

# Analog DC Voltmeter

PN 8003 / PN 8028 8-16 Volts

## Specifications

Input Voltage: 8 Volts DC to 16 Volts DC  
 Amperage Draw: 1 Milliampere  
 LED Operating Currents:  
 12V DC Red Approximately 16mA  
 24V DC Orange Approximately 20mA  
 Display: Analog scale 8-16 Volts  
 Accuracy: 3% of scale range

	PN	Inches	Millimeters
Face Width:	8003	2-5/8	66.68
	8028	2	47.24
Mounting Hole:	8003	1-7/8	53.95
	8028	1-1/2	47.63

## Guarantee

Any Blue Sea Systems product with which a customer is not satisfied may be returned for a refund or replacement at any time.

Blue Sea Systems, Inc.  
 4600 Rydex Way  
 Bellingham, WA 98226 USA  
 p 360.738.8230  
[www.blueseas.com](http://www.blueseas.com)

9310 Rev. 004

# Installation

## Warning

These instructions are intended to provide assistance with the installation of this product, and are not a substitute for a more comprehensive understanding of electrical systems. We strongly recommend that a competent electrical professional perform the installation of this product.

### 1. Disconnect all AC and DC power

Before starting, disconnect the main positive cable from all batteries to eliminate the possibility of a short circuit while installing the meter panel. Also disconnect the AC shore power cord from the boat to eliminate the possibility of electrocution from AC wiring near the DC meter.

### 2. Select mounting location and cut opening

Select a mounting location which is protected from water on the meter front and back and is not in an area where flammable vapors from propane, gasoline or lead acid batteries accumulate. The meter is not ignition protected and may ignite such vapors. There are two mounting methods for the 8028 and 8003 meters, surface mount or panel mount.

# Analog DC Voltmeter

PN 8003 / PN 8028 8-16 Volts

## Specifications

Input Voltage: 8 Volts DC to 16 Volts DC  
 Amperage Draw: 1 Milliampere  
 LED Operating Currents:  
 12V DC Red Approximately 16mA  
 24V DC Orange Approximately 20mA  
 Display: Analog scale 8-16 Volts  
 Accuracy: 3% of scale range

	PN	Inches	Millimeters
Face Width:	8003	2-5/8	66.68
	8028	2	47.24
Mounting Hole:	8003	1-7/8	53.95
	8028	1-1/2	47.63

## Guarantee

Any Blue Sea Systems product with which a customer is not satisfied may be returned for a refund or replacement at any time.

Blue Sea Systems, Inc.  
 4600 Rydex Way  
 Bellingham, WA 98226 USA  
 p 360.738.8230  
[www.blueseas.com](http://www.blueseas.com)

9310 Rev. 004

# Installation

## Warning

These instructions are intended to provide assistance with the installation of this product, and are not a substitute for a more comprehensive understanding of electrical systems. We strongly recommend that a competent electrical professional perform the installation of this product.

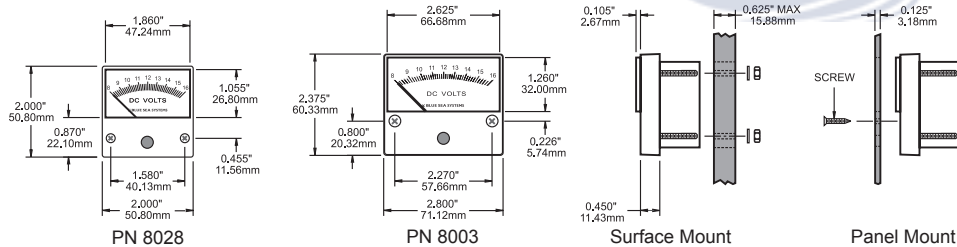
### 1. Disconnect all AC and DC power

Before starting, disconnect the main positive cable from all batteries to eliminate the possibility of a short circuit while installing the meter panel. Also disconnect the AC shore power cord from the boat to eliminate the possibility of electrocution from AC wiring near the DC meter.

