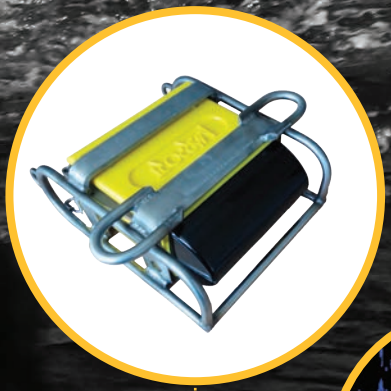
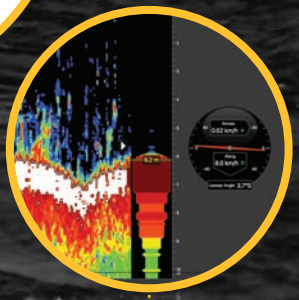
Speed Sensors User Manual





MARPORT

Contents

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History

V1	07/12/17	First release
V2	03/09/18	• New topic: About Time Variable Gain on page 27
V3	07/06/18	• New troubleshooting topic: Sensor cannot connect in wireless connection on page 62 • Interference Check on page 53: more detailed information about **Spectrum** page.
V4	11/30/18	• Frequency Plan on page 67: drawings have been changed, frequencies are now allocated between 34 kHz and 36 kHz and frequency ranges of narrowband and wideband hydrophones are indicated.
V5	07/16/20	Now documents Mosa2 version 02.03, Scala version 01.06.34 and Scala2 version 02.02.
V6	03/08/21	• Now documents Mosa2 version 02.05. • Connecting the Sensor to Mosa2 on page 20: added guidance on how to connect sensor to Mosa2 using the Configuration Cable product. • Added troubleshooting topic: Sensor does not connect correctly with Mosa2 when using the Configuration Cable on page 63 • Installing Speed Sensors on the Trawl on page 49: added guidance on how to install the Speed Explorer with the pins facing up. • Technical Specifications on page 14: added dimensions of the board used for inverted installation. • Added details on the **Down 1 + Down 2** sounding mode in Configuring the Uplink, Up and Down Settings on page 23. • Outputting Scala/Scala2 Symmetry Data to Scantrol on page 46: added details about the computer IP address. • Added contact details for the sales offices in South Africa and Norway in Support Contact on page 66.

V7	07/05/21	• Now documents Scala2 version 02.04 and Mosa2 version 02.07. • Replaced term Configuration Plug by Configuration Cable. • Connecting the Sensor to Mosa2 on page 20: Updated distance between other electrical devices and the computer: 1 m instead of 50 cm. •
V8	08/04/22	• Now documents Scala2 version 02.10.x and Mosa2 version 02.11.x . • Added guidance about connecting the sensor to Mosa2 using the Configuration Cable and Dock in Connecting the Sensor to Mosa2 on page 20. • Added guidance about charging the sensor with the Dock in Charging the Sensor on page 58. • Replaced DealerWeb website by Marport Authorized Service Provider (MASP). • Added contact details of the sales office in United Kingdom, and updated contact details of Iceland sales office.

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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:

- Scala: 01.06.06-01.06.34 / Scala2: 02.10.x
- Mosa2: 02.11.x

Patents apply to products. U.S. Patents 9,772,416; 9,772,417

Introduction and Presentation

Read this section to get a basic knowledge of your Speed sensor.

Tip: Click Marport logo at the bottom of pages to come back to the table of contents.

Introduction

Marport's speed sensor family includes two categories of sensors:

- The Flow sensors, that include the Trawl Speed sensor, Grid sensor and Symmetry sensor.
- The Speed Explorer

They all track pitch and roll data. Each of them has different functions and purposes.

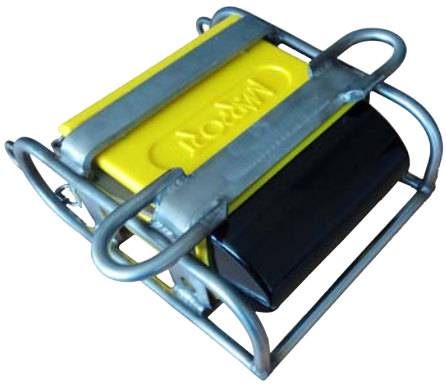
The Grid sensor is placed on the grid of a trawl. It tells you if the grid does its job: selecting out the unwanted catch while target species enter the codend. It monitors the angle of the grid and the flow of water passing through it. This way, you know if the grid is twisted or blocked and you can fix the problem before losing significant catches.

The Trawl Speed sensor can be placed on the headrope. It measures water flow in two axis: the flow along the direction of the trawl and across it. You can control if the trawl is moving at the right speed and with the right geometry. It measures along speed up to 6 knots and cross currents speed up to 3 knots.

The Symmetry sensor is placed on the headrope. It measures the across speed, so that you can control if the trawl is perpendicular to the current.

Finally, the Speed Explorer has the functions of a Trawl Speed sensor and a Trawl Explorer sensor combined. Placed on the headrope or tunnel, it measures water flow along the direction of the trawl (up to 10 knots) and across it (up to 3 knots) and displays an echogram. This way, you can see fish passing through the trawl and have an overview of the trawl's opening and the effects of the currents around it. It also track pitch & roll, depth and temperature data. Data is received more often than with the other speed sensors.

Speed sensors are compatible with Scantrol software.



Note:

Scala

Scala2

These labels tag topics or actions that are specific to Scala and/or Scala2. Depending on the version you have, you may follow either one of these labels.

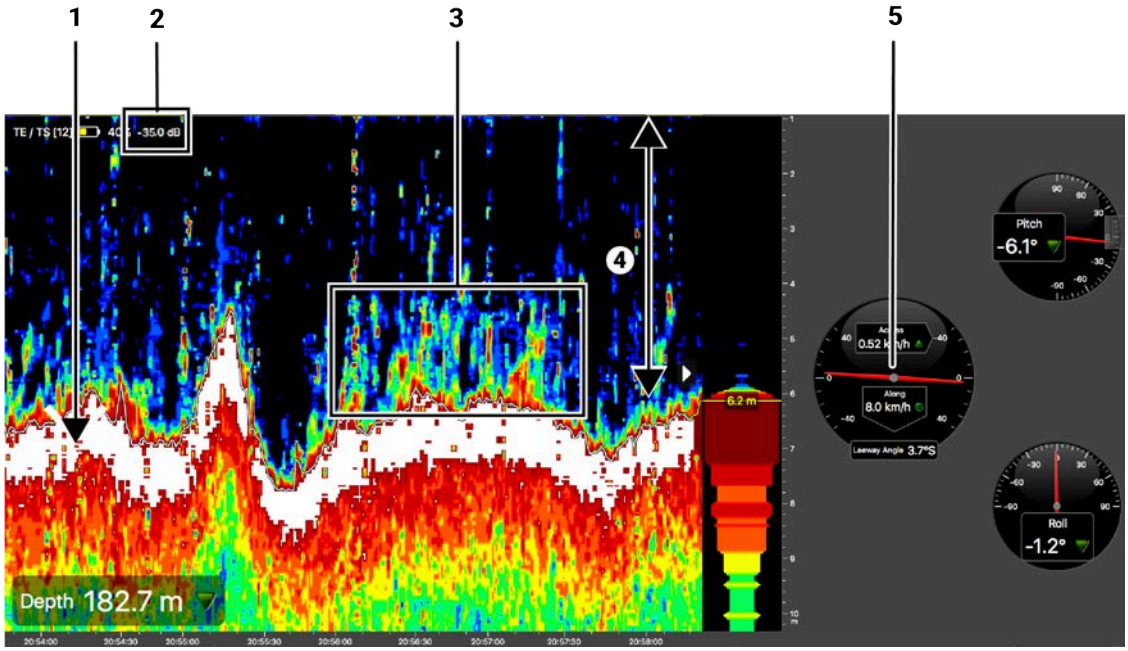
Applications

Here are some examples of data received from Grid, Trawl Speed and Speed Explorer sensors and displayed in Scala/Scala2.

Grid sensor display

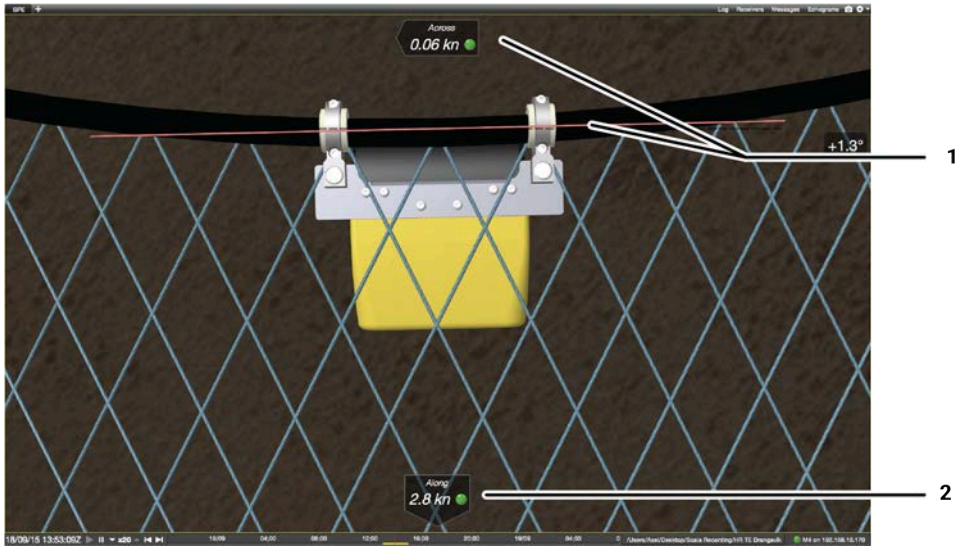
1. Control the angle of the grid (45°) / **2.** Check the water flow to know if the grid is blocked

Speed Explorer display



1. Seabed / **2.** Target strength (only for V3 version of sensors) / **3.** Haddocks / **4.** Trawl opening / **5.** Trawl Speed dial: displays water across and along speeds.

Trawl Speed 3D view



1. Control if the trawl opening has the correct angle. Across speed needs to be around 0.

2. Control the speed of the water along the trawl, and adjust your speed according to the currents.

Safety Guidelines

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

Basic good practices

When using the product, be careful: strong impacts can cause damage to the electronic components inside.

Never place the product in a hazardous and/or flammable atmosphere.

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.

Only qualified Marport dealers can do maintenance and repairs on internal components of the sensors.

Precautions

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

About Water Speed and Trawl Geometry

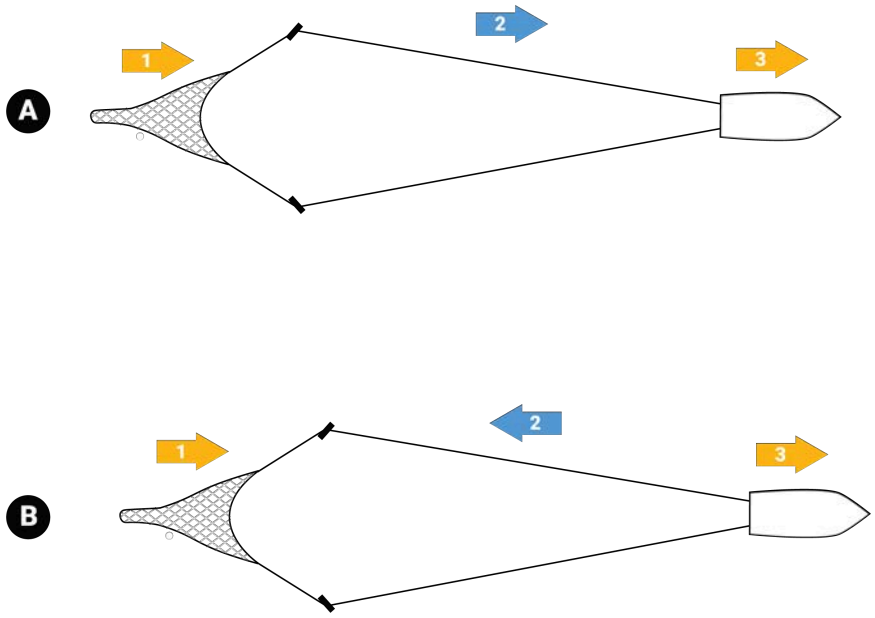
Along Water Speed

The along water speed is the trawl longitudinal speed through water (relative to the water). It is different from the GPS speed. The GPS speed of the vessel is the speed of the vessel relative to the ground. The along water speed depends on the current, bearing, pitch and roll of the trawl or vessel.

The trawl and fish are in the same frame of reference: water. Therefore, it is important to know the speed of the trawl through water. Each type of fish has his own speed and behaviour. If you know the water speed in the trawl, you will be able to adapt the speed for the fish you are looking for.

For example, you want the trawl speed to be at 5 knots relative to the water, and you have a GPS speed of 5 knots:

- If the along water speed is inferior to the GPS speed, it means there is a co-current. If the trawl does not go fast enough, fish could go faster and escape the trawl. So, for example, if the along water speed is at 4 knots, it means there is a co-current of 1 knot. You need to increase the GPS speed of at least 1 knot to make the trawl go faster.
- If the along water speed is superior to the GPS speed, it means there is a counter-current. If the trawl goes too fast against the current, there will be pressure inside the trawl and fish may get damaged or ejected. You will also increase your fuel consumption. So, for example, if the along water speed is at 7 knots, it means there is a counter-current of 2 knots. You need to decrease the GPS speed of 2 knots, to be at 5 knots through water.



A. The along water speed is 4 knots (**1**) and the GPS speed of the vessel is 5 knots (**3**). It means there is a co-current of 1 knot (**2**). You need to increase the GPS speed of 1 knot.

B. The along water speed is 7 knots (**1**) and the GPS speed of the vessel is 5 knots (**3**). It means there is a counter-current of 2 knots (**2**). You need to reduce the GPS speed of 2 knots.

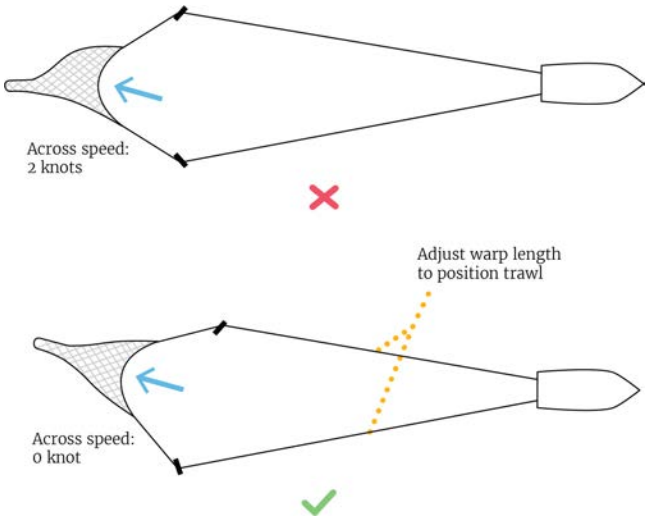
Across Water Speed

Your trawl opening must be perpendicular to the current in order to catch more fish. The sensors measure the across water speed, that allows you to know if the trawl opening is perpendicular or not.

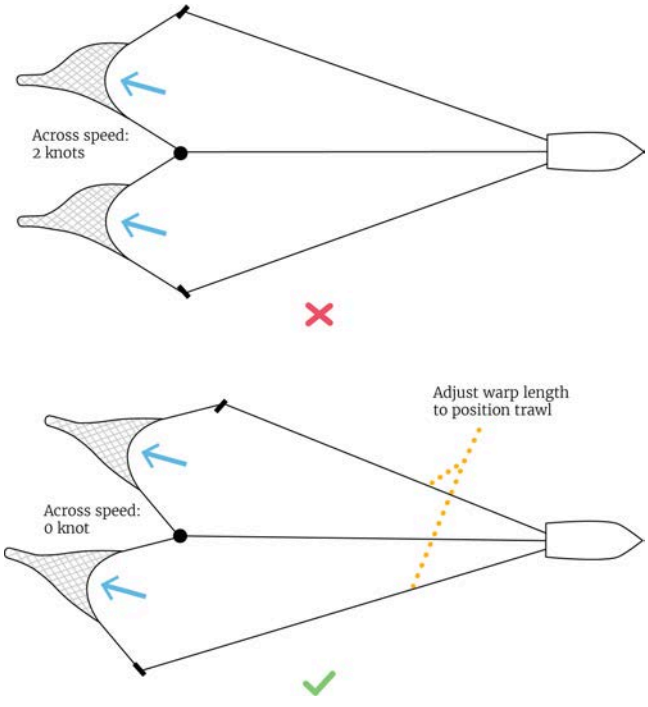
If the trawl is not perpendicular to the current, it can impact its geometry and create non-uniformity in the mesh size. As a result, you could catch non-targeted species.

