

M2 OLED Tank Monitor Instructions

PN 1839

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

Specifications

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

* Variable with voltage, display intensity, and sleep mode


Regulatory


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

Tanks

Senders	North American 240Ω–33Ω
	European 10Ω–180Ω
	Blue Sea Systems Ultrasonic
	Custom resistive
Display Resolution	1%
Custom Tank Shapes	Auto Calibration

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.

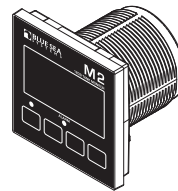
WARNING

- If you are not knowledgeable about electrical systems, have an electrical professional install this unit. The diagrams in these instructions pertain 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.

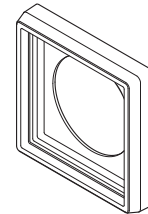
CAUTION

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

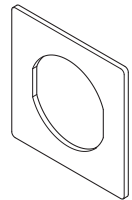
Components Included



M2 Head Unit



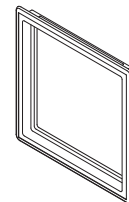
Surface Mount Bezel and Seal



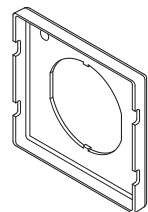
Surface Mount Gasket



Surface Mount Cover



Flat Mount Bezel



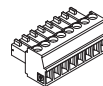
Flat Mount Clamp



Mounting Ring



Mounting Nut

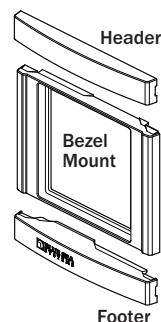


Connector



Screwdriver
Retail Package Only

360 Panel Mounting Kit (1525 sold separately)




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


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


#8 x 1/2"
Flat Head Sheet
Metal Screws
(4X)

TANK FUNCTIONS (1839)

Monitor up to four tanks. Provides High/Low level alarms for each channel.


Memory

All M2 meters store settings in Flash memory that will remember your settings while powered off.

Connections

IMPORTANT! Signals from tank senders are generally very small and are easily affected by interference. The best way to prevent this is to wire the negatives of the senders as close as possible to the meter's DC Negative connection (pin 1)

Meter Power Supply Connections

 All meters must have pins 1 (DC Negative) and 2 (DC Supply) 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 5A fuse.

Tank Connections

North American Standard Senders

North American Standard senders are resistive type senders that have a resistance between 240 and 33 ohms. (With 240 ohms indicating empty).

European Standard Senders

European Standard senders are resistive type senders that have a resistance between 10 and 180 ohms. (With 10 ohms indicating empty).

Blue Sea System Ultrasonic Senders


Blue Sea Systems Ultrasonic sender use sound waves to measure the distance from the sender to the top of the liquid in the tank. Blue Sea Systems has two different senders, one for gasoline (1811) and one for diesel, water, and waste (1810).

IMPORTANT! Ultrasonic senders lose resolution when installed in tanks shallower than their maximum depth. This is most noticeable on the 1810, when it is used in tanks shallower than 12". If you have questions regarding using the Blue Sea Systems Ultrasonic Sender in shallow tanks, please contact Blue Sea Systems Technical Support.

Customer Senders

Customer senders must have a resistive output between 0 and 300 ohms.

Relay Connections

 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-resetting fuse that will protect against shorts. In addition, an 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)

INITIAL SYSTEM SETUP

Wiring and 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 1, and up to 5, 5A fuses
 - Minimum of 1, and up to 5 In-line Fuse holders, one for each 5A fuse
 - Common connection point such as a Power Post or Bus Bar.
 - Up to four (4) tank senders.
 - Wires, terminals, and tools needed for electrical installation.
3. Choose meter 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 page 15 and 16 of this manual.
 - Cutout template for the 360 Panel Mounting Kit is provided with the 1525.
4. Install Tank Senders according to the manufacturer's instructions.
5. Make all connection to the meter's terminal block before connecting terminal block to meter.
 - See Wiring Diagram and Pinout notes on page 4.
 - Tank Sender negative wires should connect as close as possible to 1839 Pin 1 to reduce interference. A power post like part number 2010 provides a good connection point between the tank senders and 1839 pin 1.
 - The 5A Fuse to pin 2 should be within 7" of the power source. Do not put the fuse in the fuse holder at this time.
 - If you are not using the relay output feature the pins 3 and 4 do not need to be wired.
 - See pages 13-14 for some wiring options for the Relay Out feature.
6. Plug wired terminal block into the back of the meter.
7. Keeping hands away from the terminal block, insert the 5A fuse into the fuse holder, this will power the meter.
8. Go to next section "Basic Meter Setup" to properly setup your meter.

