

INSTALLATION MANUAL

Nautech Core / Core PRO / Core PRO+

Nautech Isolate

Professional Installer Edition

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1. Introduction & Scope

1.1 Purpose of This Document

This Installation Manual explains how to **install the Nautech Core PRO+ correctly and safely**.

The document is written for **professional marine installers and system integrators**. Its goal is to ensure that the hardware is installed in a way that:

- protects the device from damage,
- avoids common installation errors,
- and allows the system to operate as intended.

This manual focuses **only on physical installation**:

- mounting,
- wiring,
- connectors,
- antennas,
- and basic system integration.

This document **does not** explain:

- how to use the system,
- how the mobile app works,
- how to configure cloud services,
- or how to operate the system day to day.

Those topics are covered in separate documents.

This Installation Manual is part of a **documentation set**. Each document has a clear role.

This document covers installation only.

1.2 Document Set Overview

The Nautech Core documentation is split into separate documents to avoid confusion between installation and commissioning.

The **Getting Started Guide** describes the minimum steps required to bring a new system online.

1. **Core installation**

Physical installation of the hardware and connections.

→ This is the scope of this document.



2. **New user registration**

Creating a user account in the Nautech system.

3. **Core Registration & Activation**

Assigning the installed Core device to a user account.

All the three steps details are available online: <https://nautech.cloud/gettingstarted>

Step 1 (Core installation) described in this document are to be performed by **System Integrators**.

Step 2 (New user registration) and **Step 3 (Core Registration & Activation)** are handled after installation and are typically performed by the **System Owners / Operators** or **Administrator**. They are referenced where needed but not explained in detail in this manual.

This separation helps ensure a clean handover from installer to owner.

1.3 Product Variants Covered

This manual applies to the following products:

- **Nautech Core**
- **Nautech Core PRO**
- **Nautech Core PRO+**

Basic installation rules are the same for all Core versions.

Where a connector, feature, or wiring option is **not available on all versions**, this is clearly marked in the relevant section.

Examples:

- Digital Switch Inputs and Relay Outputs are available only on **Core PRO and Core PRO+**.
- **NMEA OneNet** connectivity is available only on **Core PRO+**.

Before installation, always verify:

- the exact Core variant,
- and which interfaces are present on the device.

1.4 Intended Audience

This document is written for **professional installers** working in a marine environment.

Typical readers include:

- marine electricians,
- system integrators,
- shipyards and service partners,
- authorized installation companies.

The document assumes:

- basic knowledge of DC electrical systems,
- familiarity with NMEA2000 networks,
- experience with marine electronics installation.

While the document is written in a practical and readable way, it is **not intended as a Do It Yourself guide** for end users.

A vessel owner may read this manual to understand the installation, but the actual work should be performed by a qualified professional.

1.5 Installation Authorization

The Nautech Core PRO+ is designed to be installed as part of a vessel's electrical and communication system.

Installation should be performed by a person who:

- is qualified to work on marine DC systems,
- understands grounding, fusing, and cable routing,
- is a certified NMEA2000 installer.

Improper installation may result in:

- unreliable operation,
- damage to the device or connected equipment,
- loss of warranty coverage.

For these reasons, Nautech strongly recommends **professional installation**.

1.6 Responsibility & Liability

The installer is responsible for:

- correct electrical connection,
- proper antenna installation,
- compliance with marine electrical best practices,
 - correct integration into the vessel's NMEA2000 network, following the mandatory installation sequence described in this manual.

The installer must also ensure that:

- all mandatory connections are completed before power-on,

- all safety warnings are observed,
- the system is in mechanically fixed and stable, operational state.

This document defines **what must be installed and how**, but it does not replace professional judgment in vessel-specific situations.

2. Safety Information & Critical Warnings

This section highlights **safety-related topics that directly affect installation quality and device reliability**. Ignoring the points below may result in equipment damage, unstable operation, or permanent hardware failure.

2.1 General Electrical Safety

The Nautech Core PRO+ is designed for **NMEA2000 systems**.

