MARPORT | PRO

DOOR PRO SENSORS

2024

USER MANUAL

PUBLISHED 27TH SEPTEMBER 2024

Contents

Legal

History

V1	09/27/24	First release

Copyright

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: 02.13.x
- Scala2: 02.14.x

If you use other versions, the visual interface and options may vary.

Introduction and Presentation

Get a basic knowledge of the sensor.

Introduction

The **Door Spread Legacy** and **Door Sounder Pro** are part of Marport's latest generation of sensors, featuring significant upgrades from earlier models. These enhancements include compatibility with the latest Mosa2 and Scala2 software features, with the Dock smart charger, and higher-definition echogram images.

Door Spread Legacy sensors are designed for single trawls and are compatible with older Spread sensors, allowing for easy replacement of your existing door sensors. Installed on the starboard and port doors, they monitor the spread of your trawl doors through an acoustic link. The port sensor communicates with the starboard sensor, sending precise distance data to the vessel. Additionally, these sensors track pitch and roll, water temperature, and depth, providing a comprehensive view of each door's performance. This allows you to detect issues like a door falling flat during a tow or doors crossing over each other.

For smaller trawlers, a **mini Spread sensor** is available, featuring a compact (stubby bottle) design with either standard or slim housing.

The **Door Sounder Pro** sensor displays an echogram and communicates with the vessel via our narrow band protocol. These sensors can be installed on both doors to ensure a consistent distance between the door shoes and the seabed.

Compatibility with Simrad PI systems is available as an option.

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.

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

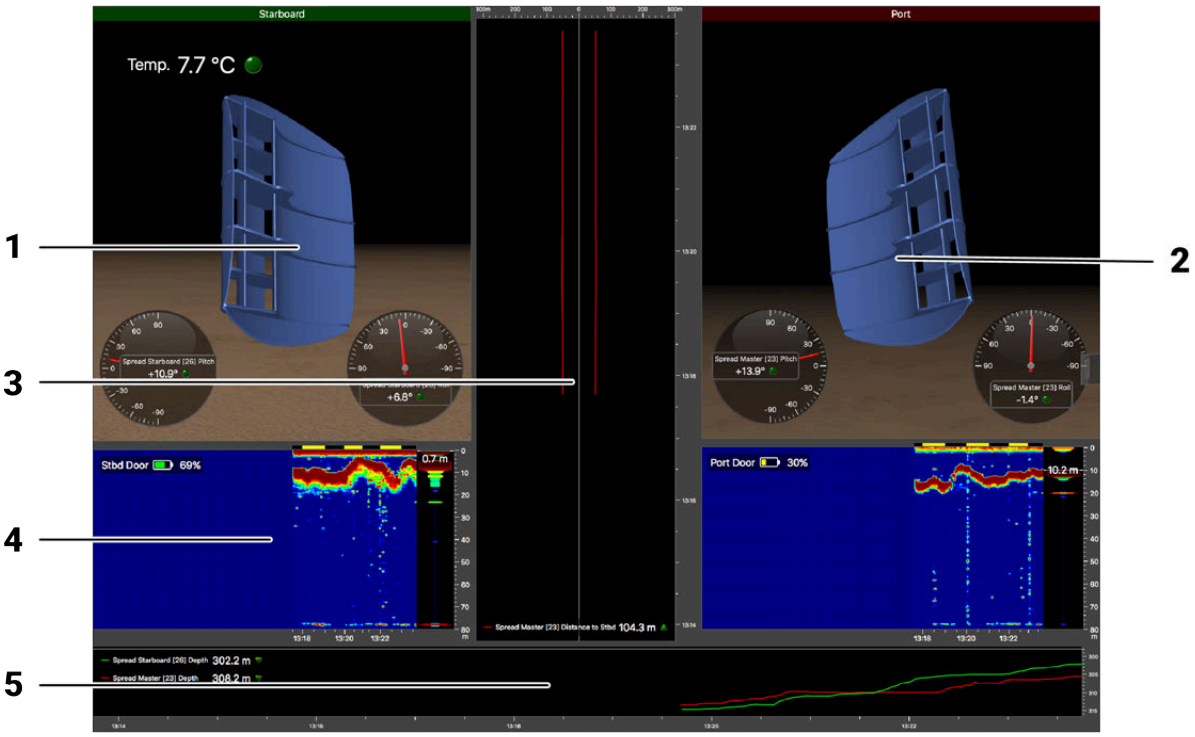
Precautions

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

Applications

Here is an example of data received from Spread Sensors and Door Sounder sensors displayed in Scala2.

- Master and Starboard Spread Sensors
- Door Sounder sensors on both doors



1. Starboard door

2. Port door

3. Distance between doors displayed as text or line graphs

4. Echogram of the sea bottom from Door Sounder sensors on each door

5. Depth of doors

Description

System Compatibility

The Door Pro sensors are compatible with the following versions of Marport's software and equipment.

Mosa2	02.13.03 or later
Scala2	02.14.00 or later
Mx receiver firmware	08.06.00 or later
Dock	01.02.00 or later

Technical Specifications

Door Spread Legacy

Uplink frequency	30 to 60 kHz
Range to vessel	up to 2500 m[1]
Data update rate (telegrams)	Spread: 3-15 sec. - Depth: 3-8 sec. - Temp: 3-16 sec. - Pitch & roll: 3-15 sec.
Depth range	up to 1800 m
Depth resolution	0.1 m with 0.1% accuracy
Pitch angle	±90°
Roll angle	±90°
Pitch & roll accuracy	±0.1°
Temp measurement range	-5° C to +25° C
Temp accuracy	±0.1° C
Typical battery life	Up to approx. 16 days (approx. 8 days for mini Spread Sensor)[2]
Charging time	4 hours[3]
Battery type	Lithium-Ion
Weight in air (with housing)	7.3 kg
Weight in water (with housing)	2.4 kg
Mini Spread Sensor weight in air	4 kg, slim 3.3 kg
Mini Spread Sensor weight in water	1 kg, slim 0.9 kg
Warranty	2 years (Sensor & Battery)[4]

Door Sounder

Uplink frequency	30 to 60 kHz
Range to vessel	up to 2500 m[1]
Sounder broadband frequency	Configurable between 120-210 kHz

Sounder range	5 to 160 m
Data update rate	Echog. of Door Sounder V1: up to 1 image per second Echog. of Door Sounder with target strength calibration: up to 3 images per second Battery: max. every second
Typical battery life	Up to approx. 75 hours[2]
Charging time	4 hours[3]
Battery type	Lithium-Ion
Weight in air (with housing)	7.3 kg
Weight in water (with housing)	2.4 kg
Warranty	2 years (Sensor & Battery)[4]

1. Reference only, depends on functions enabled. / 2. Depends on sensor uplink power and options. / 3. Based on average charging time. / 4. Marport Standard Marine Limited Warranty

Door Sounder Beamwidths

Beamwidths for Uplink pings:

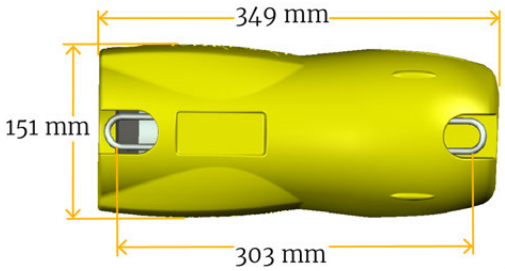
Beamwidth	**@ 35 kHz**	**@ 50 kHz**	**@ 60 kHz**
-3dB	46°	40°	30°

Beamwidths for down pings:

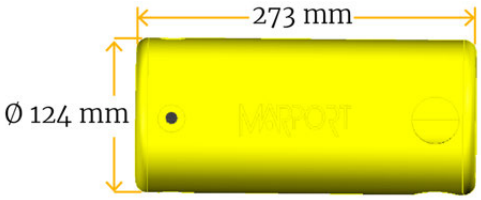
Beamwidth	**@ 125 kHz**	**@ 160 kHz**	**@ 200 kHz**
-3dB	26°	24°	22°

Dimensions

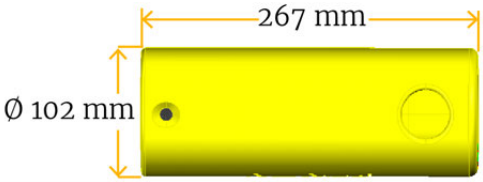
Spread Sensor (standard) & Door Sounder (XL bottle)



Mini Spread Sensor (stubby bottle)



Mini Spread Sensor with slim housing (stubby bottle)



Firmware and Features

This section describes the firmware and features that must be configured on MASP to set up the sensor.

To be operational, the sensor needs to be configured with two files:

- a firmware file (*.A2F): it is the firmware of the sensor,
- an application file (*.A2A): it defines the sensor features and options.

These files are generated via MASP.

Firmware

The latest version of the firmware is available for download on MASP.

Compatibility: F450-02.03.01 and after

Features and Options

The features and options are configurable according to the type of hardware and customer's choices.

Door Spread Legacy

Note: Interoperable with previous generation of door spread sensors.

Features	• **Product name**: manually entered. • **Application**: PRP Spread Legacy • **Body**: Stubby, XL • **Battery capacity** (not configurable): 1-pack if Stubby, 2-pack if XL
Misc. options	• Positioning
Measures	• Battery (always activated) • Temperature • Pitch • Roll • Distance1 (always activated) • Depth

Door Sounder

Features	• **Product name**: manually entered. • **Application**: Door Sounder • **Body**: XL • **Battery capacity** (not configurable): 2-pack
Sounding Options	• Down (always activated) • Up
Misc. options	• **Memory Card Log**: records a log of the sensor activity. This option is useful for troubleshooting support.
Measures	• Battery (always activated)

Door Spread PI

Note: Compatible with Simrad PI.

Features	• **Product name**: manually entered. • **Application**: Spread PI • **Body**: Stubby, XL • **Battery capacity** (not configurable): 1-pack if Stubby, 2-pack if XL
Measures	• Temperature • Distance1 (always activated) • Depth

Main Parts

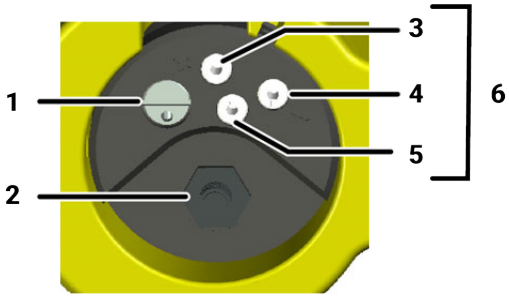
External View

Tip: Door sensors have colored markers on the housing to indicate their location on trawl doors: starboard (green) / port (red) / clump (black)

XL bottle

Stubby bottle

Stubby bottle with slim housing



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

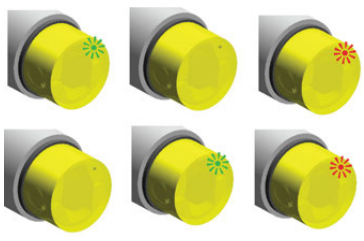
CAUTION:

- 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.

Operational Mode Indicator

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

State	Situation	LED
Starting	• Sensor has been switched on in water or with water switch.	

State	Situation	LED
		• Startup sequence: LED blinks green/off/red/off/green/red. • Then, fixed green for 1 sec.
Running	• Sensor is in water. • Water switch is on.	 • For 1 min.: LED blinks red at the beginning of each uplink communication cycle. • Or, LED blinks green / red if the product configuration is not valid.
Configuring	• Sensor is out of water. • User is testing and configuring using a Configuration Cable. • Sensor turns off after 10 min. without test or configuration operation.	 LED blinks green.
Charging	• Charger plug is connected. • User is configuring at the same time via the Dock.	 • LED blinks red. • LED is fixed red after 10 sec. if connected to a charger other than the Dock.
On deck	• Sensor has been hauled on deck. • The virtual water switch is on. • The sensor is locked in a low power state to not switch into running mode.	 LED blinks green every 4 sec.

Sensor Configuration

Learn how to configure the sensor settings.

Note: This guide refers to the following versions of **Mosa2:** 02.13.x. If you use another version, the visual interface and options may vary.

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

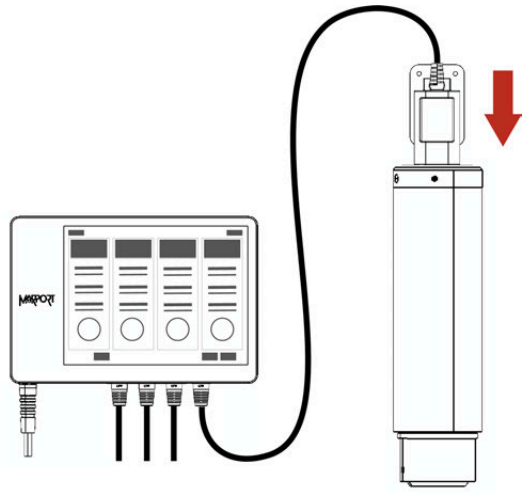
Connecting the Sensor to Mosa2

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

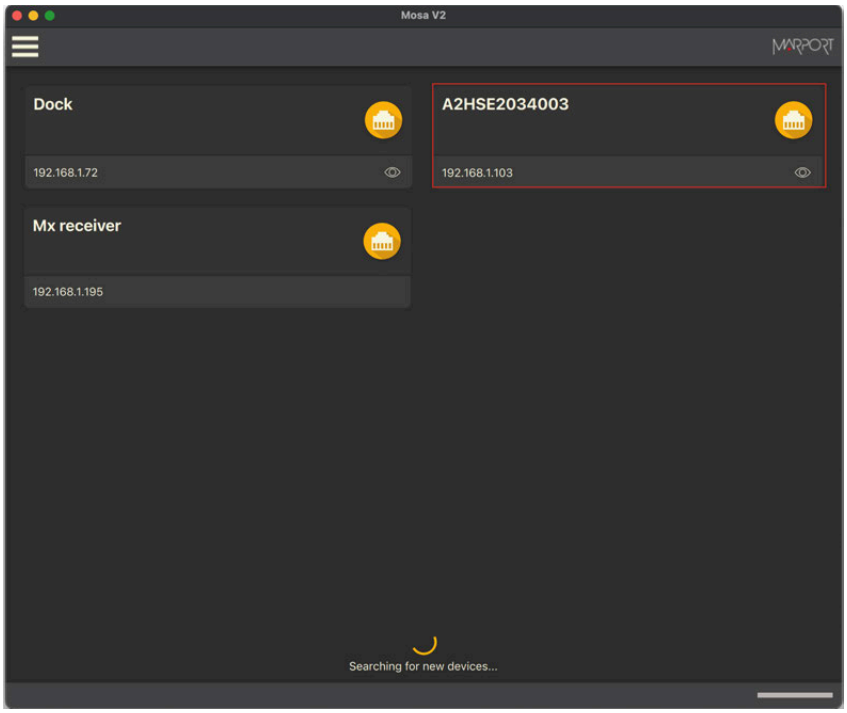
Using a Dock Charger Plug

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.



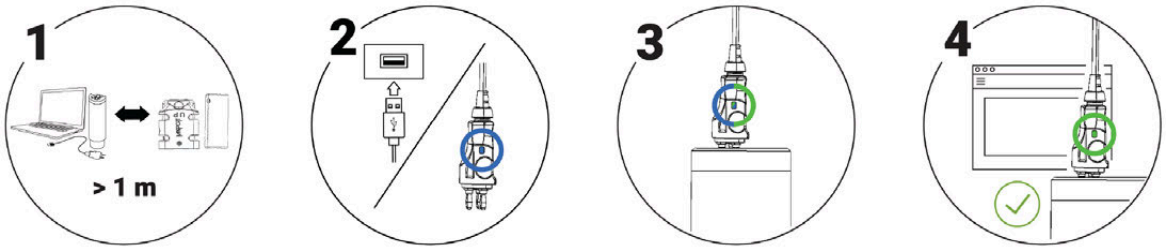
- Click  to open the sensor configuration page.
- Click  to show the deploy animation on the charger plug for 30 seconds.

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.
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.

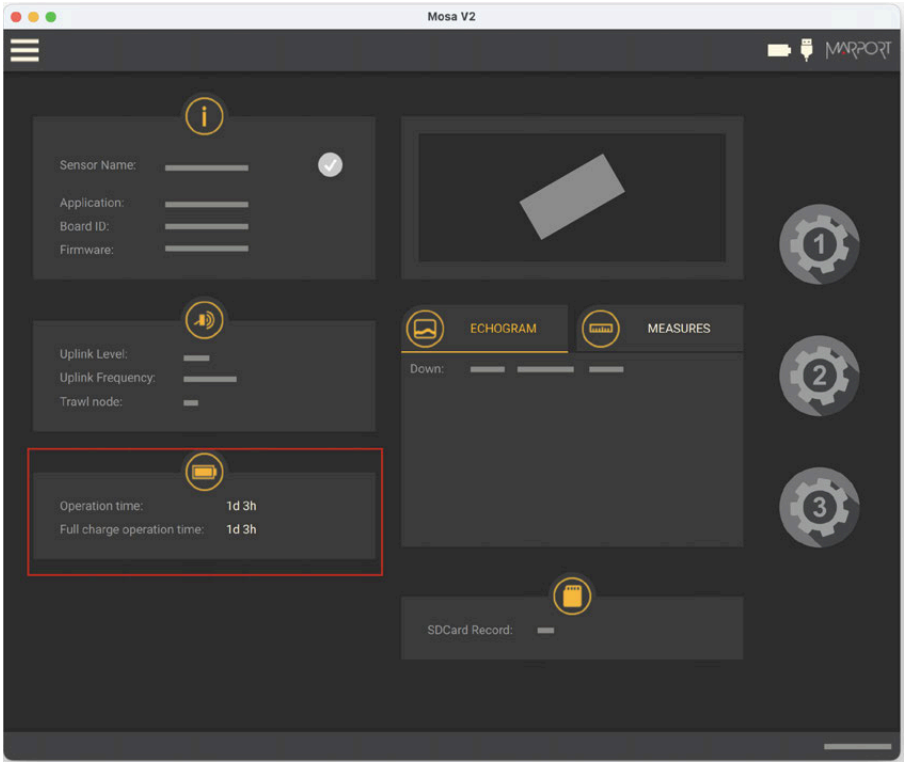


You can now configure the sensor.

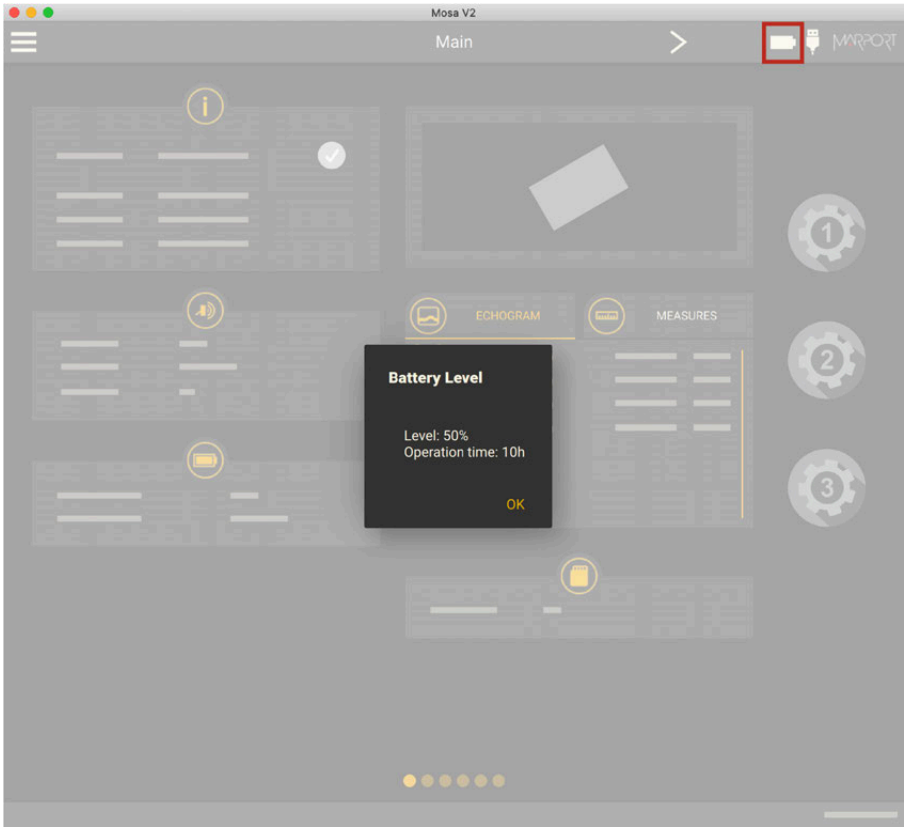
Note: You can keep the Configuration Cable continuously connected by USB, and virtually eject or connect it. When no sensor is connected to the Configuration Cable, click **Menu** **> Eject Config Plug** or **Connect Config Plug**. When ejected, you come back to the discovery page. It stays disconnected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

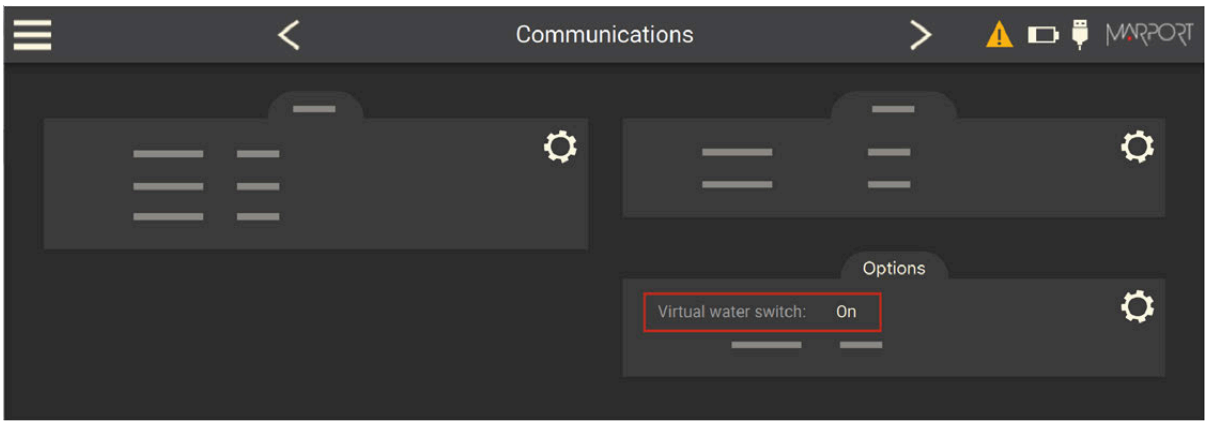


Note: When you change settings such as the uplink power or sounding range, it affects the battery consumption and remaining lifetime. The battery information will update after the sensor has been switched on and operating for 10 minutes.

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 lifetime.

  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.

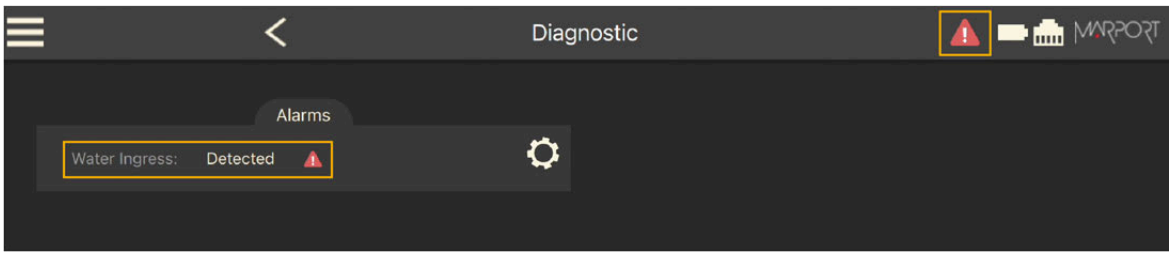
  We recommend to deactivate it if the sensor is operating close to the surface or if you need to test the sensor in the office.

Diagnostic Information

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

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.

In **Expert** mode, 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

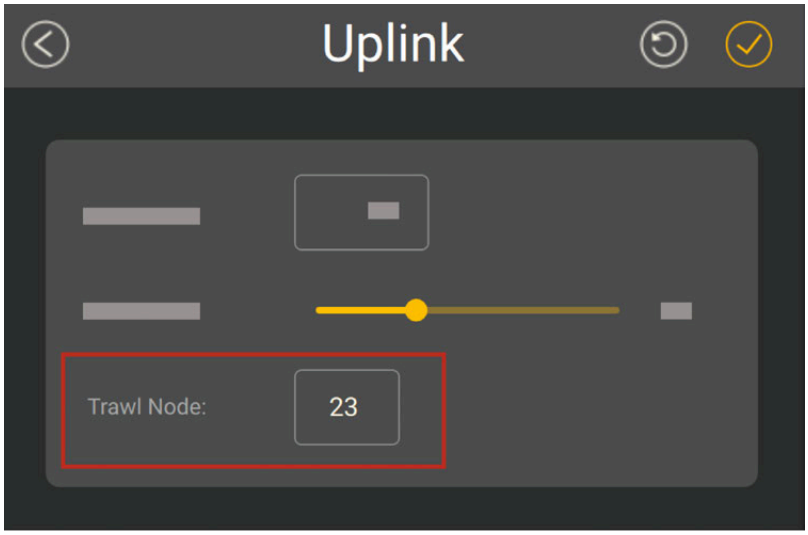
You need to give a trawl node to the sensor. It is the number corresponding to the position of the sensor on the trawl.

The trawl nodes corresponding to the positions on the doors are the following:

Sensor location	Trawl gear node
Port	Door Spread Legacy / Spread PI : 23 Door Sounder Pro: 24
Starboard	Door Spread Legacy / Spread PI : 26 (single trawl)

Sensor location	Trawl gear node
	Door Sounder Pro: • Single trawl: 27 • Twin trawls: 124 • Triple trawls: 224 • Quadruple trawls: 324
Clump	Door Sounder Pro: • Twin trawls: 27 • Triple trawls: 27, 124 • Quadruple trawls: 27, 124, 224

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 (on page 47)**. If not, change it accordingly.

3. Click ✓.

Configuring the Uplink Signal

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

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

Door Sounder Pro

Door Spread Legacy

2. Door Sounder Pro only: Choose a communication protocol.
   - NBTE V4: latest protocol, for A2S sensors.
   - Select previous versions if the sensor needs to be compatible with versions of the Mx receiver earlier than 08.03.04.
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**
33%	Works for most conditions.
100%	◦ Sensor is far from vessel - e.g. more than 800 m depending on conditions, high depth ◦ High level of interferences

Recommended uplink powers	Conditions
	◦ Issues receiving data ◦ Low SNR

5. Door Sounder Pro only: In **Refresh Rate**, leave **Fast** selected.

Spread Sensor Specific Settings

Configuring the Telegrams

You change the telegram assigned to each type of data.