Basic Meter Setup

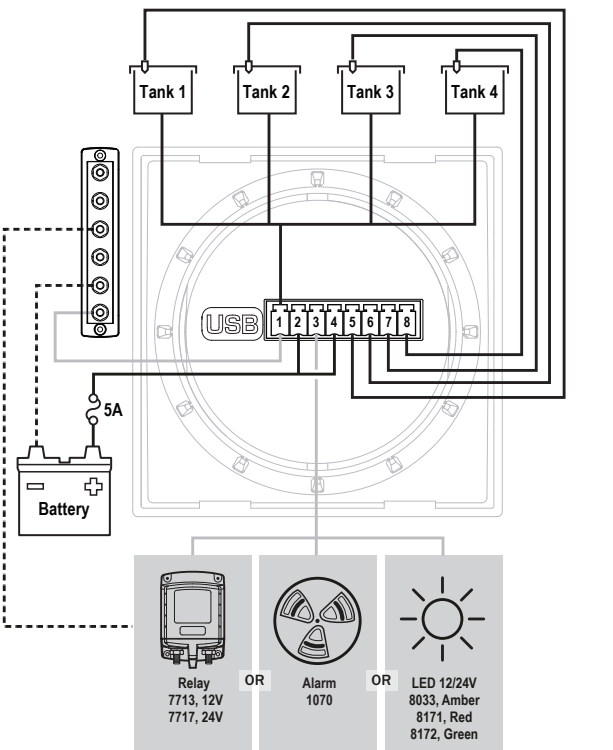
Note: Meters running firmware revision SW014 or higher have the ability to output a configuration file, allowing you to save your settings to a USB thumb drive. This can be used to restore previous settings or to quickly set up additional meters. Please see the firmware update and configuration instructions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

Note: Detailed information of meter use and settings start on page 5.

1. To set up the 1839 M2 Tank Monitor you will need the following information for each tank.
 - Tank Volume
 - Sender Type
 - If using a nonstandard resistance sender, then the Hi (Full) and Low (Empty) resistance values will be needed.
 - Tank Shape: rectangular, triangular, or custom.
 - Depth: only needed if using the Blue Sea Systems Ultrasonic Senders 1810 or 1811
2. When you have the information for each tank, go into the 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 menu option and press the **Select** button.
4. Scroll down to Tank 1 Setup and press the **Select** button.
5. If the tank input is not being used, set Enabled to Off, then skip to step 8.
6. The Tank Label can be customized at this time, See Changing System Labels on page 10 for details.
7. If the tank input is being used, enter in the fields for:
 - Volume
 - Sender Type
 - Depth, if using an ultrasonic sender
 - Tank Shape: will automatically adjust to Auto or Calibrate during the calibration process.
 - Resistance Hi/Resistance Lo: DO NOT ADJUST THESE VALUES unless you have a nonstandard resistance tank sender.
8. Repeat steps 5-7 for each Tank Setup.
9. To calibrate irregular shaped tanks, see Calibration instructions on pages 11-12
 - For rectangular and triangular shaped tanks, no calibration is needed.

DETAILED WIRING

1839 Tank Monitor



Pin 4 Relay Supply only required if pin 3 relay out is used.
See page 13 for detailed relay instructions.

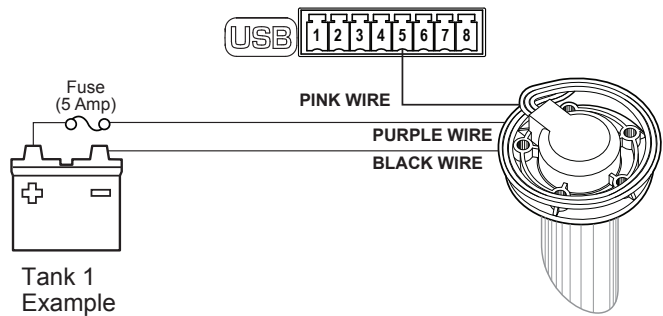
Pin-out Table

1839 Connector Pin Assignment Table

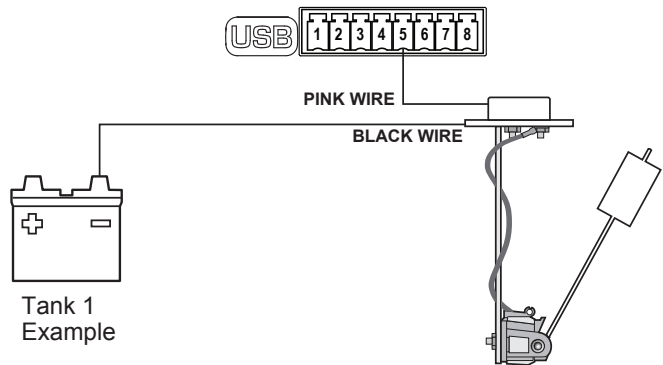
USB	Micro USB Port
8 Pin Connector*	Function
1 Required Connection	DC Negative
2 Required Connection	DC Supply
3	Relay Output
4	Relay Supply
5	Tank 1
6	Tank 2
7	Tank 3
8	Tank 4

