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MULTI S400

User manual
Manuel utilisateur

Other languages available on the CD-Rom or at :
Autres langues disponibles sur CD-Rom ou sur:

www.advansea.com

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S400 advanSea instruments comply with regulations in force.

Important

It is the owner's sole responsibility to ensure that this appliance is installed and used in such a way that will not cause any accidents, personal injury or property damage. The user of this appliance is solely responsible for observing safe boating practices.

Installation: if not installed correctly, the appliance will not operate to the best of its ability. In the event of doubt, please contact your advanSea retailer. Ensure that all holes made to mount the appliance are drilled in places without risk and that they do not weaken the structure of the boat. If in doubt, contact a qualified boat builder.

PLASTIMO SHALL NOT BE HELD LIABLE IN THE EVENT THE USE OF THIS APPLIANCE CAUSES ACCIDENTS, DAMAGE OR INFRINGEMENT OF THE LAW.

Reference language: this statement, instruction and user manuals and other information documents regarding the appliance, hereinafter referred to as "documentation", may be translated into other languages. In the event of a dispute regarding interpretation of the documentation, the French version shall be binding. This manual presents the procedures for installing and operating the appliance at the date of printing. AdvanSea reserves the right to modify the technical characteristics of the appliance without notice.

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1. Introduction

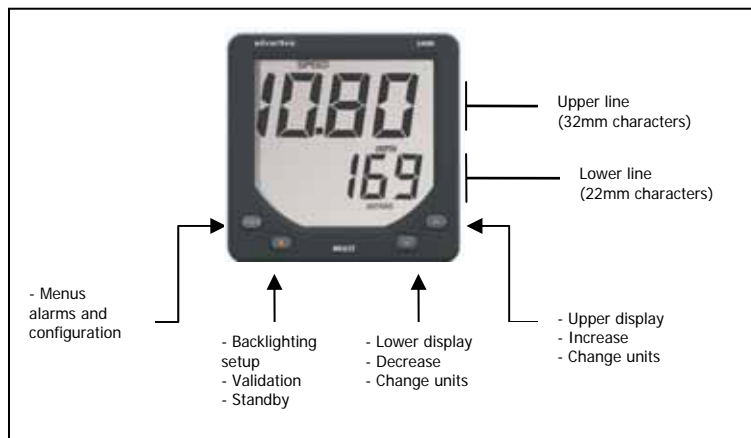## 2. General operation

3. Installation

1 Introduction

Thank you for choosing an AdvanSea product. We are convinced your S400 instrument will provide you with many safe and happy years of navigation. This manual describes how to install and operate the Multi S400 AdvanSea.

1.1. General presentation

Description of the display:
The S400 unit is equipped with a large screen, and large characters for optimum readability from all angles of vision. The screen is treated against condensation to prevent the formation of mist. The screen and its keys are backlit with adjustable level.

Upper line
(32mm characters)

Lower line
(22mm characters)

- Menus
alarms and
configuration

- Backlighting
setup
- Validation
- Standby

- Lower display
- Decrease
- Change units

- Upper display
- Increase
- Change units

The LCD screen on your Multi S400 is designed to:
- display the surface speed of the boat
- display the water temperature
- display the depth
- display the battery voltage
- acquire data through its NMEA input
- send data via its NMEA output
- exchange data on the AS-1 AdvanSea bus
- activate external lights and buzzers

To do so, it is supplied with 3 connection cables:
- 1 connector-free cable for the power supply, the bus, the NMEA IN & OUT, the alarm output
- 1 LT8 cable for connection to the speedometer sensor
- 1 RCA cable for connection to the sounder sensor

The Multi S400 is part of the S400 advanSea family of navigation instruments, including instruments for measuring speed, depth, and wind. They may be connected together to form an integrated data system for a boat (see chapter 2.7).

1.2. Components supplied with your Multi S400

The Multi S400 comes with (as standard):
- protective cover
- user manual
- warranty card
- adhesive rear sealing joint for flush mounting

The Multi S400 does not come with sensors. You can order complete kits, or consult our website www.advanSea.com.