Marine DC System Characteristics

On a vessel different nominal voltage (12 V or 24 V) DC systems may operate besides each other. Transients and voltage spikes are common, especially during engine start, charging, or shore power switching. Grounding schemes vary between vessels and may not be clearly documented.

The NMEA2000 system is a 12V system.

The Nautech Core must be connected to the NMEA2000 system with a standard NMEA2000 drop cable, with its maximal length of 10 m.

The NMEA2000 drop cable is the only voltage supply of the Nautech Core system.

2.2 Critical RF Warning – Antennas

⚠ DO NOT power on the device without the cellular antennas connected.

The **4G Main**, **4G Div** and **WiFi Antennas** must be screwed up first, before switching on the device. The device might be damaged, if turned on without the antennas!



3 System Overview

Nautech Core is intended to access and read the pre-installed NMEA sensors, both on **sailing yachts** and **motor yachts**.

- **Environmental sensors** (Wind, Temperature, Humidity)
- **Position and heading** (GPS, Compass)
- **Battery management system**
- **Engine**: all metrics of the engine with NMEA-2000 interface
- **Rudder angle** (sailing yachts), **Trim angle** (motor yachts)
- **Fluid level sensors**
- **Log (SoW)** and **Depth** sensor
- **IP Cameras**
- **Digital Switches**



3.1 NMEA2000 Connection & Power feed

Nautech Core shall be fitted to the standard **NMEA2000 network** of the yacht, attached to a standard free **NMEA2000 drop cable** of the network.

Nautech Core is capable to be connected **both physical NMEA2000 standards**:

- **“Classical” NMEA2000 network**
- **SeaTalk NG Network**

Power feed:

The electrical power source of Nautech Core is the NMEA2000 network’s standard 12V DC source.

The power characteristics reflects:

- 9-16V DC voltage input range
- **Nominally 12V DC** via NMEA2000 Micro-C connector
- **3...3.5 Watts** average consumption in normal operation
- 7 Watts peak consumption

The installer is responsible for proper NMEA 2000 connections.

NMEA2000 communication:

Nautech Core has an internal optical isolated attachment to the NMEA2000 CAN network. After activation the Nautech Core automatically starts to process the NMEA2000 network messages.

3.2 Internet connection to Nautech Cloud

Nautech Core synchronizes to **Nautech Cloud**.

The Internet connection to Cloud is available both via its **internal 4G modem** with Nautech-managed Internet subscription, and also the **external wired Ethernet-based uplink**.

If both are available, Ethernet has priority.

The internal modem and its managed Internet subscription does cover the full data need of Nautech Core, if the Ethernet is not available.

The Ethernet-based uplink is preferred to use with **Teltonika Routers**, and also **Starlink Router**. The Starlink connection provided Internet connection even in offshore sailing.

The synchronization from local database happens every minutes, so the authorized person can remotely monitor & control the events in soft-realtime base.

3.3 Recommended Installation Locations

Nautech Core is an **IP67-rated device**, with waterproof capacity. All connectors are sealed and are waterproof. The device internal volume is filled with solid silicone from the inside, perfectly sealing the electronic components from moisture.

The nominal operating temperatures are **-20 C°...+50 C°**

The **installation location** must be **indoor**, preferably hidden **behind the cabin furniture or instrument panel**.

