SENTINEL
Marine solutions

Sentinel Boat Monitor BM-50

Installation Guide

(Lite, Standard and Pro versions)

INCLUDED

- Sentinel Boat Monitor device
- Installation bracket
- 4 self-tapping screws
- User manual
- Warranty

OPTIONAL PARTS

- Magnetic door switch (SKU:A1012)
- Bilge float sensor (SKU: A1013)
- Shore power sensor (SKU: A1009)
- External GPS antenna with 3m cable (SKU: A1052)

CONTENT

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Important Safety and Performance Guidelines

WARNING

Temperature Exposure: Prevent device malfunction and internal damage by keeping the BM-50 within temperatures below 50 degrees Celsius, shielding it from excessive heat exposure.

Power Supply Protection: Safeguard the battery and electrical circuit by installing a 1 A fuse holder on the positive power cable when connecting directly to the battery to prevent potential damage.

CAUTION

Positioning Accuracy: Avoid obstructing the sky view above the BM-50 device or its GPS antenna with metal objects, which can disrupt satellite reception and diminish positioning accuracy.

Battery: The device contains an internal battery. Risk of explosion if the battery is replaced by an incorrect type.

Relay Current Limitation: Ensure relay currents do not exceed 1 A in the Pro and Standard versions to prevent damage; use additional relays for higher loads.

NOTICE

Optimal Installation Spot: Ensure optimal device performance by wall mounting with connectors facing downward; consider using an optional external GPS antenna with an extension cable for improved satellite reception.

Device Version Differentiation: This installation guide covers instructions for three device versions - Standard, Lite, and Pro. Clear markers will direct you to the relevant information for your device model throughout the guide. Please read attentively to ensure accurate installation.

Device versions

BM-50 Lite

BM-50 Standard

BM-50 Pro

1. Install the Sentinel App

To start using your Boat Monitor device you should install the “Sentinel Marine solutions” app for your platform and create a Sentinel account.

1.1 Using the Sentinel App

To access the boat's data you need a Sentinel Boat Monitor installed and a Sentinel app for your mobile device. Use Play Store for Android or App Store for iOS and search for “Sentinel boat” app.

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1. If you already have have a Sentinel account skip steps 2-6 and select Login, otherwise select “Create account”
2. Enter your email address and choose a password
3. A verification email will be sent to the address you have entered. Please check your “Spam” folder if you haven’t received it

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4. To verify your email address click on “Validate email address” button. After validating, you can proceed with the Sentinel app
5. Terms of Use, Privacy Policy need to be accepted before using the app
6. Click on the blue “Add boat” window at the bottom of the screen

7. Select “Register your boat”
8. Scan your QR Code (found on the device or in the installation manual)
9. Input the name of the boat. Before boat’s data can be received you need to activate the Sentinel Boat Monitor.

NOTE! Depending on the type of installation (eg. factory installation, retrofit, independent professional) there might be different options available on this screen.

10

10. To activate the Sentinel BM, follow the instructions to input the activation code
11. Enter the 6-digit activation PIN code (found on the device or in the installation manual)

NOTE! It might take up to 2 hours for the device to start sending data to the cloud. Make sure that during this period a stable power supply is available.

2. Installation Guide

The BM-50 is primarily designed for wall mounting. Connectors should always face down (towards the ground) as shown in figure to achieve optimal positioning accuracy with built-in antennas. Unless an external GPS antenna with an extension cable (optional, not included) is used, other orientations of the device will cause poorer satellite reception and will lower the positioning precision. The sky view above the device or GPS antenna with extension cable should not be obstructed with any metal objects, pipes or conductors.

The BM-50 device should be installed in a dry location away from direct contact with water and should not be exposed to direct sunlight. Operating temperatures above 50 degrees Celsius may lead to irregular operation and damage to internal components of the Boat Monitor. It is important to follow these guidelines to ensure the proper functioning and longevity of the BM-50 device.

2.1 Wall mounting

The BM-50 features an installation bracket that allows simple device installation and replacement. The bracket is fixed to the wall using 4 screws or adhesive tape.
Remove the bracket by gently lifting the clips on top of the device (1), and then pull the bracket away from the device.