Telegrams are used to define the acoustic communication between the sensor and the receiver. Data (e.g. temperature, depth) are recognized by the receiver according to the type of telegram defined (e.g. TL, CL). The telegram defines intervals between pulses emitted by the sensor, and one interval represents one value. For example, if the interval between 2 pulses of an AL spread telegram is 15 s, the spread is 250 meters.

The telegrams that are sent depend on the sensor's features and options.

Important: Make sure there is a minimum distance of 100 Hz between PRP telegrams and a minimum distance of 400 Hz with the uplink frequency of NBTE sensors. See **Frequency Plan (on page 93)** for a full list of boat/channel codes.

1. In **Communications** page, you can see the list of the telegrams sent by the sensor.
2. Click ⚙ in **Telegrams List**, then set a telegram.

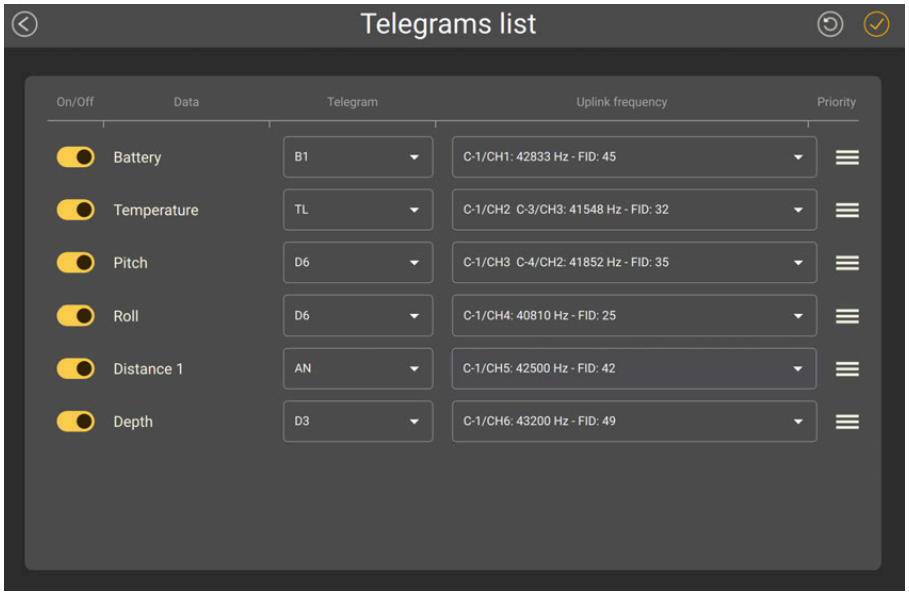
Option	Telegram	Value and/or update rate
Distance (Master/ Port and Clump sensors only)	AN	Less than 320 m. Sends data every 3 to 8 sec.
	AL	Less than 390 m. Sends data every 11 to 15 sec. (compatible with Scanmar system)
	AL3	Less than 290 m. Sends data every 11 to 15 sec. (compatible with Scanmar system)
	A6	Less than 640 m. Sends data every 3 to 8 sec. (starboard telegram only)

Option	Telegram	Value and/or update rate
	AL6	Less than 630 m. Sends data every 11 to 14 sec. (compatible with Scanmar system)
	AL7	Less than 360 m. Sends data every 11 to 14 sec. (compatible with Scanmar system)
	AN7	Less than 370 m. Sends data every 11 to 14 sec. (compatible with Scanmar system)
Distance Door PI	SLOW	Every 32 to 36 sec.
	MEDIUM	Every 13 to 16 sec.
	FAST	Every 4 to 7 sec.
Depth	D1	100 m., every 1 to 2 sec.
	D2	150 m., every 3 to 8 sec.
	D3	300 m., every 3 to 8 sec.
	D3_MC	300 m., every 4 to 8 sec.
	D6	600 m., every 3 to 8 sec.
	D12	1200 m., every 3 to 8 sec.
	D18	1800 m., every 3 to 8 sec.
Temperature	TL	Every 11 to 16 sec.
	TL_MC	Every 8 to 11 sec.
	TN	Every 3 to 11 sec.
Pitch and Roll	CL	Every 11 to 14 sec.
	VQ	Every 5 to 7 sec.
Pitch only	D6	Every 3 to 4 sec.
	AN	Every 3 to 6 sec.
	VSH	Every 2 to 4 sec.
Roll only	D3	Every 3 to 8 sec.
	D6	Every 3 to 4 sec.
	AL	Every 11 to 15 sec.

Option	Telegram	Value and/or update rate
	VRH	Every 2 to 4 sec.
Battery	B1	Every 60 to 70 sec.

Note: Using telegrams that send data more often reduces the battery life.

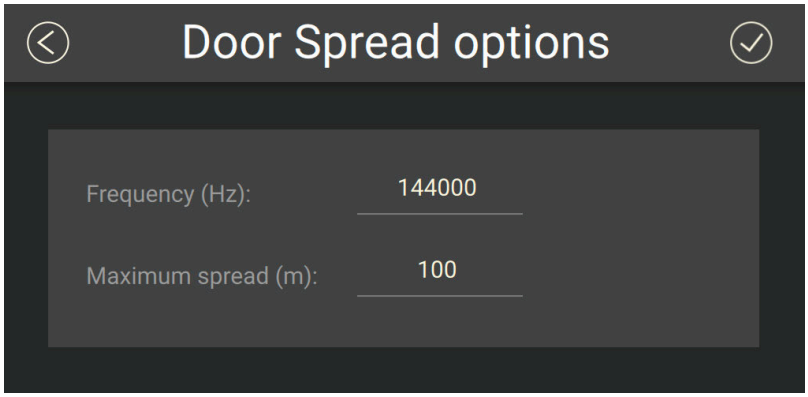
3. To configure a Catch Twister (±180° roll), set the roll telegram to **D6**.
4. Set a frequency for each data, either manually or using a boat/channel code.
5. Click ☰ and drag it to change the order in which data are sent.



Configuring Door Spread Settings

Configure the communication settings between the spread sensors.

1. Go to the **Door Spread** page, then click ⚙ in **Door Spread**.



2. Enter a frequency for the communication between all spread sensors.

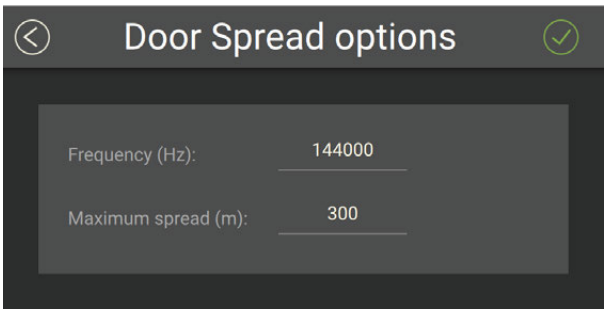
> **Note:** The frequency must be the same for all of them.

3. Enter the maximum spread between:
   - Master sensor placed on the port door: distance to the starboard door.
   - Starboard sensors placed on the clumps: distance to closest clump, toward port direction.
   - Starboard sensor: distance to the Master sensor or to the closest clump, toward port direction.

> **Note:** You can set a spread distance between 50 and 800 meters. A lower maximum spread distance will save battery life. We recommend to put a value a little higher than the estimated distance to keep a safe margin.

We recommend these maximum spread values to save battery life:

Sensor	Max. spread
Master	300 to 400 m
Clump 1	200 m
Clump 2	200 m
Starboard	200 m



Trouble: If you have communication issues, you can set a maximum spread higher than 200 meters, even if the real spread value is lower. This will increase the emission power level of 6 dB more than the default level. Be aware that this will reduce the battery life.

Calibrating the Pitch and Roll

You need to calibrate the pitch and roll of the sensors when placed on the trawl doors.

Tip: Some trawl door manufacturers measure the pitch and roll offsets themselves and write them on the doors. Check on trawl doors.

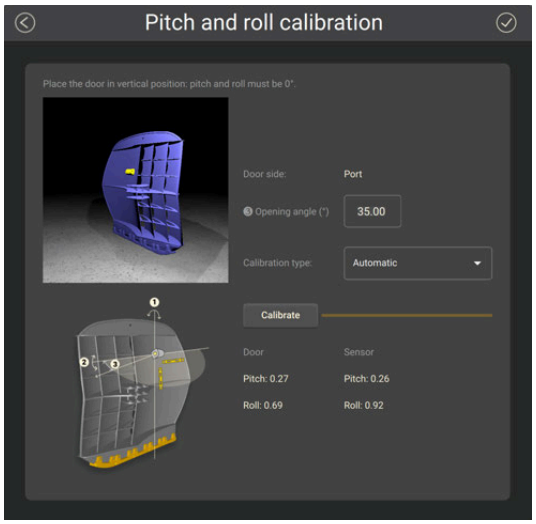
A sensor pocket is usually welded to the door at a 15 to 20 degree vertical angle. This means that when trawl doors are vertical, the sensors will already have a pitch angle and maybe a roll angle. You need to calculate these angles and offset them in order to have 0° of pitch and roll when doors are vertical.

When calibrating the pitch and roll on Mosa2, you can select between three calibration types:

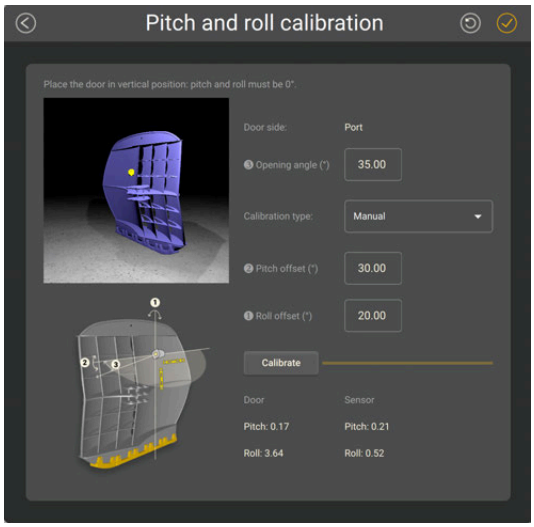
- **Automatic**: select if you do not know the offsets. In this case, the doors need to be taken out and placed on the ground in order to calibrate the pitch and roll.
- **Manual**: select if you already know the pitch and roll offsets, for example if they are written on the doors.
- **Import offset**: select if you need to apply the same offsets as those from a previous installation, using the *.A2C configuration file (for example when replacing the sensor). See **Exporting Sensor Configuration (on page 44)** to know how to get the configuration file

1. Remove all rigging, shackles and attachment points from the doors.
2. Remove the net gear attached to the door.
3. Using a crane or forklift, place the door on a flat surface, such as a dock or similar location.
4. Using the necessary rigging, hang doors with angles as close to 0 degree as possible on the vertical and horizontal plane. Use a carpenter level to help you.
5. Insert the sensor in the pockets on the doors.

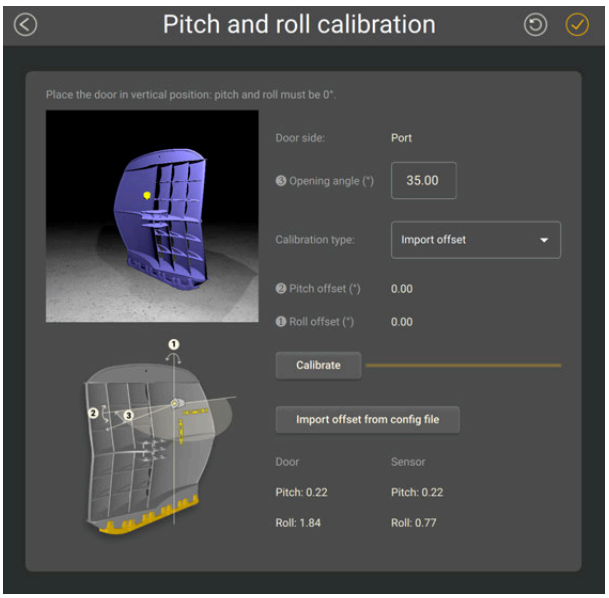
6. Connect the sensor to the Dock or Configuration Cable to connect to Mosa2.
7. From Mosa2, go to **Measurements** page and click ⚙ in **Motion**.
8. Check on the bottom of the window that the pitch and roll of the door are close to 0 degree.
9. From **Opening Angle**, enter the angle between the door and the sensor (horizontal plane) in degrees. If you do not know the angle, ask the manufacturer for the angle of attack. If you cannot know the angle, you can put 35° but be aware that a wrong angle impacts pitch and roll measurements.
10. Select the **Calibration type**:
    - **Automatic**: make sure the doors are in vertical position, then click **Calibrate**.
    - **Manual**: enter the offset values manually, then click **Apply offset**.
    - **Import offset**: click **Import offset from config file** and select the *.A2C configuration file from a previous installation.
11. When the calibration is finished, click ✓.



Automatic calibration



Manual calibration



Import offset

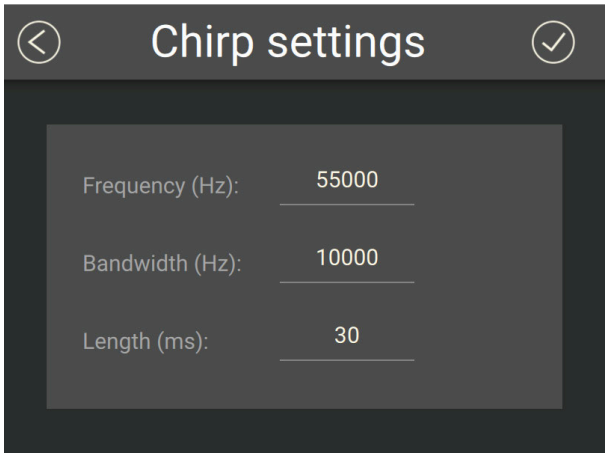
12. If you need to update the **Accelerometer coefficients**, download the last XML test file from MASP and connect in **Expert** mode.

The sensor is calibrated.

Configuring Positioning Settings

Configure the following settings if the sensor has the positioning option.

1. Go to **Positioning** page and click in **Chirp**.



2. Enter the central frequency of the signal sent by the sensor.
3. Enter the frequency bandwidth. We do not recommend to enter a bandwidth lower than 10000.
   For example, if the center frequency is 50000 Hz and the bandwidth is 10000 Hz, the signal will cover the frequency from 45000 Hz to 55000 Hz.
4. Enter the chirp length, recommended value is 30 ms.

Door Sounder Pro Specific Settings

Configure the settings of the Door Sounder Pro echo sounder.

Configuring Data Sending Sequence

You can configure the order and types of measurements (e.g. temperature, pitch, roll...) sent to the receiver.

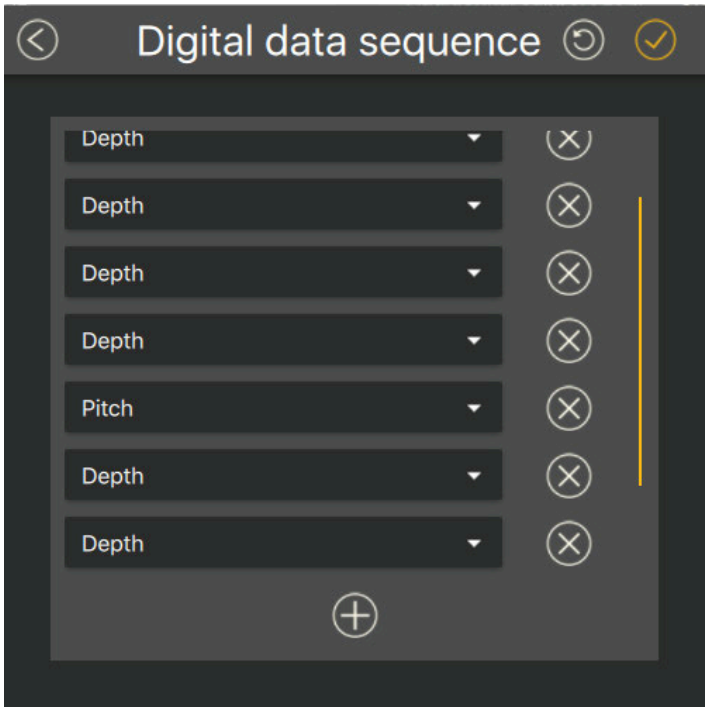
1. Press command + A or click **Menu** and click **User Mode > Advanced**.
2. In **Communications** page, click in **Data Sequence**.

3. To add data, click ⊕ then select data in the drop-down menu. The sequence begins by the top.

Trouble: If you do not see some data, it means it is not activated on the sensor (application file).

4. To delete data, click ⊗ in front of data.

5. To activate True mode display, enter a sequence corresponding to the following order: 4 x Depth / 1 x any data / 4 x Depth / 1 x any data, etc.



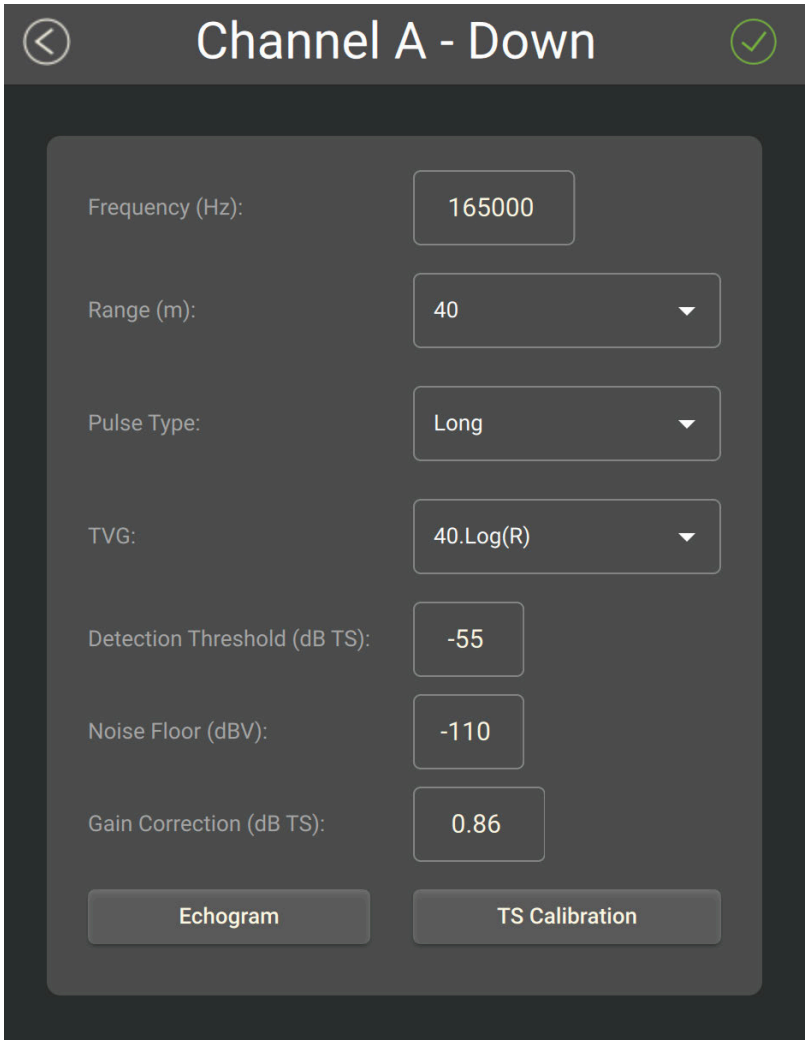
6. Click ✓.

Configuring the Echo Sounder

Configure the echo sounder settings of the Door.

1. Go to the **Echo Sounder** page.
2. To select the direction of the sounding, click ⚙ in **Sounding Mode**, then choose a **Mode** between **Down only** or **Up** (choices depend on activated options).

3. Go back to the page, then click  in front of the sounding direction, depending on the **Sounding Mode** that was configured.



4. Leave default **Frequency (Hz)** at 165,000 Hz.
5. Set the **Range (m)** of the sounding according to the maximum distance at which targets and bottom can be detected.

> **Note:** We recommend to set the maximum range value when using the automatic range in order to see the sea bottom as soon as possible.

> **Note:** 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.

6. If you want the range of the down sounding to automatically change to 20 m when the bottom is closer, see **About the Automatic Range Mode (on page 36)**.

7. Select a **Pulse Type** to have an appropriate length of pulse according to the distance to the bottom:
    - **Short**: shallow waters (100 µs)
    - **Medium**: moderate depth (300 µs)
    - **Long**: deep waters (500 µs)

    Important: Pulse length is an important setting for the calibration of the sensor. If you change the pulse length on a sensor calibrated for target strength, you need to calibrate the sensor again.

8. 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 the bottom, footrope or a school of fish.
    - 40 log: focus on individual targets.
    - 30 log: compromise between the two others.
9. Set the **Detection Threshold (dB TS)** to -79 if you want to detect small targets. Otherwise, leave the default settings at -73 dB.
10. Do not change the other echo sounder settings.

About Time Variable Gain

TVG (Time Variable Gain) is a method that compensates 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.

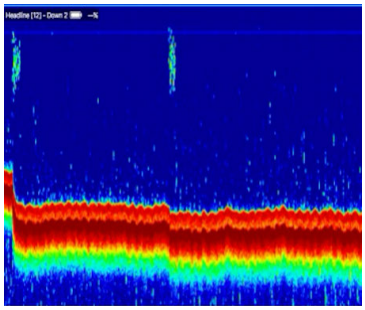
You can choose between three different TVG modes:

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

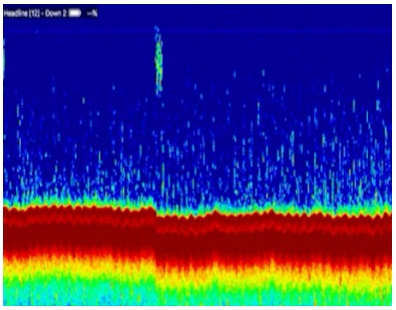
For example, if you want a good view of the footrope, select a TVG mode at 20 or 30 log. You can see on the images below that the footrope is clearer at 20 and 30 log.

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

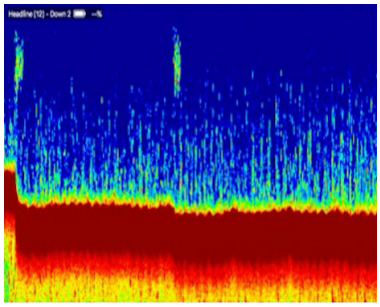
20 log



30 log



40 log



About the Automatic Range Mode

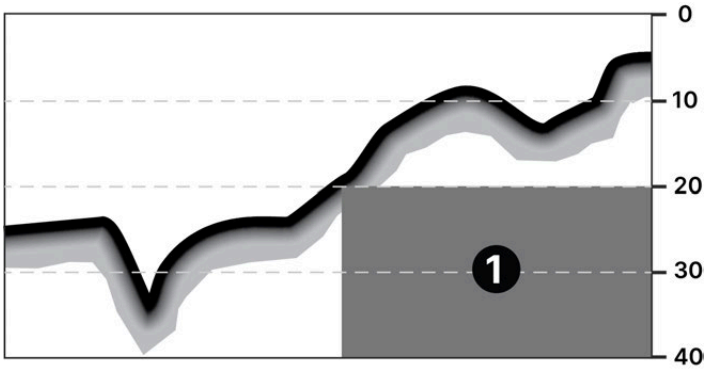
The sensor has an automatic range mode that is useful to get better quality echograms when the trawl is close to the bottom.

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 (**1**).



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

Note: The sensor requires pitch and roll angles within -25° to 25° for automatic range operation.

Mosa2 settings

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

- The **Mode** must be set to **Down only**.
- The Down sounding **Range (m)** must be more than 20 meters.
- The **Refresh Rate** must be set to **Fast**.
- The **Trawl Opening** must be lower than 18.5 meters to be able to switch to a 20-meter range.
- **Automatic Range** must be activated.

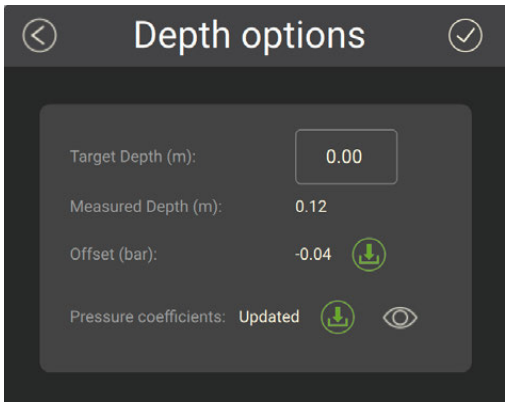
Note: The trawl opening value sets the minimum distance to see inside the trawl. As a result, if the trawl opening distance is equal or higher than 18.5, the sensor will not reduce the range to 20 meters.

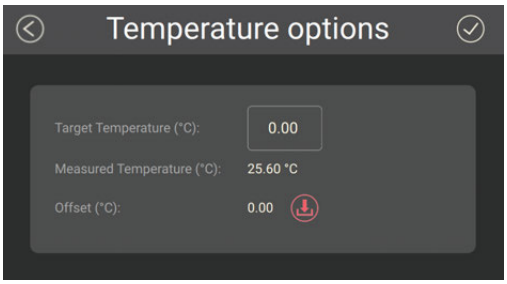
See **Configuring the Echo Sounder (on page 33)** for details about Mosa2 settings.

Applying Offsets to Measurements

You can apply offsets to temperature and depth measurements if the measured values do 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).
4. About the pressure coefficients: you do not need to upload this file, the coefficients are directly included in the application file downloaded from MASP. Note that if you replace the pressure sensor, you need to change the sensor in MASP and upload the application file again.