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

Blue Sea Systems Ultrasonic Sender 1810, 1811



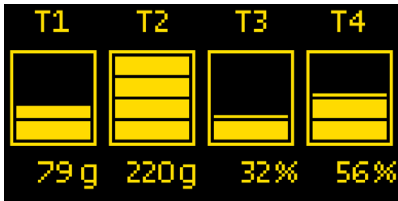
Resistive 2 Wire Sender



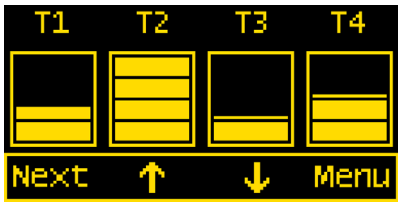
USING THE METER

Example Screens From Tank Meter (1839)

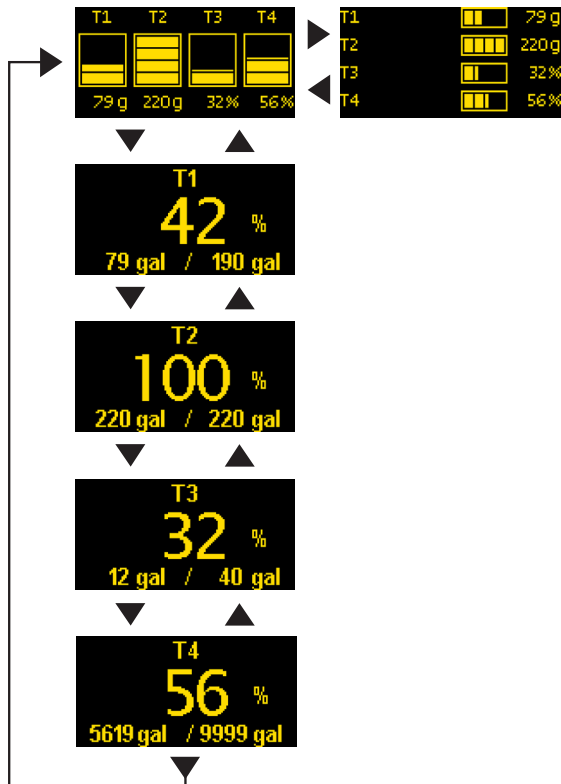
When an M2 Meter is initially powered up, it will display the Blue Sea Systems logo, its serial number and its software revision. After a couple of seconds, the unit will display a high-level System Summary screen.



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 “tank” channels and individual tank screens showing more detailed information.



Press the Menu button to bring up 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.

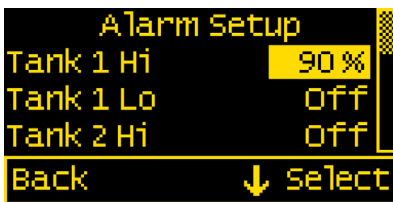
CONFIGURING THE METER

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 & CONTROL

The meter's alarm can be set to trigger for High or Low tank volumes. 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. Disconnected sensors, displayed as NC on the summary screen, are treated as 0% for the purpose of determining alarm status. This means if a sensor, that has a low level alarm set, becomes disconnected then that input's low alarm will activate.



Setting Alarms

The M2 Meter family provides monitoring capability of input channels. Alarms are triggered if a channel is above or below a certain user selected threshold value. The following example indicates how to setup a tank full alarm.

1. Go to the Alarm Setup menu.
2. Scroll to the desired input channel (i.e., Tank 1 Hi).
3. Press the **Select** button and the cursor should start blinking.
4. Set the tank level 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 tank level threshold cannot be set above a high tank level threshold. Likewise, a high tank level threshold cannot be set below the low tank level threshold. The meter will automatically increase or decrease the tank level thresholds to enforce this.

In the above example, an alarm will set anytime Tank 1 is greater than or equal to 90% of the full scale rating. This could be used to monitor a holding tank or to indicate that a tank is almost full while filling fuel. Note that the display can be changed from % to gallons or liters in Tank 1 Setup.

Tank Alarm Dly (Alarm Delay)

An alarm delay can be specified so that alarms don't immediately trigger. This can be useful if tank sloshing is causing false alarms.

The hold off timer operates as a count-up/count-down timer. When the tank value 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 minutes 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 will blink.



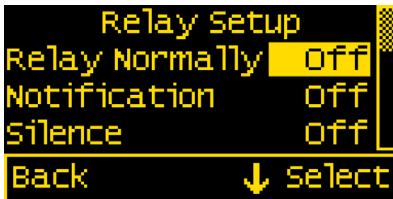
Viewing Alarms Status

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 high or low tank levels. Disconnected sensors, displayed as NC on the summary screen, are treated as 0% for the purpose of determining relay status. This means if a sensor, that has a low level relay set, becomes disconnected then that input's low relay will activate.

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. Detailed relay wiring can be found on pages 13 and 14.



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 on (contacts closed) in normal operation and OFF means it is normally off (open contacts). 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 de-activate after the user presses a key on the display. The key press will only de-activate 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.

Tank Relay Dly (Delay)

A relay delay can be specified so that relays don't immediately trigger. The relay delay functions the same as the alarm delay. See Tank Alarm Dly (Delay) section, (page 6), for details.

