

# INSTALLATION INSTRUCTIONS

SeaKey™

**(ENG)** **Installation Instructions**  
Kit numbers

**(GER)** **Einbauanleitung**  
Satznummer

**(FRE)** **Instructions de montage**  
N°de kit

**(SPA)** **Instrucciones de montaje**  
Kits números

**(ITA)** **Istruzioni di montaggio**  
Kit numero

**(SWE)** **Monteringsanvisning**  
Tätningring  
Satsnummer



# VOLVO PENTA



**Important!** This batch with its accompanying instructions is produced for Volvo Penta's service workshops, boat-builders, machine manufacturers and other authorized workshops which have personnel with qualified professional training.

The installation instructions are only produced for professional use and are not intended for non-professional use. Volvo Penta will not assume any liability whatsoever for damage incurred, either damage to materials or personal injury, which may result if the installation instructions are not followed or if the work is carried out by non-professional personnel.



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Die Einbauanleitung ist nur für den berufsmäßigen Gebrauch vorgesehen und nicht für unprofessionelle Anwendung gedacht. Volvo Penta übernimmt nicht die geringste Haftung für irgendwelchen Schäden an Personen oder Sachen, die als Folge einer Nichtbefolgung der Einbauanleitung oder wegen Ausführung der darin beschriebenen Arbeiten durch nicht beruflich geschulte Personen entstehen.



**Important!** Ce kit, avec instructions de montage, est destiné aux ateliers de service Volvo Penta, aux constructeurs de bateaux et autres ateliers de construction agréés avec un personnel qualifié.

Les instructions de montage sont exclusivement conçues pour une utilisation professionnelle. Volvo Penta se dégage de toute responsabilité pour d'éventuels endommagements, corporels ou matériels, résultant du non respect des instructions ou d'un travail effectué par un personnel non compétent.



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Monteringsanvisningen är enbart framtagen för yrkesbruk och är inte avsedd för icke yrkesmässig användning. Volvo Penta påtager sig inget som helst ansvar för eventuella skador, såväl materiella som personskador, som kan bli följden om monteringsanvisningen ej följs, eller om arbetet utförs av icke yrkeskunnig personal.



**Vigtigt!** Dette sæt med tilhørende monteringsvejledning er blevet udviklet for Volvo Pentas serviceværksteder, bådebyggere, maskinproducenter og andre autoriserede værksteder, som har medarbejdere med kvalificeret, faglig uddannelse.

Monteringsvejledningen er udelukkende beregnet til professionel anvendelse og ikke til hobby- eller fritidsbrug. Volvo Penta påtager sig intet som helst ansvar for eventuelle skader på såvel materiel som personer, som kan være en følge af at monteringsvejledningens anvisninger ikke blev overholdt, eller hvis arbejdet blev udført af ikke-professionelt personale.



**Tärkeää!** Tämä sarja ja asennusohje on tarkoitettu Volvo Pentan huoltokorjaamoille, veneenrakentajille, konevalmistajille ja muille valtuutetuille korjaamoille, joiden henkilökunta on saanut pätevän ammattikoulutuksen.

Asennusohje on tarkoitettu ainoastaan ammattikäyttöön. Volvo Penta ei vastaa mahdollisista materiaali- tai henkilövahingoista, joita asennusohjeen laiminlyöminen tai ammattitaidottoman henkilökunnan suorittama asennustyö voi aiheuttaa.



**Belangrijk!** Deze set met de bijgevoegde montage-aanwijzing is ontwikkeld voor de werkplaatsen van Volvo Penta, botenbouwers, machinefabrikanten en overige bevoegde werkplaatsen, die personeel hebben met een gekwalificeerde vakopleiding.

De montage-aanwijzing is alleen ontwikkeld voor professioneel gebruik en is niet bedoeld voor niet-professioneel gebruik. Volvo Penta neemt geen enkele verantwoordelijkheid op zich voor eventuele schade, zowel materiële schade als persoonlijk letsel, die het gevolg kan zijn als de montage-aanwijzing niet wordt gevolgd, of als het werk wordt uitgevoerd door niet-vakkundig personeel.



**Importante!** Este jogo, juntamente com as respectivas instruções de montagem, foi concebido para as oficinas de serviço da Volvo Penta, construtores navais, construtores de máquinas e outras oficinas autorizadas, com pessoal devidamente formado.

As instruções de montagem foram concebidas unicamente para utilização profissional e não se destinam a utilização não profissional. A Volvo Penta não se responsabiliza por quaisquer danos eventuais, tanto materiais como pessoais, que possam resultar no caso de as instruções de montagem não serem seguidas, ou se os trabalhos forem executados por pessoal não profissional.



**Prosoxq!** To perioxómeno aytoú toy pakétoy mazí me tiw odhgíew synarmológhshw poy to akoloyuoún einai eidiká epilegméno gia synergeía sérbiw thw Volvo Penta, nayphgeía, kataskeyastéw mhxnón kai gia loipá ejyosiodothména synergeía poy diauétoy n ejeidikeyméno prospvikó.