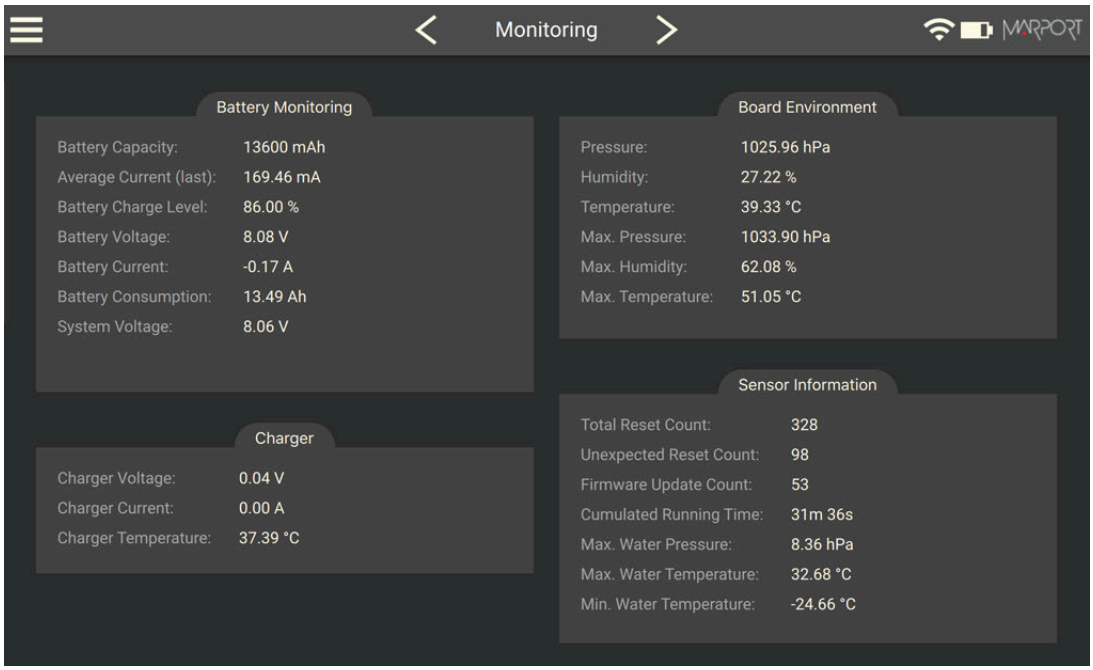
Testing Measures

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

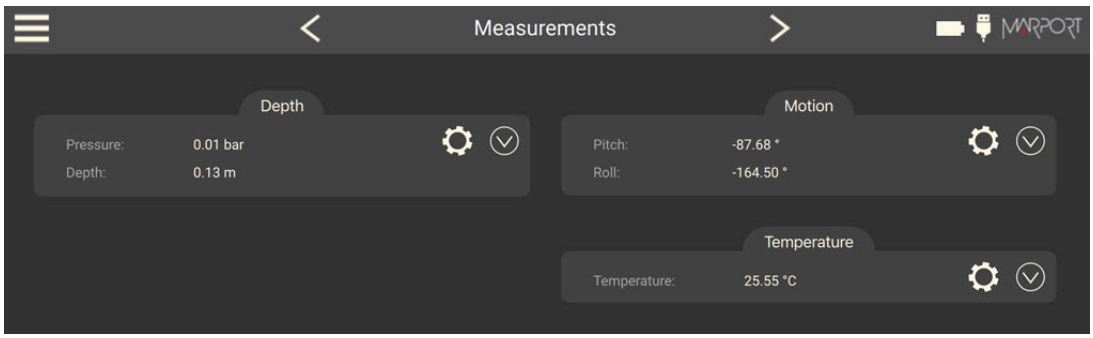
You can test the sensor in water or in air. In air, the following measures will be wrong: height, conductivity.

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.
   - **Motion**: calibrate the door sensors.

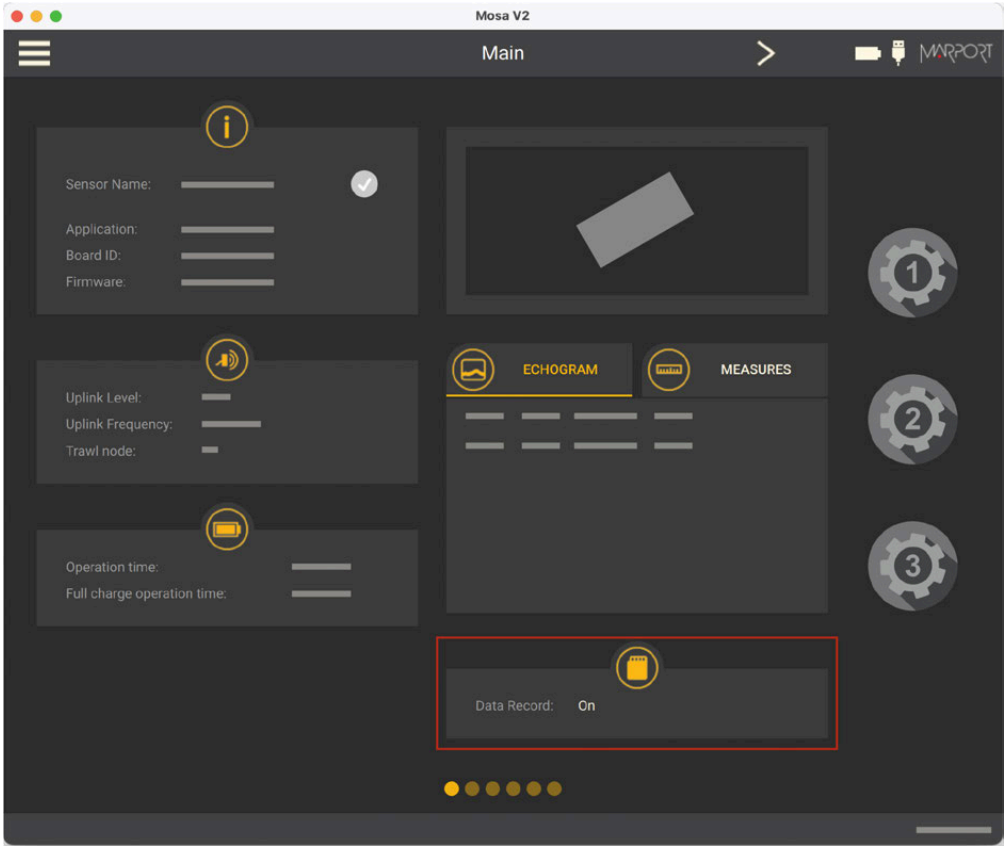
Memory Card Recording

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

Overview

Data recorded on the sensor memory card are in higher resolution, with a higher refreshing rate. For sensors with echograms, you can see target strength values without uplink sound transmission loss.

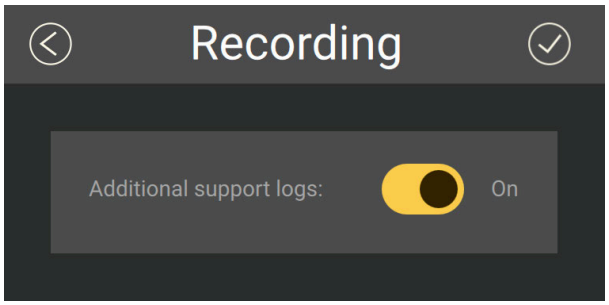
You can see on Mosa2 main page if the memory card recording feature is activated:



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 memory card

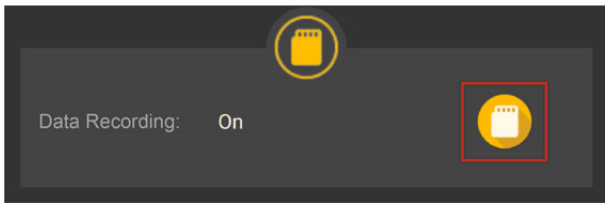
The last 99 recorded sensor data files and last 99 battery files are displayed. Two types of files are on the memory card:

- 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.

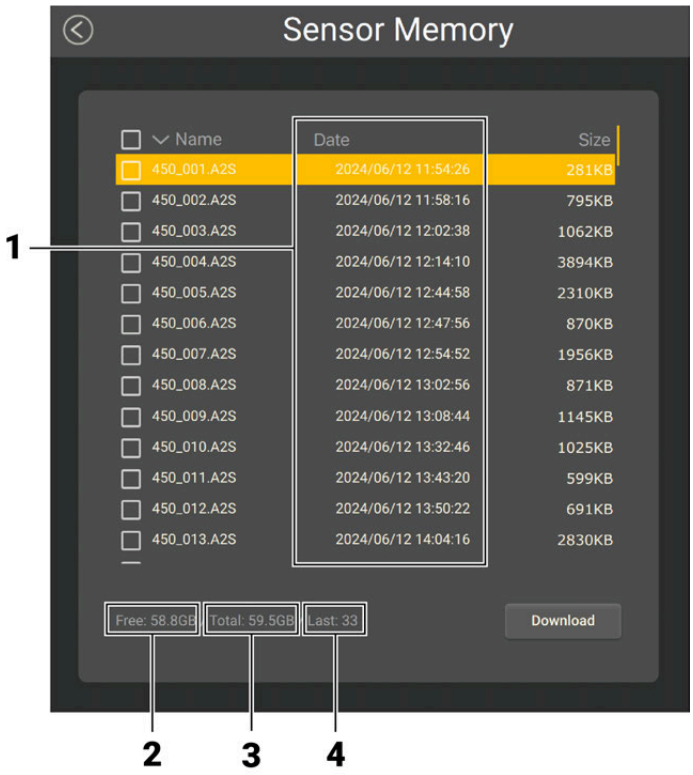
Note: The first time the sensor connects to Mosa2 or if the sensor desynchronizes, a clock with a warning icon is displayed in the top toolbar. Click it to synchronize the time of the memory card with the computer's time.

Note: When downloading the files, we recommend to connect the sensor to Mosa2 using the Dock or the Configuration Cable for a better transfer of data.

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

See **Replaying Data Recorded on a Memory Card (on page 62)** to learn how to replay these data in Scala2.

Saving a Configuration on Mosa2

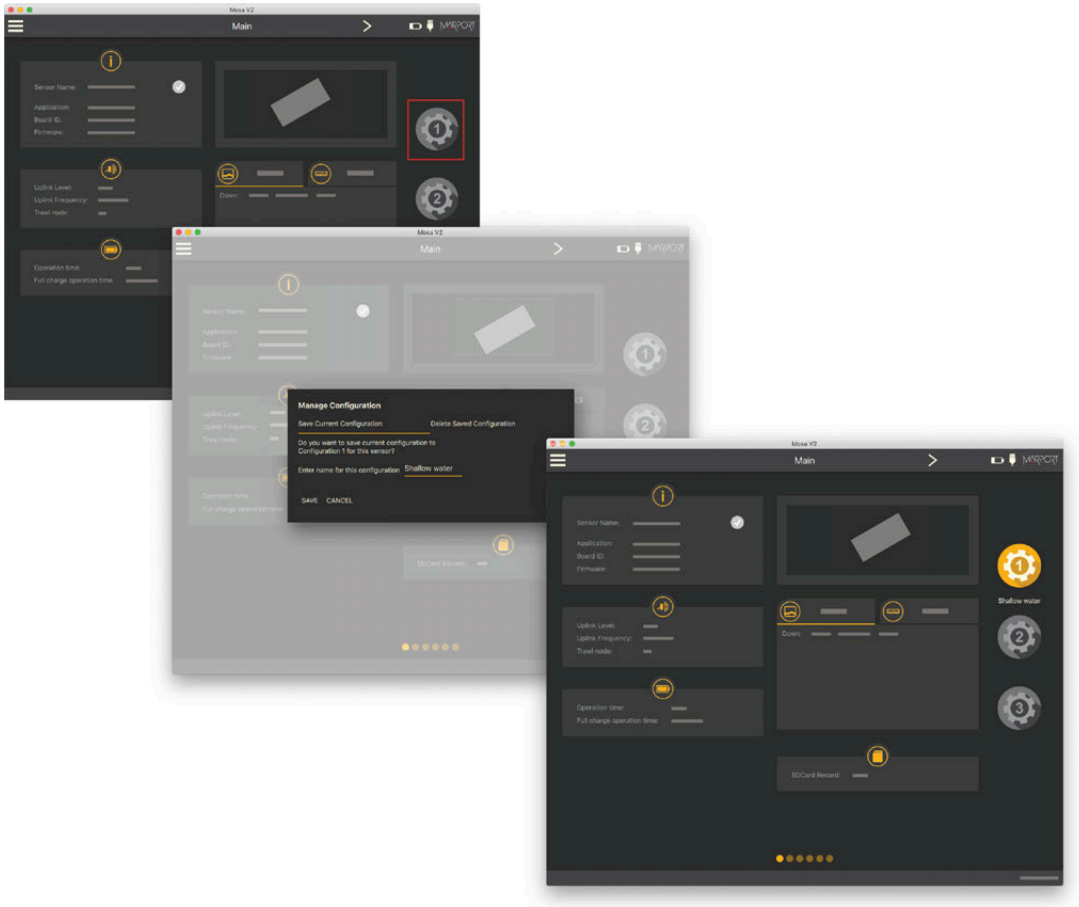
You can save different configurations of the sensor to be able to quickly change the configuration when you change your fishing method.

- 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:

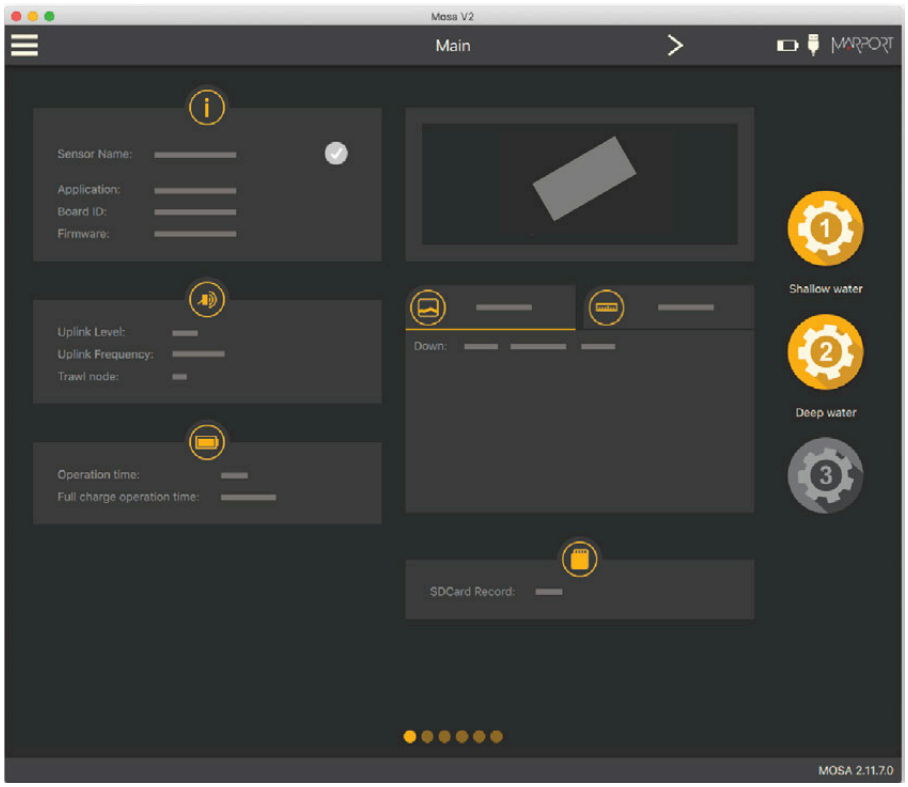
- If fishing in shallow water, you can use a configuration with an uplink level of 33%, a short pulse and a short range.
- If fishing in greater depths, you can change for a configuration with an uplink level of 100%, a long pulse and a long range.

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**.

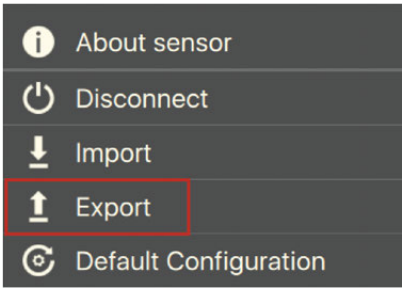
Exporting Sensor Configuration

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.

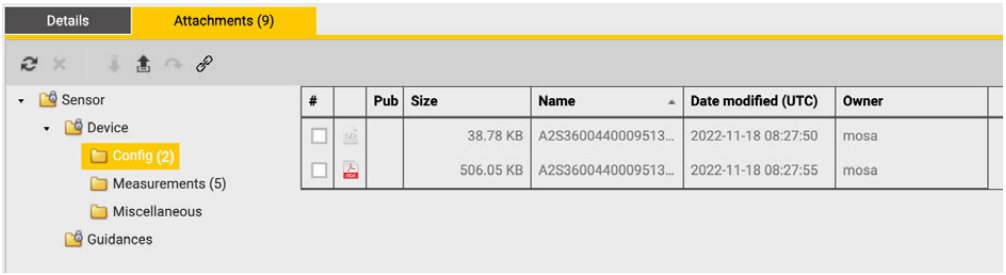
If you have issues with your sensor, send this file to support teams.

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.



Importing a Sensor Configuration

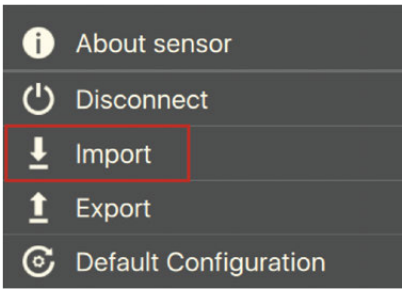
You can apply to a sensor a configuration that has already been made on another sensor.

- You have exported a configuration (see **Exporting Sensor Configuration (on page 44)**) 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 and Display

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

Note: This guide refers to the following version of Scala2: 02.14.x. If you use another version, the visual interface and options may vary.

Adding the Sensor to the Receiver

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

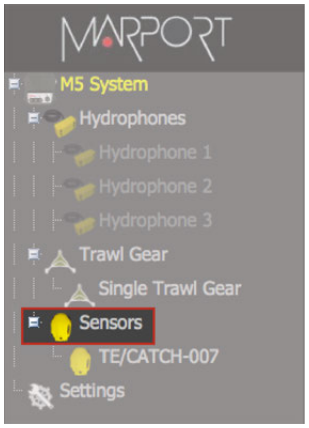
For compatibility details, see **System Compatibility (on page 7)**.

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 your sensor to the receiver, make sure your receiver version is compatible. Check **System Compatibility (on page 7)**.

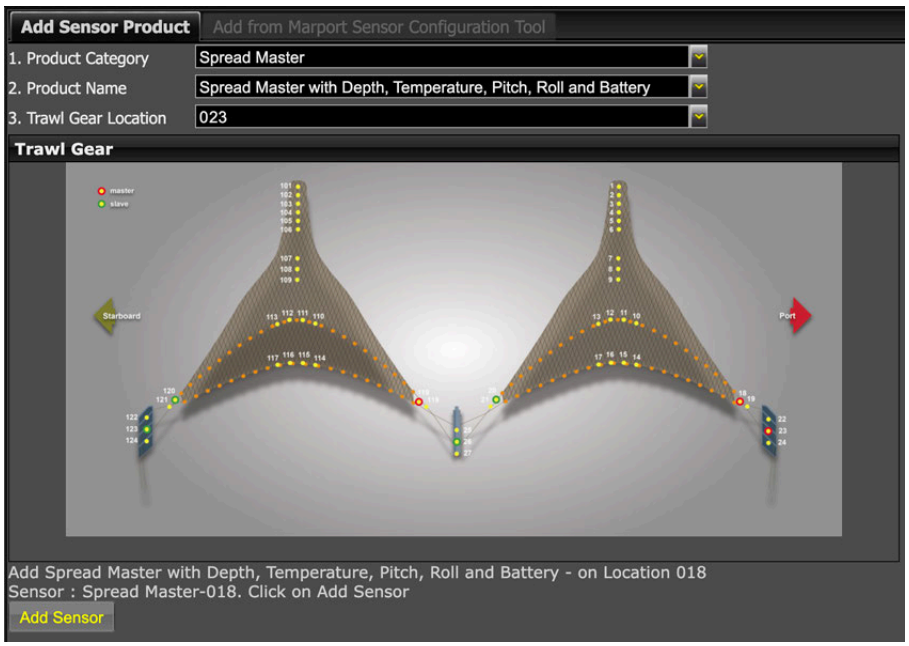
1. From Scala2, click **Menu** **> Expert Mode** and enter the password `copernic`.
2. Right-click the IP address of the receiver at the bottom of the page, then click **Configure Receiver**.
3. From the left side of the receiver page, click **Sensors**.



4. From the page **Add Sensor Product**, select the options corresponding to your type of sensor:

Type of sensor	Product Category	Product Name	Trawl Gear Location
Spread Sensor	Spread Master	Spread Master with...*	Same as defined in Mosa2 (see **Configuring the Trawl Node (on page 21)**).
	Spread Starboard	Spread Starboard with...*	
Door Sounder	Door Sounder	Narrow Band Door Sounder	
Marport PI compatible Spread sensor	PI Sensor	PI Spread	

Note: *Choose the **Product Name** according to the sensor features chosen in MASP.



5. 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 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.

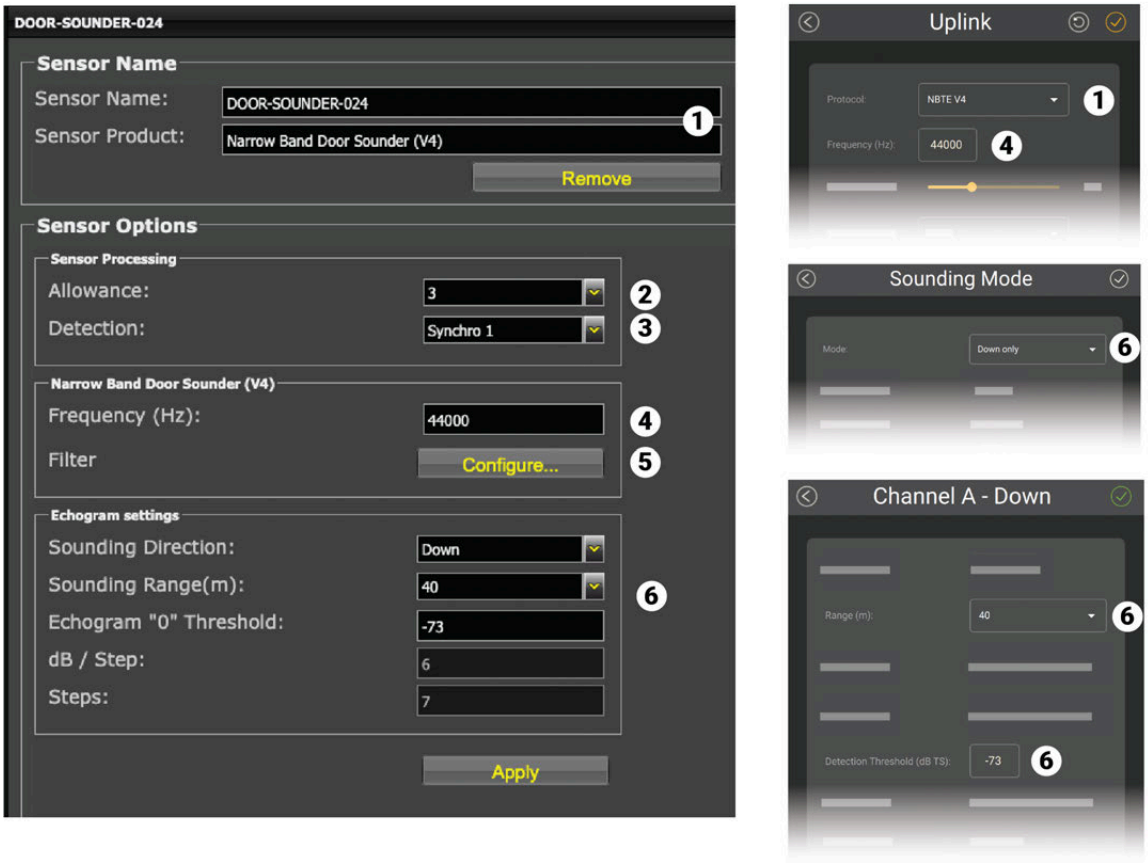
Door Spread Legacy

1	Sensor name displayed in Scala2 and its features.
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	For each option, enter the same frequencies and telegrams as those entered in Mosa2.

5	Click **Configure** to change filters applied on incoming data.
6	Apply the same positioning (chirp) settings as those entered in Mosa2.

Click **Apply** when you have finished.

Door Sounder Pro



1	Sensor name displayed in Scala2 and its features. The version of the communication protocol must correspond to what was set in Mosa2.
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** and **2** only if no interferences on the vessel (not recommended). • **3** is default setting. • Choose between **4** and **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	Click **Configure** to change filters applied on incoming data. Filters are particularly useful to reduce interferences on the echogram data. **Tip:** Please refer to Scala2 user guide for more information about the filters.
6	Select the same sounding direction, range, and detection threshold as those set in Mosa2.

Click **Apply** when you have finished.

What to do next

Configure the positioning settings if the sensor has the positioning option.

Configuring Data Display

You can display measurements taken by the sensors (e.g. distances between doors, depth, pitch and roll...) on pages in Scala2.

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

- **Spread Master** / **Spread Slave** / **Spread Clump** for Spread sensors.
- **Door Sounder**

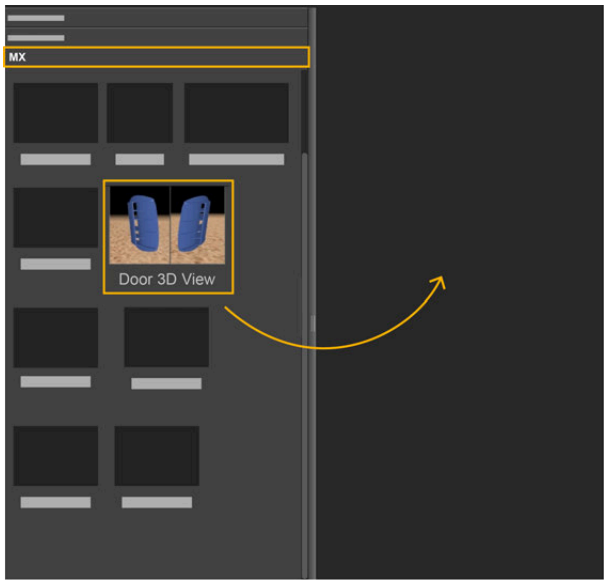
The title is followed by the node where the sensor was placed when added to the system. Data displayed (e.g. spread distances, pitch & roll) depends on the firmware installed.

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

Displaying Doors 3D View

You need to have Spread sensors with pitch and roll option activated.

