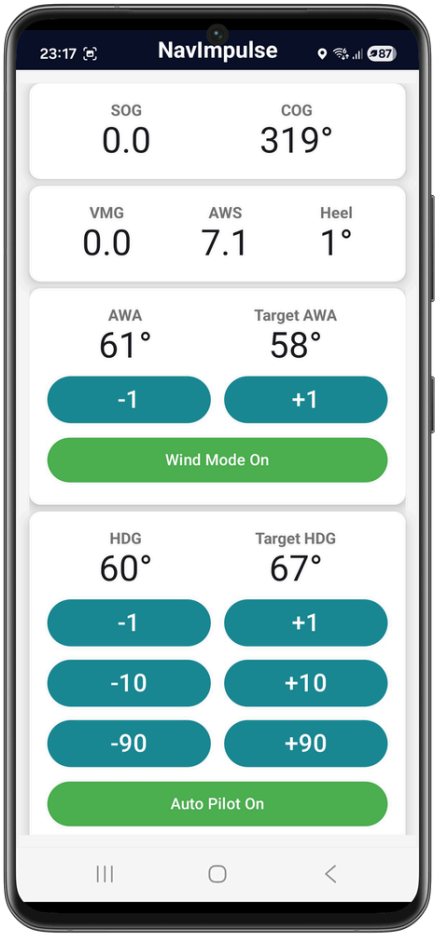
NavImpulse

Marine Electronics

NAVIMPULSE AUTOPILOT
TECHNICAL SPECIFICATIONS

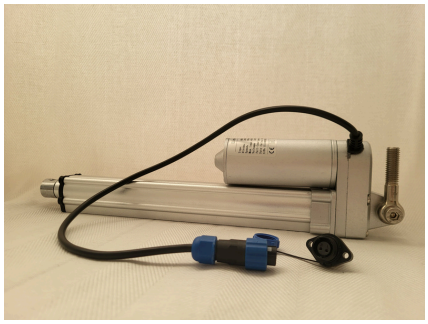


The Smart Autopilot for the Modern Sailor

Autopilot Brain Specifications

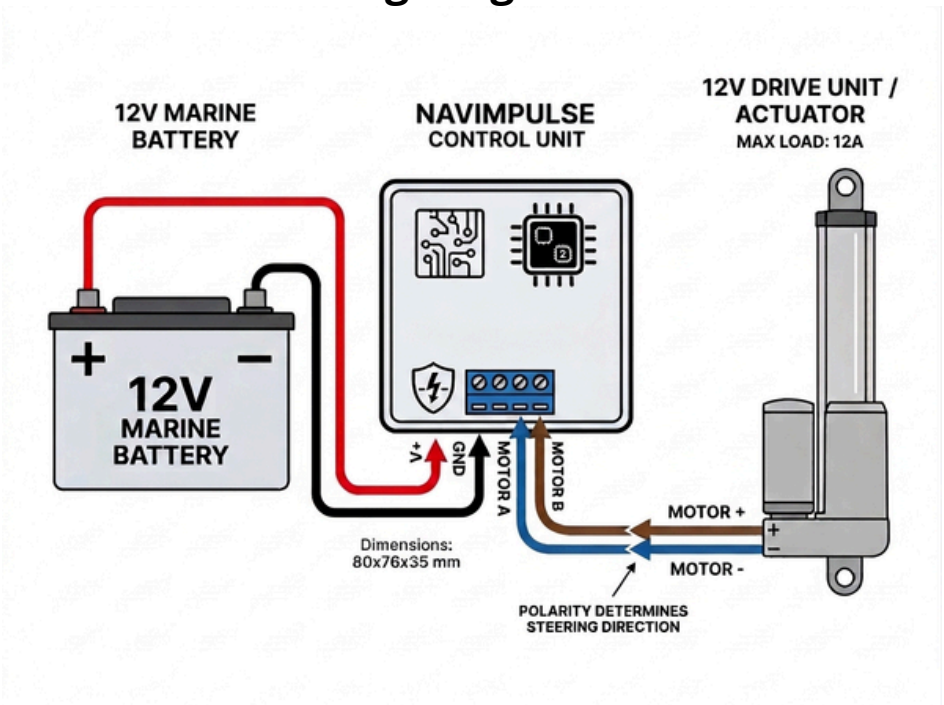
- **Processor:** Dual-Core Architecture (Dedicated PID real-time processing)
- **Sensor Fusion:** Integrated 9-Axis Gyro-stabilized System
- **Power Input:** 12V DC
- **Drive Output:** High-current PWM control. Max Load: 12A continuous
- **Connectivity:** Encrypted Bluetooth Low Energy (BLE)
- **Environment:** Interior / Dry area installation only (Not waterproof)
- **Dimensions:** 80 x 76 x 35 mm
- **Weight**: Lightweight design, approx. 85g
- **Mounting**: 4x M4 screw holes for secure mounting