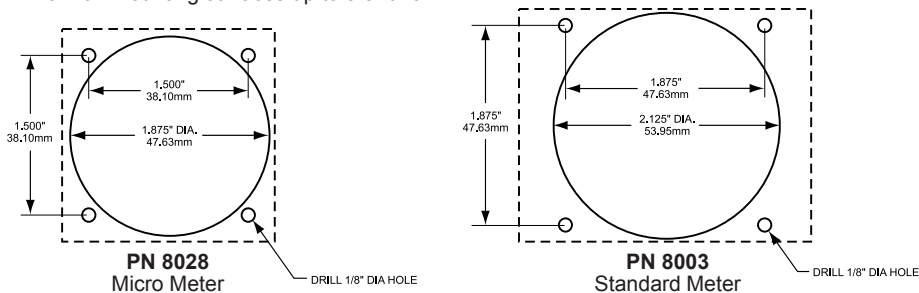
### 2. Select mounting location and cut opening

Select a mounting location which is protected from water on the meter front and back and is not in an area where flammable vapors from propane, gasoline or lead acid batteries accumulate. The meter is not ignition protected and may ignite such vapors. There are two mounting methods for the 8028 and 8003 meters, surface mount or panel mount.

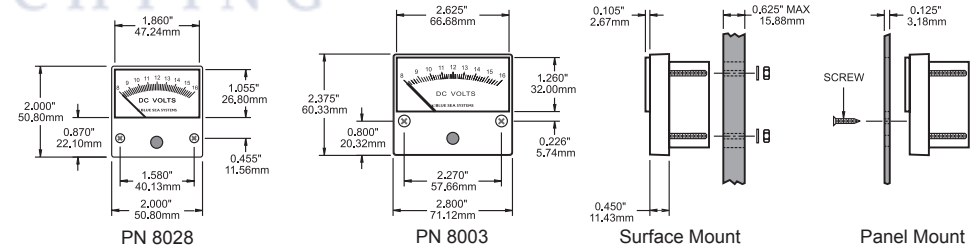
# Installation (continued)



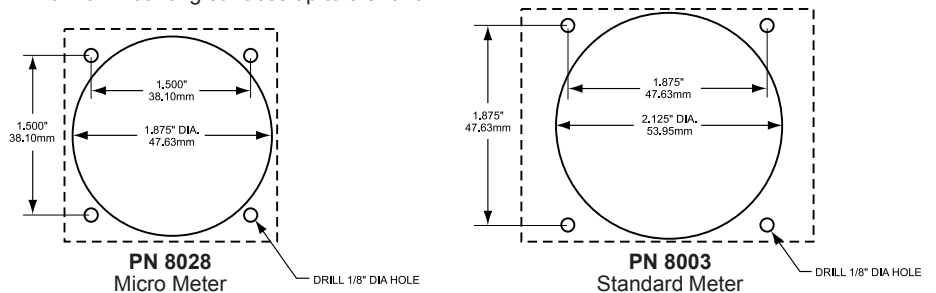
**Surface Mount:** Drill five clearance holes as shown below. The part number of the meter will determine the size and location of the clearance holes. Use the nuts and washers supplied in the accessory package to secure the four mounting studs to the mounting surface. This method will work on mounting surfaces up to 5/8" thick.



# Installation (continued)



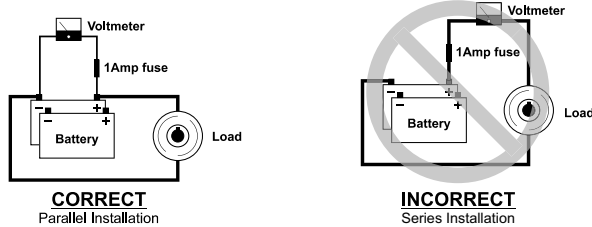
**Surface Mount:** Drill five clearance holes as shown below. The part number of the meter will determine the size and location of the clearance holes. Use the nuts and washers supplied in the accessory package to secure the four mounting studs to the mounting surface. This method will work on mounting surfaces up to 5/8" thick.



**Panel Mount:** For thicker mounting surfaces, the meter can be mounted into a 0.125" thick panel. Blue Sea Systems offers meter mounting panels for our standard size meters only. For PN 8003 use PN 8013 to mount a single meter or PN 8014 to mount two meters.

### 3. Installation of Voltmeter Wires

Wire the meter as shown below, making certain to attach the positive lead to the terminal on the meter marked "+" and the negative lead to the terminal marked "-". Use a minimum 16 AWG wire, red for positive and black or yellow for negative (ABYC recommends yellow for negative). Install a 1 ampere fuse in the positive lead near the source. Do not connect the voltmeter in a series (in-line) configuration.



### 4. Installation of Backlight

- Connect the yellow negative wire to a DC ground.
- Connect the red positive wire to any 12V DC positive supply, or connect the orange positive wire to any 24V DC positive supply. The positive supply is usually connected to a switch that controls the vessel's other nighttime illumination. Tie up the unused positive wire.