1. Remove the bracket by gently lifting the clips on top of the device (1), and then pull the bracket away from the device.

2. Attach the bracket to the wall using included self-tapping screws or adhesive tape. Be careful to retain the bracket orientation as the top and bottom clips on the bracket are different. Top clips are longer than bottom ones.

3. Install the device back to the bracket inserting the bottom clips first (1) and pushing it towards the bracket at the top (2).

2.2 Electrical connection overview

Device features 5 external connectors (cables):

CONNECTORS	LITE	STANDARD	PRO
External GPS antenna connection	-	✓	✓
5-pin M12 CAN2 connector	-	-	✓
18-pin Main cable	-	✓	✓
10-pin Main cable	✓	-	-
RJ45 ethernet connector	-	-	✓
5-pin M12 CAN1 (NMEA2000) connector	-	✓	✓

Main device connection is achieved through an 18 wire main cable harness (or 10 wire in case of Lite version). Power is supplied through red and black wires of the harness; individual wire functions are listed in the tables below.

2.3 Wire color code description

2.3.1 Lite version

Color	Function	Description
Red	VIN1/Supply	Voltage input 1 - Service battery + BM-50 power supply
Yellow	VIN2	Voltage Input 2 - Engine battery (port)
Pink	VIN3	Voltage input 3 - Engine battery (starboard)
Purple	Bilge	Digital input 1 - Bilge sensor**
Green	Door	Digital input 2 - Door sensor**
Black	GND	Ground

2.3.2. Standard version

Color	Function	Description
Red	VIN1/Supply	Voltage input 1 - Service battery + BM-50 power supply
Yellow	VIN2	Voltage Input 2 - Engine battery (port)
Pink	VIN3	Voltage input 3 - Engine battery (starboard)
Brown	VIN4	Voltage input 4 - general purpose
Blue	Shore	Digital input 1 - Shore power**
Purple	Bilge	Digital input 2 - Bilge sensor**
Green	Door	Digital input 3 - Door sensor**
Red- blue	PIR	Digital input 4 - PIR sensor**
Grey	Relay 1	Relay 1 Contact
White- grey	Relay Common	Relay Common
White- yellow	RS485_P	RS-485 B (+)*
White- green	RS485_N	RS-485 A (-)*
Black	GND	Ground
Grey- brown	GND	Ground

2.3.3. Pro version

Color	Function	Description
Red	VIN1/Supply	Voltage input 1 - Service battery + BM-50 power supply
Yellow	VIN2	Voltage Input 2 - Engine battery (port)
Pink	VIN3	Voltage input 3 - Engine battery (starboard)
Brown	VIN4	Voltage input 4 - general purpose
Blue	Shore	Digital input 1 - Shore power**
Purple	Bilge	Digital input 2 - Bilge sensor**
Green	Door	Digital input 3 - Door sensor**
Red- blue	PIR	Digital input 4 - PIR sensor**
Grey	Relay 1	Relay 1 Contact
White	Relay 2	Relay 2 Contact
White- grey	Relay Common	Relay Common
White- yellow	RS485_P	RS-485 B (+)*
White- green	RS485_N	RS-485 A (-)*
Pink- grey	RS232_RX	RS-232 Rx*
Green- brown	RS232_TX	RS-232 Tx*
Black	GND	Ground
Grey- brown	GND	Ground
Yellow- brown	Unused	unused

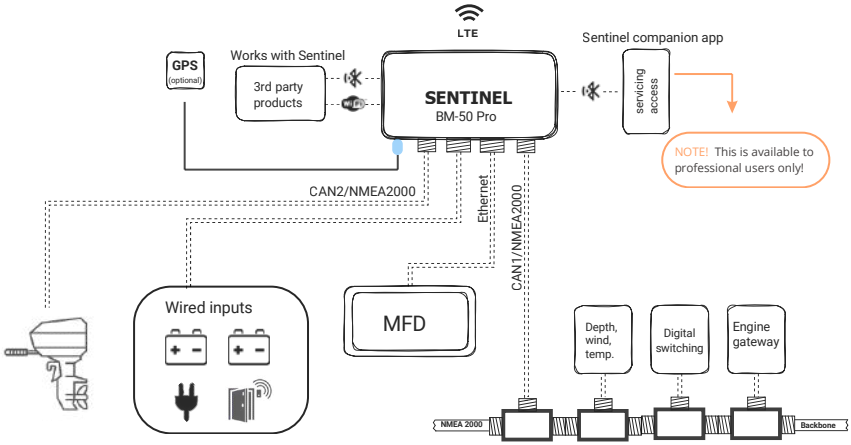
* contact Sentinel for more information on supported protocols
** bilge, door, PIR and shore power inputs can be changed to other digital sensor types.