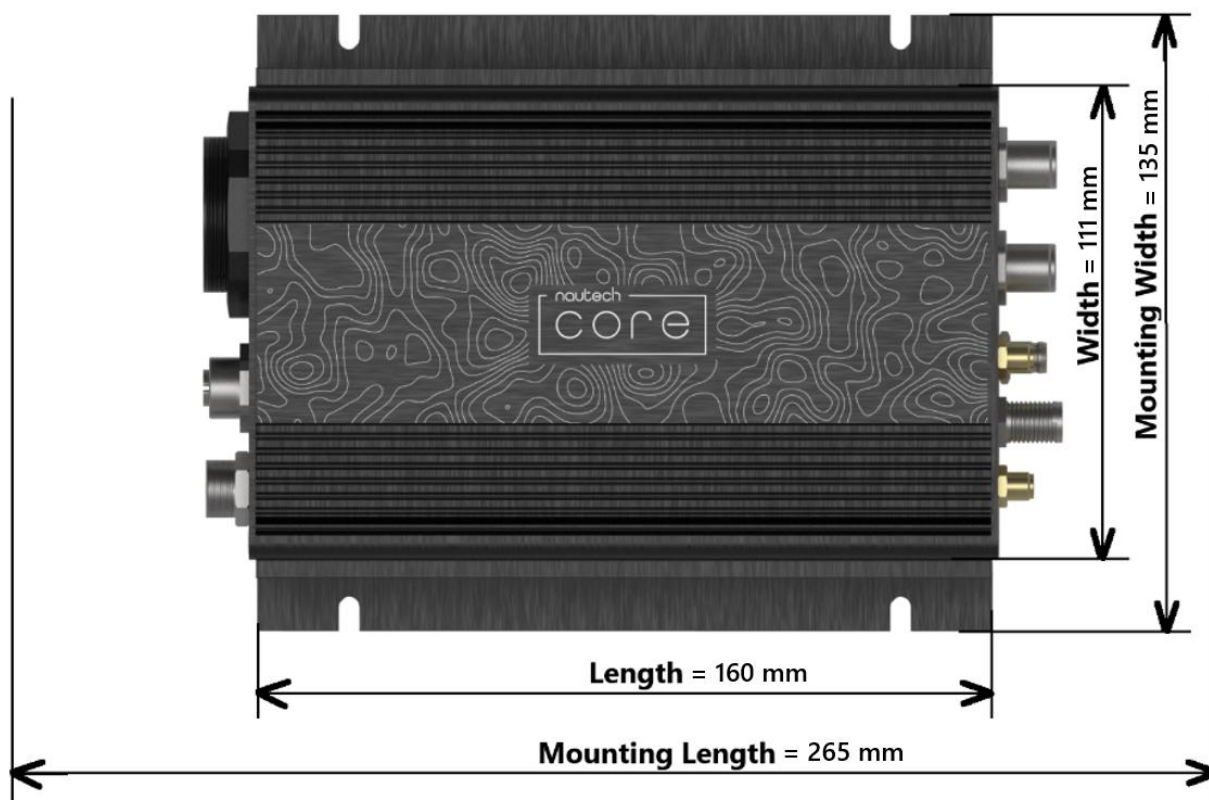
Both Nautech Core and Nautech Isolate must be fixed by 4 stainless steel screws to a stable surface. A floating or unfixed installation is strictly not allowed.

Dimensions and required space:

Ideally such a location shall be chosen, where **rational cable lengths** (within NMEA2000 standard) can be applied to Core's physical interfaces. (See **3.4 Installation Cases: with and without Nautech Isolate**)

Nautech Core can be installed with the following physical dimensions, as shown below. The mounting width also takes into account the bending length of the cables connected to the device.

The device height is 61 mm above the installation surface.