You will also find a complete list of accessories at www.advanSea.com

1.3. Technical characteristics

Measurement characteristics	
Sounder:	Measurement range: from 0.5 to 199 meters Operating frequency: 200 kHz Accuracy: ±0.1 meter up to 5.0 meters and ≤2% beyond 5.0 meters (this accuracy is given for a constant sound speed in water of 1490 m/s) Resolution: 0.1 from 0 to 19.9 and 1 beyond Configurable offset: ±9.9 meters
Speed:	Measurement range: from 0.0 to 60.0 knots Speed ratio: fixed at 6.1 Hz/knots Accuracy: ±1.0 knots up to 20.0 knots and ±5% beyond 20.0 knots. Resolution: 0.01 from 0 to 19.99 and 0.1 beyond Calibration possible on 2 measurement points (Slope and Offset)
Trip log:	Measurement range: from 0.00 to 655.35 kilometres Resolution: 0.01
Total log:	Measurement range: from 0 to 65535 kilometres Resolution: 1

Battery voltage:	Measurement range: **from 10.0V to 16.5V** Accuracy: **±0.2V** Resolution: **0.1V**

Electrical specifications

Buzzer output (green wire):	Switched to ground, open collector, 30 V DC and 300 mA max. It is recommended to protect this output with a 300 mA fuse.
NMEA 0183:	Version 3.01, asynchronous 4800 baud, 8 bit link, without parity, 1 stop bit. The electrical levels used on the NMEA output are referenced to the ground and vary according to the system's voltage supply. On powering on, a proprietary NMEA frame $PNKEV,*MULTI V0.10*4A* is sent to identify the transmitter.
Communication bus:	Half-Duplex 38400 baud link on one wire. Words are sent on 8 bits, without parity with 1 stop bit. The number of devices connected to the bus is limited to 20.
Power supply:	9 volts to 16.5 volts / Consumption <150m

Mechanical specifications

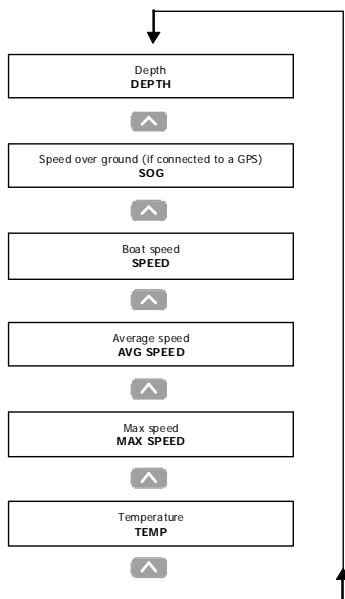|	
Overall dimensions	Unit size 112mm x 112mm depth 28mm Mounting on flat wall by means of a threaded drum of diameter 49mm, step 1.5mm and length 35mm and a plastic nut diameter 80 mm
Environment	IP66 Front panel IP40 rear panel
Operating temperature	From -10°C to +50°C
Storage temperature	From -20°C to +60°C

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2 General operation

2.1. Powering on

The MULTI S400 display does not include an integrated switch. The unit is powered by a 12 V DC supply on the red (+) and black (-) wires. When stopped, all settings are memorized.
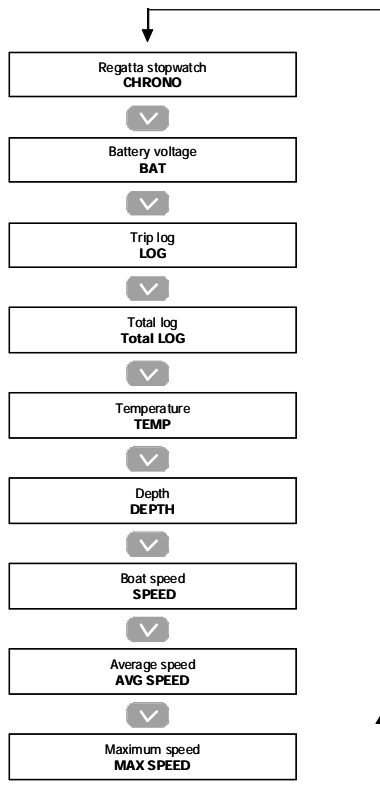
2.2. Operation in normal mode

