off
Back            ↓ Select
```

Setting Alarms

The M2 Meter family provides monitoring capability of input channels. The meter can monitor Voltage, Current, and Frequency. Alarms are triggered if a
channel is above or below a certain user selected threshold value. (Note: not every meter supports every alarm.) The following example indicates how to
setup an over voltage alarm.

1. Go to the Alarm Setup menu.
2. Scroll to the desired input channel (i.e, DC1 Volts Hi).
3. Press the **Select** button and the cursor should start blinking.
4. Set the voltage threshold using the ← and → buttons. (Holding down the buttons allows faster selection.)
5. Press the **Enter** button to save the change or the **Cancel** button to cancel any change.

NOTE: A low voltage threshold cannot be set above a high voltage threshold. Likewise, a high voltage threshold cannot be set below the low voltage
threshold. The meter will automatically increase or decrease the voltage thresholds to enforce this.

In the above example, an alarm will set anytime DC1 voltage is greater than or equal to 17V.

Voltage Alarm (1830, 1833)

Voltage alarms can be set for high (Hi) or low (Lo) voltage conditions.

Current Alarm (1830, 1832)

The current alarm can only be set for over-current conditions. Current alarms are applied to both positive and negative current readings. Setting the current alarm to 100A will cause the alarm to trigger at +100A and -100A.

State of Charge (SoC) Alarm (1830 Only)

The State-of-Charge alarm can only be set for low state of charge conditions.

DC Alarm Dly (Delay)

An alarm delay can be specified so that alarms don't immediately trigger. This can be useful when monitoring a starting battery so that the alarm doesn't trigger every time an engine is started.

The hold off timer operates as a count-up/count-down timer. When the input exceeds the alarm value then the timer will start counting up until it reaches the delay time. When it reaches the delay timer, an alarm will sound. If the alarm condition goes away before the delay timer has been met, then the timer will count down until the timer is zero again. For example, if the Alarm Delay is set for 5 minutes and an alarm condition is active for 4 minutes and then inactive for 1 minute then if the alarm condition is active again, the alarm will sound in 2 minutes (5 minutes - 4 minutes + 1 minute). Note that there is only one delay per channel.

Clearing Alarms

When an alarm occurs, the buzzer will sound, the red ALARM LED will light, and the screen will display which alarm was triggered, the alarm set point and the current value. Pressing any button silences the buzzer and another button press returns to the previous display.

Until the cause of the alarm is resolved, the ALARM LED will remain on and the channel that triggered the alarm
(Voltage, Current, State of Charge, or Frequency) will blink.
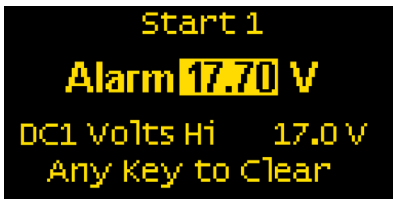

Viewing Alarms Status

For any active alarm, the parameter will flash if it is displayed. To view a complete list of active alarms, press **Menu>Setup>Alarm Setup**. Any active alarm will flash. You may have to scroll through the menu to see all of the alarms.

RELAY SETUP & CONTROL

M2 Meters provide an option to control an external relay. The M2 can trigger the relay based on Voltage, Current, State of Charge or Frequency.

These relay options can be set from the Relay Setup menu. To get there, first navigate to the Setup menu. Then scroll to Relay Setup and press the **Select** button.
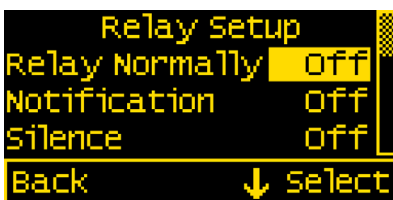
Relay Normally On/Off

This setting sets the normal operating state of the connected relay. The options are ON or OFF where ON means the relay is normally on (contacts closed) in normal operation and OFF means it is normally off (contact open). Scroll to Relay Normally, press Select (selection will flash), then press the **LEFT** or **RIGHT** arrow buttons to change the setting. Press **Enter** to save your selection. Press **Cancel** to cancel a change.

Notification

The Notification setting controls whether or not a notification is displayed when a relay is activated. Notifications will show which relay threshold was surpassed and for which channel. Scroll to Notification and press **Select** to change the setting. Press the **LEFT** or **RIGHT** arrow buttons to choose either ON or OFF. ON will display notifications and OFF will not. Use this option if you don't want to be notified that the relay is activating. Press **Enter** to save the setting or **Cancel** to cancel a change.

