

MARPORT | PRO



TRIDENT  
SENSOR

2024

USER MANUAL



# Contents

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<b>Legal</b>	<b>4</b>	Sounding Modes	27
History	4	Configuring the Echo Sounder	29
Copyright	4	About the Automatic Range Mode	32
Disclaimer	4	Applying Offsets to Measurements	33
		Testing Measures	34
		SD Card Recording	36
		Saving a Configuration on Mosa2	38
		Exporting Sensor Configuration	41
		Importing a Sensor Configuration	41

---

<b>Introduction and Presentation</b>	<b>6</b>		
Introduction	7		
Applications	8		
Safety Guidelines	9		
Description	10		
System Compatibility	10		
Technical Specifications	10		
Main Parts	13		
Operational Mode Indicator	15		

---

<b>System Configuration and Display</b>	<b>43</b>		
Adding the Sensor to the Receiver	44		
Adding the Sensor to the Receiver	44		
Configuring Sensor Settings	45		
Configuring Data Display on Scala2	47		
Displaying the Trident View	51		
Replaying Data Recorded on a SD Card	55		

---

<b>Sensor Configuration</b>	<b>17</b>		
Connecting the Sensor to Mosa2	18		
Battery Information	20		
About the Virtual Water-Switch Option	22		
Diagnostic Information	23		
Configuring the Trawl Node	24		
Configuring the Uplink Frequency and Power	26		

---

<b>Installation</b>	<b>57</b>		
Installing the Sensor on the Trawl	58		

---

**Maintenance and Troubleshooting** **61**

Charging the Sensor with the Dock	62
Cleaning the Sensor	63
Maintenance Checklist	64
Troubleshooting	65
Mosa2 does not open due to error message	65
Sensor does not connect correctly with Mosa2 when using the Configuration Cable	66
The Dock screen does not display all the details of the Trident or Door Explorer sensor	67
The echogram has a lot of interference	67
The echogram display is interrupted	69
The sensor is not running when testing out of water	70
Support Contact	72

---

**Appendix** **73**

Frequency Plan	73
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**Index** **a**

# Legal

## History

V1	04/19/22	First release
V2	08/04/22	<ul style="list-style-type: none"><li>• Now documents Scala2 version 02.10.x and Mosa2 version 02.11.x.</li><li>• Added frequency bandwidth schemas in <b>Frequency Plan (on page 73)</b>.</li></ul>
V3	02/26/24	<ul style="list-style-type: none"><li>• Added beam angles drawings in <b>Technical Specifications (on page 10)</b>.</li></ul>

## Copyright

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## Disclaimer

Marport endeavors to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omissions.

**The present user guide is applicable for the following versions:**

- Mosa2: 02.11.x
- Scala2: 02.14.x

System requirements:

- macOS: from 10.12 (Sierra) to 13.01 (Ventura)
- Receiver firmware: from 08.02.11

# **Introduction & Presentation**

# Introduction and Presentation

Get a basic knowledge of the sensor.

## Introduction

Trident is a netsonder with a wide angle of view. Placed on the headline, it is designed to work primarily on pelagic trawls.

The sensor is available in two applications:

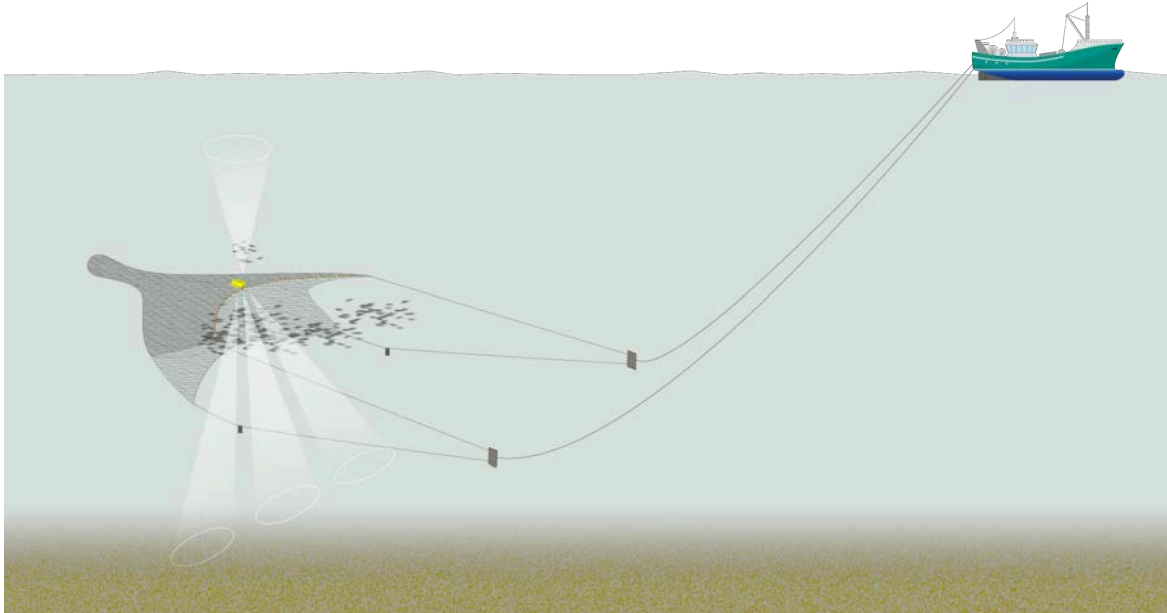
- Trident Down Looking: it sends three echogram images of the area below the sensor, and one above.
- Trident Up Looking: it sends three echogram images of the area above the sensor, and one below.

Echogram ranges are configurable from 20 meters to 160 meters. Moreover, the sensor includes an automatic range mode, in order to have a better image resolution when the trawl is close to the bottom.



# Applications

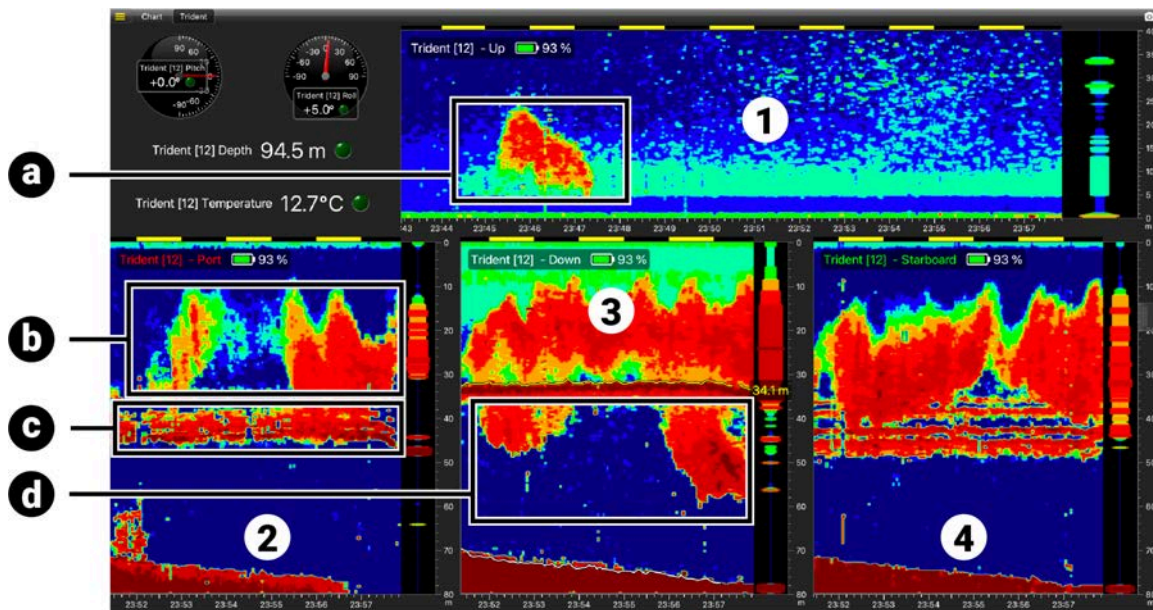
## Overview of the system



### Examples of data received in Scala2

The image below shows data received from a Trident Down Looking sensor installed on the headline of the trawl gear.





### Detections

- a. Fish passing above the headline
- b. Fish inside the trawl
- c. Footrope
- d. Fish passing below the footrope

### Sounding directions

- 1. Up sounding
- 2. Down port sounding
- 3. Down vertical sounding
- 4. Down starboard sounding


## Safety Guidelines

**!** **Important:** To ensure proper and safe use of this equipment, carefully read and follow the instructions in this manual.

### Product installation and use

Install and use this product in accordance with this user manual. Incorrect use of the product may cause damage to the components or void the warranty.

**!** **Warning:** Never place the product in a hazardous and/or flammable atmosphere.

 **Notice:** Do not open the sensor bottle. Only qualified Marport dealers can do maintenance and repairs on internal components of the sensors.

## Description

### System Compatibility

The Trident is compatible with the following versions of Marport's software and equipment.

<b>Mosa2</b>	02.09.x or later
<b>Scala2</b>	02.08.x or later
<b>Mx receiver firmware</b>	08.02.11 or later
<b>Dock</b>	01.01.00 or later

### Technical Specifications

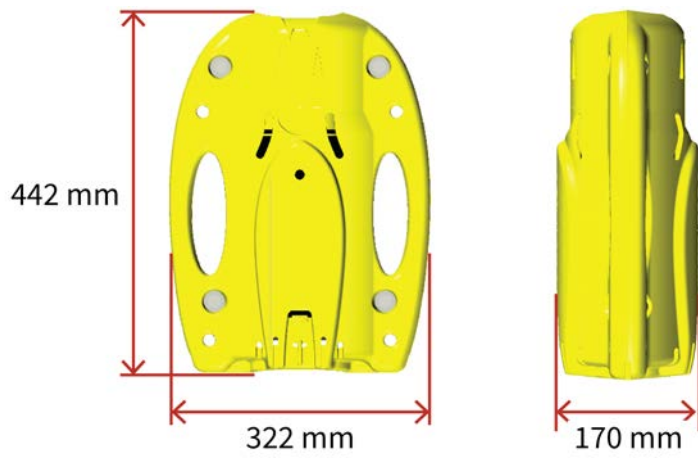
Uplink frequency	30 to 60 kHz
Range to vessel	up to 2500 m*
Data update rate	<p><b>Trident Down Looking</b></p> <ul style="list-style-type: none"> <li>• <b>Down only:</b> <ul style="list-style-type: none"> <li>◦ Ranges from 20 to 160 m: Echogram, temperature, depth, pitch, roll, battery level @2 s</li> <li>◦ Automatic range (20 m): Echograms @1.1s - Temperature, depth, pitch, roll, battery level @2.2 s.</li> <li>◦ Automatic range (10 m): Echograms @0.65 s - Depth, pitch, roll @2.6 s - Temp, battery level @5.2 s.</li> </ul> </li> <li>• <b>Down + Up</b> (ranges from 20 to 160 m): Echogram, temperature, depth, pitch, roll, battery level @2.4 s</li> </ul> <p><b>Trident Up Looking</b></p>

	<ul style="list-style-type: none"> <li>• <b>Up only</b> (ranges from 20 to 160 m): Echogram, temperature, depth, pitch, roll, battery level @2 s</li> <li>• <b>Down + Up</b> (ranges from 20 to 160 m): Echogram, temperature, depth, pitch, roll, battery level @2.4 s</li> </ul>
Depth range	up to 1800 m
Depth resolution	0.1 m with 0.1% full scale accuracy
Echogram range	10 (auto) / 20 / 40 / 80 / 160 meters
Pitch and roll range	-64° to +63°
Pitch & roll accuracy	+/- 1°
Temp measurement range	-5° C to +25° C
Temp accuracy	±0.1° C
Typical battery life	Up to 100 hours †
Charging time (from 0% to 100%)	<8 hours ‡
Battery type	Lithium-Ion
Weight in air (with housing)	13.48 kg
Weight in water (with housing)	5 kg
Warranty	2 years (Sensor & Battery) **

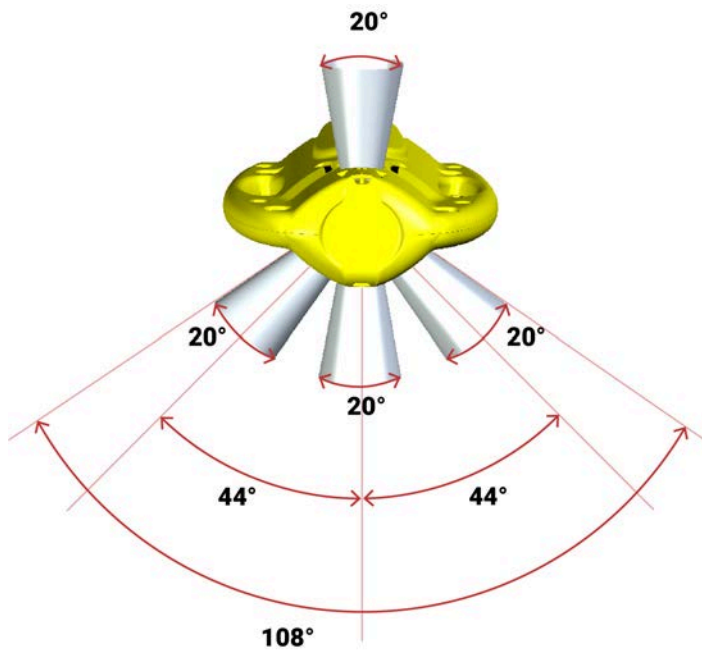
\*Reference only. Depends on communication settings and transmission conditions /  
† Depends on sensor uplink power and options. / ‡ Based on average charging time. /  
\*\*Marport Standard Marine Limited Warranty

The housing is delivered with 4 soft shackles: dimensions 7-10x100x100 mm, resistance up to 1 ton (+/- 10% tolerance).

## Dimensions



## Beam Angles



## Main Parts

### Trident Housing



1. Screw maintaining the bottle inside the housing
2. End cap
3. Transducer: oriented toward the vessel
4. Punches indicating the number of beams

Punches in the housing show the direction and number of the beams.

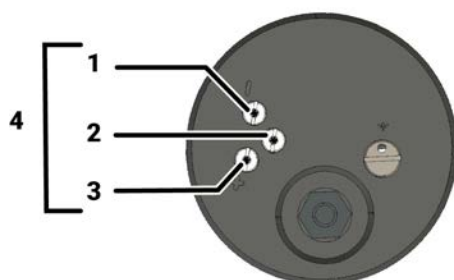
- **Trident Down Looking:** the face with one hole is facing up.



- **Trident Up Looking:** the face with three holes and one screw at the bottom is facing up.



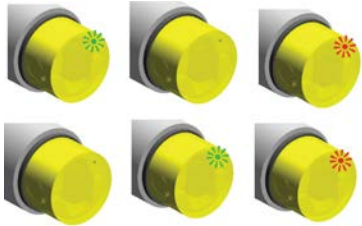



## End Cap




1. Negative charge
2. Water switch
3. Positive charge
4. Shoulder bolts
5. Pressure sensor
6. Temperature sensor

## Operational Mode Indicator

A LED on the sensor's transducer indicates the operational mode of the sensor.

