Shark's Head Documentation

Arcsine Pty Ltd

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Chapter 1. Installation

The installation of Shark's Head modules is fairly simple and straightforward.

The modules can be mounted in any orientation, horizontal, vertical, and even upside down. For a temporary installation and to test radio connectivity, hook-and-loop tape or double-sided sticky tape can be used. Eventually, they should be fastened down securely.

As the communication between all the components is wireless, the wiring is only required to supply 12V DC to the components. We recommend you employ a qualified person for this installation.



All wiring has to comply with your country's electrical standard(s), no matter whether you do it yourself or it's done by an electrician. In particular, ensure that the wiring is properly fused to address the risk of overheating, melting or an electrical fire.

The power requirements for the modules are very small; for details, please see Chapter 7, *Specifications*. The modules are internally fused against over current and wrong polarity. However, the cable from the system's DC bus (or the breaker panel) to the module cannot be protected by the module itself, hence a fuse or breaker is required in case the insulation gets damaged (e.g. by heat or a sharp edge) and the wires are shorted.

It is generally desirable to leave the Shark's Head system active when the vessel is being left unattended. The common way of accomplishing this is by using dedicated breaker(s) for the HQ and the modules and leave the main battery switch on or run separate wires directly from a house battery to the Shark's Head system (including fuses close to the battery) similar to how some bilge pumps are being set up.



We recommend the first option, leaving the main battery switch turned on at all times (unless doing maintenance) and turning off all the breakers that are not in use.



Please make sure the current draw from the Shark's Head system is not deep discharging the batteries over time. For a typical installation, this draw is less than 250mA at 12V including the HQ and 4 modules. This equals to a power consumption of 6 Ah per day.

1.1. Browsers

1.1.1. Recommended browsers

We recommend the latest version of either Firefox or Chrome.

1.1.2. Supported browsers

The following browsers are supported.

Browser	Version	Operating system	Firefox
59 and later	Mac OS X, iOS, Window s, Linux	Chrome	65 and later
Mac OS X, iOS, Windows, Linux	Safari	13 and later	Mac OS X, iOS

1.1.3. Known unsupported browsers

The following browsers are known not to work with Shark's Head.

Browser	Version	Operating system	Comment
IE	11.0	Windows 7	Most functions work, but not everything. We recommend either Firefox or Chrome
MS Edge	20	Windows 10	Most functions work, but not necessarily everything. We recommend either Firefox or Chrome

We haven't tested all browsers, e.g. Opera or QQ. As and when either the Shark's Head team or our customers test other browsers we'll add them to the appropriate list.

The traffic light at the top left hand corner in desktop mode or in the menu bar at the bottom in mobile mode is a good indicator whether your browser works well with HTML5. If all four cells are white this is not the case.

1.2. Headquarters Installation

The HQ requires a 12V connection, either from the 12V bus or a wall wart, via the 2.1mm centrepositive barrel jack.

If you use the enclosed connector, attach the red wire to the 12V bus positive, and black to negative.



All wiring has to comply with your country's electrical standard(s), no matter whether you do it yourself or it's done by an electrician. In particular, ensure that the wiring is properly fused to address the risk of overheating, melting or an electrical fire.

Because the system should be able to record sensor data even when no one is on board, we recommend using a separate breaker for all Shark's Head modules that are always left on.



Figure 1. Headquarters power connection

The side opposite the power jack contains two LEDs and a switch.



Figure 2. Headquarters LEDs and switch

The left LED shows the alert status.

The middle hole is the power and activity LED. It it always on when the HQ is running but will also flash occasionally when there is activity happening on the HQ's CPU.

To the right is the Wifi switch. It is deliberately recessed to prevent accidental change. This switch controls whether the HQ is acting as a Wifi access point or as a Wifi client.

Secure the HQ somewhere centrally located in a dry spot.

1.2.1. Accessing the HQ for the first time

Before you power up the HQ for the first time, ensure that the **clt-AP** switch is set to **AP**. Then apply power and wait about 30 seconds for the HQ to start. When it's ready it will give a short beep and turn its left LED solid green.

From your computer, phone or tablet, search for Wifi connections. You'll find the HQ broadcasting with a SSID of **sharksheadNNN**, where **NNN** is the first three digits of the HQ's serial number. Select this network.

The network password is **shapXXXX** where **XXXX** is the last 4 digits of the HQ's serial number. This includes any leading zeros, so a serial number of **987-654-0123** will have a password of **shap0123**.

http://192.168.0.1/

You'll see this page

Shark's Head Setup
1. Select your language
 English (UK) English (US) Deutsch
Next
2. Select your timezone
3. Set the time
4. Final comment
 Select your timezone Set the time Final comment

Figure 3. Initial setup page

Selecting your language only affects your specific browser on this particular device (it is being stored as a so-called cookie). Setting a bookmark to this page would make it easier to reach it in the future.



You can still change the language and other settings later without losing any data.

Alternatively, you can connect the HQ to an existing on-board Wifi router and access the HQ through that router. See Section 2.1.4, "Wifi" for details.

1.2.2. Logging into the Shark's Head web interface

To access most of the options detailed in this document you must log into the web interface via the Admin \rightarrow Login page.

Admin is a drop-down menu located on the top right of the web page. On your phone it is part of the menu at the bottom, showing an arrow pointing into a square.



Figure 4. Right-side menu options

The default password for the web interface is **adminXXXXXXX** where **XXXXXXX** is the last seven digits of the HQ's serial number. The same "leading zeros" applies here as it did for the network password mentioned above. E.g. if your serial number is **012-004-0055** your default admin

password would be **admin0040055** without the dash (or hyphen).

You can change this password on the **Admin** \rightarrow **Setup** page, then selecting **Password** from the drop-down menu. See Section 2.1.5, "Password" for details.

1.3. General Module Installation

If you've purchased a Shark's Head bundle containing the HQ and one or more modules then they will all be ready to communicate with each other out of the box and you can skip the rest of this chapter.

If you've purchased one of more modules separately from the HQ then you will need to perform one simple task before progressing, which is "pairing" this module with your HQ. During this enrolment process, the encrypted radio link is being set up and the module sends some configuration data to the HQ.

To prepare this enrolment process you need to enter the module's serial number into the HQ (the new module does not need to be turned just yet).

Go to the Admin \rightarrow Modules \rightarrow New module page.

Modules
< > New module In progress
New module
This page is used to add new modules to your network.
To add one or more modules enter their serial numbers here, one at a time, then install the hardware. The system will do the rest.
If a module should replace an existing one, select instead that module's page above and use the "replace" link.
Serial number: OK

Figure 5. Enter new module serial number

The serial number is on a label stuck to the outside of the module, and also under the lid (in case the outside label becomes damaged).

If you have multiple new modules, you may enter their serial numbers now, one at a time.