NOTE! Use Web or Mobile App to change sensor type from their default values. Find out how:

LINK:
https://sentinelmarinesolutions.freshdesk.com/a/solutions/articles/26000034625

QR CODE:

Typical installation block diagram for BM50 PRO is shown below:

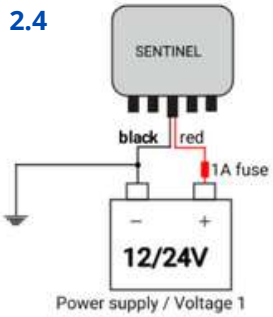


2.4 Power supply connection

To ensure continuous monitoring, the device should be connected to a constant power source. When connecting any power or voltage input directly to the battery, it is important to protect the battery and electrical circuit from potential damage by installing a fuse holder with a 1 A fuse on the positive (+) power cable as close as possible to the battery terminal.

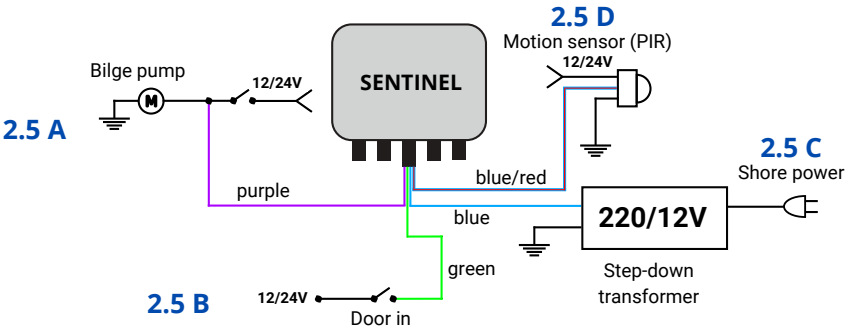
Connect the red wire through a fuse (fuse should not be inserted until installation is complete) to permanent power source (battery).

Connect the BLACK wire to system ground.



2.5 Bilge, door switch connection and shore power detection

Boat monitor comes with predefined digital input configuration shown on wiring diagram 2.5. If a different configuration is required, digital inputs can be reconfigured in the Sentinel app.



DEFAULT DIGITAL INPUT CONFIGURATIONS

A: Purple - bilge sensor: used for float switch or bilge pump activity detection as shown in fig. 2.5A. The input uses ACTIVE HIGH logic by default. If active low logic is required, you can set it up easily in a WebApp. **(Lite, Standard, Pro)**

B: Green - door sensor: used for door alerts. Connect magnetic switch as shown in fig. 2.5B. The input uses ACTIVE LOW logic by default (switch open when the door is open). If active high logic is required, you can set it up easily in a WebApp. **(Lite, Standard, Pro)**

C: Blue - shore power presence detection: used for alerts on shore power disconnection. Connect a step-down transformer (not included) as shown in fig. 2.5C. **(Standard, Pro)**

D: Red-Blue - Motion sensor (PIR), used for detecting motion events on a boat. The input uses ACTIVE HIGH logic by default. If active low logic is required, you can set it up easily in a WebApp. **(Standard, Pro)**

NOTE! How to change the input logic in WebApp:

https://sentinelmarinesolutions.freshdesk.com/a/solutions/articles/26000034625

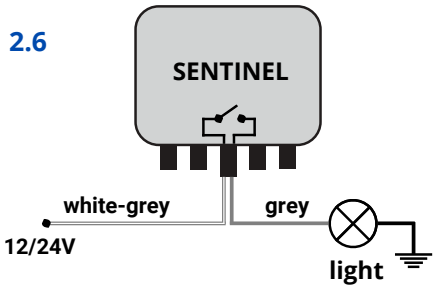
QR CODE:

2.6 Relay output (Pro and Standard version)

The Standard version has one built-in low power relay while the Pro version has two. In the Pro version, one contact of both relays is connected to the Relay Common wire.