Silence Relay

Turn this option on if you want the relay to deactivate after the user presses a key on the display. The key press will only deactivate the relay and will not engage any functions on the meter. For example, this option could be used to silence an external buzzer. Scroll to Silence and press **Select** to change the setting. Press the **LEFT** or **RIGHT** arrow buttons to choose either ON or OFF. Press **Enter** to save the setting or **Cancel** to cancel any change.

DC Relay Dly (Delay)

A relay delay can be specified so that relays don't immediately trigger. This can be useful when monitoring a starting battery so that a relay doesn't trigger every time an engine is started.

The hold off timer operates as a count-up/count-down timer. When the input exceeds the relay value then the timer will start counting up until it reaches the delay time. When it reaches the delay timer, the relay will change state. If the relay condition goes away before the delay timer has been met, then the timer will count down until the timer is zero again. For example, if the Relay Delay is set for 5 minutes and an relay condition is active for 4 minutes and then inactive for 1 minute then if the relay condition is active again, the relay will sound in 2 minutes (5 minutes - 4 minutes + 1 minute). Note that there is only one delay per channel.

Setting Input Thresholds

Settings for each channel's high and low voltage thresholds are provided. The connected relay's normal operating state will toggle (change state) if these thresholds are met. For both high and low thresholds, the activation and deactivation voltages are different to prevent the relay from rapidly toggling (cycling on and off). Each channel has Hi ON and Hi OFF settings and Lo ON and Lo OFF settings.
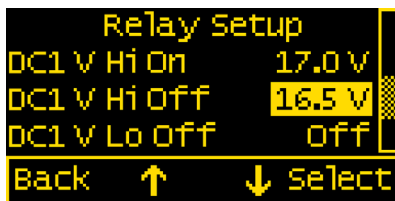
Relay Setup Screen with Relay Normally = Off (Open)
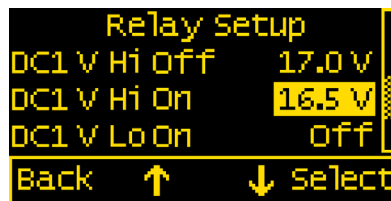
Relay Setup Screen with Relay Normally = On (Closed)
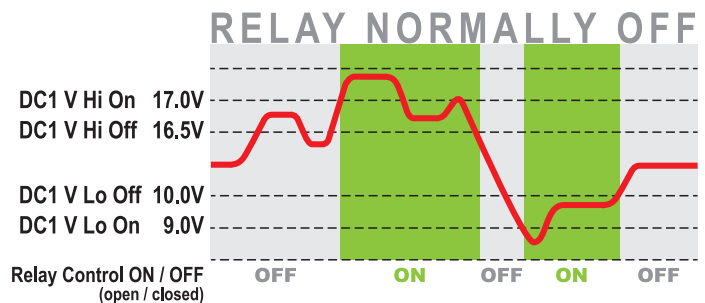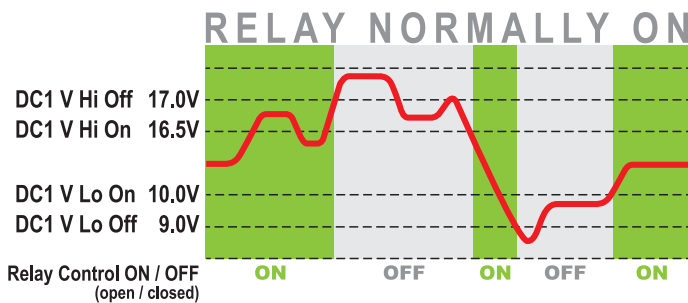
Example. If the relay is Normally On (closed) and is connected to DC1, then it will open at the user's input threshold value for DC1 V Hi Off (17.0 V). To close again, the voltage must drop below the user's input value for DC1 V Hi On (16.5 V). Similarly, the relay will open at the User input for DC1 V Lo Off. The voltage must meet the User input for DC1 V Lo On to close the relay.

To change one of the settings, scroll to desired setting and press **Select**. Press the **LEFT** or **RIGHT** arrow buttons to change the Voltage value and then press **Enter** to save the setting. Press **Cancel** to cancel the change.
NOTE: Lower threshold settings cannot be set above higher voltage threshold settings. Similarly, higher voltage thresholds cannot be set below lower voltage thresholds. The meter will automatically increase or decrease the voltage thresholds to enforce this.

Clearing Relay Notification

If the Notification option is set to ON, then any time the relay changes from its default state (turns Off when set to Normally On or turns On when set to Normally Off) a message will be displayed on the main screen. Pressing a Key will clear this notification. If the Silence Relay setting is set to ON,then clearing a Notification will return the relay to its default state.

Viewing Relay Status

For any active alarm, the parameter will flash if it is displayed. To view a complete list of active alarms, press **Menu>Setup>Relay Setup**. Any active relay will flash.

