EC Declaration of Conformity, available at www.jotron.com

**Abbreviations and definitions**

**BAUD**
Transmission rate unit of measurement for binary coded data (bit per second).

**BIT**
Short form of Binary Digit. The smallest element of data in a binary-coded value.

**BITE**
Built in test equipment.

**BPS**
Bits Per Second.

**CHARACTER STRING**
Continuous characters (other than spaces) in a message.

**CHECKSUM**
The value sent with a binary-coded message to be checked at the receiving end to verify the integrity of the message.

**COSPAS**
COsmicheskaya Sistyema Poiska Avariynich Sudov (Space System for the Search of Vessels in Distress)

**CLOCK**
A precisely spaced, stable train of pulses generated within an electronic system to synchronize the timing of digital operations within the system.

**DEFAULT**
A condition that the navigator assumes automatically if no other condition is initiated by the operator.
**EPIRB**

**GLOBAL POSITIONING SYSTEM (GPS)**
The NAVSTAR Global Positioning System, which consists of orbiting satellites, a network of ground control stations, and user positioning and navigation equipment. The system has 24 satellites plus 3 active spare satellites in six orbital planes about 20,200 kilometers above the earth.

**GPS**
Global Position System

**GPS SYSTEM TIME**
Time corrected to Universal Time Coordinated (UTC) and used as the time standard by the user segment of the GPS system.

**IEC**

**IMO**
International Maritime Organization

**INTERFACE**
Electronic circuits that permit the passage of data between different types of devices; For example, the speed and heading interface circuit permits data from a speed log and compass to pass to the navigator processor.

**ITU**
International Telecommunication Union.

**LED**
Light Emitting Diode.

**LUT**
Local User Terminal (Ground Station)

**MCC**
Mission Control Center
PROCESSOR
The processor circuit card in the console that controls system operations and computes the positioning/navigation solutions.

RCC
Rescue Coordination Center

SARSAT
Search and Rescue Satellite-Aided Tracking System

SBM
Shore Based Maintenance - as required by SOLAS regulation IV/15.9.2 of SOLAS 1974 as amended with, in accordance with MSC/Circ.1039 guidelines for shore-based maintenance of Satellite EPIRBs within 5 years if:

- Passenger ships (>12 passengers) and cargo ships (>300GT) engaged in international voyages, shall perform Shore-Based Maintenance (SBM) as follows:
  - Latest by the date of the EPIRB label with this text, or the battery label, whichever is first.
  - When this EPIRB becomes due for SBM in accordance with national requirements.

SOFTWARE
Values programmed and preloaded into memory. The values represent a permanent set of instructions for running the automatic functions (computations) of the navigator.

VHF
Very High Frequency - A set of frequencies in the MHz region.

VSWR
Voltage standing wave ratio
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</table>
WARNING / IMPORTANT

Jotron Electronics a.s. is a prime manufacturer of safety equipment designed for rescue of human lives and their property. For safety equipment to be effective in line with the design parameters it is important that they are handled, stowed and maintained in compliance with the manufacturers instructions. Jotron Electronics a.s. can not be held responsible for any damage caused due to incorrect use of the equipment or breach of laid down procedures or for failure of any specific component or other parts of the equipment.

The chapter covering battery replacement (6.1.2) is added for information only. Jotron Electronics a.s. does not take any responsibility for improper disassembling/assemblin of the beacon. We strongly recommend all service to be done by authorized Jotron agents. In addition to normal service, Jotron agents have the necessary equipment and education to test the operational functions of the beacon. Non-original maintenance and/or service parts may destroy the equipment function and performance.

TO PERMANENTLY DISABLE EPIRB

The battery module must be removed and treated according to chapter 6.1.2 paragraph 1, 2, 3 and 4, chapter 6.1.3, 6.1.4, 6.1.5 and 6.1.6 in this manual.

The information in this book has been carefully checked and is believed to be accurate. However, no responsibility is assumed for inaccuracies.

CAUTION!

This equipment contains CMOS integrated circuits. Observe handling precautions to avoid static discharges which may damage these devices.