When the across speed displayed on Scala/Scala2 is 0, it means the trawl is perpendicular. If it is superior, it means the trawl is not well positioned and you may loose fish. You need to adjust the warp length to make the trawl face the current.

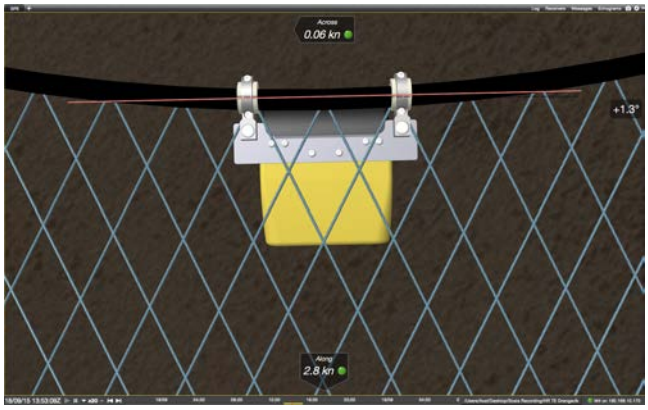
Single Trawl



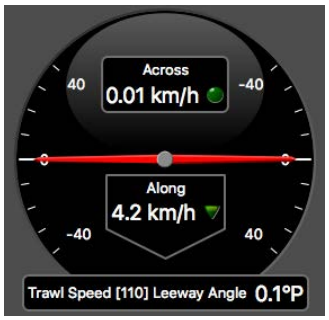
Twin Trawl



To see the water speeds and identify the trawl position, from Scala/Scala2, look at the Trawl Speed 3D view or Trawl Speed dial.



Scala



Scala2

Description

Firmware

Each category of sensors have different options.

Product Category	Product Name	Specific Options	Firmware Name	Firmware Number
Flow sensors*	Trawl Speed	Along and across speeds	3N1 V2 with pitch and roll	FIRM058
	Symmetry	Across speed only		
	Grid	Along speed and grid angle		
Speed Explorer	TE/TS V2	Echogram with autorange, depth, temperature, along & across speeds.	TE/TS	FIRM056
	TE/TS V3	Echogram with autorange, target strength values, depth, temperature, along & across speeds.	TE/TS V3	FIRM059

*Firmware for Flow sensors is the same for the 3 types of products. The type of product needs to be configured on Mosa2. You can also activate/deactivate the pitch and roll option on Mosa2.

Technical Specifications

Flow sensors

Uplink frequency	30 to 60 kHz
Range to vessel	up to 2500 m*
Data update rate	Along/across speed: trawl speed and grid max. every 14 sec. - Symmetry: max. every 28 sec. - Pitch&Roll: 8 to 15 sec. (depends on settings)
Depth range	up to 1600 m
Depth resolution	0.1m with 0.1% accuracy
Pitch angle	±90°
Roll angle	±180°
Pitch & roll accuracy	±0.1°
Temp measurement range	-5° C to +25° C
Temp accuracy	±0.1° C

Across speed range	Up to ± 3 knots
Along speed range	Up to ± 6 knots
Speed resolution	0.1 knot
Across and along speed accuracy	±0.1 knot
Typical battery life	Up to 80 hours**
Charging time	Standard: 8-12 hours †
	Fast charge: 4 hours
Battery type	Lithium-Ion
Weight of Trawl Speed and Symmetry sensors (sensor + protection cage) in air	22.4 kg
Weight of Trawl Speed and Symmetry sensors (sensor + protection cage) in water	13 kg
Weight of Grid sensor and protection cage in air	19 kg
Weight of Grid sensor and protection cage in water	11.3 kg
Warranty	2 years (Sensor & Battery) ‡

Speed Explorer

Uplink frequency	30 to 60 kHz
Range to vessel	up to 2500 m*
Sounder broadband frequency	Configurable between 120-210 kHz
Sounder range	5 to 160 m
Data update rate	Depth: 1-8 sec. - Temp/Battery/Altitude/ Pitch&Roll: every 6 sec. - Along/Across speed: every 7 sec.
Echogram update rate	Up to 3 images per second
Pitch angle	±90°
Roll angle	±180°
Pitch & roll accuracy	±0.1°
Depth resolution	0.1m with 0.1% accuracy
Temp measurement range	-5° C to +25° C
Temp accuracy	±0.1° C
Across speed range	Up to ± 3 knots

Along speed range	Up to ± 10 knots
Speed resolution	0.1 knot
Across and along speed accuracy	±0.1 knot
Typical battery life	Up to 50 hours**
Charging time	Standard: 8-12 hours †
	Fast charge: 4 hours
Battery type	Lithium-Ion
Weight of sensor + protection cage in air	22.4 kg
Weight of sensor + protection cage in water	13 kg
Warranty	2 years (Sensor & Battery) ‡

*Reference only. Depends on functions enabled. / † Based on average charging time. / ‡ Marport Standard Marine Limited Warranty / **Depends on sensor uplink power.

Speed Explorer Beamwidths

Beamwidths for Uplink pings:

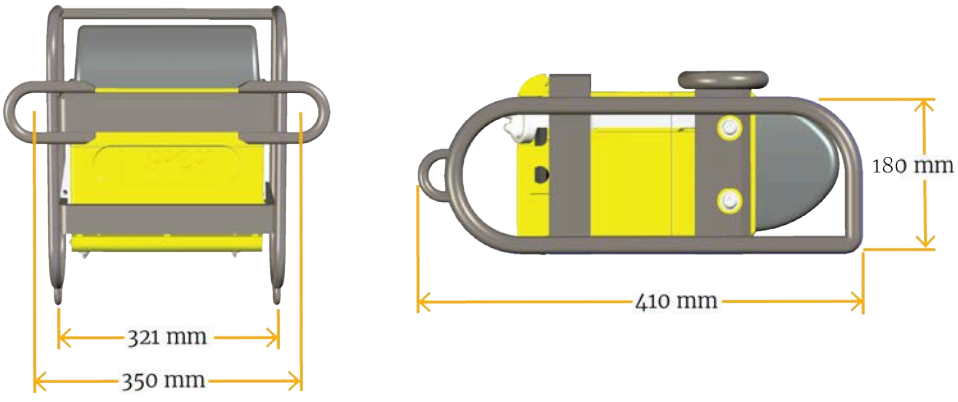
Beamwidth	**@ 35 kHz**	**@ 50 kHz**	**@ 60 kHz**
-3dB	46°	40°	30°

Beamwidths for Up and Down pings:

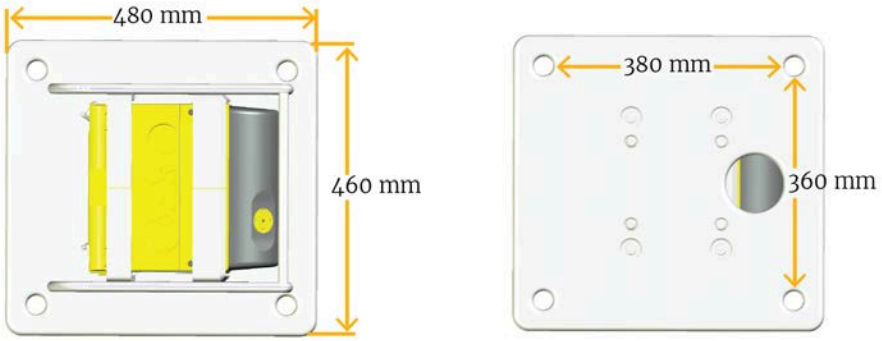
Beamwidth	**@ 125 kHz**	**@ 160 kHz**	**@ 200 kHz**
-3dB	26°	24°	22°

Outline Dimensions

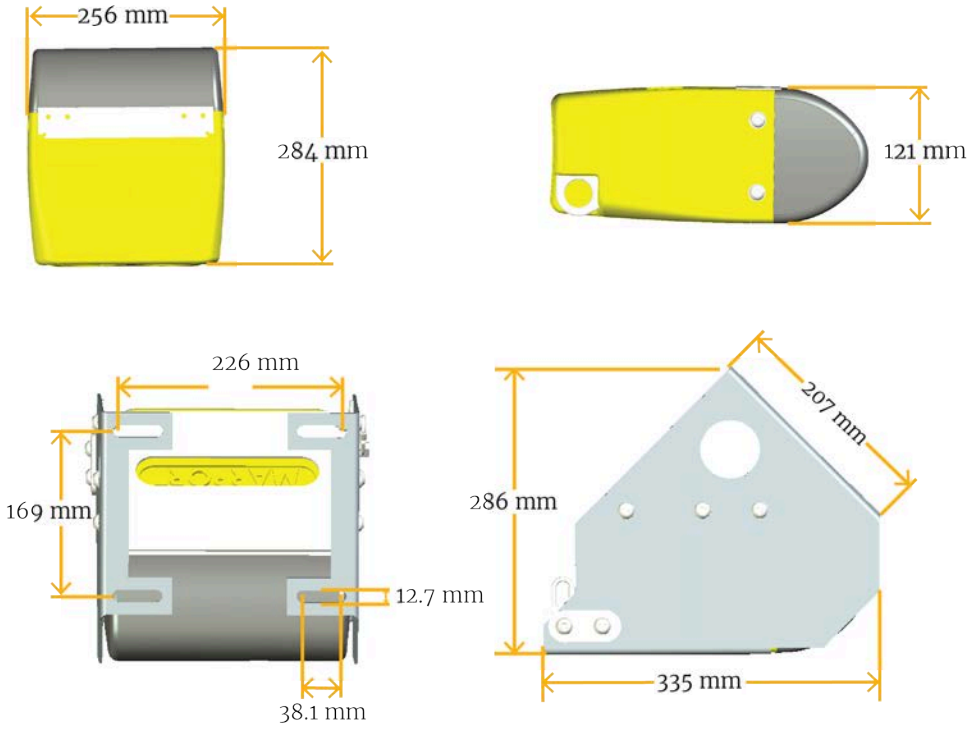
Trawl Speed, Symmetry and Speed Explorer sensors



Speed Explorer with a board for inverted installation

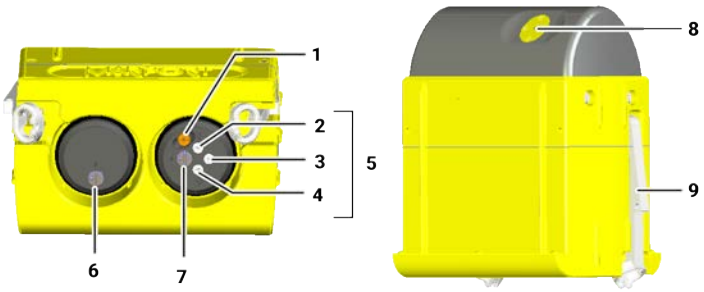


Grid sensor



Main Parts

External View



1. Temperature sensor
2. Negative charge
3. Water switch
4. Positive charge
5. Shoulder bolts
6. Pressure-relief spring
7. Pressure sensor
8. EM log pins
9. Latch

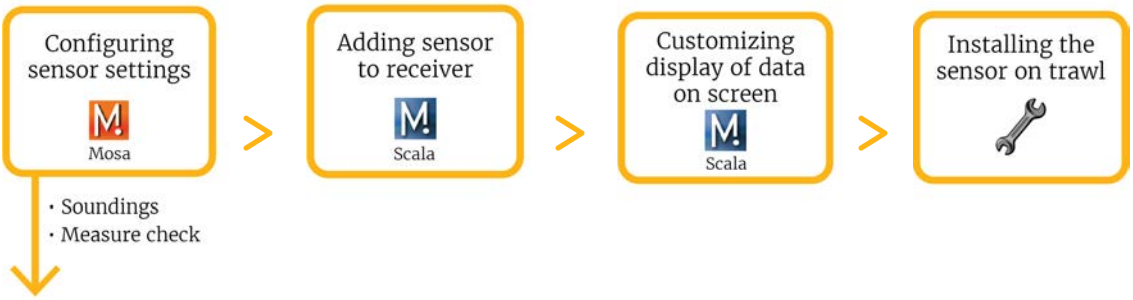
CAUTION:

- Do not put foreign objects into pressure sensor opening or try to open it.
- Do not remove the shoulder bolts from the outside of the sensor.

It may damage the components.

Installation Steps

Click an installation step to jump directly to the corresponding section.



Note: You can customize the display of data on Scala/Scala2 at any time.

Sensor Configuration

Learn how to configure the sensor settings.

Note: This guide refers to the following versions of **Mosa2:** 02.11.x . If you use another version, the visual interface and options may vary.

Connecting the Sensor to Mosa2

To configure the sensor, you need to connect it to Mosa2 using a wireless communication or using the Configuration Cable.

Using a Wireless Connection

About this task

Important: Mosa 2.11 running on macOS Monterey: A1 sensors cannot connect by short range wireless signal. You must use a Configuration Cable.

Procedure

1. Open Mosa2.

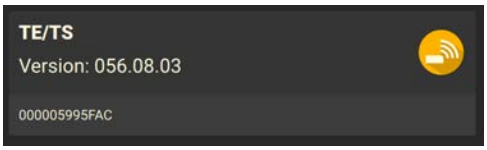
2. Connect the water-switch.

The light on the transducer flashes red.

3. Disconnect the water-switch.

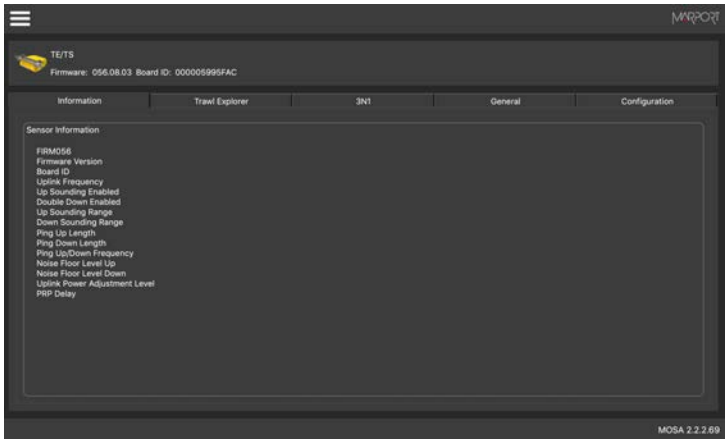
After a few seconds, the light flashes green.

4. Wait a few seconds for the sensor to be recognized. When it appears in the discovery page, click .



Results

The sensor configuration pages are displayed.



Using the Configuration Cable

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

About this task

Note: Compatible with Mosa2 02.05.x and above.

Tip: Refer to the Configuration Cable Quick Reference Guide for more details about the use of this product.

Procedure

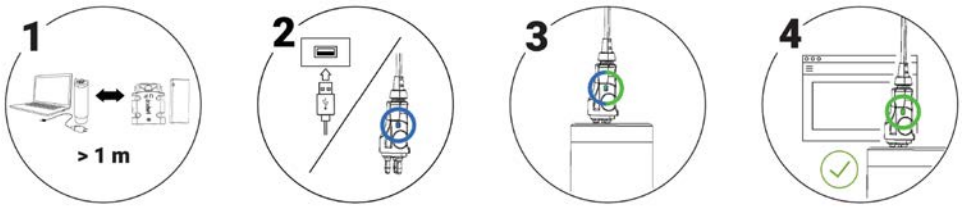
1. Move other electrical devices minimum 1 m away from the computer.
2. Connect the USB connector directly to the computer.

   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.

Example



What to do next

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.