State	Situation	LED
Starting	<ul style="list-style-type: none"> <li>• Sensor has been switched on in water or with water switch.</li> </ul>	 <ul style="list-style-type: none"> <li>• Startup sequence: LED blinks green/off/red/off/green/red</li> <li>• Then, fixed green for a 1 sec.</li> </ul>
Running	<ul style="list-style-type: none"> <li>• Sensor is in water.</li> <li>• Water switch is on.</li> </ul>	 <ul style="list-style-type: none"> <li>• For 1 min.: LED blinks red at the beginning of each uplink communication cycle.</li> <li>• Or, LED blinks green / red if the product configuration is not valid.</li> </ul>
Configuring	<ul style="list-style-type: none"> <li>• Sensor is out of water.</li> <li>• User is testing and configuring using a Configuration Cable</li> <li>• Sensor turns off after 10 min. without test or configuration operation.</li> </ul>	 <p>LED blinks green.</p>
Charging	<ul style="list-style-type: none"> <li>• Charger plug is connected.</li> <li>• User is configuring at the same time via the Dock.</li> </ul>	



State	Situation	LED
		<ul style="list-style-type: none"> <li>• LED blinks red.</li> <li>• LED is fixed red after 10 sec. if connected to a charger other than the Dock.</li> </ul>
On deck	<ul style="list-style-type: none"> <li>• Sensor has been hauled on deck</li> <li>• The virtual water switch is on</li> <li>• The sensor is locked in a low power state to not switch into running mode</li> </ul>	 <p>LED blinks green every 4 sec.</p>



# Sensor Configuration

# Sensor Configuration


Learn how to configure the sensor settings.

 **Note:** To configure the sensor on Mosa2: Press command + A or click **Menu**  and click **User Mode > Advanced**

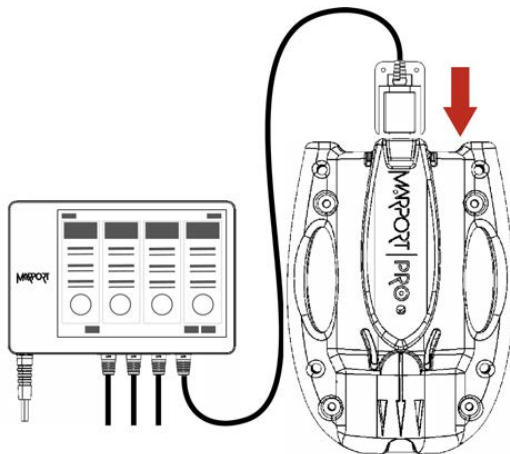
## Connecting the Sensor to Mosa2

To configure the sensor, you need to connect it to Mosa2 application, using either the Dock or the Configuration Cable.

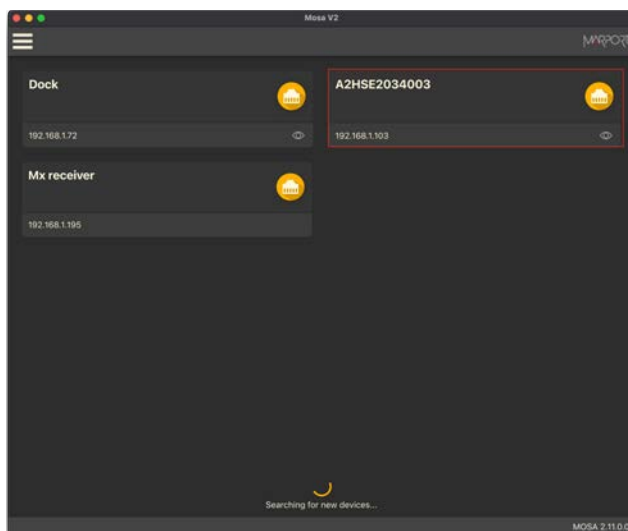
### Using a Dock Charger Plug



 **Tip:** Refer to Dock user manual to have more details about the use of this product.

1. Connect one Dock charging plug to the sensor's endcap.



2. Mosa2 discovery page opens. The sensor is displayed.



- Click  to open the sensor configuration page.
- Click  to show the deploy animation on the charger plug for 30 seconds.

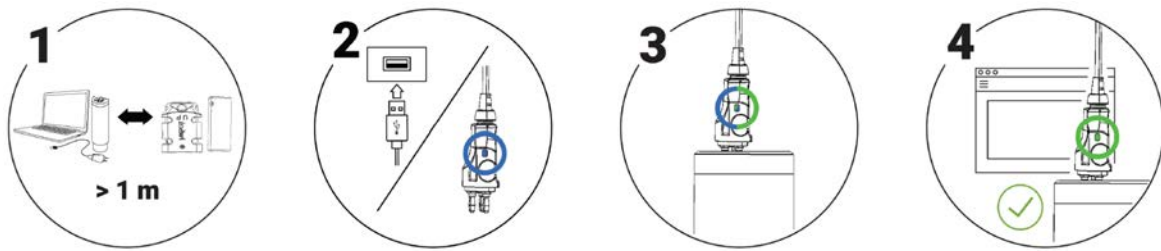
## Using the Configuration Cable

Connect the Configuration Cable from the computer to the sensor to display the sensor configuration page on Mosa2.





**Tip:** Refer to the Configuration Cable Quick Reference Guide available on our website for more details about the use of this product.

1. Move other electrical devices minimum 1 m away from the computer.  
Mosa2 opens automatically and the startup wizard is displayed. The LED on the plug is solid blue.
3. Connect the three-pin plug to the sensor.  
The LED on the plug blinks alternatively blue and green.
4. Wait a few seconds. The configuration page of the sensor is displayed on Mosa2.  
The LED on the plug is solid green.

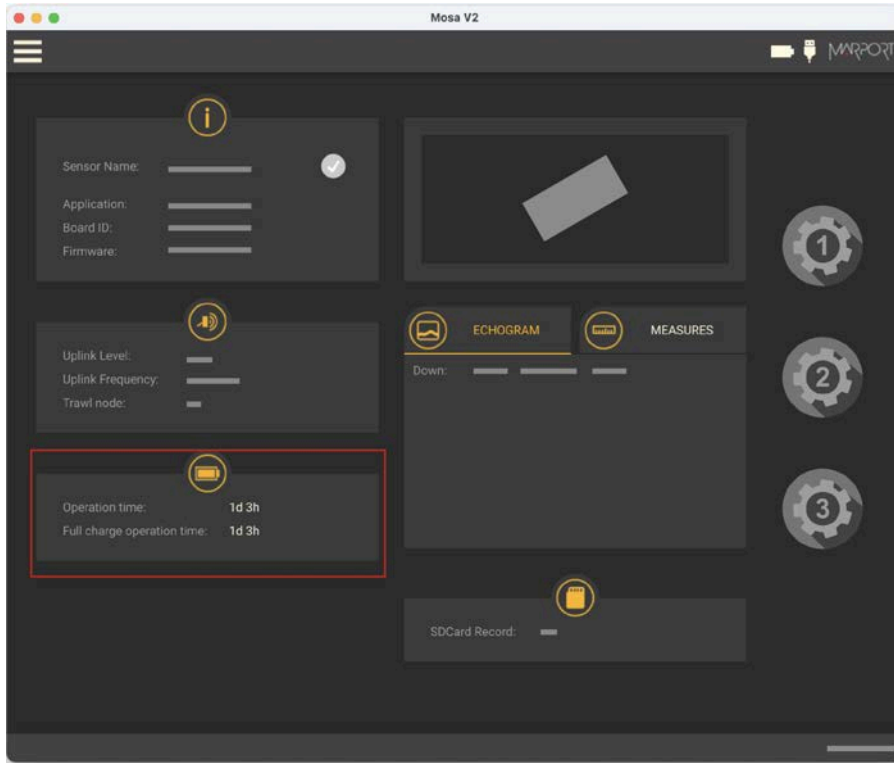


You can now configure the sensor.

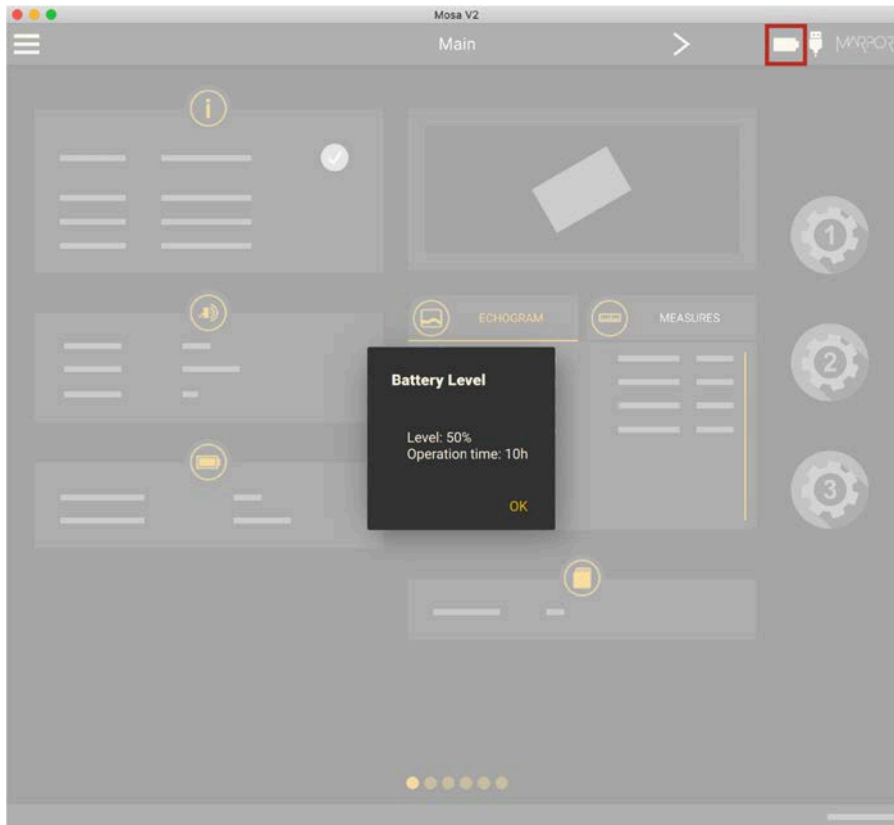
 **Note:** You can keep the Configuration Cable continuously connected by USB, and virtually eject or connect it. When no sensor is connected to the Configuration Cable, click **Menu**  **> Eject Config Plug** or **Connect Config Plug**. When ejected, you come back to the discovery page. It stays disconnected until you virtually connect to it or manually disconnect then connect it.

## Battery Information

The battery lifetime is displayed on the first page.



You can also check the battery level at anytime from the top bar:

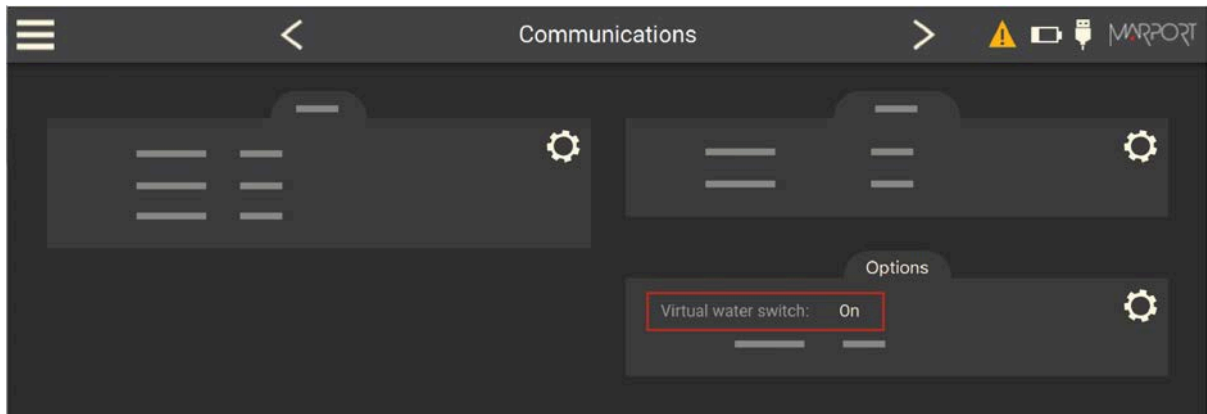


- Note:** When you change settings such as the uplink power or sounding range, it affects the battery consumption and remaining lifetime. The battery information will update after the sensor has been switched on and operating for 10 minutes.

## About the Virtual Water-Switch Option

Mosa2 has a virtual water-switch option that changes the conditions under which the sensor is running.

- Note:** The virtual water switch is available only for the **Pro** line of sensors (PCBA A2S Gen 2 and later, and all A2H versions). It is activated by default.



- When the virtual water-switch is activated: the sensor runs when the depth is more than 2 meters and the water-switch is in contact with water. We recommend to activate it to prevent the sensor from running outside water. For example, if the sensor is hauled on deck and stays inside the net, the water-switch remains wet and keeps emitting. This will significantly reduce the battery life-time.



**Note:** When activated, an orange warning icon is displayed in the top bar.



- When the virtual water-switch is deactivated: the sensor runs only when the water-switch is in contact with water. The depth is not taken into account. We recommend to deactivate it if the sensor is operating close to the surface or if you need to test the sensor in the office.

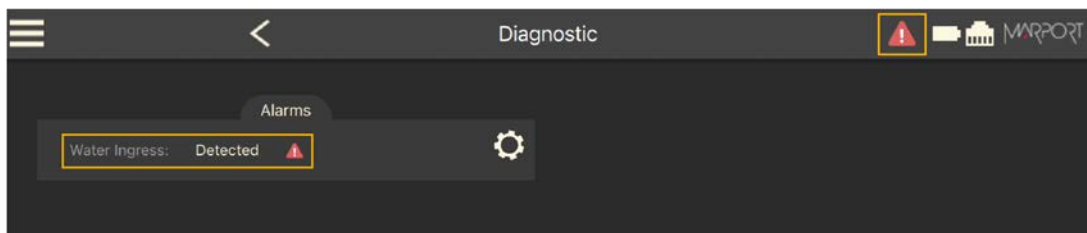
## Diagnostic Information

Scala2 and Mosa2 applications warn the user in case of water ingress in the sensor.

- **Note:** Diagnostic information is available for Marport Pro sensors (A2S and A2H PCBA versions), from the firmware version **F450-02.02.00 or later** and Mosa2 version **02.11.08**.

In case of water ingress in the sensor, alarms are displayed in Scala2 Virtual Charger Room, in Mosa2 and on the charger plug when connected to the sensor.

- Mosa2 displays a dialog at the start of the application and warning icon in the toolbar and diagnostic page:



- The charger plug displays a warning icon:



When the alarm appears, take the sensor out of water immediately and contact Marport support.

- **Warning:** In case of water ingress in the product, do not charge it: battery may vent or rupture, causing product or physical damage.

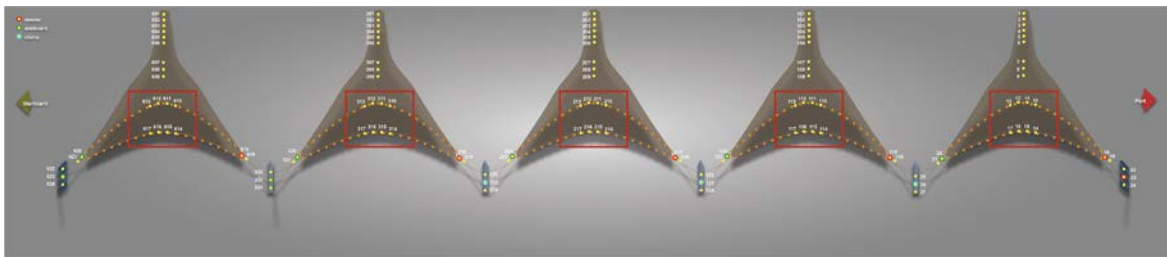
## Configuring the Trawl Node


You need to give a trawl node to the sensor. It is the number corresponding to the position of the sensor on the trawl.