In Standard version the load should be connected to the grey wire. In Pro version the second load should be connected to the white wire.
To ensure proper functioning, the current **must not exceed 1 A on each relay**. The maximum allowed switching **voltage is 60 V**. For switching loads that require more power, an additional power relay is needed.

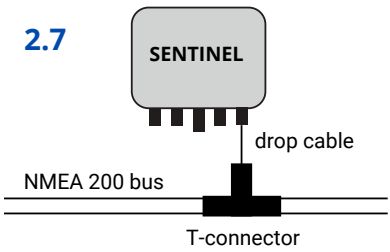
Example: switching low power LED light with Boat monitor.



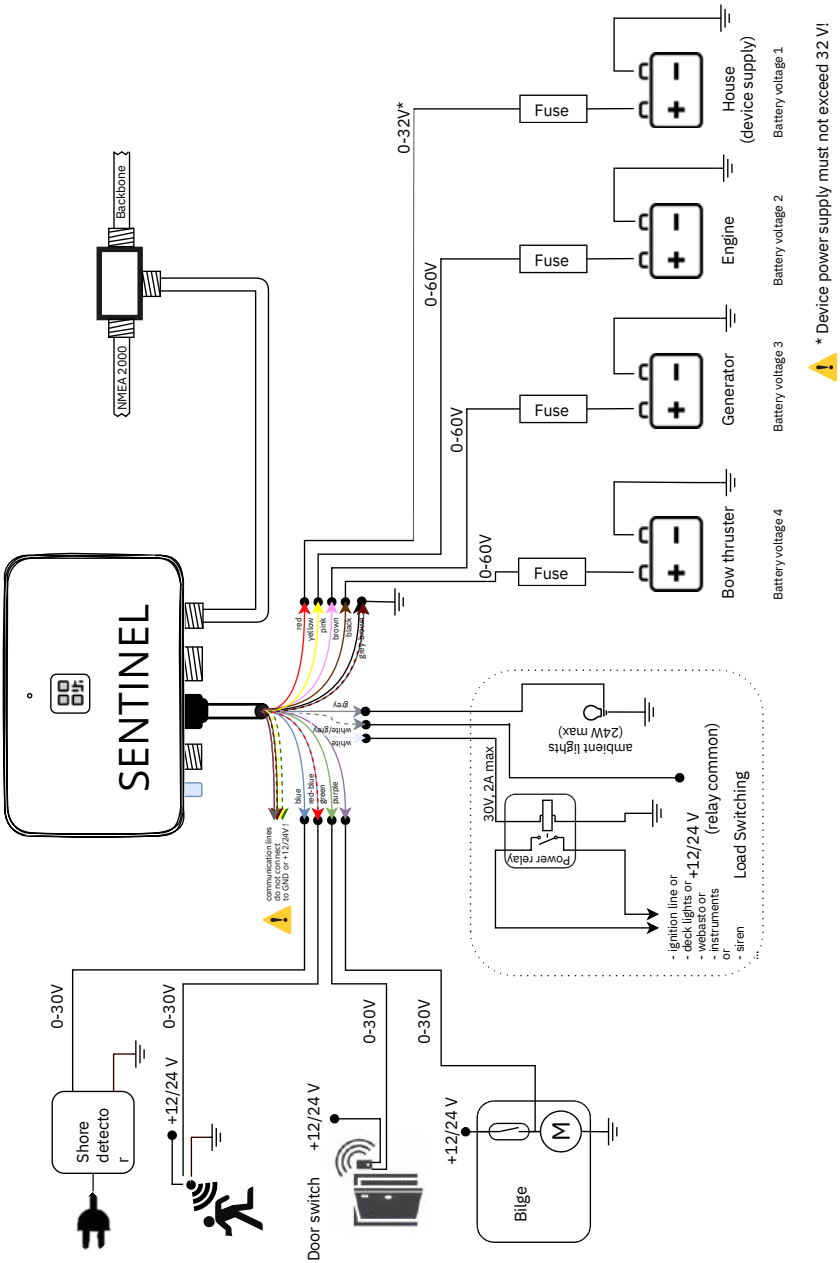
2.7 NMEA 2000® connection (Pro and Standard)

CAN1 / NMEA2000 connector is a primary NMEA 2000 interface that connects to the boat instrument NMEA2000 backbone. The Pro version has a secondary CAN2 multipurpose CAN interface. Contact Sentinel support for more information.