Viewing Relay Status

To view a complete list of active relays, press **Menu>Setup>Relay Setup**. Any active relay will flash.

Setting Input Thresholds

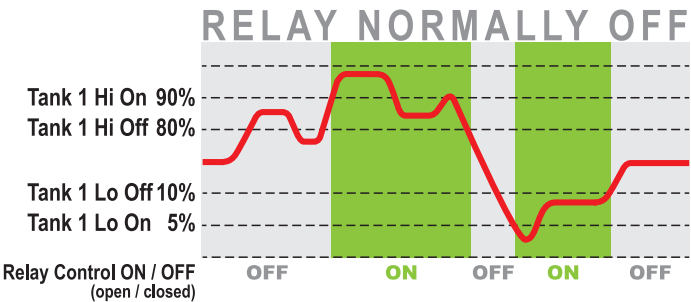
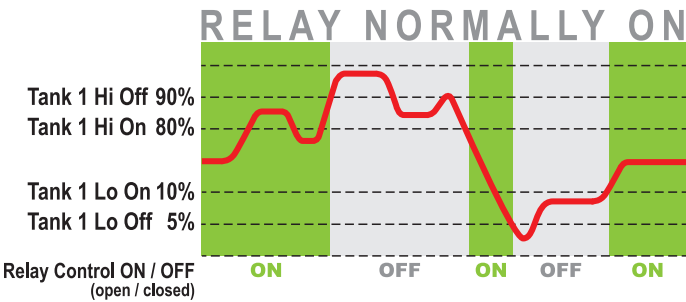
Settings for each channel's high and low tank thresholds are provided. The connected relay's normal operating state will toggle (change state) if these thresholds are met. For both high and low thresholds, the activation and deactivation levels are different to prevent the relay from rapidly toggling (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 = On (Closed)



Relay Setup Screen with Relay Normally = Off (Open)



LEGEND

Tank Level

Example. If the relay is Normally On (closed) and Tank 1 is configured as above, then it will open at the user input threshold value for Tank 1 (90%). To close, the level must drop below the User's input value for Tank 1 On (80%). Similarly, the relay will open at the User input for Tank 1 Lo Off (5%). The level must meet the User input for Tank 1 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 tank value and then press **Enter** to save the setting. Press **Cancel** to cancel the change.

NOTE: Lower threshold settings cannot be set above higher tank threshold settings. Similarly, higher tank thresholds cannot be set below lower tank thresholds. The meter will automatically increase or decrease the tank thresholds to enforce this.

Clearing Relay Notification

If the Notification option is set to ON then any time the relay is opened (Normally Off) or closed (Normally On). A message will be displayed on the main screen. Pressing a key will clear this notification. If Silence is set to ON then the relay will be opened (Normally Off) or closed (Normally On).



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.

Demo Mode

With Demo Mode ON, the meter displays factory programmed values. 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.

Units

Select which type of units, Imperial (gallons) or metric (liters) to be used, if a tank is set to display volume, instead of percent.

CHANGING SYSTEM LABELS

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 tank, follow the instructions below:

1. Navigate to the setup menu for the desired tank (such as Tank Setup). **Menu->Setup->Tank 1 Setup**
2. In the menu, move the cursor to tank 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.

Note: Although the maximum label length is 14 characters, some screens may only be able to display the first 5 or so characters.

TANK SETUP

The meter provides setup settings for each tank. To access these settings, first go to the Setup menu. Scroll to the desired tank.

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

Volume

Set the volume.

Show Percent

If this value is on, then tank values will displayed as a percentage. If the value is off then it will be displayed in either gallons or liters.

Sender Type

This setting presets the Resistance Lo and Resistance Hi values based on the type of sender attached to the meter. The available options are listed below:

- USA – North American Standard type of sender between with a resistance between 240 and 33 ohms.
- Euro – European Standard type of sender with a resistance between 10 and 180 ohms.
- 1810 – Blue Sea Systems Ultrasonic Tank Sender for Diesel, Water & Waste.
- 1811 – Blue Sea Systems Ultrasonic Tank Sender for Gasoline Only.
- Cstm – Indicates the Resistance Lo and/or Resistance Hi values have been manually changed.
Inputs limits are between 0 ohms minimum and 300 ohms maximum.

Resistance Lo/Resistance Hi

The tank meter operates by reading the resistance of the tank sender. The resistance value (in ohms) can be entered here for an empty tank (Resistance Lo) and for a full tank (Resistance Hi). Changing either of these values when the Sender Type is set to either 1810 or 1811 will give unpredictable results when an Ultrasonic Tank Sender is used.

Sensor 20% - Sensor 100%

These are the calibration values for the tank. See Manually Entering Custom Tank Shapes for instructions on how to adjust these values.

Tank Depth (Only used with 1810 and 1811 Senders)

This setting indicates the depth of the tank in inches. This setting is not affected by switching the units in **Setup->Display->Units**.