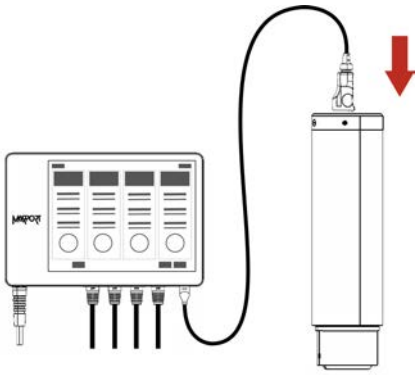
Using the Dock and a Configuration Cable

About this task

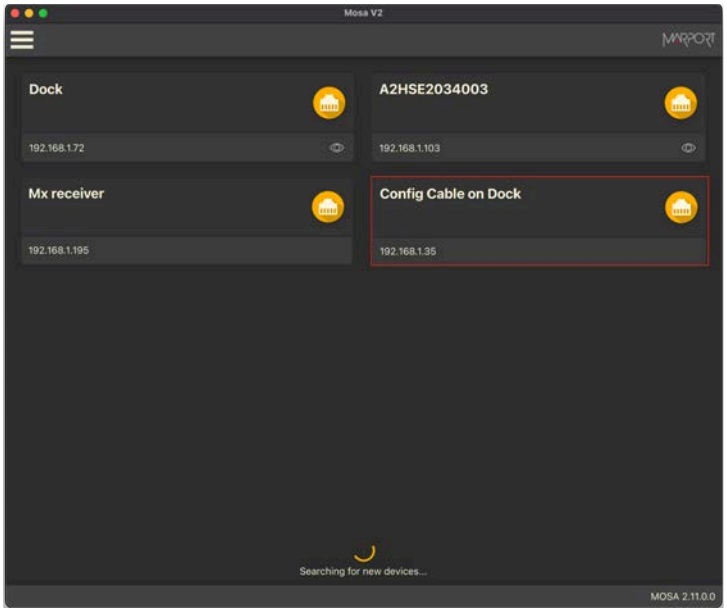
Note: Compatible with Mosa2 02.11.x and above.

Procedure

1. Connect the USB connector of the Configuration Cable to the Dock and the plug to the sensor's endcap.



2. Open Mosa2. The Configuration Cable is displayed on the discovery page.



Click to open the sensor configuration page.

3. To leave Mosa2 configuration page and come back to the discovery page, click ≡ > **Disconnect**.

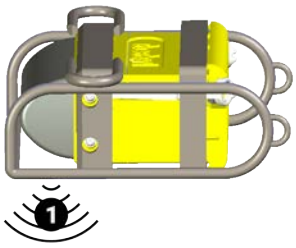
Speed Explorer Specific Settings

Speed Explorer sensor has specific settings that need to be configured.

Sounding Modes

The sensor can send pings according to three different sounding modes.

Down 1

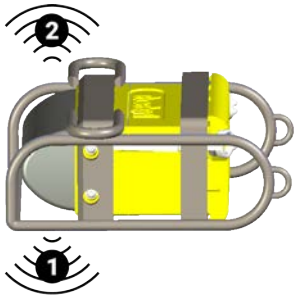


Sensor sends pings towards down direction (**1**) only.

You can see fish going into the trawl.

Pings are sent quicker than with the other modes, so more data is received, which enables a better horizontal resolution. This mode is recommended for better quality echogram images.

Down 1 + Up



Sensor sends pings towards down (**1**) and up (**2**) directions.

With the down sounding, you can see fish going into the trawl. With the up sounding you can see if fish are missing the trawl and passing above the headrope. This way, you can correct the trawl position.

Fewer pings are sent because they are distributed between the 2 directions. As a result, data arrives slower to the receiver and echograms are of lesser quality.

Down 1 + Down 2

Sensor sends 2 consecutive pings towards down direction (**1** and **2**).

This mode is useful if you need to send two different pings towards the down direction. For example, sending one short and one long ping, or sending one low frequency and one higher frequency ping.

Like down + up mode, fewer pings are sent because they are distributed between the two different down soundings. As a result, data arrives slower to the receiver and echograms are of lesser quality.

Configuring the Uplink, Up and Down Settings

You can configure different settings for uplink, down and up soundings.

Before you begin

The sensor is connected to Mosa2.

About this task

Remember: Always click **Apply** after you change a setting and make sure there is a green check mark ✓.

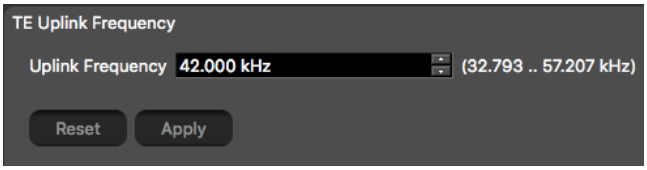
Procedure

Click the tab **Trawl Explorer**.

Uplink

Procedure

From **TE Uplink Frequency**, enter a frequency for the signal toward the vessel.

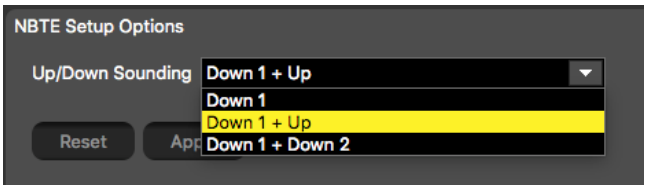


Important: This parameter must be the same in the sensor settings in Scala/Scala2.

Up/Down Soundings

Procedure

1. From **NBTE Setup Options**, select the sounding mode (see Sounding Modes on page 23 for more information).



Important: **Down 1 + Down 2** sounding mode: configure **Down 1** sounding in **Down** settings and **Down 2** sounding in **Up** settings (**Up Sounding Range**, **Ping Up Length**, **Ping Up Frequency**, **Up channel minimum TS**, **Up TVG Mode**, **TVG Up**).

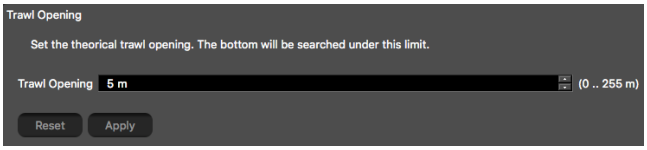
2. From **Down Sounding Range** and, if applicable, **Up Sounding Range**, select the range according to how many meters you want to see under the sensor.

Note: The range influences the display of echogram images. The smaller the range, the shorter the listening time, which gives better quality images. But the bigger the range is, the lesser the image quality is, because data arrives slower. If you are using **Down 1 + Up** or **Down 1 + Down 2** sounding mode, the image quality is even lower, as explained in Sounding Modes on page 23.

Note: The range of the down sounding can automatically change to 20 meters if the distance to the bottom becomes lower than 20 meters and if you entered a trawl opening lower than 20 m. See next step to activate or not this feature.

Important: This parameter must be the same in the sensor settings in Scala/Scala2.

3. If you want the range of the down sounding to automatically change to 20 m when the bottom is closer (< 20 m):

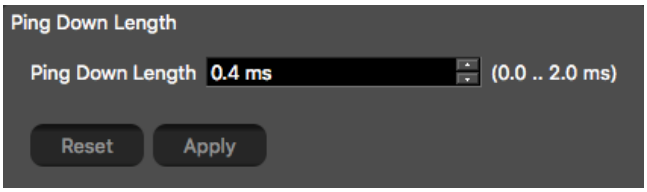


- Make sure you only use **Down 1** sounding mode.
- Enter the height of the trawl opening. It must be lower than 20 m. This is to make sure the sensor will search for the bottom beginning from this distance. This way, the sensor will not confuse the footrope with the bottom of the sea. For example, if the footrope is at 4 meters, enter a greater distance, such as 5 meters.

Note: With the autorange feature, the echogram displays better quality images when the distance to the bottom is smaller.

Important: Do not use the autorange feature if using **Down 1 + Up** or **Down 1 + Down 2** sounding mode: you will have wrong data on the echogram.

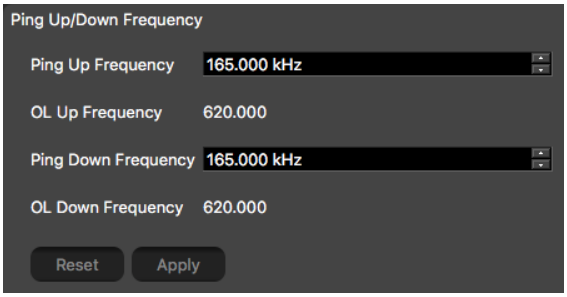
4. If you do not want the range of the down sounding to automatically change, enter 20 m or more.
5. From **Ping Down Length** and, if applicable, **Ping Up Length**, enter a pulse length. Choose a pulse length according to the distance at which you need to detect fish. (the longer the pulse, the further you can see, but with a lower resolution):



- Detection between 20 cm and 2 m: enter 0.1 ms
- Detection between 50 cm and 160 m (V2: up to 80 m): enter 0.4 ms .

Note: The maximum detection depth depends on ping frequency and type of bottom. The lower the ping frequency is, the longer the detection depth is.

6. From **Ping Up/Down Frequency**, enter frequencies for down and, if applicable, up soundings. You can choose the same frequency for both because they do not transmit at the same time.



Important: Frequency needs to be between 120-210 kHz.

Important: TE/TS V3 Do not change ping frequency on a V3 sensor or it will have to be returned to a Marport sales' office for target strength calibration.

Target Strength

Procedure

1. TE/TS V3 For V3 version of sensors, **Down channel minimum TS** and **Up channel minimum TS** helps you detecting targets on the echogram. You can put -79 dB if you want to detect small targets. Otherwise, leave the default settings at -73 dB.

Important: This parameter must be the same in the sensor settings in Scala/Scala2.

2. Select the appropriate TVG (Time Variable Gain) mode. See About Time Variable Gain on page 27 for more information.

TE/TS V3 For V3 version of sensors, go to **Down TVG Mode** and, if applicable, **Up TVG Mode**:

- 20 log: focus on bottom or school of fish.
- 40 log: focus on individual targets.
- 30 log: compromise between the two above settings.

TE/TS V2 For V2 versions of sensors, go to **TVG Down** and, if applicable, **TVG Up**:

- In **TVG Coefficient**, enter between 0.500 and 0.520 to have approximately the equivalent of 20 log, 0.75 for 30 log or 1 for 40 log.

- In **Attenuator Coefficient**, enter 25.
- Leave **VCO Coefficient** default settings at 3.

About Time Variable Gain

TVG (Time Variable Gain) is a method that compensate signal loss in the water. Basically, the aim is to have targets or sea bottom displayed in the same color on the echogram, whatever the distance from the sensor.

When the sounder sends pings, the deeper the target is, the more attenuated signals will be received and sent back. As a result, if the signal is too much attenuated, echoes (target strength) received from a target might not be as strong as they should be. TVG is here to compensate this effect. It uses a lower gain level when signals travel toward a target at a small distance and higher gain level when signals travel toward deeper targets. The end result is to compensate sounding attenuation and therefore to show a same target strength for a same target at different depths.

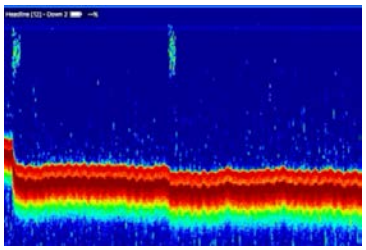
You can choose between three different TVG modes:

- 20 log: use to focus on the bottom, footrope or a school of fish.
- 40 log: use to focus on individual targets.
- 30 log: compromise between the two others.

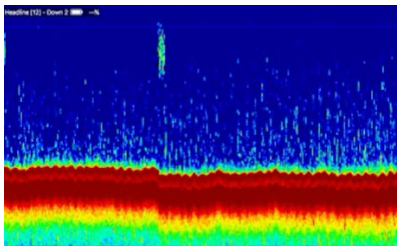
For example, if you want a good view of the footrope, select a TVG mode at 20 or 30 log. You can see on the images below that the footrope is clearer at 20 and 30 log.

If you want a good view of individual targets, you can see that with 40 log, targets in the water column are clearer.

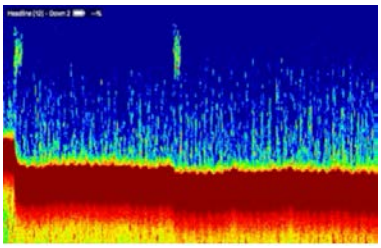
20 log



30 log



40 log



Configuring Measurement Sending Sequence and True Mode

If you use the True Mode display for echograms in Scala/Scala2, you need to select a specific sequence of measurements (e.g. temperature, pitch, roll...) sent by the uplink to the receiver.

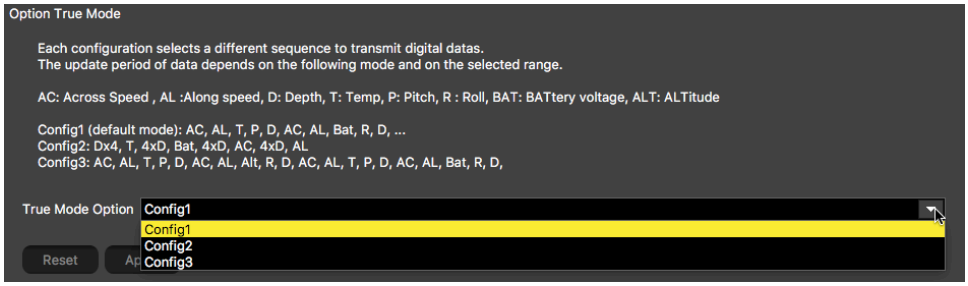
Before you begin

The sensor is connected to Mosa2.

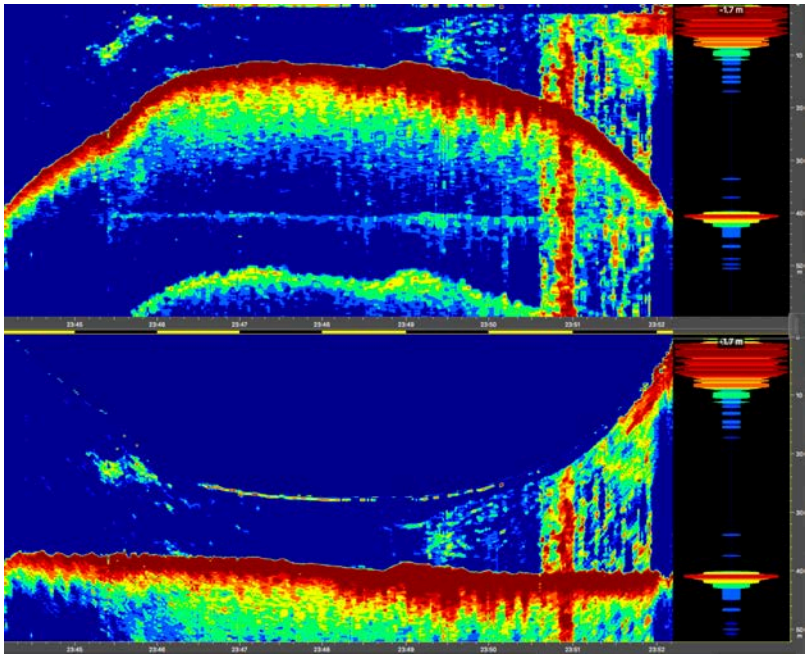
Procedure

1. From Mosa2, click **Menu** ☰ > **Expert** and enter the password `copernic`.
2. Click the tab **Trawl Explorer**.

3. From **Option True Mode**, select a sequence from **True Mode Option**.
   - Select **Config1** (default): this is the more appropriate sequence for a Speed Explorer.
   - Or select **Config3** if you use the **True Mode** display on echograms in Scala/Scala2.



4. Click **Apply**.
   Below is an example of echograms without **True Mode** (top) and with **True Mode** (bottom). When the option is activated, you see the area between the sea surface and the seabed. This way, you can see the trawl descent. See Scala/Scala2 user guide for more information.



Configuring Flow Sensor Telegrams

You need to define channels and telegrams that the sensor uses to transmit data to the receiver. These settings are for Trawl Speed, Grid and Symmetry sensors.

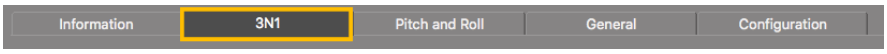
About this task

Important: Make sure there is a minimum distance of 200 Hz between the uplink frequency and other NBTE sensors' frequencies. See Frequency Plan on page 67 for a full list of boat/channel codes.

Remember: Always click **Apply** after you changed a setting.

Procedure

1. Click the tab **3N1**.



2. From **3N1 Boat Code/Channel Code**, select a frequency for the uplink that communicates with the receiver.
3. From **3N1 Telegram**:
   - For a Trawl Speed sensor, select **Telegram CL**.
   - For a Symmetry sensor, select **Telegram SY**.
   - For a Grid sensor, select **Telegram GL**.

What to do next

You need to configure the pitch and roll telegrams.