To watch the installation progress, use the **In progress** link from that page.

Now it's time to power up the module. For this enrolment process the module needs to be physically close enough to the HQ to be able to talk to it directly. An easy way to accomplish this is to power up the module on the chart table or salon table if the HQ is situated nearby and a 12V barrel connector can be hooked up or temporarily borrowed from some other module that's already in use.

The module should start flashing amber for a short period, then it will display a solid green LED. This will automatically turn off after a short period. You can disconnect the module once the green LED is on and move it to its intended location. If the module keeps flashing its amber LED for more than about 30 seconds you should temporarily move the module closer to the HQ and confirm that the correct serial number is shown in the **In progress** page.



Modules that do not have direct radio contact with the HQ will require one or more modules placed between them to relay (or pass on) the radio packets between the module and the HQ. All bus-powered modules will act as packet relays, and the establishment of relay routes is automatic and dynamic.

1.4. Device Controller Installation

A Device Controller allows you to monitor and control either an energy consumer, such as lights or a radio or a pump, or an energy producer, such as a solar charge controller.

The DC is installed between the target device and the 12V bus, in slightly different configurations dependent on the target device being either a consumer or a producer.



All wiring has to comply with your country's electrical standard(s), no matter whether you do it yourself or it's done by an electrician. In particular, ensure that the wiring is properly fused to address the risk of overheating, melting or an electrical fire.

1.4.1. As a Consumer Controller

The DC is installed between the 12V bus and the consumer. Remove the lid to gain access to the 4-way terminal block.



Figure 6. Consumer controller wiring

To locate which wire goes where, hold the box so that the button and hole for the wires are at the bottom. Then, going from left to right across the terminal block, the 12V bus positive is on the left, then the 12V bus negative, then the consumer's positive, then the consumer's negative wire at the right-hand end. There is a label on the board that details this as well, **Input** being the 12V bus and **Output** being the consumer.



Mixing up the polarity does not destroy the device.

Put the lid back on and secure the DC as appropriate to your needs.



The device can be installed in any orientation, preferably with the LED visible and the button reachable.

As a final task, head on over to Section 2.2, "Device Controller Configuration" for details on how to configure the DC as a consumer controller and other configurable options.

1.4.2. As a Producer Controller

The DC is installed between the output of the producer and the 12V bus. Remove the lid to gain access to the 4-way terminal block.



Figure 7. Producer controller wiring

To locate which wire goes where, hold the box so that the button and hole for the wires are at the bottom. Then, going from left to right across the terminal block, the positive output of the producer is on the left, then the producer's negative output, then the 12V bus positive, then the 12V bus negative at the right-hand end. There is a label on the board that details this as well, **Input** being the producer's output, and **Output** being the 12V bus.

Put the lid back on and secure the DC as appropriate to your needs.

And as a final task, head on over to Section 2.2, "Device Controller Configuration" for details on how to configure the DC as a producer controller, and other configurable options.

1.5. Temperature, Pressure and Humidity Sensor Installation

The TPH requires a 12V connection, either from the 12V bus or a wall wart, via the 2.1mm centrepositive barrel jack.

If you use the enclosed connector, attach the red wire to the 12V bus positive, and black to negative.



All wiring has to comply with your country's electrical standard(s), no matter whether you do it yourself or it's done by an electrician. In particular, ensure that the wiring is properly fused to address the risk of overheating, melting or an electrical fire.

Securely mount the TPH in a well ventilated spot, away from direct sunlight.



You can record data from different locations, such as the engine room, crew quarters, salon, galley or anchor locker by installing multiple TPH sensors.



Figure 8. TPH sensor power connection

1.6. Flammable Gas Detector Installation



At the time of this writing, this sensor has not been certified by an accredited institute. This means it should not be used as the only means of detecting flammable gases, but as an additional safety device, possibly in a different location.

The values shown in the graph are not calibrated and hence cannot be converted to some ppm (parts per million) levels. Having said that, even certified sensor do not show such numbers. They only set off an alarm if the level is "considered" too high. Our sensor is providing the same functionality, only the user can modify the alarm thresholds as required.

This sensor can be most useful as a:

- secondary source of information about the explosive gas levels
- backup sensor in case the primary fails
- spot check sensor for specific areas which would be difficult to retrofit with a wired, centrally located explosive gas alarm system
- historical log of levels of explosive gases. No other explosive gas alarm system that we know of provides this information

The detailed historical graphs can help to prevent harm by possibly revealing smaller leaks. Its additional features like triggering an alarm for someone on shore makes it particularly useful and versatile.

We recommend to deploy at least two sensor units: one next to the primary sensor as a backup/verification source, and another one low in the gas locker to detect a gas leakage on the high pressure side or the gas solenoid.

A leak in the gas locker should not cause a risk of explosion, as the locker has to be ventilated to the outside. Nevertheless, such a leak could mean that a new gas bottle is emptied after a few hours or days.

The EG detector requires a 12V connection, either from the 12V bus or a wall wart, via the 2.1mm centre-positive barrel jack.

If you use the enclosed connector, attach the red wire to the 12V bus positive, and black to negative.



All wiring has to comply with your country's electrical standard(s), no matter whether you do it yourself or it's done by an electrician. In particular, ensure that the wiring is properly fused to address the risk of overheating, melting or an electrical fire.

Mount the EG detector securely in a location that will cover the intended area.



As most hydrocarbon-based explosive gases are heavier than air, a lower location is preferable to a higher one. A good spot would be a dry area of the bilge but also in the salon, the crew quarters or the bottom of the gas locker. As it is 12 V DC driven, it is inherently spark proof.



Figure 9. Flammable gas detector power connection

1.7. Carbon Monoxide Detector Installation

The CO detector requires a 12V connection, either from the 12V bus or a wall wart, via the 2.1mm centre-positive barrel jack.

If you use the enclosed connector, attach the red wire to the 12V bus positive, and black to negative.



All wiring has to comply with your country's electrical standard(s), no matter whether you do it yourself or it's done by an electrician. In particular, ensure that the wiring is properly fused to address the risk of overheating, melting or an electrical fire.

Mount the CO detector securely in a location that will cover the intended area. A higher location is preferable to a lower one.



Figure 10. Carbon monoxide detector power connection

1.8. Bilge Water and Pump Sensor Installation

The smart bilge water and pump sensor module (BG) has three leads:

- 12V DC (the positive wire)
- ground (negative wire)
- pump voltage sensor

plus the water sensor wires coming out of the box.

The 12V DC should be connected to an always-on 12V lead like the one going to your bilge pump float switch input (not the bilge pump itself). The ground wire needs to be connected to the negative bus bar, most likely using the same bilge pump ground wire.

The pump voltage sensor cable needs to be connected the 12V positive bilge pump lead. This is usually the wire between the float switch and the bilge pump itself.

