



Innovative marine electrical products—Built to Last

**VSM**  
422



1800

## Installation and Configuration Manual

- **Four meters in one**
  - AC Multimeter
  - DC Multimeter including Amp Hours
  - Tank Monitoring
  - Bilge Cycling
- **Twenty-two measurements**
- **Fifteen programmable alarms**

Blue Sea Systems

VSM 422 Installation and Configuration Manual



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## INSTALLATION CHECKLIST

- Check for parts shown on front of QuickStart Installation Guide
- Read Warning and Cautions (page 3)
- Read QuickStart Installation Guide for mounting instructions
- Read System Overview, Mounting Considerations, Detailed Wiring, and Sensing Description (pages 4–9)
- Read QuickStart Installation Guide for installation notes
- Follow Initial System Setup instructions (page 13)
- Configure Displays (page 53)
- Configure Alarms (page 61)

## SPECIFICATIONS

### DC Specifications:

Nominal System Voltage	12 or 24 Volts
Operating Voltage	8.5–33.0 Volts
Minimum Current Draw	35mA@9.5 Volts, 18.8mA@24 Volts
Voltage Accuracy	+/- 0.5%
Current Range	0–500 Amps
Current Accuracy	+/- 1.0%

### AC Specifications:

Nominal System Voltage	120 Volts@60 Hz—North America 230 Volts@50 Hz—Typical of Europe
Operating Voltage	0–300 Volts
Voltage Accuracy (RMS)	+/- 0.5%
Current Range	0–150 Amps
Current Accuracy (RMS)	+/- 2.0%
Frequency	40–90 Hz

### Regulatory

EC Declaration of Conformity (page 92)

VSM 422 Surface Mount Gasket creates an IP67 waterproof seal on unit face—temporary immersion for 30 minutes

**NOTE: Panel mount configurations are not waterproof.**

### Magnetic Compass Deviation

Compass safe working distance is 10.00" (250mm) from VSM 422 Head Unit.

## RESOURCE INFORMATION

### Application Briefs:

State of Charge (SOC)	<a href="http://blueseas.com/viewresource/1324">http://blueseas.com/viewresource/1324</a>
AC Current Measurement	<a href="http://blueseas.com/viewresource/86">http://blueseas.com/viewresource/86</a>

## WARNING AND CAUTION SYMBOLS



### WARNING

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



### CAUTION

The CAUTION symbol refers to restrictions and rules with regard to preventing damage.



## WARNING



- ✔ Verify that all AC sources are disconnected before connecting or disconnecting the current transformer. Failure to do so will generate lethal voltages on the current transformer.
- ✔ 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 the VSM 422 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 unit is installed. Many inverters have a "sleep mode" in which their voltage potential may not be detectable with measuring equipment.
- ✔ If an AC generator is installed on the vessel, it must be stopped and rendered inoperable before the unit is installed.
- ✔ Verify that no other DC or AC sources are connected to the vessel's wiring before installing the unit.
- ✔ If the meter must be removed, connect the current transformer leads together before restoring power to the AC system.



## CAUTION



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

## SYSTEM OVERVIEW

### Optional Input:

The pin three connection can be configured as one of three options: a third tank, a third battery, or bilge monitoring.

### AC Functions:

The AC system allows for monitoring of the AC voltage, frequency and current levels. High and low alarms can be configured for each of these.

### DC Functions:

The DC system monitors the voltage levels on up to three batteries, as well as the current draw on the battery on which state of charge is being monitored. High and low limits can be set for the voltage on each battery. A high current alarm can also be set on the battery monitored for State of Charge.

### State of Charge (SOC):

State of Charge gives feedback on how "full" the battery is with usable energy. The system keeps track of the amp hours (Ah) remaining on the battery, the charge cycles on the battery, and the temperature of the battery. Low State of Charge and high battery temperature alarms can be set. With the low state of charge alarm set, the VSM 422 shows the time remaining until the alarm will activate, at both the current power usage and at the average power usage for the last 20 minutes.

### Tank Functions:

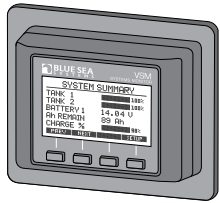
The VSM 422 is capable of monitoring up to three tanks. The system has an auto calibration routine for generating a tank shape profile for non-rectangular tanks. Tank status can be represented in both capacity (gallons or liters) or as a percentage of capacity. Anti-slosh routines are built in to increase accuracy of readings. Both high and low level alarms can be set for all tanks.

### Bilge Functions:

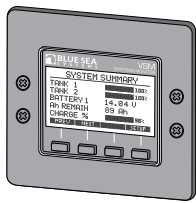
The VSM 422 monitors the current run status of the pump, the time running in the last hour, the cycles in the last 24 hours, and the total cycles since the last cycle reset. High alarms can be set for both the minutes of run time in the last hour, as well as the number of cycles in the last 24 hours.

## MOUNTING CONSIDERATIONS

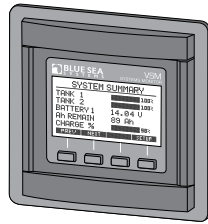
The Vessel System Monitor has three mounting methods: surface mount, flat panel mount, and 360 panel mount. When surface mounted using the supplied gasket, an IP67 waterproof rating is created for the front of the unit. Because panel mounting systems are not waterproof, the unit should not be panel mounted in an exposed location. For all mountings, the back of the unit is not waterproof and must be kept dry.



Surface Mount



Flat Panel Mount



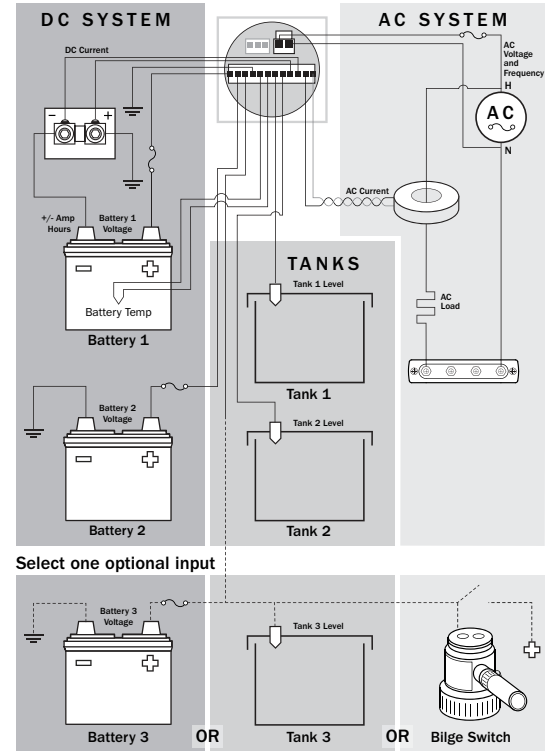
360 Panel Mount

## INSTALLATION NOTES

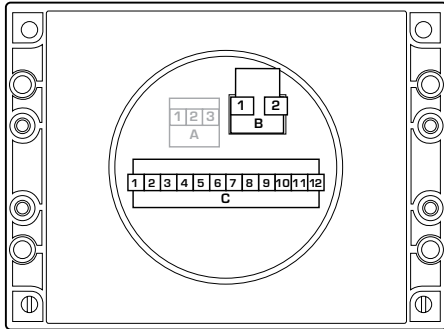
1. The unit must be connected to a non-switched circuit to ensure accurate and consistent State of Charge monitoring.
2. Make all connections to the unit's terminal block before connecting the terminal block to the unit. Keep hands away from the terminal block when applying power to the unit.
3. As the final DC connection, insert a fuse into the in-line fuse holder on the wire to the positive battery terminal.

## DETAILED WIRING

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



## CONNECTIONS



Connector Pin Assignment Table

Connector	Function
<b>Header A</b>	<b>Communication*</b>
Pin 1	Communication
Pin 2	Communication
Pin 3	Communication
<b>Header B</b>	<b>AC</b>
Pin 1	AC Line
Pin 2	AC Neutral
<b>Header C</b>	<b>Sensors and Power</b>
Pin 1	DC Voltage Battery 1 (Unit Power)†
Pin 2	DC Voltage Battery 2
Pin 3‡	DC Voltage Battery 3, Tank Level 3, or Bilge Function
Pin 4	DC Negative
Pin 5	Battery Temperature (Positive)
Pin 6	Battery Temperature (Negative)
Pin 7	Tank Level 1
Pin 8	Tank Level 2
Pin 9	DC Shunt (Positive)
Pin 10	DC Shunt (Negative)
Pin 11	AC Current Coil (Positive)
Pin 12	AC Current Coil (Negative)

\* Communication port is for use with future modules

† Ampere hours are measured for Battery 1 ONLY

‡ Three input options available

## SENSORS

### DC Current

The shunt must be placed 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 VSM 422 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 VSM 422 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 reading for Battery 1 when it is not being charged and has a load should be negative. If it is not, reverse the DC shunt leads. (see page 95)

### DC Voltage

Voltage lines to the VSM 422 should be directly connected to the positive battery terminal with a dedicated wire ahead of any other connections. This will ensure correct voltage and SOC monitoring. Use an appropriate in-line fuse (5A suggested) on the positive wire.

