

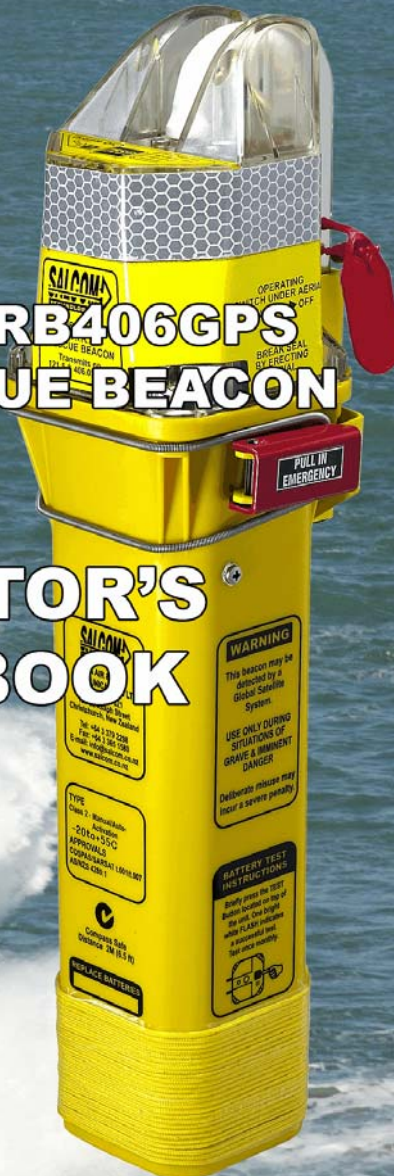


Owner: _____

Vessel: _____

MRB406 & MRB406GPS MARINE RESCUE BEACON

OPERATOR'S HANDBOOK



MRB406 & MRB406 GPS EPIRB OPERATORS HANDBOOK

GENERAL OPERATING DESCRIPTION & TECHNICAL DATA

MODEL TYPES

The SALCOM 406Mhz Satellite EPIRB's are produced in two versions which are outwardly identical. The model type is identified by the description on the front TOP label where it will indicate "MRB406" or "MRB406GPS". All versions contain a 406.028Mhz, 5 watt transmitter as well as a 121.5Mhz Homing transmitter.

MRB406: This version is the basic model which will send the unit's unique identification number in the 406MHZ transmission when activated. It is capable of manual or automatic operation. When released from its bracket and the aerial is raised, the MRB406 will automatically activate when placed in water. When activated, the white strobe indicator will immediately give one flash and pulse at ten second intervals for one minute.

DURING THIS FIRST MINUTE NO ALARM SIGNALS ARE BEING SENT.

After one minute, the 121.5Mhz homing transmitter will start transmitting and approximately 50 seconds later is interrupted briefly when the 406Mhz transmitter sends a burst containing the identification data of the EPIRB. At the one minute duration point the white strobe type indicator will begin flashing at a faster rate (approximately every 2.3 seconds). In addition the red led indicator will flash indicating transmissions are taking place. An audible sound may also be heard from the EPIRB during activation which is the sound of the homing transmitter siren operating. The 406Mhz signal may be detected instantly by Geo-stationary satellites which are in equatorial orbits but the actual calculation for position information can only be obtained by LEO (Low Earth Orbit) satellites which regularly cover every area of the globe.

MRB406GPS: As well as containing all the above features, the **MRB406GPS** also contains a GPS receiver capable of receiving transmissions from orbiting satellites and determining an accurate positional fix of the EPIRB. This information is then included in the 406Mhz transmitter message. This has the advantage of presenting near real-time information to Search and Rescue Authorities of the EPIRB location via both the LEO satellites and particularly the Geo-Stationary satellites. A response by Search and Rescue authorities to a distress transmission is likely to be more prompt if a location signal is included in the transmission.

The MRB406GPS model is activated in exactly the same method as the basic model. However there are some initial timing differences upon switch on. Immediately upon switch-on the EPIRB will give one bright flash of the strobe light and will then pulse at ten second intervals until a valid GPS location has been obtained or approximately five minutes has elapsed.