DISPLAY SETUP

The meter display settings can be accessed from the Display Setup menu. From the setup screen, scroll to Display Setup and press the **Select** button.

The different display settings are described below. To change a setting, press **Enter** and press the **LEFT** or **RIGHT** arrow buttons to view the available setting options. Press **Enter** to save the setting. Press **Cancel** to cancel a change.

Brightness

This setting is for adjusting the brightness of the display. The value is a percentage where 0% is dimmest and 100% is brightest.

Sleep Timer

Following a certain period of inactivity, the meter will enter a sleep mode and will turn off the display. Any button may be pressed to exit the sleep mode and restore the display. The Sleep Timer sets the number of minutes from 0 to 600 before entering sleep mode. This feature will be disabled by changing the setting to OFF.

Dim Timer

In addition to sleep mode, the meter can also dim its display after a period of inactivity. The duration of delay in minutes from 0 to 600 can be adjusted with this setting. This feature will be disabled by changing the setting to OFF. By continuously pressing the **LEFT** button the meter can be placed in AUTO dim mode. In this mode the meter will automatically dim after two minutes when the ambient light is low (night mode). When the light comes back on, the meter will revert to its normal brightness.

Units (1830 Only)

Select either °F or °C. These are the units used to specify the battery temperature.

Enable SoC

Setting this to off, will remove all displays of SoC, making the meter a standard DC multimeter. This should be set to off, when a current measurement other than net current on Battery 1 is desired. For example, if the shunt is placed to monitor Alternator output or a specific load group, such as a DC panel.

SoC Alarms and Relays will operate even if Enable SoC is set to OFF.

Demo Mode

With Demo Mode ON, the meter displays factory programmed values for the Battery Voltages, Current, and State of Charge, depending on meter PN. Changing the setting to OFF returns the meter to display actual measured values. This mode is typically used for commercial or promotional purposes. Note: Alarms and Relay settings will still respond to the actual settings and not the Demo settings. To enter Demo Mode, press **Menu>Setup>Display Setup>Demo Mode**. Press the **LEFT** or **RIGHT** arrow buttons to toggle Demo Mode ON or OFF.

CHANGING SYSTEM LABELS Available under DC1, DC2, DC3, and DC4 Setup

The M2 allows the user to change the labels that are displayed above each channel. Each channel can have a maximum of 16 characters, however in the summary screens only the first 11 or 12 characters of the channel label are displayed.

Changing Label Names

To change the name of a battery, follow the instructions below:

1. Navigate to the setup menu for the desired battery (such as DC1 Setup). **Menu->Setup->DC1 Setup**

2. In the battery setup menu, move the cursor to battery name to be changed (indicated by the >> symbol)

3. Press **Select** to enter the name editing mode.

4. Use the **LEFT** and **RIGHT** arrow buttons to move the cursor over the characters.

5. When the cursor is over a character, press **Enter** to edit that character. The cursor will start blinking.

6. Use the **UP** and **DOWN** arrow buttons to select a new character and press **Ok** to set that character.

7. Once all desired characters have been changed, press the **Cancel** button to exit the name editing mode.

DC1 SETUP

The meter provides setup settings for each battery. To access these settings, first go to the Setup menu. Scroll to the desired battery label followed by Setup (such as DC1 Setup) and then press **Select**. **NOTE:** some settings may not be available for all batteries.

The battery setup settings are described below. To make a change, scroll to setting and press **Enter**. Press the **LEFT** or **RIGHT** arrow buttons to view the available setting options. Press **Enter** to save the setting. Press **Cancel** to cancel a change.

Enable

To display the battery and its measurements, change this setting to ON. If enable is OFF, the battery along with its measured values will not be displayed. However, any associated alarm or relay settings are still activate. To de-active the alarm or relay, disable them in the Alarm Setup and Relay Setup menus.

Set State of Charge (SoC) to FULL (1830 Only)

When this option is selected, the meter will consider the battery's present State of Charge to be FULL. To do this, scroll to Ok and press **Select**. The screen will then return to the meter summary display.

Battery Voltage (1830 Only)

This setting indicates the nominal voltage of the battery. The options are 12V, 24V, 36V, & 48V.

Battery Type (1830 Only)

This setting indicates the battery type. The available options are listed below:

• FLStd - Standard Flooded Lead Acid Batteries

• AGM - Standard Absorbed Glass Mat (AGM) Batteries

• TPPL - Thin Plate Pure Lead AGM Batteries

• GEL - Gel Batteries

• FLRsv - Flooded Acid Reserve. Premium Flooded Lead Acid Batteries such as Rolls.