### AC Current

In most cases the AC Current Transformer should be located on the main AC feed before any other devices. See <http://blueseas.com/viewresource/86> for more information on AC Current Transformer location. The location does not affect state of charge (SOC) calculations.

The Current Transformer does not indicate polarity. If AC voltage is applied and current shows greater than zero but the power reading is zero or a negative value, reverse the AC Current Transformer leads. The leads should be twisted to reduce the effects of interference.

### AC Voltage

The ungrounded AC line should be fused inline with a fast acting fuse of 0.25A to 0.5A to protect against shorts.

### Bilge Sensor

Connect "switch on" lead of bilge pump to the VSM 422 unit. This wire should read +12/24V when running and 0V when off.

### Temperature Sensor

The battery temperature sensor should be located near the State of Charge battery. It can be mounted to a battery box using the hole, or cable-tied to the negative battery terminal. **IMPORTANT! Do not fasten the Temperature Sensor directly to the battery in any way that may puncture or damage the battery.**

### Tank Sender

The VSM 422 is compatible with three sender protocols.

#### Resistive 2 Wire Senders: (see page 94 for Installation Diagram)

10 – 180  $\Omega$  VDO—Typical of Europe  
240 – 33  $\Omega$  Teleflex—North America

#### Ultrasonic 3 Wire Senders: (see page 94 for Installation Diagram)

Blue Sea Systems PN 1810 and PN 1811.

Blue Sea Systems ultrasonic sender PN 1810 is used for water, waste, and diesel fuel tanks up to 32" (812mm) in depth. Blue Sea Systems ultrasonic sender PN 1811 is used for gasoline tanks up to 24" (609mm) in depth.

When connecting the tank sender to ground it is important to connect them as directly as possible to the main negative bus to prevent high loads such as battery chargers from affecting the tank readings.

The VSM 422 will not produce accurate readings if a second gauge is connected to the same tank sender. Install a sender for each gauge if you wish to read a tank level from more than one location.

The Blue Sea Systems ultrasonic sender requires an external power source. When power to the sender is lost, the VSM 422 will read the tank as full, and may trigger the tank's high level alarm.

For each tank the sender must be specified, and the shape of the tank set as rectangular or auto-calibrated before accurate readings are displayed.

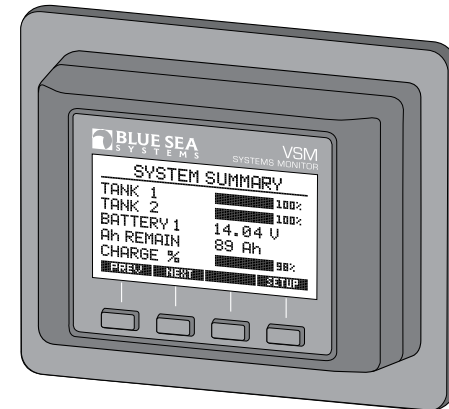
**BOLD** text designates a button.

*Italicized* text designates text on the VSM 422 screen.

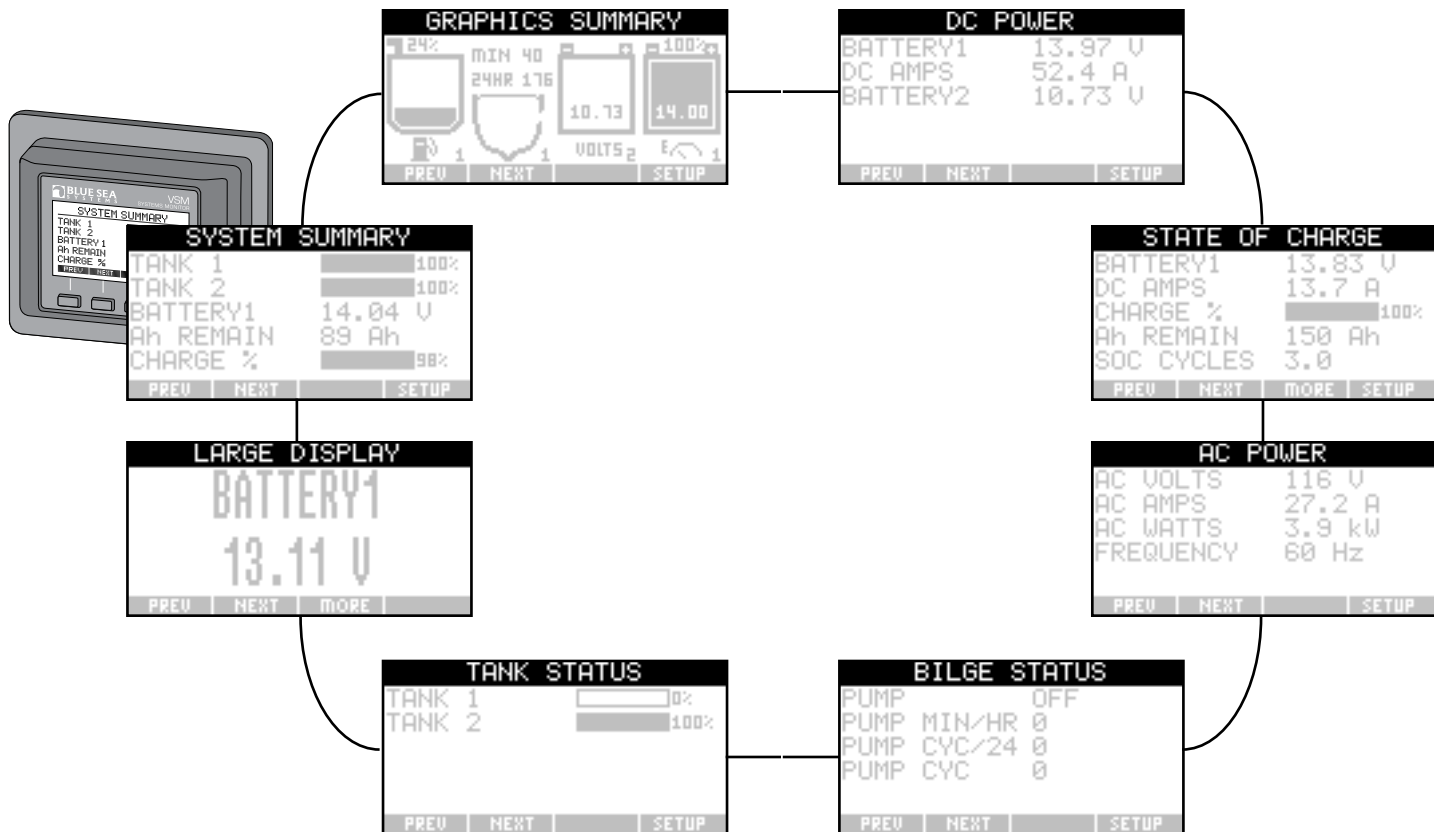
The user interface is controlled by the four buttons located below the display. Each one of the buttons corresponds to the text at the bottom of the screen.

System information is displayed with eight screens: *SYSTEM SUMMARY*, *GRAPHICS SUMMARY*, *DC POWER*, *STATE OF CHARGE*, *AC POWER*, *BILGE STATUS*, *TANK STATUS*, and *LARGE DISPLAY*.

Some screens such as *STATE OF CHARGE* and *LARGE DISPLAY* have a **MORE** button; this can be used to cycle through the information that is not visible on one screen. In some setup screens **<-** and **->** arrows will be shown. These indicate that the selection options continue on a screen that is displayed when the user has scrolled past the top or bottom of the screen. The data fields for both summary screens can be customized through display setup.



# MAIN DISPLAY STRUCTURE



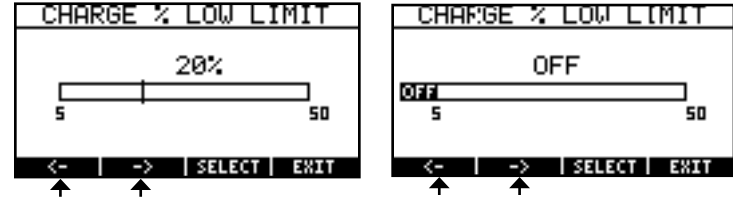


## INITIAL SYSTEM SETUP

Many setup screens require that the user enter data. There are two methods of entering data.