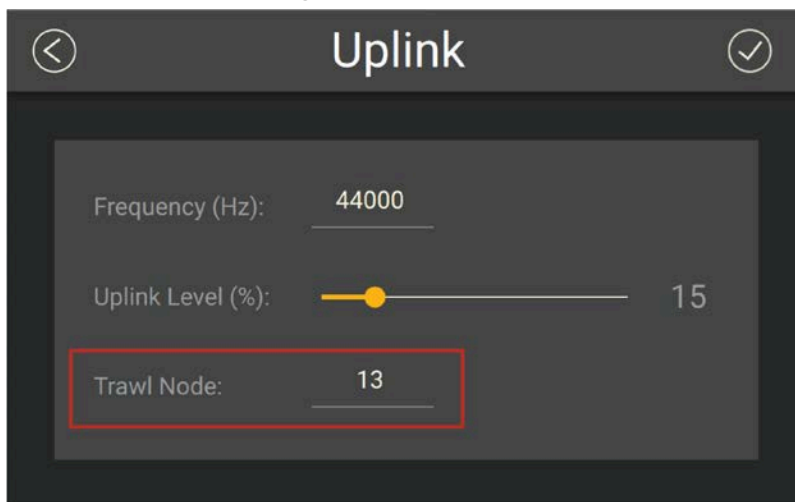
The trawl nodes corresponding to the positions on the headline and footrope are the following:




Trawl number	Node numbers
Trawl 1	10 to 17
Trawl 2	110 to 117
Trawl 3	210 to 217
Trawl 4	310 to 317
Trawl 5	610 to 617



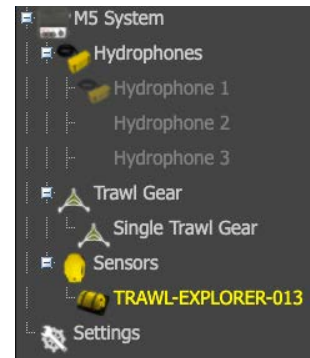
1. Go to the **Communications** page, then click  in **Uplink**.
2. Enter a node according to the position of the sensor on the trawl.



 **Important:** Make sure to put the same number when adding the sensor to Scala2 receiver page. If not, change it accordingly.



Add Sensor Product	
Add from Marport Sensor Configuration Tool	
1. Product Category	Trawl Explorer
2. Product Name	Trident Down Looking
3. Trawl Gear Location	013

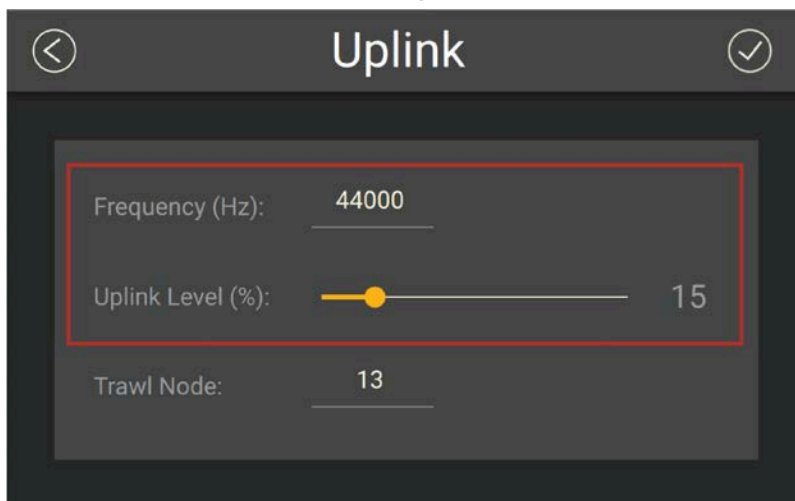


3. Click .

## Configuring the Uplink Frequency and Power

Configure the settings of the communication link between the sensor and the vessel.

1. Go to the **Communications** page, then click  in **Uplink**.



2. Choose the communication protocol.
3. Enter a frequency for the communication with the vessel. Default is 44,000 Hz.
4. Drag the slider to change the power of the uplink signal.



**Note:** A higher level of uplink power reduces the battery lifetime.

Recommended uplink powers	Conditions	Estimated battery life
33%	Works for most conditions.	104 hours
100%	<ul style="list-style-type: none"><li>• Sensor is far from vessel (e.g. more than 800 m depending on conditions, high depth)</li><li>• High level of interferences</li><li>• Issues receiving data</li><li>• Low SNR</li></ul>	18 hours

## Sounding Modes

The sensor sends echogram images to different directions depending on the application and sounding settings.

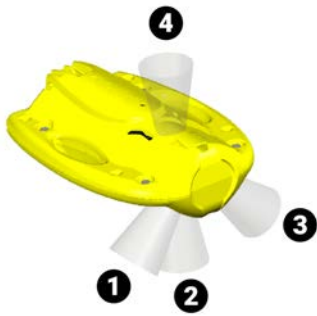
### Down Looking Application

#### Down only



The sensor sends three echogram images of the area below: starboard (1), vertical (2), port (3).

### Down + Up

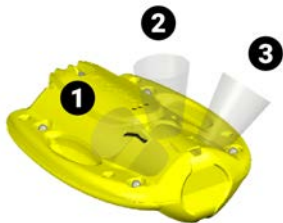


The sensor sends three echogram images of the area below and one echogram image of the area above (4).

The update rate is lower because the pings are distributed between up and down directions. As a result, data arrives more slowly to the receiver.

### Up Looking Application

#### Up only



The sensor sends three echogram images of the area above: : starboard (1), vertical (2), port (3).

#### Down + Up



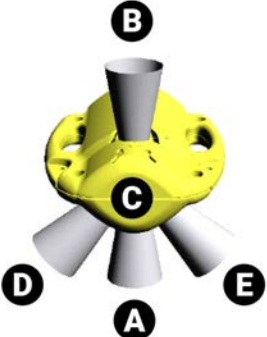
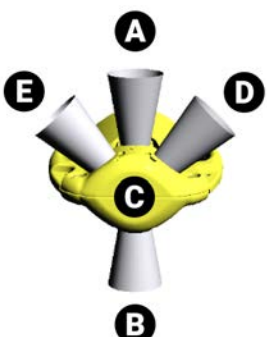
The sensor sends three echogram images of the area above and one echogram image of the area below (4).

The update rate is lower.


## Configuring the Echo Sounder

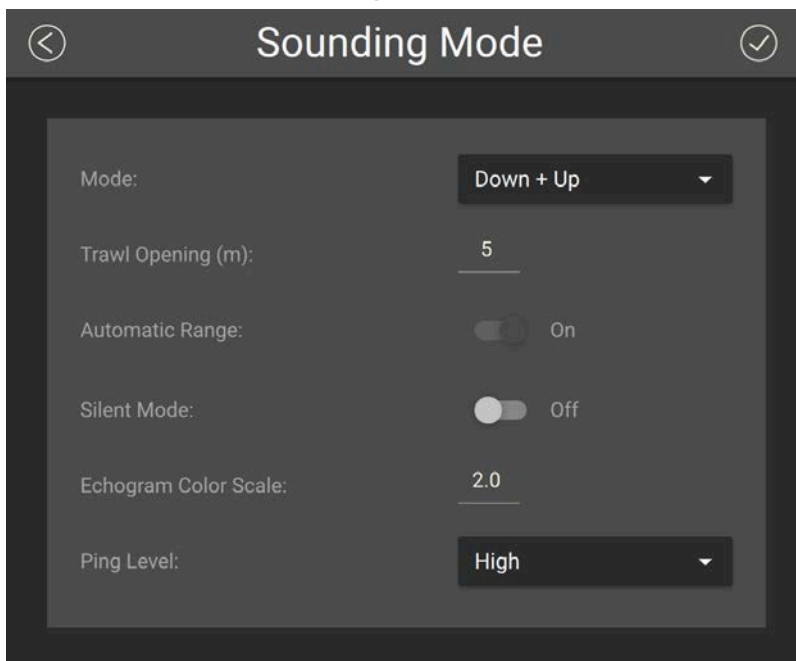
You need to configure the echo sounder settings so that they correspond to the fishing conditions.

The sounding orientation of the channels changes depending on if the sensor application is down looking or up looking.

Application	Picture	Transducer's channel	Orientation
Trident Down Looking		C	Fore
		A	Down
		B	Up
		D	Starboard
		E	Port
Trident Up Looking		C	Fore
		A	Up
		B	Down
		D	Port
		E	Starboard

**!** **Important: Ping Level, Ping Frequency, Pulse Type** and **TVG** are important settings for the calibration of the sensor. A new calibration is mandatory whenever one of these settings is changed.

1. Go to the **Echo Sounder** page, then click  in **Sounding Mode**.



2. Select a **Mode**:

- **Trident Down Looking application:**

- **Down only** sends three echograms of the area below the sensor.



**Note:** You must select this mode to use the **Automatic Range** feature.

- **Down + Up** sends 3 echograms of the area below and 1 above the sensor.



- **Trident Up Looking application:**

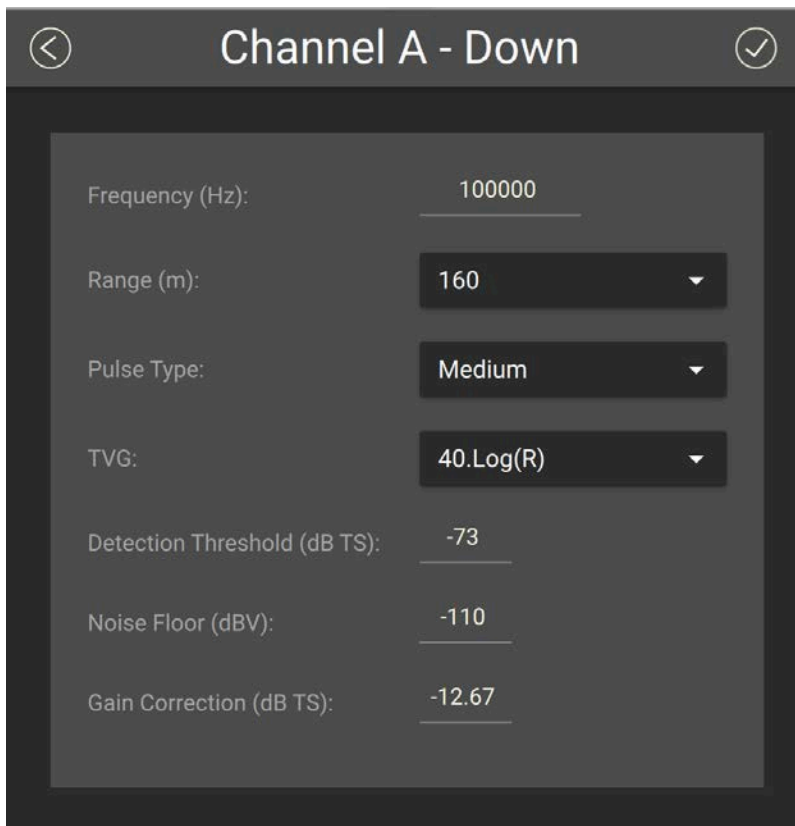
- **Up only** sends three echograms of the area above the sensor.
- **Down + Up** sends 3 echograms of the area above and 1 below the sensor.




**Note: Down + Up:** Note that the data will have a slower update rate because the pings are distributed between the two directions.

3. You can activate the **Automatic Range** mode to have better quality echograms during bottom trawling. See **About the Automatic Range Mode (on page 32)** for details.
4. If using the **Automatic Range** mode, enter a **Trawl Opening**:

- lower than 19 meters to be able to switch to a 20 meter-range.
  - lower than 9 meters to be able to switch to a 10 meter-range.
5. **Ping Level** is the strength of the echogram signal. Default is **High**, but you can lower the level to **Medium** or **Low** if you notice that the sensor interferes with other equipment on the vessel.
  6. Click  to save the changes.
  7. On the **Echo Sounder** page, click  next to a sounding direction.



8. Set a **Frequency (Hz)**: it must be the same for all the sounding channels. Default is 100 kHz.
9. The **Range (m)** of the sounding is the maximum distance at which targets and bottom can be detected.
  -  **Tip:** We recommend to set the maximum range value when using the automatic range in order to see the sea bottom as soon as possible.
10. Select a **Pulse Type** to have an appropriate length of pulse according to the distance to the bottom:

- **Short:** shallow waters (100  $\mu$ s)
  - **Medium:** moderate depth (300  $\mu$ s)
  - **Long:** deep waters (500  $\mu$ s)
11. Select a **TVG** setting to compensate the signal loss in water and have targets or sea bottom displayed in the same color on the echogram, whatever the distance from the sensor:
    - 20 log: focus on bottom or school of fish.
    - 40 log: focus on individual targets.
    - 30 log: compromise between the two above settings.
  12. Do not change the other echo sounder settings.

## About the Automatic Range Mode

The sensor has an automatic range mode that is useful to get better quality echograms when the trawl is close to the bottom.


### Principle

Range influences the display of echogram images. The smaller the range, the shorter the listening time and the better the quality of images. But if you set a bigger range, data arrives slower which results in poorer image quality.

You can activate the automatic range mode if you need to get better quality echograms when the trawl is close to the bottom. This mode is recommended when bottom trawling.

The echogram can automatically switch to a 20-meter range when the distance to the bottom is less than 20 meters and to a 10-meter range when the distance is less than 10 meters.

The change of range depends on the settings configured on Mosa2.


 **Important:** This mode is available only with Trident Down Looking application.

### Mosa2 settings

The following **Sounding Mode** options must be set in Mosa2:





- **Automatic Range** must be activated.
- The **Mode** must be set to **Down only**.
- The **Trawl Opening**:
  - must be lower than 19 meters to be able to switch to a 20-meter range.
  - must be lower than 9 meters to be able to switch to a 10-meter range.

 **Note:** The trawl opening value sets the minimum distance to see inside the trawl. As a result, if the trawl opening distance is equal or higher than 19 or 9 meters, the sensor will not reduce the range respectively to 20 or 10 meters.

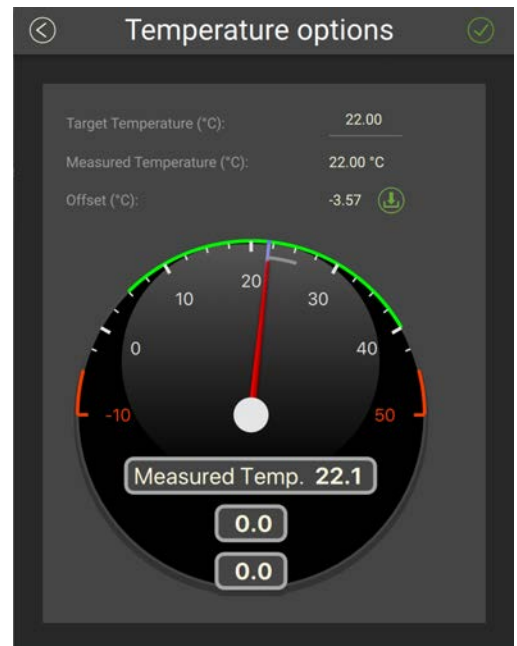
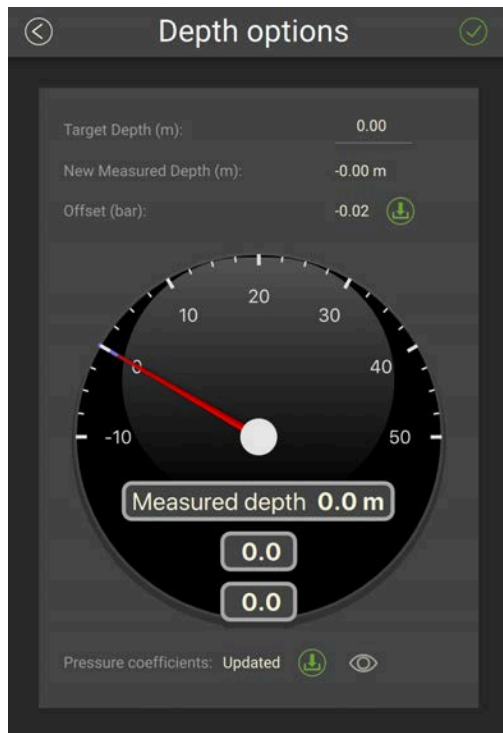
See **Configuring the Echo Sounder (on page 29)** for details about Mosa2 settings.