2.2.1. Selecting information on the upper display

The ⌃ key is used to select various data in the upper line. Key operation:

Depth
DEPTH

⌃

Speed over ground (if connected to a GPS)
SOG

⌃

Boat speed
SPEED

⌃

Average speed
AVG SPEED

⌃

Max speed
MAX SPEED

⌃

Temperature
TEMP

⌃

2.2.2. Selecting information on the lower display

The ☑ key is used to select various data in the lower line. Key operation:

```
Regatta stopwatch
CHRONO
      ☑
Battery voltage
BAT
      ☑
Trip log
LOG
      ☑
Total log
Total LOG
      ☑
Temperature
TEMP
      ☑
Depth
DEPTH
      ☑
Boat speed
SPEED
      ☑
Average speed
AVG SPEED
      ☑
Maximum speed
MAX SPEED
```

2.2.3. Selecting units of measurement

To change the unit of measurement for some data in the upper line, press at least 2 seconds on the [∧] key.

To change the unit of measurement for some data in the lower line, press at least 2 seconds on the [∨] key.

The following table summarizes the various units displayed according to the data selected:

Data	Unit of measurement		
Temperature	°Fahrenheit	**°Celsius**	
Depth	Feet	**Metres**	
Speed over ground	**Knots**	km/h	Miles/h
Boat speed			
Average speed			
Max speed			
Trip log	**Nautical Miles**	Kilometres	Miles
Total log			

In bold, default units.

2.2.4. Resetting data

To reset the average speed and max speed data on the upper line, first display the parameter to be reset to 0 and press simultaneously at least 2 seconds on the [○] + [∧] keys.

To reset the average speed, max speed, Trip log and Total log data on the lower line, first display the parameter to be reset to 0 and press simultaneously at least 2 seconds on the [○] + [∨] keys.

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2.2.5. Countdown timer

Once CHRONO is displayed on the lower line, trigger it by pressing simultaneously on the ● + ∨ keys.

The countdown starts from the data displayed (which can be configured between 1 and 10 minutes, see menu paragraph 2.5.6.). A long beep signals when the countdown switches to the full minute. The end of the countdown is signalled by a short beep every second for the last 5 seconds followed by a long beep to mark the end of the countdown.

When the countdown is finished, the countdown timer counts the navigation time in hours/minutes (with two points flashing per second).

Press again simultaneously for at least 2 seconds on the ● + ∨ keys during the countdown to stop it and reset the display to the selected value.

2.2.6. Backlighting

The display and the 4 keys are backlit, with 4 levels of intensity. Level "0" corresponds to backlighting switched off.

To control backlighting:
Press the ● key to display the backlighting page, then the ∧ and ∨ keys to adjust the lighting level from 0 to 4.

Pressing again on the ● key send the lighting level on the bus to control backlighting on other device displays.

4
LIGHL

2.3. Alarms

The 🔔 icon is lit when at least one alarm has occurred on one item of data managed by the MULTI display. A sensor alarm appears when it is activated (different from 0) and the measurement has exceeded the high or low threshold previously defined. This alarm is then shown by:

- The flashing icon 🔔
- The data concerned by the alarm flashing,
- Automatic lighting of the LCD backlighting to its highest level,
- The internal buzzer sounds,
- The buzzer or the external lights are activated.

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An alarm can be cancelled and inhibited for 3 minutes by pressing on any key on the keypad. After this period, a new alarm may be triggered when the measurement sensor once again exceeds the programmed thresholds.

Several devices interconnected on the bus, can be used to relay a sensor alarm to other compatible displays present on the network. Example: a boat speed alarm can be viewed on all "MULTI" displays present on board.

The Depth and Boat speed data can be monitored by configuring high and low alarm thresholds.

The Battery voltage data can be monitored by configuring the low threshold alarm.