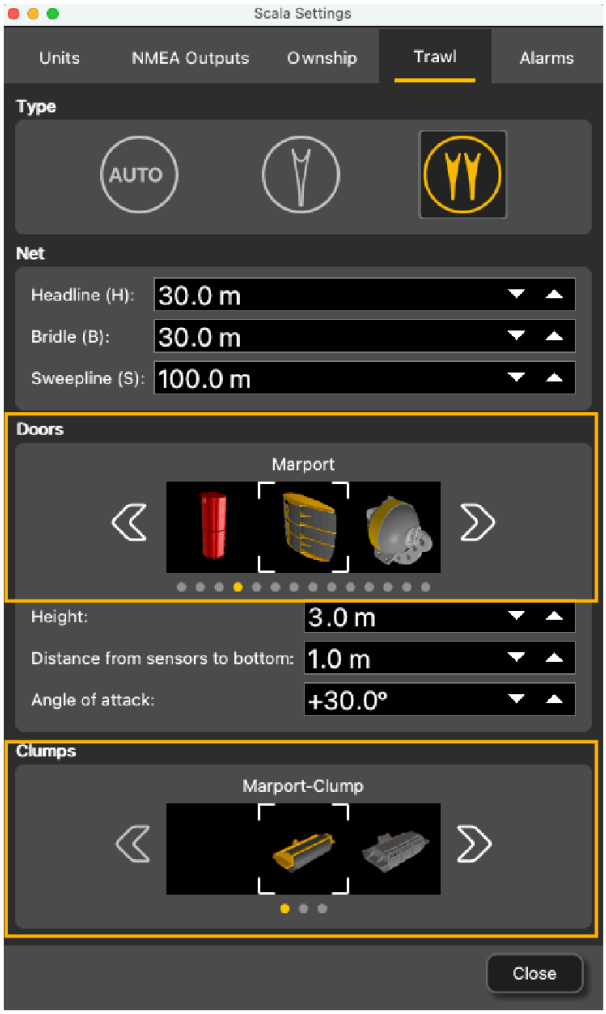
1. From the top left corner of the screen, click **Menu** **> Customize** and enter the password `eureka`.
2. From the top toolbar, click the add icon +.
3. Open the customize panel, then go to **Mx** and drag **Door 3D View** to the page.



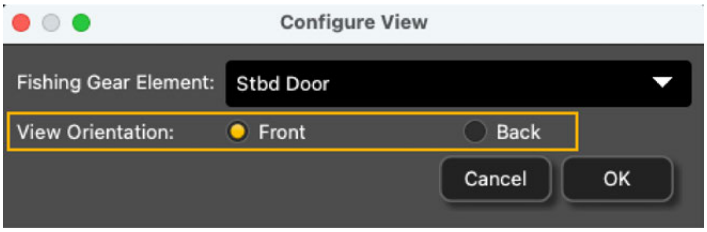
4. To change the door or clump model:

a. From the top left corner, click **Menu** ☰ **> Settings**.

b. Click the **Trawl** tab and select the models of doors and clumps from the lists, using left and right arrows.

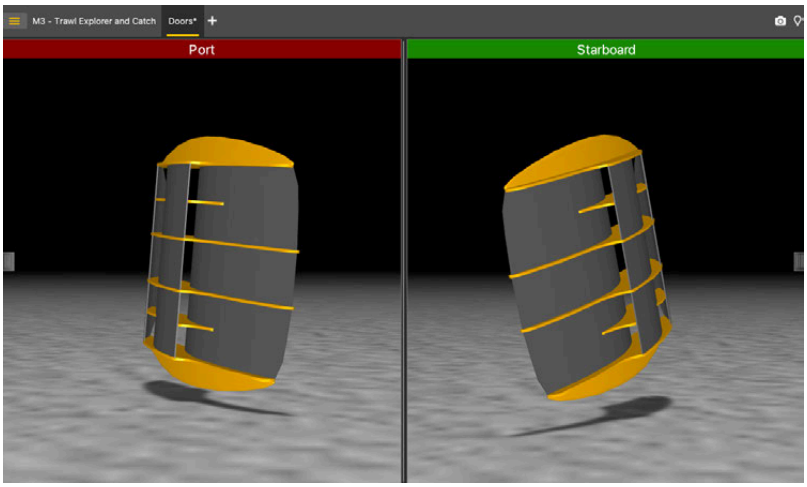


5. You can also change the viewing angle: looking from the trawl toward the vessel (front), or from the vessel toward the trawl (back).

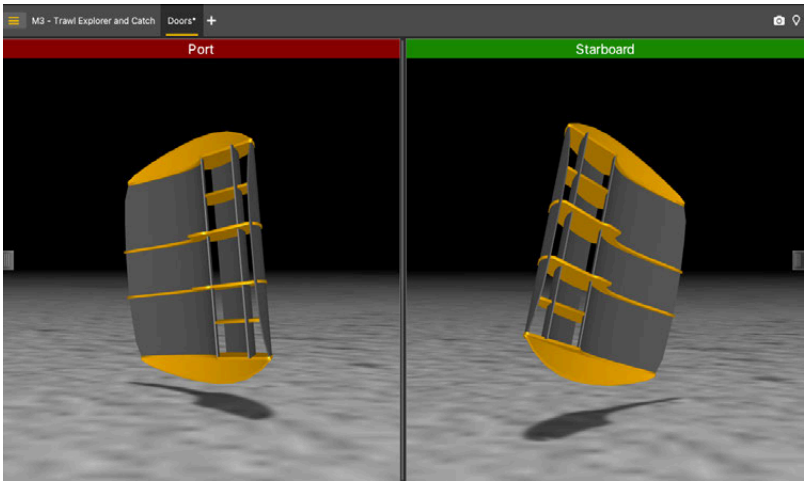


6. To change the view angle of the door, right-click the 3D view and choose:

◦ **Horizontal Camera** to see the doors from the front.

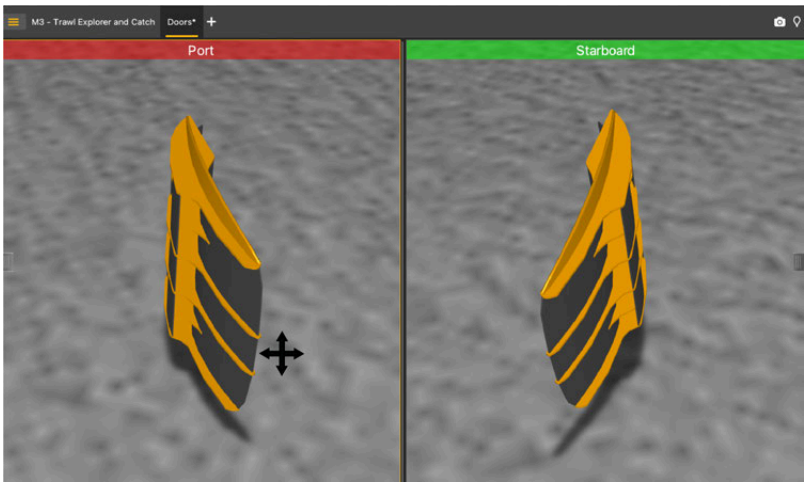


◦ Or back.



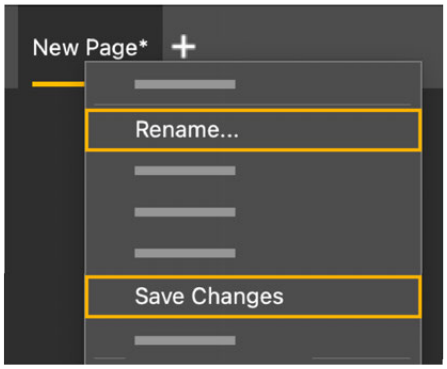
- **Vertical Camera** to see the doors from above.

- **Free Camera** to adjust the viewing angle yourself, by clicking and dragging the 3D doors.



7. To display the ground, right-click the 3D view and select **Display Ground**. You should leave the ground displayed in order to see if the doors are touching it.
8. To save the changes you made:

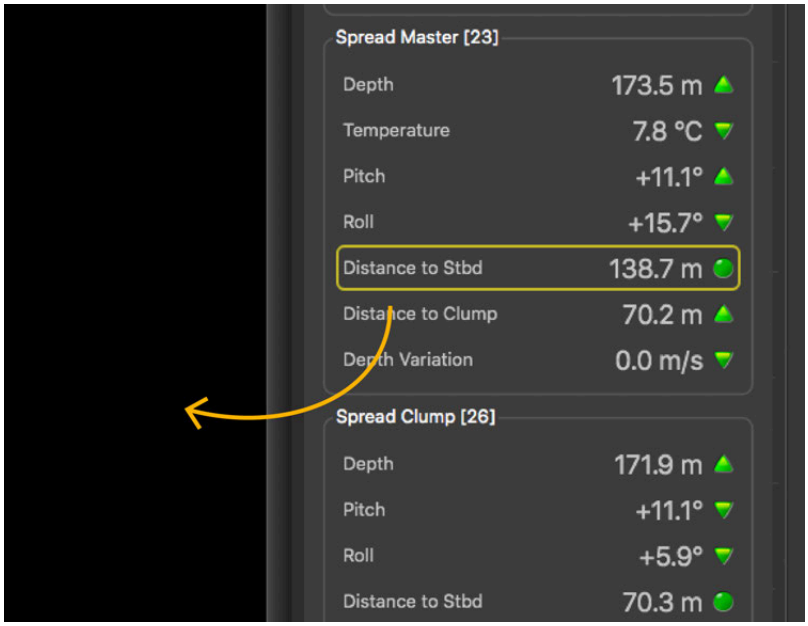
a. To rename the page, right-click the name of the page and click **Rename**.
b. To save the page, right-click the name of the page and click **Save Changes**.



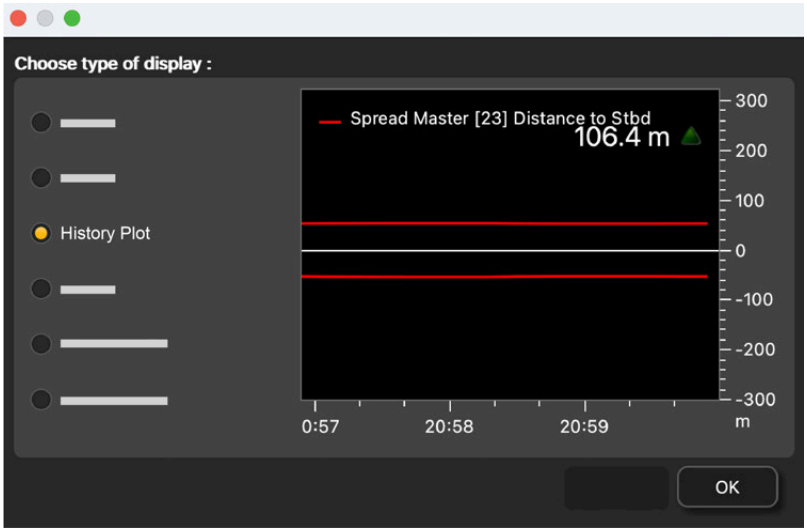
Displaying Single Trawl Spread

You need to have Spread sensors that send distance between port and starboard doors.

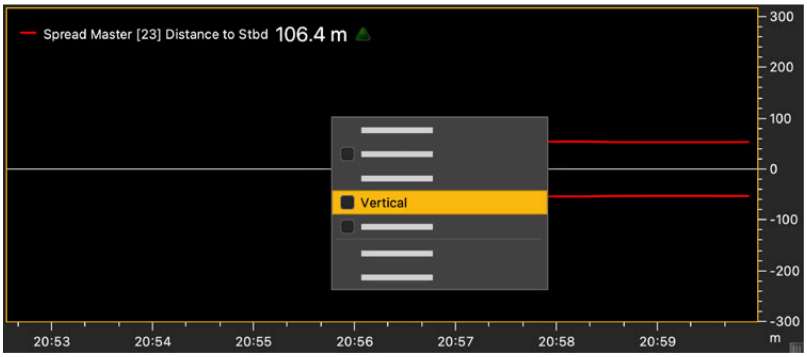
1. From the top left corner of the screen, click **Menu** **> Customize** and enter the password `eureka`.
2. Open the control panels and from the **Mx** tab, click + hold distance data from spread sensors such as **Distance to Stbd** from a **Spread Master** and drag it to the page display.



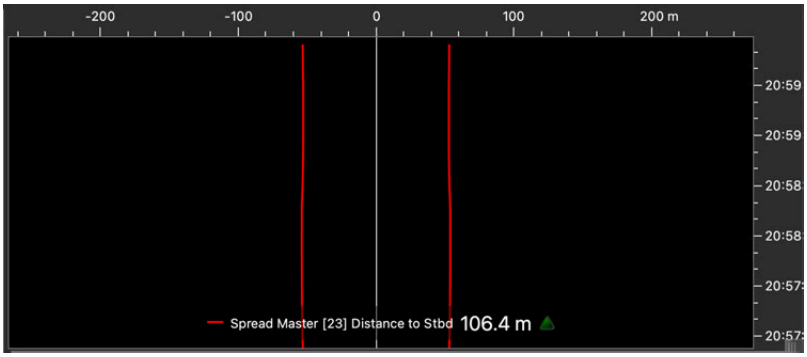
3. In **Choose type of display**, select **History Plot**.



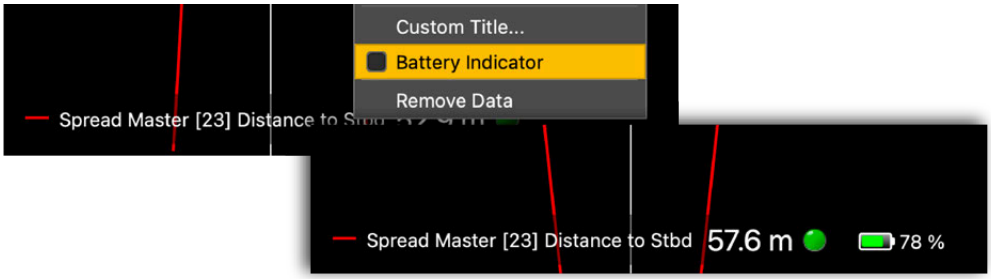
4. Right-click the history plot and select **Vertical**.



The history plot becomes vertical. You can see the distance between the port and starboard door.



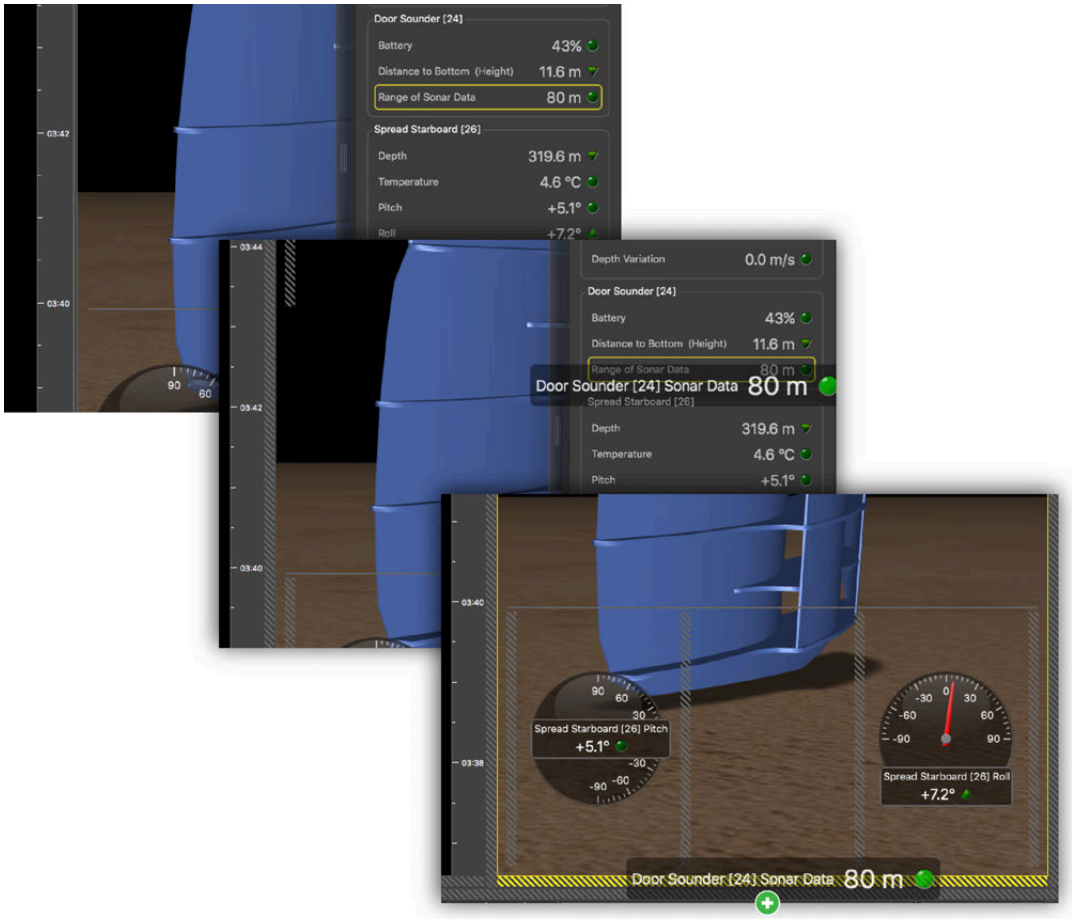
5. If you have a firmware version 08.03 and above, you can display the battery level on the plot. Right-click the title of the plot and click **Battery Indicator**.



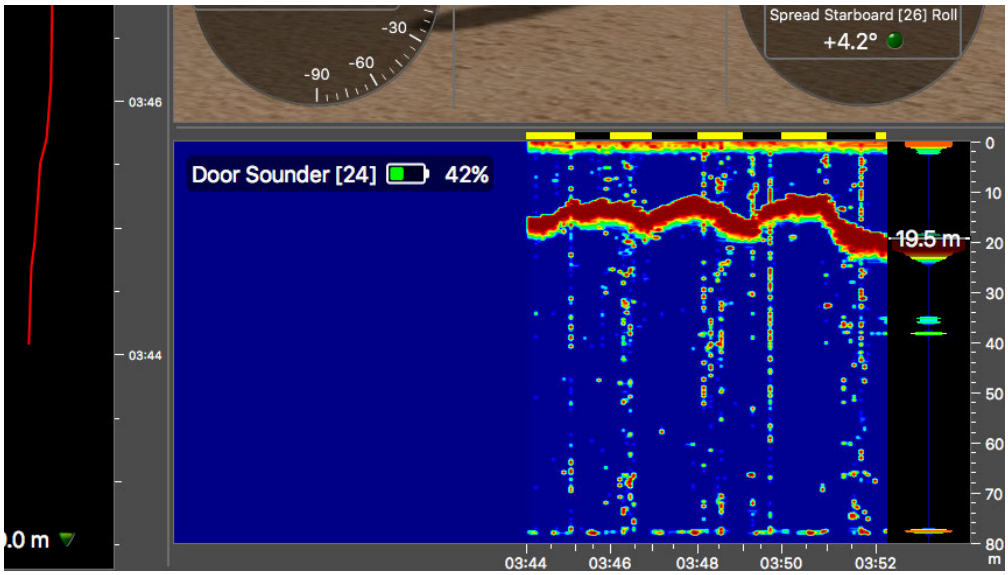
Displaying Door Sounder Echograms

You can display echograms from Door Sounder sensors in order to see how doors are placed above the sea bottom.

1. From the top left corner of the screen, click **Menu** **> Customize** and enter the password `eureka`.
2. Open the control panels and from the **Mx** tab, click + hold **Sonar Data** from a Door Sounder or Bottom Explorer (Door Sounder with target strength calibration) and drag it to the page display.



The echogram is displayed.



Changing the Distance from the Door Sounder to the Bottom

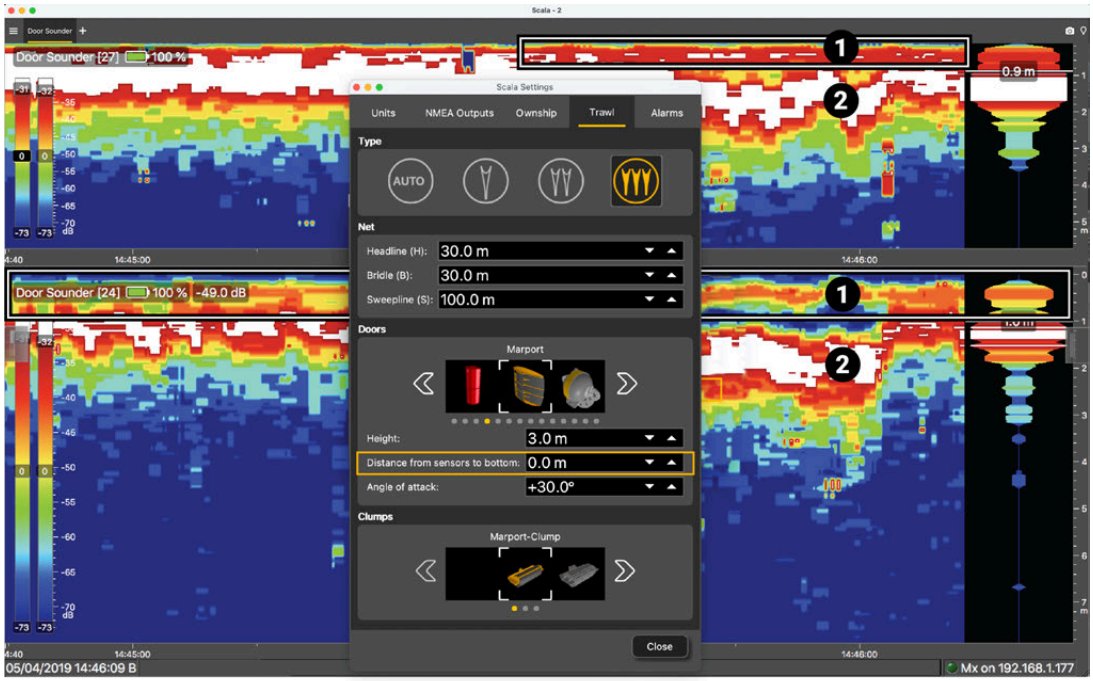
You can change the distance at which the Door Sounder echogram begins.

By default, the echogram is displayed beginning from the sensor position. You can increase the distance at which the echogram begins to:

- Have distance to bottom values beginning from the shoes, instead of from the sensor position.
- Remove the echo of the shoes from the echogram.

1. Click **Menu** **> Settings**, then go to the **Trawl** tab.
2. In **Doors > Distance from sensors to bottom**, enter the distance of the Door Sounder sensors from the door shoes.
   The echoes of the shoes do not appear anymore on the echogram.

The image below shows the default echogram from Door Sounder sensors. You can see that the echoes of the shoes (**1**) appear above the echo of the ground (**2**).



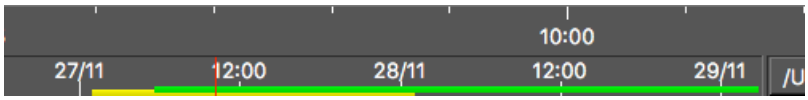
The image below shows the echogram received from Door Sounder sensors when a distance is added. Now, you can only see the echo of the ground (**2**).

Replaying Data Recorded on a Memory Card

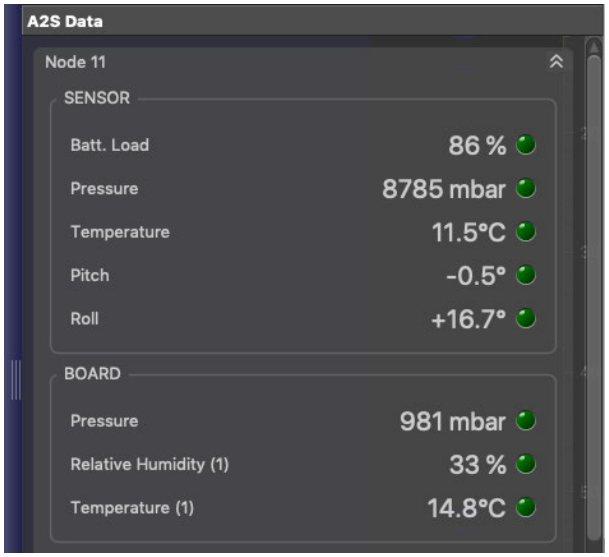
In Scala2, you can replay data that has been recorded in high definition on the sensor memory card.

Note: Data in high definition is available only when downloading it from the sensor memory (A2S files). Data received in Scala2 will have a lower definition (SDS files).

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 was received in live is displayed in the **Mx** panel and data recorded on the SD card is 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.

Configuring the System with the Positioning Option

If the sensors have the positioning option, you need to configure the system in order to receive the trawl position and display it in Scala2.

Configuring the Hydrophones

You need to configure the hydrophones to correctly receive signals from the sensors.

Tip: To help you remembering the configuration, always begin to configure the port hydrophone, then the starboard hydrophone. This way, most of the values associated with port side will be smaller than those of the starboard side (hydrophone number, node numbers...).

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 page, click **Hydrophones**.
4. Add the two receiving hydrophones, then enter the following settings:
    a. From **Rx/Tx** select **Receive**.
    b. From **Location**, select the port and starboard hydrophone. It is important to know which one is port and which one is starboard.

Note: If you do not select the location, you will not be able to configure positioning settings.

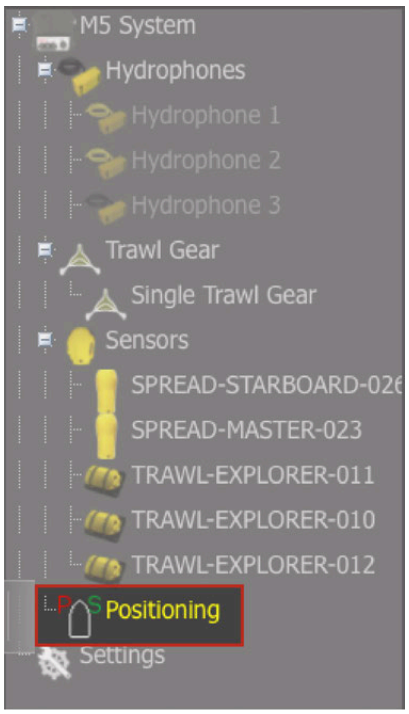
Configuring the Positioning Settings

Configure the positioning settings on the system web page to correctly receive the positioning data from the sensors.

You have added the sensors to the receiver.

Tip: A spreadsheet is available on the **Useful Resources** page of Marport support website to help you complete this page.

1. From the left side of the screen where the system is displayed, click **Positioning**.

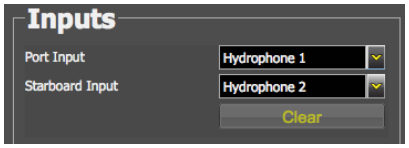


   The positioning configuration page appears.
2. In **Baseline**, enter the baseline distance and the misalignment angle.

   Note: The baseline is very important to have accurate positions of the doors.

