Ocean Signal

User Manual

for the

SafeSea E100

SafeSea E100G

Emergency Position Indicating Radio Beacons

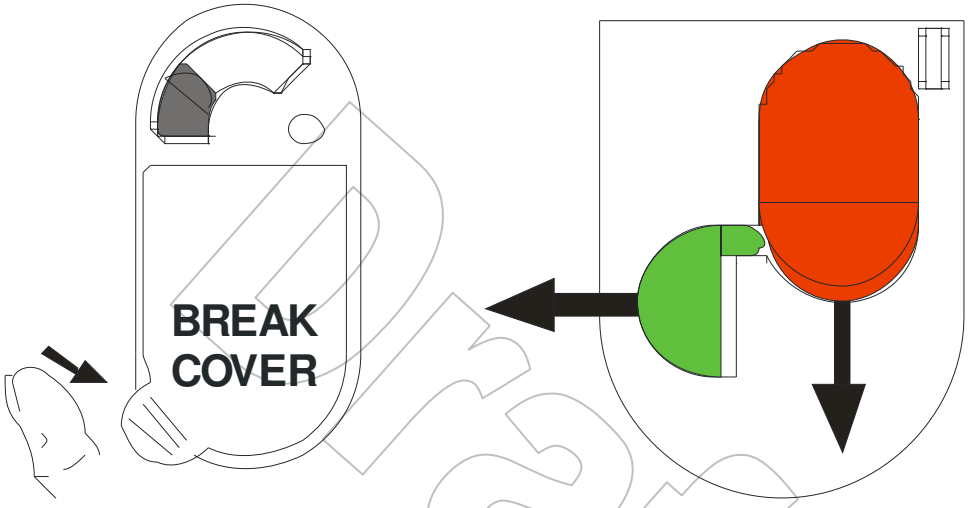
In Case of Emergency

WARNING

USE ONLY IN SITUATIONS OF GRAVE AND IMMINENT DANGER

Remove the EPIRB from its mounting or housing

To manually activate EPIRB



Break the switch cover

Slide and hold the Green switch to the left. Slide the Red switch into the down position

Remove the lanyard cover, holding on to the free end of the lanyard and throw the EPIRB into the water

EPIRB Programming Details

Insert your EPIRB programming details, as indicated on the side of your EPIRB, into the form below.

UIN: .....

Vessel Name: .....

MMSI: .....

Country: .....

Call Sign: .....

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1: Introduction

This manual provides valuable in formation for the installation, operation and maintenance for both the SafeSea E100 and SafeSea E100G.

It covers the operation for both the:

SafeSea E100 EPIRB
&
SafeSea E100G EPIRB with GPS

Please read this manual completely before using your EPIRB. Parts of this manual apply to the E100G only.

2: Registration

WARNING

⚠ THE OWNER OF THIS 406MHz EPIRB MUST REGISTER IT WITH THE APPROPRIATE NATIONAL AUTHORITY.

⚠ FAILURE TO REGISTER THIS EPIRB MAY RESULT IN A FINE, SLOWING THE RESCUE PROCESS OR EVEN LOSS OF LIFE.

All 406MHz EPIRBs are programmed with a unique identity number (UIN), which is based upon the country of registration. This is normally the country to which the vessel is flagged. Registration provides the Search and Rescue authorities with the correct emergency contact details, which will speed up the rescue process.

Once registration has been performed you should receive a "decal" sticker which must be affixed to the area on the EPIRB marked "**Attach proof of registration in this area**". This decal is your proof of registration.

Useful registration contacts are:

UK EPIRB Registry
HM Coastguard (Southern)
Pendennis Point
Castle Drive
Falmouth
TR11 4WZ
For online UK registration go to:-

http://www.ukshipregister.co.uk/mcga07-home/emergencyresponse/mcga-searchandrescue/epirb.htm

NOAA/SARSAT
NSOF, E/SP3
4231 Suitland Road
Suitland, MD 20746
USA

For online US Registration go to:-

https://beaconregistration.noaa.gov/rgdb/

This EPIRB is a radio transmitter; as such, you should update your existing radio license to include this EPIRB.