Finally, attach the BG enclosure in a place that allows the water sensor wires to come down to the level where you want the high water alarm to go off.



If there is a T-quick-connector in your package, the left wire of the T-connector base connects to the top blade of the horizontal part. This allows quick crimping onto the existing bilge pump power supply cable, if it has the right size to fit into this connector's blade.



All wiring has to comply with your country's electrical standard(s), no matter whether you do it yourself or it's done by an electrician. In particular, ensure that the wiring is properly fused to address the risk of overheating, melting or an electrical fire.

Chapter 2. Configuration

2.1. Headquarters Configuration

The HQ is configured through the **Admin** \rightarrow **Setup** page.

There are several configuration options available from the pull-down menu:

2.1.1. General

You can change number formats and units to suit your preferences, e.g. metric or imperial; as well as the size of the status panel and whether graphs are being animated (the plot is growing on the screen).

2.1.2. Time

Adjust the time or date by entering new values into the fields. Leave a field empty to keep the current value.

Setup			
Time			
		Leave empty to use	current values
Time	HH:MM or HH:MM:SS, 24-hour format		17:34:49
Date	DD MMM YYYY		10 May 2020
		OK Cancel	

2.1.3. Timezone

Select your timezone from the drop-down menu.

Setup	
Timezone	
Current timezone	Australia/Sydney
Select timezone	ᅌ

Some timezones are located under a second level, such as **US** and **Europe**. An elipsis (...) at the end of a name indicates there are further options available.

2.1.4. Wifi

The HQ starts in AP mode by default as detailed in Section 1.2.1, "Accessing the HQ for the first time". However, it can also act as a Wifi client if there is already a Wifi router on board and it should be used as the central Wifi hub.



Use this page to select the Wifi Access Point (AP) to which your HQ should connect as a client. This doesn't immediately come into effect, rather it preselects it and allows entering the password.

To then connect to that AP you must set the HQ's **clt-AP** switch to the **clt** (as in client-mode) position.

Wait until the HQ beeps and shows solid green on its left LED. Takes about 1 minute.

Then you need to log in to your AP (e.g. the Wifi router), via whatever mechanism they provide, to determine the IP address it has assigned to the HQ. You then use this IP address to access the HQ rather than the default 192.168.0.1. Setting a bookmark for that page would make it easier to navigate back to it.

2.1.5. Password

Use this page to change the password.

Setup	
Password	
Current password or HQ's serial number	
New password	P
New password again	P
Change password	

Figure 11. HQ Password Change

You must provide either the current password or HQ's serial number to change the password.

2.1.6. SharksHead Online

SharksHead Online can deliver alerts generated by your HQ to you via SMS and/or email.



Figure 12. SharksHead Online

See my.sharkshead.com for details.

To allow the SH support personnel to temporarily access your HQ, you need to enable the Remote online support on this page. After a few hours, this remote access will be turned off automatically, in case you forget to turn it off after the remote access has taken place.

2.2. Device Controller Configuration

The Device Controller has a couple of configurable items. Go to **Admin** \rightarrow **Modules** and select your DC from the drop-down menu. You'll see something like this:

Current Temperature - Enclosure	CS 13.0 TS 13.4	Enabled Enabled	Disable Disable
Configuration			
Attached to Breaker current threshold Breaker fuse speed	Consumer 5.000 A Fast	Set Set	
Fade	Off	Set	

Figure 13. Device controller configurable options

The standard functions on this page are and should be left enabled, unless advised otherwise by an authorised Shark's Head support team member.

The switch is the software version of your physical on/off switch, similar for the breaker, the output mode controls constant voltage or PWM (pulse width modulated) output, the voltage, current and enclosure temperature are mapped to the electrical sensors for those three values, respectively.

Make sure to set the **Attached to** option correctly for the target device to which your DC is connected. A Producer current adds to the sum of currents whereas a Consumer current gets subtracted from the sum.

The **Breaker current threshold** can be set to a value up to the rated current of the breaker. The rated current is shown when you try to change the threshold. Adjusting this setting can prevent the melting of cables or even a fire in the following scenario: suppose you are fitting a new consumer, like an LED light, that's normally drawing 0.5A and came with a small gauge wire that cannot be easily replaced because its press fitted into the device.

If the breaker is left at its rated default value of maybe 10A, a damaged cable or malfunction of the light can cause a higher current to flow, but because the cables that came with the light are so thin the current is not high enough to trip the breaker. However, the current might be way too big for those thin wires which will overheat, melt and maybe even catch fire!

Hence if you know the max current the device is drawing (which is it's power rating divided by the bus voltage, e.g. a 10W light on a 12V system would draw max. 10W/12V = 0.83 A) you would want to set the threshold to about 1.5x that value (or about 1.3A in the example).

On a physical switch panel, the available breaker could be a 10A or a 20A version and there is no way to adjust them.

The breaker fuse speed can be set to one of three, with timings of:

Table 1. Breaker fuse speeds

Value	Speed
Fast	100ms
Medium	400ms

Value	Speed
Slow	1s

The **Fade** option allows a gradual transition of the output voltage to the new value. It is using the same timings as for the fuse speeds shown above. Fading is mostly used on dimmable lights.

See Section 3.3, "Device Controller Operation" on how to control the DC and how to view its realtime and historical data.

2.3. Temperature, Pressure and Humidity Sensor Configuration

The barometric pressure sensor, like any barometer, should be checked against the barometric pressure from a reliable source nearby, especially if the location changes in altitude, such as in a land vehicle or while hiking. This is less likely to be the case on a boat. Reliable sources for this are official weather stations or airports nearby.

If no such source is available, the sensor can still be used. For the weather forecast the temporal change of the air pressure is more important then the correct absolute value. The latter is of interest if you want to compare it with other stations, e.g. by radio, or if you want to know whether you are in a high or a low pressure system at the moment.

Go to the **Admin** → **Modules** page and select your TPH module. There you'll see:

Functions							
Temperature - Atmospheric Pressure - Atmospheric Humidity - Atmospheric	TS 17.0 PS 17.1 HS 17.2	Enabled Enabled Enabled	Disable Disable Disable				
Configuration							
Calibrate pressure sensor Raise pressure change alert v Pressure change alert sensitiv	vhen Fal vity Hig	Set Set h Set					

Figure 14. Calibration and configuration options for the TPH module

To calibrate the pressure sensor you'll need the pressure from a known source close by. Once you do the calibration you may need to wait up to 5 minutes for the pressure reading from the TPH to stabilise.



The units for the pressure readings (e.g. hPa or inHg) can be changed in the Admin \rightarrow Setup \rightarrow General page.

You should wait at least 15 minutes after starting the TPH before performing the calibration.