2.3.1. Setting the depth alarm thresholds

Press menu, then once again on menu to display the "dEEP" high threshold page for the sounder, then adjust the required value of the threshold using the ∧ and ∨ keys.
Press ⚫ to exit setup mode, or time out after 10 seconds.

Press menu, then once again on menu to display the "SHAL" low threshold page for the sounder, then adjust the required value of the threshold using the ∧ and ∨ keys.
Press ⚫ to exit setup mode, or time out after 10 seconds.

2.3.2. Setting the speed alarm thresholds

Press menu, then once again on menu to display the "SPEEd ↓" low threshold page for the speed, then adjust the required value of the threshold using the ∧ and ∨ keys.

Press ⚫ to exit setup mode, or time out after 10 seconds.

Press menu, then once again on menu to display the "SPEEd ↑" high threshold page for the speed, then adjust the required value of the threshold using the ∧ and ∨ keys.
Press ⚫ to exit setup mode, or time out after 10 seconds.

2.3.3. Setting the battery alarm threshold

The battery alarm allows you to monitor the supply voltage to your installation. This is important, particularly for good sounder performance.

Press menu, then once again on menu to display the "bAt" low threshold page, then adjust the required value of the threshold using the ∧ and ∨ keys.

Press ● to exit setup mode, or time out after 10 seconds.

## 2.4. Configuration

2.4.1. Keel offset

The depth displayed on the Multi display represents the distance between the probe mounted on the hull and the bottom, plus or minus the keel offset:

- For a positive offset, the depth is measured from a point located above the probe (Depth = distance between probe and bottom + Offset).
- For a negative offset, the depth is measured from a point located below the probe (Depth = distance between probe and bottom - Offset).

To adjust this offset:

Press menu for 2 seconds, then on menu until the "kEEL offset page is displayed, then adjust the required value using the ∧ and ∨ keys.

Press ● to exit setup mode, or time out after 10 seconds.

2.4.2. Speed damping

A damping coefficient is available to the user for boat speed. Depending on navigation conditions, this parameter can be adjusted to between 1 and 30.

Press menu for 2 seconds, then on menu until the "dAMP" setup page is displayed, then adjust the required value using the ∧ and ∨ keys.

Press ● to exit setup mode, or time out after 10 seconds.

2.4.3. Calibrating the water temperature

The water temperature is calibrated in the calibration menu, by replacing the water temperature displayed with the water temperature estimated by the user, or measured using another source.

Press menu for 2 seconds, then on menu until the "tEMP" setup page is displayed, then adjust the required value using the ∧ and ∨ keys.

Press 🔘 to exit setup mode, or time out after 10 seconds.

2.4.4. Calibrating by speed

The speedometer sensor can be calibrated by speed or by distance.

The boat speed is calibrated in the calibration menu, by replacing the boat speed displayed with the boat speed estimated by the user, or measured using another source.

We recommend you navigate at constant speed. Note the speed displayed on a GPS receiver (it should be greater than 5 kts) or measure the time taken to cover a given distance (speed between 5 and 20 kts, in calm seas, with little current).

Press menu for 2 seconds, then on menu until the "SPEEd" setup page is displayed, then adjust the required value using the ∧ and ∨ keys.
Press 🔘 to exit setup mode, or time out after 10 seconds.

2.4.5. Calibrating by log

After resetting the Trip log to "0", cover a specific set distance (identified on a chart). To partly compensate for current and tide effects, cover the distance in both directions, parallel to the current.
In the calibration menu, replace the distance displayed for the Trip log with the real distance covered.

Press menu for 2 seconds, then on menu until the "LOG" setup page is displayed, then adjust the required value using the ∧ and ∨ keys (max. ±50% adjustment of the value measured by the Trip log).Press 🔘 to exit setup mode, or time out after 10 seconds.

2.4.6. Configuring the countdown timer

The duration of the countdown can be configured to the nearest minute, between 1 and 10 minutes.

Press menu for 2 seconds, then on menu until the "tIME" setup page is displayed, then adjust the required value using the ∧ and ∨ keys.

Press 💡 to exit setup mode, or time out after 10 seconds.