When an EPIRB is transferred to a new vessel, the EPIRB must be re-programmed to include the relevant information as required by the country controlling the new vessel. As previously mentioned, the EPIRB UIN also contains the country code; therefore, changing the country to which the vessel is flagged will result in the EPIRB needing to be re-programmed.

Note: It is very important to ensure your EPIRB is registered with your National Authority. The requested registration information will ensure that the rescue authorities quickly identify the type of vessel they are searching for and make contact to ensure the alert is not a false alarm. Although failure to register your beacon will not stop you being rescued, it may cause unnecessary delays and effort in the rescue centre.

2.1: Programming Details

Your EPIRB is supplied with a label titled “Programming Details”, this contains areas where the programming details of the EPIRB can be marked with an indelible permanent maker. This information includes:

1) UIN (Unique Identity Number).
2) Vessel Name.
3) MMSI.
4) Country.
5) Call Sign.

If this label has not been provided with the EPIRB information pre-inserted then the user should write this information on the label using an indelible pen.

Affix the label to the left side of the EPIRB in the area provided. Then place the clear label provided over the first label.

It is advised that this information is also copied into the section provided on Page 3 of this manual.

3: Installation

WARNING

Ensure that the EPIRB is mounted away from any strong magnetic sources such as loudspeakers, compass compensation magnets, etc.

Failure to follow the following installation guidelines may cause the EPIRB to operate incorrectly.

3.1: Location

The location selected must be sufficiently robust to support the weight of the complete installation. Exposure to the elements and surrounding hazards, along with vibration should also be taken into consideration when choosing the location. Ensure that the mounting location allows easy access to the EPIRB for maintenance and servicing.

To ensure that the EPIRB will always float free from the sinking vessel ensure that the float free housing is located high up on the superstructure, free from any obstructions and located in a position that it will not be trapped, regardless of the angle the sinking vessel may be in.

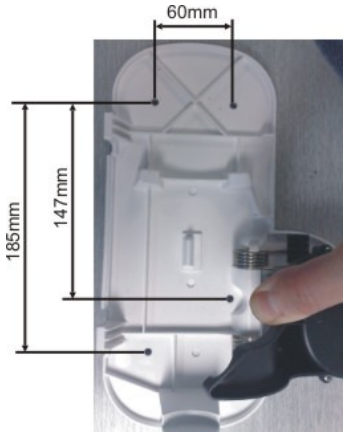
Ensure that when mounting the EPIRB, it is mounted with the antenna facing upwards.

Do not mount the EPIRB closer than 1metre to any steering compass as this may affect the accuracy of the compass.

Keep the EPIRB away from any strong magnetic sources such as loudspeakers, compass compensation magnets, etc.

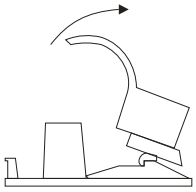
3.2: Float Free Housing

Using the dimensions, indicated above, use the four N°6 x 5/8" screws provided to secure the float free housing to the chosen structure.



3.2.1: Loading the EPIRB

1) Lift the HRU back.



2) Load the EPIRB, controls facing up, into the location seat, ensuring to carefully fold the antenna back behind the EPIRB.

3) Gently lower the HRU, this device also clamps the EPIRB in place.

4) Place the housing cover over the back, by placing the locating hole (on the side of the housing) over the clips.

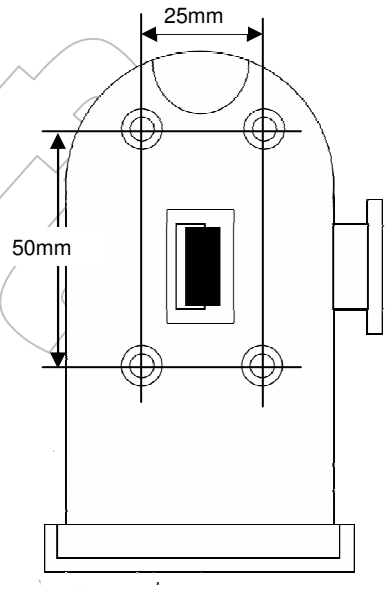
5) Push and rotate the housing release knob into the locked position.