• FLLoM - Flooded Low Maintenance. Sealed Flooded Lead Acid Batteries

• CFoam - Carbon Foam AGM Batteries

• LiION - Lithium Ion batteries

Battery Capacity (1830 Only)

This setting indicates the capacity of the battery in Amp-hours. The available range is 1A to 5000A.

Full Chrg Volts (PN 1830 Only)

This setting indicates the voltage at which the battery is considered to be fully charged. The available range is 0.1V to 70.0V. This should be set to the absorption voltage of your charger. If you don't know the absorption voltage, you can figure the absorption voltage out by observing the output voltage of the charger once it enters the absorption phase. If you have multiple charging sources, set it to the higher absorption voltage. In extremely hot or cold temperatures the absorption voltage will need to be set slightly higher (for cold) or slightly lower (for hot).

Example 1. In Blue Seas Systems' P12 Charger this parameter is called the *Absorb Voltage*. For lead acid values, the default value is 14.5V DC. So in the M2 the Full Chrg Volts setting would be set slightly smaller than the 14.5V (14.4V).

Example 2. An unknown 10 A charger is connected to a partially discharged battery. Initially the meter should read approximately 10 A of charging current with the voltage increasing over time. At some point (around 14.5-14.8V DC) the voltage should stabilize and the charging current will start decreasing. This voltage is the Full Charge Voltage. Set the Full Chrg Volts to 0.1V below the observed voltage.

Full Chrg Amps (1830 Only)

In addition to Voltage, the user can set the Charging Current at which the battery is considered fully charged. The value is a percentage between 0.0% and 10.0% of the battery's set Amp-hour capacity. This value should be set to 0.2% higher than the End of Absorption Amps. That is the current where the battery charger switches from Absorb to Float stage. Values are typically 2% for AGM and 3% for Lead Acid. As a battery ages, this percentage may need to be increased.

Charge Eff. (1830 Only)

This setting is for indicating the battery's percent charge efficiency. The value may be set between 0% and 100%. The user can adjust the charge efficiency up or down depending on the age and/or type of battery that they are using. Li-Ion and AGM batteries tend to be much more efficient that flooded Lead Acid Batteries. If the M2 meter indicates 100% before the charger is done with its bulk charge then the efficiency is likely to high. Try decreasing it a couple of percent. If the M2 meter never indicates full charge then efficiency is likely to low. Try increasing it a couple of percentages.

Temperature (1830 Only)

Specify the lowest temperature that the batteries will be exposed to. As temperature drops, the effective capacity of batteries also drops. The M2 calculates the battery capacity based on this worst case temperature. This number could be adjusted seasonally to provide better accuracy.

SoC Voltage Sync (1830 Only)

This setting allow the M2 to estimate the current State of Charge after the battery has rested for a period of time. In certain situations where small charges are affecting the voltage reading (some solar installations would do this), the synchronization will estimate the SoC incorrectly. In that case, turn this feature off. This setting is turned off for Li-Ion batteries.

Shunt Value (1830, 1832)

The M2 is shipped with a single 500A/50mV shunt (the ratio is 10000:1). The shunt value assumes that the full scale shunt output voltage is 50 mV. To use a shunt with a smaller output voltage use the following formula: Shunt Value = (New Shunt Ratio)/20. For example to use a 400A/20mV shunt (Note: 20mV = 0.02V), you would set Shunt Value to (400A/0.02) /20 = 1000A.

Zero Shunt (1830, 1832)

Menu->Setup->DC1 Setup->Zero Shunt.
IMPORTANT! To zero out the shunt, connect both of the current sense wires to the negative bus bar side of the shunt.
Then press the **Reset** button on the M2 Meter to confirm the action.

State of Charge (SoC) Cycles (1830 Only)

Menu->Setup->DC1 Setup->SoC Cycles. The SoC Cycles option allows the user to reset the battery's recorded SoC cycles to 0. To do this, scroll to and press **Select** on SoC Cycles. Text will appear asking to confirm or cancel the reset request. Press **Yes** to confirm or **No** to cancel the action.
NOTE: This function does not work in Version 1 of the Firmware.

State of Charge (SoC) Default Settings

To reset the battery's State of Charge settings to the default values, press **Select** on SoC Defaults. Text will then appear asking to confirm or cancel the reset request. Press **Yes** to confirm or **No** to cancel. The following changes will occur after a reset:

1. Battery Voltage will be reset to 12V
2. Battery Type will be reset to FLStd
3. Battery Capacity will be reset to 100A
4. Full Chrg Volts will be reset to 14.4V
5. Full Chrg Amps will be reset to 2.0%
6. Charge Eff. will be reset to 98%.
7. Temperature will be reset to 77°C or 25°C depending on Units selected.
8. SoC Volt Sync will be reset to ON.
9. SoC Cycles will be reset to 0
10. State of Charge is Reset to 100% and all SoC calculated values, such as Ah Used, Wh Used, Time Remaining, etc will all reset.