10
CHRONO
tIME
SETUP

2.4.7. Simulation mode

Simulation mode can be accessed via the Configuration menu. This mode is shown by the icon **SIMUL** flashing on the LCD and remains active after power has been cut off. It may be used for sales demonstrations of the product and features the following functions:

- Displays a coherent bottom profile (in distance and variation),
- Displays a coherent boat speed (in absolute value and in acceleration),
- Displays a speed over ground related to the simulated boat speed,
- Displays a coherent water temperature,
- Displays the real supply voltage,
- Transmits simulated data via the NMEA output.
- Transmits simulated data via the communication bus.

Press menu for 2 seconds, then menu until the "SIMUL" page is displayed, then activate (on) or deactivate (OFF) simulation using the ∧ and ∨ keys.

Press 💡 to exit setup mode, or time out after 10 seconds.

on
SIMUL
SETUP

2.4.8. Key beeps

The key beeps can be activated or deactivated.
Press menu for 2 seconds, then menu until the "bIP" page is displayed, then activate (on) or deactivate (OFF) the beep using the ∧ and ∨ keys.

Press 💡 to exit setup mode, or time out after 10 seconds.

on
bIP
SETUP

2.4.9. Resetting data in the memory

At any time, the memory of the Multi display can be returned to factory settings. To do so, a memory reset command is accessible in the menu. The following parameters are restored in the memory:

- Speed unit: Knots
- Depth unit: Metres
- Distance unit: Nautical Miles
- Temperature unit: °Celsius
- Speed damping: 10 seconds
- Speed calibration coeff.:   Slope at 1.0
- Temp. calibration coeff.:   Offset to 0
- Keel offset: 0
- Depth alarms: deactivated, high and low threshold at 0
- Speed alarms: deactivated, high and low threshold at 0
- Temperature alarms: deactivated, high and low threshold at 0
- Battery alarm: deactivated, low threshold at 0
- Countdown timer init.:   10 minutes
- Trip log: 0
- Total log: 0
- Simulation mode: deactivated
- Backlighting level: 0 (OFF)

Press menu for 2 seconds, then menu until the "rESEt" page is displayed, then activate (on) or deactivate (OFF) the reset using the ∧ and ∨ keys.

**on
RESEt**
SETUP

Press ● to exit setup mode, or time out after 10 seconds.

2.5. Standby

To save energy on board, the "MULTI" display can be placed on standby by pressing for 5 seconds on the ● key.

Standby mode switches off backlighting, the screen, stops sensor measurement and processing of NMEA input and output interfaces. Only the vital bus management and keyboard functions remain active. Active displays present on the bus indicate measurement impossible with an OFF icon instead of the data.

Standby mode is not saved. **At any time, simply pressing one of the four keys or cutting off the power stops standby mode and returns all device functions to normal.**

2. 6. Network operation (Bus AS-1)

The AS-1 bus is used to connect products in the advanSea family via a rapid and reliable exchange protocol. Only the bus wires need to be connected. No start-up settings are required.

The communication protocol allows for multiple data exchange at previously defined transmission speeds.
Thus, it is possible:

- to exchange several similar measurements on the same bus, for example: several speedometer sources.
- to change the units, the alarm threshold values or to calibrate from a single instrument.
- to activate or deactivate alarms from a single instrument.

The protocol allows exchange of similar data from different sources (direct measurement from the sensor, or from the bus or via NMEA).

2.6.1. Displaying multiple data

In order to display multiple data, a repeater instrument (without a sensor) should be differentiated from a measurement instrument (with a sensor or receiving NMEA data).
A repeater instrument can display maximum 2 multiple data available on the bus (for example: port speed and starboard speed). If there are more than 2 multiple data present on the bus (for example 3 speed sensors), the repeater will only read the information from the 2 measurement instruments with the lowest serial numbers.

A measurement instrument (with a sensor or receiving NMEA data) will only display the data from its own sensor or from the NMEA source received, even if other similar data are available on the bus.