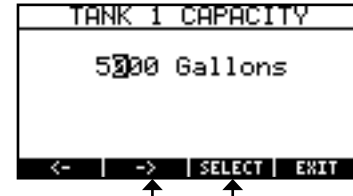
### Scroll Bar Method:

The numbers on the left and right represent the high and low range of the value selected, and the number in the middle is the current value. To adjust the value use the <- and -> buttons. Turn off an alarm by scrolling all the way to the left for a low limit or all the way to the right for a high limit. The current value will show *OFF*. Pressing **SELECT** will set the value; pressing **EXIT** will cancel the change.



### Character Selection Method:

Change the value by selecting the character using the <- and -> buttons and pressing **SELECT** when the character is highlighted. The left two buttons then become **A<-Z** and **A->Z** if a name is being changed or **0<-9** and **0->9** if a number is being changed. Use these buttons to change to the desired value for the character. Numerals **0** through **9** and a blank space are available after **Z** when the characters are in the "name" mode. Press **SELECT** to lock the character. The buttons will then return to <- and -> and another character can be highlighted. When all of the characters have been set press **EXIT**.



## Optional Input Configuration

Connection to pin 3 on Header C can be configured to one of three options, battery 3 monitoring, tank 3 monitoring, or bilge monitoring.

1. Page through main screens by pressing **NEXT** until the *SYSTEM SUMMARY* page is visible.
2. Press **SETUP**
3. Scroll to and press **SELECT** on *OPTIONAL INPUT*

```
SYSTEM SUMMARY
TANK 1      ██████████ 100%
TANK 2      ██████████ 100%
BATTERY1    14.04 V
Ah REMAIN   89 Ah
CHARGE %    ██████████ 98%
PREV | NEXT | SETUP
```

```
System Setup
Setup Display Data
Optional Input
Backlight Time
Units of Measure
AC Frequency
UP | DOWN | SELECT | EXIT
```

4. Scroll to and press **SELECT** on desired optional input for system.

```
OPTIONAL INPUT
Tank 3
Bilge Pump
Battery 3
UP | DOWN | SELECT | EXIT
```

5. Press **EXIT** to return to main system screens.

```
System Setup
Setup Display Data
Optional Input
Backlight Time
Units of Measure
AC Frequency
UP | DOWN | SELECT | EXIT
```


```
SYSTEM SUMMARY
TANK 1      ██████████ 100%
TANK 2      ██████████ 100%
BATTERY1    14.04 V
Ah REMAIN   89 Ah
CHARGE %    ██████████ 98%
PREV | NEXT | SETUP
```

## Units of Measure Setup

1. Page through main screens by pressing **NEXT** until the *SYSTEM SUMMARY* page is visible.


2. Press **SETUP**.

```
SYSTEM SUMMARY
TANK 1      ██████████ 100%
TANK 2      ██████████ 100%
BATTERY1    14.04 V
Ah REMAIN   89 Ah
CHARGE %    ██████████ 98%
PREV | NEXT | ██████████ | SETUP
```



3. Scroll to and press **SELECT** on *Units of Measure*.

```
System Setup
Setup Display Data
Optional Input
Backlight Time
Units of Measure
AC Frequency  ↓
UP | DOWN | SELECT | EXIT
```



4. Scroll to and press **SELECT** on desired unit system.

```
UNITS OF MEASURE
English
Metric
UP | DOWN | SELECT | EXIT
```



5. Press **EXIT** to return to main system screens.

```
System Setup
Setup Display Data
Optional Input
Backlight Time
Units of Measure
AC Frequency  ↓
UP | DOWN | SELECT | EXIT
```



```
SYSTEM SUMMARY
TANK 1      ██████████ 100%
TANK 2      ██████████ 100%
BATTERY1    14.04 V
Ah REMAIN   89 Ah
CHARGE %    ██████████ 98%
PREV | NEXT | ██████████ | SETUP
```

## AC System Configuration

1. Page through main screens by pressing **NEXT** until the *SYSTEM SUMMARY* page is visible.
2. Press **SETUP**.

```
SYSTEM SUMMARY
TANK 1      ██████████ 100%
TANK 2      ██████████ 100%
BATTERY1    14.04 V
Ah REMAIN   89 Ah
CHARGE %    ██████████ 98%
PREV | NEXT | ██████████ | SETUP
```

3. Scroll to and press **SELECT** on *AC Frequency*.

```
System Setup
Setup Display Data
Optional Input
Backlight Time
Units of Measure
AC Frequency ██████████ ↓
UP | DOWN | SELECT | EXIT
```

4. Scroll to and press **SELECT** on desired frequency.  
60 Hz—North America  
50 Hz—Typical of Europe

```
AC FREQUENCY
60 Hz
50 Hz
UP | DOWN | SELECT | EXIT
```

5. Press **EXIT** to return to main system screens.

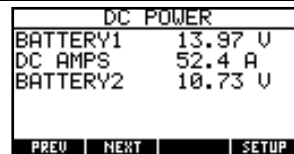
```
System Setup
Setup Display Data ██████████
Optional Input
Backlight Time
Units of Measure
AC Frequency ██████████ ↓
UP | DOWN | SELECT | EXIT
```

```
SYSTEM SUMMARY
TANK 1      ██████████ 100%
TANK 2      ██████████ 100%
BATTERY1    14.04 V
Ah REMAIN   89 Ah
CHARGE %    ██████████ 98%
PREV | NEXT | ██████████ | SETUP
```

## DC System Configuration

1. Page through main screens by pressing **NEXT** until the *DC POWER* page is visible.
2. Press **SETUP**.

```
DC POWER
BATTERY1  13.97 U
DC AMPS   52.4 A
BATTERY2  10.73 U
PREV | NEXT | SETUP
```



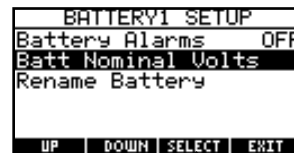
3. Scroll to and press **SELECT** on battery.

```
DC SETUP
Setup Battery 1
Setup Battery 2
Setup Battery 3
DC Amps Alarm  OFF
UP | DOWN | SELECT | EXIT
```



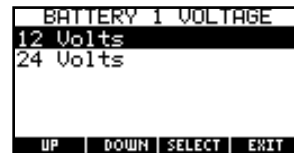
4. Scroll to and press **SELECT** on *Batt Nominal Volts*.

```
BATTERY1 SETUP
Battery Alarms  OFF
Batt Nominal Volts
Rename Battery
UP | DOWN | SELECT | EXIT
```



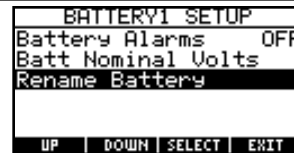
5. Scroll to and press **SELECT** on desired nominal voltage.

```
BATTERY 1 VOLTAGE
12 Volts
24 Volts
UP | DOWN | SELECT | EXIT
```



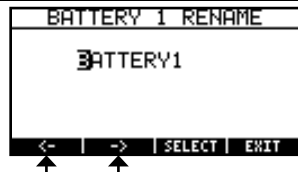
6. Scroll to and press **SELECT** on *Rename Battery*.

```
BATTERY1 SETUP
Battery Alarms  OFF
Batt Nominal Volts
Rename Battery
UP | DOWN | SELECT | EXIT
```

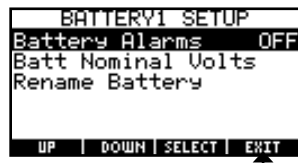


## DC System Configuration (continued)

7. Set battery name using the Character Selection method. (page 13)



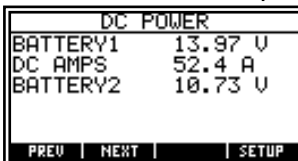
8. Press **EXIT**



9. Repeat steps 2 to 8 for each battery.



10. Press **EXIT** to return to main system screens.



## Tank Configuration

1. Page through main screens by pressing **NEXT** until the *TANK STATUS* page is visible.
2. Press **SETUP**.



3. Scroll to and press **SELECT** on tank.



4. Scroll to and press **SELECT** on *Rename Tank*.



5. Set tank name using the Character Selection method. (page 13)
6. Press **EXIT**



7. Scroll to and press **SELECT** on *Display % or Vol*.



## Tank Configuration (continued)

8. Scroll to and press **SELECT** on desired display format.



9. Scroll to and press **SELECT** on *Select Sender Type*.



10. Scroll to and press **SELECT** on desired sender.



11. If an ultrasonic sensor is being used scroll to and press **SELECT** on *Set Tank Depth*.



12. Set the tank depth using the Slide Bar method.  
13. Press **SELECT**.





## Tank Configuration (continued)

There are two ways to calibrate tanks with the VSM 422: Rectangular Calibration and Auto Calibration. Rectangular tanks are tanks where the shape of the tank does not change based on the height. Auto Calibration is ideal if a non-rectangular tank is being used. Use either Rectangular or Auto Calibration to complete tank configuration.

### Tank Configuration (Rectangular Calibration)

Make sure that the tank sensor is properly adjusted for the tank depth. For ultrasonic sensors this means setting the tank depth. Follow tank configuration steps 1–13 on pages 25–27 for tank setup. Then use the steps below to calibrate for a rectangular tank. The steps below are not required if the monitor will be displaying the tank in percent.