## INTRODUCTION

This installation instruction covers the SeaKey on-board equipment. Any use other than those specified in these instructions may give unpredictable results.

Proper preparation is extremely helpful for efficient service work. A clean work area at the start of the job will minimize tools and parts becoming misplaced. Obtain tools, instruments and parts needed for the job before work is started. Interrupting a job to locate special tools or repair kits is a needless delay.

## TERMS AND CONDITIONS

### IMPORTANT! PLEASE READ CAREFULLY.

The SEAKEY services are provided in accordance with and subject to the SEAKEY Service Agreement General Terms and Conditions. The SEAKEY hardware is covered by the terms of a limited warranty. Except as otherwise provided in those documents, neither Volvo Penta, nor any sellers or third party suppliers, including the engine manufacturer, boat manufacturers, boat distributors, boat dealers, service providers, and wireless carriers (the "providers") makes any warranties, express or implied, regarding the SEAKEY marine terminal system, including without limitation, the access, speed, quality or availability of services, accuracy of the technology, information, content or other material provided or made available. **WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. ALL SUCH EXPRESS OR IMPLIED WARRANTIES ARE EXPRESSLY EXCLUDED.** The Operator's Manual contains additional limitations on your rights and our liabilities, as well as important information about SEAKEY system operation. Please read it carefully.

## REFERENCES, ILLUSTRATIONS AND SPECIFICATIONS

We reserve the right to make changes at anytime, without notice, to specifications, models, and procedures. Also, the right to change any specifications or parts at any time without incurring any obligation to equip same models manufactured prior to date of such change. All information, photographs, illustrations, and specifications, contained in these instructions are based on the latest information available at the time of printing.

Photographs and illustrations used in this instruction may not depict actual models or equipment. The continuing accuracy of this installation instruction cannot be guaranteed.

Use the general torque specification for all fasteners unless otherwise specified in the instructions.

## IMPORTANT SAFETY NOTICES

Carefully observe the safety alert symbols below for dangers, warnings, and cautions. They alert installers and operators of possible dangers or important information contained in this manual.

**HOWEVER: Warnings alone do not eliminate hazards, nor are they a substitute for safe boat handling and proper accident prevention measures!**

### **Danger!**

**Failure to comply with a danger symbol will result in serious injury or death to boat operator, boat occupants, and/or others.**

### **Warning!**

**Failure to comply with a warning may result in injury or death to boat operator, boat occupants and/or others.**

### **Caution!**

**Failure to comply with a caution may result in failure or damage to the equipment.**

**NOTE! Special attention should be used to prevent incorrect assembly or disassembly.**

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## **Caution!**

**Please read through the entire document before beginning the installation. While the installation in itself may appear straight forward, there are critical issues that must be understood, including positioning for best satellite reception, etc.**

## 2 Terminology

### 2.1 Abbreviations

GPS Global Positioning System

MSU Marine Satcomm Unit

### 2.2 Definitions

MSU Marine Satcomm Unit - Hardware that provides satellite communication on the boat, as well as the interface to the Operator Module, and other modules that would initiate a data transfer.

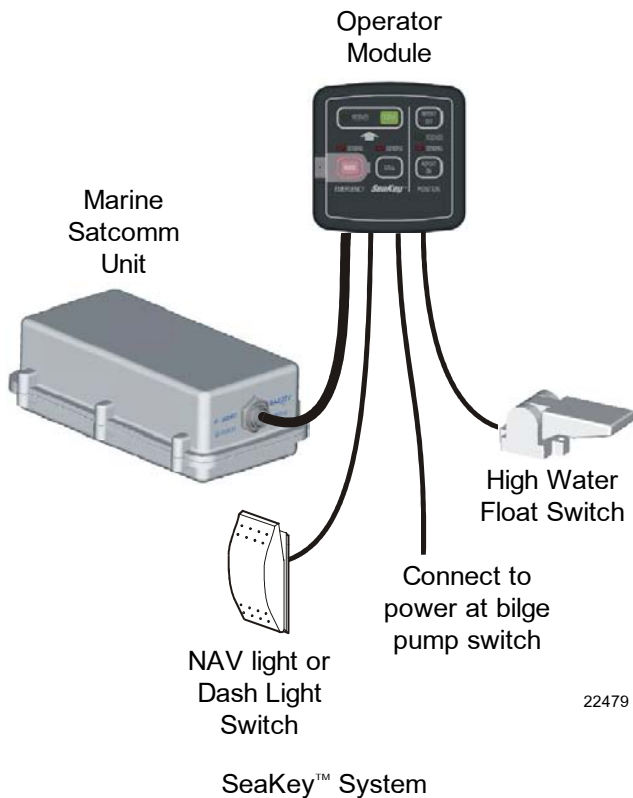
Operator Module - The dash-mounted control panel for the SeaKey™ system, which provides buttons, and visual feedback of system status.

SeaKey™ - An on-board, wireless communications system providing users with a variety of location-specific services, that can include safety, security, travel-related information and messaging.

