SENSAR MARINE

Expansion Hub

Installation Guide

Model: EH700

Revision: DRAFT 2.0

April 2026

1. Introduction

Thank you for choosing the Sensar Marine Expansion Hub EH700. The Expansion Hub is a purpose-built companion module that extends the monitoring, communication and data-acquisition capabilities of the BM700 Boat Monitor. It adds NMEA2000 integration, multi-channel analog voltage measurement, safety alarm monitoring, and expandable sensor connectivity.

1.1 About This Document

This installation guide is intended for professional marine technicians.

1.2 Expansion Hub Capabilities

The Expansion Hub connects to your existing Boat Monitor and provides the following ports, as labeled on the hub enclosure lid:

- **Boat Monitor** — connection to the main Sensar Marine Boat Monitor unit
- **Bilge Sentry 1** — primary bilge monitoring sensor input
- **Bilge Sentry 2** — additional bilge monitoring sensor input*
- **Satellite** — satellite antenna *(hardware availability Summer 2026)*
- **NMEA 2000** — connection to the vessel's NMEA 2000 network for engine data, fuel level, and more
- **Expansion 1** — analog expansion wire harness for Battery 3, AUX Battery (Battery 4), Bilge Pump 2, Theft, and Fire Alarm**
- **Expansion 2** — analog expansion wire harness for Shore Power, Battery 5*, Battery 6*, and Theft 2*

** Will be activated by a future software release pushed automatically to your device*

*** Interfacing with a fire alarm system is covered in its own installation guide. Additional hardware may be required.*

2. Safety Information

DANGER	ELECTRICAL HAZARD — Always disconnect shore power and switch off the vessel's main battery switch before beginning installation. Failure to do so may result in electrical shock, short circuits, or fire.

WARNING	MARINE ENVIRONMENT — All connections must be made using marine-grade wiring practices. Use tinned copper wire, adhesive-lined heat shrink, and corrosion-resistant terminals. Inadequate connections in a marine environment will corrode and fail.

2.1 General Safety Precautions

1. Disconnect all power sources (shore power, battery switches) before starting work.
2. Use appropriate personal protective equipment (safety glasses, insulated tools).
3. Ensure all wire connections are mechanically secure and properly insulated against moisture ingress.
4. Route cables away from heat sources, moving parts, and sharp edges.

3. System Overview

The EH700 Expansion Hub sits between your existing BM700 Boat Monitor and additional analog sensors on the vessel. It communicates with the BM700 over a dedicated data cable connected to the “Boat Monitor” port on the hub. The EH700 is housed in a sealed, epoxy-potted marine-grade enclosure and is designed for low-power operation, leveraging the BM700’s internal battery for extended autonomous monitoring when external power is unavailable.

Data from all connected sensors flows through the Expansion Hub to the Boat Monitor, which transmits it to the Sensar Marine cloud platform via cellular (and optionally satellite) connectivity. Sensor readings appear in the Sensar Marine app in real time.

4. What’s in the Box

Verify the following components are included before beginning installation:

- 1× Expansion Hub EH700 unit (SM 2026-02 v3)
- 1× Expansion 1 wire harness — 1 m cable with M12 8-pin connector and color-coded, labeled flying leads
- 1× Expansion 2 wire harness — 1 m cable with M12 8-pin connector and color-coded, labeled flying leads
- 1× Boat Monitor data cable — 1 m cable for connecting to BM700
- Mounting hardware (screws, adhesive tape)
- This installation guide

NOTE	Bilge Sentry modules, the Satellite module, and the NMEA 2000 cable are sold separately. The sensors to be connected to the expansion harnesses, such as theft contacts and shore power sensor are sourced separately by the installer.

5. Pre-Installation Planning

5.1 Choosing a Mounting Location

Select a location for the Expansion Hub that meets the following criteria:

- Dry, protected area below deck (engine room, electronics cabinet, or helm console void)
- Within cable reach of the Boat Monitor unit
- Within reasonable cable reach of sensors to be connected via the expansion harnesses

- Accessible for future maintenance and troubleshooting
- Away from engine exhaust, extreme heat sources, and areas prone to flooding

5.2 Planning Cable Runs

Before drilling or running cables, plan the routing for both expansion harnesses:

1. Identify which sensors you will connect to Expansion 1 and Expansion 2.
2. Measure cable run distances to ensure the harness flying leads will reach. If an extension is needed, use marine-grade tinned copper wire of the same gauge or a heavier gauge.
3. Avoid routing near high-current AC wiring, engine ignition systems, or radio antenna cables.
4. Plan for cable support (clips, ties, or conduit) at regular intervals to prevent chafe.

IMPORTANT	The wire harness flying leads are color-coded and pre-labeled.

6. Connecting to the Boat Monitor

Ensure the connection is secure and the cable is supported to prevent strain on the connectors.

Once connected, the Boat Monitor will automatically detect the Expansion Hub, and the app will display additional tiles.

7. NMEA 2000

The Expansion Hub includes an embedded NMEA 2000 gateway module that listens to the vessel’s N2K backbone and reports select PGNs to the Boat Monitor.

Currently Supported PGNs: 127488 (Engine Rapid), 127489 (Engine Dynamic), 127505 (Fluid Level), 129026 (COG & SOG) — with multi-instance support.

7.1 Installation of NMEA 2000 Cable / Connector

The Expansion Hub connects to the vessel's existing NMEA 2000 backbone via a standard M12 5-pin Micro-C drop cable (sold separately).