While you're on the TPH page you can configure a few other aspects of the module.

You can enable pressure change alerts with the last two configuration options. An alert will be raised if the pressure changes by a certain amount within a certain time frame. This is intended to give you advance warning of a possible weather change without having to check the barometer periodically.

2.4. Flammable Gas Detector Configuration

The EG module has two configurable options. Go to the Admin \rightarrow Modules page and select your EG module. There you'll see

Configuration		
Monitoring interval Sensitivity	Medium Low	Set Set
Notes		

Figure 15. Flammable Gas Detector Configuration Options

Monitoring interval varies between 1 minute (fast) and 5 minutes (slow).

Sensitivity adjusts the high (red alert) and low (amber alert) thresholds.

The sensor in the EG module is sensitive to various gases, some of which aren't dangerous. For example, it is possible for the EG sensor to register a higher reading, and possibly raise an amber alert, by simply being near the EG sensor while drinking a glass of wine. Just for fun you can breathe across the sensor after having a few drinks and see what it reports back!

Chapter 3. Operation

3.1. General Module Operations

There are several operations that can be applied to most modules, all of which are accessible from the **Admin** \rightarrow **Modules** page, plus there are general operations that can be performed with each module's button.

Dasht	oard Environmental Electrical - Safety - Alerts Documentation
17:33	13.0 V -0.4 A 97.9 %SoC 16.6 °C 1,027.2 hPa 60.8 %rH
	Modules
	< Mo 16 - Flammable gas > New module In progress
	Mo 16 - Flammable gas
	EG Model 2, Version 0.3 Serial number 074-204-3448
	Edit label Replace Locate Network test
	Functions

Figure 16. Edit label, Replace, Locate and Network test

Edit label			
Functions			
System status indicator - RGB LED	SI 0.1	Enabled	Disable
System status indicator - Buzzer	SI 0.3	Disabled	Enable
System status indicator - Web	SI 0.2	Enabled	Disable
Voltage - System bus	VS 0.1	Enabled	Disable
Current - Storage	CS 0.0	Enabled	Disable
Energy - Storage	Se 0.2	Enabled	Disable
Power - Storage	Se 0.3	Enabled	Disable
Current - Consumers	CS 0.4	Enabled	Disable

Figure 17. Function enable and disable

Notes	
New note	
19 Apr 2020 20 Dec 2019	Upgraded to version 0.5. Installed.

Figure 18. Notes

3.1.1. Edit label

This allows you to add a label to each module. The label will appear alongside the module number whenever the module name is displayed.

For my module #16 I have added **Flammable gas** as the label, and the image above shows how the module number and label is displayed in the drop-down menu and the title below it.



The label is not translated when switching language.

3.1.2. Replace

This allows the replacement of one module with another module, perhaps to upgrade a module or to replace a failed module.

All data from the replaced module will be retained. The replacement module will assume the old module's number.

We recommend to always replace a module with the same type of module, for example, replace a TPH module with another TPH.

In the Replace page, enter the serial number of the replacement module, then apply power to the module. To check the status, hit the **In progress** link.

[NOTE]

If the replacement module displays an amber 1- or 2-flash LED pattern for more than about 30 seconds then you should temporarily move the module closer to the HQ. You can move the module back to its intended location once the module displays a solid green LED.

3.1.3. Locate

This turns the module's LED blue to be able to identify that module (in case there are several modules with the same functionality in close proximity).

The module will go **blue-dot** on the status panel when the module has received the locate command.



Figure 19. Mo 16 has its Locate LED turned on

To turn the LED off either hit **Locate** again or press the module's button.

3.1.4. Network test

This flashes the module's LED blue once every 1/2 second.

Every 1/2 second the HQ sends a command to the module. If the module successfully receives this command, it briefly flashes its LED.

Use this when installing modules so you don't install the module in a radio dead spot.

Hit **Network test** again to turn the test off, otherwise **Network test** will automatically turn off after 15 minutes.

While **Network test** is active the module will go **blue-dot** on the status panel, as it does when **Locate** is on.

3.1.5. Function enable and disable

Many aspects of a module's functionality can be separately enabled and disabled.

Be aware of any flow-on effects when you disable a function. For example, you will no longer receive pressure change alerts if you disable the TPH module's pressure sensor.

3.1.6. New Note

This allows you to add a note to a module. The date is automatically added, you provide the text.

Notes are displayed most recent first to oldest last and can not be deleted or modified once they've been saved. This is similar to the ships log.



Notes are not translated when switching language.

3.1.7. Module button

You can perform a variety of actions with the button on each module. The actions are both context and press-duration dependent.

Module reset

Press and hold the button for at least 10 seconds to reset the module.

Locate off

If you have turned locate on via the **Admin** \rightarrow **Modules** page for a module, and hence the module's LED is showing blue, a short press of the button will turn locate off.

Other actions

Apart from module reset and locate off (when locate is on), the actions performed by the button are dependent on the module in question. Please see the module's operation section for details.

3.2. Headquarters Operation

3.2.1. Shutdown HQ and Reboot Shark's Head

These two operations are available from the Admin \rightarrow Modules \rightarrow Mo 0 - HQ page.

Storage current tin	ne limit 0:00:05	Set	
Operations			
Shutdown HQ Reboot SH	Shutdown HQ Reboot SH		
Notes			

Figure 20. Shutdown and Reboot buttons

Shutdown HQ shuts down the HQ operating system and powers off the hardware.

To restart the HQ you must remove power from the HQ for a few seconds, then reapply power. The HQ's buzzer will give a short beep and its left LED will show solid green (for 1 minute) when the HQ is up and running again.

Both shutdown and power on take approximately 30 seconds each.

Reboot Shark's Head terminates and restarts the HQ process that is at the heart of Shark's Head.

The HQ's buzzer will give a short beep and its left LED will show solid green (for 1 minute) when the process is up and running. Takes about 1 second or less.

In general there should be no reason to perform this operation.

3.2.2. Updating HQ

Updating the HQ software is a three step process.

- 1. Download the latest update.
- 2. Upload the update to the HQ.
- 3. Perform the update.

Download

Updates are available for download from https://sharkshead.com/firmware-updates/

Compare your HQ's model and version number on the Admin \rightarrow Modules \rightarrow Mo 0 - HQ page against the available downloads.



Figure 21. HQ model and version number

Upload

Go to the **Admin** \rightarrow **Updates** page, then either press the **Browse...** button to select the update you have downloaded, or drag-n-drop the file into the central area of the page.



Figure 22. Uploading update files

The name of the file will appear underneath the drag-n-drop area while the file is being uploaded. When complete, a green border will appear around the box containing the file name.

Upload
SHU files to upload: Browse No files selected.
or drag and drop SHU files here
2020092000.shu

Figure 23. Green border around the file name

[NOTE]

Do not proceed until the green border appears.