Tank Shape

- Rect – Standard Rectangular Tank
- Tri – Triangular Shaped Tank. Good for tanks in Bilges.
- Auto – This setting only shows up after the tank has been auto calibration. Changing this value back to Rect or Tri will overwrite the auto-cal values.
- Cstm – This setting indicates that the User has manually changed the tank calibration settings by manually adjusting any of the Sensor 20% - Sensor 100% values.

Custom Tank Shapes

The M2 Tank Meter has the ability to define custom tank shapes. This can be done two ways by either using the Auto Calibrate feature or manually entering the tank Parameters.

Using Auto-Calibrate

The Auto-Calibrate function requires the tank to be filled at a constant rate and for the sensor reading be initially less than 15%. When using ultrasonic sensor (1810 and 1811) adjust the flow rate, so it takes 10 minutes or longer for the tank to fill during auto calibration. For grey, waste, and water tanks a hose can be used to provide a constant flow. Diesel and Gas tanks can be more difficult because foaming may cause the user to slow down filling once the tank is almost full. If foaming is a problem then use the Manual method described above.

1. Select **Setup->Tank(1-4)->Auto Calibrate->Ok**
2. If the sensor reads more than 15% an error message will be displayed along with the sensor reading. At this point the tank can be emptied or the back button can be pressed to exit the auto calibrate procedure.



3. If the sensor is less than 15% then an option to start the calibration process is given.
4. Press the **Start** button and start filling the tank at a constant rate.



5. The timer will start counting as the tank fills. In addition the sender will indicate that the tank is getting filled. When the tank reaches 100% the timer will automatically stop. Press the **Finish** button to accept the calibration values or the **Cancel** to abandon the changes. If the tank is full before the sender reaches 100% then press **Finish**.
6. After the **Finish** button is pressed the M2 will populate Sensor 20% - Sensor 100% with the proper calibration values. Scroll down to inspect the values.

Manually Entering Custom Tank Shapes

The M2 Tank Meter has five setup points that can help define odd sized shapes. Each of the set points allows the actual volume of the tank to be defined for various sensor readings. For example, setting the Sensor 20% value to 10%, indicates that when the tank sensor reads 20% the tank is really just 10% full. Similar set points are available at 40%, 60%, 80%, and 100%.

If a tank can be completely emptied, then to calculate the set points do the following:

1. Empty the tank. (If the tank cannot be completely emptied, the estimation works best if the tank is emptied with the sensor reading under 20%.
2. Set the tanks shape to Cstm, and set each Sensor X% value to itself. Sensor 20% set to 20. Sensor 40% set to 40, etc.
3. Set the tank to display percentage.
4. Add liquid to the tank until the meter reads 20%.
5. Record the actual number of gallons added to the tank.
6. Keep on adding liquid and record the number of gallons added when the meter reads 40%, 60%, 80% and 100%.
7. Press **Setup->Tank X Setup** and scroll down to **Sensor 20%**.
8. Enter the following value: (Tank Capacity – Total Gallons Added + Gallons Added at 20%)/(Tank Capacity)
9. Repeat Step 8 for 40%, 60%, 80% and 100%

Example: Triangle Tank

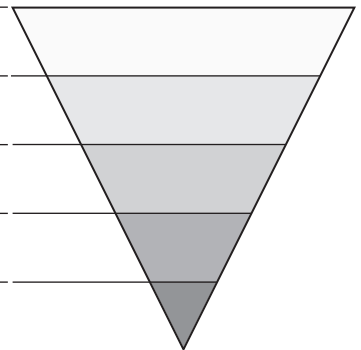
A user has a triangle fuel tank that has a Tank Capacity of 50 Gallons. The tank isn't completely empty and the meter reading is less than 20% in Rectangular mode. The user adds fuel until the meter reads 20%. The amount of fuel added was 1 gallon, at 40% he has added 7 gallons, at 60% he has added 17 gallons, at 80% he has added 31 gallons and at 100% he has added 49 gallons. The total gallons Added is 49 gallons.

To calculate the Sensor 20% value we use the equation in step 8 above: $(50g - 49g + 1g)/50g = 4\%$.

To calculate the Sensor 40% value we use the equation in step 8 above: $(50g - 49g + 7g)/50g = 16\%$.

Likewise we can calculate the rest of the values (60% & 80%) as shown in the table.

Rectangular Tank Reading	Gallons Added at X%	Sensor X%	Custom Tank Reading
100%	49 gallons	100%	50 gallons
80%	31 gallons	64%	32 gallons
60%	17 gallons	36%	18 gallons
40%	7 gallons	16%	8 gallons
20%	1 gallon	4%	2 gallons
0%	0 gallons	-	0 gallons



Note: It is possible to have the tank full before the sensor reads 100% by inputting a value into the Sensor 100% field that is greater than 100%. For example if the sensor reading for a full tank is 90% and Sensor 80% is calculated to be 75% then Sensor 100% can be calculated with the following:

$$\begin{aligned} \text{Sensor 100\%} &= \text{Sensor 80\%} + 20\% * \frac{100\% - \text{Sensor 80\%}}{\text{fullValue\%} - 80\%} \\ &= 75\% + 20\% * \frac{100\% - 75\%}{90\% - 80\%} \\ &= 125\% \end{aligned}$$

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.