- Locate a T-connector on the NMEA 2000 backbone with an available drop port.
- If no port is available, install an additional T-connector into the backbone by disconnecting two adjacent backbone connectors and inserting the new T-connector between them.
- Connect the drop cable between the T-connector drop port and the NMEA 2000 port on the Expansion Hub.
- Ensure all connectors are fully seated and finger-tight. Do not over-tighten.

NOTE	The Expansion Hub monitors power on the NMEA 2000 network and activates the monitoring function when the network is powered. It does not draw any power from the network. The drop cable length must not exceed 6 m (20 ft). If you are installing a new NMEA 2000 network, refer to the manufacturer's installation guide for the network equipment.

8. Expansion 1 Harness — Wiring Guide

The Expansion 1 harness provides five analog input channels. The connector end plugs into the port labeled “Expansion 1” on the Expansion Hub lid.

8.1 AUX Battery (Blue + / Yellow –)

The AUX Battery monitor is a flexible way to monitor a battery that is not connected to a common ground. This is common for trolling motor batteries and system backup batteries. Connect the yellow wire to the negative terminal of the battery and the blue wire to the positive terminal. If the battery has a common ground, connect the yellow wire to it.

Install an inline fuse (3 A) on the Blue (positive) wire within 7 inches (175 mm) of the battery terminal.

8.2 Battery 3 (Red + Common Ground)

Connect the red wire to the positive terminal of the battery to be monitored. Common ground is required.

Install an inline fuse (3 A) on the Red (positive) wire within 7 inches (175 mm) of the battery terminal.

NOTE	According to ABYC standards (E-11), there should be a fuse between the sensor wire and any battery terminal. This fuse should be within 7 inches (175 mm) of the battery terminal. This applies to all battery connections in this guide.

8.3 Bilge 2 (Brown + Common Ground)

Use for monitoring the activity of a second bilge pump. The installation procedure is similar to that for the bilge pump monitoring, including the Boat Monitor.

First - identify the desired Bilge Pump wire.

Bilge pump with 2 wires: v The T-splice connector mounts to the positive (+) wire between the bilge pump and the float switch.

Bilge pump with 3 wires: The T-splice connector mounts to the manual cable. This is the third cable, typically the same cable that connects to the instrument dashboard for manual operation of the bilge pump and indicator light.

Second - install the T-splice connector

- Open the hinged side wall on the connector
- Place the connector anywhere along the length of the appropriate bilge pump wire. Position the wire in the channel.
- Close the hinged side wall to capture the bilge pump wire.
- Insert the provided tap wire into the open port of the connector until it stops.
- Using a set of pliers, complete the circuit by pressing the metal u-contact down flush with the top of the connector
- Close the connector top lid and make sure the locking mechanism clicks into place.

Finally - connect

Now that the provided tap wire is attached to the correct bilge pump wire, insert the quick-release spade connector into the corresponding connector on the battery cable's brown-and-white "Bilge Pump" wire.

8.4 Theft (Pink / Grey)

The theft alarm is a Normally Closed loop with an end-of-line resistor mounted generally at the far end of the line. The system will indicate alarm status for wire cut and for short. A short is when someone attempts to short-circuit the loop to bypass the alarm function.

8.5 Fire Alarm (White + / Green –)

Integration with the existing fire alarm system is covered in a separate installation guide.

9. Expansion 2 Harness — Wiring Guide

The Expansion 2 harness provides four analog input channels. The connector end plugs into the "Expansion 2" port on the Expansion Hub.

9.1 Shore Power (White + / Green –)

The shore power input requires an external sensor that provides a DC voltage signal. When the sensor delivers a voltage greater than 10 V, the system detects and indicates that shore power is connected. When the voltage drops below this threshold, shore power is reported as disconnected.

- Install your chosen shore power sensor according to the sensor's instructions.
- Connect the **White** (positive) wire to the sensor's positive DC output.
- Connect the **Green** (negative) wire to the sensor's negative/ground reference.

9.2 Battery 5 (Red + / Brown –)

Battery 5 *(will be supported by a future software release)*

The Battery 5 supports the monitoring of a battery that is not connected to a common ground. Connect the brown wire to the negative terminal of the battery and the red wire to the positive terminal. If the battery has a common ground, connect the brown wire to it.

Install an inline fuse (3 A) on the Red (positive) wire within 7 inches (175 mm) of the battery terminal.

9.3 Battery 6 (Blue + / Yellow –)

Battery 6 *(will be supported by a future software release)*

The Battery 6 supports the monitoring of a battery that is not connected to a common ground. Connect the yellow wire to the negative terminal of the battery and the blue wire to the positive terminal. If the battery has a common ground, connect the yellow wire to it.

Install an inline fuse (3 A) on the Blue (positive) wire within 7 inches (175 mm) of the battery terminal.

9.4 Theft 2 (Pink / Grey)

Theft 2 *(will be supported by a future software release)*

This is a second, independent theft/intrusion detection loop, identical in operation to the Theft input on Expansion 1. Follow the same procedure as Section 6.4.

10. Battery Configuration in the App

If any of the battery banks connected to the Expansion Hub use Lithium (LiFePO4) chemistry, you must update the battery chemistry setting in the Sensar Marine app. Navigate to the vessel's Boat Profile and set the chemistry for each battery input accordingly.

If all connected batteries are Lead Acid, the default values are sufficient and no changes are needed.