Perform

The final task is to apply the update. Go to the **Admin** \rightarrow **Modules** \rightarrow **Mo 0 - HQ** page and you'll see, for example

Updates		
20 Sep 2020	HQ Model 2, Version 1.10	Upgrade

Figure 24. Update is ready to be installed

Hit the upgrade button and the HQ will go **violet-dot** on the status panel while the update is being processed. Updates typically only take a second or two to complete.



Figure 25. HQ going violet-dot while an update is in progress

The update is done when the Mo 0 violet-dot goes from the status panel.

3.3. Device Controller Operation

Each Device Controller has realtime and historical data you can view, and a switch and circuit breaker you can control.

Aggregated data is also avaiable such as the sum of all the currents across each of your Consumer DCs and your Producer DCs.

The data and controls are available on the **Dashboard**, the **Electrical** \rightarrow **Consumers** and the **Electrical** \rightarrow **Producers** pages.

The switch and breaker controls operate the same on all these pages, with minor visual differences to suit the page on which they are displayed.

The Dashboard shows realtime data in the form of a gauge. Gauges for voltage, current etc are available under each DC, and gauges for aggregated data are available under the **Mo 0 - HQ** module.

The Electrical Consumers and Producers pages show realtime data in the form of a table, and historical data in the form of a graph.

The switch on a DC can be in one of two modes, **Simple switch** and **Dimmer switch**. As a dimmer switch you can set a dimmer value from 0% to 100%.

The breaker can be either **Opened** or **Closed**, and in **auto** or **manual override** modes.

A breaker in **Closed**, **auto** mode will react to over voltage, over current and over temperature events by tripping. The reason for the trip will be displayed by the breaker.

An over voltage or over temperature trip will return to **Closed**, **auto** once the relevant sensor value drops below its threshold.

An over current trip will not automatically reset. You must fix the underlying problem first, then manually set the breaker closed.

A breaker in **manual override**, or **MO** for short, will not react to any over voltage, over current or over temperature events. It will remain in the **Opened** or **Closed** state until you change it.

See Section 2.2, "Device Controller Configuration" on how to configure a Device Controller.

Here's the Device Controller's family album.



Figure 26. DC's on the top line of the dashboard

1	Dashbo	ard				
	Off DS Switch Lights	Dimmer switch 10 %	Closed, auto Breaker Lights	On SS Switch Battery charger	Tripped: High current Breaker Battery charger	Ex

Figure 27. DC breaker tripped, over currrent. Note the red alert this raised



Figure 28. Aggregate current gauges on the Dashboard

Ξ	Consumers						
	Now						
	Module	Switch	Breaker	Voltage	Current	Power	Encl. temp.
	Mo 8 - Lights	On DS Dimmer switch	Closed, auto	12.783 V	0.296 A	3.783 W	24.00 °C
	Mo 13 - Battery charger	Off SS	Opened, auto				
	Mo 15 - Extension cable	On SS	Closed, auto	12.766 V	0.093 A	1.187 W	24.62 °C
	Summary			12.784 V	0.389 A	4.970 W	

Figure 29. DC controls and realtime data on the Electrical \rightarrow *Consumers* \rightarrow *Now page*



Figure 30. DC historical data on the Electrical \rightarrow Consumers \rightarrow Then page

3.4. Temperature, Pressure and Humidity Sensor Operation

3.4.1. Module button

If **Locate** has been turned on from the TPH's **Admin** \rightarrow **Modules** page, then a short press of the button will turn locate off.

A long press of more than 10 sec will reset the module. After releasing the button the LED should turn green once it's connected to the HQ, otherwise it keeps double flashing amber.

3.5. Flammable Gas Detector Operation

3.5.1. Module button

If an alert has been raised because the gas sensor reading has breached a threshold, then a short press of the button will acknowledge the alert and shut off the buzzer.

If **Locate** has been turned on from the EG's **Admin** \rightarrow **Modules** page, then a short press of the button will turn locate off.

A long press of more than 10 sec will reset the module. After releasing the button the LED should turn green once it's connected to the HQ, otherwise it keeps double flashing amber.

3.6. Alerts

The HQ will raise an alert whevever a sensor's value has breached a threshold. The alert will be removed once the value no longer breaches the threshold. Some alerts may require corrective action before they are removed.

There are three types of alerts, each representing a different severity.

Table 2. Alert severity

Alert	Meaning
Amber	Notification, deal with it at your leisure
Red	Important, check it out as soon as possible
Alarm	Emergency, act upon this immediately

There are four ways in which the HQ displays alerts: the **Alerts** page, the **traffic light**, the **LED** and the **buzzer**.

Here is the **Alerts** page with the traffic light in the top left corner.



Figure 31. The Alerts page

Acknowledging alerts instructs the HQ to deemphasise the alert from the traffic light, LED and buzzer.

1	Alerts					
	Time Fri Sep 18 17:00:53 2020 Thu Sep 17 23:31:16 2020 Thu Sep 17 23:31:16 2020 Thu Sep 17 23:30:38 2020 Thu Sep 17 23:30:38 2020 Thu Sep 17 23:30:38 2020	Module Mo 0 - HQ Mo 2 - Outside TPH Mo 2 - Outside TPH Mo 10 - Right battery Mo 10 - Right battery	Level Amber Green Green Green Green	Message Storage current above threshold AA battery pack voltage ok Barometric pressure is steady Enclosure temperature below threshold Battery temperature below threshold Voltage within threshold limits	State Acknowledged	When Fri Sep 18 17:01:46 2020
	Thu Sep 17 23:30:38 2020 Thu Sep 17 23:30:29 2020 Thu Sep 17 23:30:29 2020 Thu Sep 17 23:30:29 2020	Mo 10 - Right battery Mo 8 - Lights Mo 8 - Lights	Green Green Green	Current below threshold Enclosure temperature below threshold Voltage within threshold limits		

Figure 32. An acknowledged alert

The top cell of the traffic light goes deep red when there are unacknowledged Alarm alerts, the second cell goes light red for unack'ed Red alerts and the third goes amber for unack'ed Amber alerts. The bottom cell goes green when either all the alerts have been acknowledged or there are no current alerts.

The top three cells will display a number when alerts have been raised. When the cell is coloured the number indicates the number of unacknowledged alerts, and when it is white the number indicates the total number of alerts.

To recap this:



The traffic light shows the non-green cells in their respective colour with a number in each cell for the number of alerts of that priority. Acknowledging the alert(s) will turn those cells back to a white background but the number will persist until the reason for the alarm has been remediated.

As an example: if the bilge sensor raises a high water alarm, the alert counter in the traffic light will only decrement (or disappear) when the water has receded.

This approach prevents the crew from "forgetting" about this issue.