JOTRON electronics a.s reserves the right to make changes without further notice to any products or modules described herein to improve reliability, function or design. JOTRON electronic a.s does not assume any liability arising out of the application or use of the described product.
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BATTERY SAFETY DATA SHEET
(Form: EEC directive 91/155)

(2) SAFETY ADVICE

S2  Keep out of reach from children.
S8  Keep container dry.
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S43 In case of fire, use D type extinguishers. Never use water.
S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

(3) FIRST AID MEASURES

In case of contact of cell contents with eyes, flush immediately with water for 15 min. With skin, wash with plenty of water and take off contaminated clothes. If inhalation, remove from exposure, give oxygen, seek medical advice.

(4) FIRE-FIGHTING MEASURES

Extinguishing media
Suitable: Type D fire extinguishers
Not to be used: Water - CO₂ - Halon, dry chemical or foam extinguishers

Special exposure hazards
Generation of chlorine, sulfur dioxide, disulfur dichloride during thermal decomposition.

Special protective equipment
Use protective working boots, rubber apron and safety glasses with side shields.
INSTRUCTIONS FOR KEEPING THE RADIO LOG AND THE RADIO OPERATORS OBLIGATION ACCORDING TO NATIONAL AND INTERNATIONAL REGULATION.

1. The radio log shall be kept in accordance with requirements in the Radio Regulations, SOLAS Convention, national regulations regarding radio installations and the STCW Convention (STCW 95 including the STCW Code) including relevant regulation regarding watchkeeping on board passenger- and cargo ships.

2. Unauthorized transmissions and incidents of harmful interference should, if possible, be identified, recorded in the radio log and brought to the attention of the Administration in compliance with the Radio Regulations, together with an appropriate extract from the radio log. (STCW Code B-VIII/2 No.32)

TEST OF RADIO EQUIPMENT AND RESERVE SOURCE OF ENERGY

Weekly:
GMDSS handheld VHF transceivers to be tested without using the mandatory required emergency batteries.

Monthly:
Float-free and manual EPIRBs to be checked using the means provided for testing on the equipment. Check data for periodical maintenance requirement for float-free EPIRB. Search and rescue radar transponders (SART) to be checked against 9 GHz radar.

False alerts transmitted by EPIRB
False alerts are a serious problem for the rescue service. Nearly 90% of EPIRB initiated distress alerts turn out to be false alarms.
If for any reason, your EPIRB should cause a false alarm, it is most important that you contact the nearest search and rescue authority and tell them it was a false alarm. They can then stand down any rescue service (coast radio station or appropriate CES or RCC). Use any means at your disposal to make contact. Switch off the distress alarm by de-activating your EPIRB, as soon as possible.

If your beacon is activated in a non-distress situation or a distress situation which has been resolved and you no longer require assistance, contact the nearest search and rescue authorities via the most expeditious means available with the following information:

Beacon ID number (15 character UIN):
Position (At time of activation):
Date of Activation:
Time of Activation (Time zone):
Duration of Activation:
Beacon marke and model:
Vessel Name/lD:
Circumstances/cause (if known):
The United States search and rescue authority is the U.S. Coast Guard. The primary points of contact are:

Pacific Ocean Area
USCG Pacific Area Command Centre
Tel: (510)-437-3701

Atlantic Ocean / Gulf of Mexico Area
USCG Atlantic Area Command Centre
Tel: (757)-398-6231

From Any Location
USCG Headquarters Command Centre
Tel: (800)-323-7233
# TEST AND MAINTENANCE RECORD

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</tbody>
</table>

N=NEW EPIRB INSTALLED, T=TEST, B=NEW BATTERY
1. GENERAL DESCRIPTION

The Tron 40S is an emergency equipment consisting of:

• Tron 40S COSPAS/SARSAT emergency EPIRB

• One of the following brackets:
  - FB4 - Automatic float free bracket.
  - FBH4 - Automatic float free bracket v/heating.
  - MB4 - Manual bracket.
  - FB5 - Automatic float free bracket.

The JOTRON Tron 40S EPIRB is developed to meet the regulations and rules for use on vessels and life rafts in the maritime service. Tron 40S meets the following specifications for 406 MHz EPIRBs for use in search and rescue operations at sea:

ETS 300 066  
MPT 1259  
C/S T.001  
IMO A662  
IMO A695 (17){1}  
IMO A810 (19)  
DIR 96/98 EEC

1.1 TRON 40S

The Tron 40S is buoyant, and is designed to automatically release and activate in case of an emergency where the EPIRB and its bracket is submerged into the sea. The Tron 40S can also be operated as a manual EPIRB, by manually releasing it from its bracket and then activate it.