1. Scroll to and press **SELECT** on *Set Tank Capacity*



2. Set tank volume using the Character Selection method. (page 13)
3. Press **EXIT**.



4. Press **EXIT**.
5. Repeat Tank Setup starting with step 3 for all remaining tanks.

## Tank Configuration (Auto Calibration)

After following steps 1–13 on pages 25–27, continue with the appropriate Auto Calibration procedure.

When running the Auto Calibration it is important that the current tank's alarms are turned off and that the boat will not trigger any alarm for other systems. If an alarm occurs, auto calibration must be run again for accurate tank metering. It is recommended that tank levels are as low as safely possible before running calibration. For gray and black water tanks, fresh water may be used to fill the tank during calibration.

There are three different Auto Calibration procedures that can be run depending on what information is known. Use the Auto Calibration Procedure Selection Charts on page 32 to determine the needed information and the appropriate procedure number.

## Tank Configuration (Auto Calibration)

Tank calibration is most accurate if performed when the tank is as close to empty as possible.

### Auto Calibration Procedure Selection Charts

#### If the tank is near empty: $\leq 10\%$ Full

(the current tank level will be assumed to be the empty point by the meter)

		The amount of liquid added during calibration can be measured	
		YES	NO
The empty tank capacity is known	YES	Procedure 1 (page 33)	Procedure 1 (page 33)
	NO	Procedure 1 (page 33)	Procedure 1 <sup>†</sup> (page 33)

#### If the tank is not empty: $>10\%$ – $30\%$ Full

		The amount of liquid added during calibration can be measured	
		YES	NO
The empty tank capacity is known	YES	Procedure 2 (page 37)	Procedure 3 <sup>†</sup> (page 41)
	NO	Procedure 3 <sup>†</sup> (page 41)	Procedure 3 <sup>†</sup> (page 41)

\* Monitor will only be able to correctly display percentage. Use 100 as the full tank capacity.

† Must be able to estimate the percentage of the tank that is filled at the start of Auto Calibration.

## Tank Configuration (Auto Calibration Procedure 1)

1. Scroll to and press **SELECT** on *Set Tank Shape*.

```
TANK 1 SETUP
Set Tank Shape  ↑
Set Tank Depth
Automatic Calibration

UP | DOWN | SELECT | EXIT
```

↑

2. Scroll to and press **SELECT** on *Use Auto Calibration*.

```
TANK 1 SHAPE
Rectangular
Use Auto Calibration

UP | DOWN | SELECT | EXIT
```

↑

3. Scroll to and press **SELECT** on *Automatic Calibration*.

```
TANK 1 SETUP
Set Tank Shape  ↑
Set Tank Depth
Automatic Calibration

UP | DOWN | SELECT | EXIT
```

↑

4. When tank is empty press **SELECT** on *Start Calibration*.  
Fill tank at a steady rate.

```
AUTOMATIC CAL
Start Calibration

Sender Readings 100%
Tank Capacity 100l
Press select to start

| SELECT | EXIT
```

↑

5. When the tank is full press **SELECT**.

```
CALIBRATING TANK1
Finish Calibration

Sender Readings 100%
Est. Tank Level 100l
Fill Timer 0:30

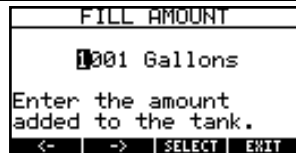
| SELECT | EXIT
```

↑

## Tank Configuration (Auto Calibration Procedure 1)

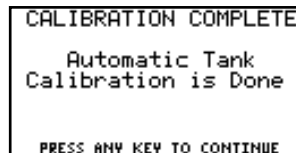
6. Keep the default fill amount. Press **EXIT**.

```
FILL AMOUNT
0001 Gallons
Enter the amount
added to the tank.
<- | -> | SELECT | EXIT
```



7. Press any key to continue.

```
CALIBRATION COMPLETE
Automatic Tank
Calibration is Done
PRESS ANY KEY TO CONTINUE
```



8. Scroll to and press **SELECT** on *Set Tank Capacity*.

```
TANK 1 SETUP
Tank Alarms      OFF
Rename Tank
Display % or Vol
Select Sender Type
Set Tank Capacity ↓
UP | DOWN | SELECT | EXIT
```



9. Set tank volume to known tank volume or metered fill amount using the Character Selection method. (page 13)

10. Press **EXIT**.

```
TANK 1 CAPACITY
0000 Gallons
0<-9 | 0->9 | SELECT | EXIT
```




11. Press **EXIT**.

12. Repeat Tank Setup starting with step 3 for all remaining tanks.

```
TANK 1 SETUP
Tank Alarms      OFF
Rename Tank
Display % or Vol
Select Sender Type
Set Tank Capacity ↓
UP | DOWN | SELECT | EXIT
```



```
TANK SETUP
Setup Tank 1
Setup Tank 2
Setup Tank 3
UP | DOWN | SELECT | EXIT
```



## Tank Configuration (Auto Calibration Procedure 2)

1. Scroll to and press **SELECT** on *Set Tank Shape*.

```
TANK 1 SETUP
Set Tank Shape  ↑
Set Tank Depth
Automatic Calibration
UP | DOWN | SELECT | EXIT
```



2. Scroll to and press **SELECT** on *Use Auto Calibration*.

```
TANK 1 SHAPE
Rectangular
Use Auto Calibration
UP | DOWN | SELECT | EXIT
```



3. Scroll to and press **SELECT** on *Set Tank Capacity*.

```
TANK 1 SETUP
Tank Alarms      OFF
Rename Tank
Display % or Vol
Select Sender Type
Set Tank Capacity ↓
UP | DOWN | SELECT | EXIT
```



4. Set tank volume to known tank volume or metered fill amount using the Character Selection method. (page 13)
5. Press **EXIT**.

```
TANK 1 CAPACITY
0000 Gallons
0<-9 | 0->9 | SELECT | EXIT
```



6. Scroll to and press **SELECT** on *Automatic Calibration*.

```
TANK 1 SETUP
Set Tank Shape  ↑
Set Tank Depth
Automatic Calibration
UP | DOWN | SELECT | EXIT
```



## Tank Configuration (Auto Calibration Procedure 2)

7. When tank is empty press **SELECT** on *Start Calibration*.  
Fill tank at a steady rate.

```
AUTOMATIC CAL
Start Calibration
Sender Reading 100%
Tank Capacity 1001g
Press select to start
| SELECT | EXIT
```

8. When the tank is full press **SELECT**.

```
CALIBRATING TANK1
Finish Calibration
Sender Reading 100%
Est. Tank Level 1001g
Fill Timer 0:20
| SELECT | EXIT
```

9. Enter metered amount as fill amount using the Character Selection method. (page 13)  
10. Press **EXIT**.

```
FILL AMOUNT
1001 Gallons
Enter the amount
added to the tank.
<- | -> | SELECT | EXIT
```

11. Press any key to continue.

```
CALIBRATION COMPLETE
Automatic Tank
Calibration is Done
PRESS ANY KEY TO CONTINUE
```

12. Press **EXIT**.  
13. Repeat Tank Setup starting with step 3 for all remaining tanks.

```
TANK 1 SETUP
Set Tank Shape ↑
Set Tank Depth
Automatic Calibration
| UP | DOWN | SELECT | EXIT
```

```
TANK SETUP
Setup Tank 1
Setup Tank 2
Setup Tank 3
| UP | DOWN | SELECT | EXIT
```

## Tank Configuration (Auto Calibration Procedure 3)

1. Scroll to and press **SELECT** on *Set Tank Shape*.

```
TANK 1 SETUP
Set Tank Shape  ↑
Set Tank Depth
Automatic Calibration
UP | DOWN | SELECT | EXIT
```



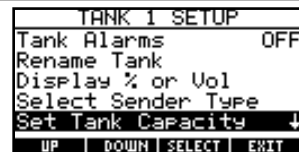
2. Scroll to and press **SELECT** on *Use Auto Calibration*.

```
TANK 1 SHAPE
Rectangular
Use Auto Calibration
UP | DOWN | SELECT | EXIT
```



3. Scroll to and press **SELECT** on *Set Tank Capacity*.

```
TANK 1 SETUP
Tank Alarms      OFF
Rename Tank
Display % or Vol
Select Sender Type
Set Tank Capacity ↓
UP | DOWN | SELECT | EXIT
```



4. Set tank volume as 100.
5. Press **EXIT**.

```
TANK 1 CAPACITY
0000 Gallons
0<-9 | 0->9 | SELECT | EXIT
```



6. Scroll to and press **SELECT** on *Automatic Calibration*.

```
TANK 1 SETUP
Set Tank Shape  ↑
Set Tank Depth
Automatic Calibration
UP | DOWN | SELECT | EXIT
```