If valid GPS location data has been received, then the EPIRB will transmit this information almost immediately but **NO SOONER THAN ONE MINUTE AFTER SWITCH ON**. Once transmissions have commenced then the white flashing strobe light will flash regularly at approximately 2.3 second periods, the red indicator will flash, and the audible homing transmitter siren will be heard. **Should the EPIRB fail to receive a valid positional fix then the full period of almost FIVE minutes will elapse before transmissions begin.** Under these circumstances no positional information will be transmitted but all other EPIRB functions will continue. Once GPS location information has been sent (or the five minutes has elapsed) the GPS section of the EPIRB permanently closes down and only switching off and on again will restart the sequence.

REMEMBER IN ALL CASES THAT YOU HAVE A PERIOD OF ONE MINUTE BEFORE AN ALARM IS SENT SO THAT YOU MAY SWITCH OFF THE UNIT IF IT HAS BEEN ACCIDENTALLY ACTIVATED.

TEST SWITCH

A separate "Test" switch is mounted on the EPIRB which is used to verify that the EPIRB is in working order. Do not hold this switch down, the test starts as soon as the switch is pressed.

Approximately once a month this switch should be briefly pressed. Limit this test to the first 5 minutes of each hour to minimize interference. After about 2 seconds, during which a brief siren burst should be heard, the strobe light will give one flash. This indicates a successful test.

If the battery voltage is low, or the transmitter output is low or fails, the strobe light will not flash. Instead the test failure is indicated by the red LED indicator flashing rapidly for a further five seconds before the EPIRB automatically shuts down. Holding the "Test" switch continuously down will only result in the one test transmission sequence.

HOW TO STORE AND ACTIVATE YOUR EPIRB

1. Ensure that the aerial is folded and held by the plastic breakaway seal. The aerial must remain folded at all times to help prevent accidental activation and prove that the EPIRB has not been tampered with. If the aerial is raised and the EPIRB is wet, the presence of water across the outside terminals could activate the EPIRB.
2. Secure the EPIRB bracket to a suitable bulkhead in a VERTICAL position that allows easy access to the EPIRB. Ensure there is no possibility of damage by falling objects or personnel. It should be in an elevated position where it is not subject to exposure to water or fuel fluids and should be kept clean and well maintained.

Note it should not be mounted close to navigation devices such as compasses closer than the distance marked on the EPIRB nor should the EPIRB be mounted close to strong magnetic fields such as radar equipment.

Ensure that unauthorized persons or children are always supervised to prevent tampering.

3. At regular intervals (recommend monthly) press the "TEST" button firmly whilst the EPIRB is mounted in the bracket. After a few seconds the strobe will flash once indicating that the self-test has been completed. It is not necessary to hold the switch down continuously and only one transmission will occur.
4. In an EMERGENCY SITUATION remove the EPIRB from the quick-release bracket, unwrap any restraining tape on the aerial, and lift the aerial to the vertical position, thereby breaking the plastic seal. Unravel the attached securing line and switch the EPIRB "ON" using the toggle switch which is exposed when the aerial is raised. **If conditions are suitable, the EPIRB operates most effectively if it is placed in the water. Ensure that it is firmly attached by the lanyard. With the aerial raised, it will begin operating regardless of the position of the operating switch and will transmit for a minimum period of 48 hours.**
5. SWITCHING OFF: In an emergency, once activated, the EPIRB should be left operating until you have been rescued or you have been requested to switch it off. If the EPIRB fails to switch off by the operating switch then the water level contacts may be conducting. Dry the EPIRB if possible and fold the aerial to its original position, securing with either tape or cord. In the folded position the EPIRB should stop transmitting (provided the operating switch is also "OFF"). Should the EPIRB continue to transmit, disconnect the battery plug by unscrewing the four case retaining screws and removing the top case.
6. ALTERNATIVE OPERATING SITUATIONS: Metal enclosures may screen and degrade the quality of transmission and the EPIRB should be located away from such situations. It is recommended that an open **area clear of such obstructions as liferaft canopies, deck shelters etc.**, be sought, particularly if the MRB406GPS version is being used.
7. ACCIDENTAL ACTIVATION: It is important that precautions are taken to prevent accidental activation that may alert Search and Rescue authorities. Pressing the "Test" button will not alert the authorities. Keep the EPIRB in a secure situation where it can not easily be activated accidentally and ensure that children or others do not have unsupervised access. If the EPIRB starts flashing at 10 second intervals it means that it is about to transmit an alarm signal. If an accidental alarm signal is transmitted (the siren will be heard and the strobe light will flash every 2 seconds) you should disable it immediately. **Advise the nearest Search and Rescue Centre of the date, time, duration, the HEX code (as printed on the EPIRB) and the reason for the accidental activation..** Familiarize yourself how to operate the EPIRB **before** an emergency develops.