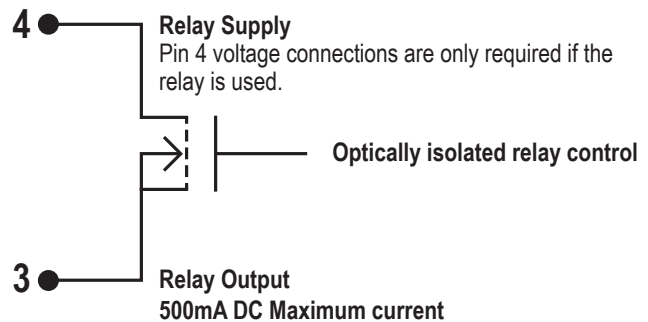
SOFTWARE UPDATE

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.blueseas.com.

OPTIONAL WIRING

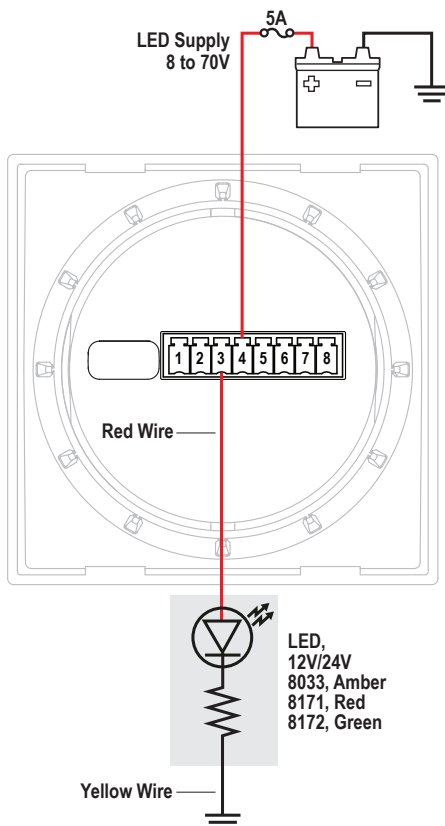
M2 Relay Connections

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 Output connection. In the 1830 and 1833 meters, the Relay Supply connection can also be used to monitor a voltage.



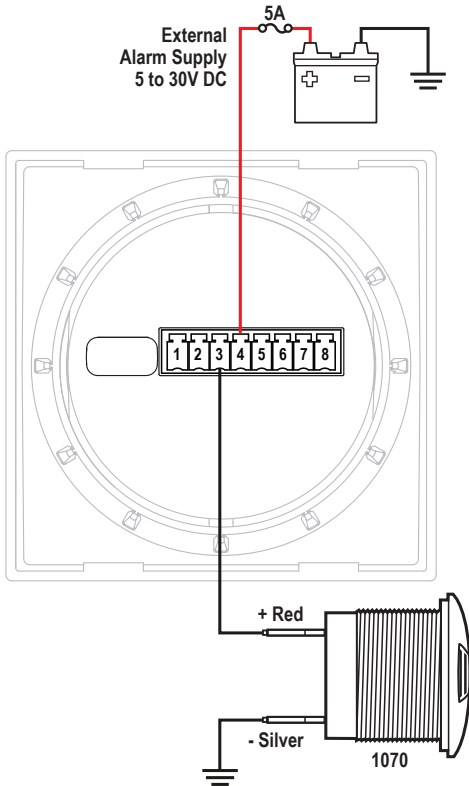
External LED

An external LED such 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.



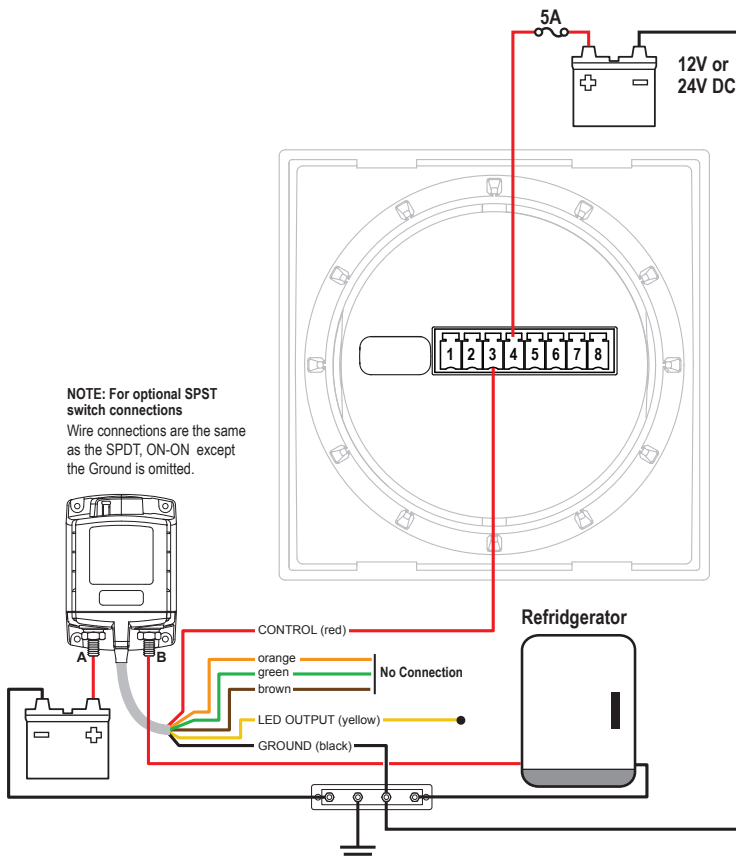
External Alarm (1070 Floyd Bell Turbo)