## Tank Configuration (Auto Calibration Procedure 3)

7. Press **SELECT** on *Start Calibration*.  
Fill tank at a steady rate.

```
AUTOMATIC CAL
Start Calibration
Sender Readings 100%
Tank Capacity 100s
Press select to start
| SELECT | EXIT
```

8. When the tank is full press **SELECT**.

```
CALIBRATING TANK1
Finish Calibration
Sender Readings 100%
Est. Tank Level 100s
Fill Timer 0:20
| SELECT | EXIT
```

9. Enter (100 - Start Estimate Percent) as fill amount using the Character Selection method. (page 13)  
10. Press **EXIT**.

```
FILL AMOUNT
0013 Gallons
Enter the amount
added to the tank.
<- | -> | SELECT | EXIT
```

11. Press any key to continue.

```
CALIBRATION COMPLETE
Automatic Tank
Calibration is Done
PRESS ANY KEY TO CONTINUE
```

12. Scroll to and press **SELECT** on *Set Tank Capacity*.

```
TANK 1 SETUP
Tank Alarms OFF
Rename Tank
Display % or Vol
Select Sender Type
Set Tank Capacity ↓
UP | DOWN | SELECT | EXIT
```



## Tank Configuration (Auto Calibration Procedure 3)

- Set tank capacity to known tank capacity or metered fill amount using the Character Selection method. (page 13)
- Press **EXIT**.

```
TANK 1 CAPACITY
0000 Gallons
0<-9 | 0->9 | SELECT | EXIT
```



- Press **EXIT**.
- Repeat Tank Setup starting with step 3 for all remaining tanks.

```
TANK 1 SETUP
Tank Alarms      OFF
Rename Tank
Display % or Vol
Select Sender Type
Set Tank Capacity ↓
UP | DOWN | SELECT | EXIT
```



```
TANK SETUP
Setup Tank 1
Setup Tank 2
Setup Tank 3
UP | DOWN | SELECT | EXIT
```



## State of Charge Configuration

1. Page through main screens by pressing **NEXT** until the *STATE OF CHARGE* page is visible.
2. Press **SETUP**.

```
STATE OF CHARGE
BATTERY1 13.83 V
DC AMPS 13.7 A
CHARGE % ██████████ 100%
Ah REMAIN 150 Ah
SOC CYCLES 3.0
PREV | NEXT | MORE | SETUP
```

3. Scroll to and press **SELECT** on *Battery Inputs*.

```
SOC SETUP
Soc Alarms OFF
Battery Inputs
Charge Inputs
Reset Soc Cycles
Reset Soc Defaults
UP | DOWN | SELECT | EXIT
```

4. Scroll to and press **SELECT** on *Battery Type*.

```
BATTERY INPUTS
Battery Type
Battery Capacity
Cap Temp Coefficient
UP | DOWN | SELECT | EXIT
```

5. Scroll to and press **SELECT** on desired battery type.

```
BATTERY TYPE
FL Acid Reserve
FL Low Maintenance
FL Conventional
AGM Standard
AGM Acid Starved ↓
UP | DOWN | SELECT | EXIT
```

6. Scroll to and press **SELECT** on *Battery Capacity*.

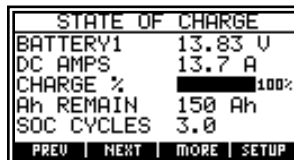
```
BATTERY INPUTS
Battery Type
Battery Capacity
Cap Temp Coefficient
UP | DOWN | SELECT | EXIT
```

## State of Charge Configuration (continued)

- Set battery capacity using the Scroll Bar method.
- Press **SELECT**.



- Press **EXIT** twice to return to main system screens

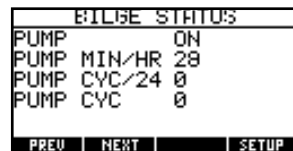


*Charge Inputs and Capacity Temperature Coefficient* are best left to factory settings.

## Bilge Pump Configuration

1. Page through main screens by pressing **NEXT** until the *BILGE STATUS* page is visible.
2. Press **SETUP**.

```
BILGE STATUS
PUMP      ON
PUMP MIN/HR 28
PUMP CYC/24 0
PUMP CYC    0
PREV | NEXT | SETUP
```



3. Scroll to and press **SELECT** on *Rename Pump*.

```
BILGE SETUP
Pump Alarms OFF
Rename Pump
High Cycle Reset
UP | DOWN | SELECT | EXIT
```

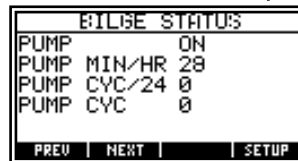


4. Set pump name using the Character Selection method. (page 13)
5. Press **EXIT** twice to return to main system screens.

```
PUMP RENAME
BILGE
<- | -> | SELECT | EXIT
```



```
BILGE STATUS
PUMP      ON
PUMP MIN/HR 28
PUMP CYC/24 0
PUMP CYC    0
PREV | NEXT | SETUP
```



## Backlight Time Setup

1. Page through main screens by pressing **NEXT** until the *SYSTEM SUMMARY* page is visible.

```
SYSTEM SUMMARY
TANK 1      ██████████ 100%
TANK 2      ██████████ 100%
BATTERY1    14.04 V
Ah REMAIN   89 Ah
CHARGE %    ██████████ 98%
PREV | NEXT | SETUP
```

2. Press **SETUP**

```
System Setup
Setup Display Data
Optional Input
Backlight Time
Units of Measure
AC Frequency
UP | DOWN | SELECT | EXIT
```

3. Scroll to and press **SELECT** on *Backlight Time*.

```
BACKLIGHT TIME
1 Min
5 Min
10 Min
15 Min
Always On
UP | DOWN | SELECT | EXIT
```

4. Scroll to and press **SELECT** on desired timeout.

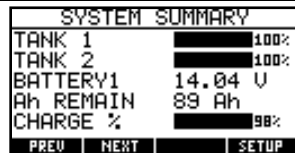
```
System Setup
Setup Display Data
Optional Input
Backlight Time
Units of Measure
AC Frequency
UP | DOWN | SELECT | EXIT
```

5. Press **EXIT** to return to main system screens.

```
SYSTEM SUMMARY
TANK 1      ██████████ 100%
TANK 2      ██████████ 100%
BATTERY1    14.04 V
Ah REMAIN   89 Ah
CHARGE %    ██████████ 98%
PREV | NEXT | SETUP
```

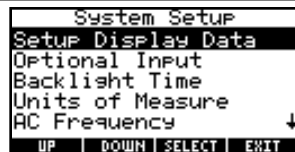
## System Summary Setup

1. Page through main screens by pressing **NEXT** until the *SYSTEM SUMMARY* page is visible.



2. Press **SETUP**

3. Scroll to and press **SELECT** on *Setup Display Data*.



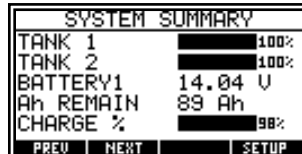
4. Scroll to and press **SELECT** on data slot.



5. Scroll to and press **SELECT** on data.

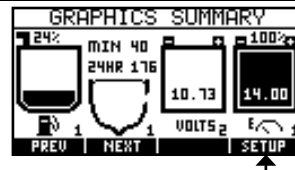


6. Press **EXIT** twice to return to main system screens.



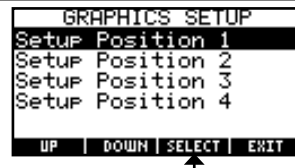
## Graphics Summary Setup

1. Page through main screens by pressing **NEXT** until the *GRAPHICS SUMMARY* page is visible.

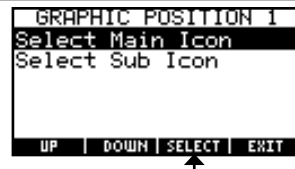


2. Press **SETUP**

3. Scroll to and press **SELECT** on data position.



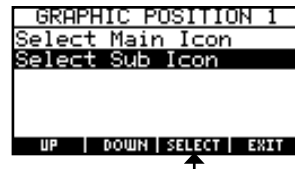
4. Scroll to and press **SELECT** on *Select Main Icon*.



5. Scroll to and press **SELECT** on icon.

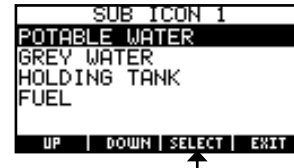


6. Scroll to and press **SELECT** on *Select Sub Icon*.

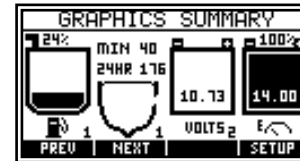


## Graphics Summary Setup (continued)

7. Scroll to and press **SELECT** on icon. (The options depend on the Main Icon that was selected in step 5)



6. Press **EXIT** twice to return to main system screens.





## ALARM SETUP

When an alarm is triggered, the screen will change to an alarm summary screen displaying the:

- Alarm type—AC, DC, State of Charge, Bilge and Tank
- Alarm limit—High and Low
- Alarm limit value
- Sensor reading value






Silence the alarm by pressing **QUIET**. The summary screen will remain visible until **CLOSE** is pressed.