BATTERY REPLACEMENT

The batteries fitted to the MRB406 are long life Lithium type cells. **Batteries will be required to be replaced within five years of purchase.** The expiry date is marked on the outside case and the internal battery pack indicating when the batteries should be replaced. Only authorized dealers and certified technicians should carry out battery pack replacement.

If the EPIRB has been used in an emergency ensure that it is serviced and the battery pack replaced. Used battery packs must be discarded through a hazards disposal organization.

TRANSPORTATION

Devices containing Lithium batteries have certain transport restrictions placed upon them. Do not use the postal service but check with your courier Company before dispatch.

REGISTERING YOUR EPIRB

It is very important that you complete the enclosed Registration Form and forward it to the Authorities shown. This information is essential to allow a match of your EPIRB with your vessel details once the EPIRB identification number is received.

Enclosed with this EPIRB are registration papers appropriate to the Country of purchase and which you should complete and forward to the address shown. You should note the following:

- (1) The Country of Registration (i.e., Country Code as marked on the outside of the EPIRB) should match your country of residence and contact numbers.
- (2) If you are purchasing an EPIRB and your address is outside the country of purchase the EPIRB should be reprogrammed by your supplier. Normally the country code will be the same as the country in which you have purchased your EPIRB.
- (3) If you should sell or dispose of your vessel and/or EPIRB you should ensure that the new details are also forwarded to the appropriate authority.
Keep the original packing for shipping and service.

PRINCIPLE CONTACT NUMBERS

A short list of Search and Rescue Authorities addresses follows. For full details a comprehensive list may be obtained from the cospas/sarsat web site at www.cospas-sarsat.org under "beacons", "beacon registration".

Country	Name & Address	Telephone	Telex	Fax/email
Argentina	National Maritime, Fluvial and Lacustre SAR Agency Base Naval Puerto Belgrano (CP811) Buenos Aires, Republic of Argentina	(54) 1 317 2038 (54) 0 093287140 (54) 0 093287150	(33) 9085 SICO AR	(54.0) 093287153
Australia	Registration and Coding: Planning & Business Support Manager Emergency Response Australian Maritime Safety Authority Level 3, 25 Constitution Avenue GPO Box 2181 Canberra City, ACT, 2601 AUSTRALIA	(61) 2 62795711	(71) 62349 MRCCAUS AA62349	(61) 2 62306868 rccaus@ausa.gov.au
Bahamas	Coding, Registration and Type Approval: 4th Terrace Collins Avenue P.O. Box N-48601 Nassau, Bahamas	(1) 242 322 4437		(1) 441 323 7288 egmoss@pucbahamas.gov.bs
Brazil	CINDACTA1 / BRMCC SHIS QI 05 Lago Sul - Area Especial 12 CEP- 71615-600, Brasilia - DF, Brazil	(55) 61 3658395		(55) 61 3652964 brmcc@cindacta1.aer.mil.br