3.4 Installation Cases: with and without Nautech Isolate

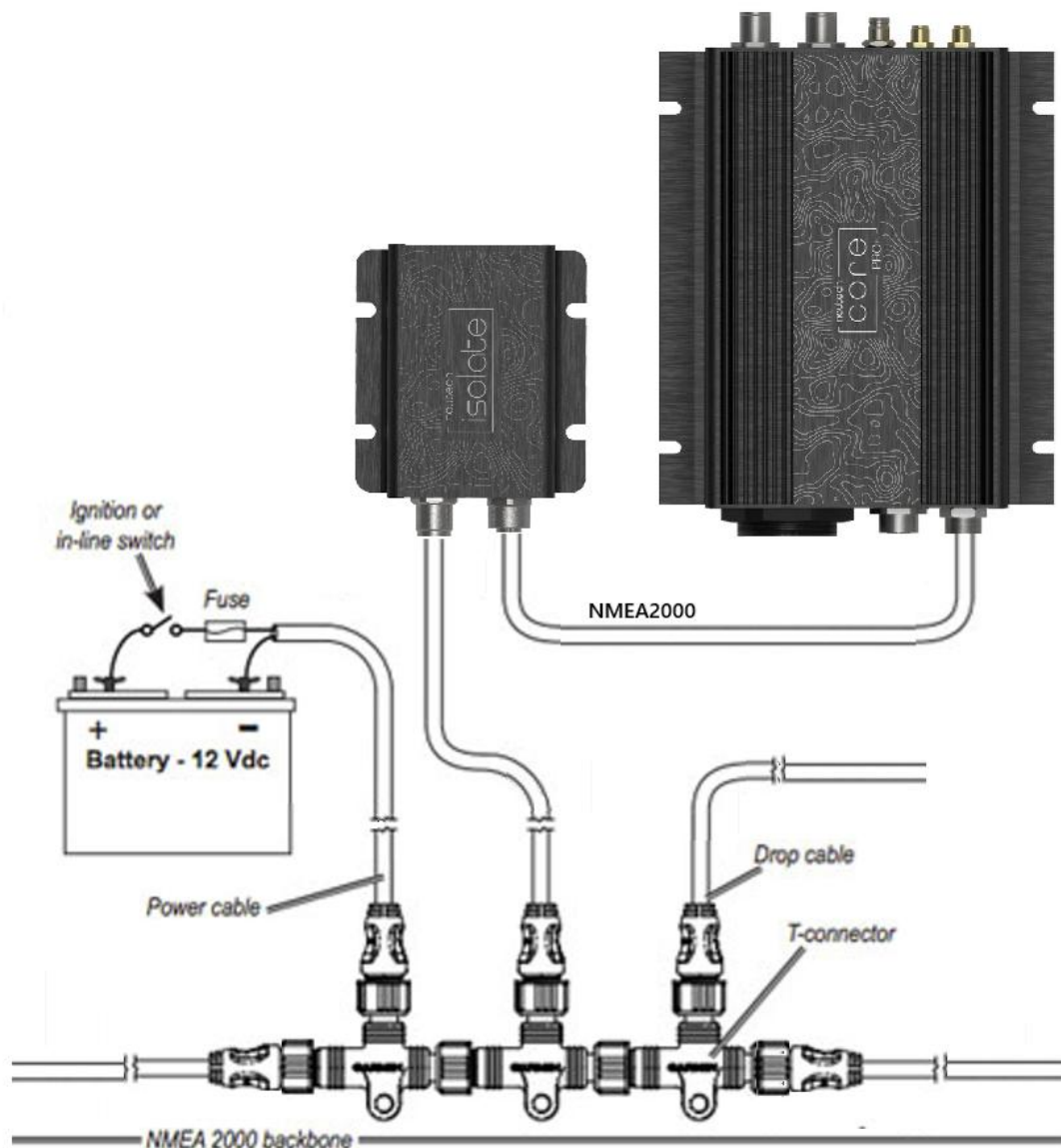
Nautech Core / Core PRO / Core PRO+ can be installed with and without Nautech Isolate.

Nautech Isolate is an optional and recommended product between Nautech Core and the NMEA2000 backbone. The **isolate** is dedicated prefix of the **Core**, recommended option HW. Isolate output can be connected only to a single Nautech device.