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



External Relay

If you need to switch more than 0.5 A, 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 PN 7713.



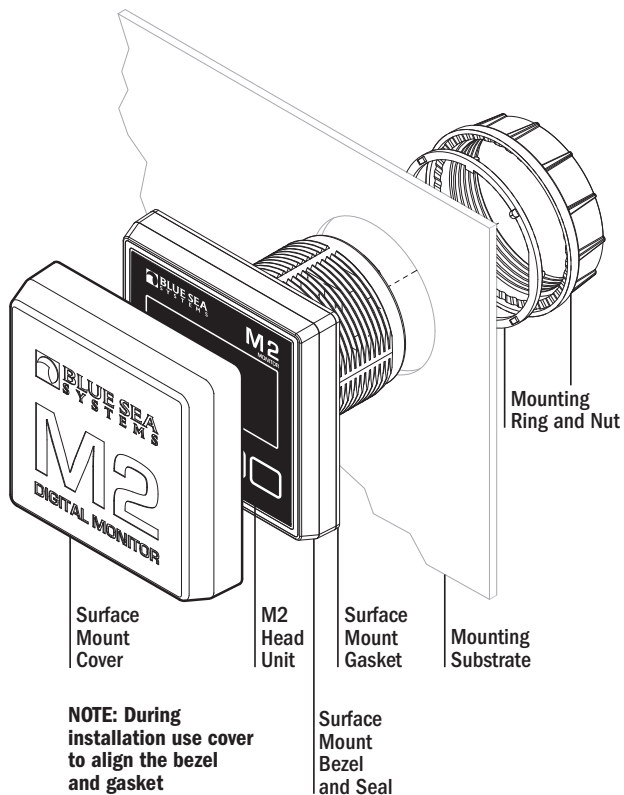
NOTE: 9012, 7700, 7701, 7702, & 7703 Remote Battery Switches are not compatible with the internal relay.

MOUNTING CONSIDERATIONS & CUTOUT TEMPLATES

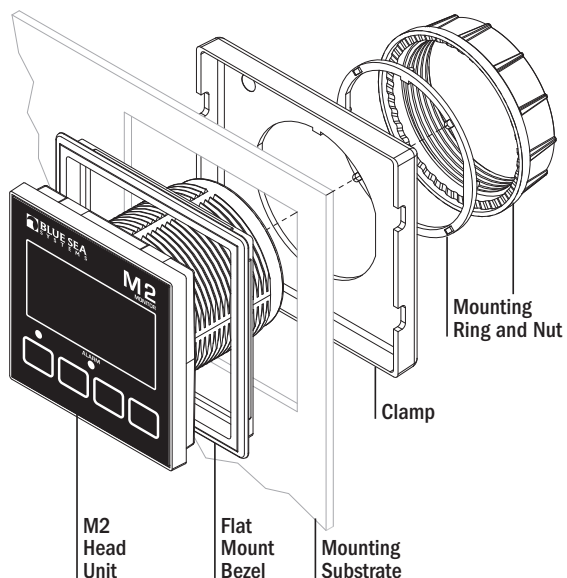
Mounting Considerations

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.