Canada	Registration (EPIRBs/ELTs, PLBs): Canadian Beacon Registry National Search and Rescue Secretariat 275 Slater Street, 4th Floor Ottawa, Ontario K1A 0K2 Canada	(1) 613 996 1504 (1) 800 727 9414 (Canada only)		(1) 613 996 3746
Chile	Coding / Registration:Regulatory Administration / Maritime Direccion General del Territorio Maritimo y de Marina Mercante / DGTM y MM Errazuriz 537 Valparaiso, Chile	(56) 32 208281 (56) 32 208283 (56) 32 208284	230602 DGTM CL 330461 DGTM CK 330607 ANGEL CK	(56) 32 208042
Croatia	Harbour Masters Office 51000 Rijeka Senjsko Pristaniste 3, Croatia	(385) 51 214031 (385) 51 212474		(385) 51 212696 (385) 51 212660
Fiji	Coding, Registration and Type Approval (ELTs): Air Safety Department Civil Aviation Authority of Fiji Islands Private Mail Bag Nadi Airport, Fiji Islands	(679) 721555		(679) 725125 sao@caaf.org.fj
France	Coding / Registration: Regulatory Administration / Maritime Ministère de la Mer / SECMAR 3 Square Desaix, 75015 Paris, France	(33) 1 44371643	201052 MISMER F	(33) 1 40581050
Greece	Coding / Registration / Type Approval / Licensing: Hellenic Ministry of Merchant Marine Merchant Ships Inspectorate Radiocommunication Department 1 K.Palaiologou Street GR-185 35 Piraeus, Greece	(30) 1 419 1817 (30) 1 419 11815	(60.1)2125 81 EEPGR	(30) 1 413 7997 telecoms@mail.yen.gr
Ireland (Republic of)	Registration (EPIRBs): Maritime Radio Affairs Unit Room 328, Department of Communications and Natural Resources Leeson Lane, Dublin 2 Republic of Ireland	(353) 1 619 9280 (353) 1 619 9281		(353) 1 662 1571 john.byrne@marine.gov.ie
Italy	ITMCC Lungomare Starita n.5 - 70123 Bari, Italy	(39) 080 534 1571 (39) 080 534 4033	811376	(39) 080 534 2145 itmcc247@infinito.it
Malaysia	Marine Department Peninsular Malaysia Safety of Navigation Division P.O.Box 12, 42007 Port Klang, Malaysia	(60) 3 368 6616		(60) 3 367 1334 (60) 3 368 5020 kpgr@marine.gov.my
New Zealand	New Zealand Rescue Coordination Centre Avalon Tower Percy Cameron Street PO Box 30050 Lower Hutt, New Zealand	(64) 4 577 8033		(64) 4 577 8041 406registry@maritimenz.govt.nz

Singapore	Port Operation Control Maritime and Port Authority of Singapore 21st Storey, Tanjong Pagar Complex 7B Keppel Road Singapore 089055 Republic of Singapore	(65) 6226 5539	(87) MARTEL RS 20021	(65) 6227 9971 pocc@mpa.gov.sg
South Africa	Registration (EPIRBs): SASAR MRCC Cape Town Private Bag X8, Tokai 7966, South Africa	(27) 21 787 2222		(27) 21 787 2337
Spain	Coding / Registration (EPIRBs): Area de Inspección Radiomarítima Dirección General de la Marina Mercante Calle Ruis de Alarcón, 1 28071 Madrid, Spain	(34) 91 597 9275		(34) 91 597 9176 jaalonso@mfm.es
Switzerland	Registration (EPIRBs): Schweizerisches Seeschiffahrtsamt Nauenstrasse 49 PostfachCH-4002 Basel, Switzerland	(41) 61 270 91 26		(41) 61 270 91 29
United Kingdom	Coding / Registration (EPIRBs): HM Coastguard Pendennis Point, Castle Drive Falmouth, Cornwall TR11 4WZ, UK	(44) 1326 211 569		(44) 1326 319 264
United States of America	Coding / Registration: Sarsat Beacon Registration E/SP3, RM 3320, FB-4 NOAA 5200 Auth Road Suitland, MD 20746-4304 USA	(1) 301 457 5678	(230)74076 81 SARS UC	(1) 301 568 8649

MRB406 AND MRB406GPS SPECIFICATIONS

Classification	Class II, manual deployment, manual or water activated.
Operating temp range	-20degs C to +55degs C.
Storage	-30 to +70 deg. C.
Reflector	Solas retro-reflective above waterline.
Weight	MRB406, 1050gms, MRB406GPS, 1100gms
Dimensions	345x80x80mm
Bracket	Quick- release toggle.
Endurance	Minimum 48 Hours.
Security	Breakable plastic seal.
Certification	Cospas-sarsat TAC178:AS/NZ 4280
Processing	Internal processing of digital and r.f. levels of both transmitters.

Indicators

High intensity white light >0.75cd: indicates successful test with one flash as well as slow and fast flashes upon activation.(10secs & approximately 2.3 secs.)

Red Led: Indicates transmissions are taking place and also operates as a fail and fault indicator;

Slow flash: normal transmission is taking place.

Fast flash: a fault has developed such as Low battery or Low power transmit.

Internal Speaker

Lanyard

Audible indicator of Homing transmitter siren.
length min. 5M.

Transmit frequencies

406.028Mhz and 121.5Mhz.