Note: When replacing the EPIRB in the Float Free Housing please ensure that the unit is clean and dry. The area around the activation controls and the lanyard should be free from water and dirt to ensure reliable operation.

3.3: Mounting Cradle

Using the dimensions indicated, use the N°6 x 5/8" screws provided to secure the cradle to the chosen structure.

The cradle is designed for internal use. If it is mounted in an external location it is done so at the user's discretion.



3.3.1: Loading the EPIRB

Align the back of the lanyard storage area, situated at the rear of the EPIRB, with the clip mechanism of the cradle and push into place. There will be an audible "click" indicating that the EPIRB is now secured in place.

⚠ Do not attach the lanyard to any part of the vessels superstructure or other part that will hinder the release of the EPIRB.

4: Operation

WARNING

USE ONLY IN SITUATIONS OF GRAVE AND IMMINENT DANGER.

MISUSE MAY RESULT IN A SEVERE PENALTY.

The EPIRB is designed for best operation whilst floating in water. If used in other situations ensure that the EPIRB is placed in the open, clear of any cover and kept upright. Do not place the EPIRB close to large structures or under cover.

In the case of abandoning ship, if possible, recover the EPIRB and tie to the survival craft, or person using the lanyard.

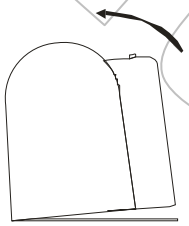
For optimum operation, it is recommended that the EPIRB be tied to the raft and floated in the water.

4.1: Manual Operation

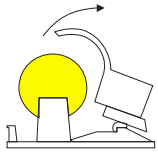
4.1.1: Releasing from an Enclosure

1) Push & rotate, anti-clockwise, the housing release knob.

2) Tilt and lift the housing cover.

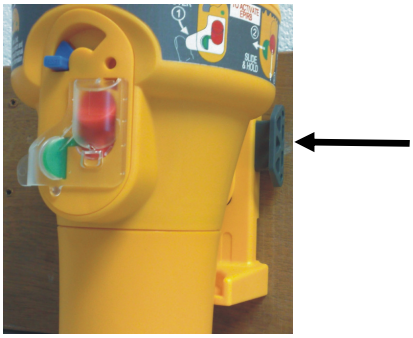


3) Lift the release mechanism and remove the EPIRB.



4.1.2: Releasing from a Bracket

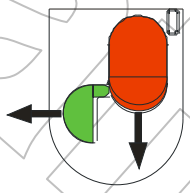
Press the Grey release key on the right hand side of the bracket and remove EPIRB.



4.1.3: Manually Operating the EPIRB

1) Break off the manual switch cover.

2) Slide and hold the Green switch to the left, then slide the **Red** switch into the down position.



The EPIRB will now be operational. The strobe lights will begin to flash at a rate of once every 2.5 seconds as soon as the unit is activated.

It is important that for best performance the EPIRB should be situated in an upright position with a clear view of the sky and as far away from any metallic structures as is possible.

If the EPIRB contains a GNSS receiver, ensure that the GPS antenna is not obstructed and has a complete, unobstructed view of the sky – as indicated on the top of the EPIRB.

A lanyard is provided to tether the EPIRB to the lifeboat or life raft to ensure that it does not drift away. Make sure this is firmly attached.

EPIRB Operational Indicators		
EPIRB Mode	**Green** Indicator	**Red** Indicator
Initial EPIRB activation	On for 1 second	
Acquiring GPS position *	1 Flash every 5 seconds	
GPS position acquired *	Flash for 1 second	
121.5MHz Tx **		1 flash, with strobe light, every 2.5 seconds
406MHz Tx		Flashed for 2 seconds
406MHz Tx, with GPS position *	Flashed for 2 seconds	
406MHz Tx, without valid GPS position *		Flashed for 2 seconds

* SafeSea E100G only

** The 121.5MHz homer does not begin transmission until after the first 406MHz transmission – approximately 50 seconds.

4.2: Automatic Operation

The EPIRB will sense when it has been placed in water and automatically begin to operate, after a short delay, in the same manner as described above.