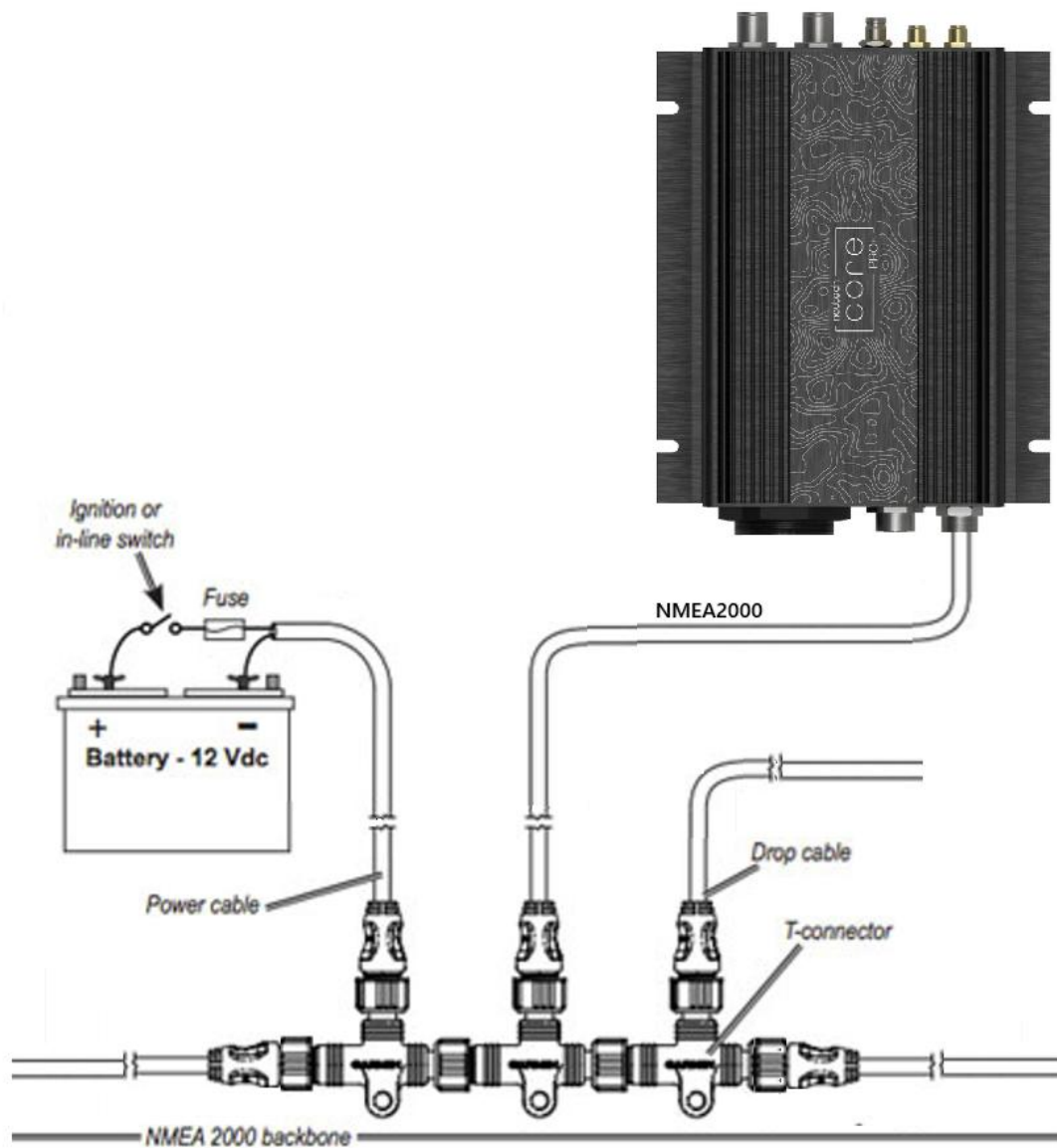
Nautech isolate is a floating 12V DC --> 12V DC converter, to produce galvanically isolated 12V Power. The **isolate** unit creates a separate power section on a specific part of the NMEA2000 network, to prevent Nautech Core from **EMC effects** and **galvanical corrosion**.

If using isolate, the default optical isolation of CAN lines is extended with the power feed isolation, meanwhile the input power feed voltage stays measurable by the Core.