## 3 Overview

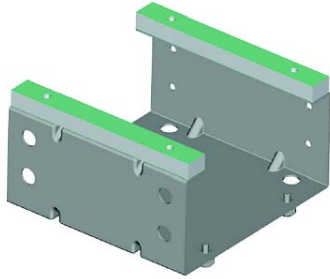
The SeaKey™ system requires handling by the installer to insure robust operation. This includes allowing proper access to the main power supply, installation of the control panel at the helm, and location of the communication hardware in a position that provides optimal signal strength.

All of these factors contribute to a properly functioning system that will give the boat owner the highest level of safety, and security that can be provided by the SeaKey™ system.





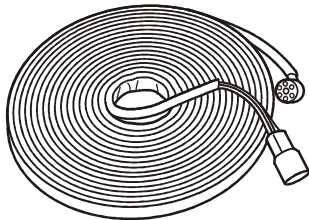
Marine Satcomm Unit



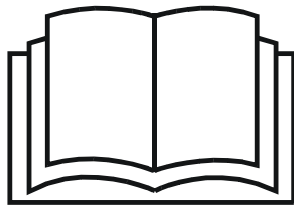
Bracket for MSU



Operator Module



Cable for MSU to Operator Module



SeaKey Installation Guide  
SeaKey Operator's Manual  
Various Dealer/Owner Documents

## 4 Equipment List

Please refer to the appropriate equipment list in this section for either the Complete Kit, or the Pre-Install Kit.

### 4.1 Complete Kit Equipment List

The Complete Kit includes the following items:

Marine Satcomm Unit (MSU)

22484 Bracket for MSU

Operator Module

Cable for MSU to Operator Module

SeaKey™ Installation Instructions (this document)

SeaKey™ Operator's Manual

Various dealer/owner documents

### 4.2 Pre-Install Equipment List

The Pre-Install Kit includes the following items:

Bracket for MSU

22481 Blank Operator Module

Cable for MSU to Operator Module

SeaKey™ Installation Instructions (this document)

## 5 Power Supply Requirements

### 5.1 Requirements for Connection

The system must have access to the main power supply on the boat such that the unit is being charged, even after the main power has been switched off for normal accessories. Thus, the SeaKey™ system should be given the same priority as the bilge pump system, in regard to power supply access. This allows the safety and security features to be available constantly.

### 5.2 Requirements for Main Power:

 **Caution!**

**Connect at the bilge pump switch to either 12 volts or 24 volts. This connection should be before the main battery switch, so that the SeaKey™ System has a constant charging source.**

Average power dissipation is 20 milliamps at 12 volts.

Maximum continuous power dissipation is 200 milliamps at 12 volts.

While the boat battery is not being charged, the power dissipation rate of this system allows it to operate for approximately 2 months before the boat battery discharges. This rating is highly dependent on the capacity and the condition of the lead-acid battery that powers the boat.

### 5.3 Requirements for Panel Backlight Power:

 **Caution!**

**Connect to 12 volts at the NAV switch or the dash light switch. This connection should be after the main battery switch, and powers the backlight for the Operator Module. This connection allows the control panel to be visible in darkness.**

Average power dissipation is 10-20 milliamps at 12 volts.

Maximum continuous power dissipation is 20 milliamps at 12 volts.

## 6 The Operator Module

The Operator Module provides the user interface to the operator. It would normally be installed at the helm to allow easy access. Installation requires a 3-inch diameter, circular panel cut out, with clearance around that for a square panel, measuring 3.5 inches per side. See the drill template at the back of these instructions.

At the rear of the module, are located the spade terminals which provide connection to the main power, high water float switch, and control panel backlight power. The large circular connector on the Operator Module accepts the male end of the MSU control cable.

**⚠ Caution!**

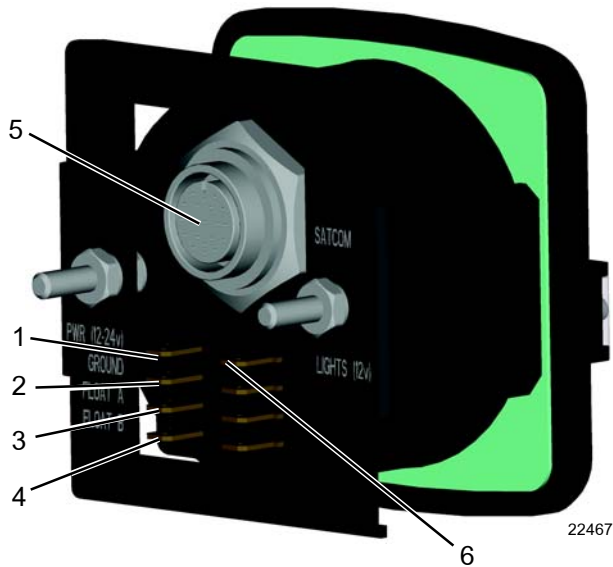
**This unit contains no user serviceable parts and must be returned to the manufacturer for service.**

**Note! The Operator Module accepts the male end of the MSU control cable.**



22480

Operator Module, Front View



22467

Operator Module, Rear View

- 1 ..... Power 12-24 volts
- 2 ..... Ground
- 3 ..... Float A (High-Water float switch)
- 4 ..... Float B (High-Water float switch)
- 5 ..... Satcomm (cable to MSU)
- 6 ..... Lights 12V (Dash lights)