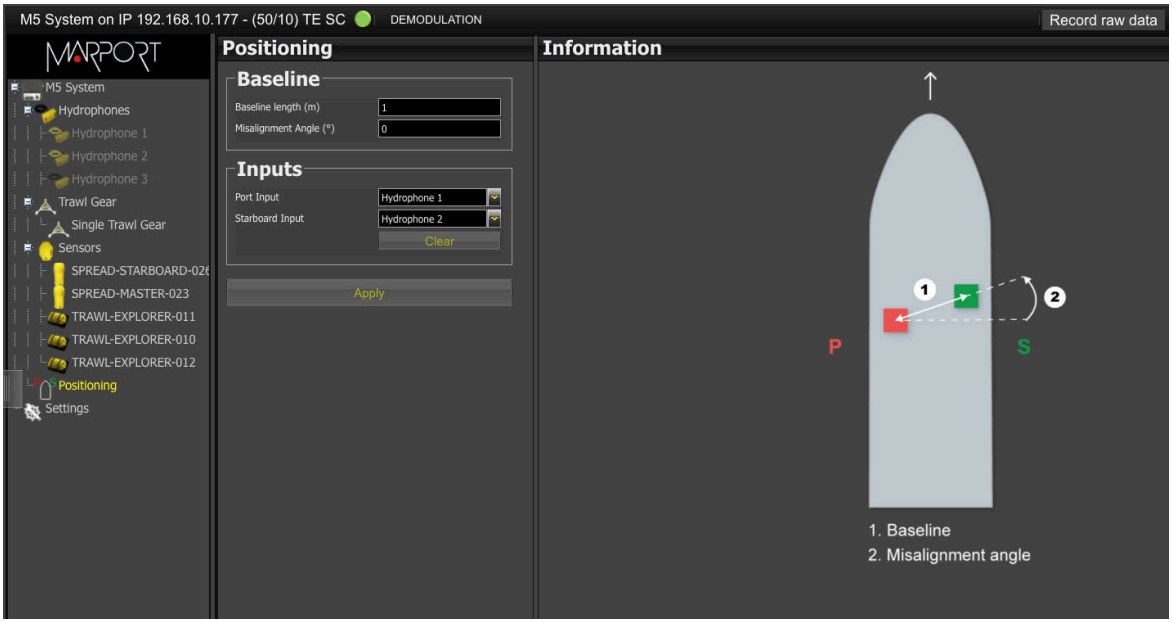
   Important: If the starboard hydrophone is placed further aft, add a negative (-) sign before the angle.

3. In **Inputs**, enter the port and starboard hydrophones, according to the hydrophone configuration.



Note: On **M4 and M6 systems**, the receiving hydrophones must be both connected to a hydrophone input between H1, H2 and H3 or both between H4, H5 and H6.

4. Click **Apply**.



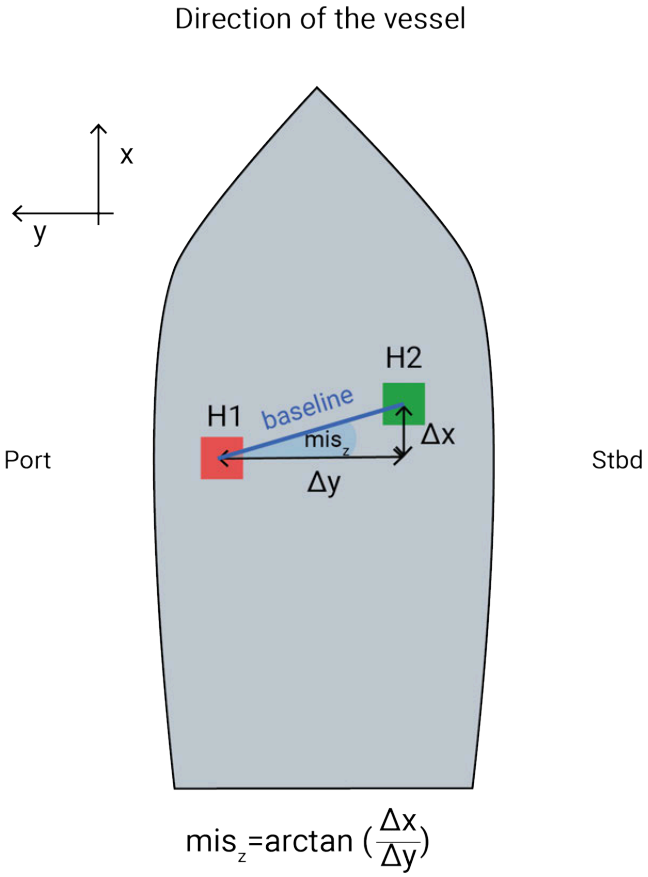
Calculations for the Positioning System

When configuring the positioning system on the system web page (Scala2 receiver page), you must consider the position of the hydrophones. When they are misaligned, you can calculate their misalignment angle with the following calculations.

Tip: A spreadsheet is available on the **Useful Resources** page of Marport support website to help you complete this page.

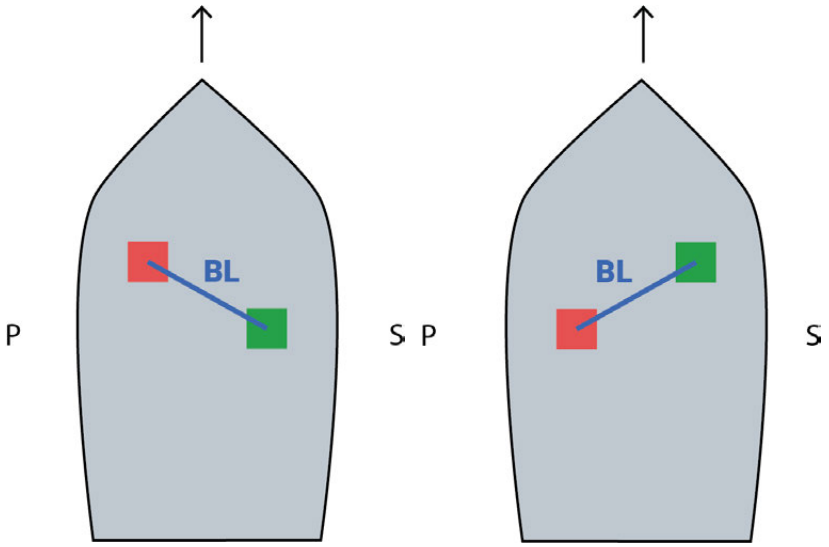
Note: Baseline length is the distance between two hydrophones. It must be in meters.

The misalignment angle (angular offset around Z axis) is calculated with the following formula:



Sign of Angles

You need to add a negative sign (-) to the result if the starboard hydrophone is placed further aft. The sign of the angles is important to receive correct positioning data.

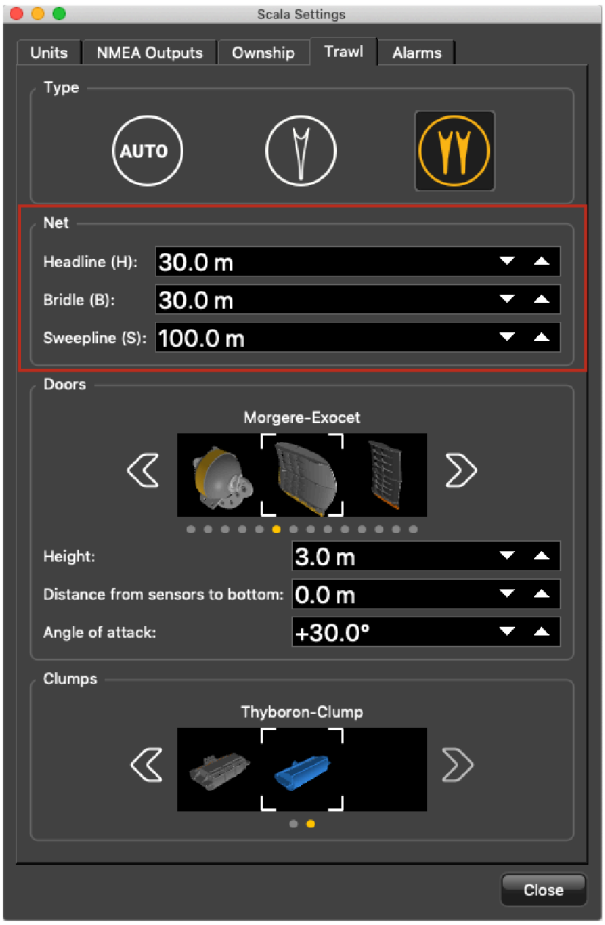


Negative sign (-) Positive sign (+)

Configuring Trawl Settings

You need to configure trawl settings to display the trawl on the chart and vessel 3D overview.

1. Click **Menu** **> Settings**.
2. From the tab **Trawl**, complete **Headline (H)**, **Bridle (B)** and **Sweepline (S)** with accurate measurements of your trawl gear.



Adding Data from External Devices

You need to add to Scala2: warp lengths, GPS coordinates and heading data received from devices such as winch control systems or GPS compass.

See to know which NMEA sentences are compatible.

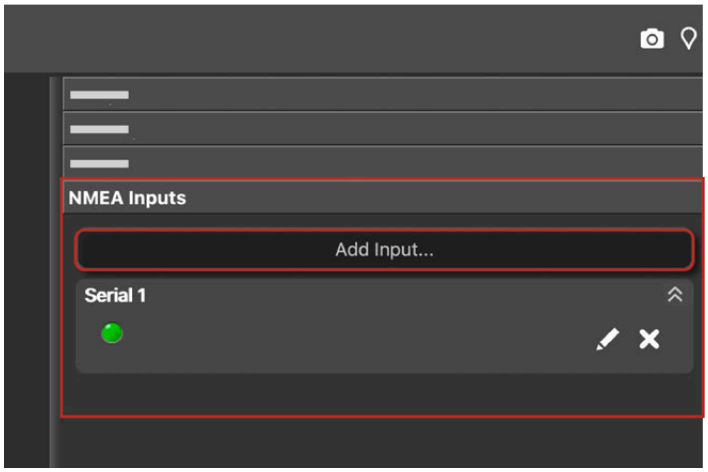
Note: Heading data is very important to have precise positioning of the trawl.

Note: Make sure you receive data from only one GPS device or the trawl will not be displayed correctly.

Note: Warp lengths can be received from a winch control system, or entered manually in the control panels, under **Manual Estimation**. If no warp lengths, the positioning will be calculated from the bearing, spread distance and depth data sent by the Spread

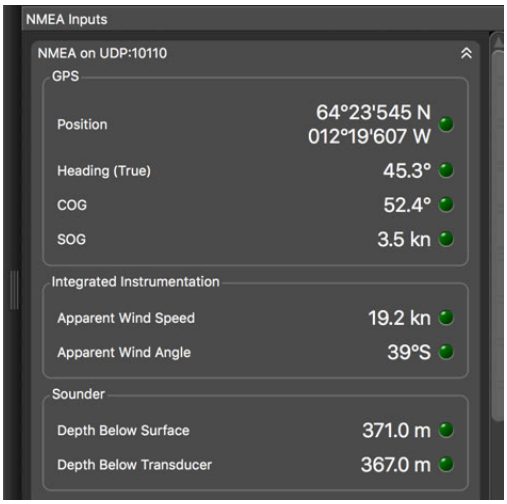
sensors. However, we strongly recommend to receive warp lengths from a winch control system. Without it, the accuracy of the positioning will be reduced.

1. In the control panels, click **NMEA Inputs > Add Input**.

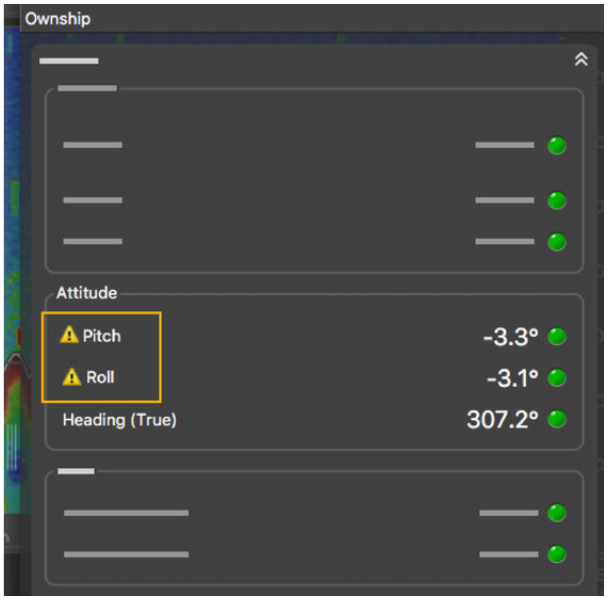


2. Choose the type of connection between serial port, UDP or TCP socket.
3. If using a serial port:
    a. In **Port**, select the incoming data you want to add.
    b. In **Baud**, choose the transmission speed (bit per second).
    c. Leave the other default parameters if you have no specific requirements.
    d. Select a different input format if you have Marelec or Rapp Marine/Rapp Hydema equipment. Otherwise, select **Standard NMEA format**.
    e. To broadcast the data received on this serial port to other equipment than Scala2, select **Output to UDP**, then enter a port above 1000 and enter 255.255.255.255 to broadcast to all equipments, or enter a different subnet mask.
4. If using UDP:
    a. Enter the port of the server sending data.
5. If using TCP:
    a. Enter the IP address of the server and the port.
    b. Select a different input format if you have Marelec or Rapp Marine/Rapp Hydema equipment. Otherwise, select **Standard NMEA format**.
    c. To broadcast the input data to other equipment than Scala2, select **Output to UDP**, then enter a port above 1000 and enter 255.255.255.255 to broadcast to all equipments, or enter a different subnet mask.
6. Click **OK**.

NMEA data appears in the **NMEA Inputs** control panel and in the **Ownship** panel. LEDs blink green when data is received (it may be steady green if data is received continuously). When communication with the NMEA devices is lost, LEDs do not blink anymore.



Trouble: If you see a warning sign in front of data, it means that you receive the same data from more than one device. Right-click the data, then click **Configure Data** and select the primary source.

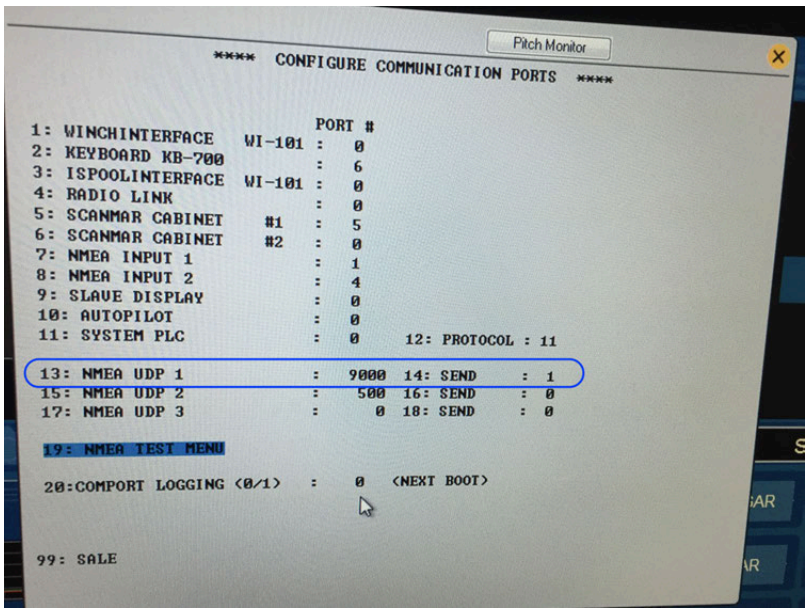


Receiving Warp Lengths from Scantrol

You can output warp length data from Scantrol iSYM Trawl Control application to Scala2 software.

Note: In this procedure, data are transmitted via a UDP port but a connection via a serial port can be possible.

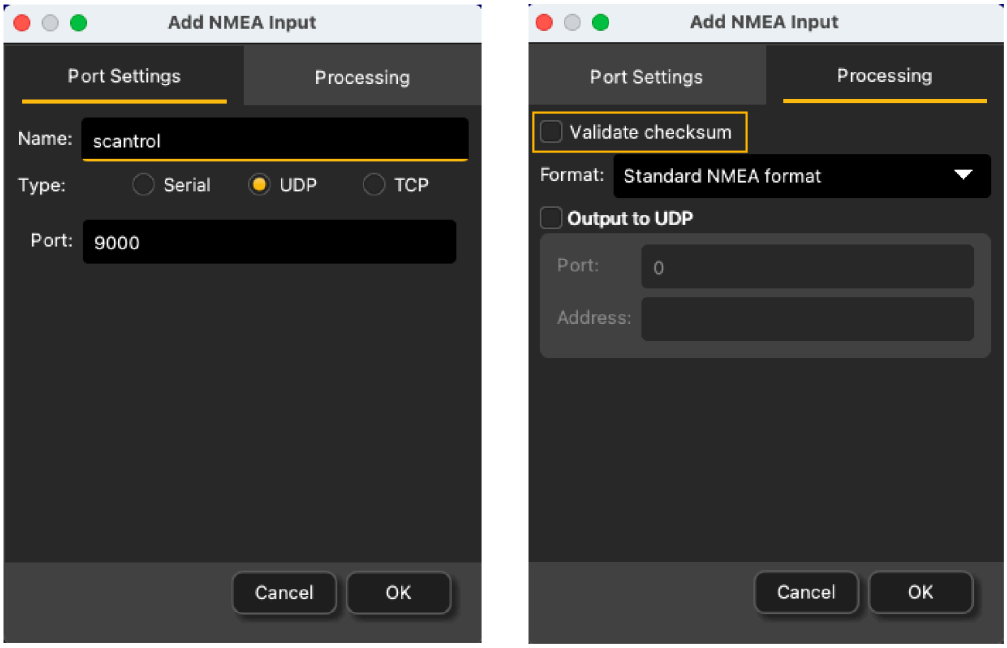
1. Scantrol and Marport computers must be connected together via an Ethernet wired network. Both computers must be on the same sub-network to communicate with each other: 192.168.0.XX.
   For example, the network IP address can be set at **192.168.0.10** on Scantrol computer and at **192.168.0.12** on Marport computer. The subnet mask address is 255.255.255.0 for both.
2. Go to iSYM's **Configure Communication Ports** menu, then in **13: NMEA UDP 1** enter a port number, such as `9000`, and set **SEND** to `1`.



Note: The port number must be different from the one on which Scala2 sends data (if applicable).

3. In Scala2, open the control panels then click **NMEA Inputs > Add Input**.

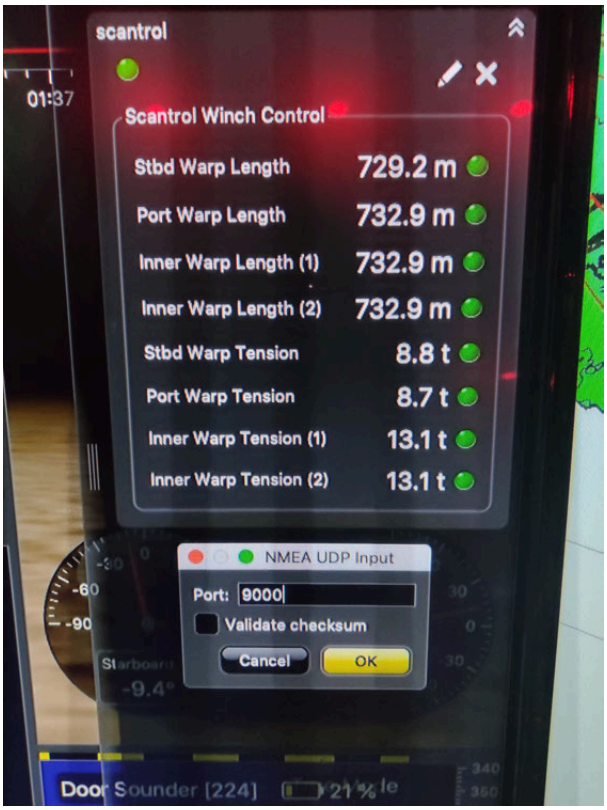
4. Set a UDP connection and enter the corresponding port.



5. Clear the **Validate Checksum** checkbox.

> **Important:** If you do not clear this checkbox, you will not receive the data from Scantrol.

Scantrol data are displayed in Scala2.



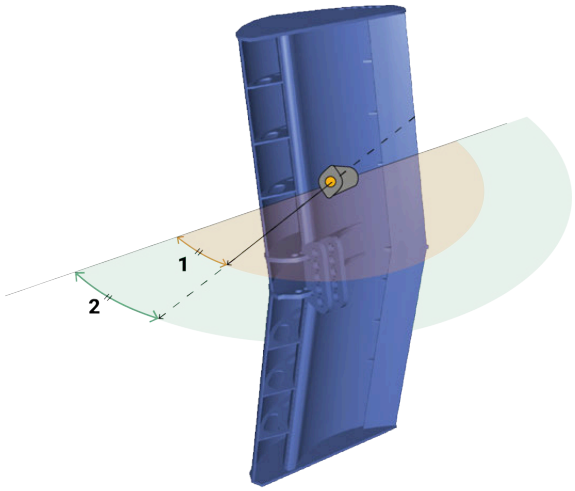
Installation

Learn how to install the sensor on the trawl gear.

Installation Principles

Angle of Attack

The angle of attack is the angle of the door in relation to the towing direction. This angle is important for the efficiency of the doors. It varies between trawl door models, so refer to manufacturer to know the exact angle. The angle is usually from 25° to 40°.



1. Angle of attack: 25-40°

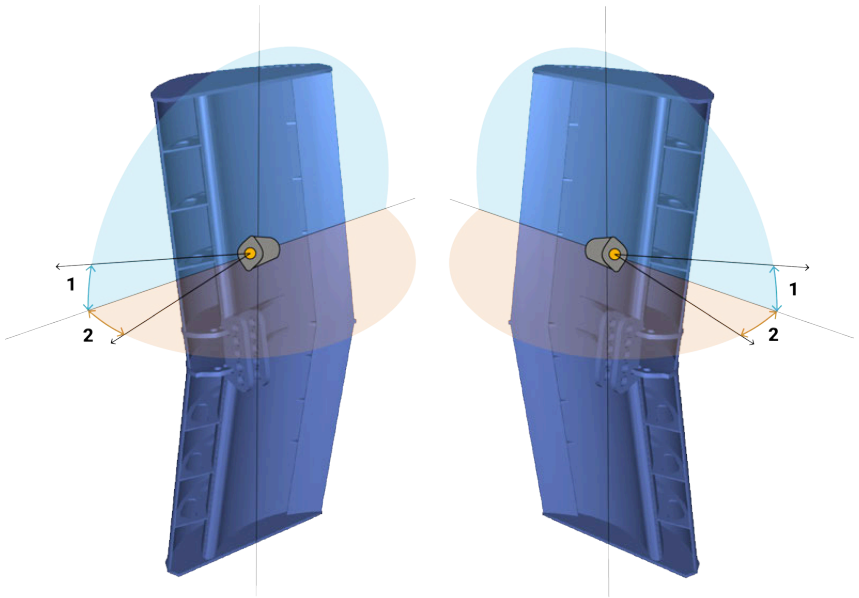
2. Opening angle: 25-40°

Opening and Elevation Angles for Spread Sensors

The opening and elevation angles depend on the pocket installation on the door.

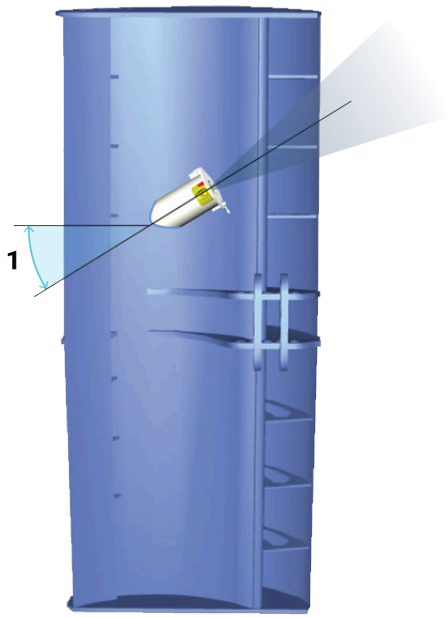
The opening angle is the horizontal angle of the pocket in relation to the door. It should be between 25° and 40°. Opening angles should be in line with the angle of attack. You need to indicate the opening angle on Mosa2.

The elevation angle, or tilt angle, is the vertical angle of the pocket in relation to the door. It should be between 15° and 20°. The sensor must point toward the vessel: adjust the elevation angle based on the operational depth of the door during fishing operations.



1. Elevation angle: 15-20°

2. Opening angle: 25-40°

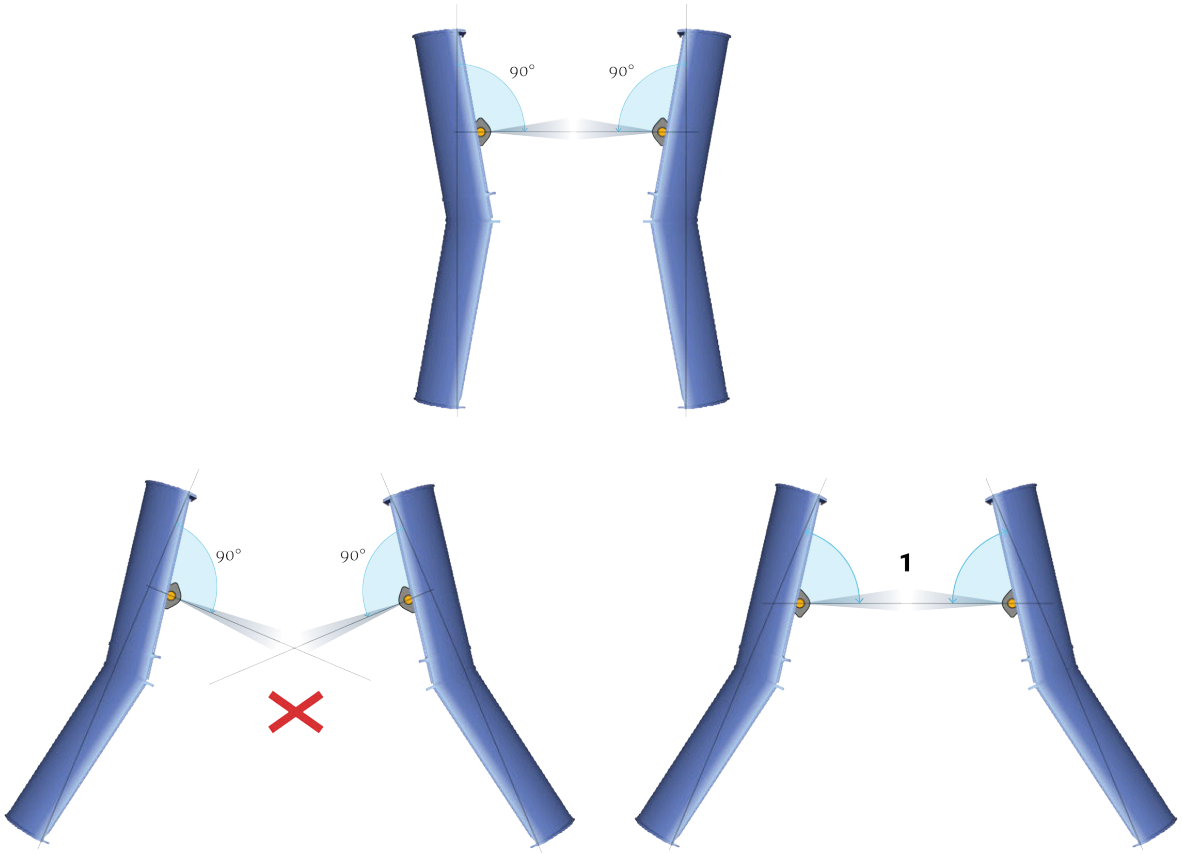


1. Elevation angle: 15-20°

Roll Angles for Spread Sensors

Roll angle of the sensors depends on the tilt of the doors when fishing. If doors are straight during fishing, you can apply a roll angle of 90°. If doors are tilted inward during fishing, slightly

roll the pocket so that lines of communication between the sensors stay aligned. If not, you will have sporadic spread readings.