## Applying Offsets to Measurements

You can apply offsets to temperature and depth measurements if the measured values does not correspond to the environment of the sensor.

1. Go to **Measurements** page and click  next to depth or temperature to apply offsets.
2. Enter a target value. Click .

The measured value becomes the same as the target value. The value of the offset is displayed.



3. If you need to reuse offsets from a previous configuration, click  then select the configuration file (\*.A2C).

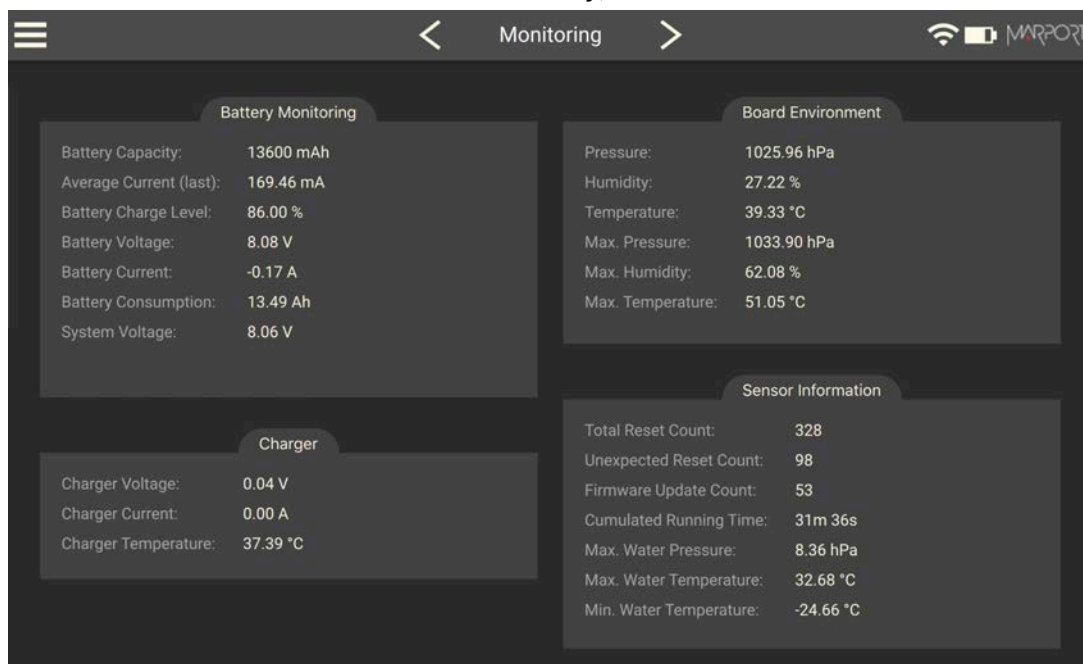
## Testing Measures

You can test the measures taken by the sensor (e.g. battery level, temperature, depth) to check that there are no faults.

You can test the sensor in water or in air. In air, the following measures will be wrong: height, conductivity.

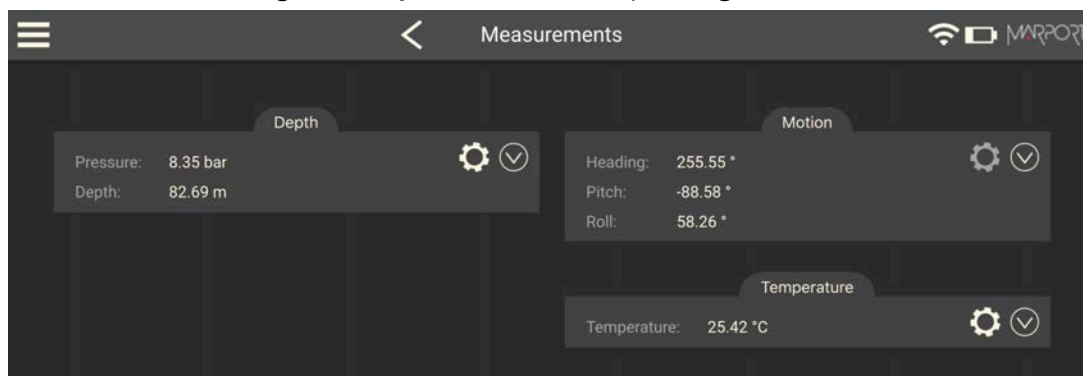
1. Press command + A or click **Menu**  and click **User Mode > Advanced**
2. Go to the **Monitoring** page.


You can check information about the battery, board and sensor.



3. Go to the **Measurements** page.

You can see the values of the activated measures, such as depth, temperature. If the sensor is working correctly, measures are updating.



4. Click  to check and, if necessary, adjust data measured by the sensor:

- **Depth:** Place your sensor on a desk or on the ground and enter 0 in **Target Depth**.
- **Temperature:** Enter the estimated temperature of your environment.

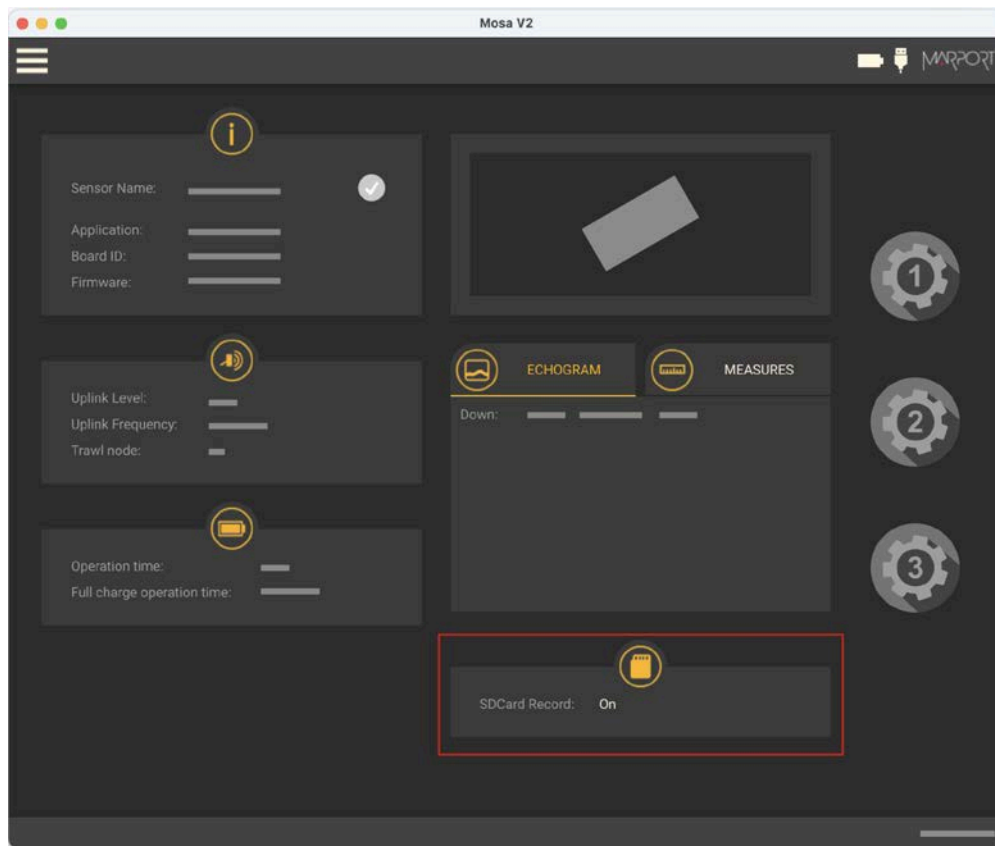
# SD Card Recording

This topic explains the SD card recording feature (this feature is optional).

## Overview


Data recorded on the SD card are in higher resolution, with a higher refreshing rate.

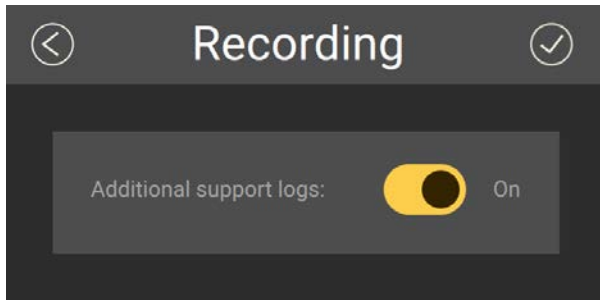
You can see on Mosa2 main page if the SD card recording feature is activated:



## Additional settings

We recommend to activate the support logs to help support teams for error diagnosis.



1. Go to the **Communications** page, then click  in **Recording**.
2. Activate **Additional support Log**.



### Getting data from the SD card

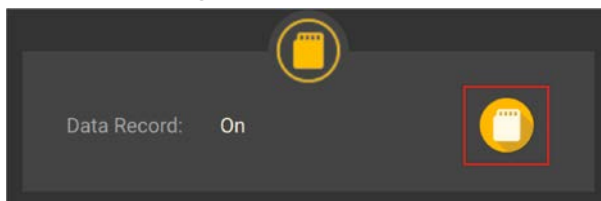
The last 99 recorded sensor data files and last 99 battery files are displayed. Two types of files are on the SD card:

- Files containing measures recorded by the sensor. Their name begins by "450". These data are more precise and recorded more often than data received on the receiver. One file corresponds to a tow (time between entering and leaving water). The recording date displayed in the second column is synchronized with your computer time.
- BATT = Files created when the sensor is charging (1 file per charging cycle). They are useful for support teams for troubleshooting.

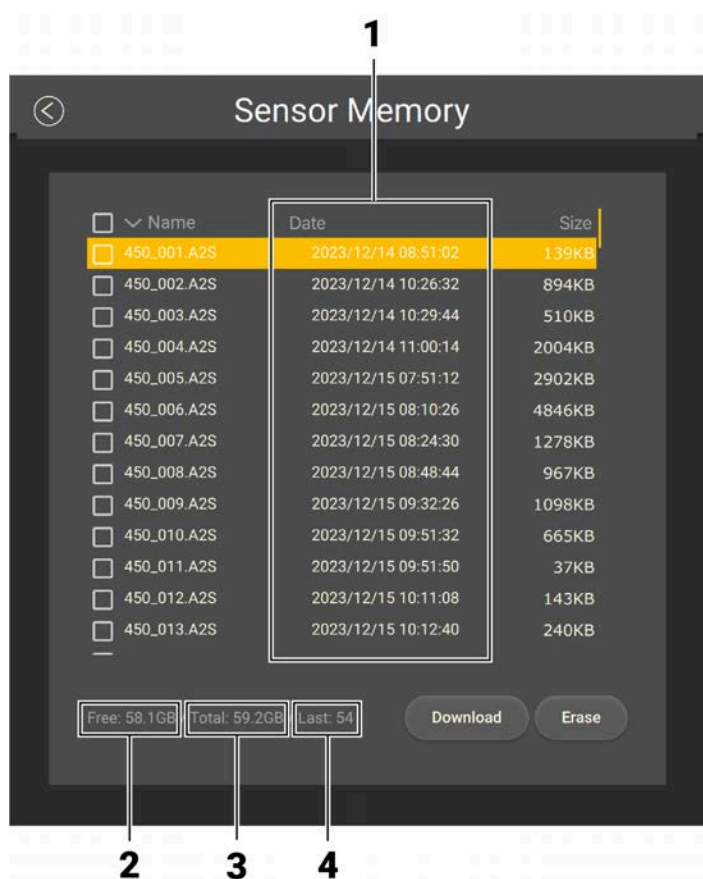
 **Note:** The first time the sensor connects to Mosa2 or if the sensor desynchronizes, a clock with a warning icon  is displayed in the top toolbar. Click it to synchronize the time of the SD card with the computer's time.

1. Press command + E or click **Menu**  and click **User Mode > Expert**.

2. On the first page, click  in **Data Recording**.



Recorded files are displayed. Click the title of the columns to sort them by their name, date or size.



1. Time of end of towing
2. Free memory
3. Total memory size
4. Index of the last file written


## Saving a Configuration on Mosa2

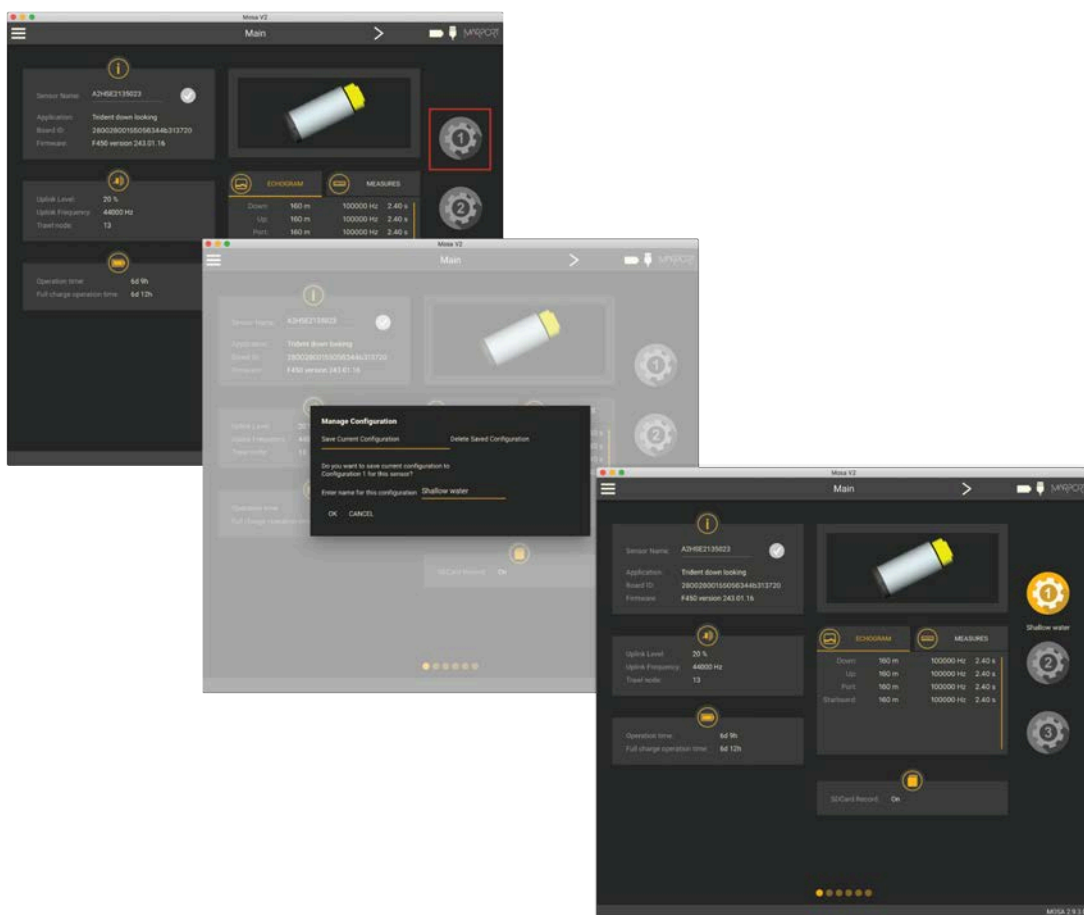
You can save different configurations of the sensor to be able to quickly change the configuration when you change your fishing method.