If the EPIRB is mounted in the float free housing or on the bracket this function is disabled until the EPIRB has been removed from either fixture.

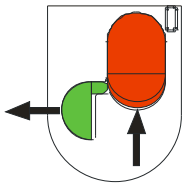
If the EPIRB is mounted in a float free housing, if the vessel sinks, the EPIRB will automatically be ejected from the housing allowing it for float to the surface and begin transmission.

4.3: De-activation

4.3.1: De-activation from Manual operation

If the EPIRB was accidentally activated or the emergency situation has passed, the EPIRB can be manually de-activated.

Slide and hold the **Green** switch to the left then slide the **Red** switch into the up position.



4.3.2: De-activation from Automatic Operation

If the EPIRB was automatically activated, by placing in water, remove from the water and dry. The EPIRB will automatically switch off after approximately 30 seconds.

5: False Alerts

False alerts are a serious problem they cause valuable resources to be diverted away from real emergency situation. If a false alert is initiated, by any means, it is important to contact the nearest search and rescue authorities and inform them of the false alert.

Report the following:

1) EPIRB UIN.
2) Date, time and duration.
3) Cause of activation.
4) Location when the alert was activated.
5) Location at time of deactivation.

If the EPIRB was activated by mistake then turn it off. The first emergency transmission will not occur for approximately 50 seconds, if the unit is turned off in this time then EPIRB will not have sent an emergency distress.

If the unit has been dropped into the water then remove from the water and dry the case, wait approximately 30 seconds for the water contacts to de-activate.

If the unit is still flashing after this period, check that the unit has not been manually activated; if so then follow the procedure to manually switch the EPIRB off.

The EPIRB should now be switched off, replace the EPIRB on to the cradle or into the float free housing.

The SafeSea E100/G is fitted with water detection contacts. Although these contacts are hidden to help prevent accidental activation due to heavy sea or weather conditions, the mounting bracket and float free housing is designed to prevent activation of the water contacts in these conditions. Therefore, if the EPIRB is not correctly fitted in it's mounting it is possible that this may cause a false alert situation.

5.1: Disabling the EPIRB

In the unlikely event that your EPIRB develops a fault and does not switch off then to completely disable the unit remove the battery, as described in section 6.4.

6: Maintenance

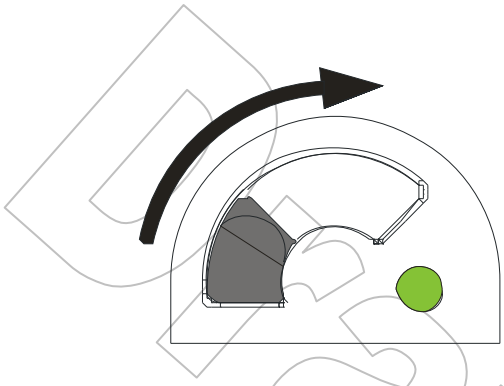
6.1: Self Test Mode

WARNING

TEST TRANSMISSIONS ON THE HOMER FREQUENCY OF 121.5MHz ARE LIMTED, BY THE INTERNATIONAL RADIO REGULATIONS, TO WITHIN THE FIRST FIVE MINUTES OF AN HOUR.

It is recommended that the EPIRB is tested not more than once a month.

The EPIRB self test mode can be initiated by rotating the Grey test switch clockwise and holding for 1 second, until the indicator begins to rapidly flash Green. The test switch should be released once the indicator begins to flash Green.



This will initiate a self test; be prepared to record the number of indicator flashes upon completion of the test.
The self test monitors the 121.5MHz homer RF power, initiates a satellite transmission in order to measure key performance parameters, will monitor the 406MHz RF power, synthesiser lock and battery voltage under load. The self test message is designed to prevent the satellite from forwarding an alert message during self test. After the satellite transmission the strobe light is flashed, demonstrating operation.
A successful test is determined by a series of **Green** indicator flashes – between one and six flashes, this sequence is repeated after a 2 second delay. A failure is determined by a series if **Red** indicator flashes – between one and five flashes, this sequence is repeated after a 2 second delay.