2.6.2. Remote access

A repeater instrument (without a sensor) can read and write, via AS-1 bus, all the calibration parameters or the alarm thresholds from the same type of measuring instrument. Thus, it is possible to calibrate the speed from the MULTI display connected to the bus.

System limitation:
For complex installations, with several similar measurement instruments, it is impossible to calibrate alarms from a repeater instrument. In this case, these settings can only be adjusted from the measurement unit (display to which the sensor is connected).

2.7. Messages

There are 3 event messages which automatically disappear after 5 minutes or simply by pressing a key:

Err Bat Displayed each time a power drop near the 9V threshold is detected (safety threshold). Returns to normal if the battery exceeds this security level after a few seconds.

Err MEM Displayed on powering on if a memory malfunction occurs.

Err Bus Displayed at the first detection, after powering on, if a bus wire is pinched (incorrect wiring).

3 Installation

3.1. NMEA 0183 interfacing

The Multi S400 display has one NMEA 0183 input and one output, non shielded. The NMEA 0183 frame format recognized by the Multi display complies with the V3.01 standard of January 2002.

3.1.1. NMEA 0183 input interface

The NMEA 0183 input interface can simultaneously acquire the 5 physical measurements listed in the table below. To avoid confusing the same data from different frames, a 3-levl priority management algorithm is used to prioritize some frames over others. Example: if the frames VTG and RMC are received, only the VTG frame will be decoded to receive the SOG data.

No	NMEA data	Frames used		
		Priority 1	Priority 2	Priority 3
1	Boat speed	VHW	--	--
2	Speed over ground	VTG	RMC	--
3	Depth	DPT	DBT	--
4	Log	VLW	--	--
5	Water temperature	MTW	--	--

Note: The data from the NMEA input are displayed with the **NMEA** icon.

3.1.2. NMEA 0183 output interface

The Multi S400's NMEA output emits at a speed of 1 Hz the 5 frames below:

No	NMEA frames	Data transmitted	
1	VHW	Boat speed	--
2	VLW	Total log	Trip log
3	MTW	Temperature	--
4	DBT	Depth	--
5	DPT	Depth	--

Note: The NMEA 0183 output does not repeat the frames received on its input.

3.2. Mounting and connections

3.2.1. Mounting the Multi S400 unit

The Multi unit must be mounted in a visible location and protected from any risk of shocks. It should be placed more than 10cm from a compass and more than 50cm from radio or radar antenna, far from all engines, fluorescent light, alternators and radio or radar transmitters. It should be accessible from the rear; minimum depth cabin side 50mm. The rear panel of the unit should be protected from humidity. The mounting surface should be flat and of thickness less than 20mm.

- Drill a hole 50mm in diameter at the chosen location
- Unscrew the nut located on the rear of the unit
- Remove the adhesive protection around the unit
- Insert and position the unit in the mounting hole
- Screw back the nut

3.2.2 . Description of electrical connections

3.2.2.1. Bus connection

The bus link is provided by a 7-wire shielded cable, arranged as follows:
- Red   +12V DC
- Black   GND / NMEA (-) Input and Output
- Orange   bus
- Yellow   NMEA input (+)
- White   NMEA output (+)
- Green   Buzzer and external light
- Blue   NC

3.2.2.2. Speed connection

The connection with the speed sensor is provided by a 30 cm shielded cable, fitted with an 8-pin connector with bayonet locking.

Connector pins:

Pin	Wire		Function
1:	Bare	→	Ground
2:	Red	→	+12V DC
3:	White	→	Thermistor -
4:	Brown	→	Thermistor +
5:	Yellow	→	Sensor presence
6:	Green	→	Paddlewheel
7:	Bare	→	Sounder ground
8:	Colourless	→	Sounder excitation

This connection is used to connect a multifunction sensor: Speed/Sounder/Temperature

3.2.2.3. Sounder connection

Connection to the sounder sensor is via a 30 cm coaxial cable and an overmoulded RCA connector.