Connect the CAN1 connector to the NMEA 2000® backbone (bus) via a drop cable and T-connector. Important: Boat Monitor cannot be powered from the NMEA 2000® backbone.



2.8 Typical system wiring diagram



MORE INFO
For details on pairing Bluetooth devices, troubleshooting, CZone integration and other application notes, see http://www.sentinelmarine.net/boat-monitor/docs/

INSTALLATION COMPLETE
To power up the device for the first time insert the fuse on the supply wire (see fig. 2.2). The device should power up and LED should light up. When the subscription is active it takes approximately 1 minute until LED lights up green. This pattern signals normal operation.

3. Troubleshooting

In case of issues first check the device LED.

LED	Status	Action to be taken
Red	Device is unable to connect (SIM inactive, no coverage, communication issue)	Check subscription, make sure there is cellular coverage. If no issue can be detected, contact support via the mobile app.
Yellow	Device is registered to the network but cannot send data (low signal, network problem)	Wait a few minutes, make sure cellular signal is sufficient for normal operation. If no issue can be detected, contact support via the mobile app.
Green	Device is up and running normally	No action needed
Blinking (any color)	GNSS (GPS) signal is low or non-existent	Device is unable to acquire current position. Check for metal objects obstructing the sky view of the device and/or move the device to another location.
Changing colors	Device busy	Wait for the color to turn red/yellow/green

* If the device LED is off, check the fuse and make sure the power supply to the device is higher than 12V! If the issue cannot be resolved, contact Sentinel support by using the report issue feature built into the Sentinel application.

3.1. Technical specification

Parameter	Minimum	Typical	Maximum
Supply Voltage*	11.7 V	12 V -32 V	34 V
Input resistance of digital and analog inputs (except power supply)	500 kΩ		
Input Voltage Range: Voltage 1 Voltage 2/3/4			32 V 60 V
Digital input Voltage threshold		5 V	
Relay switching voltage Relay switching current			60 VDC 1A

POWER SUPPLY: 12 to 30 V DC 4 W Max
ENERGY CONSUMPTION (12 V)*: Nominal: average 35 mA r.m.s,
OPERATION TEMPERATURE: -10 °C to +55 °C
STORAGE TEMPERATURE: -40 °C to +60 °C
STORAGE RELATIVE HUMIDITY: 5 to 95 % (no condensation)
* when internal battery is charged

NOTE! The device will not start if the startup voltage is below 12V.

Boat monitor compliance

CE This product is marked with logo and uses radio frequency bands that are harmonized throughout the European Community and others. Declaration of conformity is located in the box together with warranty list.

Appendix A
List of receiving NMEA2000 PGNs

PGN ID	PGN Name
130316	Temperature Extended Range
65280	Proprietary pgn 65280
130306	Wind Data
127251	Rate of Turn
127257	Attitude
127258	Magnetic Variation
128259	Speed
128267	Water Depth
129026	COG & SOG, Rapid Update
129284	Navigation Data
130310	Environmental Parameters
130578	Vessel Speed Components
127488	Engine Parameters, Rapid Update
127489	Engine Parameters, Dynamic
127493	Transmission Parameters, Dynamic
127497	Trip Parameters, Engine
127498	Engine Parameters, Static
127508	Battery Status
127506	DC Detailed Status
127245	Rudder
127507	Charger Status
127509	Inverter Status
130312	Temperature
130313	Humidity
130314	Actual Pressure
127501	Binary Switch Bank Status
127504	AC Output Status
127503	AC Input Status
127250	Vessel Heading
127496	Trip Parameters, Vessel
130311	Environmental Parameters
127505	Fluid Level