The series of **Green** indicator flashes show how many hours use the EPIRB has undergone. The series of **Red** indicator flashes show the failure mode.

Green Indicator Flashes			**Red** Indicator Flashes	
N° of Flashes	N° of Hours Use		N° of Flashes	Mode of Failure
1 Flash	0 to 1hr 59min		1 Flash	121.5MHz homer
2 Flashes	2hrs to 3hrs 59min		2 Flashes	406MHz generation
3 Flashes	4 hrs to 5hrs 59min		3 Flashes	406MHz power amplifier
4 Flashes	6hrs to 7hrs 59min		4 Flashes	Replace battery
5 Flashes	8hrs to 9hrs 59min		5 Flashes	Other failure
6 Flashes	10hrs +			

6.2: GNSS Self Test Mode

WARNING

TESTING THE GNSS RECEIVER IS LIMITED TO 5 TESTS OVER THE LIFETIME OF THE BATTERY.

TESTING THE GNSS RECEIVER EXPENDS SIGNIFICANT AMOUNTS OF ENERGY FROM THE BATTERY PACK AND MAY TAKE UP TO 10 MINUTES TO COMPLETE.

THIS TEST MUST ONLY BE PERFORMED WHERE THE EPIRB HAS A CLEAR AND UNOBSTRUCTED VIEW OF THE SKY. THIS IS REQUIRED TO ALLOW THE GNSS RECEIVER TO ACQUIRE A SIGNAL FROM SUFFICIENT SATELLITES TO ALLOW IT TO DETERMINE A POSITION.

If the user would like confidence that the GNSS receiver is operating correctly then the test can be started by the following method. It is preferable not to perform this test in direct sunlight as it may be make counting the LED's flashes at the end of the test difficult. The EPIRB must remain under observation for the whole of the test to ensure the completion of the test is not missed.

To enter the GNSS self test mode, perform the following procedure:

1) Rotate the Grey test key clockwise and hold for 1 second until the indicator LED begins to rapidly flash **Green**.
2) Release the test switch and quickly reactivate the test switch whilst the indicator is still rapidly flashing.
3) Hold the switch until the indicator begins flashing **Green** at a slower rate, continue to hold the test key for 5 seconds.
4) Release the test switch when the indicator changes from flashing **Green** to a constant **Red**.

The GNSS self test is now active, during the test the indicator will remain **Red** and flash **Green** once every 5 seconds.

Successful completion of the test is displayed by the indicator flashing **Green** for 10 seconds with the strobe light flashing every 2.5seconds. A failure upon completion of the test is indicated by the indicator flashing **Red** for 10 seconds with the strobe light flashing every 2.5 seconds.

The GNSS self test can be cancelled at any time by activating the Grey test switch and holding it on for 5 seconds.

The EPIRB is limited to 5 GNSS self tests, the unit will not perform any more than this until the battery is replaced.

If the GNSS self test is initiated and the EPIRB has already performed 5 GNSS self tests, the indicator will flash **Red** for 5 seconds and then power down. If the Grey test key is held on after the indicator has finished flashing **Red**, it will then begin to rapidly flash between **Red** and **Green** to indicate that the EPIRB power is being held on and is needlessly draining the battery reserves.

No of GNSS Tests Remaining	No of Green LED Flashes	Number of Strobe Flashes
4	4 (and then repeated)	2
3	3 (and then repeated)	2
2	2 (and then repeated)	2
1	1 (and then repeated)	2
0	Flashes for 5 seconds	2

Note: This test mode is only available on the SafeSea E100G

6.3: Inspection

During the monthly EPIRB self test it is advised that the following inspection is performed.