3.2.3. Connections

- Connect the sounder sensor to the RCA connector
- Connect the speedometer sensor to the LT8 connector
- Connect the - power to the black wire without connector and the red wire to the + power via a switch and a 1A fuse.
- For a system comprising several "Advansea" instruments, connect all the orange bus wires from each instrument together.
- Connect an NMEA source (GPS for example) to the yellow wire for the +nmea and the black for the – nmea

See diagram below:
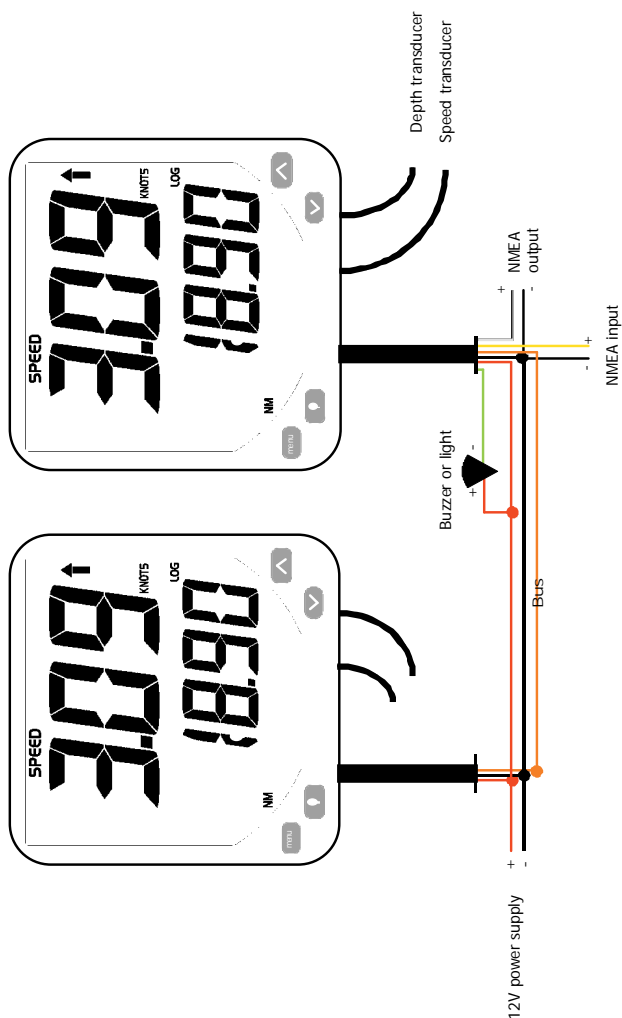
4. Troubleshooting

This troubleshooting guide assumes that you have read and understood this manual. It is possible in many cases to solve difficulties without the need for the after-sales service. Please read this chapter carefully before contacting your AdvanSea retailer.

1. **The unit will not power on:**
   - Fuse melted or circuit breaker triggered.
   - Voltage too low
   - Power cable disconnected or damaged.
2. **Wrong or incoherent speed reading:**
   - Calibration incorrect
   - Speed sensor cable disconnected or damaged
   - Speed/temperature sensor damaged. Check the paddlewheel.
   - Incorrect mounting or sensor not sufficiently immersed. Review the installation.
   - Electrical interference. Review the installation.
3. **Wrong or incoherent depth reading:**
   - The unit cannot detect the sea bottom momentarily, because the depth is too high or too low, due to lack of water clarity, reverse manoeuvring or rough seas.
   - Sensor cable disconnected or damaged.
   - Dirty or damaged sensor. Check that the sensor is not covered with too thick a coat of paint.
   - Sensor incorrectly mounted or not sufficiently immersed.
   - Ultrasound signal interference from another sensor.
   - Electrical interference. Review the installation.

   It is recommended to do a test with another working sensor (hold it under water near the boat) to check if the sounder and the on-board sensor are working correctly.
4. **Wrong temperature reading:**
   - Calibration incorrect.
   - Speed/temperature sensor cable damaged.
5. **SIMU flashing on the screen, with incoherent readings displayed.**
   - Unit in simulation mode (see 2.5.7).

If the problems continue, we recommend you contact your advanSea retailer or our customer support department. All contacts can be found at www.advansea.com.

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S400 Series

GPS Combo

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