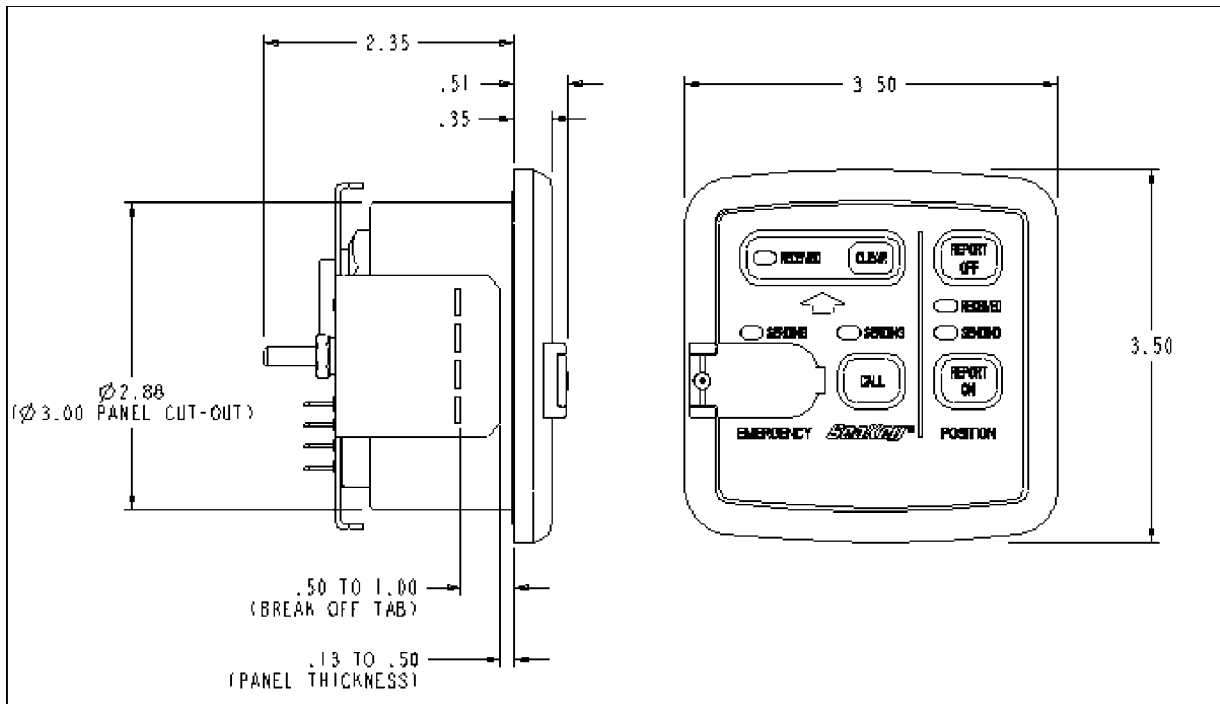
The physical dimensions of the spade terminals are as follows:

Spade Terminal Dimension .....	Distance [inches]
Vertical spacing .....	0.200
Horizontal spacing .....	0.750
Width of Terminal .....	0.247
Thickness of Terminal .....	0.0315

The mounting bracket attaches from the rear, and can be used on mounting surfaces that have a thickness between 0.13" to 0.5", or by removing the tab extensions, between 0.5" and 1.0".

The connections for the main and panel power require at least 18 AWG, rated to 105° C.

The connections for the float switch require at least 18 AWG, rated to 105° C



Operator Module, Physical Dimensions

22468

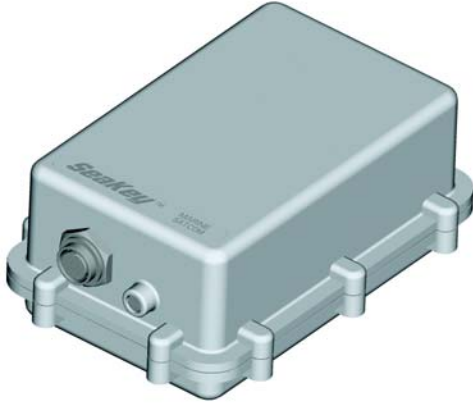
## 7 The Marine Satcomm Unit

The MSU provides the satellite communication channel for the entire system. This unit contains a satellite communicator, along with the circuitry to support the Operator Module. The large circular connector on the MSU accepts the female end of the MSU control cable.