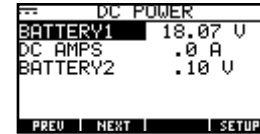
**Note:** When AC is disconnected, alarms for frequency and low voltage will sound if these alarms are set. Press the **QUIET** and **CLOSE** buttons to silence these alarms. The alarms will not become active again until power is restored and within limits. If starting a new power source such as a generator or inverter, check the readings to see that they are within limits and that the alarm is returned to normal.

A flashing icon representing the alarm type will be displayed in the upper left-hand corner of all screens. This icon remains in this location until the problem is resolved.

The label for the value that has been triggered will also flash in all screens where it is normally shown.

### Alarm Icons:

Tank	
DC	
AC	
State of Charge	
Bilge	



## Battery Voltage Alarm Setup

1. Page through main screens by pressing **NEXT** until the *DC POWER* page is visible.
2. Press **SETUP**

```
DC POWER
BATTERY1  13.97 V
DC AMPS   52.4 A
BATTERY2  10.73 V
PREV | NEXT | SETUP
```

3. Scroll to and press **SELECT** on battery.

```
DC SETUP
Setup Battery 1
Setup Battery 2
Setup Battery 3
DC Amps Alarm  OFF
UP | DOWN | SELECT | EXIT
```

4. Scroll to and press **SELECT** on *Battery Alarms*.

```
BATTERY1 SETUP
Battery Alarms  OFF
Batt Nominal Volts
Rename Battery
UP | DOWN | SELECT | EXIT
```

5. Scroll to and press **SELECT** on limit and use the Scroll Bar method to set limit.

```
ALARMS BATTERY1
Set High Limit  OFF
Set Low Limit   OFF
UP | DOWN | SELECT | EXIT
```

```
HIGH LIMIT BATTERY1
OFF
13.00 ----- 16.00
<- | -> | SELECT | EXIT
```

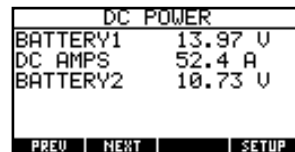
6. Press **EXIT** three times to return to main system screens.

```
ALARMS BATTERY1
Set High Limit  OFF
Set Low Limit   OFF
UP | DOWN | SELECT | EXIT
```

```
DC POWER
BATTERY1  13.97 V
DC AMPS   52.4 A
BATTERY2  10.73 V
PREV | NEXT | SETUP
```

## DC Current Alarm Setup

1. Page through main screens by pressing **NEXT** until the *DC POWER* page is visible.



2. Press **SETUP**

3. Scroll to and press **SELECT** on *DC Amps Alarm*.



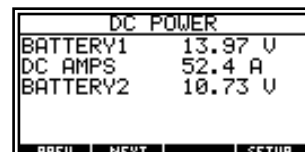
4. Press **SELECT** on *Set High Limit*.



5. Use the Scroll Bar method to set limit.

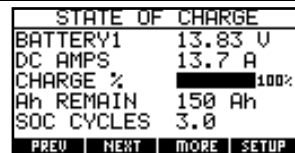


6. Press **EXIT** twice to return to main system screens.



## Charge Percentage Alarm Setup

1. Page through main screens by pressing **NEXT** until the *STATE OF CHARGE* page is visible.



```
STATE OF CHARGE
BATTERY1 13.83 V
DC AMPS 13.7 A
CHARGE % ██████████ 100%
Ah REMAIN 150 Ah
SOC CYCLES 3.0
PREV | NEXT | MORE | SETUP
```

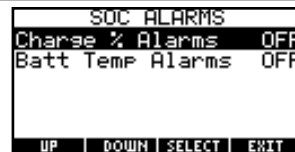
2. Press **SETUP**



```
SOC SETUP
Soc Alarms OFF
Battery Inputs
Charge Inputs
Reset Soc Cycles
Reset Soc Defaults
UP | DOWN | SELECT | EXIT
```

3. Scroll to and press **SELECT** on *Soc Alarms*.

4. Scroll to and press **SELECT** on *Charge % Alarms*.



```
SOC ALARMS
Charge % Alarms OFF
Batt Temp Alarms OFF
UP | DOWN | SELECT | EXIT
```

5. Press **SELECT** on *Set Low Limit*. Use the Scroll Bar method to set limit.

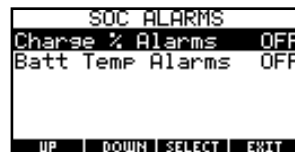


```
CHARGE % ALARM
Set Low Limit OFF
SELECT | EXIT
```

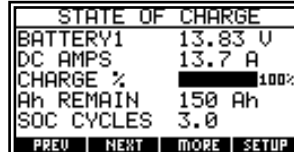


```
CHARGE % LOW LIMIT
OFF
5 ██████████ 50
<- -> | SELECT | EXIT
```

6. Press **EXIT** three times to return to main system screens.



```
SOC ALARMS
Charge % Alarms OFF
Batt Temp Alarms OFF
UP | DOWN | SELECT | EXIT
```



```
STATE OF CHARGE
BATTERY1 13.83 V
DC AMPS 13.7 A
CHARGE % ██████████ 100%
Ah REMAIN 150 Ah
SOC CYCLES 3.0
PREV | NEXT | MORE | SETUP
```

## Battery Temperature Alarm Setup

1. Page through main screens by pressing **NEXT** until the *STATE OF CHARGE* page is visible.

```

STATE OF CHARGE
BATTERY1 13.83 V
DC AMPS 13.7 A
CHARGE % ██████████ 100%
Ah REMAIN 150 Ah
SOC CYCLES 3.0
PREV | NEXT | MORE | SETUP
    
```

2. Press **SETUP**

```

SOC SETUP
Soc Alarms OFF
Battery Inputs
Charge Inputs
Reset Soc Cycles
Reset Soc Defaults
UP | DOWN | SELECT | EXIT
    
```

3. Scroll to and press **SELECT** on *Soc Alarms*.

```

SOC ALARMS
Charge % Alarms OFF
Batt Temp Alarms OFF
UP | DOWN | SELECT | EXIT
    
```

4. Scroll to and press **SELECT** on *Batt Temp Alarms*.

5. Press **SELECT** on *Set High Limit*. Use the Scroll Bar method to set limit.\*

```

BATTERY TEMP ALARM
Set High Limit OFF
SELECT | EXIT
    
```

```

BATT TEMP HI LIMIT
OFF
120 ██████████ 180 OFF
<- | -> | SELECT | EXIT
    
```

\* If metric units of measure are selected (page 17) the *High Limit* range will be 48–82.

6. Press **EXIT** three times to return to main system screens.

```

SOC ALARMS
Charge % Alarms OFF
Batt Temp Alarms OFF
UP | DOWN | SELECT | EXIT
    
```

```

STATE OF CHARGE
BATTERY1 13.83 V
DC AMPS 13.7 A
CHARGE % ██████████ 100%
Ah REMAIN 150 Ah
SOC CYCLES 3.0
PREV | NEXT | MORE | SETUP
    
```

## AC Current Alarm Setup

1. Page through main screens by pressing **NEXT** until the *AC POWER* page is visible.

```
AC POWER
AC VOLTS    116 V
AC AMPS     27.2 A
AC WATTS    3.9 kW
FREQUENCY   60 Hz
PREV | NEXT | SETUP
```

2. Press **SETUP**

3. Scroll to and press **SELECT** on *Amps Alarm*.

```
AC ALARMS
Voltage Alarms OFF
Amps Alarms   OFF
Frequency Alarms OFF
UP | DOWN | SELECT | EXIT
```

4. Scroll to and press **SELECT** on *Set High Limit*.

```
AC AMPS ALARM
Set High Limit OFF
SELECT | EXIT
```

5. Use the Scroll Bar method to set limit.

```
AMPS HI LIMIT
OFF
10.0 ----- 120.0
<- | -> | SELECT | EXIT
```

6. Press **EXIT** twice to return to main system screens.

```
AC AMPS ALARM
Set High Limit OFF
SELECT | EXIT
```

```
AC POWER
AC VOLTS    116 V
AC AMPS     27.2 A
AC WATTS    3.9 kW
FREQUENCY   60 Hz
PREV | NEXT | SETUP
```

## AC Voltage Alarm Setup

1. Page through main screens by pressing **NEXT** until the *AC POWER* page is visible.

```
AC POWER
AC VOLTS    116 V
AC AMPS     27.2 A
AC WATTS    3.9 kW
FREQUENCY   60 Hz
PREV | NEXT | SETUP
```