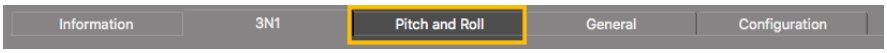
Pitch & Roll

About this task

You can send pitch and roll data on a single or on different channels. Sending them on different channels enables you to receive data more often, but this reduces the battery life.

Procedure

1. Click the tab **Pitch and Roll**.



2. If you send pitch and roll data on the same channel:

   a) From **Pitch and Roll or Roll Boat Code/Channel Code**, select a frequency.
   b) From **Pitch and Roll or Roll Telegram**, choose between:

   - **Telegram CL**: sends data every 11 to 14 sec.
   - **Telegram VQ**: sends data every 5 to 9 sec.

   Note: VQ sends data more often, but it reduces the battery life.

3. If you send pitch and roll data on two different channels:

   a) From **Pitch and Roll or Roll Boat Code/Channel Code**, select a channel for roll data.

b) From **Pitch and Roll or Roll Telegram**, choose roll telegram between:

- **Telegram D3**: sends data every 3 to 8 sec.
- **Telegram AL**: sends data every 11 to 15 sec.

Note: D3 sends data more often, but it reduces the battery life.

c) From **Pitch Boat Code/Channel Code**, select a channel for pitch data.
d) From **Pitch Telegram**, choose between:

- **Telegram D6**: sends data every 3 to 4 sec.
- **Telegram AN**: sends data every 3 to 6 sec.

4. If needed, you can deactivate pitch and roll. However, we do not recommend to deactivate these measures because they are very important for Flow Sensors.

a) From Mosa2, click **Menu** ☰ > **Expert** and enter the password `copernic`.
b) To deactivate the roll: from **Pitch and Roll or Roll Activation**, select **No**.
c) To deactivate the pitch: from **Pitch Activation**, select **No**.

Checking Speed Measures with EM Log Tester

You need to check the speed measures of all speed sensors with an EM Log tester.

Before you begin

- The speed of the sensor is calibrated.
- The sensor is connected to Mosa2.

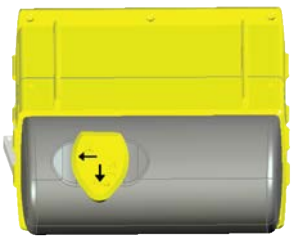
About this task

If you do not have the EM Log tester, please refer to your local Marport sales office.

The EM Log tester is also useful to check that the sensor is still operational over time. You can check speed before every fishing campaign to make sure the sensor works properly.

Procedure

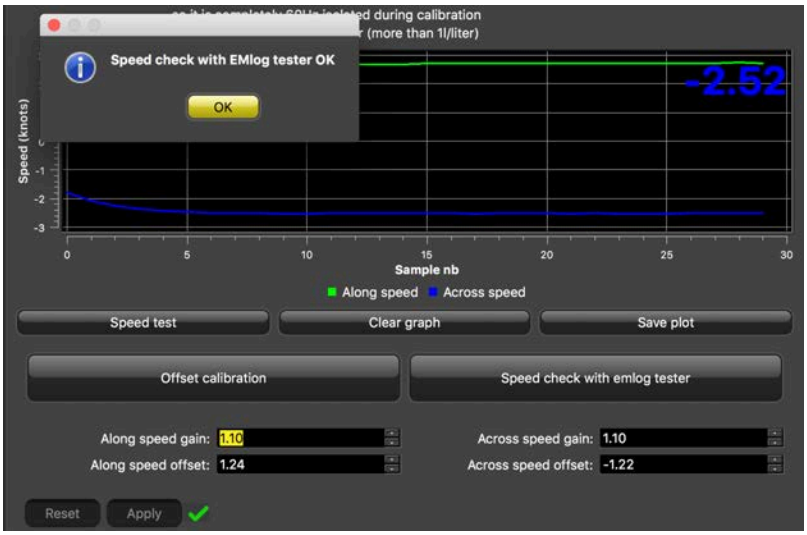
1. From Mosa2, click **Menu** ☰ > **Expert** and enter the password `copernic`.
2. Click the tab with the name of the sensor (3N1, Trawl Explorer) and click the **Calibration** menu.
3. Put the EM Log tester on the EM Log pins according to the following picture. Make sure the 4 pins are correctly aligned and hold still the EM log.



Tip: You can place a double-face adhesive tape at the center of the four pins to stick the tester to the EM log pins.

4. Click **Speed check with emlog tester**.

   The along speed must be between 2 and 3 knots, and the across speed must be between -3 and -2 knots.



Troubleshooting: If the along speed is negative and the across speed positive, it means that you placed the EM Log tester upside down or that the cabling inside the sensor is inverted.

Troubleshooting: If an error message says the offset and gain are incorrect or the EM log tester is broken, it may be because the EM log tester was not totally immobile during the test. Consider using double-face adhesive tape to stick the tester to the pins.

Configuring the Uplink Power

You can increase the uplink power of the sensor to increase the power of the signal transmitted. It is useful if you have interferences or if the sensor is far from the vessel.

Before you begin

The sensor is connected to Mosa2.

Procedure

1. From Mosa2, click the tab **General**.

2. From **Uplink Power Adjustment Level**, choose the uplink power (values in percentage are for Mosa version 01.02.00 and later):

Sensor	Recommended Uplink Powers	Conditions	Estimated Battery Life
Flow sensor	1800 / 43%	Works for most conditions.	approx. 80h
	4095 / 100%	• Sensor is far from vessel (e.g. more than 800 m depending on conditions, high depth, placed on codend) • High level of interferences • Issues receiving data • Low SNR	approx. 44h
Speed Explorer	1000 / 32%	Works for most conditions.	approx. 50h
	1800 / 58%	• Sensor is far from vessel (e.g. more than 800 m depending on conditions, high depth, placed on codend) • High level of interferences • Issues receiving data • Low SNR	approx. 30h

Note: The average battery life also depends on the uplink frequency, sounding range and options activated.

Testing Measures

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

Before you begin

The sensor is connected to Mosa2.

Procedure

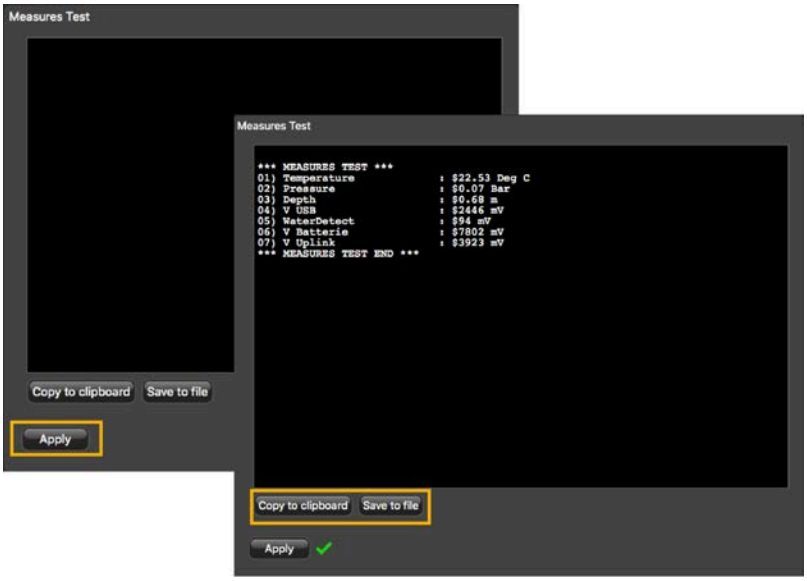
1. From Mosa2, click **Menu** ☰ > **Expert** and enter the password `copernic`.
2. Click the tab **General**.

3. From **Measures Test**, click **Apply**.

   The measures taken by the sensor are displayed.
4. Check the following measures:
   - The temperature is consistent with the sensor environment.
   - The depth is between 0 and 2m.
   - The battery is between 6.9V and 8.1V.

   Troubleshooting: If depth is incorrect, you can put an offset in **Depth** > **Depth Offset**.

   The other measures are only useful for the support service.
5. To save the test results on your computer:



   - Click **Save to file** to download the file.
   - Or, click **Copy to clipboard** then press **Cmd + V** on a word processor like Pages to paste the contents.

Exporting Sensor Configuration Settings for Record Keeping

You can export in a *.txt file all the settings configured for the sensor (such as ping length, frequency, range, TVG...).

Before you begin

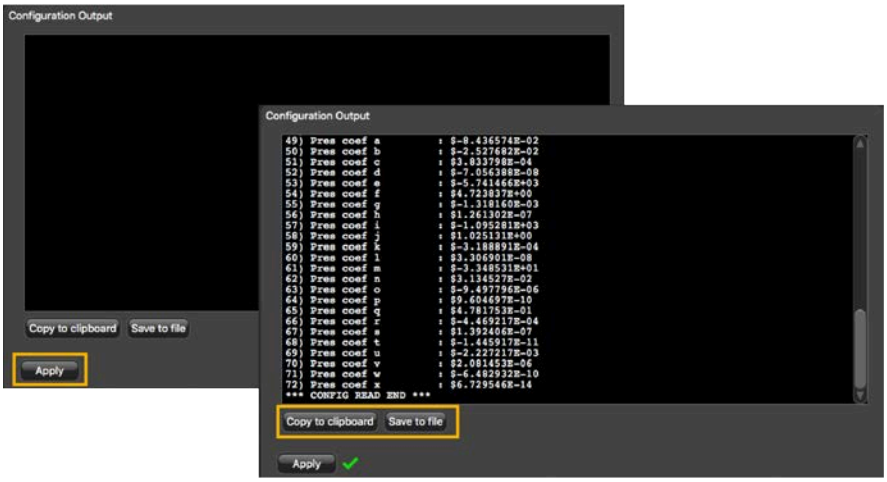
- You have finished configuring the sensor.
- The sensor is connected to Mosa2.

Procedure

1. Click the tab **Configuration**.

2. Click **Configuration Output**.
3. Click **Apply** under the black area.

   The settings are displayed.
4. To save the settings:



   - Click **Save to file** to download the file on the computer.
   - Or, click **Copy to clipboard**, then press **Cmd + V** on a word processor like Pages to paste the contents.

Exporting Sensor Configuration Settings for the Receiver

You can export on an XML file the sensor settings that you configured on Mosa2. You can afterward use this file when adding the sensor to a receiver.

Before you begin

- You have finished configuring the sensor.
- The sensor is connected to Mosa2.

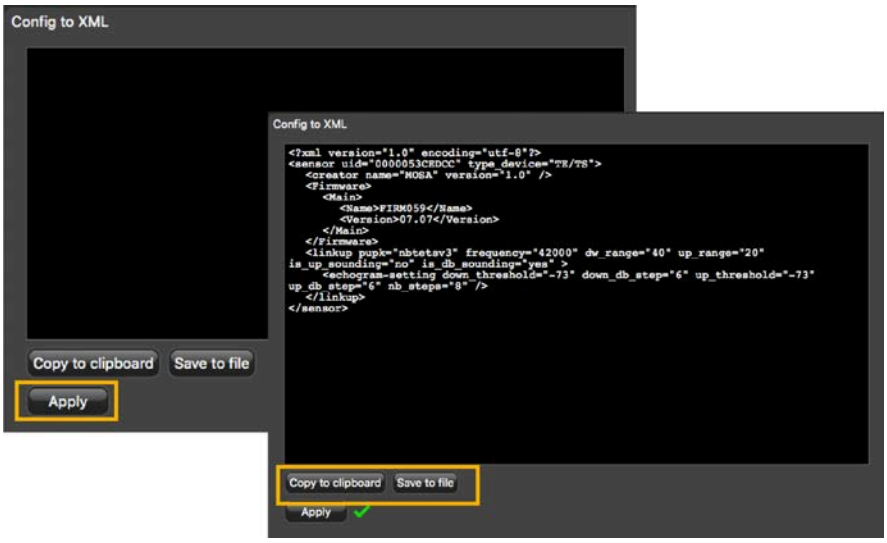
Procedure

1. Click the tab **Configuration**.

2. Click **Config to XML**.
3. Click **Apply**.

The settings are displayed.

4. To save the settings:



- Click **Save to file** to download the XML file on the computer.
- Or, click **Copy to clipboard**, then press **Cmd + V** on a word processor like Pages to paste the contents.

5. Change the name of the XML file saved on your computer.

Note: When you export the sensor settings, the XML file always has the same name. Changing its name will prevent you from overwriting it the next time you download sensor settings.

What to do next

See Adding the Sensor with a Configuration File on page 36 to know how to add the sensor to a receiver with this file.

System Configuration and Display

Learn how to configure the receiver to be able to receive and display Speed sensor data.

Note: This guide refers to the following versions: Scala 01.06.06-01.06.34, Scala2 02.10.x. If you use another version, the visual interface and options may vary.

Adding the Sensor to the Receiver

You need to add the sensor to the receiver in order to display its data on Scala/Scala2 software.

Speed sensors are compatible with the following M3/M4/M5/M6 receiver and Scala/Scala2 versions:

Firmware	Receiver version	Scala/Scala2 version
3N1 V2	all	all
TE/TS	04.01.03 or later	all
TE/TS V3	04.02.28 or later	01.02.05 or later

Adding the Sensor with a Configuration File

You can add the sensor to the receiver with a configuration file that contains the sensor settings you configured on Mosa2.

Before you begin

- You have exported an XML file containing the sensor settings (See Exporting Sensor Configuration Settings for the Receiver on page 34).

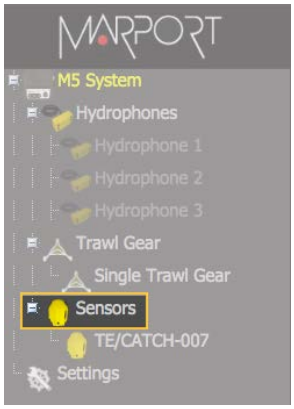
Important: You need to have **Firefox version 22 to 51**.

Procedure

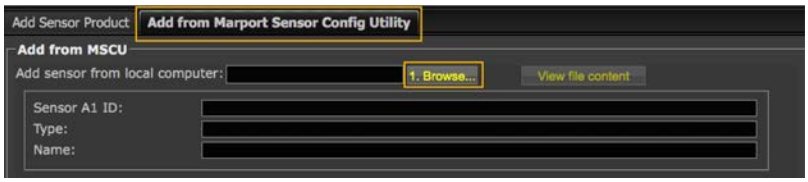
1. Enter your receiver IP address in Firefox web browser to access the system web page. The system web page gives access to the configuration of the receiver.

   Note: Default IP addresses are: 192.168.10.177 for M3 and M6 receivers, 192.168.1.170 for M4 receiver. Add the address as a bookmark in Firefox to easily access it.

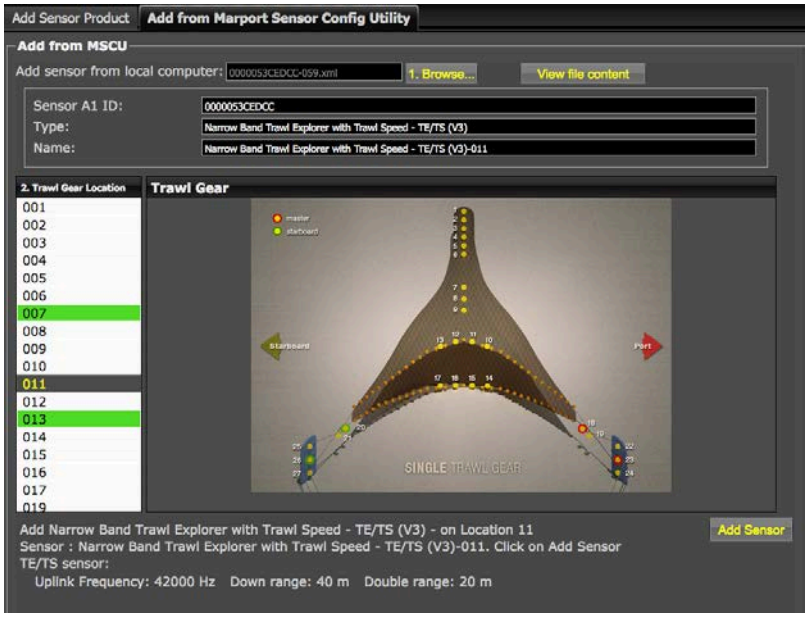
2. From the left side of the page, click **Sensors**.



3. Click the tab **Add from Marport Sensor Config Utility**.
4. Click **Browse** and select the XML file.



Information about the sensor is displayed.