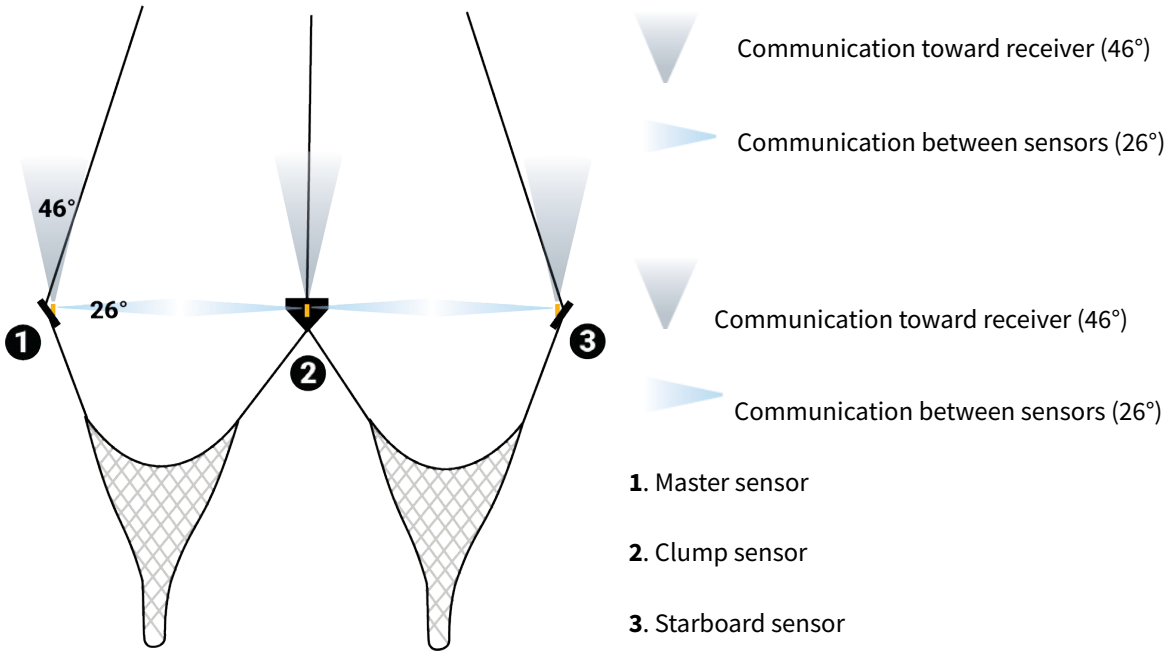


Adapt roll angles of pockets according to the tilt of the doors.

Door Spread Communication

Spread sensors communicate with each other and with the receiver. Lines of communication between them and toward the receiver must be unobstructed.

The beamwidth toward the receiver (uplink ping) is 46° and beamwidth toward the other sensors (down ping) is 26°. This beamwidth is thinner: this is why it is important to keep sensors aligned.



Door Sounder sensors do not communicate with each other, so only lines of communication toward the receiver and bottom must be unobstructed.

Installing Sensor Pockets

You need to install pockets on each trawl door to hold the door sensors.

- Read **Installation Principles (on page 74)** to become familiar with installation requirements.
- You need different pockets depending on your type of door sensor:
  - Standard Spread Sensor (XL bottle)
  - Mini Spread Sensor (stubby bottle)
  - Mini Spread Sensor (stubby bottle) with slim housing

See **Pocket Drawings (on page 99)** to know which installation you need.

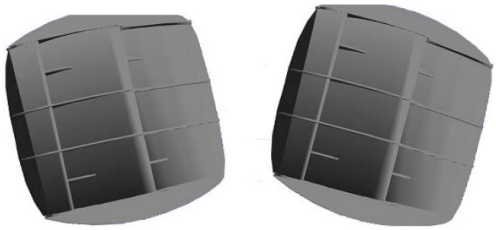
Important: Make sure you install the sensor pockets in accordance with the **installation principles (on page 74)**: pockets are important for the correct functioning of the sensors. If they are misaligned or if the pocket hides the sensor signal, you will have issues receiving data.

Important: We strongly recommend to have alignment bars inside the pockets to hold the sensor in the correct position.

Important: Take care to gather as much information as possible from the trawl doors manufacturer before installation, such as the angle of attack and towing angle.

Note: If your door model have the doors rigged “nose up” or “nose down”, you need to change the angle of the door pockets so that the sensor always point toward the bottom of the ship when being towed.

Nose down (left) and nose up (right)



Note: If you use the sensors for bottom trawling, install pockets on the upper part of trawl doors. Make sure the pocket's position does not influence too much the center of gravity of the door. Refer to door manufacturer for details.

1. Use drawings of door pockets to mark the shape to be cut off: **Pocket Drawings (on page 99)**.

   Note: Ask your local Marport sales office for scaled templates of door pockets.

2. Cut round openings in the doors.

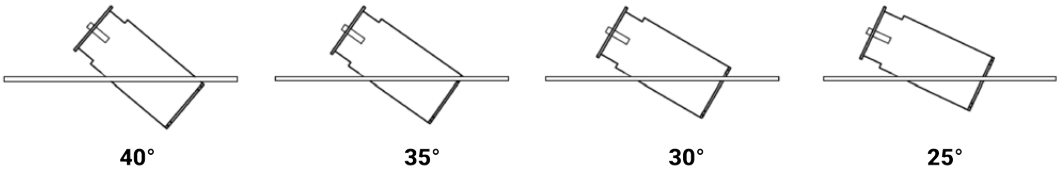
3. When setting up the alignment bar in the sensor pocket:

Note: Master and Starboard sensors need to be oriented in a way they can communicate with each other. The alignment bar in the pocket ensures correct positioning. The housing of the sensors have a slot so they can be inserted in the alignment bar.

- The alignment bar must be downwards on the port door (Master sensor).
- It must be upwards on the starboard door, or clump (Slave or Clump sensor).

4. Place the sensor pocket with the bottom portion sticking out of back side of the door. Adjust accordingly to the elevation angle and angle of attack you need (see **Pocket Angle**

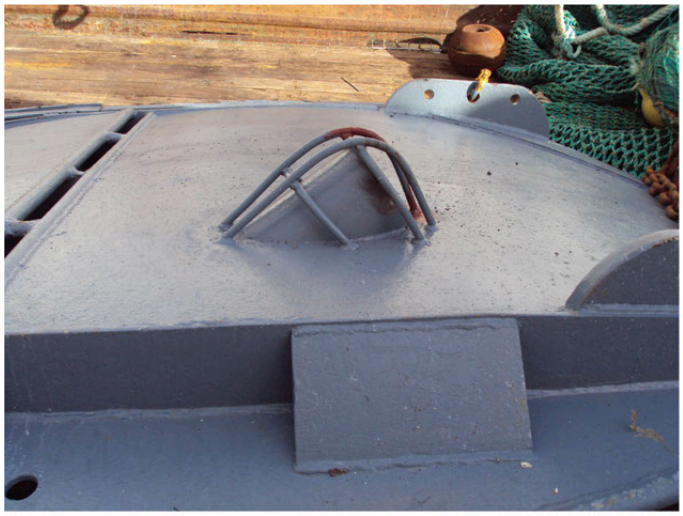
of Attack (on page 99)). Picture below shows angles of attack seen from above the door.



5. You can trace a line with a marker around the pocket at the point it enters the door to remember the correct position.
6. Check if angles are correct:
    a. Weld only a few points on two sides of the pocket to hold it on the door.
    b. Slide the sensor into the alignment bar inside the door pocket. You can adjust the roll of the sensor using the alignment bar (see **Pocket for XL Bottles (on page 100)**).

    c. Open Mosa2 software.
    d. Activate and deactivate the water switch to connect the sensor to Mosa2 via a wireless signal.
    e. Go to **Measurements** page and click ⚙ in **Motion**.
    f. Check on the bottom of the window that the pitch and roll of the door are close to 0 degree.
    g. If you do not have Mosa2 software, manually check the angles.
7. If values are not correct, move the pocket, then check again.
8. If values are correct, permanently weld the pocket to the door.

9. We recommend to use a protective cage made of metal bars around pockets to protect sensors, like the examples below.



Note: Make sure there is sufficient space between the protective cage and the sensor pocket, so that if the cage becomes bent, you can still remove the sensor.

Installing Door Spread Sensors

You need to install Spread sensors in pockets welded to the trawl doors.

To install Spread sensors on the doors, you need to have specifically designed sensor pockets welded to the trawl doors. See Installing Sensor Pockets (on page).

1. Remove the screw holding the pocket cover.
2. Install the Master sensor (red marker) on the port door and the Starboard sensor (green marker) on the starboard door.
3. The top of the transducer (side with marker on housing) must be oriented toward the vessel and the side of the transducer with the circle or A letter must be oriented toward the opposite door.

   Note: Pockets can have an alignment bar that ensure correct positioning of the sensors. Simply slide the sensor into the alignment bar.

4. Attach the safety line from the sensor to the pocket and fasten the pocket's screw.
5. Make sure that both sensor transducers are aligned with each other during towing. This way, they can communicate with each other.
6. Make sure there is nothing in front of the sensors that would block their signal toward the vessel.

Port

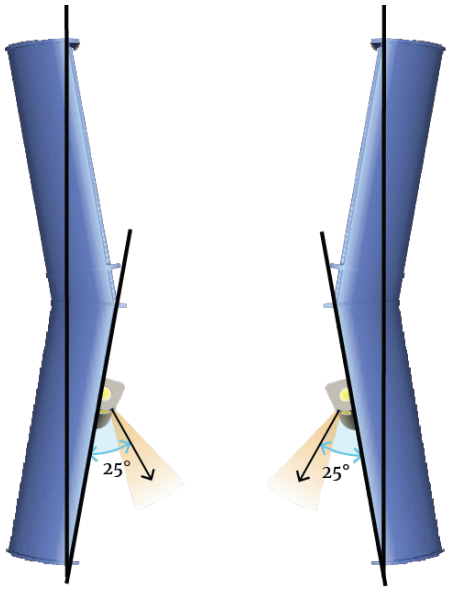
Starboard

Installing Door Sounder Sensors

You need to install Door Sounder sensors in pockets welded to the trawl doors.

To install Door Sounder sensors on the doors, you need to have specifically designed sensor pockets welded to the trawl doors. See **Installing Sensor Pockets (on page 77)**.

- The sensor down sounder must have a roll angle of 25° in relation to the door.
- Attack angle: 25-40°
- Elevation angle: 15-20°. Adjust the angle so that the sensor points toward the vessel during operation.



1. Remove the screw holding the pocket cover.
2. Install Door Sounder sensors inside each door pocket: the top of the transducer (side with marker on housing) must be oriented toward the vessel and the side with the circle/A must points downwards with an angle of 25° in relation to the door.

   Note: For bottom trawling, install sensors on the lower part of doors.

3. Attach the safety line from the sensor to the pocket and fasten the pocket's screw.
4. Make sure there is nothing in front of the sensors that would hide their signal toward the vessel, and nothing in front of the down sounder.

Maintenance and Troubleshooting

Read this section for troubleshooting and maintenance information.

Important: Only an approved Marport dealer can access the internal unit. Warranty will become void if anyone other than an approved dealer tries to do internal maintenance duties on the product.

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.

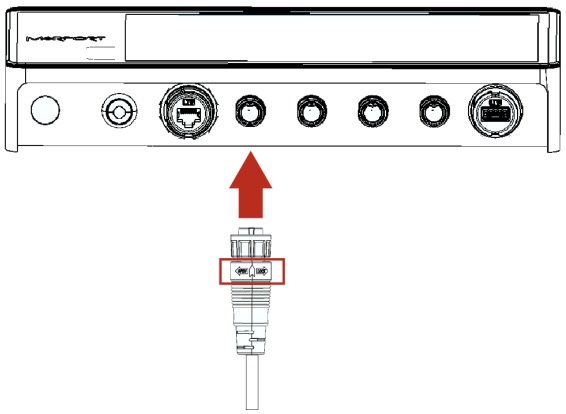
Note: For Dock products with serial number before DOC2400000: Do not leave the sensors connected on a charger that is switched off. If the charger is not connected to the mains voltage, the sensor switches on and this will drain the battery.

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.

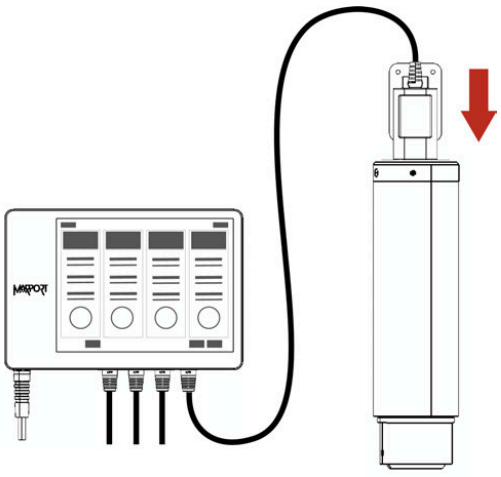
1. Before charging the sensor: wash with fresh water and dry the sensor. This prevents corrosion of the charging pins.

   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.

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	• 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 85)** 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.

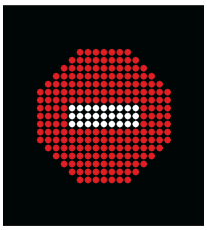
- Switch on the sensor by activating the water-switch, then listen for a ping noise and check if you see the LED switched on.
- Test the sensor measures with Mosa2: depth, temperature, pitch, roll, and if applicable: spread distance, echogram, catch status, speed measures (using the EM log tester).
- If you have a test hydrophone, check the reception in the wheelhouse with Scala2.

Troubleshooting

Learn how to solve common problems.

Warning icon on the Dock charger plug

The sensor is not detected by the Dock and there is a warning icon on the Dock charger plug.

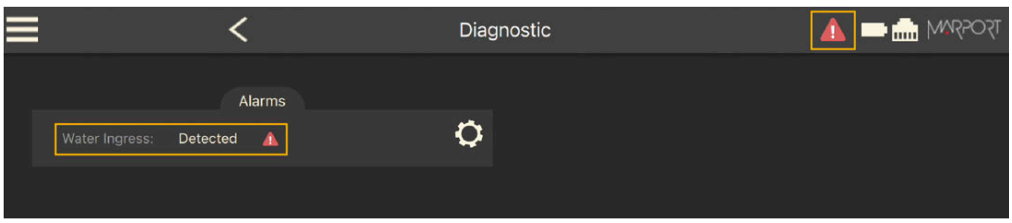


➜ The shoulder bolts are dirty or damaged.

- Clean them using a swab or Q-tip with Isopropyl alcohol.
- Fully clean the surface from debris and inspect the surface for burrs or pitting.
- If not taken care of, there is a risk of short circuit.

➜ If you have inspected the shoulder bolts and the problem persists, it means water may have leaked into the sensor.

- Connect the sensor to Mosa2 to check if there is a diagnostic alarm:
  1. Connect the sensor to a Dock charger plug or connect a Configuration Cable from the computer to the sensor, and open Mosa2.
  2. From Mosa2, go to the **Diagnostic** page and check the alarms.



- If there is an alarm or if the sensor is not detected by Mosa2, disconnect it from the Dock and do not charge it until it is inspected by a technician.
- Send the sensor back for servicing to a Marport office.

Important: Only Marport technicians can open the sensor to access the internal components.

CAUTION: In case of water ingress into the sensor, battery may vent or rupture, causing product or physical damage.

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.

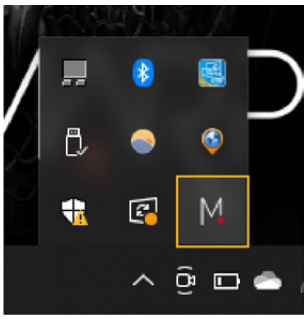
Sensor does not connect correctly with Mosa2 when using the Configuration Cable

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 Scala2 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 startup 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.

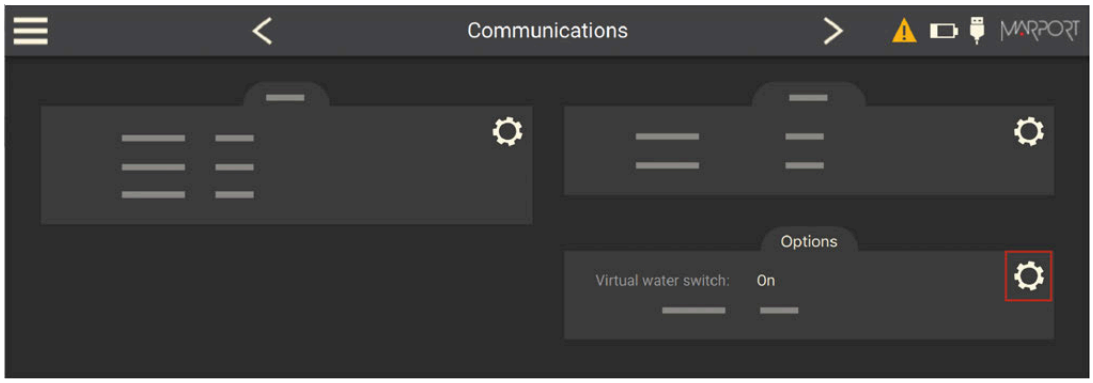
The sensor is not running when testing out of water

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 not emit any data.

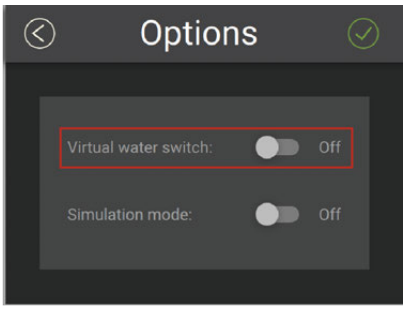
➜ The virtual water switch option may be activated in Mosa2. When this option is activated, the sensor runs only at a depth more than 2 meters. For more details, read **About the Virtual Water Switch Option (on page 20)**.

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

Marport France SAS
8, rue Maurice Le Léon
56100 Lorient, France
supportfrance@marport.com

ICELAND

Marport EHF
Tónahvarf 7
203 Kopavogur, Iceland
supporticeland@marport.com

NORWAY

Marport Norge A/S
Breivika Industrivei 69
6018 Ålesund, Norway
supportnorge@marport.com

SOUTH AFRICA

Marport South Africa
Cape Town, Western Cape
11 Paarden Eiland Road
Paarden Eiland, 7405
csanter@marport.com

SPAIN

Marport Spain SRL
Camino Chouzo 1
36208 Vigo (Pontevedra), Spain
supportspain@marport.com

UNITED KINGDOM

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

USA

Marport Americas Inc.
12123 Harbour Reach Drive, Suite 100
Mukilteo, WA 98275, USA
supportusa@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).

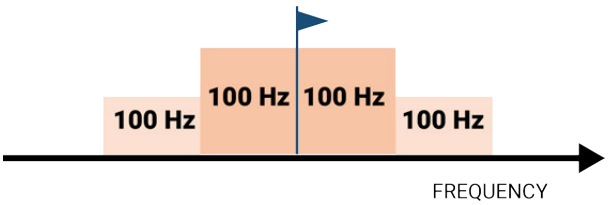
Codes		
BC/CH	Frequency	FID (Scanmar)
C-1/CH1	42833	45
C-1/CH2	41548	32
C-1/CH3	41852	35
C-1/CH4	40810	25
C-1/CH5	42500	42
C-1/CH6	43200	49
C-2/CH1	42631	43
C-2/CH2	41417	31
C-2/CH3	41690	33
C-2/CH4	40886	26
C-2/CH5	42300	40
C-2/CH6	43100	48
C-3/CH1	42429	41
C-3/CH2	41285	30
C-3/CH3	41548	32
C-3/CH4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

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

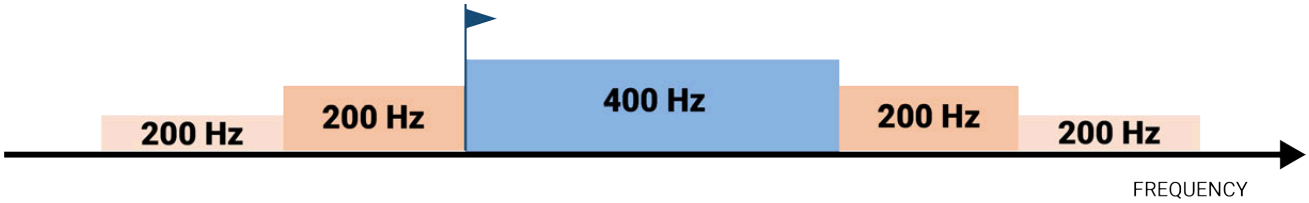


Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.9 and 40.1kHz.

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

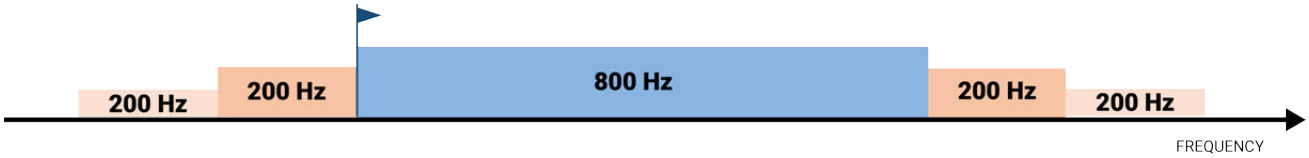
Example: If the frequency of the sensor is 40kHz, there should be no sensors between 39.8 and 41.2kHz.

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.

HDTE narrow band mode



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

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

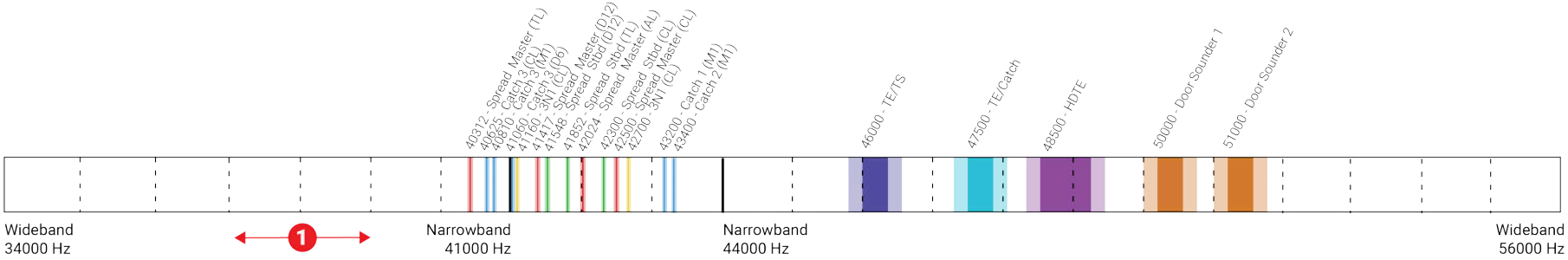
Mandatory distance with other sensors

Recommended distance with other sensors

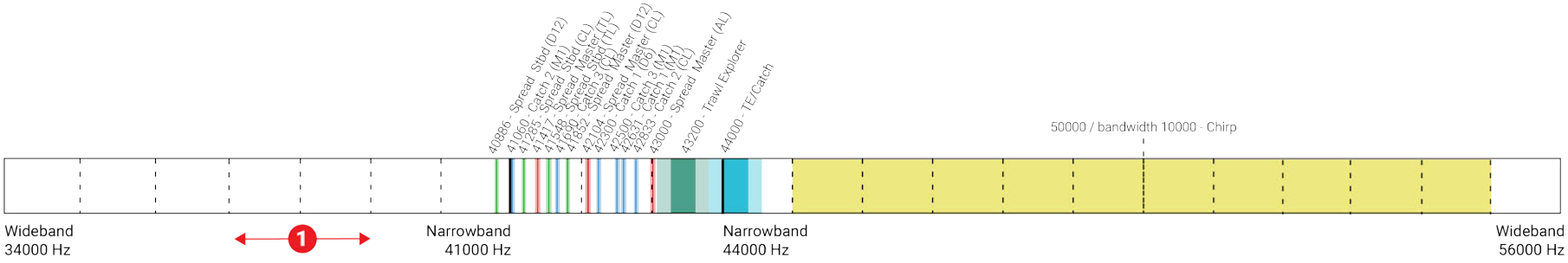
Examples of frequency allocations

- 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.

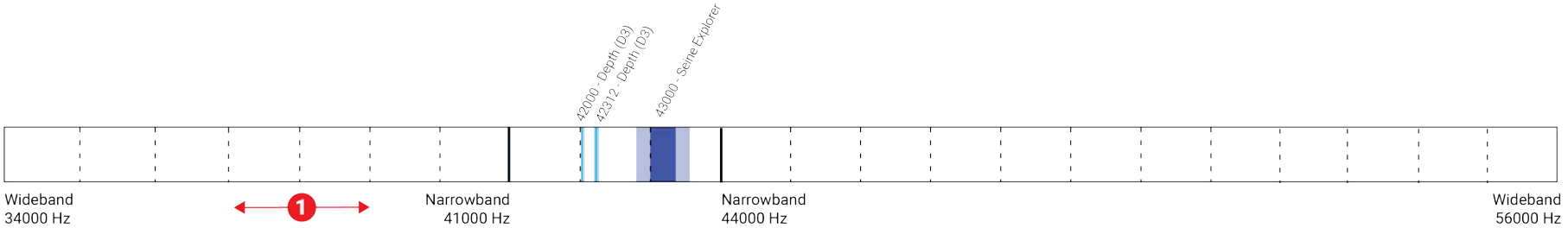
Example of a system with Spread, Catch, Trawl Speed sensors and Speed Explorer, Catch Explorer, HDTE and Door Sounder.