1) Inspect the EPIRB for obvious signs of damage – including the state of the antenna any creases in the antenna may cause the operation of the EPIRB to be impaired.
2) Confirm that the EPIRB is securely mounted on the bracket or in the float free housing.
3) Inspect the lanyard to ensure it is not attached to any structures.
4) Confirm the battery is within the specified expiry date.
5) If the EPIRB is housed in a float free housing confirm the HRU is within the specified expiry date.
6) Clean the EPIRB and mounting, it is recommended that the EPIRB is cleaned only using a damp cloth.

Note: Other than the battery pack there are no user serviceable parts inside the EPIRB. DO NOT OPEN THE EPIRB, DOING SO WILL INVALIDATE THE WARRANTY AND MAY CAUSE FALSE ALERTS.

6.4: Battery Installation / Replacement

The EPIRB is supplied with a non-hazardous 9V Lithium battery pack. It is recommended that this pack be replaced every 5 years; assuming that the EPIRB has not been used for any emergency use.

The expiry date for the battery will be marked on the battery itself. If this date has been reached then the battery must be replaced to ensure correct operating life of the EPIRB during an emergency situation.

It is recommended that, if the EPIRB is operated for any purposes OTHER than the self tests, the battery is replaced. This is to ensure of correct operating life of the EPIRB during an emergency situation.

For SOLAS vessels it is recommended that the battery is replaced at the time of the Shore Based Maintenance. Batteries should only be replaced by trained personnel with access to the required test equipment to ensure correct operation after the battery exchange.

For non-SOLAS vessels, including recreational vessels, the user may replace the battery, or use an approved service agent, following the instructions provided with each new battery.

⚠ The replacement of the battery may only be performed by the end user where it is allowed by the local or national maritime authorities.

Note: Detailed battery replacement instructions are provided with each new battery.

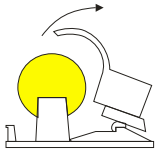
⚠ Dispose of exhausted batteries by returning them to your service agent. Lithium batteries require specialist methods for disposal.

DO NOT INCINERATE!
DO NOT DISPOSE OF AT SEA!

6.5: HRU Installation / Replacement

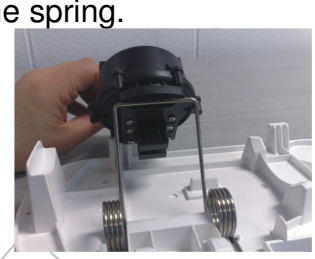
If you have an EPIRB mounted in a float free housing, this will also contain a HRU (Hydrostatic Release Unit). The HRU unit must be replaced every 2 years, the expiry date is marked on the HRU and the front of the housing. If this date has been reached then the HRU must be replaced; failure to do so may result in the HRU not operating correctly during an emergency situation.

1) Lift the release mechanism and remove the EPIRB.

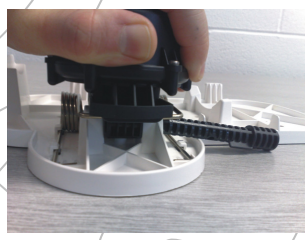


2) Push the HRU down, against the spring and remove the locking pin, carefully remove the HRU from the spring.

3) With the new HRU locate the two retaining ridges (at the bottom of the HRU) on to the spring.



4) Carefully push down on the HRU, against the spring. Have the locking pin ready, with the retaining flange (the flat surface) pointing down.



5) Push the locking pin fully home, the HRU is now ready to load the EPIRB into the housing.

6.6: Service & Warranty

All servicing or repairs of this EPIRB must be carried out by an approved service agent.

For warranty details please refer to the warranty card supplied with this unit.

Please retain the original packaging for your EPIRB. If the EPIRB has to be returned, for any reason, the original packaging should be used.