5. Select a node from the list on the left. Nodes in green are already used.

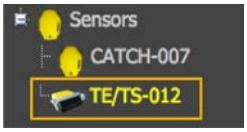
Note: We recommend the following nodes:

Type of sensor	Nodes
Speed Explorer	• Headrope: 10, 11, 12, 13 • Tunnel: 7, 8, 9
Trawl Speed	Headrope: 10, 11, 12, 13

Type of sensor	Nodes
Symmetry	
Grid	Back of trawl: 8, 7, 6, 5

6. Click **Add Sensor**.

   The sensor is added to the system, with all its settings.



Results

You can see incoming data in the control panels, in Scala **Sensors Data**/ Scala2 **Mx**.

What to do next

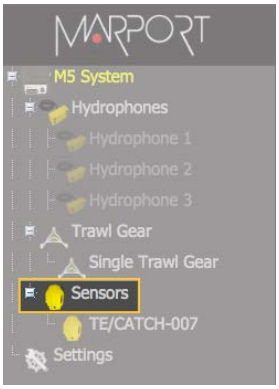
- If you want to apply filters on data received by the sensor, see Configuring the Sensor Settings on page 40.
- You can now configure the display of incoming data in Scala/Scala2.

Adding the Sensor Manually

You can add the sensor to the receiver from Scala/Scala2, by entering the same settings as the ones in Mosa2.

Adding the Sensor to the Receiver

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



5. From the page **Add Sensor Product** select the options according to your type of sensor.

Type of sensor	Product Category	Product Name	Nodes
Speed Explorer	TE/TS	TE/TS V2 or V3*	• Headrope: 10, 11, 12, 13 • Tunnel: 7, 8, 9
Trawl Speed	3N1	Trawl Speed with or without Pitch and Roll †	Headrope: 10, 11, 12, 13
Symmetry		Symmetry with or without Pitch and Roll †	
Grid		Grid with or without Pitch and roll †	Back of trawl: 8, 7, 6, 5

* Choose according to firmware installed.

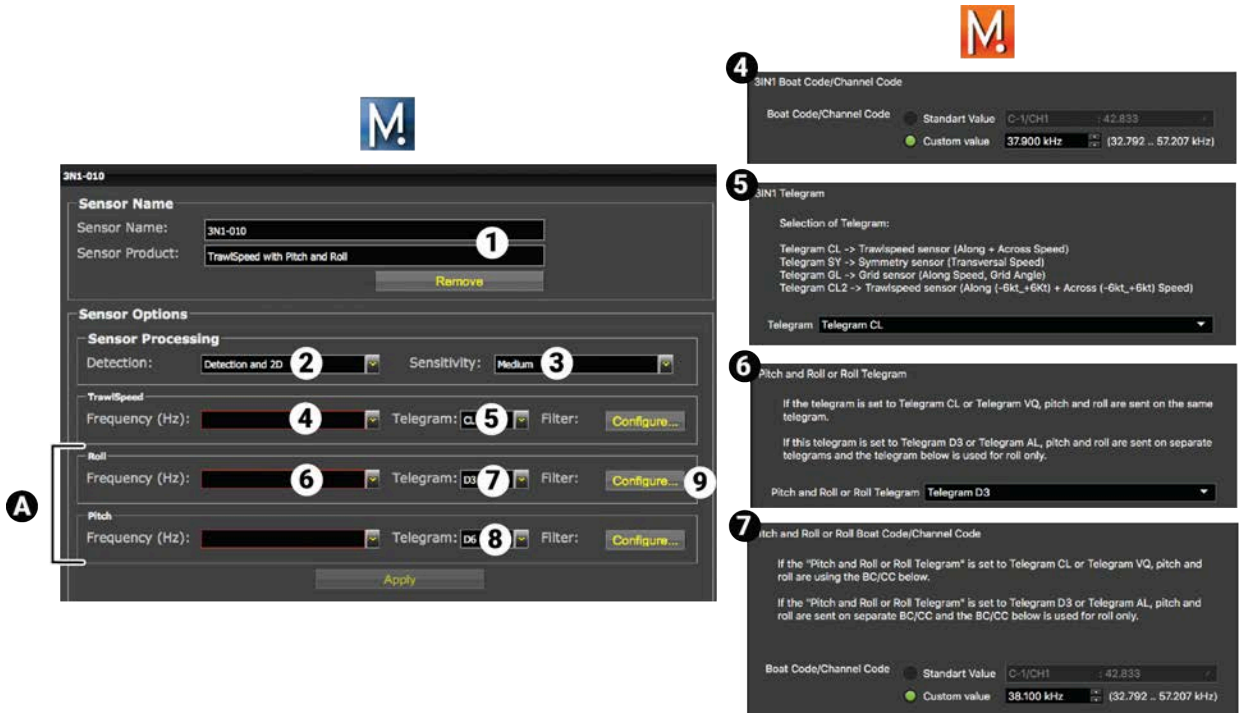
† These options depend on the sensor settings in Mosa2 (see Configuring Flow Sensor Telegrams on page 29).

6. Click **Add Sensor**.
   The sensor is added to the receiver and displayed on the left side of the screen. The configuration page is displayed.

Configuring the Sensor Settings

Flow Sensors

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



A	Only for sensors with pitch and roll.
1	Sensor name displayed in Scala/Scala2 and its features. Trawl Speed in this example, but the parameters are the same for Grid and Symmetry sensors.
2	This setting helps detecting the signal of the sensor among other sensor or echosounder signals. Change only if you have issues receiving data. • **Detection and 2D**: default value. This setting helps distinguishing the sensor signals when there are a lot of interferences (e.g. echosounders). It selects the correct signals according to very selective criteria. • **Detection**: If you do not receive data, it may be because the **Detection and 2D** setting is too selective with the signal. **Detection** is less selective and allows more signals to be received. • **Detection for Seiner**: no need for this sensor
3	• **Low**: if the signal of the sensor is high = the trawl is close to the vessel (SNR min. 18 dB). • **Medium**: Default setting. Compromise between the two other settings (SNR min. 12 dB). • **High**: if the signal of the sensor is low = the trawl is far from the vessel (SNR min. 6 dB).
4	Enter the same frequency as the one entered in Mosa2 in **3IN1 Boat Code/Channel Code**.
5	Telegram applied to the type of sensor. Automatically filled in.

6	Enter the same frequencies as the ones entered in Mosa2 in **Pitch and Roll or Roll Boat Code/Channel Code** and **Pitch Boat Code/Channel Code** (if sending pitch on a different channel).
7	• If you send pitch and roll data on same channel: enter CL or VQ. • If you send pitch and roll data on two different channels: enter D3 or AL for roll.
8	If you send pitch and roll data on two different channels, enter D6 or AN for pitch.
9	Click **Configure** to change filters applied on incoming data.

Click **Apply** when you have finished.

Speed Explorer Sensor

1	Sensor name displayed in Scala/Scala2 and its features.
2	This setting helps detecting the signal of the sensor among other sensor or echosounder signals. Change default setting only if you have issues receiving data. • Choose between **0-2** only if no interferences on the vessel (not recommended). • **3** is default setting. • Choose between **4-6** if you have issues receiving data. It allows you to receive more data, but be aware they might be wrong data.
3	This setting also helps detecting the sensor signal. Leave default setting at Synchro 1.
4	Enter the same frequency as the one entered for the uplink frequency in Mosa2.

5	Select **Up-Sounding** if the sounding mode of the sensor is **Down 1 + Up**. Then, select the range of **Up** sounding. Select **Up-Sounding** if the sounding mode of the sensor is **Down 1 + Up**. Then, select the range of **Up** sounding. Select **Double Down** if the sounding mode is **Down 1 + Down 2**. Then, select the range of **Down 2** sounding.
6	Click **Configure** to change filters applied on incoming data. Filters are particularly useful to reduce interferences on the echogram data. **Tip:** Please refer to Scala/Scala2 user guide for more information about the filters.
7	Helps you detecting targets on the echogram. Corresponds to **Channel minimum TS** in Mosa2.
8	Do not change this setting.

Click **Apply** when you have finished.

Results

The sensor is added to the system. You should see incoming data from the control panels, in **Sensors Data**. You can now configure the display of incoming data in Scala/Scala2.

Configuring Sensor Display on Scala/Scala2

You can display on pages in Scala/Scala2 measurements (e.g. speed, pitch and roll...) taken by the sensors.

About this task

Sensor measurements are displayed in the control panels, under Scala **Sensors Data** / Scala2 **Mx**. Data title should be:

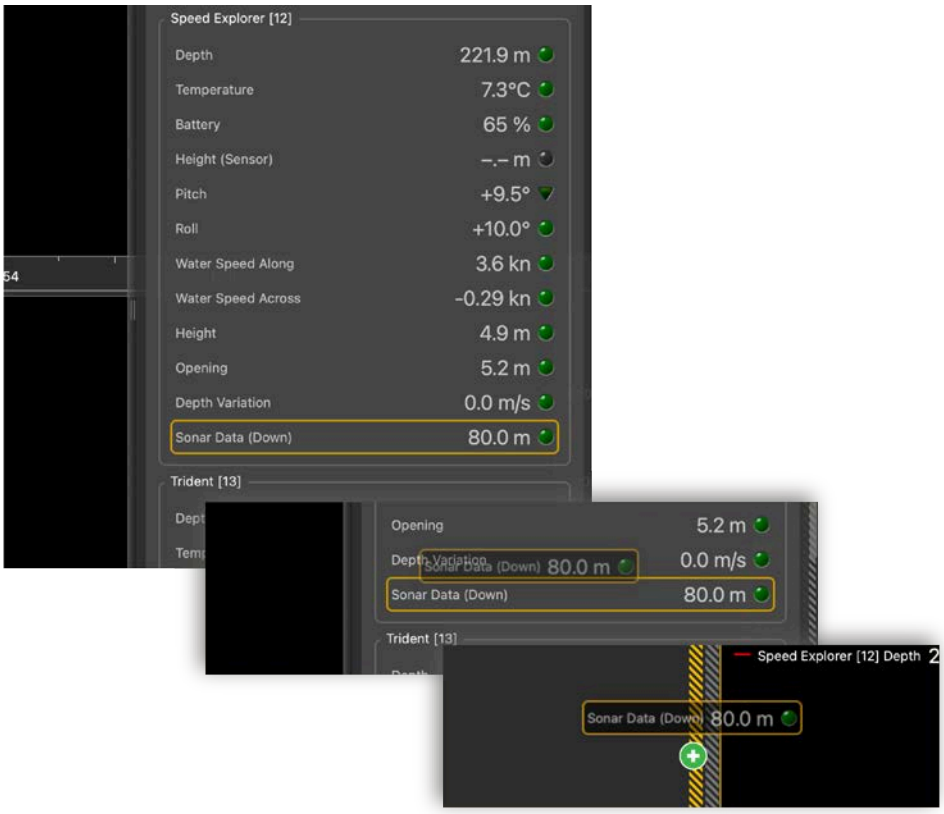
- Scala **TE/TS** / Scala2 Speed Explorer
- **Trawl Speed** or **3N1** (from Scala/Scala2 version 01.06.06) for Symmetry, Grid and Trawl Speed sensors.

The title is followed by the node where the sensor was placed when added to the system. Data displayed (e.g. pitch & roll, water speed) depends on the firmware installed.

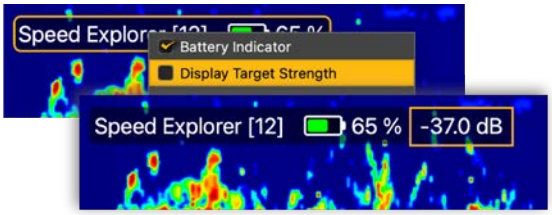
Procedure

1. From the top left corner of the screen, click **Menu** ☰ > **Customize** and enter the password `eureka`.
2. Open the control panel, then go to Scala **Sensors Data** / Scala2 **Mx**.

3. Click + drag to a page **Sonar Data** to display the echogram of a Speed Explorer.



4. TE/TS V3 To display the target strength, from the top left corner of the echogram, right-click the Speed Explorer name and select **Display Target Strength**. Hover the mouse over the echogram.

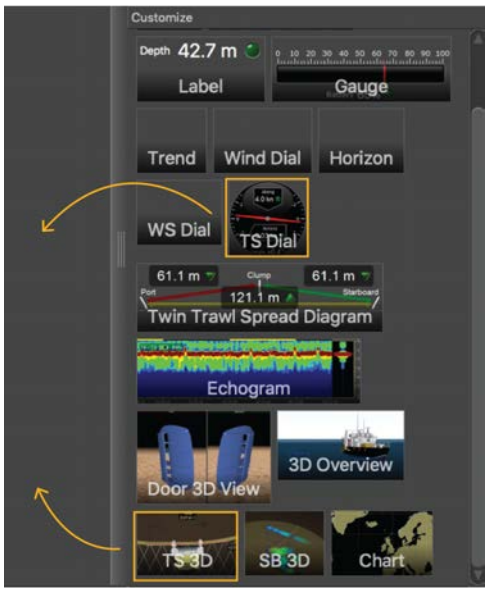


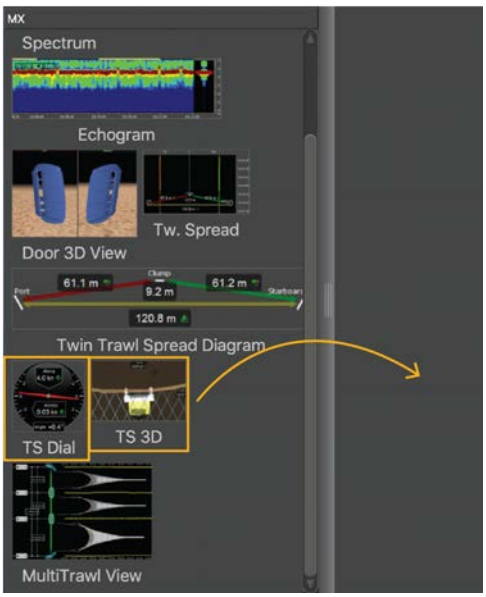
The target strength of the element where you place your mouse is displayed next to the Speed Explorer name. The higher the target strength, the bigger the target.

5. You can display **Water Speed Along** and **Water Speed Across** data in a **Trawl Speed Dial** or in a **Trawl Speed 3D View**.

Scala Open to the control panels and go to **Customize**.

Scala2 Open the customization panels and go to **MX**.





Trawl Speed Dial

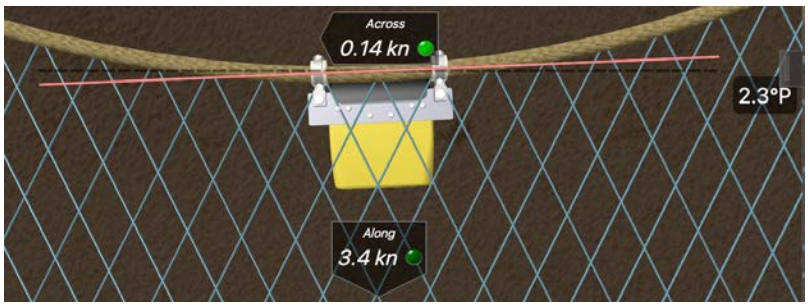
Scala

Note: Leeway angle is displayed for port (P) and starboard (S).

Scala2

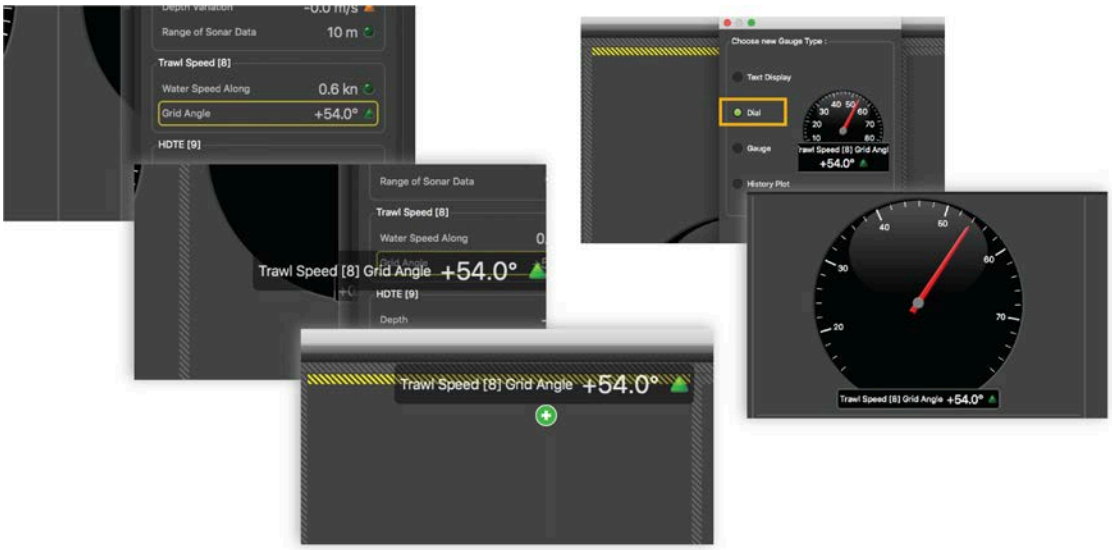
Note: Bearing angle is negative when the sensor is oriented toward port and positive when oriented toward starboard.