Core Installation topology with Nautech Isolate



Nautech Core Installation topology, without Nautech Isolate



3.5 Installation in SeaTalk NG Network

The system can be seamlessly installed in SeaTalk NG Network, as well, using an official SeaTalk NG- NMEA2000 patch cable:



- If using Nautech Isolate, the patch cable must be installed between the SeaTalk NG backbone and the Nautech Isolate. The connection of Isolate and Core always happens with classical NMEA2000 cable.
- Is using only Nautech Core, the patch cable must be installed between the SeaTalk NG backbone and Nautech Core.

4. Hardware Interfaces

4.1 Front Panel Overview



Front panel of **Nautech Core & Core PRO**



Front panel of **Core PRO Plus**

- **NMEA2000 connector:** NMEA2000 communication and power source.
To be connected directly to N2k backbone, or to Nautech Isolate
(see Chapter **3.4 Installation Cases: with and without Nautech Isolate**)
- **Ethernet connector:** Gigabit Ethernet @waterproof RJ45 connector, serves as wired internet uplink to internet router.
- **NMEA OneNet connector:** (only at PRO Plus)
Gigabit Ethernet @ waterproof X-coded connector. To be connected either to High Speed Network, or to NMEA OneNet network.
- **Status LEDs:** Charge, On, CPU, Alarm
- **Power control button:** 
Hidden button in the sunked hole, available with a SIM card tool.

4.2 Back Panel Overview



Back panel of **Nautech Core**



Back panel of **Nautech Core PRO** and **Core PRO Plus**

- **4G Main & 4G Div:** SMA female connector for antennas of 4G Internet Modem
- **WiFi:** SMA female connector for WiFi Antenna
The 4G and WiFi antennas are placed in the paper box of Nautech Core. Must be connected before first turn on.
- **GPS:** SMA female connector for external GPS antenna.
Primary GPS sources: NMEA2000 GPS receivers. Recommended to be connected as fallback secondary GPS receiver.
- **Alarm Connector:** Switch contacts of internal Alarm relay, to be connected to external 12V Alarm devices. *(See connection diagram in Appendix A)*
- **Relay Connector:** 4x general purpose relays for Digital Switching
- **Contact Input:** 4x general purpose potential-free contact inputs for Digital Switch
(See connection diagram in Appendix A)

5. Hardware Controls & Status Indicators

5.1 Status LEDs

- **Charge LED (Orange):**
 - 12V power feed available on NMEA2000 connector.
 - Internal battery of Nautech Core is being charged.
- **On LED (Green):**
 - Nautech Core is Turned On
- **CPU LED (Blue): CPU Load**
 - Ad'hoc blinking: system is running
 - Continuous blue: System Error
- **Alarm LED (Red):**
 - Active Alarm present

5.2 Power On / Power Off Logic

Primary and secondary logics:

The **primary power control logic** of Nautech Core is controlled by the NMEA2000 voltage presence:

- When voltage appears on NMEA2000 bus, the Core automatically starts, Green LED is on.
- When asking a self-shutdown command from software, the Core automatically stops. Green LED gets dark.

The **secondary power control** is controlled by the hidden power button, as a fallback solution.

- **Short push of the button:** Core starts, Green LED is on.
- **Long push (3sec) of the button:** Shut down force. Green LED gets dark.

On/Off trigger events:

Power On triggers:

- 12V Voltage Appears on NMEA2000 bus
- Short push of hidden button

Power OFF triggers:

- Force: Long press (3s) of hidden button
- Manual Self-shutdown command from software.
- When running from Core's internal battery (no voltage on NMEA2000 bus), the battery charge level decreases below 10%. Automatic self-shutdown.

Installer notes:

The core is capable to run from its internal battery, which serves a fallback functionality of remote supervision for case of power outage (e.g. boot theft event). The battery's run capacity is 4..6 hours, depending on system load. The Core can be manually turned on by the hidden button, even without external supply. This serves only installer trial purposes. The normal system operation requires steady power on NMEA2000 bus.

5.3 EMC & Marine Environment

The preinstalled NMEA2000 network connection must follow the NMEA standard. This requires all the 5 conductors of the NMEA2000 backbone (+12V, GND, CAN-H, CAN-L, Shield) must be connected. Please make sure, the NMEA2000 Shield is properly connected to the vessel's ground (DC negative), at the DC Negative Bus.