Tiller Drive Specifications



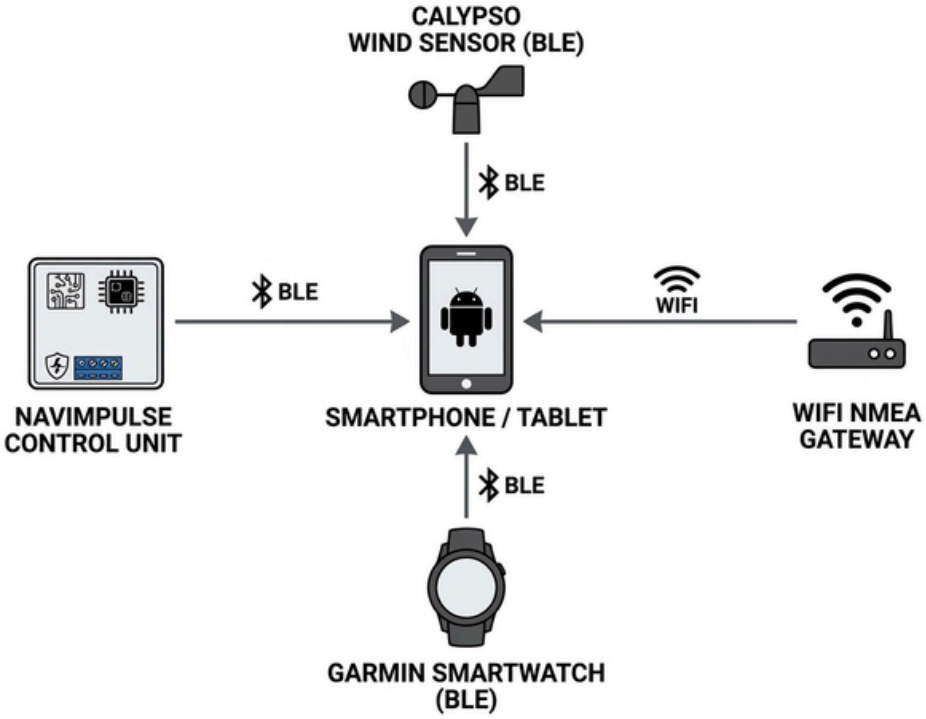
- **Stroke:** 200mm or 250mm
- **Speed** : 55 mm/s
- **Max boat weight** : 6000 kg
- **Max boat length** : 11M
- **Max power:** 85W / 400N
- **Voltage:** 12V
- **Water protection :** IP65
- **Material:** aluminum
- **Cable length:** 43cm

Wiring Diagram



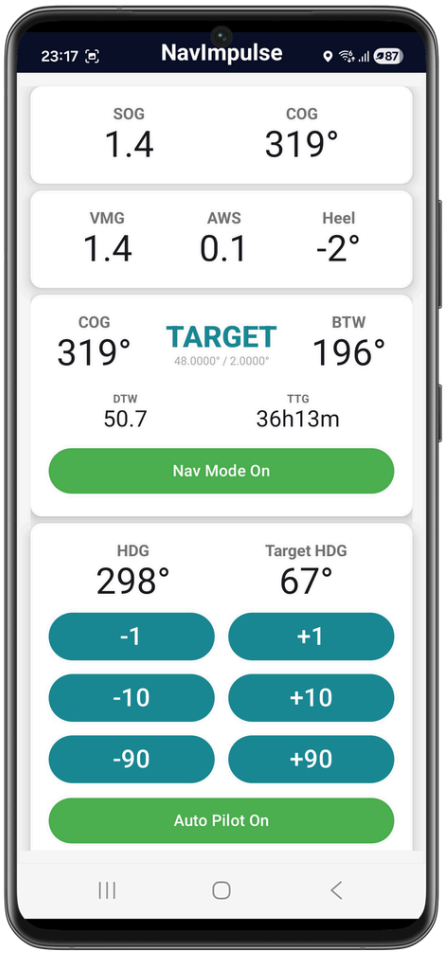
IMPORTANT : During initial setup, manually test the steering direction with the app. If the drive unit moves the rudder in the opposite direction (e.g., moves 'Port' when app commands 'Starboard'), immediately stop and swap the connections on the 'Motor A' and 'Motor B' terminals to correct polarity.