Trawl Speed 3D View



6. You can also click and drag the data from the control panels, then choose a type of display from **Choose new Gauge Type**.

7. To display the angle of a Grid sensor, drag **Grid Angle** data to a page and select **Dial**:

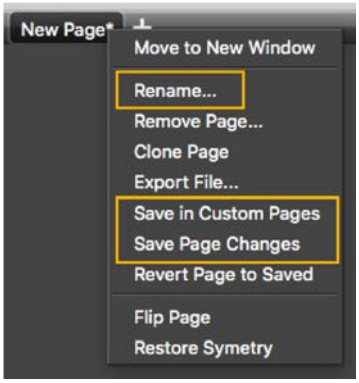


Note: The angle displayed should be 45° when the grid is correctly placed. In this example, the grid angle is slightly too high. If the grid angle is too high, non-targeted species may also be caught in the grid. If the grid angle is too low, targeted species may not enter.

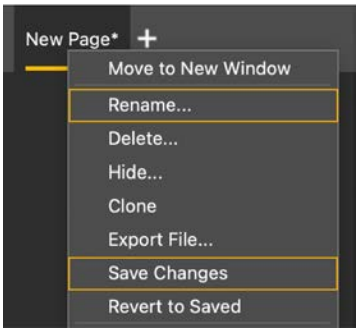
8. To save the changes you made:

   1. To rename the page, right-click the name of the page and click **Rename**.
   2. To save the page, right-click the name of the page and click **Save Changes**.
   3. Scala To have a backup of the page, right-click the name of the page and click **Save page template as**.
      Your page is saved in Scala's page backups.

Scala



Scala2



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

Outputting Scala/Scala2 Symmetry Data to Scantrol

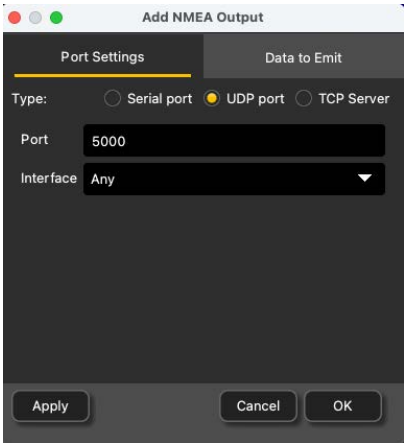
You can output across speed data from Scala/Scala2 to Scantrol iSYM application.

Before you begin

- You need to have iSYM version 3.5.10 (beta version) and above
- Make sure you have a license to use Marport software with Scantrol.

Procedure

1. Scantrol and Marport computers must be connected together via an Ethernet wired network. Both computers must be on the same sub-network to communicate with each other: 192.168.0.XX.
   For example, the network IP address can be set at **192.168.0.10** on Scantrol computer and at **192.168.0.12** on Marport computer. The subnet mask address is 255.255.255.0 for both.
2. In Scala/Scala2, go to **Settings** > **NMEA Outputs**.
3. In **Port Settings**, select **UDP port**.
4. Enter a port number, for example `5000`, and leave **Interface** at **Any**.

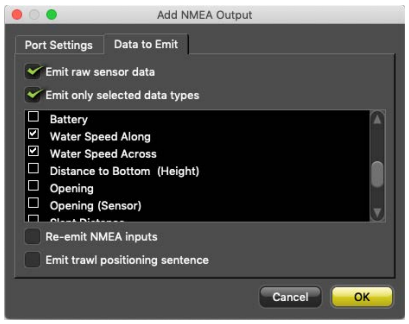


Note: The port number must be different from the one on which Scantrol data are received (if applicable).

5. Scala In **Data to Emit**,

   a) Select **Emit raw sensor data**.

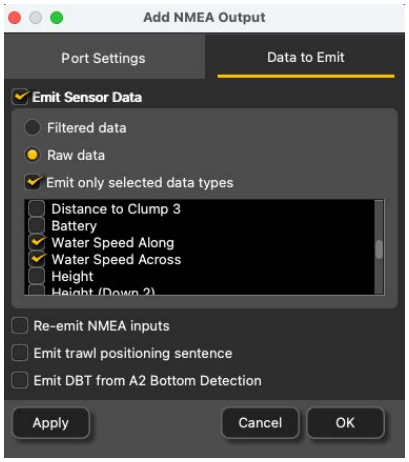
   b) Select **Emit only selected data types**, then select **Water Speed Along** and **Water Speed Across**.



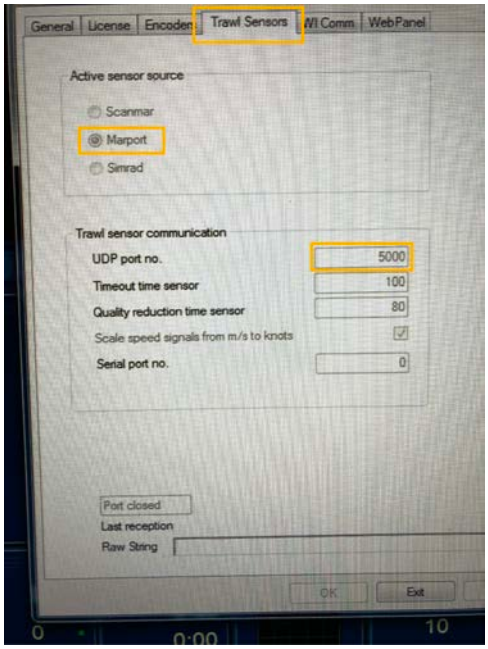
6. Scala2 In **Data to Emit**,

   a) Select **Emit Sensor Data** > **Raw data**.

   b) Select **Emit only selected data types**, then select **Water Speed Along** and **Water Speed Across**.



7. Go to iSYM's **System Settings**.
8. Go to **Trawl Sensors** tab, then select **Marport** in **Active sensor source**.
9. Configure the communication settings in **Trawl sensor communication**. Enter the same port you set in Scala/Scala2.



Note: **Port closed** mention at the bottom of the window does not impact the configuration and should be ignored.

Tip: If you need to test the NMEA connection but the sensors are not in water: configure the same output settings in Scala Replay/ScalaReplay2, then replay SDS files containing speed data.

Installation

Learn how to install Speed sensors on the trawl gear. Learn how to install the sensor on the trawl gear.

Installing Speed Sensors on the Trawl

You can install the sensor on the headrope or grid, depending on its functions.

CAUTION:

Handling precaution and a good maintenance of the EM log head is essential for the proper operation and lifetime of the flow sensors. Make sure to always use a protective cage when using the sensor. The protective cage must be approved by Marport. Any additional protective devices installed in front of the head may disrupt the flow and therefore alter the water speed measurements.

Even when the sensor is protected with a cage, make sure the head of the sensor does not hit any rail or protruding object when hauling the trawl on deck.

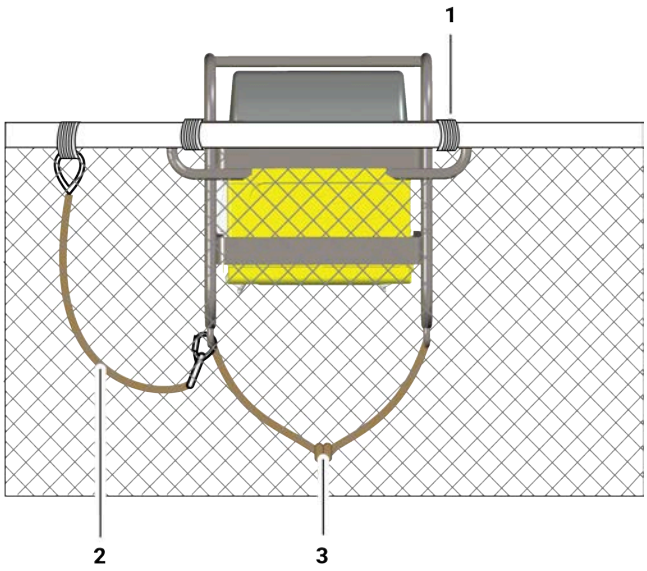
Headrope

The Trawl Speed, Symmetry and Speed Explorer sensors can be installed on the headrope to monitor the movements of the trawl.

The sensor must be placed below the headrope, EM log pins facing down, in order to send signals to the correct direction. The sensor must be placed in a way that there is less than +/- 5 degrees of pitch and roll. You may need to add floats to the back of the sensor to achieve less than +/- 5 degrees.

When the Speed Explorer is installed on the headrope, you may not see the footrope. If you want to see it, move back the sensor of a few meters.

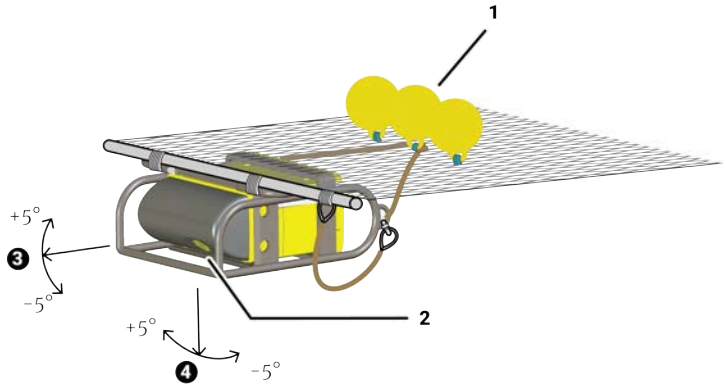
The sensor is maintained in the cage by a latch mechanism. Pull the cord at the back of the sensor to release the latch and remove the sensor from the cage. The cage will stay mounted to the headrope.



1. Attached to headrope

2. Safety wire with small shackles on both ends to secure the sensor

3. Rope passing between 2 housing attachment lugs and attached to the net



1. Floats at the back help stabilizing the pitch and roll of the sensor.

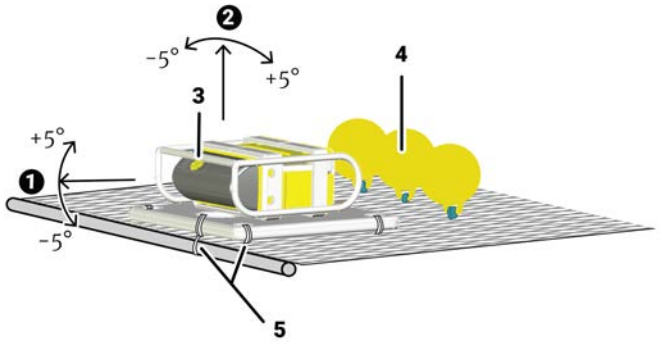
2. EM log pins facing down. Make sure nothing is in front (rope, floats): it would impede its signal.

3. Maximum pitch + 5° / - 5°

4. Maximum roll + 5° / - 5°

The Speed Explorer can also be installed upside down, with the EM log pins facing up instead of down. In this case, the Speed Explorer is installed on a board to provide more stability. The aim of this installation is to prevent the EM log pins and transducer to hit the deck when the trawl is hauled.

A specific configuration needs to be applied to the Speed Explorer to correctly work in this setup. Contact your local dealer or Marport office for instructions.



1. Maximum pitch + 5° / - 5°

2. Maximum roll + 5° / - 5°

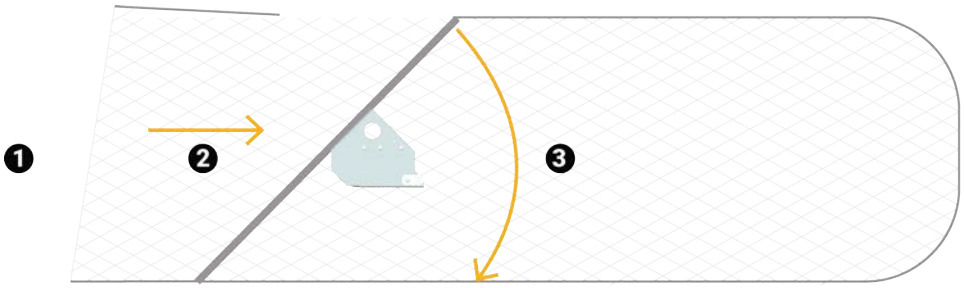
3. EM log pins facing up. Make sure nothing is in front (rope, floats): it would impede its signal.

4. Floats at the back help stabilizing the pitch and roll of the sensor.

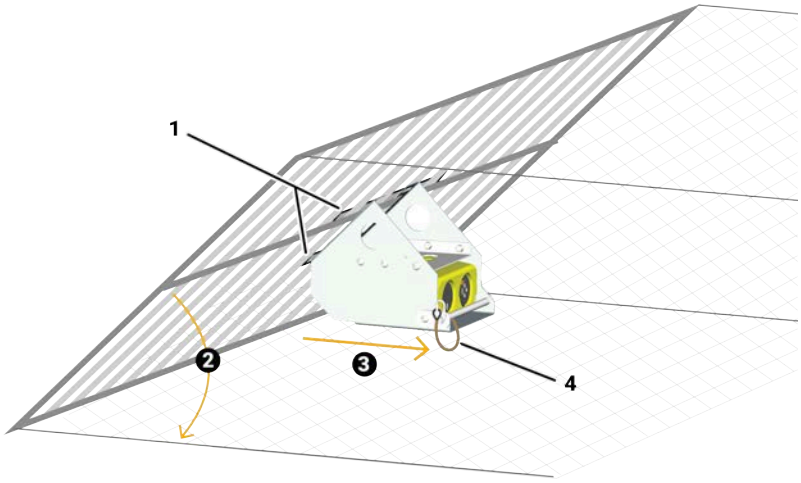
5. Ropes attaching the board to the headline and net.

Grid

We recommend to install the grid with an angle of 45°. The Grid sensor protection cage enables the sensor to be parallel to the ground. The head of the sensor must face the vessel.

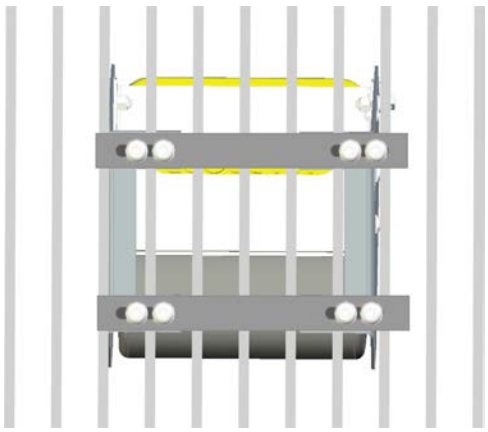


1. Vessel / **2.** Direction of the flow / **3.** Angle of the grid = 45°



1. Attached to the grid with a stainless steel plate and fastenings / **2.** Grid angle = 45° / **3.** Grid sensor must be parallel to the seabed / **4.** Safety wire between the sensor and the cage to secure the sensor

The sensor is attached to the grid with stainless steel plate and fastenings (not supplied by Marport), like on the image below:



Maintenance and Troubleshooting

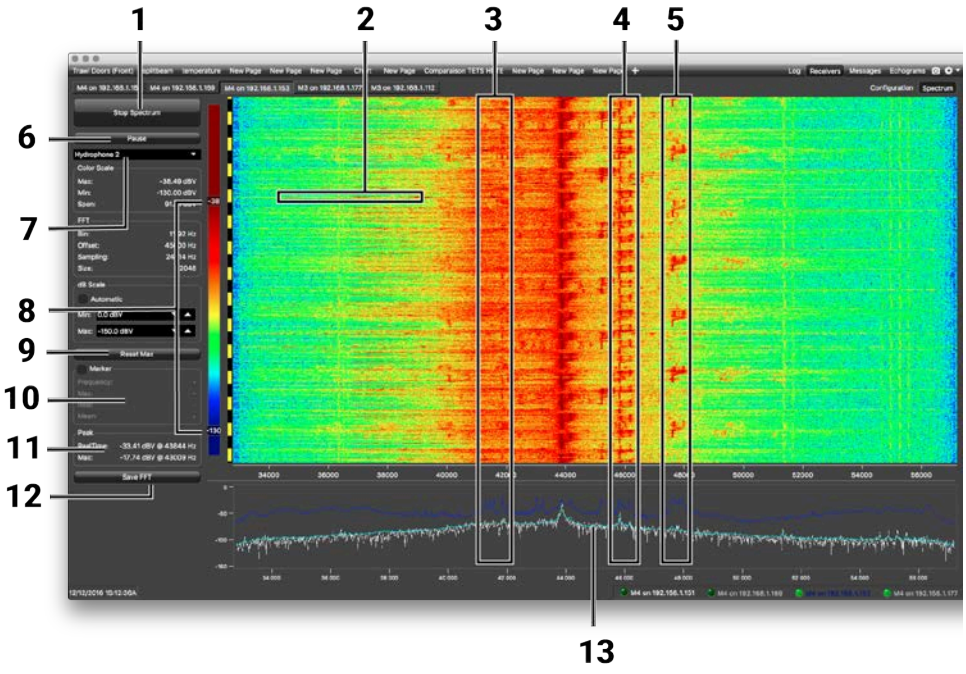
Read this section for troubleshooting and maintenance information.