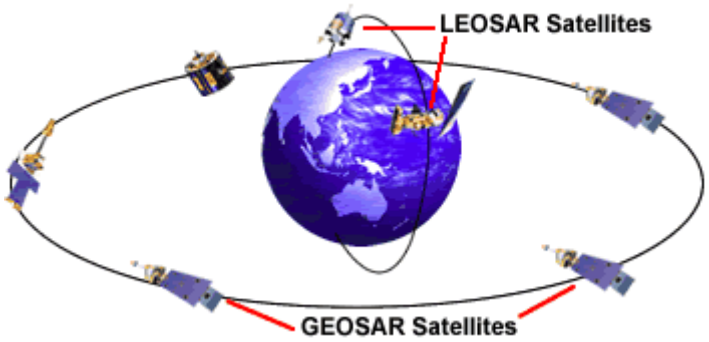
The battery packs used with this EPIRB are classed as non-hazardous under IATA Hazardous Transport Regulation.

- Batteries should be shipped as category 3090, packing instruction 968: part 1.
- EPIRBs with batteries should be shipped as category 3091, packing instruction 969: part 1. (The battery should be removed from the EPIRB before packing, but can be in the same box.)

7: Technical Information

7.1: System Overview

The COSPAS/SARSAT system utilises two satellite arrays to provide distress alert and location data to search and rescue authorities.



GEOSAR – Geostationary Earth Orbit
LEOSAR – Low-altitude Earth Orbit

The GEOSAR system can provide near immediate alerting within the coverage of the receiving satellite.
The LEOSAR system provides coverage of the polar region – beyond the range of the GEOSAR system. It can calculate the location of distress events using Doppler processing techniques and is less susceptible to obstructions which could block a signal in a given direction.

The system is comprised of instruments on board the satellites which detect the signals from the distress beacons. Ground receiving stations, referred to as Local Users Terminals (LUTs) receive and process the satellite downlink signal to generate the distress alerts. The distress alerts, generated by the LUTs, are then received by Mission Control Centres (MCCs) which then forward the alert to Rescue Co-ordination Centres (RCCs), Search and Rescue Points of Contacts (SPOCs) and other MCCs.

7.2: GPS System

The GPS system is a satellite array that enables a GNSS receiver to determine its position around the globe. There are a minimum of 24 satellites orbiting the Earth providing accurate position, velocity and time information.

The SafeSea E100G has a built in 50 channel GNSS receiver and antenna allowing reception of this positional data. The received position is then coded into the EPIRB emergency transmission thus enabling search and rescue teams to narrow the search area and increase the effectiveness of the rescue operation.

7.3: Technical Specification

406 MHz Transmitter	
Frequency	406.037 MHz ±1KHz
Output Power	5W Typical
Modulation	Phase ±1.1 Radians Pk (16K0G1D)
Encoding	Biphase L
Duration	520mS
Frequency Stability	2 parts per billion / 100mS
Rate	400 bps

121.5 MHz Transmitter	
Frequency	121.5 MHz
Output Power	25-100mW PEP
Modulation	Swept Tone AM (3K20A3X)
Sweep Range / Rate	400 to 1300 Hz
Modulation Depth	96%
Frequency Stability	±50ppm
Duty Cycle	40%

Low Duty Cycle Strobe	
Light Type	Two High Intensity LEDs
Light Colour	White
Output Power	0.75 dc effective candela
Flash Rate	20-30 per minute

Battery	
Type	Lithium Manganese Dioxide ($LiMnO^2$)
Operating	72 hours Minimum
Replacement Interval	5 years

GPS Receiver*	
Satellites Tracked	50 Channel Engine
Sensitivity Cold Start Re-acquisition	-146dBm -162dBm
Centre Frequency	1.57524 GHz
GPS Antenna	Microstrip Patch

General	
Height of Body	212mm
Maximum Body diameter	115mm
Weight	735grams

Environmental	
IEC60945 Category	Portable
Operating Temperature	Class 2 -20C to +55C
Storage Temperature	Class 2 -30C to +70C
Automatic release depth	4 metres maximum
Waterproof	Exceeds 10m at 20℃

Approvals	
Cospas-Sarsat	T.001/T.007
Europe	Marine Equipment Directive MED A.1/5.6 IEC 61097-2 IEC 60945
USA	USCG/FCC Approved FCC ID: TBD
Worldwide	IEC 61097-2
IMO Regulations	A.662(16); A.694(17); A.810(19); A.814(19)

* SafeSea E100G only