**⚠ Caution!**

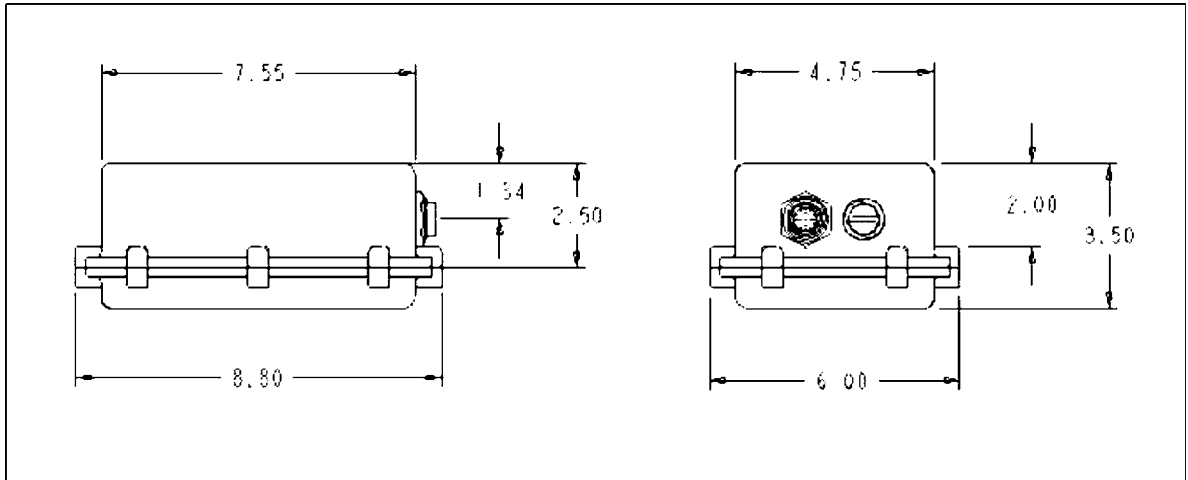
**This unit contains no user serviceable parts and must be returned to the manufacturer for service.**

**Note! The MSU accepts the female end of the MSU control cable.**



Marine Satcomm Unit (MSU)

22484



Marine Satcomm Unit, Physical Dimensions

22470

## 8 Water Level Monitor

The system accepts a connection to a float switch to allow water level monitoring. This float is separate from that which might exist in the bilge system, and is needed to initiate a high-water alert message to be sent over the communication link. An example float switch appears in the image below.

This float switch should be the type that closes the circuit when the water level is too high, and must be connected to the two terminals that are provided on the rear of the Operator Module.

Because this alert informs the owner that the bilge system capacity has been exceeded, the high-water float switch must be installed at a higher level than the bilge threshold. The high-water float switch must be installed lower than the MSU to insure that the alarm can be sent before the MSU has been submerged.

**⚠ Caution!**

**Install the high-water float switch at a minimum of 6 inches higher than the primary bilge pump float switch to avoid false readings when boat is underway.**

**⚠ Caution!**

**Install the high-water float switch a minimum of 6 inches lower than the MSU, so that when the switch goes active, the MSU will have time to send out the alarm before being submerged.**



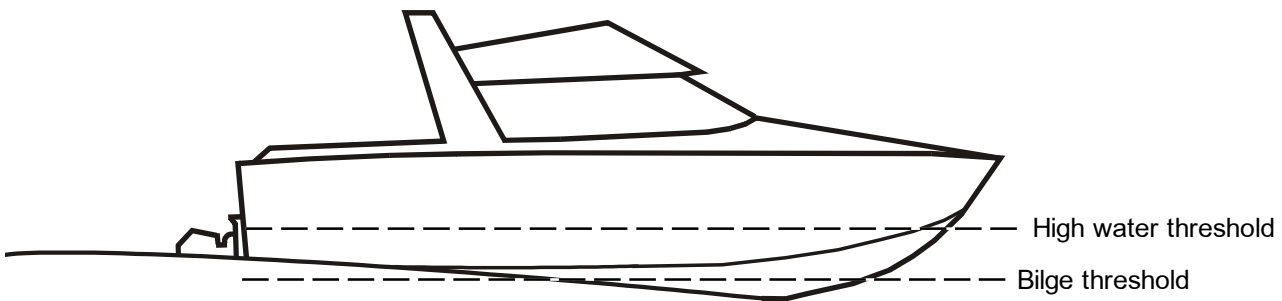
Typical Float Switch

22469



High-Water Float Switch Connection to Operator Module

22486



Threshold for High-Water, above Bilge

22491

## 9 MSU Placement Rules and Recommendations

For each model of boat, a three-step process must be followed to insure the best placement of the MSU. This process includes the measurement of signal strength, which can be accomplished by use of the SeaKey Power Meter unit.

### ⚠ Caution!

First, the installer must position the boat away from obstructions for good satellite reception, and must verify that with at least one above-deck reading in the open air, using the power meter unit. This will establish a base-line level of reception.

### ⚠ Caution!

Second, another set of readings must be performed below deck, at various locations, to determine the position of optimal reception with respect to GPS and communications satellites. The measurements here should not be much weaker than the above deck measurement. Take at least 3 readings in each location. Any candidate locations must allow enough space for the MSU and its mounting bracket.