Interference Check

You can check if there is noise interfering with the reception of signals.

Scala Spectrum Analyzer Display

The following picture explains the main parts of the spectrum analyzer page on Scala/Scala2.



1. Start/Stop spectrum analyzer
2. Noise interference
3. Pulses of the sensors (PRP)
4. Narrow band/HDTE signals
5. Door sounder signals
6. Pause spectrum analyzer
7. Select hydrophone
8. Drag to adjust color scale
9. Reset the Max line.
10. **Marker**: display frequency and levels of noise (dB) at the mouse pointer location on the graph.
11. **Peak**:
    - **RealTime**: latest highest level of noise recorded.
    - **Max**: highest level of noise recorded since the beginning of the spectrum.
12. Export recorded max, mean and real time noise levels in a txt file.
13.
    - Dark blue line: maximum signal level
    - Cyan line: average signal level
    - White line: last received signal level

Scala Checking Noise Interference

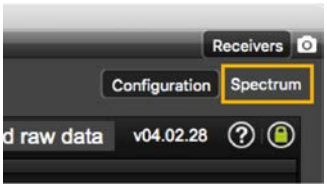
You can use the spectrum analyzer to check the noise level of the hydrophones and check for interference.

About this task

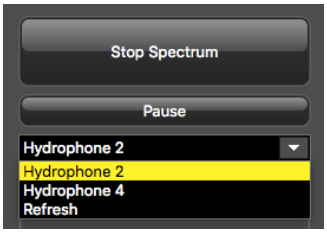
See Spectrum Analyzer Display on page 53 for details about the spectrum analyzer display.

Procedure

1. Click **Menu** ☰ > **Expert Mode** and enter the password `copernic`.
2. Again in the menu, click **Receivers**.
3. From the top right corner of the screen, click **Spectrum**.



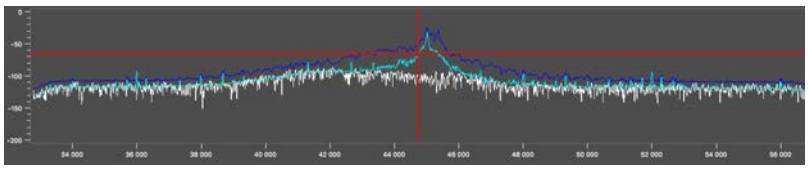
4. Select the hydrophone you want to test. Only the hydrophones that are switched on are displayed. Select refresh to update the list.



5. From the top left corner of the screen, click **Start Spectrum**.

   The graph at the bottom of the page shows three levels of noise in dBV:

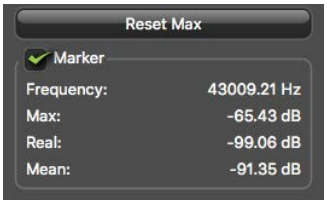
   1. **RealTime** (white): level of noise recorded in real time.
   2. **Mean** (cyan): mean recorded level of noise. It is useful to assess the noise floor.
   3. **Max** (dark blue): shows the latest highest level of noise recorded. It is useful to see on which frequencies are the sensors.



   The acceptable average level of noise depends on the conditions (distance from the sensor to the hydrophone, fishing method, type of hydrophone). You can have better performance with the following levels:

   - Active wideband hydrophone with high/low gain: below -100 dBV
   - Active narrowband: NC-1-04 below -80 dBV / NC-1-07 below -100 dBv
   - Passive hydrophone: below -110 dBV

6. To see the maximum, mean and real time measures of noise level at a specific frequency, select **Marker** on the left side of the screen and move the mouse over the graph.



   Frequency and levels of noise (dB) at the mouse pointer location are displayed under **Marker**.

7. Under **Peak**, you can check:
   - **RealTime**: the latest highest level of noise recorded.
   - **Max.**: the highest level of noise recorded since the beginning of the spectrum.
8. Check that there is more than 12dBV between the maximum noise level (dark blue line) and the average noise level (light blue line) on the peak of sensor frequencies.
9. If you changed the configuration of the hydrophone or sensors, click **Reset Max** to reset the dark blue line showing the maximum level of noise.
10. To save data recorded by the spectrum in a *.txt file, click **Save FFT**.

    The FFT file lists for the entire bandwidth used by the hydrophone (frequencies are in Hz) the maximum and mean levels of noise since the FFT export has started and the last real time level of noise before the export (dBV).

FFT level for Hydrophone 1 of Receiver 192.168.1.153			
Freq	Max	RealTime	Mean
32793	-129.07	-136.64	-138.50
32804	-129.31	-138.41	-139.65
32816	-128.72	-142.89	-139.02
32828	-128.09	-147.78	-139.86
32840	-127.95	-143.07	-140.06

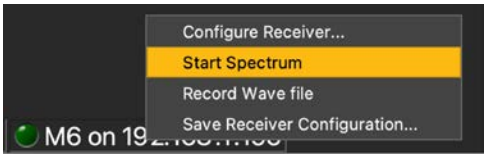
11. When you have enough data, click **Stop Spectrum**.

Scala2 Checking Noise Interference

Use the spectrum analyzer to check the noise level of the hydrophones and check for interference.

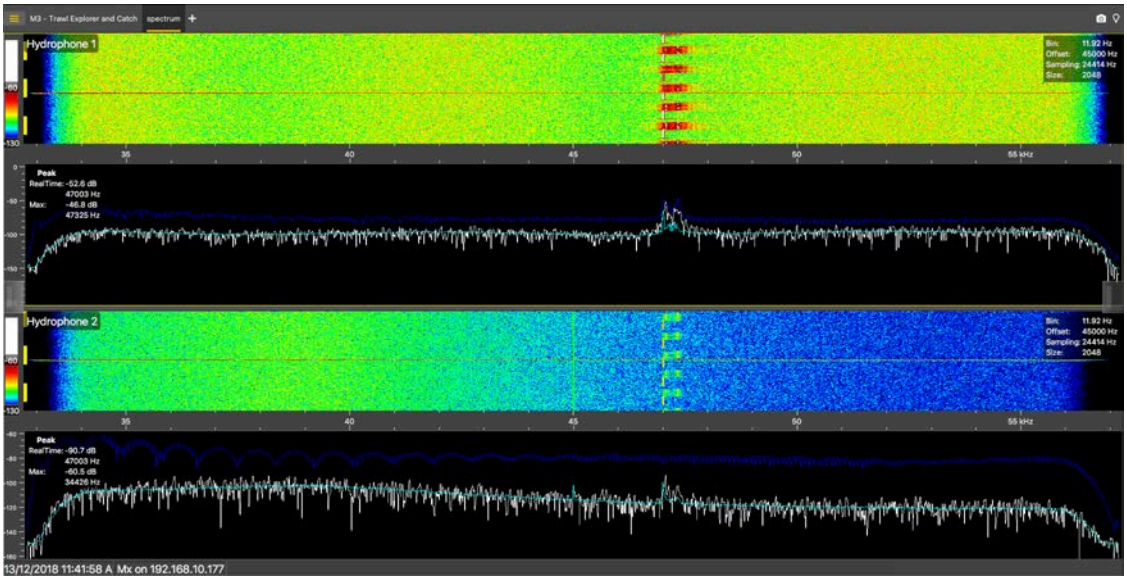
Procedure

1. Click Add + to create a new page on which you will add the spectrum analyzer(s).
2. Right-click the IP address of the receiver in the status bar and click **Start Spectrum**.



3. Open the control panels and go to the **Mx** panel.
4. Go to **Hydrophone** data, then drag and drop **Spectrum** data to a page. These data appear only when the spectrum has been started.

5. The spectrum analyzer is displayed. You can display up to 6 spectrum analyzers at the same time. Below is an example of a page with two spectrum analyzers.



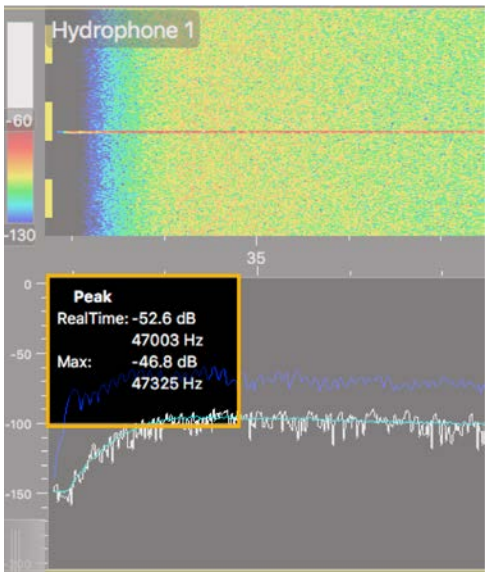
The FFT plot shows three levels of noise in dBV:

1. **RealTime** (white): level of noise recorded in real time.
2. **Mean** (cyan): mean recorded level of noise. It is useful to assess the noise floor.
3. **Max** (dark blue): shows the latest highest level of noise recorded. It is useful to see on which frequencies are the sensors.

The acceptable average level of noise depends on the conditions (distance from the sensor to the hydrophone, fishing method, type of hydrophone). You can have better performance with the following levels:

- Active wideband hydrophone with high/low gain: below -100 dBV
- Active narrowband: NC-1-04 below -80 dBV / NC-1-07 below -100 dBv
- Passive hydrophone: below -110 dBV

6. Scroll on the frequency or dBV scales to zoom in and out.
7. Under **Peak**, you can check:

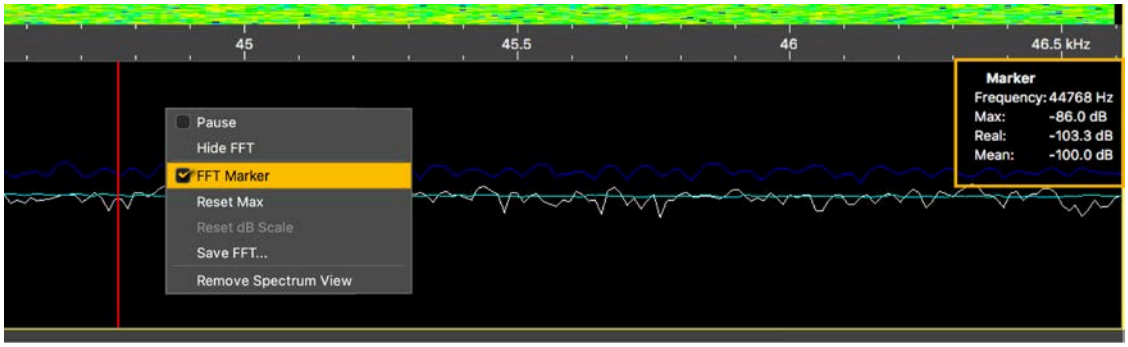


- **RealTime**: the latest highest level of noise (dBV) recorded and its frequency.
- **Max**: the highest level of noise recorded since the beginning of the spectrum and its frequency.

8. Check that there is more than 12 dBV between the maximum noise level (dark blue line) and the average noise level (cyan line) on the peak of sensor frequencies.
9. If you changed the configuration of the hydrophone or sensors, right-click the graph and click **Reset Max** to reset the dark blue line showing the maximum level of noise.
10. To check the maximum, mean and real time measures of noise level at specific frequencies:

    a) Right-click the FFT plot and click **FFT Marker**.
    b) Click and drag the marker at a specific point.

    Frequency and levels of noise at the marker position are displayed on the right side of the graph.



11. Right-click the spectrum and click **Pause** if needed.
12. To save data recorded by the spectrum in a *.txt file, right-click the FFT plot and click **Save FFT**.

    The FFT file lists for the entire bandwidth used by the hydrophone (frequencies are in Hz) the maximum and mean levels of noise since the FFT export has started and the last real time level of noise before the export (dBV).

FFT level for Hydrophone 1 of Receiver 192.168.1.153			
Freq	Max	RealTime	Mean
32793	-129.07	-136.64	-138.50
32804	-129.31	-138.41	-139.65
32816	-128.72	-142.89	-139.02
32828	-128.09	-147.78	-139.86
32840	-127.95	-143.07	-140.06

13. Right-click the spectrum analyzer and click **Hide FFT** to hide the FFT plot.
14. Right-click the IP address of the receiver in the status bar and click **Stop Spectrum**.

Charging the Sensor

Charge the sensor at any battery level with either Marport Dock charger, Basic Sensor Charger or Medusa II Multi-charger.

About this task

The sensor uses lithium-ion batteries. Charge them only with Marport's chargers.

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

Important: For Basic/Medusa chargers and Dock products with serial number before DOC2107XXX: 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.

Procedure

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

   Note: Check that the charging pins are not damaged. If they are, contact you local Marport dealer for replacement. Below is an example of shoulder bolts damaged because of insufficient maintenance.

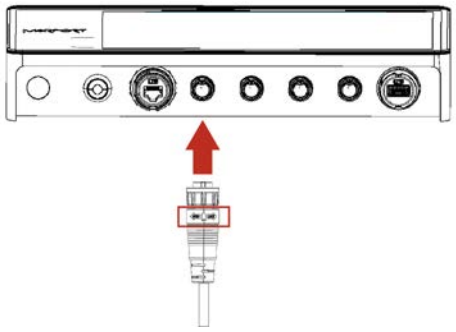
2. Place the sensor and charger in a dry room like the deck or bridge. The optimal temperature while charging is between 10 and 25 °C.
3. Place the sensor away from any installing material (e.g. wet ropes) and fix the sensor with brackets to keep it stable while charging.
4. Allow good air circulation around the charger for cooling.
5. Connect the 3-pin charging connector to the sensor shoulder bolts.

6. You can apply a small film of electrical contact grease lubricant on pins.

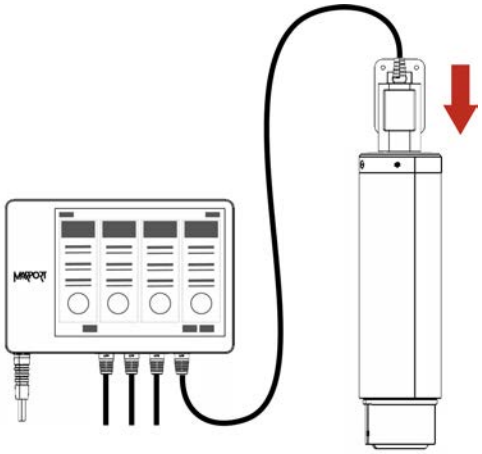
   Tip: To maintain the electrical pins, polish them with fine sandpaper.

7. Plug in the charger to a 115-230 Vac 50-60 Hz socket.
8. To charge with a Dock:

   a) Make sure the Dock is connected to a power supply and turned on.
   b) Connect the charger plug to one of the 4 charging ports.



   c) 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.

9. To charge with a Basic/Medusa Charger:

   a) If you have the Medusa multi-charger, turn the power switch to the **ON** position. The power switch lights on. If not, check the AC power cord connection.
   b) Connect the 3-pin charging connector to the sensor shoulder bolts.
   c) Look at the LED(s) on the charger box to know the charge status. For the multi-charger, there is a LED for each sensor charging cable. The charge status are:

- Green LED: > 90 %
- Orange LED: from 70 % to 90 %
- Red LED: < 70 %

Note: If the sensor is in configuration mode, it will begin to charge after 10 minutes. As long as it is in configuration mode, the charger's LED remains red, whatever the charge level.