- You have finished configuring the sensor.

You can have up to three different configurations for the sensor. When you change your fishing method, you can apply a corresponding configuration in one click. For example:

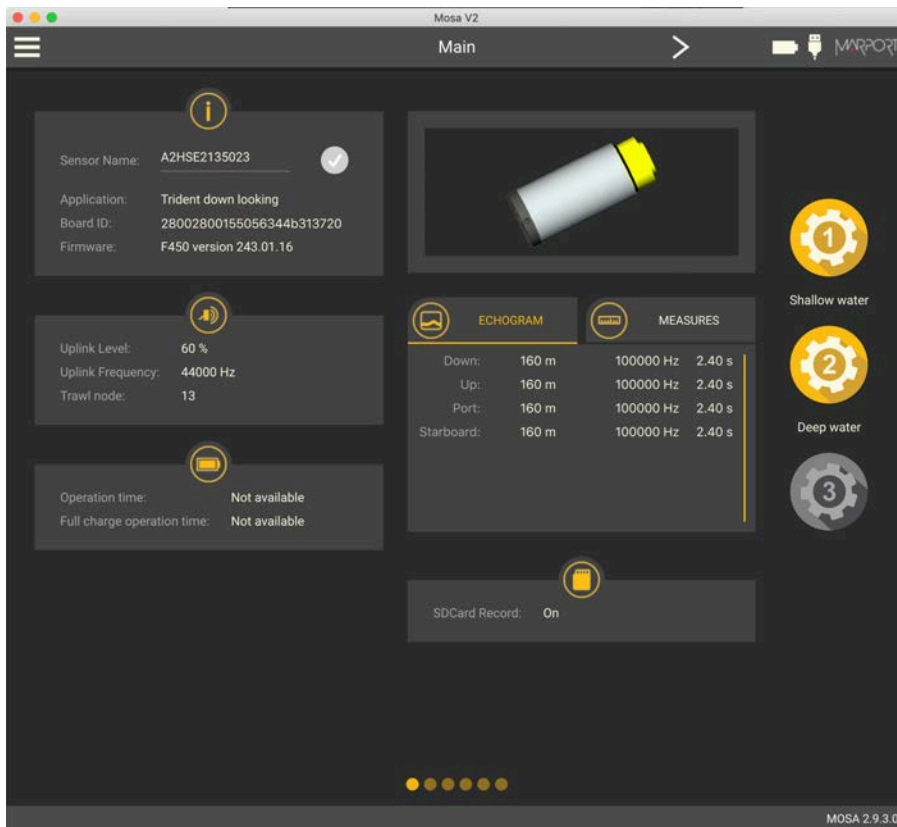
- If fishing in shallow water, you can use a configuration with an uplink level of 20%, a short pulse and a short range.
- If fishing in greater depths, you can change for a configuration with an uplink level of 60%, a long pulse and a long range.

1. When you are finished configuring the sensor, for example to use the sensor in shallow water, click one of the wheel icon  on the first page of Mosa2.
  2. In the window that appears, enter a name for the configuration and save it. The wheel icon becomes orange and the name of the configuration is displayed underneath.



3. To create another configuration, for example this time to use the sensor in deep waters, change the settings of the sensor on Mosa2.

4. When you are finished, click the second wheel icon and save the configuration.



5. If you need to change the sensor configuration back to the first configuration (shallow water), click the corresponding wheel.

The configuration is applied.

6. If you need to make changes to a configuration:

- a. Change settings.
- b. Maintain the click on the corresponding wheel until the **Manage Configuration** window appears.
- c. Click **OK** in **Save Current Configuration**.

7. To delete a configuration:

- a. Maintain the click on the corresponding wheel until the **Manage Configuration** window appears.
- b. Click **OK** in **Delete Saved Configuration**.



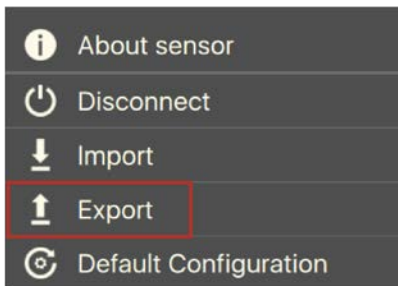
## Exporting Sensor Configuration

You can export the sensor settings you configured on Mosa2 on a file. You can afterward use this file when configuring a similar sensor.

- You are finished configuring the sensor.

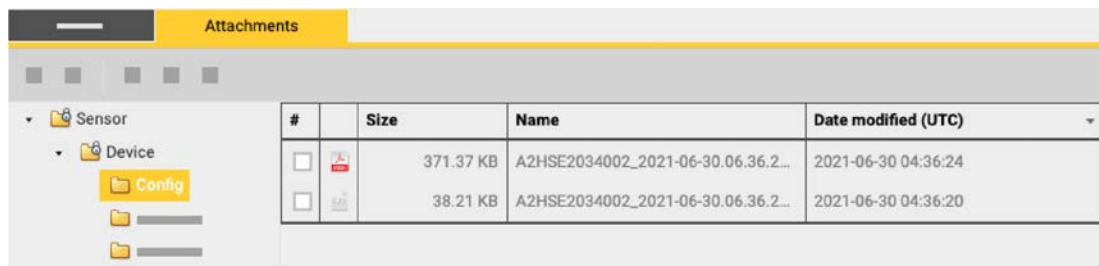
If you have issues with your sensor, send this file to support teams.

1. Click **Menu**  > **Export**.



2. From the window that appears, choose a folder on your computer to save the file and click **Open**.

The configuration file is exported and saved on your computer as an A2C file. If you are connected to the internet, it is also automatically sent to MASP in XML and PDF files:

A screenshot of a file explorer window titled 'Attachments'. The left sidebar shows a tree view with 'Sensor' expanded to 'Device' and then 'Config'. The main area shows a table of files.

#	Size	Name	Date modified (UTC)
<input type="checkbox"/>	371.37 KB	A2HSE2034002_2021-06-30.06.36.2...	2021-06-30 04:36:24
<input type="checkbox"/>	38.21 KB	A2HSE2034002_2021-06-30.06.36.2...	2021-06-30 04:36:20

## Importing a Sensor Configuration

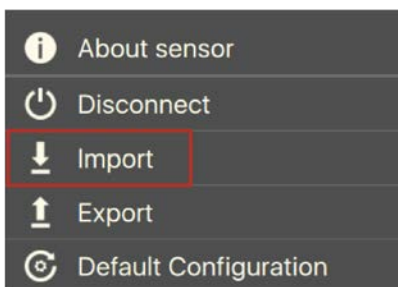
You can apply to a sensor a configuration that has already been made on another sensor.

- You have exported a configuration (see **Exporting Sensor Configuration (on page 41)**) and have the \*.A2C or XML configuration file.

Only the following settings are imported: trawl node, recording settings (SD card, support logs), communication options (virtual water switch, simulation mode), uplink level and frequency, echo sounder settings.

**!** **Important:** If the new configuration changes the echo sounder settings, you must re-calibrate the sensor for target strength value.

1. Press command + A or click **Menu**  and click **User Mode > Advanced**
2. Click **Menu**  > **Import**.



3. From the window that appears, select the \*.A2C or XML configuration file.

The configuration is loaded into the sensor.

# **System Configuration & Display**

# System Configuration and Display

Learn how to configure the receiver and display the sensor data in Scala2 application.

## Adding the Sensor to the Receiver


You need to add the sensors to the receiver in order to display their data on Scala2.

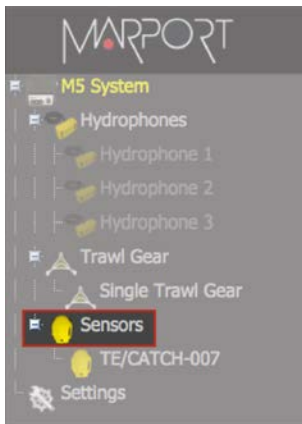
For compatibility details, see **System Compatibility (on page 10)**.

### Adding the Sensor to the Receiver

You need to add the sensors to the receiver using the system web page.

**!** **Important:** To be able to add the Trident sensor to the receiver, the version of the receiver firmware must be **08.01.01 and above**.

1. From Scala2, click **Menu**  > **Expert Mode** and enter the password `copernic`.
2. Right-click the IP address of the receiver at the bottom of the page, then click **Configure Receiver**.
3. From the left side of the receiver page, click **Sensors**.




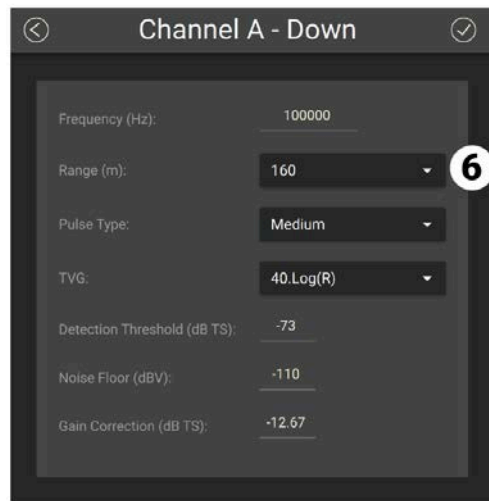
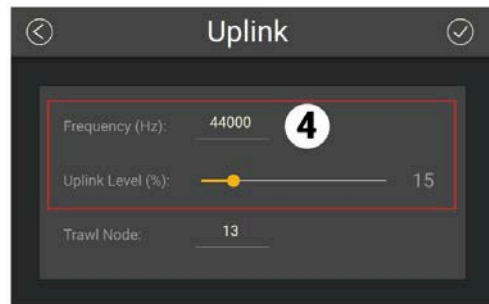
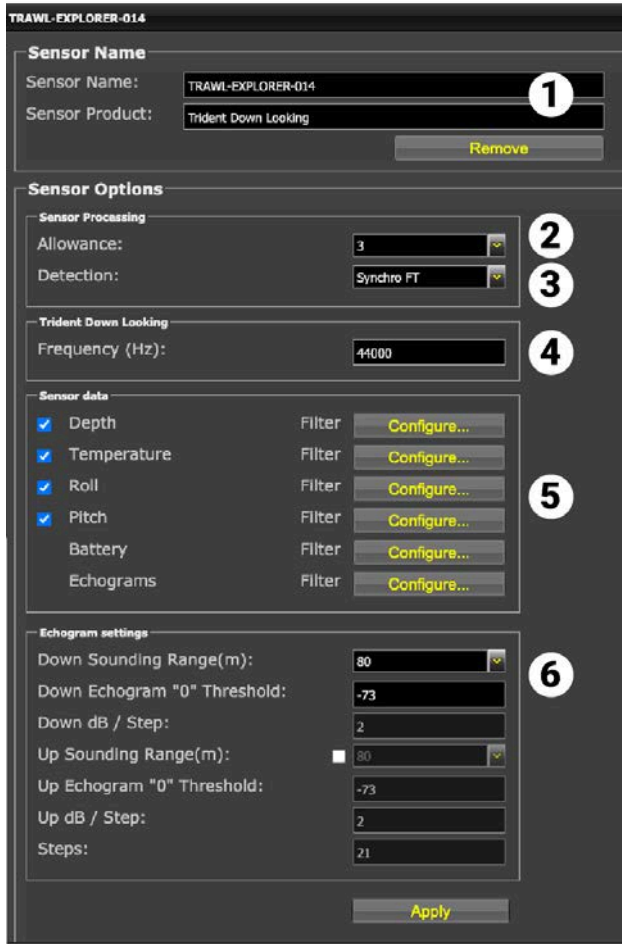
4. From the page **Add Sensor Product** select:
  - a. **Product Category:** Trawl Explorer
  - b. **Product Name:** Trident Down Looking or Trident Up Looking.
  - c. **Trawl Gear Location:** same as defined in Mosa2 (see **Configuring the Trawl Node (on page 24)**).

Add Sensor Product		Add from Marport Sensor Configuration Tool	
1. Product Category	Trawl Explorer		▼
2. Product Name	Trident Down Looking		▼
3. Trawl Gear Location	013		▼

## Configuring Sensor Settings

You need to complete communication settings when you add the sensor to the receiver.

 **Important:** Make sure the settings you enter here are the same as in Mosa2.



1	Sensor name displayed in Scala2 and its features.
2	Not used.
3	Leave default setting at <b>SynchroFT</b> .
4	Enter the same frequency as the one entered for the uplink frequency in Mosa2.
5	Click <b>Configure</b> to change filters applied on incoming data. Filters are particularly useful to reduce interferences on the echogram data.



**Note:** Filters should not be necessary. However, if you notice interference, you can apply filters such as **Some Smoothing**, **More Smoothing** or **Rate of Change**. Be aware that echogram filters such as **Echosounder and Interference Reduction** may remove small targets on the echogram.



**Tip:** Please refer to Scala2 user guide for more information about the filters.


6

Select the same sounding range and threshold as those set in Mosa2.

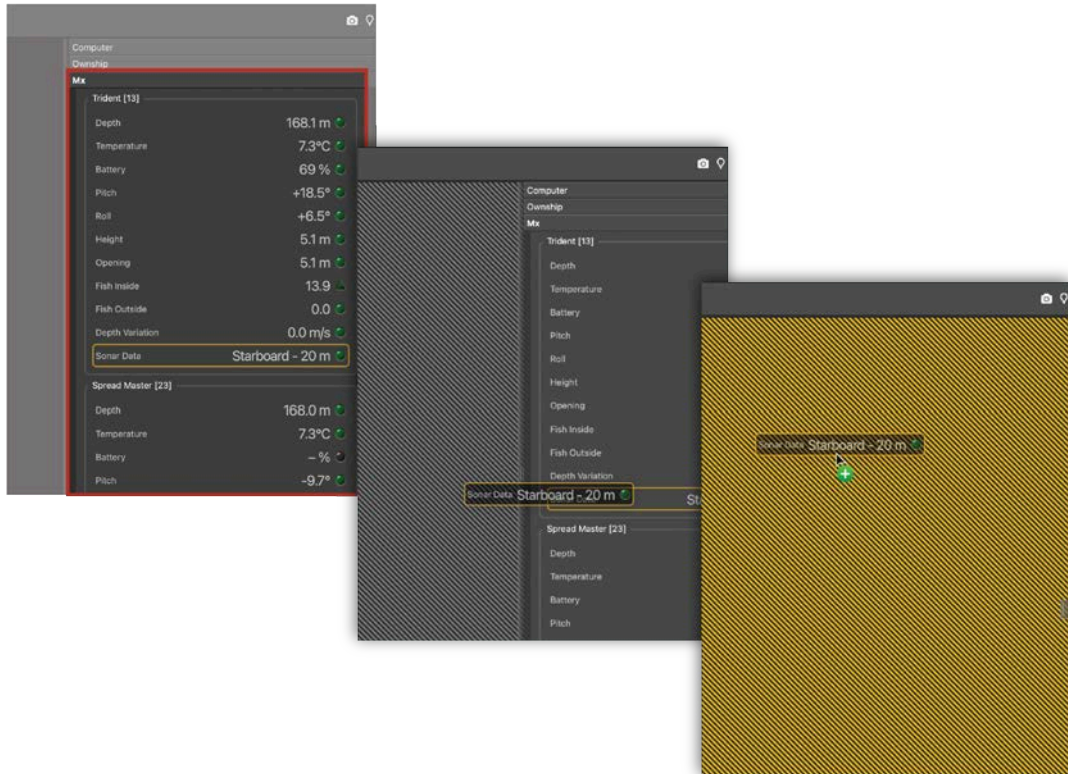
Click **Apply** when you have finished.