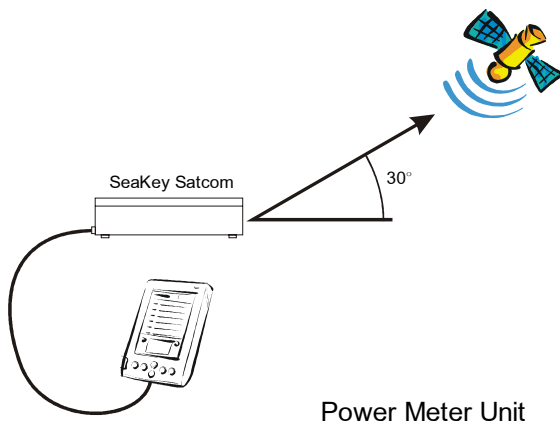
### ⚠ Caution!

Third, the MSU must be installed within the same guidelines used to determine best position with the power meter unit.

To insure best placement, the following guidelines should be followed as closely as possible.

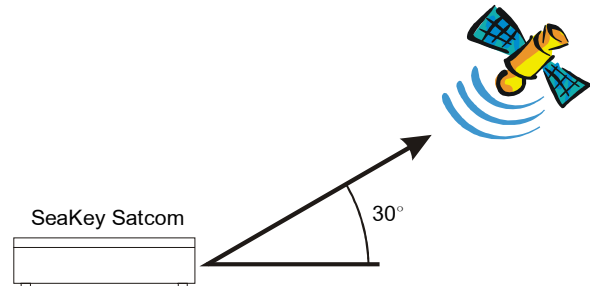
### 9.1 The Open-Air Signal Strength Reading

For each model to be fitted with a SeaKey™ system, a power meter unit should be used to determine the signal strength in open-air.



### 9.1.1 Angle of Orientation

The communication satellites are positioned at approximately a 30-degree angle with respect to North America. Because the orientation angle will affect where and how these units are installed in the boat, the next few guidelines address that, and must be followed in order to ensure maximum satellite reception.



### 9.1.2 Avoid Solid Objects

In general, solid objects including people, buildings, trees, metal, and any other obstructions can decrease signal strength. In short, the power meter unit should be in a "line of sight" orientation to the satellite for best results.

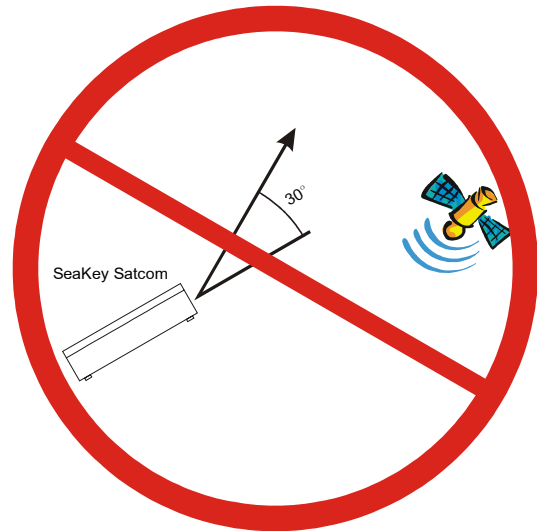


### 9.1.3 Avoid Standing in Front of the Unit

A human body can block the signal to the unit. Avoid standing between the MSU and the satellite.

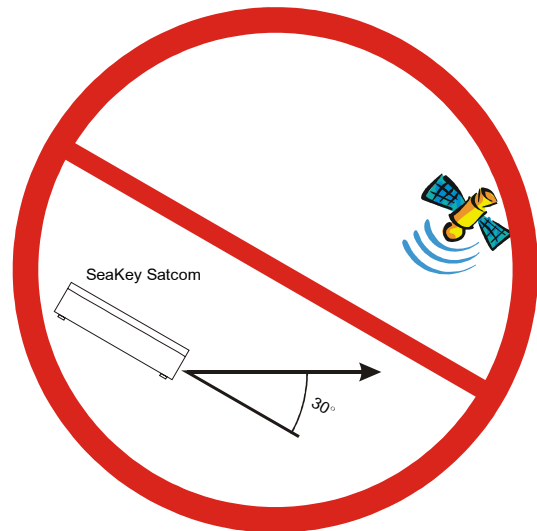
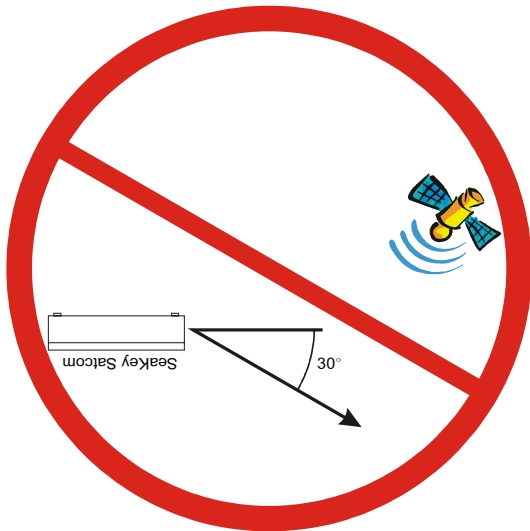


Do not place the unit in any position that is not level.



### 9.1.4 Position the MSU In a Horizontal Position

In order to receive acceptable signal strength, the MSU must remain in an upright horizontal position. Do not mount the unit upside down.