10. Wait for the battery to charge: standard charging cycle takes 8 to 12 hours. A fast charge configuration allows a 70 % charge in 1 hour and full charge in 4 hours.

Results

Once charged, the operational life time can be up to approximately 80 hours for a Flow sensor and 50 hours for a Speed Explorer.

The operational life time depends especially on the uplink power of the sensor, but also on the sounding range, uplink frequency and options activated.

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:

- Remove any marine life with a piece of wood or screwdriver.
- Wash away mud or debris with warm water.

CAUTION: Do not use highly abrasive materials or jet wash.

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

Regularly clean the EM log pins with Isopropyl alcohol or with a Scotch-Brite scouring pad. For sensors with a serial number from 4005076 and after, use fiberglass cleaning pen supplied with the sensor to clean EM log pins:

Maintenance Checklist

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

Before use	• Check that all attachment equipment are not worn or torn. Replace when appropriate. • Check that the sensor is clean. See Cleaning the Sensor on page 60 for cleaning procedures. • Check the battery level 24 hours before use and recharge if necessary.
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	• Do not leave the batteries at full charge or discharged for a long period of time or they will wear out. • Every 6 months, put the sensor in charge for less than an hour.
Every 2 years	The sensor must be returned to an approved Marport dealer for inspection and maintenance.

If the sensor has not been not 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**:
   1. Click the magnifying glass from the top right corner of your screen and type `Terminal`.
   2. Click **Terminal** from the results.
   3. Enter in the terminal: `sudo spctl --master-disable`.
   4. Press Enter.
      Anywhere option is now displayed in **Security & Privacy** preferences.

Sensor cannot connect in wireless connection

When trying to connect to the sensor by wireless connection, the sensor appears on Mosa2 discovery area but you cannot click it OR the sensor does not appear on the discovery area.

Remember: First, always connect the sensor to a charger, then disconnect it. The sensor will reboot and this may resolve the issue.

➜ The sensor is out of the range of the wireless signal.

- Bring the sensor closer to the computer.

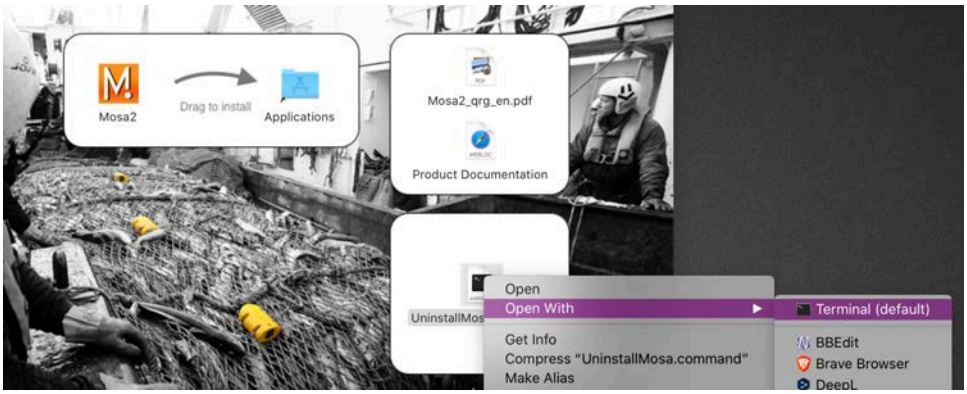
➜ If the sensor is not detected by Mosa2, the issue might come from the short-range wireless connection of the computer.

1. Close Mosa2.
2. Click the short-range wireless symbol in the top-right corner of the menu bar while holding the Shift (#) + ALT (#) keys on your Mac's keyboard.
3. Click **Debug** > **Remove all devices**.
4. Open Mosa2.

➜ In some cases, the computer keeps an history of some wireless devices and this interfere with the correct detection of sensors. You need to launch a script to uninstall Mosa2 and erase all wireless preferences.

1. Double-click the DMG file of a Mosa2 version **02.03.00 and after**.

2. Right-click **UninstallMosa.command** and select **Open With** > **Terminal**.



3. From the terminal window, enter your computer password and press **Enter**.

   Note: For security reasons, the terminal window will not display anything when you type the password.

   The terminal window displays **Process completed** when the script is completed. Mosa2 is uninstalled from your computer and all wireless settings on the computer are erased.

4. Open the DMG file to install Mosa2 again.

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.

- 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.

Data in Scala/Scala2 is wrong

Data displayed in Scala/Scala2 is wrong. For sensors with echograms, the echogram is noisy.

➜ There are signal interferences.

1. First, check that the sensor frequencies and telegrams are the same in the sensor configuration (via Mosa2) and the receiver configuration (via Scala/Scala2 or the system web page).
2. Check the frequencies of your other sensors and make sure there is enough distance between them.
3. Check the noise on the spectrum (see Checking Noise Interference on page 54). If the frequency where the sensor is placed is too noisy, change for a less noisy frequency:
   1. Flow sensors: see Configuring Flow Sensor Telegrams on page 29
   2. Speed Explorer: see Configuring the Uplink, Up and Down Settings on page 23

   Important: Do not forget to also change the frequency on the system web page (accessible through Scala/Scala2 receiver page).
4. You can increase the uplink power of the sensor to increase the power of the signal transmitted to the receiver: see Configuring the Uplink Power on page 32.
5. For sensors with echograms you can change the Echogram filter on the system web page (Scala/Scala2 receiver page):
   1. From Scala/Scala2, click **Menu** ☰ > **Expert Mode** and enter the password `copernic`.
   2. Scala Click menu again, then **Receivers**.
   3. Scala2 Right-click the IP address of the receiver at the bottom of the page, then click **Configure Receiver**.
   4. From the left side of the page, click the name of the sensor.
   5. From the sensor configuration page, click **Configure** next to **Filter**.
   6. From NBTE Echograms Filter select **Echosounder and Interference Reduction Medium** or **High**.

Echogram is fixed and blue

The echogram displayed in Scala/Scala2 is completely blue. There is no yellow line moving on top of the echogram, which means that no sonar data is received.

➜ Sounder frequency may be outside the correct frequency range.

1. From Mosa2, click **Trawl Explorer** > **Ping Down Frequency/Ping Up Frequency** and check that the frequency is between 120-210 kHz.
2. If not, change the frequency.

➜ You may have dragged and dropped wrong sonar data to the display.

1. Check that the name of the sensor on the top left corner of the echogram is .
2. If not, from sensor data, click + hold **Range of Sonar Data** and drag it to the page.

➜ The sounder in the transducer is damaged.

- Contact the support service for repair.

Speed data is wrong

Speed data displayed in Scala/Scala2 is wrong.

➜ By default in Scala/Scala2, speed units of measure are in meter/second. If you are used to knots, these measures will seem too low.

1. Check the units of measure.
2. If they are in meter/second instead of knots, click **Menu** ☰ > **Settings**.
3. From the tab **Units**, from **Speeds**, select **Knot**.

➜ EM log pins may be dirty.

1. Clean the EM log pins using Isopropyl alcohol or a Scotch-Brite scouring pad. For sensors with a serial number from 4005076 and after, use EM log cleaning pens supplied with the sensor to clean EM log pins.

2. From Mosa2, check speed measures with the EM log tester (see Checking Speed Measures with EM Log Tester on page 30).

➜ The sensor is not correctly installed on the trawl or the pitch and roll are not working correctly.

1. Check the sensor position on the trawl (see Installing Speed Sensors on the Trawl on page 49).
2. From Mosa2, check that the pitch and roll are both between 5 and -5° when the sensor is laid flat.
3. If speed data is still wrong, check speed measures with the EM log tester (see Checking Speed Measures with EM Log Tester on page 30).
4. If speed data is still wrong, check the speed calibration and do it again if necessary.

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

Marport France SAS

8, rue Maurice Le Léon

56100 Lorient, France

supportfrance@marport.com

NORWAY

Marport Norge A/S

Breivika Industrivei 69

6018 Ålesund, Norway

supportnorge@marport.com

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Marport Spain SRL

Camino Chouzo 1

36208 Vigo (Pontevedra), Spain

supportspain@marport.com

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12123 Harbour Reach Drive, Suite 100

Mukilteo, WA 98275, USA

supportusa@marport.com

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32 Wilson Street

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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.

Boat & Channel Codes

This list shows the standard frequencies for PRP telegrams. When you configure boat codes, make sure to respect the correct interval between frequencies (see table above).

Codes		
BC/CH	Frequency	FID (Scanmar)
C-1/CH1	42833	45
C-1/CH2	41548	32
C-1/CH3	41852	35
C-1/CH4	40810	25
C-1/CH5	42500	42
C-1/CH6	43200	49
C-2/CH1	42631	43
C-2/CH2	41417	31
C-2/CH3	41690	33
C-2/CH4	40886	26
C-2/CH5	42300	40
C-2/CH6	43100	48
C-3/CH1	42429	41
C-3/CH2	41285	30
C-3/CH3	41548	32
C-3/CH4	40970	27
C-3/CH5	42100	38
C-3/CH6	43000	47
C-4/CH1	42226	39
C-4/CH2	41852	35
C-4/CH3	41417	31
C-4/CH4	41160	29

C-4/CH5	42700	44
C-4/CH6	43300	50
C-5/CH1	42024	37
C-5/CH2	41690	33
C-5/CH3	41285	30
C-5/CH4	41060	28
C-5/CH5	42900	46
C-5/CH6	43400	51
C-6/CH1	39062	3
C-6/CH2	39375	7
C-6/CH3	39688	11
C-6/CH4	40000	15
C-6/CH5	40312	19
C-6/CH6	40625	23
C-7/CH1	38906	1
C-7/CH2	39219	5
C-7/CH3	39531	9
C-7/CH4	39844	13
C-7/CH5	40156	17
C-7/CH6	40469	21

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.

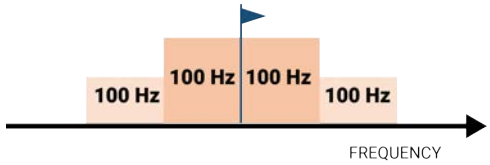


Figure 1: PRP sensors (e.g. Catch sensor, Trawl Speed, Spread sensor...)

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

Figure 2: Marport Pro sensors (e.g. Trident, Door Explorer)

Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.8-40kHz and 40-50.2kHz.

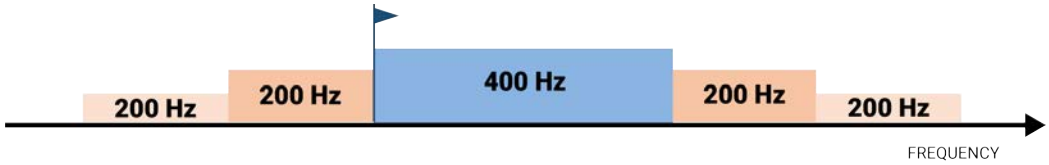


Figure 3: NBTE sensors (e.g. Speed Explorer, Trawl Explorer, Catch Explorer, Door Sounder)

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

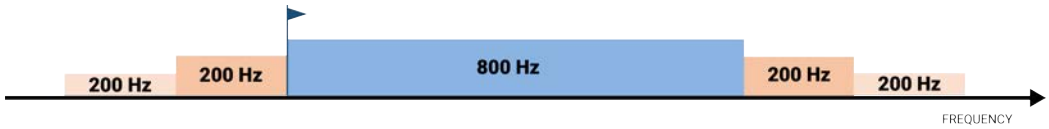


Figure 4: HDTE narrow band mode

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

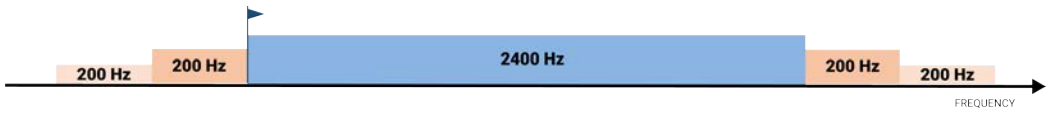


Figure 5: HDTE wide band mode

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

Frequency of the sensor

Bandwidth

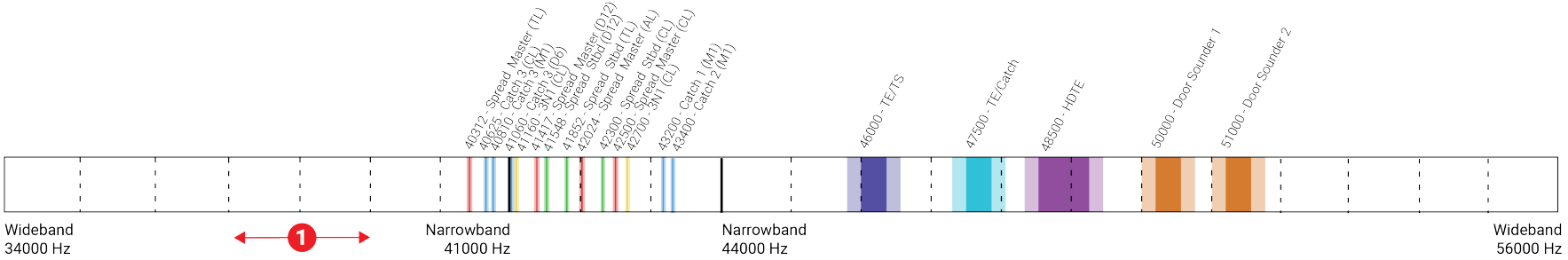
Mandatory distance with other sensors

Recommended distance with other sensors

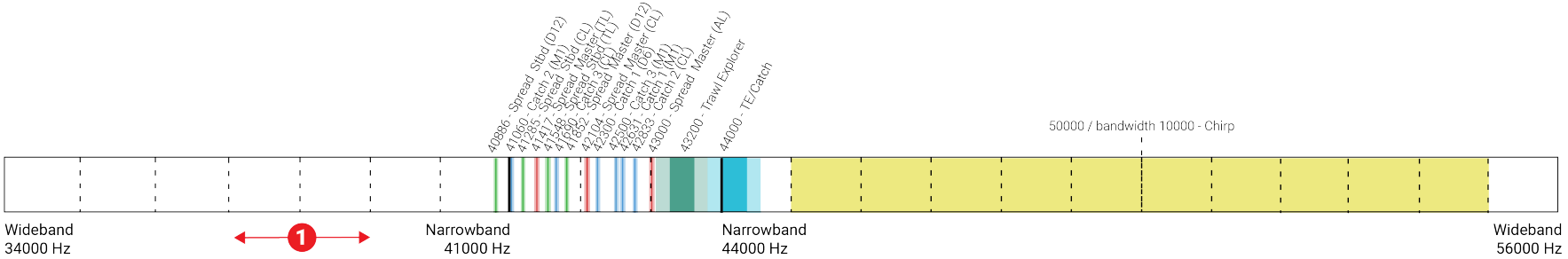
Examples of frequency allocations

- 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.

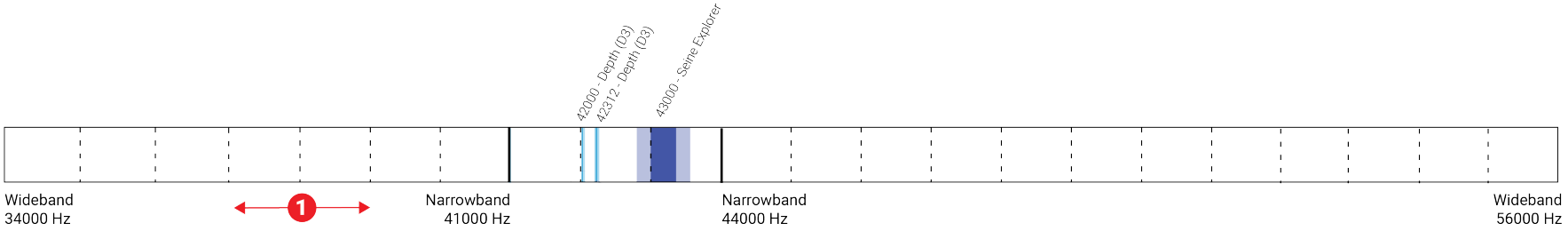
Example of a system with Spread, Catch, Trawl Speed sensors and Speed Explorer, Catch Explorer, HDTE and Door Sounder.



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.

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