2. Press **SETUP**

```
AC ALARMS
Voltage Alarms OFF
Amps Alarms    OFF
Frequency Alarms OFF
UP | DOWN | SELECT | EXIT
```

3. Scroll to and press **SELECT** on *Voltage Alarms*.

4. Scroll to and press **SELECT** on limit.

```
VOLTS ALARM
Set High Limit OFF
Set Low Limit  OFF
UP | DOWN | SELECT | EXIT
```

5. Use the Scroll Bar method to set limit.

```
VOLTS HI LIMIT
OFF
113 _____ 210
<- | -> | SELECT | EXIT
```

6. Press **EXIT** twice to return to main system screens.

```
VOLTS ALARM
Set High Limit OFF
Set Low Limit  OFF
UP | DOWN | SELECT | EXIT
```

```
AC POWER
AC VOLTS    116 V
AC AMPS     27.2 A
AC WATTS    3.9 kW
FREQUENCY   60 Hz
PREV | NEXT | SETUP
```

## AC Frequency Alarm Setup

1. Page through main screens by pressing **NEXT** until the *AC POWER* page is visible.

```
AC POWER
AC VOLTS    116 V
AC AMPS     27.2 A
AC WATTS    3.9 kW
FREQUENCY   60 Hz
PREV | NEXT | SETUP
```

2. Press **SETUP**

3. Scroll to and press **SELECT** on *Frequency Alarms*.

```
AC ALARMS
Voltage Alarms OFF
Amps Alarms    OFF
Frequency Alarms OFF
UP | DOWN | SELECT | EXIT
```

4. Scroll to and press **SELECT** on limit.

```
FREQUENCY ALARM
Set High Limit OFF
Set Low Limit  OFF
UP | DOWN | SELECT | EXIT
```

5. Use the Scroll Bar method to set limit.

```
FREQ HI LIMIT
OFF
61 _____ 10
<- | -> | SELECT | EXIT
```

6. Press **EXIT** twice to return to main system screens.

```
FREQUENCY ALARM
Set High Limit OFF
Set Low Limit  OFF
UP | DOWN | SELECT | EXIT
```

```
AC POWER
AC VOLTS    116 V
AC AMPS     27.2 A
AC WATTS    3.9 kW
FREQUENCY   60 Hz
PREV | NEXT | SETUP
```



## Bilge Cycles/24 Hours Alarm Setup

1. Page through main screens by pressing **NEXT** until the *BILGE STATUS* page is visible.

```
BILGE STATUS
PUMP      ON
PUMP MIN/HR 28
PUMP CYC/24 0
PUMP CYC   0
PREV | NEXT | SETUP
```

2. Press **SETUP**

```
BILGE SETUP
Pump Alarms OFF
Rename Pump
Cycle Counter Reset
UP | DOWN | SELECT | EXIT
```

3. Scroll to and press **SELECT** on *Pump Alarms*.

4. Scroll to and press **SELECT** on *Cycles/24 HR Alarm*.

```
ALARMS BILGE
Run Time/Hr Alarm OFF
Cycles/24 Hr Alarm OFF
UP | DOWN | SELECT | EXIT
```

5. Scroll to and press **SELECT** on *Set High Limit*.

6. Use the Scroll Bar method to set limit.

```
CYCLES/24HR ALARM
Set High Limit OFF
SELECT | EXIT
```

```
CYCLES/24HR LIMIT
OFF
1 ----- OFF
1000
<- -> | SELECT | EXIT
```

7. Press **EXIT** three times to return to main system screens.

```
CYCLES/24HR ALARM
Set High Limit OFF
SELECT | EXIT
```

```
BILGE STATUS
PUMP      ON
PUMP MIN/HR 28
PUMP CYC/24 0
PUMP CYC   0
PREV | NEXT | SETUP
```

## Run Time/Hour Alarm Setup

1. Page through main screens by pressing **NEXT** until the *BILGE STATUS* page is visible.

```

BILGE STATUS
PUMP      ON
PUMP MIN/HR 28
PUMP CYC/24 0
PUMP CYC    0
PREV | NEXT | SETUP
    
```

2. Press **SETUP**

```

BILGE SETUP
Pump Alarms OFF
Rename Pump
Cycle Counter Reset
UP | DOWN | SELECT | EXIT
    
```

3. Scroll to and press **SELECT** on *Pump Alarms*.

```

ALARMS BILGE
Run Time/Hr Alarm OFF
Cycles/24 Hr Alarm OFF
UP | DOWN | SELECT | EXIT
    
```

4. Scroll to and press **SELECT** on *Run Time/Hr Alarm*.

```

RUN TIME/HR ALARM
Set High Limit OFF
SELECT | EXIT
    
```

```

RUN TIME/HR ALARM
OFF
1 ----- 60
<- -> | SELECT | EXIT
    
```

5. Scroll to and press **SELECT** on *Set High Limit*.

6. Use the Scroll Bar method to set limit.

7. Press **EXIT** three times to return to main system screens.

```

RUN TIME/HR ALARM
Set High Limit OFF
SELECT | EXIT
    
```

```

BILGE STATUS
PUMP      ON
PUMP MIN/HR 28
PUMP CYC/24 0
PUMP CYC    0
PREV | NEXT | SETUP
    
```

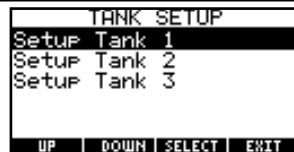
## Tank Alarm Setup

1. Page through main screens by pressing **NEXT** until the *TANK STATUS* page is visible.



2. Press **SETUP**

3. Scroll to and press **SELECT** on tank.



4. Scroll to and press **SELECT** on *Tank Alarms*.

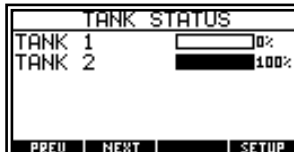


5. Scroll to and press **SELECT** on limit.

6. Use the Scroll Bar method to set limit.




7. Press **EXIT** three times to return to main system screens.



## Bilge Cycle Reset

1. Page through main screens by pressing **NEXT** until the *BILGE STATUS* page is visible.

```
BILGE STATUS
PUMP      ON
PUMP MIN/HR 28
PUMP CYC/24 0
PUMP CYC    0
PREV | NEXT | SETUP
```



2. Press **SETUP**

3. Scroll to and press **SELECT** on *Cycle Counter Reset*.

```
BILGE SETUP
Pump Alarms OFF
Rename Pump
Cycle Counter Reset
UP | DOWN | SELECT | EXIT
```



4. Scroll to and press **SELECT** on *Reset Counter*.

```
CYCLE COUNTER RESET
Reset Counter
| | SELECT | EXIT
```



5. Press **EXIT** to return to main system screens.

```
BILGE SETUP
Pump Alarms OFF
Rename Pump
Cycle Counter Reset
UP | DOWN | SELECT | EXIT
```




```
BILGE STATUS
PUMP      ON
PUMP MIN/HR 28
PUMP CYC/24 0
PUMP CYC    0
PREV | NEXT | SETUP
```

## Battery Cycle Reset

1. Page through main screens by pressing **NEXT** until the *STATE OF CHARGE* page is visible.

```
STATE OF CHARGE
BATTERY1  13.83 V
DC AMPS   13.7 A
CHARGE %  ██████████ 100%
Ah REMAIN 150 Ah
SOC CYCLES 3.0
PREV | NEXT | MORE | SETUP
```



2. Press **SETUP**

```
SOC SETUP
Soc Alarms OFF
Battery Inputs
Charge Inputs
Reset Soc Cycles
Reset Soc Defaults
UP | DOWN | SELECT | EXIT
```



3. Scroll to and press **SELECT** on *Reset Soc Cycles*.


```
RESET SOC CYCLES?
NO
YES
UP | DOWN | SELECT | EXIT
```



4. Scroll to and press **SELECT** on YES.

5. Press **EXIT** to return to main system screens.

```
SOC SETUP
Soc Alarms OFF
Battery Inputs
Charge Inputs
Reset Soc Cycles
Reset Soc Defaults
UP | DOWN | SELECT | EXIT
```



```
STATE OF CHARGE
BATTERY1  13.83 V
DC AMPS   13.7 A
CHARGE %  ██████████ 100%
Ah REMAIN 150 Ah
SOC CYCLES 3.0
PREV | NEXT | MORE | SETUP
```

## State of Charge Defaults Reset

1. Page through main screens by pressing **NEXT** until the *STATE OF CHARGE* page is visible.

```
STATE OF CHARGE
BATTERY1 13.83 V
DC AMPS 13.7 A
CHARGE % ██████████ 100%
Ah REMAIN 150 Ah
SOC CYCLES 3.0
PREV | NEXT | MORE | SETUP
```

2. Press **SETUP**

```
SOC SETUP
Soc Alarms OFF
Battery Inputs
Charge Inputs
Reset Soc Cycles
Reset Soc Defaults
UP | DOWN | SELECT | EXIT
```