The physical LED on the HQ itself lights with the colour of the highest severity unacknowledged alert.

Table 3. LED colours and patterns

Colour and pattern	Meaning
Green, solid	All alerts are acknowledged or no current alerts. Turns off after 1 minute
Amber, solid	Unacknowledged Amber alerts
Red, solid	Unacknowledged Red alerts
Red, flashing	Unacknowledged Alarm alerts

The buzzer on the HQ uses different beep patterns to indicate the highest severity alert, and possibly the type of threshold that has been breached.

Table 4. Buzzer patterns

Pattern	Meaning
Beeps, fast	Red alert raised by a gas sensor
Beeps, slow (every 3 seconds)	Amber alert raised by a gas sensor
3 beeps	An alert has been raised

3.7. Night Light Operation

The **Night Light** is enabled and disabled from the **Safety** → **Night light** page. Here's an example.

Night light		
Presence detector	Mo 9 - Infrared pre	sence detector
Device controller	Mo 8 - Lights	
Active between	17:00 to 06:00	
Primary phase	10m @ 30%	
Secondary phase	5m @ 10%	
Status	Enabled	Disable
J		

Figure 33. Night light operation

See [nl_c] on how to configure the night light.

Chapter 4. Getting The Most Out of Shark's Head

Shark's Head can do many things, but how do you get the most benefit from what it can do. Hopefully this chapter can help answer that.

4.1. Dashboard

The dashboard should be the primary page on your Shark's Head system.

It is highly configurable as you can add graphs and gauges (almost) anywhere on the page.

You can change the look and scale, and even the scale type, of gauges.

You can create different dashboards for specific conditions and switch between them very easily. For example, a dashboard with smaller gauges for when you're accessing Shark's Head via a phone, and a different layout when you use a bigger tablet or laptop screen.



No matter which layout you choose, alerts will always be visible and only a fingertip away.

Here's an example of a customised dashboard.



Figure 34. Dashboard example

To adapt the dashboard to your needs, hit the **Edit** link at the bottom left of the page. This will show all of the graphs and gauges (which are called **objects** here) that can be displayed, each overlaid with a drop-down menu where you begin your customisation.



Figure 35. Customise your dashboard

The first choice you make is where to place each object on the dashboard page. There are 4 areas, being

- 1. the **top line**, which straddles the entire width of the page
- 2. the left margin
- 3. the **right margin**
- 4. the **central panel** that sits between the left and right margins

Objects on the **top line** can be arranged horizontally across the page from left to right.

Objects on the left margin and right margin are arranged vertically.

Objects on the **central panel** are placed in horizontal lines which are arranged vertically.

Click the **Done** button when you're happy with the layout. This will save this layout and associate it with the particular browser from which you're accessing the web interface. If you want to be able to use the same layout from a different device, save it as a template afterwards as described below.

Click the **Clear** button to go back to the basic default layout.

To create multiple dashboards, create a dashboard layout, save it using the **Done** button, and then hit the **Save as template** link at the bottom of the following page. To retrieve a previously saved dashboard, hit the **Open templates** link.



To avoid accidental removal, templates can only be deleted from the Admin \rightarrow Setup \rightarrow Dashboard page.

4.2. Temperature, Pressure and Humidity Sensor

The temperature, pressure and humidity sensor works like a complete weather station which includes the functionality of your on board barometer to detect changes which can be used to forecast a bad weather front approaching:



Figure 36. TPH 2 day graph

The graph shows the development of the three parameters over the last two days. Moving the cursor over the graph shows the exact reading for that time.

Changing the scope to, say, a whole year, can give you some interesting seasonal information about your boat:



Figure 37. TPH annual graph

The above graphs shows the **average** value for the given time, for the monthly and longer time windows, the graphs could also show just the minimum value, the maximum value, or all three values at the same time:



Figure 38. TPH graph with all values

4.3. Flammable Gas Detector

There isn't much to tweak at the EG sensor apart from the alert thresholds.

The sensor doesn't have a fixed life span like with other products, where it has to be replaced regularly otherwise it stops working. In fact his happened to us with a different brand sensor. One day the self-test just decided that the sensor doesn't work and hence failed on us. Not a good solution for a long term cruiser unless you have a spare sensor around.

A slowly drifting sensor reading (while the environment stays the same) indicates the sensor should be replaced. If not possible to do so in a timely manner, the thresholds can be increased to accomodate the new, still considered safe, readings.

We still recommend to replace such a sensor as soon as possible but it won't leave you stranded out of the blue (pun intended).

Chapter 5. Web Interface

5.1. Navigation

The top menu bar on the web interface is split into a left side and a right. Entries on the left side are all related to operating Shark's Head, where you can look at current or past values or turn switches on or off or open and close relays, etc. The right menu items are all about configuring Shark's Head, where you can set alert thresholds or enable or disable sensors or change the time or timezone etc. Knowing this split between operation and configuration will help you navigate to where you want to go.

Dashboard	Environmental	Electrical v	Safety ¥	Alerts	Documentation
14:12 13.7 V	0.3 A 26.9 °C 1,0	15.9 hPa 43.3 %	rH		
Set	du				
Figure 39. Left	-side menu option	S			
	English (UK) ¥	Admin 🖌			
	🛑 Mo 3, 5	🔍 🔍 Online			

Figure 40. Right-side menu options

5.2. Read-only and Administrator Access

By default, all access to the web interface is **Read-only**. In this mode you may see every page but you are restricted from changing the configuration of the HQ and all modules. Read-only mode is indicated on the right-hand side of the menu bar.

Read-only access	English (UK) 🗙	Admin 🗙
•	Mo 1, 3, 6, 12, 13, 16	Online

Figure 41. Read-only mode

To change configuration options you must first log in as Administrator from the Admin \rightarrow Login page.

|--|

Figure 42. Admin \rightarrow Login Page

The default password is **adminXXXX** where **XXXX** is the last 4 digits of the HQ's serial number.

5.3. Changing the Administrator password

Changing the Administrator password is done from the **Admin** \rightarrow **Setup** \rightarrow **Password** page.

Setup	
Password	
Current password or HQ's serial number	•••
New password	P
New password again	P
Change password	

Figure 43. Password change

5.4. Language

You can change the language in which the web interface is displayed by selecting it from the dropdown menu on the right-hand side of the menu bar. At the time of writing you can choose between UK and US English and German.

Your choice of language is particular to your browser. It is not a system-wide configuration.

Module notes and labels are not translated.

Choosing a language also sets the number format and units.

5.5. Number Format and Units

You can change the number format and units from the **Admin** \rightarrow **Setup** \rightarrow **General** page.