DC2, DC3, DC4 SETUP

Enable

Turn the channel on or off. If Enable is set to OFF then the channel will not be displayed in the main menus. The alarms and relay functions for that channel will not be disabled. To disable the alarm and relay for a channel, set the alarm and relay for each channel to OFF.

VERSION INFO

The Version Info option in the Setup menu displays the product name, serial number, and software version. This information will be displayed on a screen after scrolling to Version Info and pressing **Select**. Pressing any button will return to the Setup menu.

FACTORY RESET

The Factory Reset option in the Setup menu allows the user to restore the meter's factory default settings. First scroll to Factory Reset and press **Select**. Text will appear asking to confirm or cancel the reset request. Press **Yes** to confirm or **No** to cancel the reset.

WRITE CONFIG

Save a configuration file storing all of the meters current settings to a USB thumb drive. File will be saved as Config_BSSXXXX.bcf, where XXXX is the model number of the meter, e.g. Config_BSS1830.bcf

READ CONFIG

Read a configuration file from a USB thumb drive. Configuration file must be in the root directory, not in a folder, and must be named Config_BSSXXXX.bcf, where XXXX is the model number of the meter, e.g. Config_BSS1830.bcf.
During a READ operation, the meter will create a backup configuration file Config.BSSXXXX.bkp that will also be stored on the thumb drive.
IMPORTANT! This will overwrite all current meter settings to the settings stored in the configuration file.
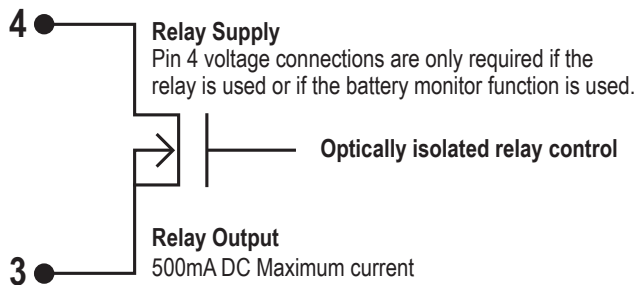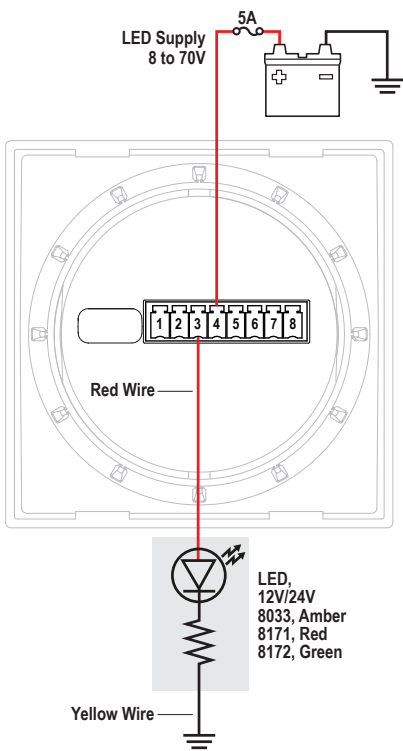
SOFTWARE UPDATE

Meters with firmware SW014 or later have the ability to update their firmware. Instructions for updating firmware and current firmware files can be found on our website: www.bluesea.com.
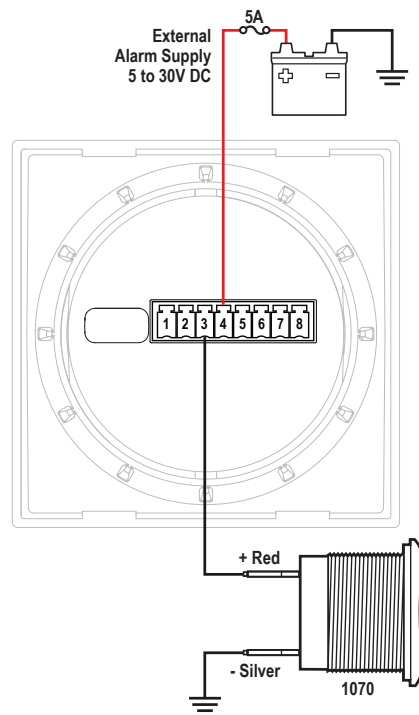
OPTIONAL WIRING

M2 Relay Connections

M2 Meters contains an internal MOSFET relay that can drive external DC loads up to 0.5A. The input is protected with a thermally activated auto-resetting fuse that will protect against shorts. In addition, an inline fuse rated at 5A should be used to protect against shorts. In typical applications, a power source is connected to the Relay Supply pin and a load is connected to the Relay Ouput connection. In the 1830 and 1833 meters, the Relay Supply connection can also be used to monitor a voltage.