System Connectivity Architecture



Android App functionalities

Requirements: Android 9.0 or higher



1. Multi-Mode Navigation Control
The system offers three distinct piloting modes :

- **Compass Mode (Auto Pilot)**: Maintains a fixed magnetic heading (Target HDG). Users can adjust course with precision increments of 1°, 10° or 90°.
- **Wind Mode:** Connects via BLE to Calypso portable wind sensor or via Wi-Fi to NMEA data to maintain a precise Target Apparent Wind Angle (AWA).
- **Navigation Mode (Waypoint):** Precision guidance to your selected waypoint. The system dynamically updates distance and remaining travel time based on your current Speed Over Ground.

2. Real-Time Telemetry & Monitoring
The dashboard acts as a central hub for critical vessel data:
Vessel Dynamics: Real-time display of Heading (HDG), Speed Over Ground (SOG), Course Over Ground (COG), and Heel angle.
Performance Metrics: Automatic calculation of VMG (Velocity Made Good) to optimize speed toward the wind or destination.
Advanced Sensor Fusion and automated Sensor Calibration: No manual calibration needed.

3. Safety & Emergency Features

- **Heading Alert System**: Allows users to set "Port" and "Starboard" safety limits. An OUT OF RANGE visual and audible alert triggers if the vessel deviates beyond these boundaries.
- **Emergency MOB (Man Over Board)**: A specialized function that instantly captures and displays the precise GPS coordinates of the incident.

4. Advanced Connectivity & Integration
The app serves as a sophisticated data gateway:
BLE (Bluetooth Low Energy): Seamlessly connects the NavImpulse Control Unit, Wind Sensors, and Garmin Smartwatches for remote wrist-based control.
WiFi NMEA Gateway: Ability to bridge and use wind data from onboard NMEA network.
Foreground Service Execution: Ensures the autopilot remains fully operational and connected even when the app is in the background or the screen is locked.

5. Professional Tuning (Pilot Settings)

- Dynamic Response: Access deep calibration settings to adjust the autopilot's reactivity, P and D gains, tailoring the system to your vessel's displacement and hull shape.
- Smart Autotune: Includes an intelligent Autotune function that automatically calculates and adjusts the P-gain in real-time to optimize steering stability without manual trial and error.

6. Voice Control
Take command of your vessel without lifting a finger.

- Hands-Free Navigation: Use simple voice commands to adjust your heading or engage the autopilot.
- Full Focus: Keep your eyes on the horizon and your hands on the lines during critical maneuvers.
- Offline Privacy: Voice processing is done 100% locally on your phone—no internet required.

7. Smartwatch Remote
Control your boat from anywhere on deck right from your wrist.

- Garmin Integration: Use your Garmin watch as a wireless remote to tweak your course or monitor status.
- Total Freedom: Whether you are at the bow or in the cabin, you stay in control via a secure Bluetooth link.

8. Smart MOB detection

- Connection-Loss Protocol: The app constantly monitors the smartwatch link; if the connection is lost (crew overboard), an emergency alert is triggered.
- Auto Head-to-Wind: If enabled and the autopilot is active, the system automatically turns the boat into the wind to stall it.
- Instant GPS Save: Immediately marks the exact MOB coordinates and sounds a loud alarm for the remaining crew.
- Note: Requires Wind Mode to be available.

IMPORTANT: Legal Disclaimer & Safety Warning

FOR NAVIGATION AID ONLY
NavImpulse is designed and provided as a navigation aid only. It is not a replacement for active seamanship or constant manual watchkeeping.

LIMITATION OF LIABILITY
By using this system, the user acknowledges and agrees to the following:

- **Skipper's Responsibility**: The skipper remains solely responsible for the safety of the vessel, crew, and third parties at all times. You must be ready to take manual control of the helm instantly.
- **Operational Constraints**: Do not use NavImpulse in congested waters, near shore, or in any conditions requiring continuous human vigilance.
- **Environmental Factors**: System performance relies on external signals and can be degraded by electromagnetic interference, GPS signal loss, or extreme weather conditions.

WARRANTY & RISK

- Legal Warranty: This product is covered by the standard EU legal warranty of conformity, covering manufacturing defects and hardware failures under normal use.
- Fitness for Purpose: Beyond legal mandates, the system is provided without guarantee of suitability for a specific vessel. The user is responsible for ensuring NavImpulse is compatible with their specific boat displacement and actuator power requirements.
- Smart MOB & Head-to-Wind: The emergency "Head-to-Wind" function is a secondary safety layer. It relies on an active Bluetooth connection, a specific configuration (Enabled/Auto-mode), and available Wind Mode data. It is not a guaranteed life-saving device.
- Assumption of Risk: The developers shall not be liable for any direct or consequential damages, including collisions, groundings, injuries, or loss of life resulting from the use, misuse, or technical malfunction of this software or hardware.