Setup	
General	
Number format	1,234,567.89 1 234 567.89 1234567.89 1.234.567,89 1 234 567,89 1234567,89
Units	Metric Imperial (UK) Imperial (US)
Pressure units	hPa kPa bar mbar mmHg inHg psi
Status panel	Mini Full
Graph animation	Enabled Disabled
	Setup General Number format Units Pressure units Status panel Graph animation

Figure 44. Number format and units

The pressure units are separately selectable from the main units selector.

All options on this page are particular to your browser. They are not system-wide settings.

5.6. Status Panel

The default status panel, called the **Mini** panel, is a single line beneath the menu bar, as shown in most images in this document.

There is also a **Full** status panel that displays more information on the left hand side of every page. This is selected from the **Admin** \rightarrow **Setup** \rightarrow **General** page. See Figure 44, "Number format and units".

Dash	board	Environme	ental	Electrical ¥	Safety	A	lert	S
	Shark	alload	Set Gen	c up eral				
Local UTC	21:49 19:49			Number format	1,	234,5	67.	89
Voltage		v		Units	M	etric	Im	iper i
SoC		A %		Pressure units	hl	Pa k	Pa	ba
Temp	27.5 979 1	°C	:	Status panel	М	ini F	ull	
Hum	40.6	%rH		Graph animatio	n Ei	nable	d	Disa
Health	Mo 0 ● Mo 1 ● Mo 2 ●	100% 100%						
Online	•							
Pending	I							

Figure 45. Full status panel

The full status panel additionally shows:

- the time, both local and UTC (Universal Time Coordinated / Universal Coordinated Time; aka Greenwich Mean Time or GMT)
- the battery system voltage, current and state-of-charge. Note that these will become populated once there are sensors that provide that information
- the temperature, pressure and humidity readings from the TPH sensor. If there is more than one TPH sensor installed, the first one takes precedence

- the network health of every module
- the **Pending list**

The network health is given as a percentage, where 100% means there has been no packet loss for a while. This could range from 1 minute to 10 minutes depending on the type of module.

A percentage less than 100 means there have been packets lost, the lower the percentage the higher the packet loss.

The **Pending list** shows the module functions to which the HQ is attempting to send a command.

5.7. Admin → Advanced Page

The **Admin** \rightarrow **Advanced** page gives you a look under the covers of Shark's Head. It exposes all of the underlying mechanisms used to control modules and set thresholds, the raw details about the radio network and an important debugging function should something go awry.

5.7.1. Module details

Selecting a module from the drop-down menu will display the 3 components that make up the module: Sensors, Actors and Configs

A C	Advanced Mo 16 - Flammable gas Routing table Network Download logs Mo 16 - Flammable gas											
P	Proceed with caution. Changing these options can severely impact system functionality.											
Sei	Sensors											
	ID Se 16.0	Type Gas	Sub type Flammables	Rep. Integer	Scale 1	Status Enabled	Value Time 240 Fri Sep	25 21:21:3	6 2020 Dis	able		
Ac	tors											
	ID Ac 16.0	Type Alert	Sub type Acknowledge	Status Enabled	State 1	Comma	and Args				Send Send	Disable
	Lo 16.1	Locate	None	Enabled	0						Send	Disable
Co	nfigs											
	ID	Туре	Sub type		Rep.	Scale	Factory default	Value	New value	Send		
	Co 16.0	Gas	Low thres	hold	Integer	1	200	600		Send		
	Co 16.1	Gas	High thres	hold	Integer	1	250	700		Send		
	Co 16.2	Time	On delay		Integer	1	0	0		Send		
	Co 16.3	Time	Interval		Integer	1	120	120		Send		
	Co 16.4	Enable bit	s Sensors a	nd Actors	Integer	1	-1	-1		Send		

Figure 46. Advanced page for the EG

Please heed the warning shown on this page. You can negatively impact the functionality of the module by changing something without an understanding of its effect.

We strongly recommend changes are only performed under the guidance of the Shark's Head support team.

The Sensors section shows you, among other things, the latest sensor value and the timestamp of

its receipt. This is updated in real-time, so if you watch the page for a bit you'll likely see the value and/or the timestamp change. Some modules, like the EG, may only update their value every few minutes, whereas other modules may send an almost constant stream of new values.

The **Actors** section shows all the actions the module can perform when requested. Requesting a module to perform an action is done by sending an **actor command** composed of a command and up to 8 arguments. We don't give out details of the actor commands so it's best you don't tinker with this section.

The software running on the HQ has components called **Directors** that know about the actors and will send actor commands when needed.

The **Configs** store things like calibration constants, thresholds, limits, counters, enable/disable bits etc. They are stored in non-volatile memory on the module so they retain their value when the power goes off.

5.7.2. Routing table

The **Routing table** shows you the module to which the HQ must send a packet so the packet reaches its intended destination module.

Dasht	ooard	Envi	ronme	ntal Elec	ctrical ¥	Safety ¥	Alerts	Documentation			
23:41	27.1 °C	975.2	hPa 3	8.5 %rH							
	Advanced										
	Routing table Network Download logs										
	Routing table										
	RN 0: 0:	Mo 1 2	Via 2 2	In 110608 69770	Out 45269 37525	Errs 625 457	CE PD 0 0	R Buf			
	,										

Figure 47. Routing table

From the first entry of the image above, to send a packet to module #1 the HQ will send the packet to module #2 (the **via** entry). Module #2 can be reached directly, as its **via** entry is also module #2.

The routing table displayed is not updated in real-time.

5.7.3. Network

The **Network** page gives you a real-time view of the number of packets received and lost from each module.

Dash	Dashboard Environmental Electrical V Safety V Alerts Documentation												
23:39													
	Advanced												
	< > Routing table Network Download logs												
	Network												
	Channel 0x33												
	Module	Module 5 Minutes 1 Hour 1 Day											
		Received	Lost	Received	Lost	Received	Lost						
	Mo 1 - TPH	10	0	118	0	2,846	0						
	Mo 2 - Explosive gas 1	11	0	93	0	2,160	2						
	Total	21	0	211	0	5,006	2						

Figure 48. Network

This page is updated in real-time. The 5 minute columns are updated every 15 seconds, the hour columns every minute, and the 24 hour columns every 15 minutes.

This, combined with the network health displayed in the full status panel, can give you a good idea of the quality of the network between the HQ and each module.

5.7.4. Download logs

Clicking **Download logs** will pop up a window so you can download the Shark's Head logs to your computer. It may take 15 seconds or more to pop up. Please be patient.

	Opening SharksHead.log.20200924-174134.tar.gz				
		You have cho	sen to open:		
	svotovo fr	SharksHea	d.log.20200924-174134.tar.gz		
act	system ft	which is: Do	ocument (48.4 MB)	_	
		from: http:/	//pi0w		
	Otatura	What should	Firefox do with this file?		
2	Status	Open with	Archive Utility (default)	o bla	
3	Enabled	Save File		able	
	Enabled	-		able	
3	Enabled			able	
3	Enabled		Cancel OK	able	
I	Enabled	-12.313	1110 Way 07 10.00.00 2020	sable	
3	Enabled	-12.522	Thu May 07 18:36:06 2020	Disable	

Figure 49. Download logs

We may ask you to email the logs to us if you've been discussing with the Shark's Head team problems you're experiencing.