4

Relay Supply
Pin 4 voltage connections are only required if the relay is used or if the battery monitor function is used.

Optically isolated relay control

Relay Output
500mA DC Maximum current

3

External LED

An external LED such PN 8171 can be connected to the Relay Output terminal. If the system is going to operate at more than 24V nominal, an additional 4K Ohms of resistance should be placed in-line with the LED.

5A

LED Supply
8 to 70V

1 2 3 4 5 6 7 8

Red Wire

LED,
12V/24V
8033, Amber
8171, Red
8172, Green

Yellow Wire

External Alarm
(1070 Floyd Bell Turbo)

The Relay Output terminal can support an external audible alarm. Such as the Floyd Bell Turbo Alarm (PN 1070).

5A

External
Alarm Supply
5 to 30V DC

1 2 3 4 5 6 7 8

+ Red

- Silver

1070

External Relay

If you need to switch more than 0.5A, you can use an external relay such as 7713, 12V or 7717, 24V Remote Battery Switch. Connect the Relay Output terminal to the red control wire. Activating the internal relay will also activate 7713.

5A

12V or
24V DC

1 2 3 4 5 6 7 8
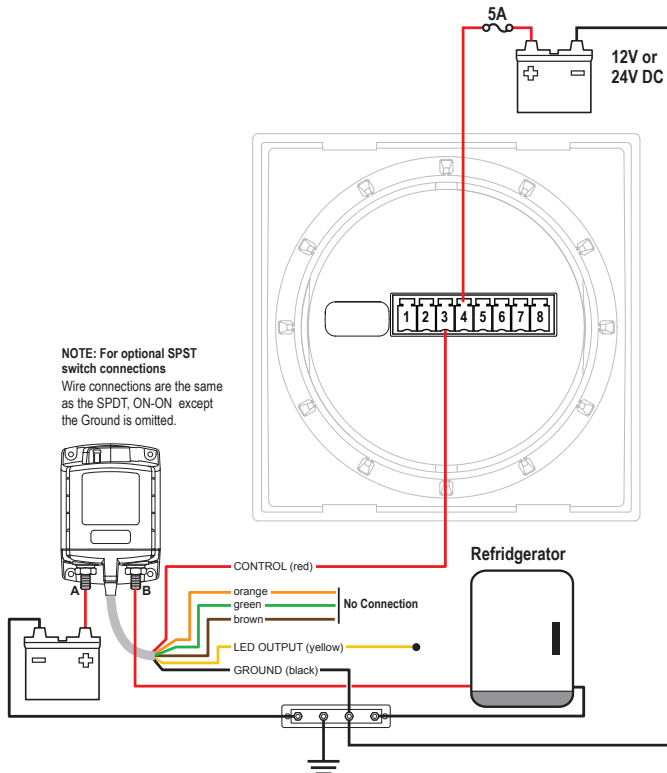
NOTE: For optional SPST switch connections
Wire connections are the same as the SPDT, ON-ON except the Ground is omitted.

A   **B**

CONTROL (red)

orange
green   **No Connection**
brown

LED OUTPUT (yellow)

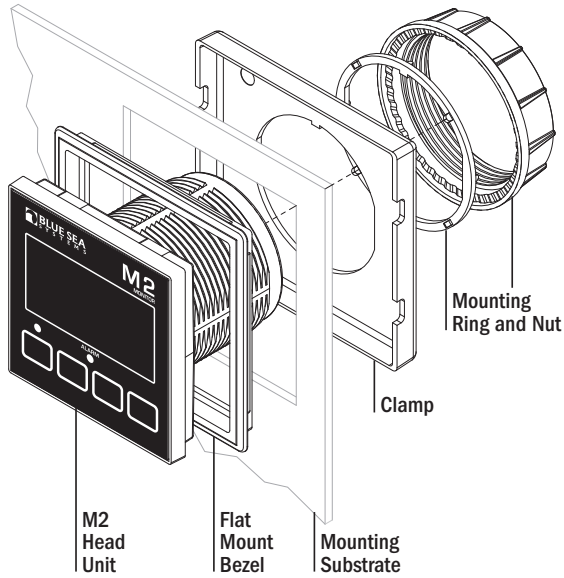GROUND (black)

Refridgerator

NOTE: 9012, 7700, 7701, 7702, & 7703 Remote Battery Switches are not compatible with the internal relay.