Surface Mount



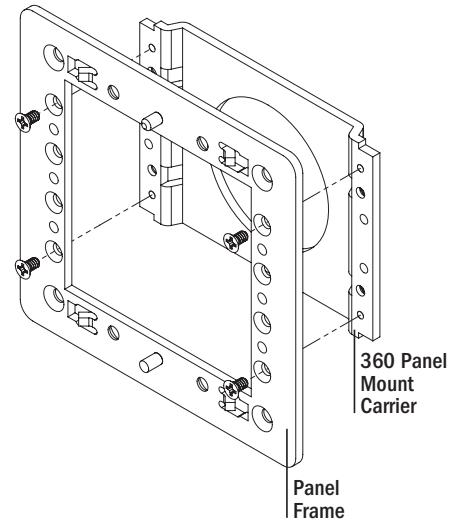
Flat Mount



360 Panel Mount 1525

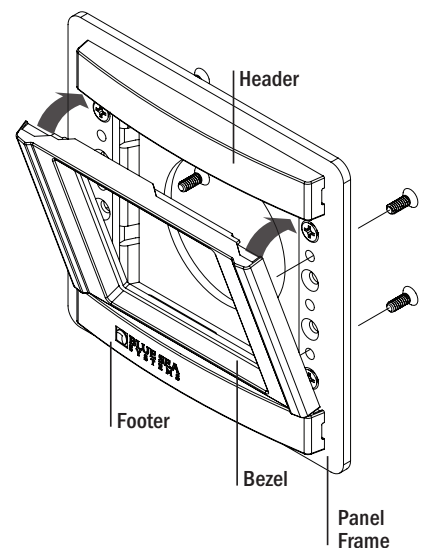
STEP 1

Use 1/4" Mounting Screws

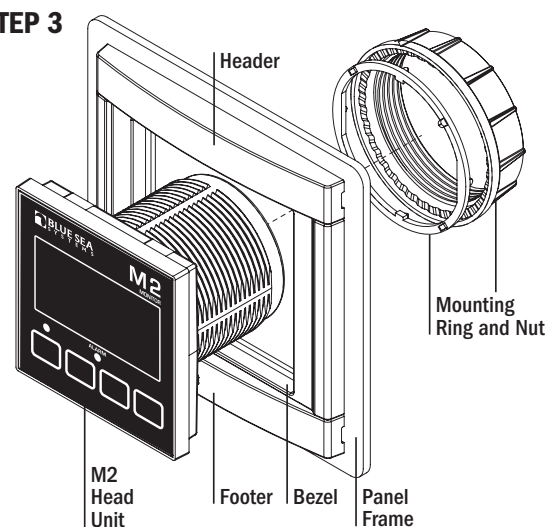


STEP 2

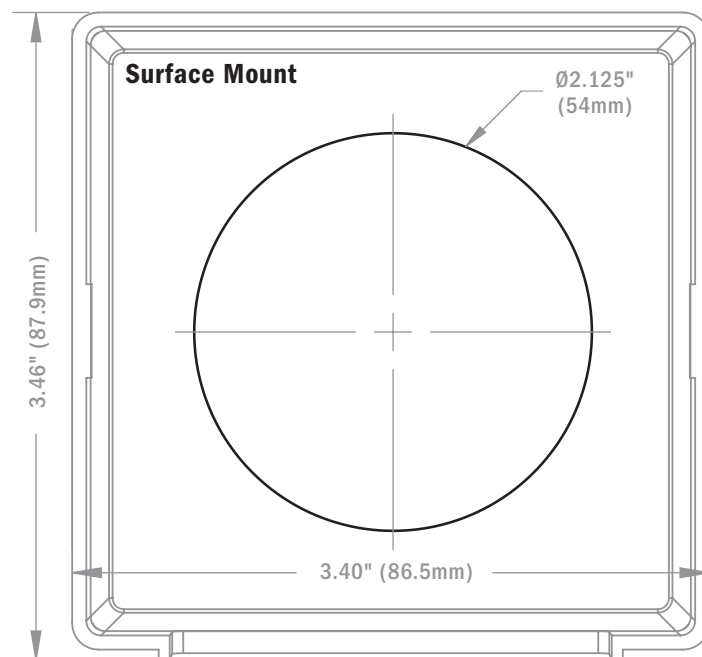
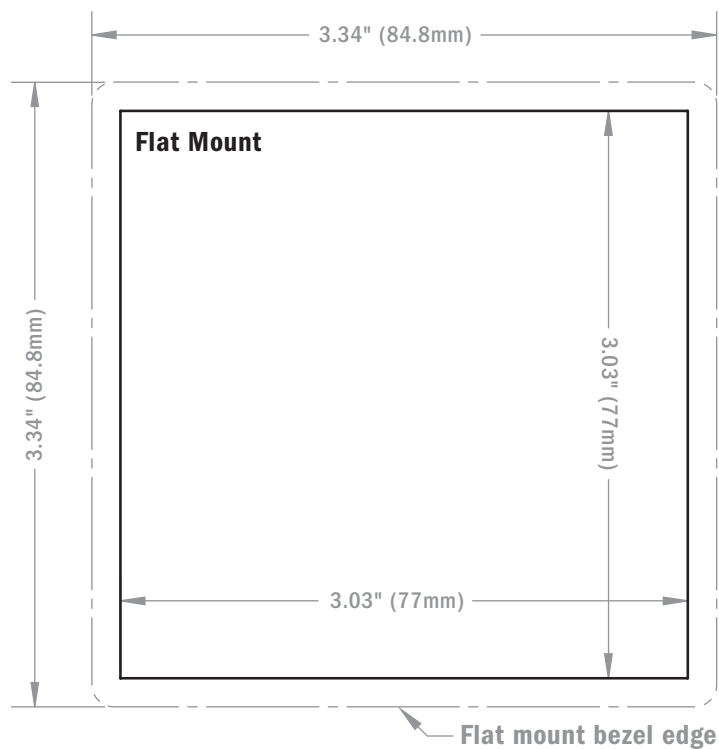
Snap header and footer into mounting clips and post. Snap the mounting bezel into place with the flat edge up.



STEP 3



Cutout Templates



⚠ 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.