The logs themselves do not contain any personal information about you. The download is a gzip'ed tar file (.tar.gz) containing the last 7 days of logs generated by the main HQ process.

If you're curious, or if you want to be sure they contain no personal info, by all means, unpack them and check them out.

Chapter 6. Troubleshooting

6.1. Empty gauges and graphs

It has been noticed on a browser like Firefox that if the dashboard is sitting untouched for many hours in a non-active browser tab, the data stream to the browser might get cut off, possibly causing the dashboard to show empty gauges and graphs. If this is the case, just reload the page using the reload button in the browser.

If just one gauge hand or graph is missing, check if the module has gone red-dot on the status panel. This means the HQ has lost contact with the module.

This should recover automatically, but if it doesn't, try and reset the module as shown in Section 3.1.7.1, "Module reset". If the module does not show a green LED after 1-2 minutes, power off the module by pulling the plug and re-inserting it after 5 seconds.

6.1.1. Wrong time or time zone, wrong number format, wrong units

All these items (and more) can be adjusted from the Admin \rightarrow Setup page.



Figure 50. The setup page

6.2. Module LED shows amber 1- or 2-flash pattern

This means the module is searching for the Shark's Head network. If this persists for more than 5 minutes, consider relocating the module or placing another module in the path between the flashing module and the HQ or a working module (to relay the flashing module's packets.)

6.3. Module is red-dot on the status panel

A red dot means the HQ has lost contact with the module. It can be seen on both the mini and full status panels. In the two images below, three modules are red-dot because they were turned off at the time. Module 0 is the HQ itself and doesn't show a radio link percentage.



Figure 51. Module is red-dot on the mini status panel

Dashboard		Environme	ental
	Sharks)	Ecud	Se Ge
Local UTC	05:13 19:13	1	
Voltage Current SoC	13.2 -0.5	2 V 5 A %	
Temp Press Hum	16.2 1,026.8 54.8	2 °C 5 hPa 5 %rH	
Health	Mo 0 Mo 50 Mo 103 Mo 124 Mo 133 Mo 137 Mo 144 Mo 152 Mo 163 Mo 173 Mo 176 Mo 190 Mo 238	100% 100% 0% 100% 100% 100% 0% 0% 100% 90% 100% 10	
Online	•		

Figure 52. Module is red-dot on the full status panel

This table should help to diagnose the problem further:

Possible reason	Remediation
Radio interference	Interference is often temporary and will rectify itself once the interfering device has been turned off. Such devices can be radios (HF, VHF etc) or fridges and freezers. Assess whether turning other devices on has an effect on the Shark's Head communication. The module's LED will show an amber 2-flash pattern to indicate it is searching for the network. Short term interference can also happen by a person standing in the radio path. Human bodies block these low power radio signals in the 2.4GHz range used by the modules.

Table 5. Module is offline

Possible reason	Remediation
A module has just been moved to a different location	Move the module to a location where it can reach at least one other radio that is closer to the HQ. As modules can relay traffic for other modules to and from the HQ, the chain of modules might've been interrupted.
The module is "stuck", LED not flashing	Reset the module by pressing its button for more than 10 seconds then releasing. The module is working again if its LED shows an amber 2-flash pattern or solid green. If it continues to show the amber flash pattern then follow the advice in Section 6.2, "Module LED shows amber 1- or 2-flash pattern". If there is no activity on the module's LED then remove the power cable and reinsert after about 5 seconds. If there is no activity after this then contact Shark's Head support.



The Shark's Head system components communicate in the 2.4GHz range, the same band as Wifi or WLAN. However, they do not use the exact same frequencies and hence do not interfere with Wifi traffic.

6.4. LED colours and flash patterns

Each module shows a variety of conditions via its LED.

Colour and flash pattern	Meaning
Green, solid	All's good. Usually turns off after 60 seconds.
Blue, solid	Locate is on. Turn it off with a short press of the module's button or from the module's Admin \rightarrow Modules page.
Blue, flashing	Network test is on. Turn it off from the module's Admin \rightarrow Modules page. Automatically turns off after 15 minutes.
Amber, 1- and 2-flash	The module is searching for the network. See Section 6.2, "Module LED shows amber 1- or 2-flash pattern" if this persists for more than a couple of minutes.
Red, SOS in Morse code	The module has failed its power-on hardware and software check. Contact Shark's Head support.

Table 6. LED colours and flash patterns

Chapter 7. Specifications

All Shark's Head modules are designed to be attached to a 12V DC bus or some other source of 12V DC. They don't rely on a common ground (or negative) potential.

The components are suitable for an environment of -10°C to +50°C (14°F to 122°F) non condensing.

[cols="6,2,2,2,1"	, options="header"]	I.HQ Specifications
-------------------	---------------------	---------------------

Value
Minimum
Typical
Maximum
Units
DC supply voltage
6
12
16
V
DC current
60
100
170
mA
Height x Width x Depth
50 x 130 x 70
mm
Weight
165
g

Table 7. DC Specifications

Value	Minimum	Typical	Maximum	Units
DC supply voltage	6	12	16	V
DC current		25	35	mA
Height x Width x Depth		35 x 115 x 55		mm

Value	Minimum	Typical	Maximum	Units
Weight		90		g

Table 8. TPH Specifications

Value	Minimum	Typical	Maximum	Units
DC supply voltage	6	12	16	V
DC current		19	29	mA
Height x Width x Depth		35 x 115 x 55		mm
Weight		100		g

Table 9. EG Specifications

Value	Minimum	Typical	Maximum	Units
DC supply voltage	6	12	16	V
DC current		84	94	mA
Height x Width x Depth		35 x 115 x 55		mm
Weight		105		g

Table 10. CO Specifications

Value	Minimum	Typical	Maximum	Units
DC supply voltage	6	12	16	V
DC current		84	94	mA
Height x Width x Depth		35 x 115 x 55		mm
Weight		105		g

Chapter 8. About Us

Shark's Head is a product of Arcsine Pty Ltd, Sydney, Australia. ABN 63 073 952 244.

Contact	Detail	URL
Web	sharkshead.com	https://sharkshead.com
Email	support	support@sharkshead.com
Twitter	@TheSharksHead	https://twitter.com/TheSharksHead
Facebook	Sharkshead	https://facebook.com/groups/2486573731568305
Instagram	sharkshead	https://instagram.com/sharkshead/
Github	sharkshead	https://github.com/sharkshead