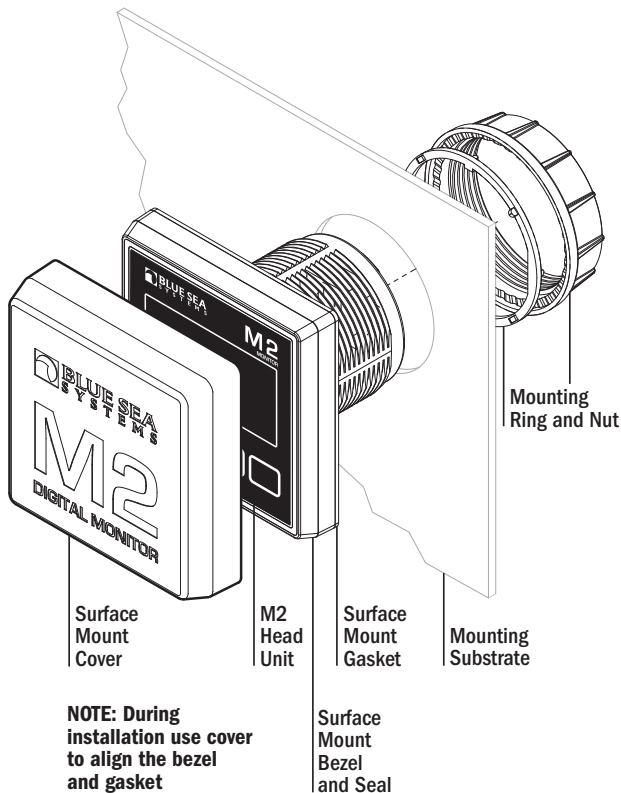
MOUNTING TEMPLATES

Mounting Considerations

M2 Digital Meters have three mounting methods: surface mount, flat panel mount, and 360 panel mount. When surface mounted per instructions the unit face is waterproof to IP66. Flat panel and 360 panel mounting systems are not waterproof. The unit should not be flat panel or 360 panel mounted if used in an exposed location. For all mountings, the back of the unit is not waterproof and must be kept dry.
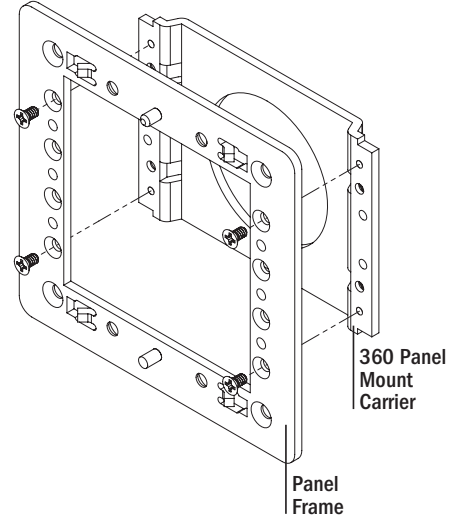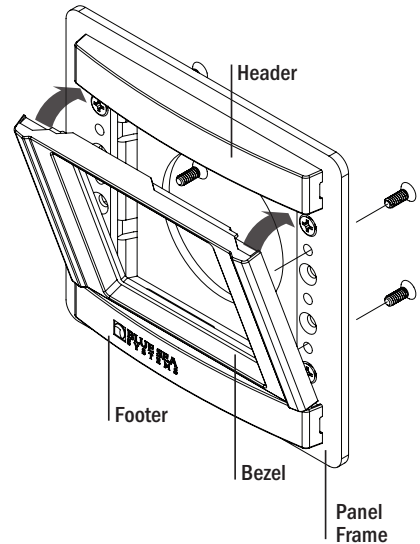
Flat Mount

M2 Head Unit

Flat Mount Bezel

Mounting Substrate

Clamp

Mounting Ring and Nut

Surface Mount

Surface Mount Cover

M2 Head Unit

Surface Mount Gasket

Mounting Substrate

Surface Mount Bezel and Seal

Mounting Ring and Nut

NOTE: During installation use cover to align the bezel and gasket