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

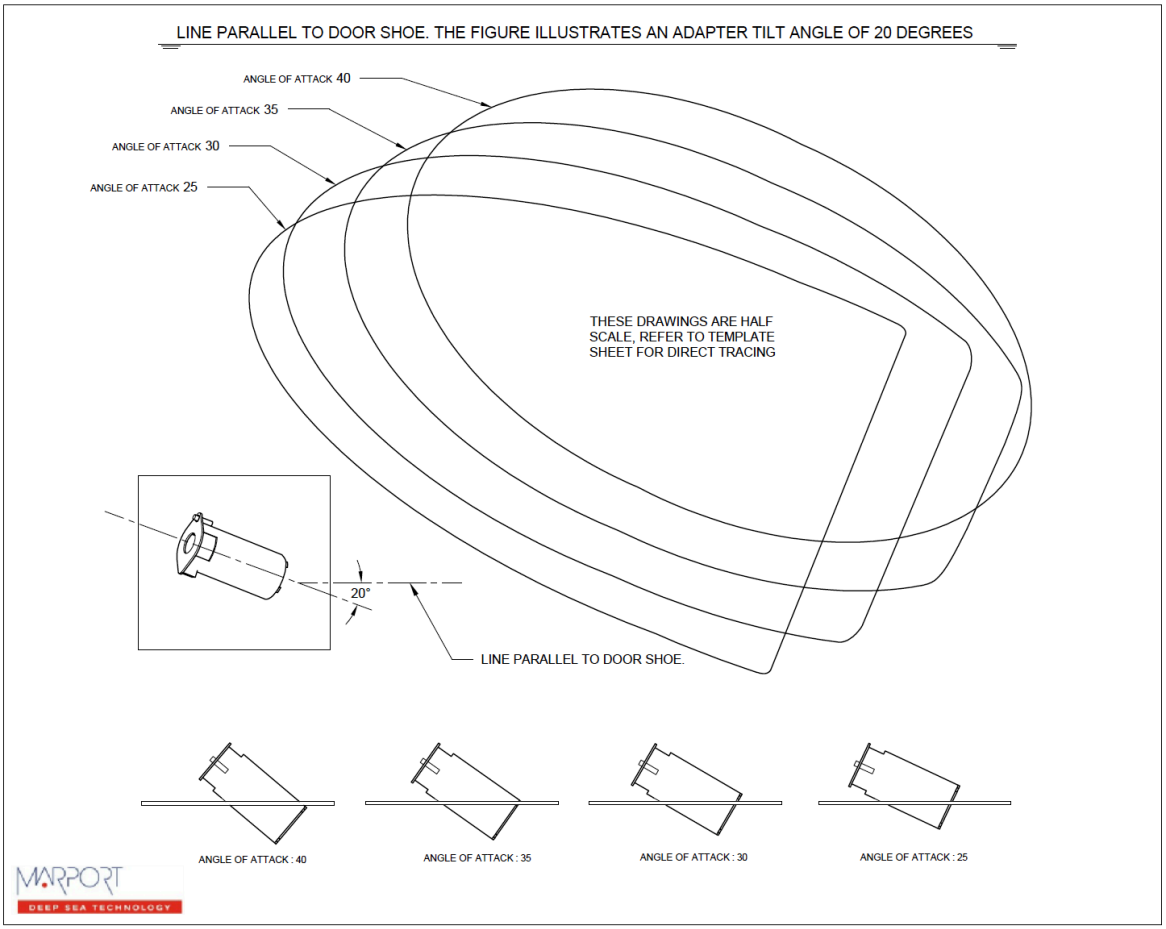
Mandatory distance with other sensors

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

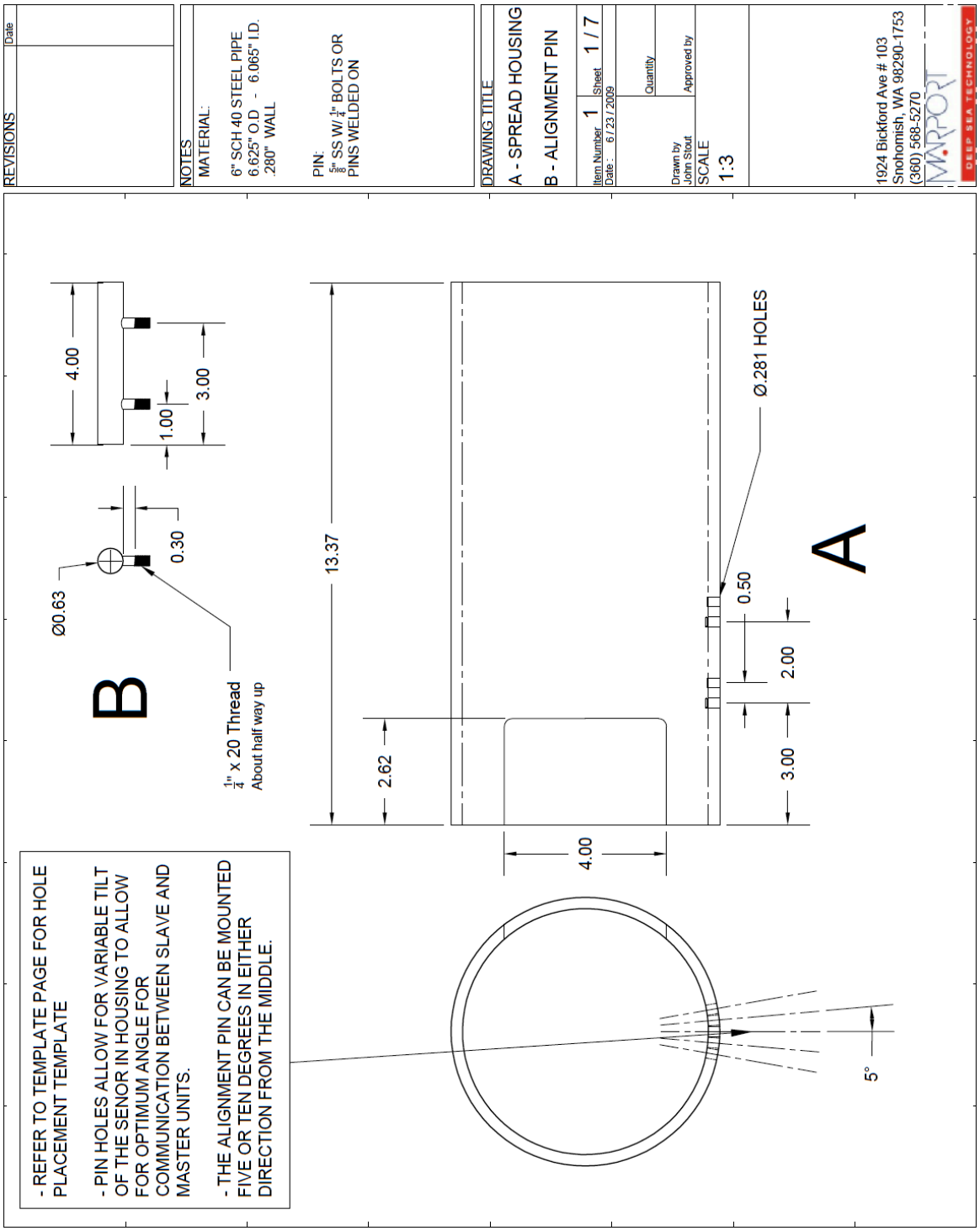
Pocket Drawings

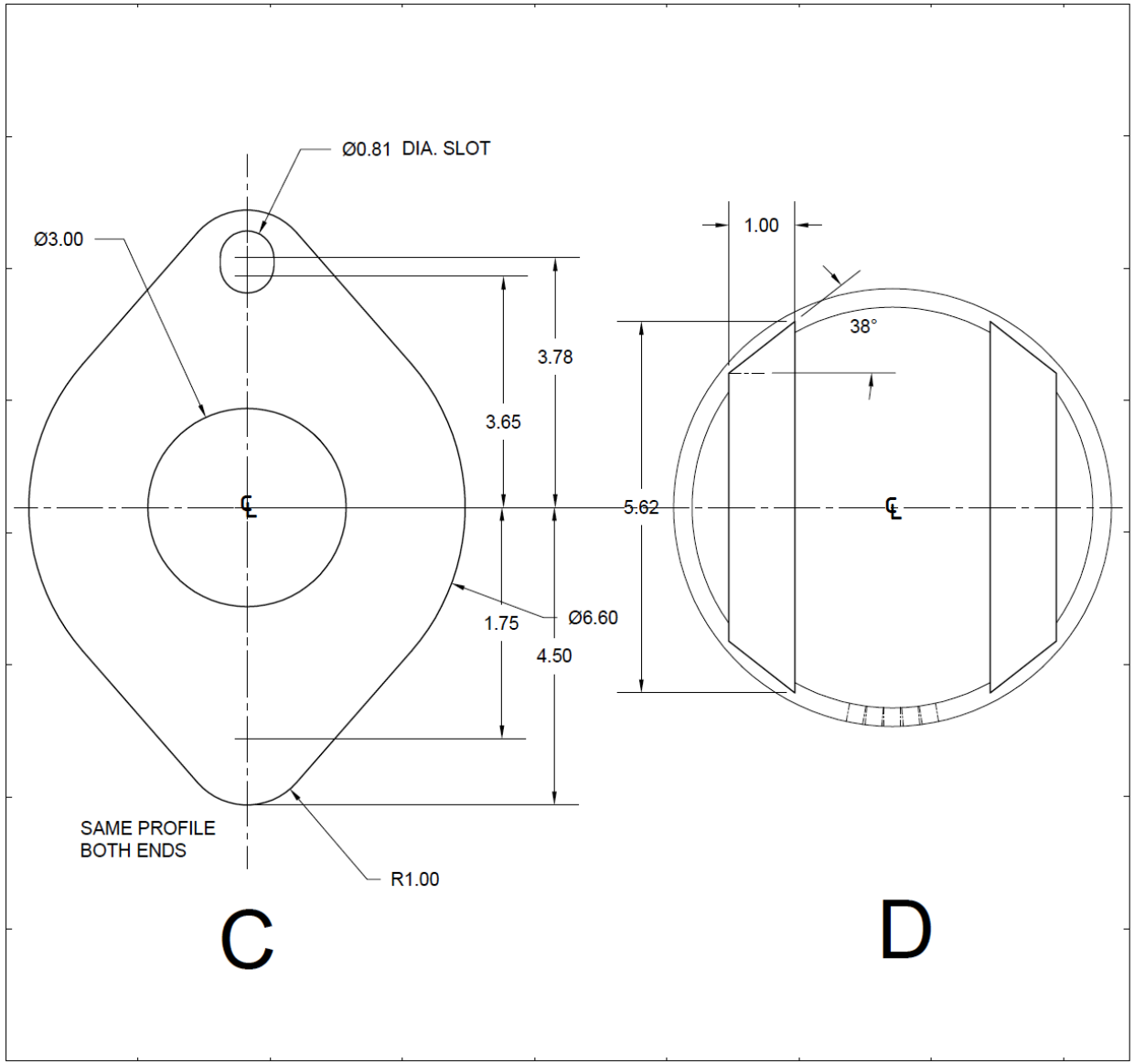
Drawings to manufacture door sensor pockets to be placed on trawl doors. Ask your local Marport Office for scaled templates.

Pocket Angle of Attack



Pocket for XL Bottles





REVISIONS	Date

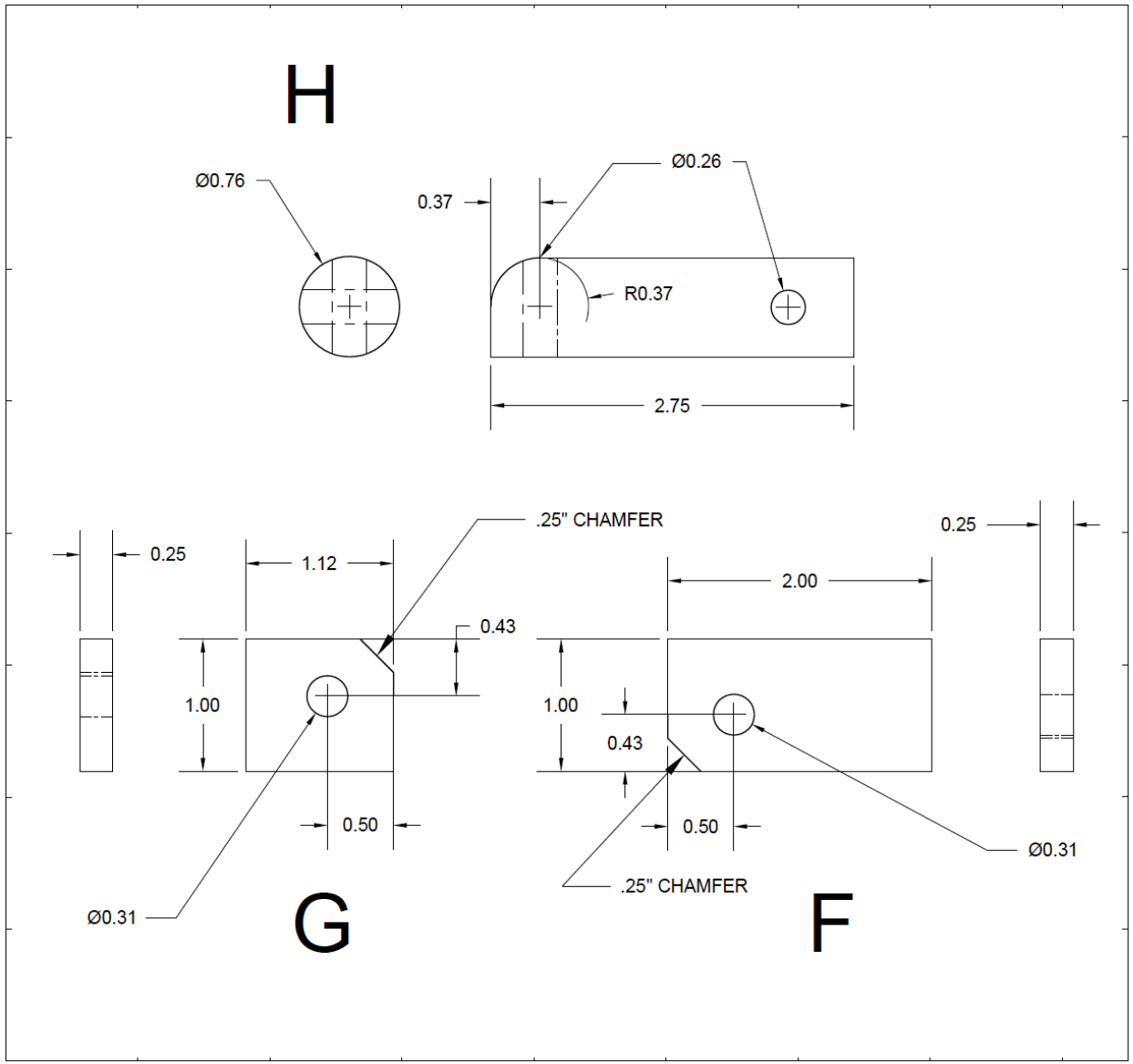
NOTES
MATERIAL:
¼" STEEL PLATE

DRAWING TITLE
C - FRONT DOOR
D - REAR BARS

Item Number 1 | Sheet 2 / 7
Date : 6 / 23 / 2009
Quantity
Drawn by John Stout
Approved by
SCALE 2:1

1924 Bickford Ave # 103
Snohomish, WA 98290-1753
(360) 568-5270

MARPORT
DEEP SEA TECHNOLOGY



REVISIONS	Date

NOTES

MATERIAL: $\frac{1}{4}$" SS

LOCK PIN : $\frac{3}{4}$" DIA. SS ROD

DRAWING TITLE

G - DOOR HINGE
F - HOUSING HINGE PART (NEED 2 PER UNIT)
H - LOCK PIN

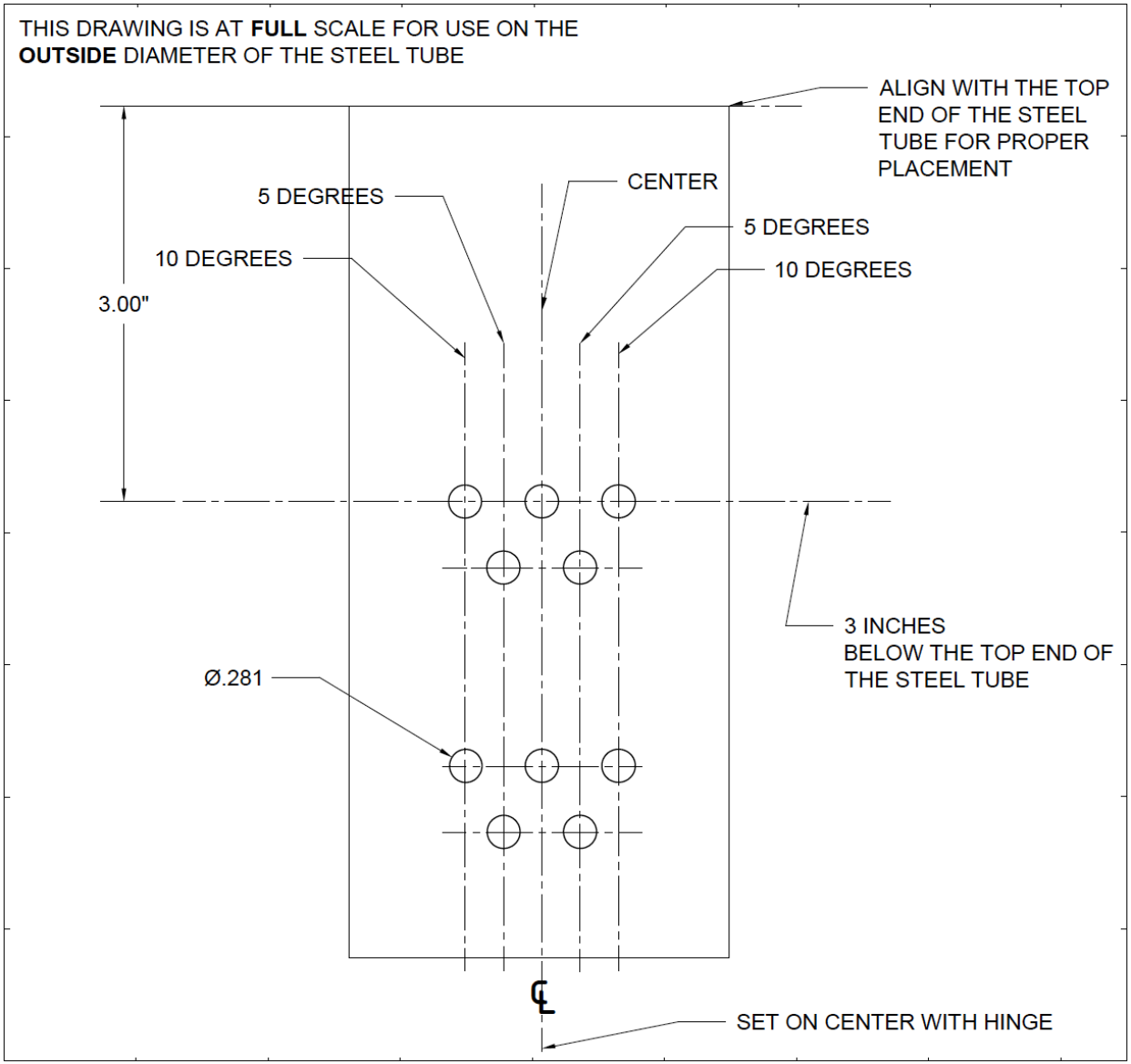
Item Number 1 | Sheet 3 / 7
Date : 6 / 23 / 2009

Drawn by John Stout | Quantity | Approved by

SCALE 2:1

1924 Bickford Ave # 103
Snohomish, WA 98290-1753
(360) 568-5270

MARPORT
DEEP SEA TECHNOLOGY



REVISIONS	Date

NOTES
TEMPLATE FOR HOLE LOCATIONS

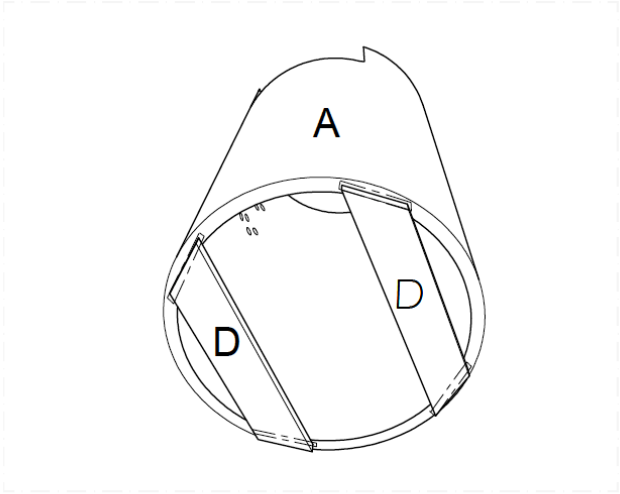
DRAWING TITLE
MFX SPREAD HOUSING

Item Number 1	Sheet 4 / 7
Date : 6 / 23 / 2009	
	Quantity
Drawn by John Stout	Approved by

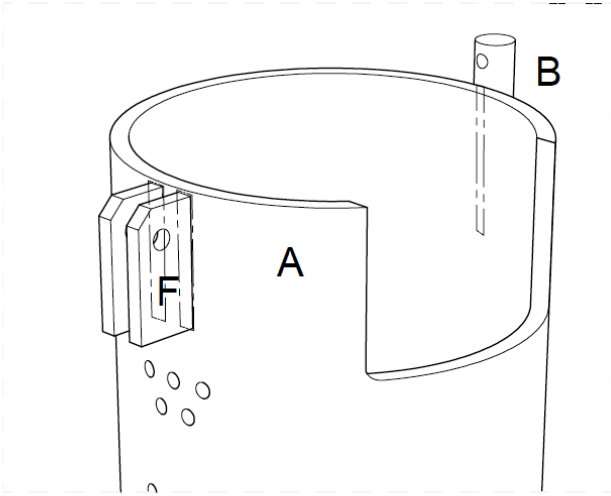
SCALE
1:1

1924 Bickford Ave # 103
Snohomish, WA 98290-1753
(360) 568-5270

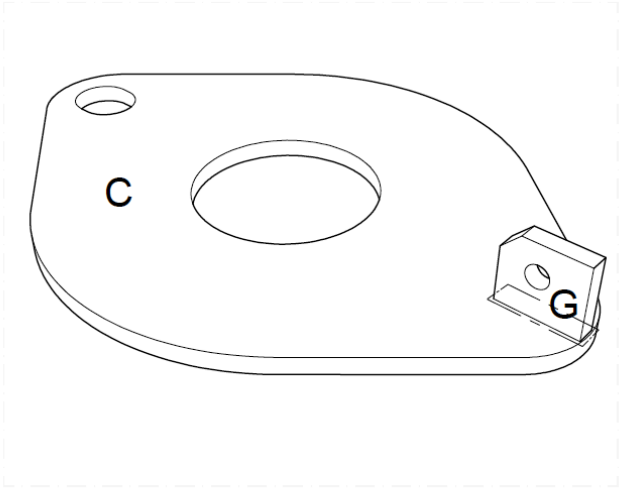
MARPORT
DEEP SEA TECHNOLOGY



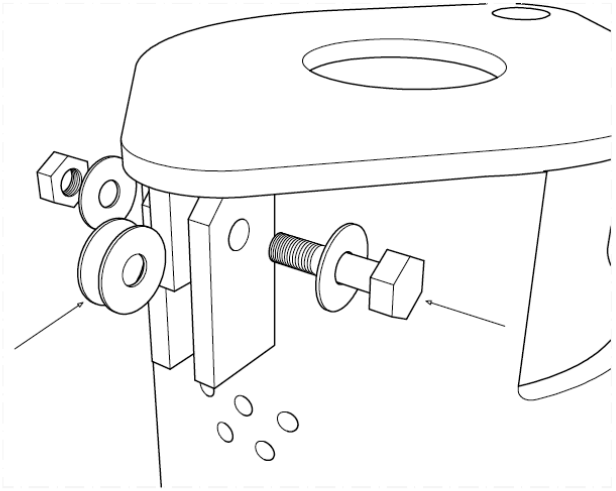
1. Weld both rear bars to main housing tube, ensuring they are parallel to front sensor opening.



2. On the other end of the housing, weld the housing hinge bars to the top end, making sure both bars or the weld does not extend above the top of the tube.

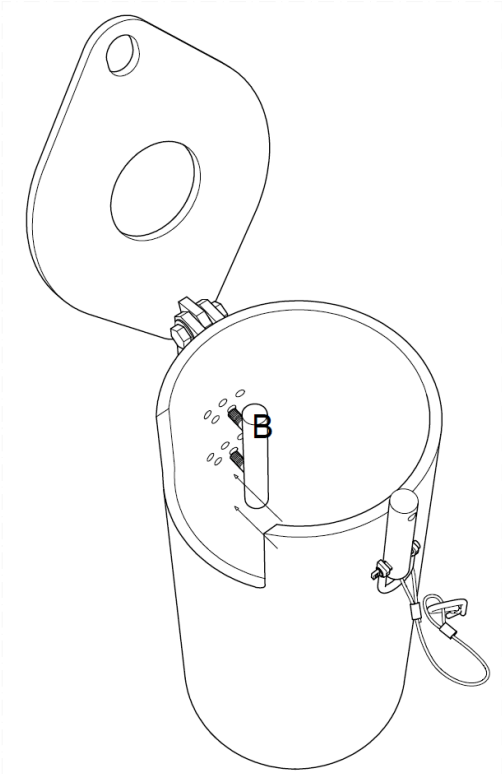


3. Next weld the door hinge onto the top end of the door piece, its distance from the edge is to be determined by the alignment of the opposite hole with the edge of the tube.