3. Scroll to and press **SELECT** on *Reset SOC Defaults*.

```
RESET SOC DEFAULTS
Cap Temp Coefficient
Full Charge Volts
Full Charge Amps
Charge Efficiency
UP | DOWN | SELECT | EXIT
```

4. Scroll to and press **SELECT** on value.

5. Press **EXIT** to return to main system screens.

```
SOC SETUP
Soc Alarms OFF
Battery Inputs
Charge Inputs
Reset Soc Cycles
Reset Soc Defaults
UP | DOWN | SELECT | EXIT
```

```
STATE OF CHARGE
BATTERY1 13.83 V
DC AMPS 13.7 A
CHARGE % ██████████ 100%
Ah REMAIN 150 Ah
SOC CYCLES 3.0
PREV | NEXT | MORE | SETUP
```

## Restore to Factory Defaults

1. Page through main screens by pressing **NEXT** until the *SYSTEM SUMMARY* page is visible.

SYSTEM SUMMARY	
TANK 1	100%
TANK 2	100%
BATTERY1	14.04 V
Ah REMAIN	89 Ah
CHARGE %	98%

PREV | NEXT | SETUP

2. Press **SETUP**

3. Scroll to and press **SELECT** on *Restore Fac Defaults*.

System Setup	
Display SW Version	↑
Download Software	
Restore Fac Defaults	

UP | DOWN | SELECT | EXIT

4. Scroll to and press **SELECT** on *YES*.

Restore Defaults?	
NO	
YES	

UP | DOWN | SELECT | EXIT

5. Press **EXIT** to return to main system screens.

System Setup	
Setup Display Data	
Optional Input	
Backlight Time	
Units of Measure	
AC Frequency	↓

UP | DOWN | SELECT | EXIT

SYSTEM SUMMARY	
TANK 1	100%
TANK 2	100%
BATTERY1	14.04 V
Ah REMAIN	89 Ah
CHARGE %	98%

PREV | NEXT | SETUP

## TROUBLESHOOTING

### Tank level readings change when electronics are turned on.

Make sure that the negative feeds to the tank sensors are connected as close to the battery as possible.

### When using ultrasonic sensors, high level tank alarm sounds when power is turned off.

Ultrasonic sensors require power to operate correctly and will show a full tank when not powered.

### State of Charge (SOC) stays at 100% even when the batteries are being discharged.

Check to make sure that when the batteries are being discharged the DC current is negative. If it is positive, reverse shunt sense wires.

### Unexpected voltage readings are shown on meter.

Make sure that all of the battery grounds are connected to each other. The VSM uses one common ground reference.

### AC current shows greater than zero but the power reading is zero or a negative value.

Reverse the AC current transformer leads. Follow WARNING on page 3 to avoid possibly lethal shock.

### A calibration error screen keeps appearing.

Contact Blue Sea Systems Technical Support for repair or replacement.

## EC DECLARATION OF CONFORMITY

**Manufacturer:** Blue Sea Systems  
425 Sequoia Dr.  
Bellingham, WA  
98226 USA  
(360) 738-8230



**Product:** Vessel Systems Monitor  
VSM 422

**The undersigned hereby declares, on behalf of Blue Sea Systems Inc., that the above-referenced product, to which this declaration relates, is in conformity with the provisions of the following Directive of the European Union:**

EU 2004/108/EC/EMC Directive

**The above-referenced product is in conformity with the following harmonized standards:**

### Shipboard Bridge-Deck Equipment

Conducted Emissions Standard: IEC 60945:2002

Radiated Emissions Standard: IEC 60945:2002

Electrostatic Discharge  
Immunity Standard: IEC 60945:2002

Electrical Fast Transient/Burst  
Immunity Standard: IEC 60945:2002

**The Technical Construction File required by this Directive is maintained at the corporate headquarters of Blue Sea Systems Inc., 425 Sequoia Dr., Bellingham, Washington.**

Scott Renne  
President



## WARRANTY

All Blue Sea Systems digital meters are warranted to be free from defects in materials or workmanship for three years from the date of first purchase.

“Date of first purchase” means:

- (i) the date on which the product was purchased by the first retail customer.
- (ii) the date on which the first retail customer purchases a vessel on which the product was installed.

Blue Sea Systems will (at its sole discretion) repair or replace any product which is:

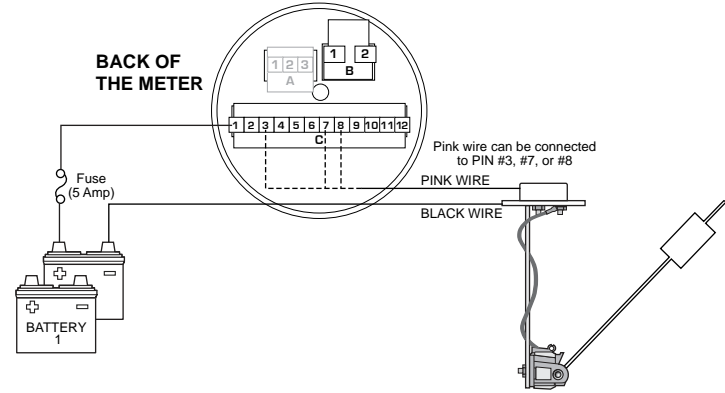
- (i) proven to be defective in materials or workmanship.
- (ii) returned to Blue Sea Systems (or its agent) during the warranty period in accordance with this warranty.

Replacement products may be new or refurbished in as-new condition. Such repair or replacement will be the sole remedy by Blue Sea Systems under this warranty. Any repaired or replacement product will be warranted in accordance with this warranty, for the unexpired balance of the warranty period on the original product.

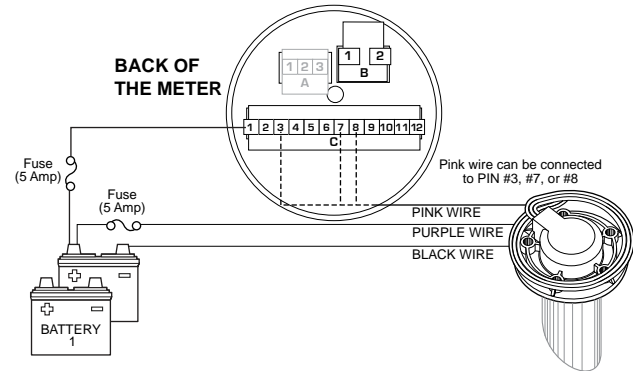
## WARRANTY REGISTRATION

Blue Sea Systems is committed to exceptional customer service. Please allow us to serve you better by registering your product online at <http://blueseasystems.com/viewresource/1325>. If you would prefer to register your product by fax, please call (360) 738-8230 or Toll Free in the USA and Canada (800) 222-7617 for a fax-ready Warranty Registration card.

## TANK LEVEL SENDER INSTALLATION DIAGRAMS

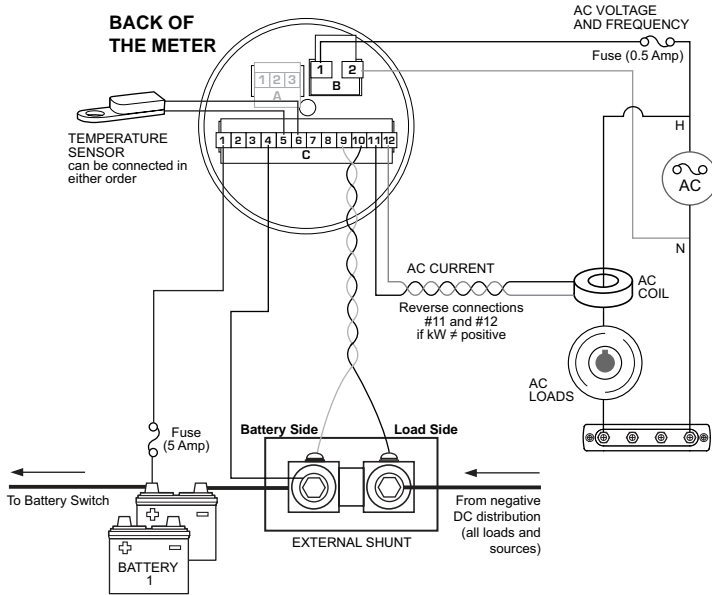


Resistive 2 Wire Sender



Ultrasonic 3 Wire Sender  
PN 1810 and PN 1811

# INSTALLATION DIAGRAM



## Install shunt for DC current measurement:

**IMPORTANT!** The shunt must be installed in the negative line to avoid damage. Positive voltage applied to terminals #9 and #10 will cause damage to the meter.

Install the shunt at any point in the DC negative feed line. Short sense wires minimize voltage loss and interference, and result in the most accurate metering.

There must be no loads connected to the battery terminal or the shunt of Battery 1 or the Amp-Hour Function will not operate correctly.