This pre-requisite is the responsibility of the yacht manufacturers, or the system integrator who has built the NMEA2000 network of the vessel.

All NMEA2000 yacht devices (including Nautech Core and Nautech Isolate) require a properly connected NMEA2000 network with proper shield connection, in order EMC disturbance can be minimized.

6. Pre-Installation Checklist

6.1 Package Contents

The Nautech Core paper box does contain the following parts:

- **Core / Core PRO / Core PRO+ base unit** – *up to the chosen configuration*
 - *Serial number on the bottom of the device*
- **3 antennas** (2 for LTE/4G, 1 for WiFi)
- **Getting started paper**, QR code and serial number on it
- On demand, the package can contain external **GNSS antenna** to the positioning.

6.2 Required Tools & Materials – minimum installation set

Tools:

- Marker pen to mark the drill positions of the screws
- Drilling machine,
- 3 or 4 mm diameter drill bit, drilling depth limit to 10 mm
- Screw driver

Materials:

- 4 or 8 pcs stainless steel screws (3 or 4 mm diameter, 10..14 mm length)
- NMEA2000 drop cable to be connected to the NMEA2000 network
- Shielded RJ45 UTP cable to connect Ethernet uplink – *if external uplink device available*

6.3 Installation Pre-conditions

- The yacht shall be standing on calm sea, preferably in a harbor.
- The pre-installed NMEA2000 network of the vessel shall be operating, including the main sensors and chart plotters.
- Find an empty NMEA2000 backbone connector, for connecting the Nautech Core (or isolate)
- Optional: Prepare the wired Ethernet connection to the onboard Internet availability (Starlink or 4G modem)

7. Hardware Installation Order – Mandatory Sequence

1. Location

Find a location, where Nautech Core can be installed.

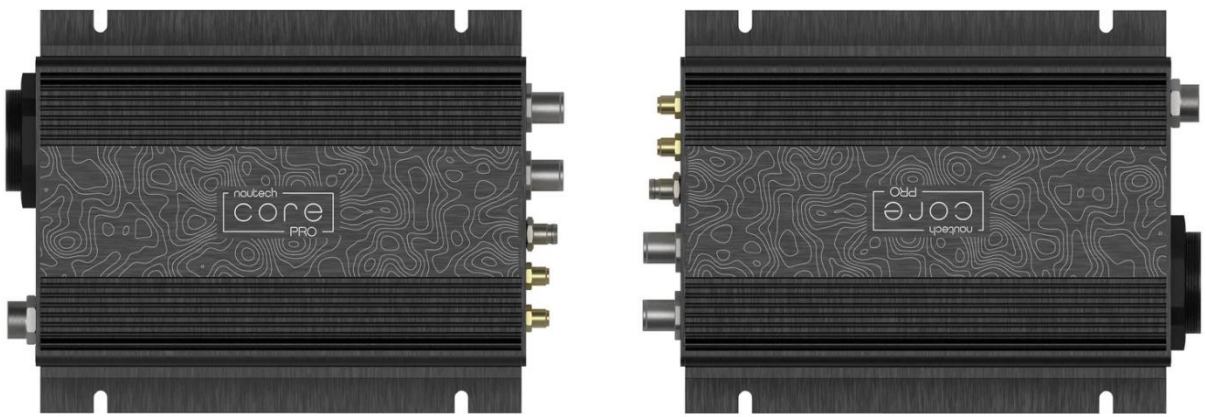
If both Nautech Core and Nautech Isolate are going to be installed, find a location for both devices, where they can be installed nearby to each other

Please check Chapter **3.3 Recommended Installation Locations**.

2. Orientation

The connectors shall not look upwards.

Recommended wall-mounted orientation options for Nautech Core:



Recommended wall-mounted orientation options for Nautech Isolate:



3. Screw marking & Drilling

Mark the hole positions of the screwing tab flanges with a marker pen.