Transmit power 406mhz

5 watts +/- 2db modulation PSK

Transmit power 121.5Mhz

75mW +/- 3db, modulation AM >85% downward swept tone.

Compass Safe Distance

300mm (12 inches) from any navigational device.

Battery Supply

Nominal 9 volts from 3 X D Lithium cells.(type LO26SX)
Battery expiry; Within 5 years. Marked on outside case and also on internal cell holder.

Format

MRB406: User Protocol, serial number. (short message)
MMSI or Radio Callsign programmable

MRB406GPS: Standard Location Protocol

Cold start

min. 1.1minute, max. 4.5 minutes.

Positional accuracy

max = (4 secs) 120 metres. (Standard Location, long format transmission).

Refresh period

Position cleared after 4 hours to default value. (Cospas-sarsat standard)

HOW THE COSPAS/SARSAT SATELLITE SYSTEM WORKS

The world body known as the Cospas/Sarsat organization is charged with running a global satellite system for Search and Rescue purposes. The system has been running for many years and is regularly upgraded with the launching of new satellites and new or enhanced Ground Receiving stations known as Local User Terminals (LUT's).

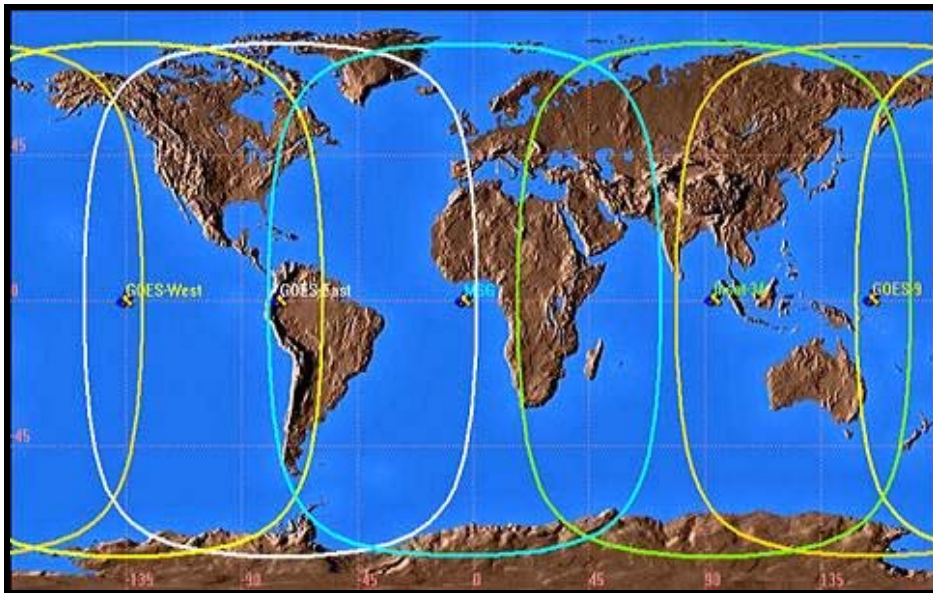
The system covers the entire globe so that it is possible to be located on any surface area of the earth. A number of polar orbiting satellites (referred to as Low Earth Orbit (LEO) satellites) receive 406Mhz signals and, until 2009, 121.5Mhz signals. By measuring their Doppler (or frequency shift) they are able to determine the position of the distress call. The 406Mhz signals carry identification data which can be matched to a register. Once processed at the LUT the identity and position are used to instigate a rescue operation. Polar orbiting satellites must be in sight of both the distress beacon and a LUT station for near instantaneous alarm. If these conditions cannot be met then the received satellite 406Mhz information is stored and sequentially downloaded so that eventually a LUT in range will receive the message. This means that there are possible delays in some areas of the world before the message can be acted upon - sometimes 30 minutes or more as satellites come within range.

To overcome this situation there are now several satellites stationed in Geo-stationary orbits at the equator which means they are effectively stationary over certain areas of the world. This gives them enormous Line Of Sight (LOS) capability to latitudes around 55degrees north and south. Signals on 406Mhz are received and processed in near real time under these circumstances. Because they are effectively stationary, these satellites cannot determine the position of the EPIRB unless the EPIRB transmits its actual position. Thus GPS equipped EPIRB's are likely to be responded to quicker than a non-gps model although it must be emphasized that the combination of LEO and Geo-stationary satellites will result in improved response even if a Location is not received.