### 9.1.5 Avoid Areas With Large Amounts of Metal

Areas with large amounts of metal will lower the signal strength of the MSU. Locations that are known to be potential trouble areas are the helm, and the galley. The helm area contains large amounts of metal wire that can block the signal to the MSU. The galley contains metal surfaces that pose a threat to acceptable signal strength.

## 9.2 The Below-Deck Signal Strength Reading

Once the open-air reading is complete, the installer has verified that a usable signal actually exists on the deck. From there, some below-deck readings are required to determine good candidate locations for placement. As with the open-air readings, the placement position should be determined with a power meter unit.

When searching for candidate mounting positions for the MSU, signal strength readings should be collected in many areas of the boat, preferably below-deck. Each candidate location should allow enough space for the MSU and its mounting bracket, and must be within reach of a 30 foot cable run to the Operator's Module. Below are example diagrams of boats and sample test positions where the boat-builder might install the unit.

### **⚠ Caution!**

**The entire cable run between the MSU and the Operator's Module should not exceed 30 feet in length. This will help assure an adequate power feed to the MSU.**

## 9.3 Installing the MSU

The SeaKey™ mounting bracket provided with this installation kit should be used to attach the MSU to the boat. The bracket provides easy mounting and dismantling for seasonal storage. The bracket can be attached from its top or side surfaces. The adhesive strips included, should be sufficient to mount the bracket, however, mounting holes are also provided in the bracket if screw mounting is necessary.

### **⚠ Caution!**

**Mount the MSU away from metallic obstructions, as occur near the dash, or the galley. This will help insure unobstructed reception.**

### **⚠ Caution!**

**Mount the MSU away from areas where people will sit, or stand, and away from permanent or temporary storage areas. This will help insure unobstructed reception.**

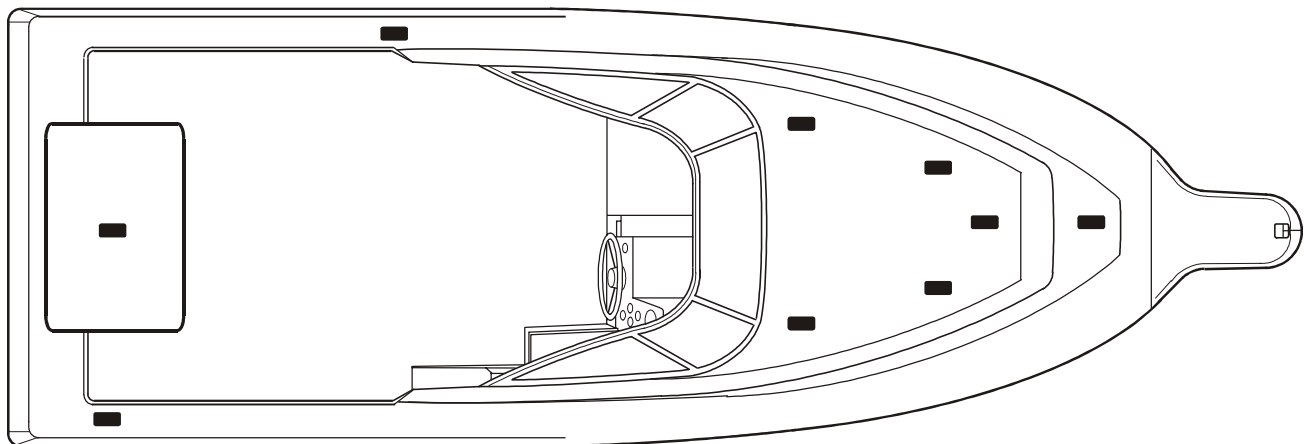
### **⚠ Caution!**

**The MSU must be mounted as close as possible to the horizontal position, as that allows maximum signal strength.**

**Note! Allow enough physical clearance for removal of the MSU from the bracket for servicing, and for off-season storage.**

**Note! When mounting the bracket with adhesive strips, the surface must be free of dust, and prepared with an appropriate cleaning agent.**