## Configuring Data Display on Scala2

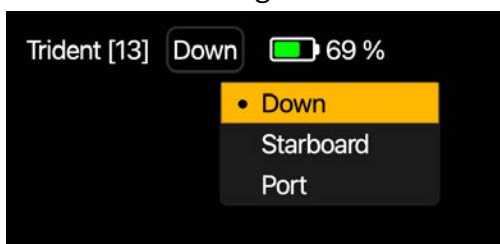
You can display the sensor's measurements and echograms on Scala2 pages.

Connect in **Customize** mode to configure the display of data. From the top left corner of the page click **Menu**  > **Customize** and enter the password `eureka`.

1. Open the control panels and go to the **Mx** tab.
2. To display the echograms, click + hold **Sonar Data** from a Trident sensor and drag it to the page display.



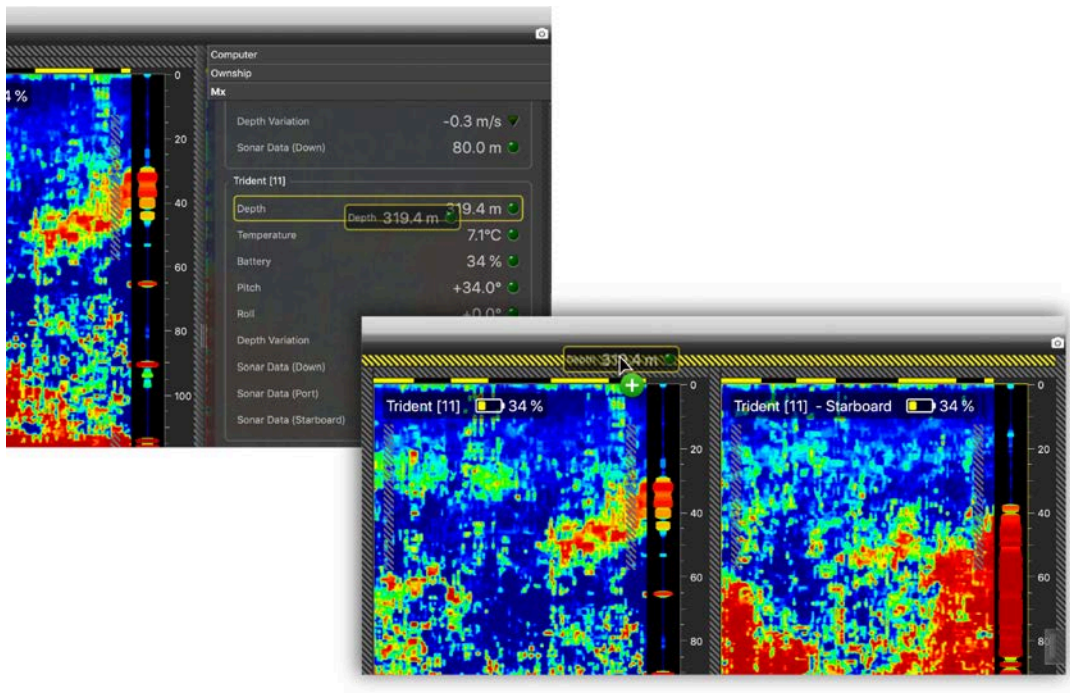
3. Select the sounding direction from the menu on the top of the echogram.



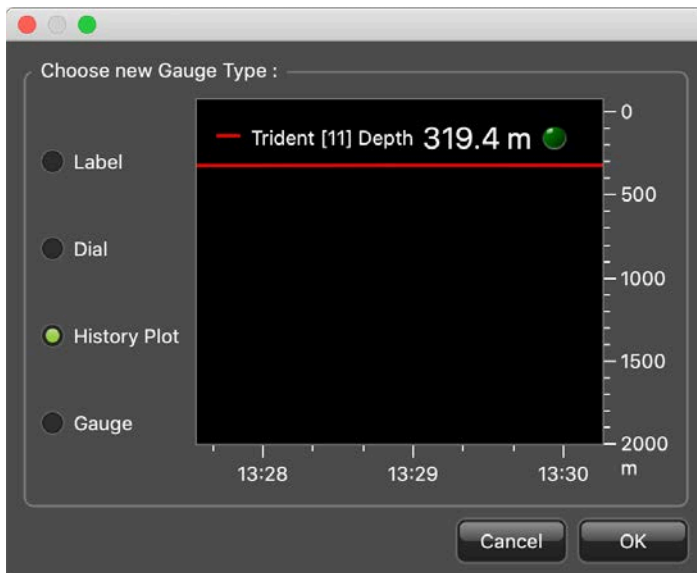
4. To display the other Trident echograms, drag again **Sonar Data** to the page, then set another sounding direction.



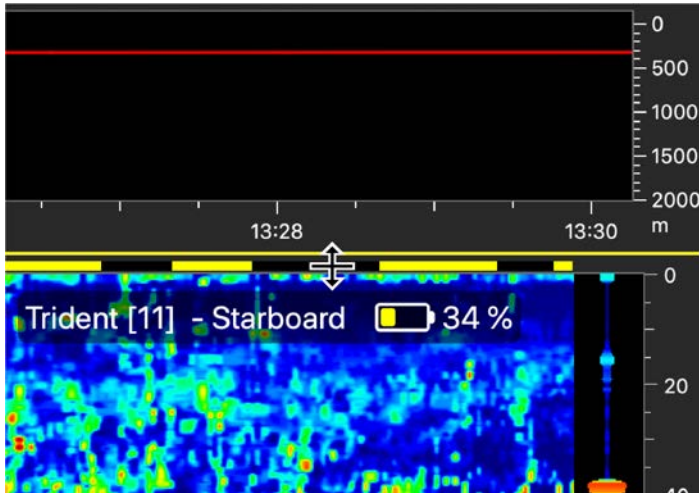
5. Click + hold other data, such as depth, pitch, roll, and drag it as well to the page display.



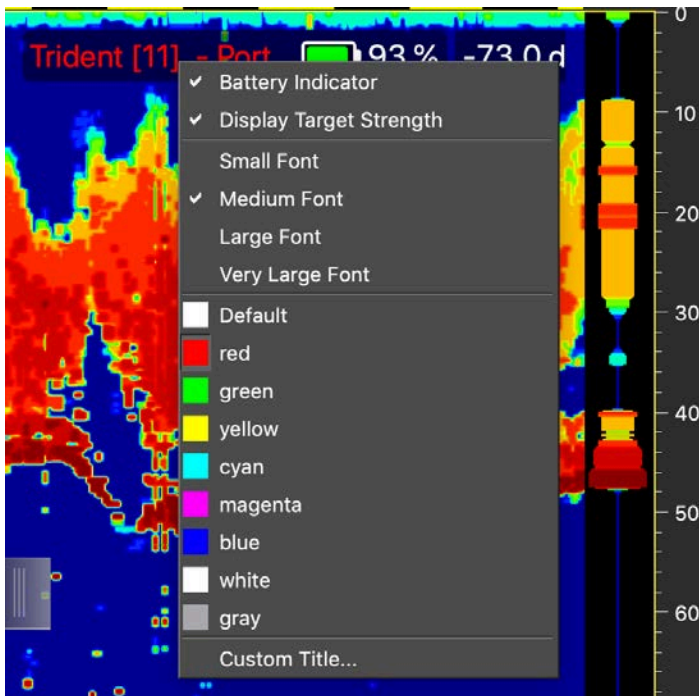
6. Select the type of display.



7. Drag the lines around the blocks of data to resize them.

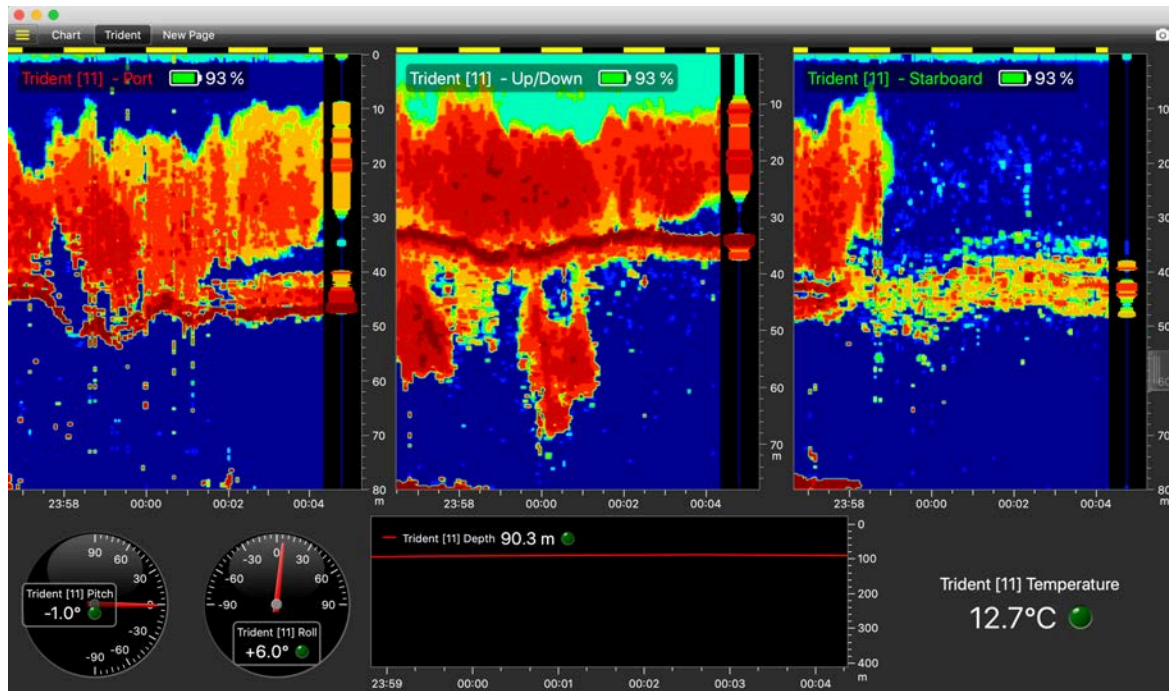




8. Right-click the title or the values of the data to display customization options.



9. To save the changes, right-click the tab with the name of the page and click **Save Changes**.


When you have finished customizing the page, you can have a screen display such as in this example.

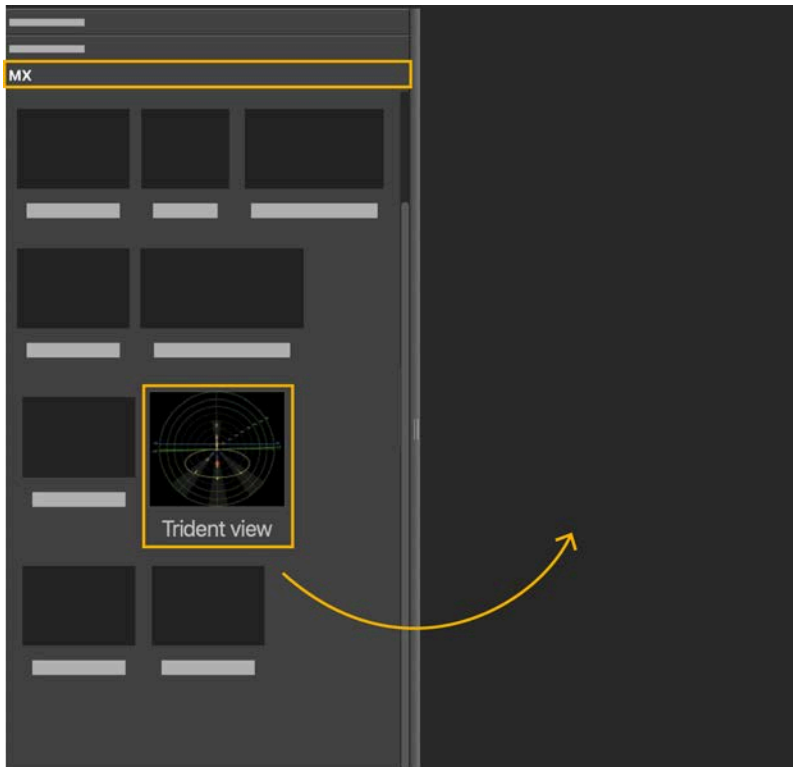


 **Note:** Deactivate the Customize mode when you have finished customizing pages: click **Menu**  > **Customize** again.

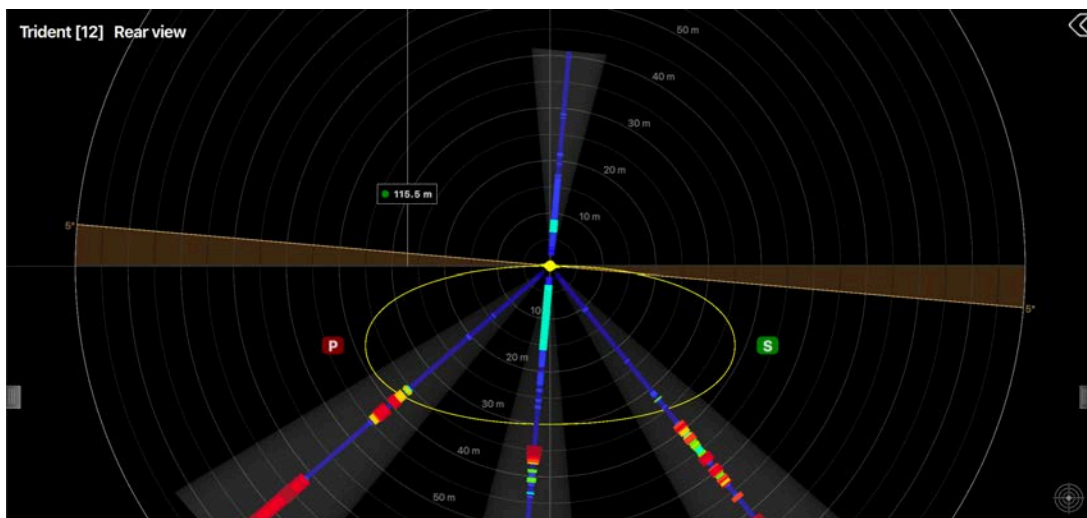
## Displaying the Trident View

Trident sensors have a dedicated 3D view, showing the echogram beams, the sounding range, the depth and roll values of the sensor.

1. Click **Menu**  > **Customize** and enter the password `eureka`.
2. Open the **Customize** panel on the left side of the screen, then drag **Trident View** to a page.