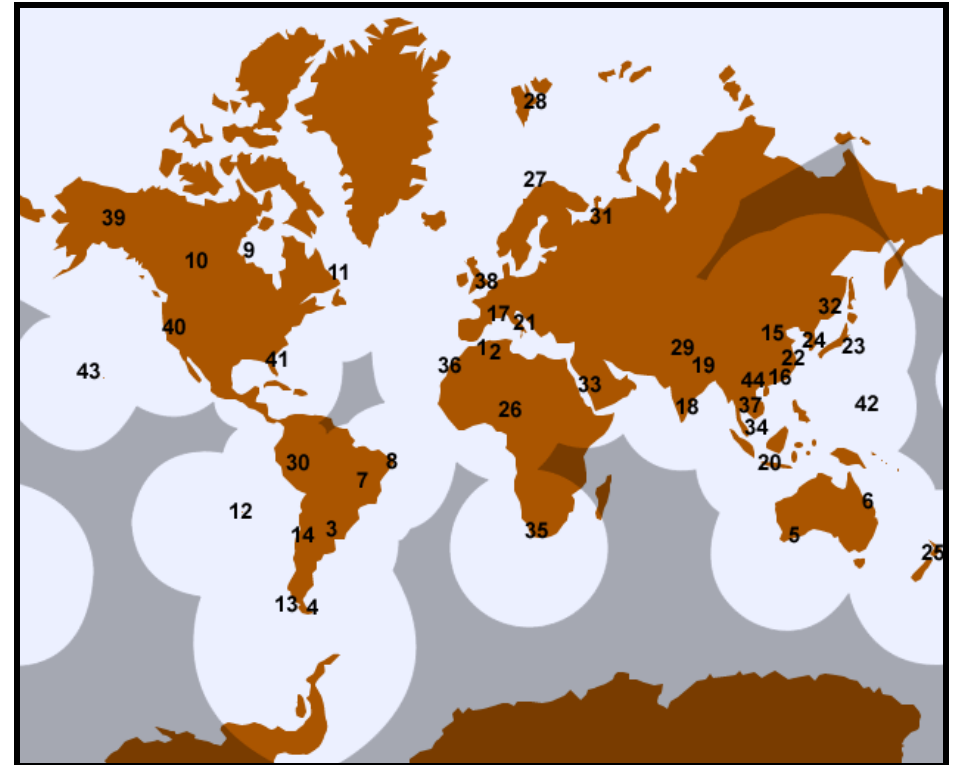
121.5Mhz Homing Transmitter: The purpose of this transmitter is to assist in the final location of a distress call by search aircraft or vessels. Suitably equipped craft may use radio direction finding equipment when close to the position for final location. The frequency is an International Aircraft Distress channel and thus it may also be heard by aircraft within range. Up to February, 2009 this frequency is also monitored by the LEO satellite system. Its range is not totally global because it is strictly a Line of Sight system where the Satellite, EPIRB, and Ground Station (LUT) must all be within range of each other.

LEOSAR Coverage

The Cospas-Sarsat LEOSAR system provides global coverage for 406 MHz beacons, and coverage over most land areas for 121.5 MHz beacons. The shaded areas indicate regions without coverage for 121.5 MHz beacons.



Geo-Stationary Satellite positions and coverage to Latitudes approximately 60 degrees N/S.



1	ALGIERS, ALGERIA	15	BEIJING, CHINA	29	LAHORE, PAKISTAN
2	OUARGLA, ALGERIA	16	HONG KONG, CHINA	30	CALLAO, PERU
3	PARANA, ARGENTINA	17	TOULOUSE, FRANCE	31	ARKHANGELSK, RUSSIA
4	RIO GRANDE, ARGENTINA	18	BANGALORE, INDIA	32	NAKHODKA, RUSSIA
5	ALBANY, AUSTRALIA	19	LUCKNOW, INDIA	33	JEDDAH, SAUDI ARABIA
6	BUNDABERG, AUSTRALIA	20	JAKARTA, INDONESIA	34	SINGAPORE
7	BRASILIA, BRAZIL	21	BARI, ITALY	35	CAPE TOWN, SOUTH AFRICA
8	RECIFE, BRAZIL	22	KEELUNG, ITDC	36	MASPALOMAS, SPAIN
9	CHURCHILL, CANADA	23	YOKOHAMA, JAPAN	37	BANGKOK, THAILAND
10	EDMONTON, CANADA	24	DAEJEON, KOREA	38	COMBE MARTIN, UK
11	GOOSE BAY, CANADA	25	WELLINGTON, NEW ZEALAND	39	ALASKA, USA
12	EASTER ISLAND, CHILE	26	ABUJA, NIGERIA	40	CALIFORNIA, USA
13	PUNTA ARENAS, CHILE	27	TROMSOE, NORWAY	41	FLORIDA, USA
14	SANTIAGO, CHILE	28	SPITSBERGEN, NORWAY	42	GUAM
				43	HAWAII, USA
				44	HAIPHONG, VIETNAM