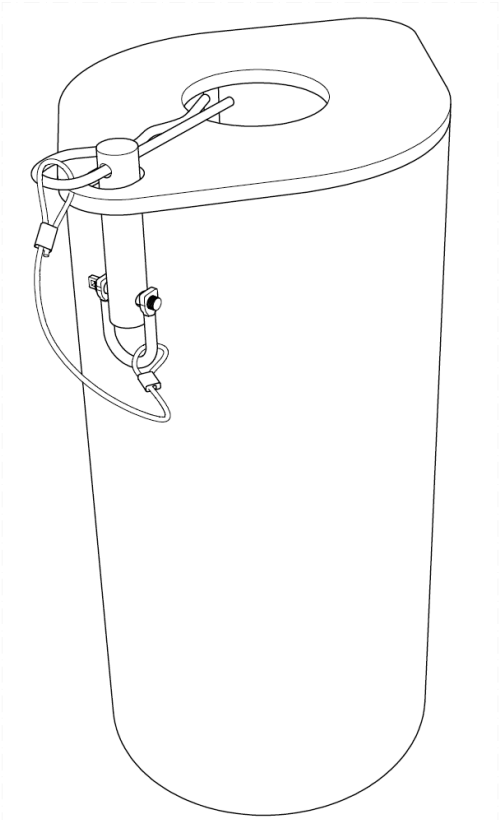


4. Place the $\frac{5}{16}$ x 1.5" bolt through the hinge with washers and $\frac{5}{16}$ nylock nut as shown

MFX SPREAD SENSOR HOUSING
Fabrication Instructions

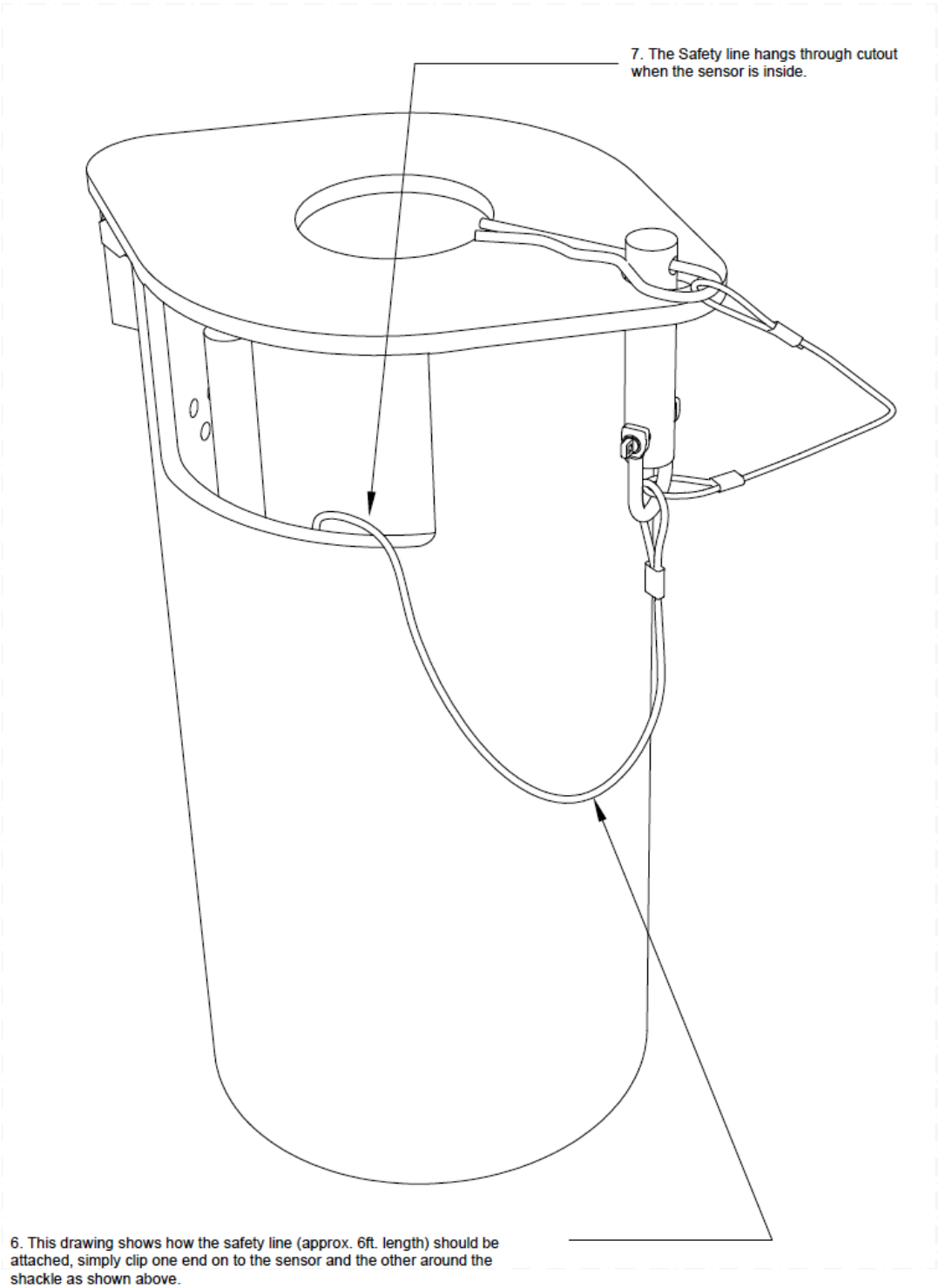


5. Now place the alignment bar at its center location. This can be adjusted for optimum performance of the sensor and once that position is found can be permanently welded into place.



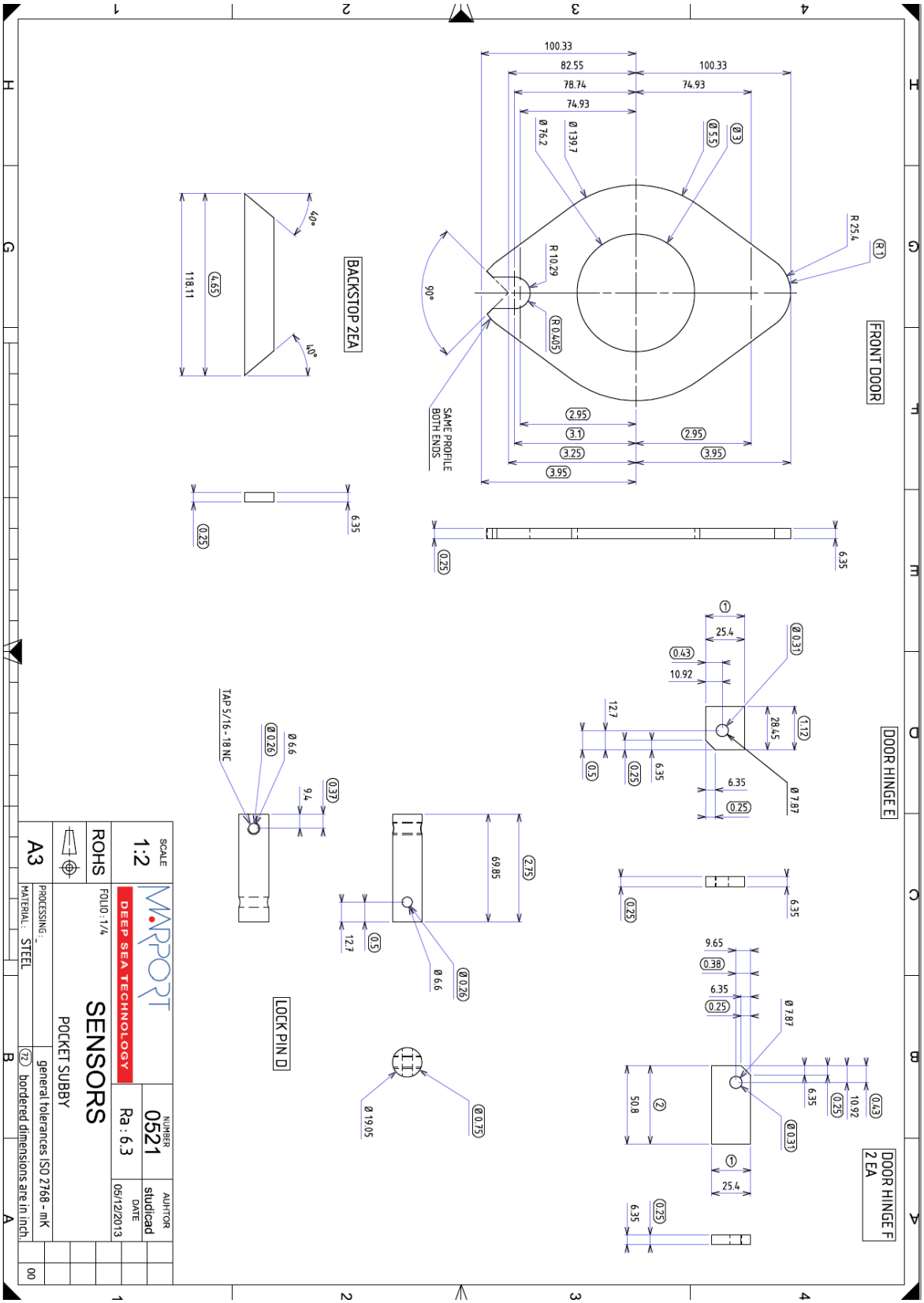
6. Now the final hardware, can be installed, including a safety cable shown on the next page.

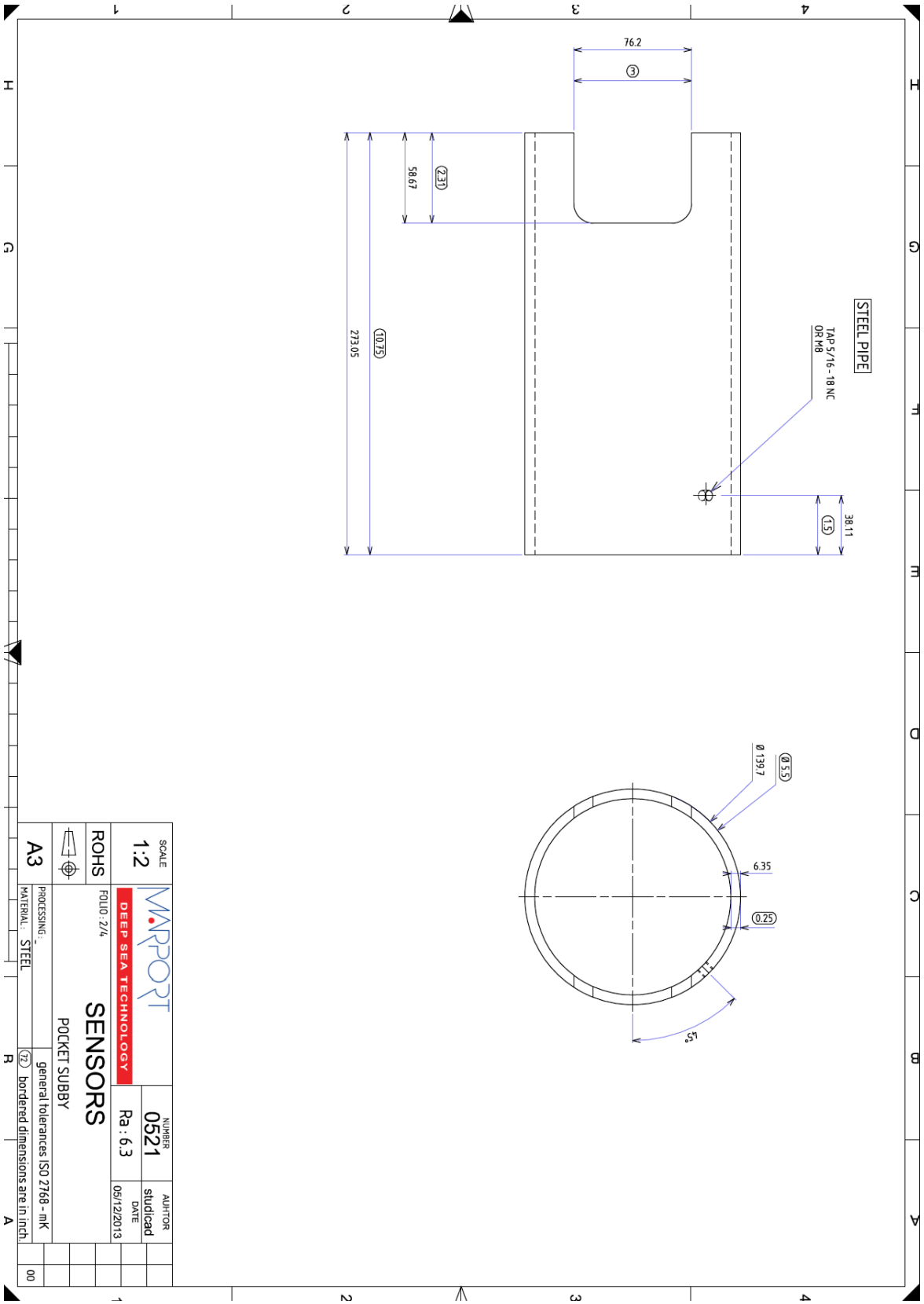
MFX SPREAD SENSOR HOUSING
Fabrication Instructions

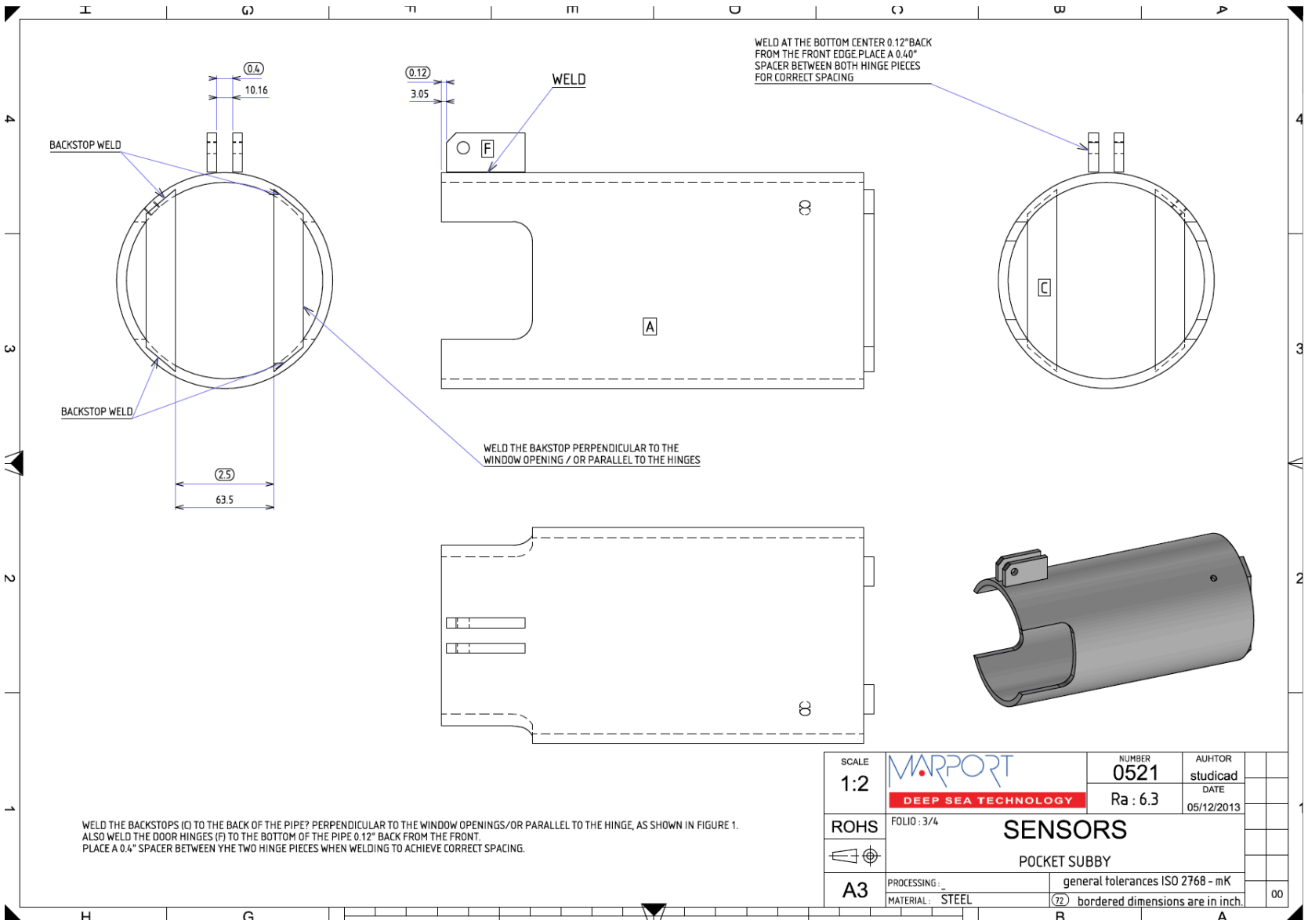


MFX SPREAD SENSOR HOUSING
Fabrication Instructions

Pocket for Stubby Bottles

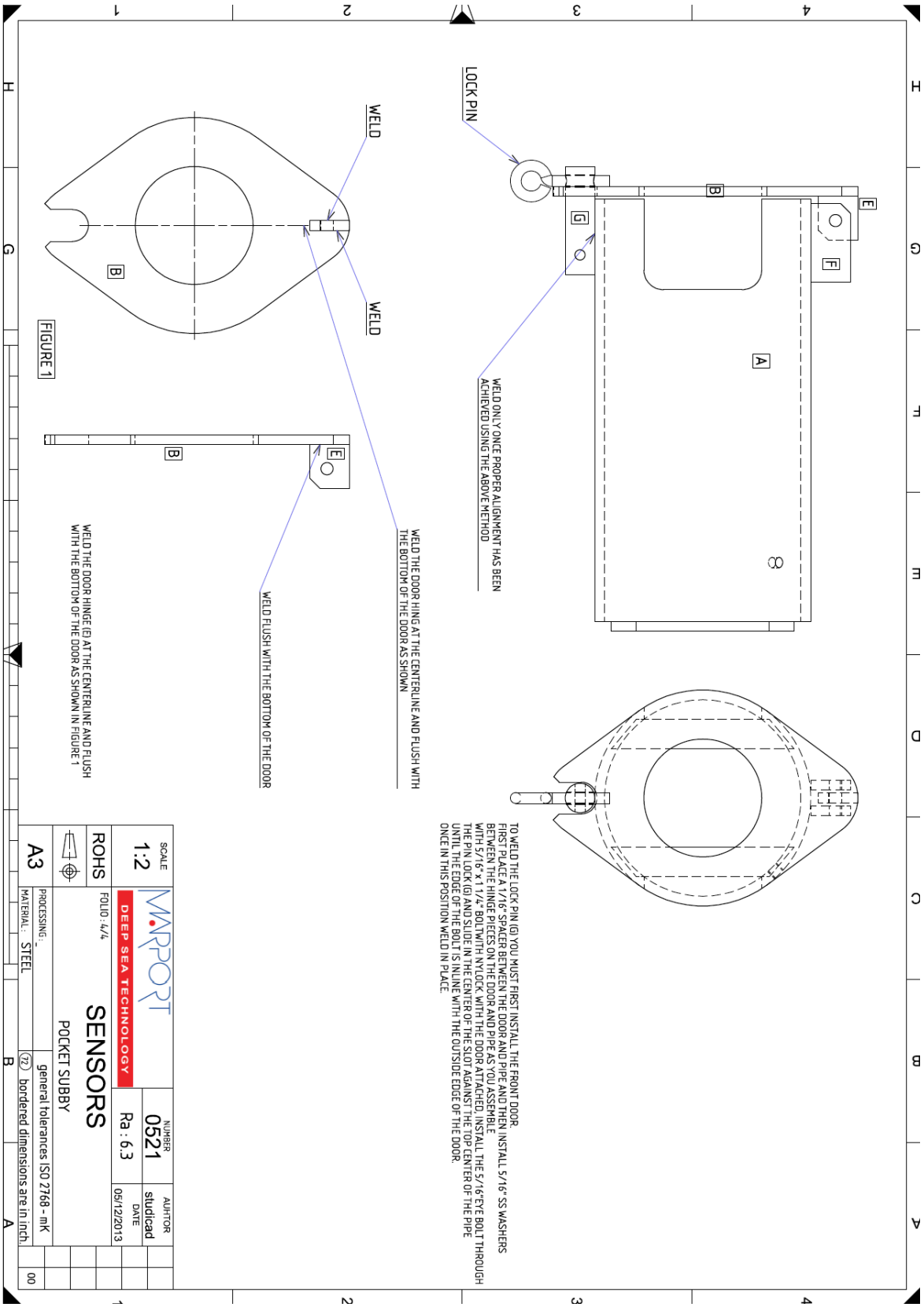



76.2
3
58.67
23.1
273.05
10.75
STEEL PIPE
TAP 5/16 - 18 NC
OR M8
38.11
13
Ø 13.7
Ø 5.5
6.35
0.25
45°
SCALE
1:2
ROHS
FOLIO : 2/4
SENSORS
POCKET SUBBY
NUMBER
0521
Ra : 6.3
AUTHOR
studicad
DATE
05/12/2013
A3
PROCESSING :
MATERIAL : STEEL
general tolerances ISO 2768 - mK
bordered dimensions are in inch
00

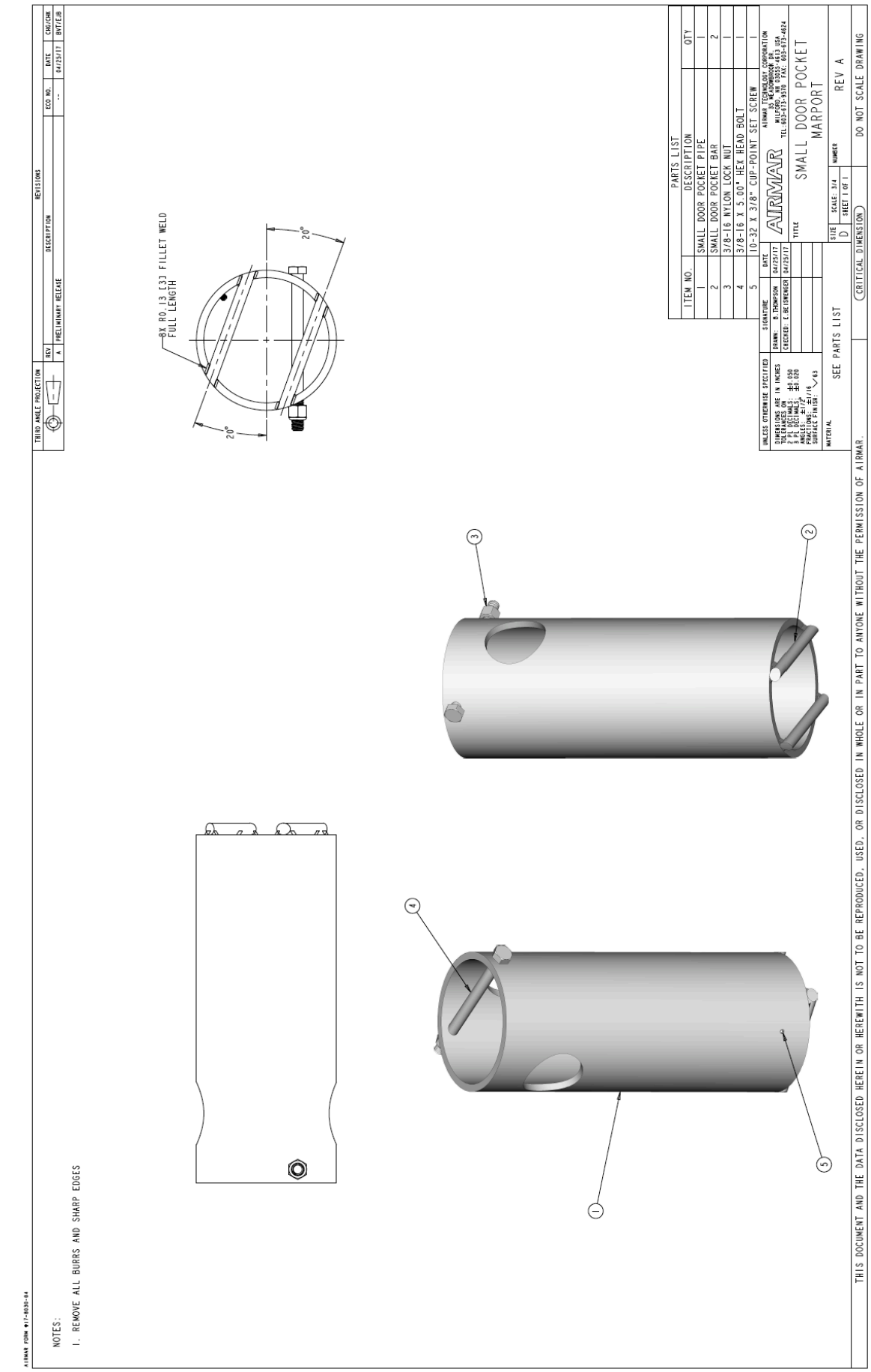


WELD THE BACKSTOPS (C) TO THE BACK OF THE PIPE? PERPENDICULAR TO THE WINDOW OPENINGS/OR PARALLEL TO THE HINGE, AS SHOWN IN FIGURE 1.
ALSO WELD THE DOOR HINGES (F) TO THE BOTTOM OF THE PIPE 0.12" BACK FROM THE FRONT.
PLACE A 0.4" SPACER BETWEEN YHE TWO HINGE PIECES WHEN WELDING TO ACHIEVE CORRECT SPACING.

SCALE 1:2	MARPORT DEEP SEA TECHNOLOGY	NUMBER 0521	AUHTOR studicad
		Ra : 6.3	DATE 05/12/2013
ROHS	FOLIO : 3/4	SENSORS	
		POCKET SUBBY	
A3	PROCESSING : _	general tolerances ISO 2768 - mK	00
	MATERIAL : STEEL	(72) bordered dimensions are in inch.	


LOCK PIN
WELD
WELD
FIGURE 1
WELD ONLY ONCE PROPER ALIGNMENT HAS BEEN ACHIEVED USING THE ABOVE METHOD
WELD THE DOOR HINGE AT THE CENTERLINE AND FLUSH WITH THE BOTTOM OF THE DOOR AS SHOWN
WELD FLUSH WITH THE BOTTOM OF THE DOOR
WELD THE DOOR HINGE (E) AT THE CENTERLINE AND FLUSH WITH THE BOTTOM OF THE DOOR AS SHOWN IN FIGURE 1
TO WELD THE LOCK PIN (G) YOU MUST FIRST INSTALL THE FRONT DOOR. FIRST PLACE A 1/16" SPACER BETWEEN THE DOOR AND PIPE AND THEN INSTALL 5/16" SS WASHERS BETWEEN THE HINGE PIECES ON THE DOOR AND PIPE AS YOU ASSEMBLE WITH 5/16" x 1 1/4" BOLTWITH NYLOCK WITH THE DOOR ATTACHED. INSTALL THE 5/16" EYE BOLT THROUGH THE PIN LOCK (G) AND SLIDE IN THE CENTER OF THE SLOT AGAINST THE TOP CENTER OF THE PIPE UNTIL THE EDGE OF THE BOLT IS INLINE WITH THE OUTSIDE EDGE OF THE DOOR. ONCE IN THIS POSITION WELD IN PLACE.
SCALE 1:2
ROHS
A3
FOLIO : 4/4
MARPORT
DEEP SEA TECHNOLOGY
SENSORS
POCKET SUBBY
NUMBER 0521
Ra : 6.3
AUTHOR studicad
DATE 05/12/2013
PROCESSING:_
MATERIAL: STEEL
general tolerances ISO 2768 - mK
(72) bordered dimensions are in inch
00

Pocket for Stubby Bottles with Slim Housing



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