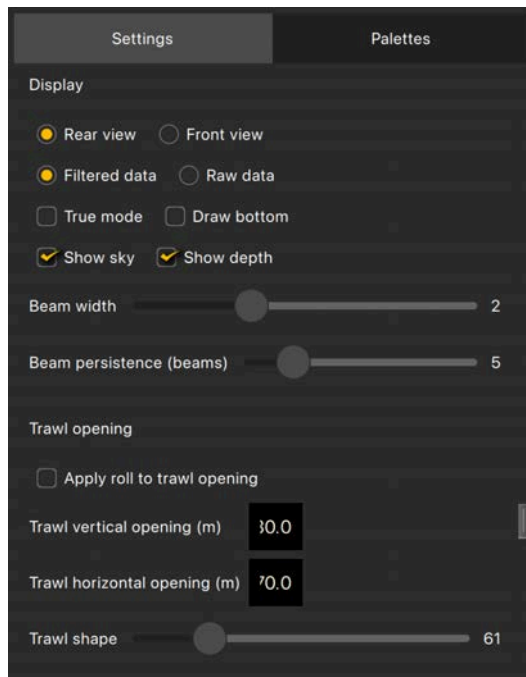
The view is displayed. Port and starboard sides are indicated. The roll values appear in red in the center of the view, on both sides of the sensor.



3. Click and drag inside the view to move it.

4. Click the arrow on the right side of the view to show the display options.

## Settings



### • Display:

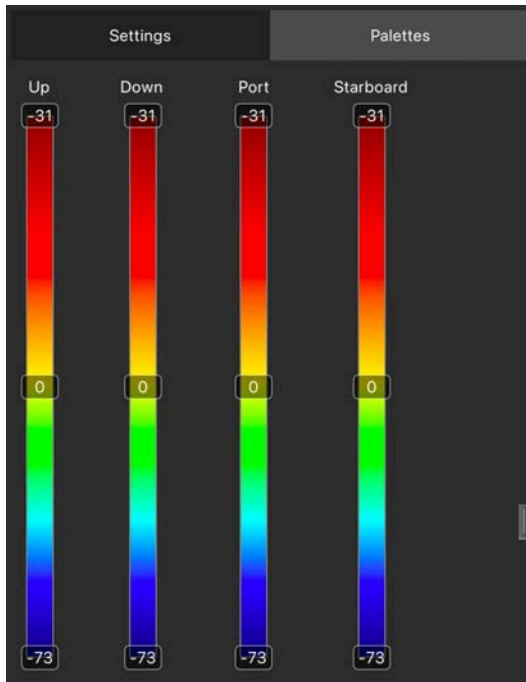
- Choose the viewing angle of the trawl between front and rear.
- Choose to display the filtered or raw data.
- **True mode:** the water surface is fixed so you can see the descent of the sensor.
- **Draw bottom:** show the detected seabed.
- **Show sky:** display a sky above the sea level.
- **Show depth:** display the distance between the sensor and the sea level.
- **Beam width:** increase the width of the echogram.
- **Beam persistence (beams):** the detections remain longer on the echogram image.

### • Trawl opening

- Select **Apply roll to trawl opening** so that the trawl opening (yellow circle) follow the roll movements measured by the sensor.
- You can enter a value for the trawl vertical or horizontal opening in order to correspond to the reality.
- **Trawl shape:** change the shape of the trawl opening, from oval-shaped to a rounded rectangle.


## Palettes

Use these palettes to change the echogram colors.



## Replaying Data Recorded on a SD Card

You can replay data that have been recorded in high definition on the SD card .

 **Note:** Data in high definition is available only when downloading them from the sensor memory. Data received in Scala2 will have a lower definition.

1. Download from Mosa2 the files recorded on the sensor memory.
2. Right-click the timeline and click **Change Directory** to choose the source directory where the files are stored.

In the replay bar, the recording period of the files in high definition is displayed in green.



In the control panels, data that were received in live are displayed in the **Mx** panel and data recorded on the SD card are displayed in the **A2S Data** panel.



3. Go to the control panels, then click and drag data from the **A2S Data** panel to a page.



# Installation

# Installation


Learn how to install the sensor on the trawl gear.


## Installing the Sensor on the Trawl

The Trident sensor must be installed on the headrope or footrope of the trawl using appropriate equipment.

Two installations are possible:

- Installation on the headrope: Trident is configured in **Down Looking** mode.
- Installation on the footrope: Trident is configured in **Up Looking** mode.

 **Notice:** Remove the Trident sensor from the trawl before winding the winch or you will damage the housing.

 **Note:** When fishing close to the surface, preferably install the sensor on the footrope in Up Looking mode. The acoustic communication with the vessel and echogram images will be better.

1. Place the sensor on the center of the net's headrope if it is in Down Looking mode or footrope if in Up Looking mode. The side with arrows must be oriented toward the vessel. Make sure the beams are oriented correctly, depending on the sensor application:

- **Trident Down Looking:** the face with one hole is facing up.



- **Trident Up Looking:** the face with three holes and one screw at the bottom is facing up.



2. Attach the sensor to the net using four soft shackles.



 **Note:** See **Technical Specifications (on page 10)** for shackles specifications.

3. You can add floats on either sides of the sensor to stabilize it and have pitch and roll values between +/- 5°.

# **Maintenance & Troubleshooting**


# Maintenance and Troubleshooting


Read this section for troubleshooting and maintenance information.


## Charging the Sensor with the Dock

Connect a sensor to one of the 4 charging connectors of the Dock to display its level of charge.


- Make sure the Dock is connected to a power supply and turned on.

 **Warning:** In case of water ingress in the product, do not charge it: battery may vent or rupture, causing product or physical damage.

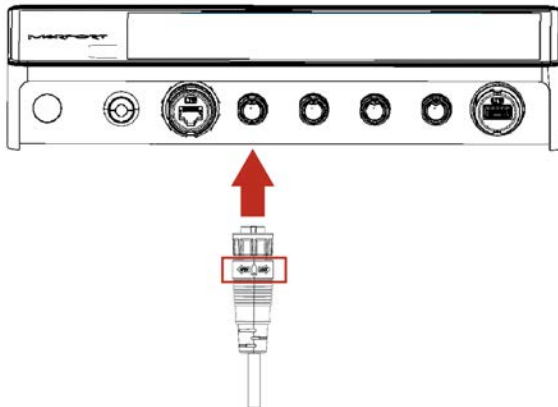
 **Note:** For Dock products with serial number before DOC2400000: Do not leave the sensors connected on a charger that is switched off. If the charger is not connected to the mains voltage, the sensor switches on and this will drain the battery.

 **Note:** Avoid full discharges and charge the battery whenever possible, at any battery level. Lithium-ion batteries do not have a charge memory, so they do not need full discharge cycles.

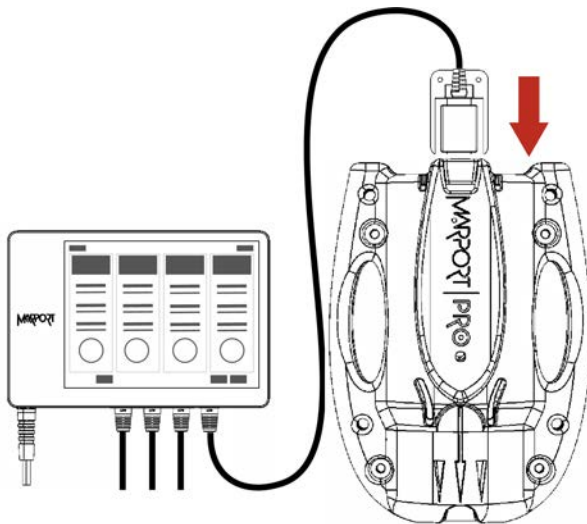
1. Before charging the sensor: wash with fresh water and dry the sensor. This prevent corrosion of the charging pins.

 **Important:** Check that the charging pins are not damaged. If they are, contact you local Marport dealer for replacement.

2. Connect the charger plug to one of the 4 charging ports.



3. Connect the 3-pin charging connector to the sensor charging pins.



The Dock screen and Virtual Charger Room display the state of charge of the sensor. A full charge takes approximately 7 hours.


## Cleaning the Sensor


You need to regularly clean the sensor for proper performance.

Wash the sensor with fresh water and dry it before you charge or store it.

Regularly check that the sensor is clean. If not:

- Wash away mud or debris with warm water.
- Use Isopropyl alcohol to clean the end cap and transducer. Use a steel wool pencil to clean the shoulder bolts, and very fine sandpaper (180 grit) to clean between them.

 **Notice:** Do not use highly abrasive materials or jet wash.

 **Notice:** Special care should be taken with sensors and components sensitive to mechanical shock or contamination.

## Maintenance Checklist

We recommend you to follow this maintenance schedule for better performance and to avoid any trouble with the equipment.

Before use	<ul style="list-style-type: none"> <li>• Check that all attachment equipment are not worn or torn. Replace when appropriate.</li> <li>• Check that the sensor is clean. See <b>Cleaning the Sensor (on page 63)</b> for cleaning procedures.</li> <li>• Check the battery level 24 hours before use and recharge if necessary.</li> </ul>
After use	Wash the sensor with fresh water.
Between uses	When the sensor is not in use, store in a dry area, without humidity, at a temperature between -10° and 70 °C (14 to 158 °F).
Not used for more than 3 months	<ul style="list-style-type: none"> <li>• Do not leave the batteries at full charge or discharged for a long period of time or they will wear out.</li> <li>• Every 6 months, put the sensor in charge for less than an hour.</li> </ul>
Every 2 years	The sensor must be returned to an approved Marport dealer for inspection and maintenance.



If the sensor has not been used for more than 3 months, we highly recommend to check the following points before using it:

- Make sure the sensors on the end cap are in good condition and clean.
- Connect the sensor to a charger and check the charging status.
- Switch on the sensor by shorting the center lug to the negative lug, then listen for a ping noise and check if you see the LED switched on.
- Test the sensor measures with Mosa2: depth, temperature, pitch, roll, and if applicable: spread distance, echogram, catch status, speed measures (using the EM log tester).
- If you have a test hydrophone, check the reception in the wheelhouse with Scala.

## Troubleshooting

Learn how to solve common problems.

### Mosa2 does not open due to error message

*Mosa2 displays an error message saying it cannot be opened.*

→ Your Mac security preferences do not allow you to open applications not downloaded from the App Store.

1. From the upper left corner of the screen, click **Apple menu > System Preferences > Security & Privacy** .
2. Click the lock icon and enter the password, if applicable.
3. At **Allow apps downloaded from**, select **Anywhere**, then close the dialog box.
4. **macOS Sierra or later: Anywhere** option is not displayed by default. To display **Anywhere**:
  - a. Click the magnifying glass from the top right corner of your screen and type `Terminal`.
  - b. Click **Terminal** from the results.
  - c. Enter in the terminal: `sudo spctl --master-disable`.
  - d. Press Enter.

**Anywhere** option is now displayed in **Security & Privacy** preferences.

## Sensor does not connect correctly with Mosa2 when using the Configuration Cable



**Remember:** If the sensor does not connect correctly with Mosa2, always:

- Disconnect both USB connector and three-pin plug.
- Connect again the Configuration Cable.
- Make sure the three pins are fully inserted inside the sensor.

→ Mosa2 does not automatically open when connecting the Configuration Cable.

- Check that you see Marport Captain icon in the desktop taskbar. If you do not see it: close, then open Mosa2. The icon should appear in the taskbar.



**Note:** Marport Captain is a program running in the background. It allows Mosa2 automatic opening and displays shortcuts to Mosa2 and Scala applications installed on the computer. It should not be closed.

- If the problem persists, install Mosa2 again.

→ At the end of step 2 of the configuration wizard, the sensor does not respond. Mosa2 displays a red cross and the Configuration Cable LED is red.

- Check that no other instance of Mosa2 application is already running on the computer. If this is the case, close both applications, then open only one.
- Or else, connect the sensor to a charger and wait until it is fully charged.

→ The sensor has been disconnected from Mosa2.

- Check that the Configuration Cable is not connected to a USB hub. The Configuration Cable must be connected directly to the computer.
- If the computer goes to sleep mode, the sensor may be disconnected. Change the settings on your computer to increase the time before sleep mode.
- If the problem persists, connect the sensor to a charger and wait until it is fully charged. Then try again to connect.

→ Mosa2 displays a critical error message.

- Disconnect both USB connector and three-pin plug. Then, connect again the Configuration Cable. If the message is still displayed, it means there is an issue with the sensor's components. Contact Marport support.

## The Dock screen does not display all the details of the Trident or Door Explorer sensor

*When connecting a Trident or Door Explorer sensor to a Dock charger plug, the Dock screen displays only the level of charge of the sensor and the sensor cannot be configured on Mosa2.*


→ The firmware version of the sensor is earlier than FIRM450-02.01.15.


Update the sensor firmware to an A2S firmware version **FIRM450-02.01.15 or above**, and bootloader version **FIRM445-02.00.06** or above, using the Configuration Cable connected to the computer.

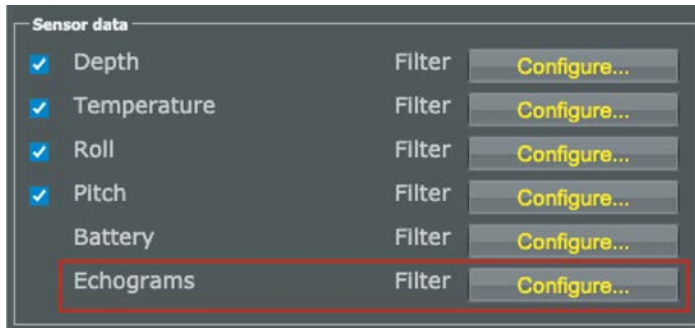
See .

## The echogram has a lot of interference

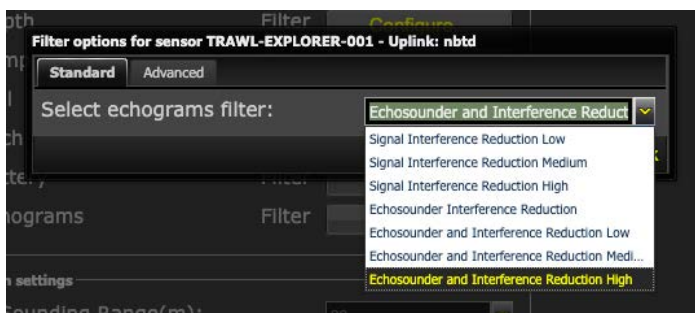
→ There is interference from environmental noise or other equipment such as echosounders. You need to increase the level of the echogram filter in Scala2.

 **Important:** Increase the level of the echogram filter only if the echogram has a lot of interference. Be aware that this filter will remove small targets.

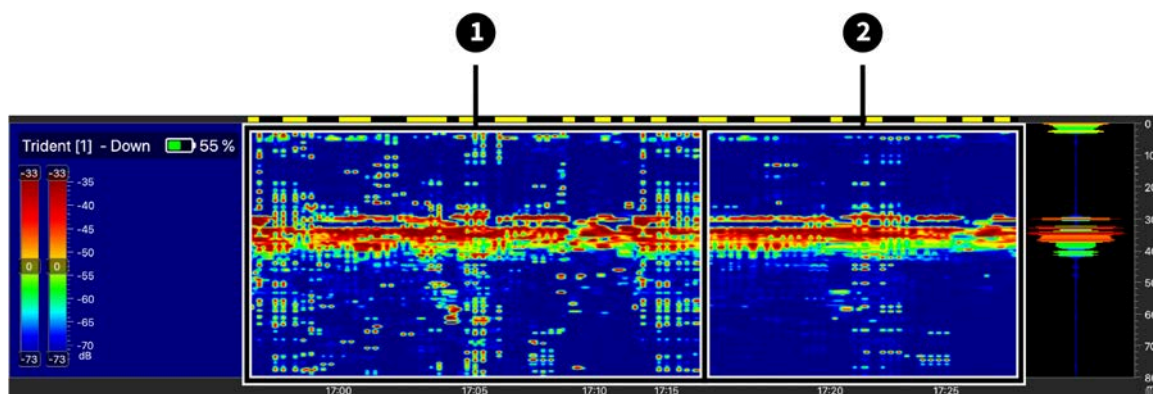
1. From Scala2, click **Menu**  > **Expert Mode** and enter the password `copernic`.
2. Right-click the IP address of the receiver at the bottom of the page, then click **Configure Receiver**.
3. Click the name of the sensor in the system tree view.
4. In **Sensor Options**, click **Configure** in front of **Echograms**.