A POINT TO REMEMBER

When considering what emergency equipment you should carry on your vessel it is important to recognize that an EPIRB is your last means of summoning assistance. It as Emergency device that should only be used when you or some personal are in "Grave And Imminent Danger". This means that prior to activation on your EPIRB you have used whatever other communications equipment that is available to call for assistance.

SERVICING AND MAINTENANCE

As with all safety equipment ensure that your EPIRB is well maintained and not subjected to potentially damaging situations. Keep it clean from build up from salt, grime and oil. – your life may depend upon it!

Check its operation approximately once per month by pressing the "Test" button and ensure that there is one bright flash indicating satisfactory performance occurs. Check that the battery expiry date is current. If you EPIRB requires service or battery replacement you should return it to the source of Distribution or alternatively direct to the Manufacturer.

Contact the manufacturer for advice and your nearest service centre. All freight must be pre-paid by the sender and you must advise your carrier that the EPIRB contains Lithium batteries.

WARRANTY

Your "MRB4" beacon is guaranteed for a period of 5 years from date of purchase against faulty or defective materials or workmanship. During this period, repairs or replacement, at the manufacturers discretion, will be made without charge, providing that the beacon has not been subjected to dismantling, abuse, or mishandling. The period of 5 years will be extended for a further 5 years if the beacon is returned to the company or authorised representative within the prescribed 5 years for battery and service check. Beacons requiring service or repair should be sent freight pre- paid direct to the manufacturer or his authorised representative. No responsibility is given or implied by the manufacturer as to the effectiveness of any beacon as the operation of any such beacon is outside the control of the manufacturer.

LIST OF DISTRIBUTORS

AUSTRALIA Salcom Australia Pty Ltd. Phone: 07 3822 7540

Unicom Santronic Importers & Wholesalers,
11 Carcoola Street, Cranbrook, Townsville, Qld, Australia 4814
Phone: 07 4775 7666. Peter Ruckman email:peter@unicomsantronic.com.au

NEW ZEALAND Sea Air & Land Communications Ltd (Salcom)
120 St Asaph Street, Christchurch. Phone: 03 379 2298

EPIRB Purchase or Transfer.

Registration of 406 MHz satellite EPIRBs with the EPIRB Registration Section of the national authority is mandatory because of the global alerting nature of the COSPASSARSAT system.

The information provided in the registration is used only for search and rescue purposes.

Fill in the owner registration card immediately upon completion of the sales transaction. Mail, fax or email the registration card to the national authority immediately-

Australian Registration;
EPIRB Registration Section,
AuSSAR
Australian Maritime Safety Authority (AMSA)
Reply Paid No. 81
GPO Box 2181,
CANBERRA ACT 2601
fax: 61 02 6230 6868
Email:aus_beacon_query@amsa.gov.au

New Zealand Registration
Rescue Co-ordination Centre,
Civil Aviation Authority of New Zealand
P.O. Box 31441
LOWER HUTT
Fax: 64 4 566 2525
email: 406registry@caa.govt.nz

Registration cards are also available on line.

If the beacon is to enter service immediately, complete the registration card and fax or email the information to the relevant national authority.

If the beacon is being transferred to a new owner, the current owner is to inform the national authority by email, facsimile, letter or telephone of the name and address of the new owner.

The new owner of the beacon is required to provide the national authority with the information as shown on the registration card.

This obligation transfers to all subsequent owners.'

**SEA AIR & LAND COMMUNICATIONS LTD**

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