360 Panel Mount PN 1525

STEP 1
Use 1/4" Mounting Screws

360 Panel Mount Carrier

Panel Frame
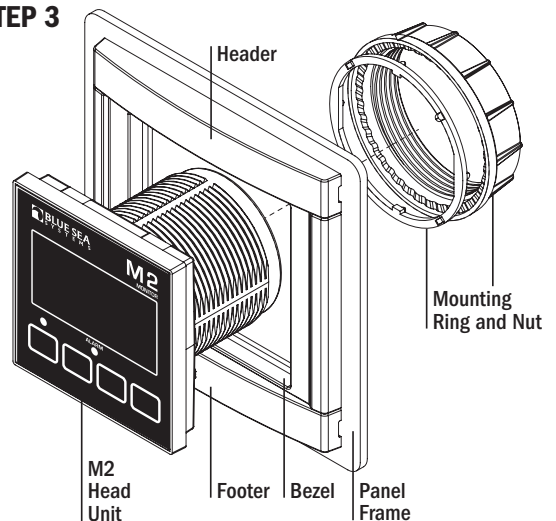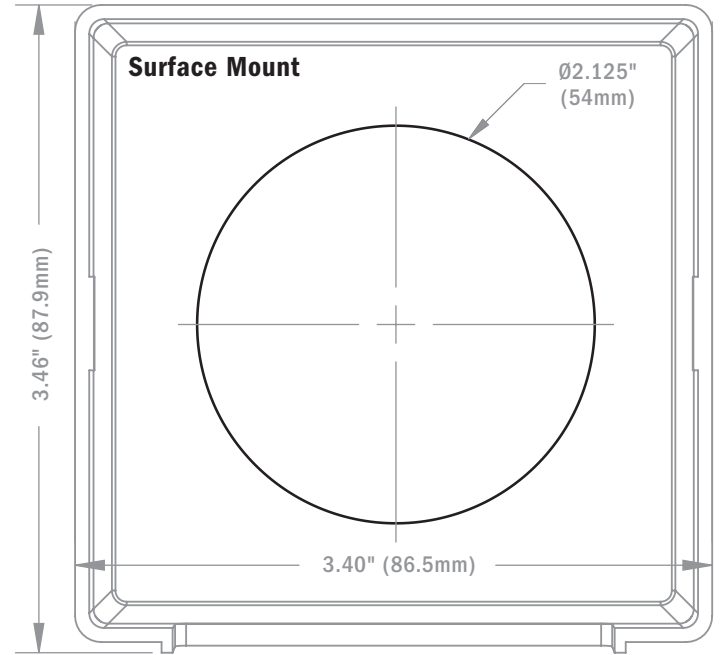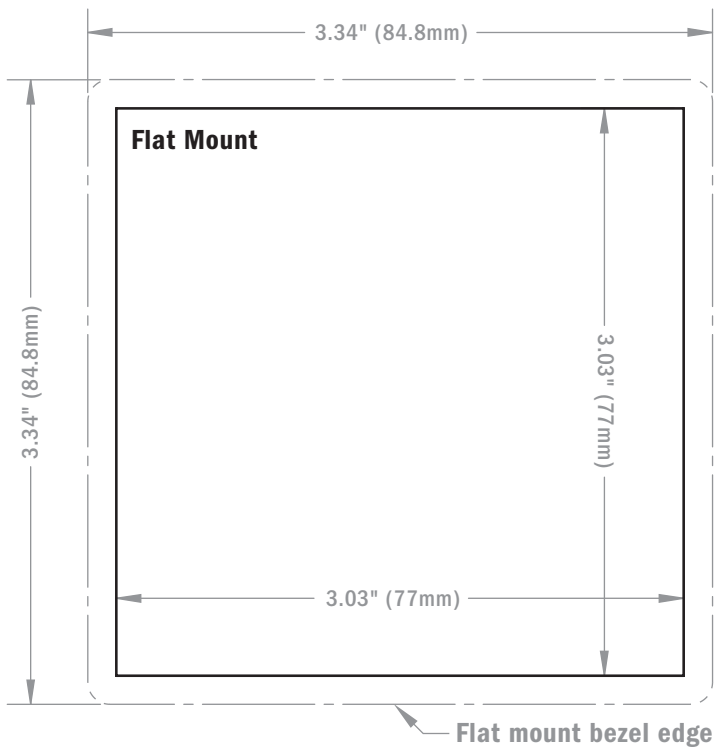
STEP 2
Snap header and footer into mounting clips and post. Snap the mounting bezel into place with the flat edge up.

Header

Footer

Bezel

Panel Frame

STEP 3

Header

Mounting Ring and Nut

M2 Head Unit

Footer

Bezel

Panel Frame

Cutout Templates

Flat Mount

3.34" (84.8mm)

3.34" (84.8mm)

3.03" (77mm)

3.03" (77mm)

Flat mount bezel edge

Surface Mount

Ø2.125" (54mm)

3.46" (87.9mm)

3.40" (86.5mm)

⚠ **WARNING!** For cutouts to be accurate, print the document at full-scale. Do not print to fit paper size or use any other print scaling options. Measure printed cutouts to confirm size prior to cutting.

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