5. In **NBTE Echograms Filter**, select **Echosounder and Interference Reduction Medium** or **Echosounder and Interference Reduction High**.



Here is an example of result when applying this filter:



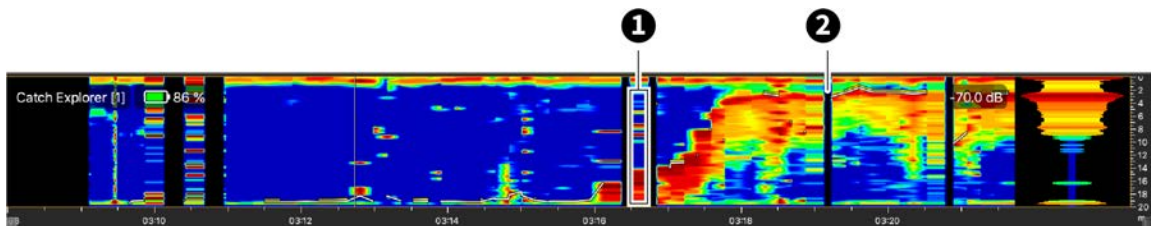
1. Noisy echogram with default filter ( **Echosounder and Interference Reduction Low** )

2. With **Echosounder and Interference Reduction High** filter applied.

## The echogram display is interrupted

*The echogram displayed in Scala2 has black gaps, as shown on the picture below.*


→ There is a loss of communication between the sensor and the boat. If the acoustic signal from the sensor is not received, the last sonar data is repeated for a few seconds, then stopped. This will show black lines on the echogram.




1. Repeated sonar data / 2. Loss of reception

Do the following actions to diagnose the issue:

1. Check the frequencies of the other sensors and make sure there is enough distance between them.
2. Check the noise on the spectrum (see ). If the frequency where the sensor is placed is too noisy, change for a less noisy frequency.

 **Important:** Do not forget to also change the frequency on the system web page in Scala2.

3. You can change the echogram filter settings on the system web page:
  - a. From Scala2, click **Menu**  **> Expert Mode** and enter the password `copernic`.
  - b. Right-click the IP address of the receiver at the bottom of the page, then click **Configure Receiver**.
  - c. From the left side of the page, click the name of the sensor.
  - d. From the sensor configuration page, click **Configure** next to **Filter**.
  - e. From NBTE Echograms Filter select **Echosounder and Interference Reduction Medium** or **High**.

## The sensor is not running when testing out of water

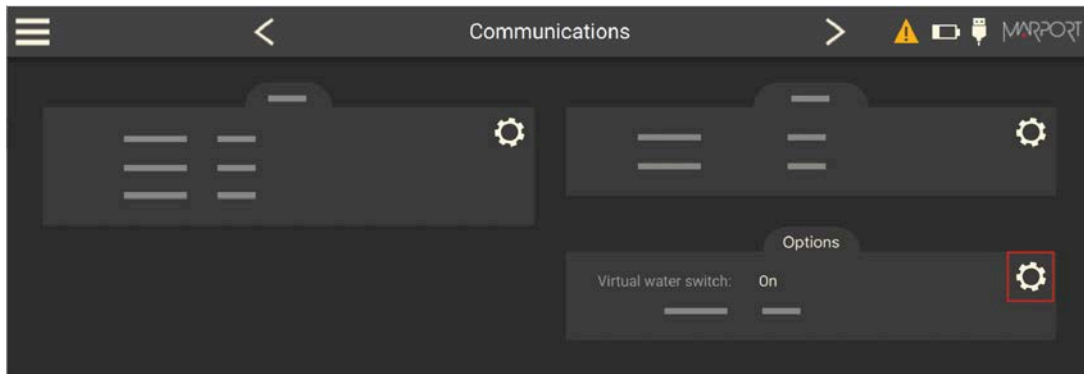
*You activated the sensor water-switch outside water or in a low level of water (for example for testing purpose) but it does not switch to running mode and does emit any data.*

→ The virtual water-switch option may be activated in Mosa2. When this option is activated, the sensor runs only at a depth more than 2 meters. For more details, read **About the Virtual Water-Switch Option (on page 22)**.

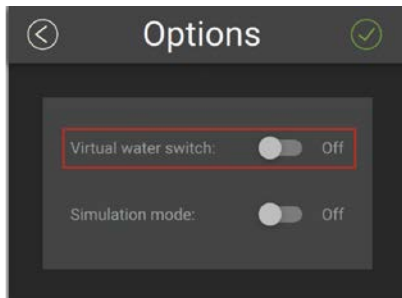
1. Connect the sensor to Mosa2 and check if there is an orange warning sign at the top of the window. If yes, it means the virtual-water switch is on.



2. Go to **Communications** page, then in **Options**, click .



3. Deactivate the **Virtual water switch** option.



# Support Contact

You can contact your local dealer if you need maintenance on your Marport products. You can also ask us at the following contact details:

## FRANCE

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8, rue Maurice Le Léon  
56100 Lorient, France  
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csanter@marport.com

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32 Wilson Street  
Peterhead, AB42 1UD, United Kingdom  
gyoungson@marport.com



# Appendix

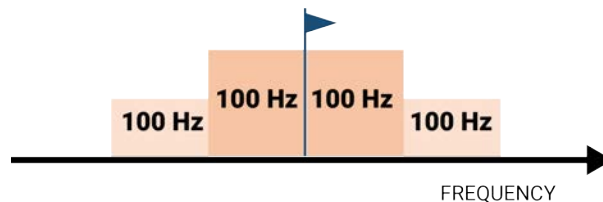
## Frequency Plan

It is important to carefully plan the setup of your sensors before adding them to the system. You can create a table with a list of frequencies and complete it when you add sensors.

### Frequencies and intervals

The diagrams below show the bandwidth of the different types of Marport sensors and intervals you must respect when adding other sensors.

Figure 1. PRP sensors (e.g. Catch sensor, Trawl Speed, Spread sensor...)



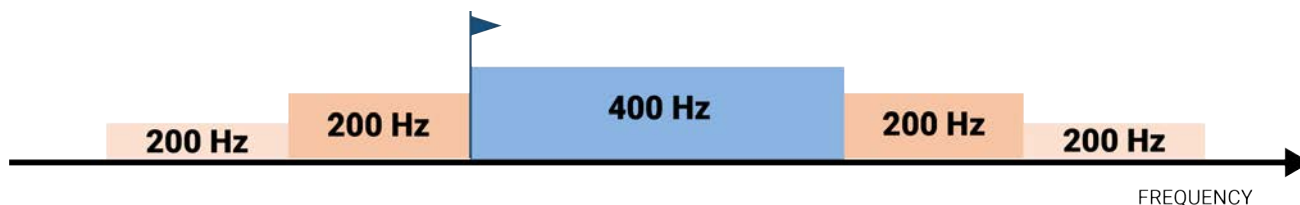
Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.9 and 40.1kHz.

Figure 2. Marport Pro sensors (e.g. Trident, Door Explorer, all Navigator range except Catch)



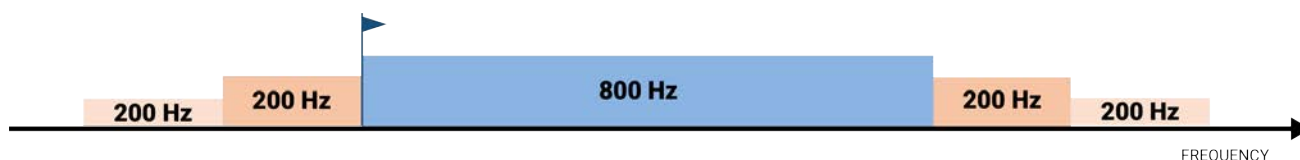
Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.8 and 41.2kHz.

Figure 3. NBTE sensors (e.g. Speed Explorer, Trawl Explorer, Catch Explorer, Catch Navigator, Door Sounder)



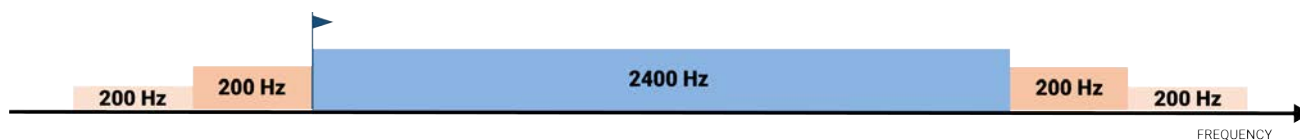
Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.8kHz and 40.6kHz.

Figure 4. HDTE narrow band mode



Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.8kHz and 41kHz.

Figure 5. HDTE wide band mode



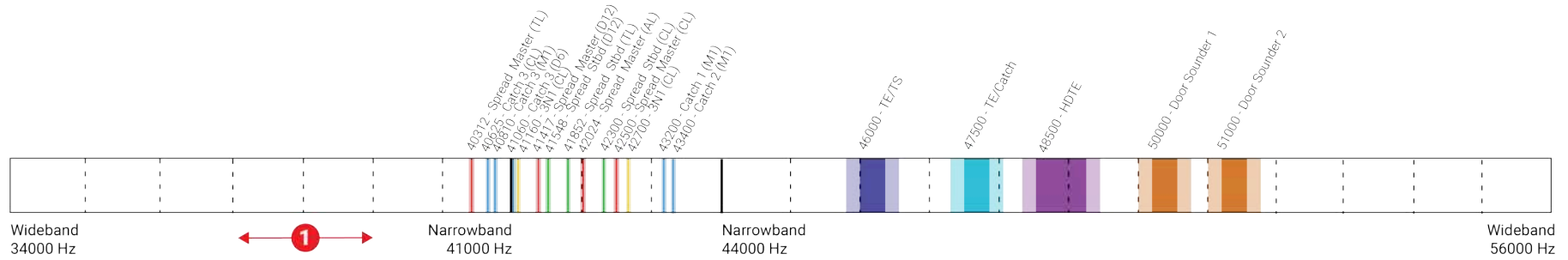
Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.8kHz and 42.6kHz.

- 
- Frequency of the sensor
  Bandwidth
  Mandatory distance with other sensors
  Recommended distance with other sensors

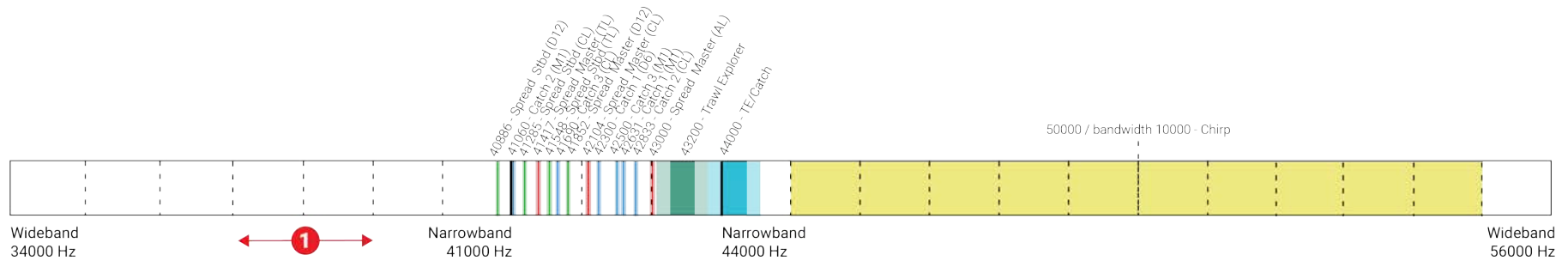
### **Examples of frequency allocations**

- We recommend to allocate frequencies between 34 and 56 kHz for wideband hydrophones and between 41 kHz and 44 kHz for narrowband hydrophones.
- Echosounders are usually placed around 38 kHz, make sure to allow enough distance with them.

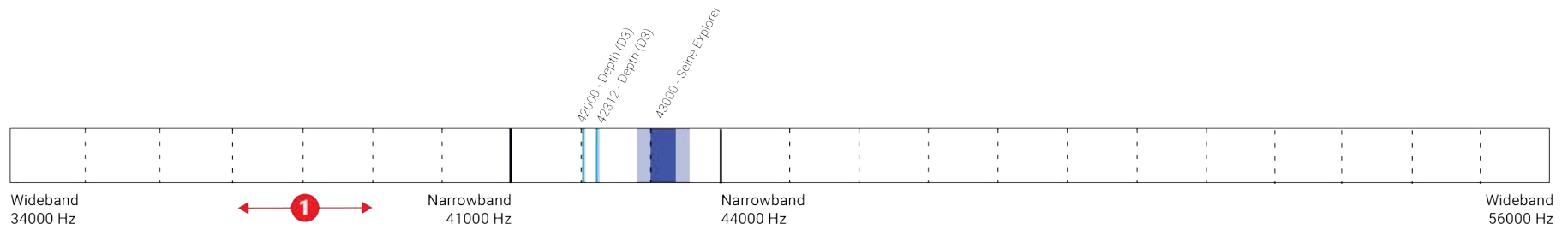
Example of a system with Spread, Catch, Trawl Speed sensors and Speed Explorer, Catch Explorer, HDTE and Door Sounder.





Example of a system with Spread sensors with positioning, Catch sensors, Trawl Explorer and Catch Explorer.



Example of a system for purse seining, with a Seine Explorer and depth Seine sensors.



-  Bandwidth
-  Mandatory distance with other sensors

**1** Avoid allocating frequencies between 37 and 39 kHz because this range is generally used by echosounders.

# Index

---

## A

Alarms

Concept **23**

Automatic range **29, 32**

---

## B

Battery

Lifetime **20**

Boat code **73**

---

## C

Channel code **73**

Charging see Dock

Cleaning **63**

Components **13**

Configuration Cable **18**

Troubleshooting **66**

---

## D

Diagnostic **23**

Dimensions **10**

Display

Echogram **47**

Dock **62**

Charging **62**

Connecting to Mosa2 **18**

---

## E

Echo sounder **29**

End cap **13**

---

## F

Frequency plan **73**

---

## H

Housing

Description **13**

Trawl Navigator **13**

Trident **13**

---

## M

Maintenance

Schedule **64**

Measures **34**

Mosa2

Opening **18**

Mosa2 configuration

Change **38**

Delete **38**  
Export **41**  
Import **41**  
Save **38**

SD card **55**

---

## O

Offsets  
Depth **33**  
Temperature **33**  
Operational modes **15**

---

## P

PCBA **13**  
Ping level **29**  
Pulse frequency **29**  
Pulse type **29**

---

## R

Range **29**  
Receiver  
Adding to **44**  
Compatibility **44**  
Compatible firmware **44**  
Sensor settings **45**  
Replay  
A2S files **55**

---

## S

Scala2 **47**  
SD card  
Downloading data **36**  
Recording **36**  
Time synchronization **36**  
Sounding mode **29**

---

## T

Technical specifications **10**  
Trawl  
Node **24**  
Trawl opening **29**  
TVG (Time Variable Gain) **29**

---

## U

Uplink  
Frequency **26**  
Power **26**

---

## V

Virtual water-switch **22, 70**

---

**W**

Warning **23**