Make the drilling. Take care, the drilling hole must be depth limited, and shall not exceed 10 mm.

4. SMA Antennas

Screw up the two 4G antennas and the Wifi antennas to the backpanel's antenna location.

5. GPS Antenna

Find a position for the GPS antenna within its wire distance. The Antenna shall be glued with its self-adhesive way to any hidden surface indoor, which is not shadowed by massive metal parts.



6. Fix Devices

- Fix **Nautech Core** to its selected location with 4 inox screws
- ***If Applicable:*** fix **Nautech Isolate** to its selected location with 4 inox screws

7. Connect GPS antenna to its SMA connector on Nautech Core.

8. Connect RJ45 Ethernet uplink

If external Internet available, connect to Nautech Ethernet port. Otherwise the internal 4G modem will be the primary uplink path.

9. *Optional:* Connect External Alarm

Install the external **Nautech Alarm** buzzer. Connect with the dedicated cable Nautech Core's alarm connector to **Nautech Alarm** buzzer.

10. *Optional:* Connect Digital Switch connectors

See Chapter **Appendix A: Advanced Connections**

11. Topology:

- Check Chapter **3.4 Installation Cases: with and without Nautech Isolate**.
- **Prepare NMEA2000 cabling according to the recommendation**

12. Do Not Connect NMEA2000 to Nautech Core, yet!

Check system, according to Chapter 8. Final Checks & First Power-On

8. Final Checks & First Power-On

8.1 Pre-Power Checklist

Nautech Isolate:

- ✓ Stable mounted by 4 screws to a proper hidden surface, nearby Nautech Core
- ✓ **Vessel Connector** connected to the NMEA2000 network backbone
- ✓ **Device Connector** cable is ready to connect to Nautech Core
- ✓ Doublecheck the installed topology against Chapter **3.4 Installation Cases: with and without Nautech Isolate**

Nautech Core *:

- ✓ Stable mounted by 4 screws to a proper hidden surface, 2 x 4G SMA Antennas connected
- ✓ 1 x WiFi SMA Antenna Connected
- ✓ GSM Antenna connected
- ✓ **Optional:** RJ45 Ethernet cable connected to Internet uplink – *if available*
- ✓ **Optional:** Alarm connector is connected to external Nautech Alarm – *if available*
- ✓ Doublecheck the installed topology against Chapter **3.4 Installation Cases: with and without Nautech Isolate**

8.2 First Power-On

0. Please first check the Chapter **5. Hardware Controls & Status Indicators** of this document.
1. **Connect the prepared NMEA2000 drop cable to Nautech Core's NMEA2000 connector.**
The drop cable is sourced either directly from N2k backbone, or from Nautech Isolate.
2. **Boot sequence starts**
3. **After 60 seconds** the Blue CPU LED shall calm down, and show rare blinking only.
Boot is complete.
4. Data collection of the live NMEA2000 network starts.
5. Nautech Core is ready 3 minutes after first powering on for
Registration and Activation to Nautech Cloud.

9. Nautech Core Activation

Go to <https://nautech.cloud/gettingstarted>

1. Please make sure, the **Core is installed and running**.
2. Please make sure, the intended authorized user of this Core and of this yacht has a **registered user account**.
If not yet, please register on <https://nautech.cloud/user-registration>
3. **Log in** on the dashboard.nautech.cloud
4. **Register Core**
Based on the unique device ID on <https://dashboard.nautech.cloud/fleet?addVessel=true>

The unique device ID can be found both on the bottom of Core,
and on the attachment paper's yellow stamp:



5. LIVE System, Cloud sync

After registration the Core gets up&running, and the system is LIVE!
It does collect all NMEA2000 data, and stores locally and in the cloud.
The authorized user can track, monitor and control the vessel any time on dashboard.nautech.cloud, from any Internet-capable device (mobile phone, tablet, PC)

6. On-demand Customization of Dashboard

The Dashboard can be formed, tuned according to the user unique needs.
Please check the detailed customization howto in the separate **User Guide Document**.