### 5. Calibration

All analog meters may be reset to the zero mark if necessary. Using a small screwdriver, turn the adjusting screw no more than 90° left or right as required.  
DO NOT ROTATE THE ADJUSTMENT SCREW THROUGH 360 DEGREES!

### Use of Voltmeter

There is no activity that will contribute more to a healthy electrical system than proper battery management. Using a voltmeter to measure open circuit voltage measures the potential charge of your battery. Since the difference between a fully charged battery and a fully discharged one is only 1 volt in a 12V system, the meter must have good resolution and accuracy. The table below shows the percent of charge for various voltages:

**Open Circuit Voltage vs. State-of-Charge**  
12 Volt Battery Open Circuit Voltage

State of Charge	Wet Cell	Gel Cell	AGM
100%	12.7-12.6	12.95-12.85	12.90-12.80
75%	12.40	12.65	12.60
50%	12.20	12.35	12.30
25%	12.00	12.00	12.00
0%	11.80	11.80	11.80

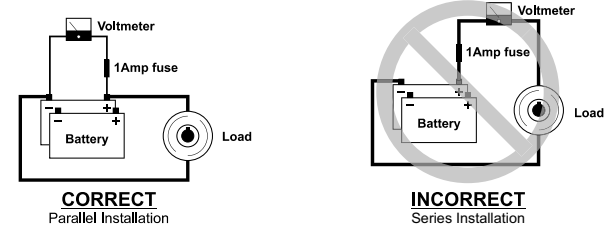
Note: Divide value in half for 6-volt batteries or multiply by two for 24-volt batteries.

Voltage is a good indicator of charge condition only when a battery's true open circuit voltage is measured. Various battery types require differing amounts of time for voltage stabilization, but with experience, the user will learn the time required for reliable readings on any particular system. An excellent resource for further reading is Nigel Calder's *Boatowner's Mechanical and Electrical Manual* (Third Edition, McGraw-Hill).

**Panel Mount:** For thicker mounting surfaces, the meter can be mounted into a 0.125" thick panel. Blue Sea Systems offers meter mounting panels for our standard size meters only. For PN 8003 use PN 8013 to mount a single meter or PN 8014 to mount two meters.

### 3. Installation of Voltmeter Wires

Wire the meter as shown below, making certain to attach the positive lead to the terminal on the meter marked "+" and the negative lead to the terminal marked "-". Use a minimum 16 AWG wire, red for positive and black or yellow for negative (ABYC recommends yellow for negative). Install a 1 ampere fuse in the positive lead near the source. Do not connect the voltmeter in a series (in-line) configuration.



### 4. Installation of Backlight

- Connect the yellow negative wire to a DC ground.
- Connect the red positive wire to any 12V DC positive supply, or connect the orange positive wire to any 24V DC positive supply. The positive supply is usually connected to a switch that controls the vessel's other nighttime illumination. Tie up the unused positive wire.

### 5. Calibration

All analog meters may be reset to the zero mark if necessary. Using a small screwdriver, turn the adjusting screw no more than 90° left or right as required.  
DO NOT ROTATE THE ADJUSTMENT SCREW THROUGH 360 DEGREES!

### Use of Voltmeter

There is no activity that will contribute more to a healthy electrical system than proper battery management. Using a voltmeter to measure open circuit voltage measures the potential charge of your battery. Since the difference between a fully charged battery and a fully discharged one is only 1 volt in a 12V system, the meter must have good resolution and accuracy. The table below shows the percent of charge for various voltages:

**Open Circuit Voltage vs. State-of-Charge**  
12 Volt Battery Open Circuit Voltage

State of Charge	Wet Cell	Gel Cell	AGM
100%	12.7-12.6	12.95-12.85	12.90-12.80
75%	12.40	12.65	12.60
50%	12.20	12.35	12.30
25%	12.00	12.00	12.00
0%	11.80	11.80	11.80

Note: Divide value in half for 6-volt batteries or multiply by two for 24-volt batteries.

Voltage is a good indicator of charge condition only when a battery's true open circuit voltage is measured. Various battery types require differing amounts of time for voltage stabilization, but with experience, the user will learn the time required for reliable readings on any particular system. An excellent resource for further reading is Nigel Calder's *Boatowner's Mechanical and Electrical Manual* (Third Edition, McGraw-Hill).