**Note! The MSU accepts the female end of the MSU control cable.**



■ Denotes possible test positions

NOTE! All positions are below deck surface

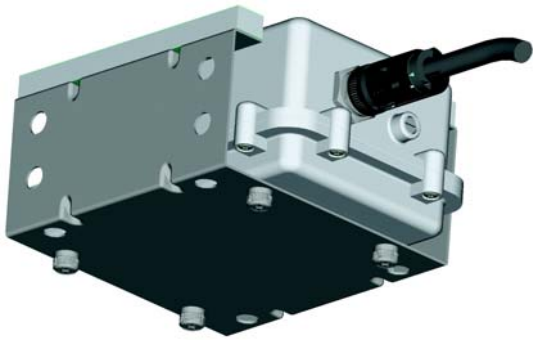
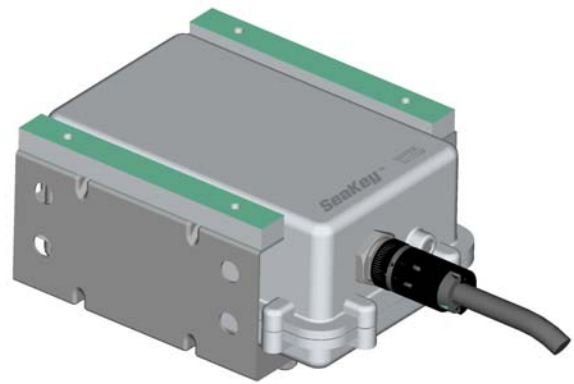
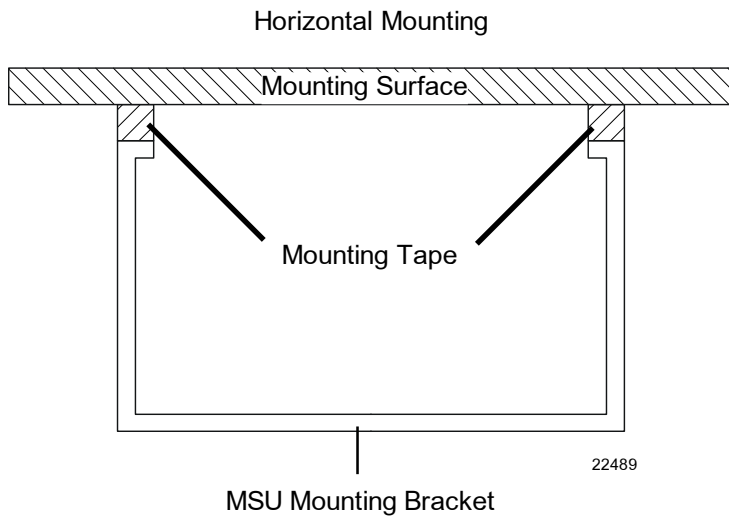
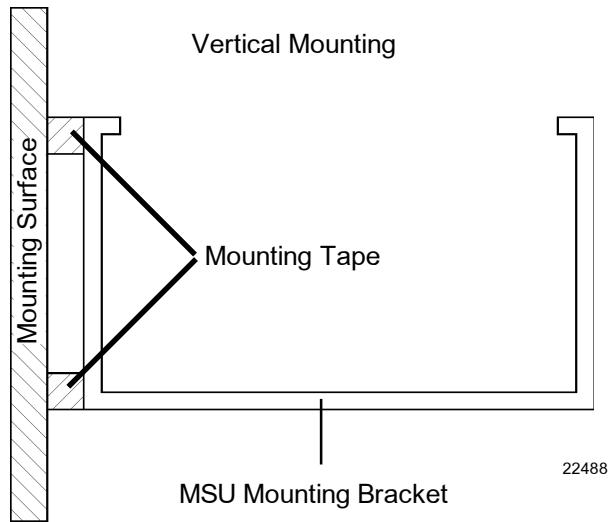
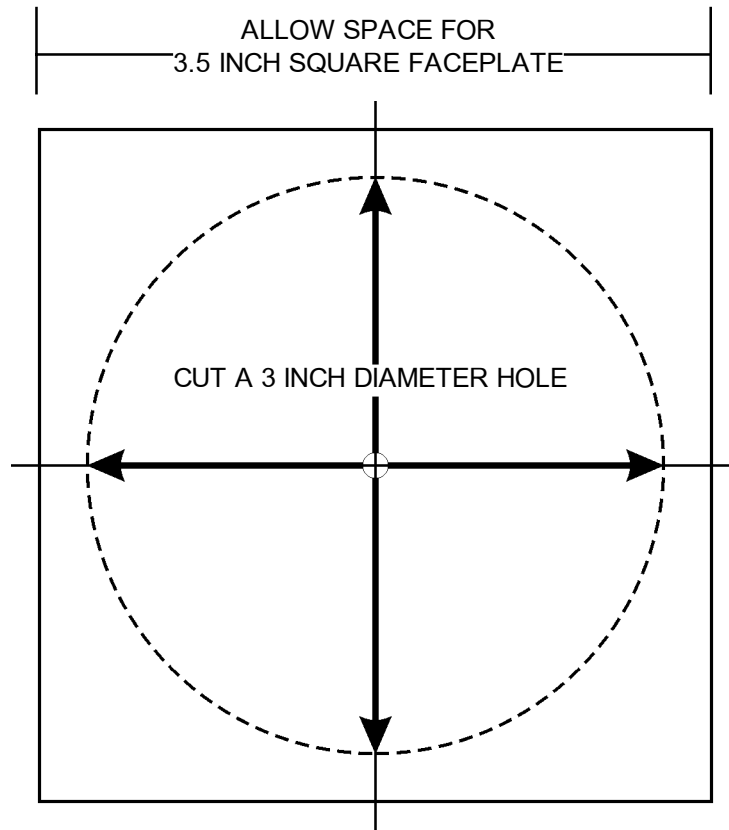


Figure 15: MSU in Bracket, bottom view



MSU in Bracket, top view





Operator Module Drill Template

**⚠ Caution**

**Be careful not to reproduce the drill template at the wrong magnification, and always verify the hole diameter to be 3 inches."**

**VOLVO  
PENTA**

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