Five different brackets are currently available for the Tron 40S. MB4 and MB5 is the manual bracket and FB4 and FBH4 is the automatic bracket. FB5 is automatic bracket with cover. The manual bracket comes without the hydrostatic release mechanism and is used to store the beacon inside the wheelhouse or other protected places. The automatic bracket is mounted in a free space outside where the beacon can be released automatically.

The purpose of the Tron 40S is to give a primary alarm to the search and rescue authorities. The EPIRB gives an immediate alarm when activated, transmitting the ID of the ship in distress. Care must be taken not to activate the EPIRB unless in an emergency situation, in such cases the user will be held responsible. For periodic testing a test function is implemented. During the test cycle the EPIRB does a selftest on the transmitters and on the battery status. No emergency signal is transmitted during the selftest.

The battery of the EPIRB will last for at least 48 hours from activation of the EPIRB.
1.2 SYSTEM DESCRIPTION

The COSPAS/SARSAT system was introduced in 1982 as a world wide search and rescue system with the help of satellites covering the earth’s surface. Since the introduction of the system more than 18865 persons have been rescued by the COSPAS/SARSAT system (2004). Currently the system consists of 5 functional satellites in a polar orbit constellation, these satellites cover the entire earth’s surface and receive the emergency signal from the 406 MHz transmitter within the Tron 40S, more polar orbiting satellites will be available in the future, giving a faster location and rescue time.

In addition several geostationary satellites are equipped with a 406 MHz tranponder, these satellites are not able to locate the Tron 40S but will give an early warning to the rescue forces, minimising the time from an emergency occurs till the rescue forces are at the site.

Each emergency EPIRB in the system is programmed with its own unique code, therefore it is vital that the ships data that is given to the dealer you obtained your Tron 40S, is correct. It is also important that your EPIRB is registered in the database for each country. This database is normally located in the same country that the ship is registered.

1.2.1 SIGNAL DETECTION [FIG. 1]

When the Tron 40S is activated (manually or automatically) it transmits on the frequencies 121.5 MHz and 406.025 MHz. An analogue signal is emitted on 121.5 MHz and a digital signal is transmitted on 406.025 MHz. After the Tron 40S is activated, the next passing satellite will detect the transmitted signal and relay it to an antenna at a ground station, called a LUT.

For the 121.5 MHz signal the satellite must be within line of sight of both the Tron 40S and a ground station. The ground station or LUT has a 2500 km satellite reception radius centred at the LUT. In areas without LUT coverage (mostly less populated areas in the southern hemisphere), signals from the 121.5 MHz transmitter will not be detected by the satellites, only by passing aircraft’s. This is not the case with the 406 MHz transmitter, because the satellites have a memory unit which stores the signals for relay to the next available LUT giving it a truly global coverage.

Once the signal is received by the LUT, it is processed for location and sent to a Mission Control Centre (MCC). The MCC sorts the alert data according to geographic search and rescue regions and distributes the information to the appropriate Rescue Co-ordination Centre (RCC), or if outside the national search and rescue area, to the appropriate MCC that covers the area where the distress signal was detected. The RCC in turn takes the necessary action to initiate search and rescue activities.

The International Cospas-Sarsat System will cease satellite processing of 121.5/243 MHz beacons from 1 February 2009. From that date only 406 MHz beacons will be detected by the Cospas-Sarsat satellite system. This affects all maritime beacons (EPIRBs), all aviation beacons (ELTs) and all personal beacons (PLBs).
1.2.2 DISTRESS LOCATION DETERMINATION [FIG. 1]
The location of the distress signal is determined by taking measurements of the
doppler shift of the EPIRB frequency when the satellite first approach and then pass
the EPIRB.

The actual frequency is heard at the time of closest approach (TCA). Knowing the
position of the satellite and using the received doppler signal information, it is
possible to determine the location of the Tron 40S from the satellite at the TCA. At
the LUT, actually two positions are calculated. One is the actual position (A) and the
other is the mirror image (B) position. A second satellite pass confirms the correct
location (A). With the 406 system the real solution can be determined on the first
pass with a reliability of nearly 90% and down to an accuracy of less than 5 km (3.1
miles).

1.2.3 EPIRB REGISTRATION
Normally the MCC will contact the vessel or the contact person registered in a ship-
ning register and/or an EPIRB register (Ships owner, family member etc.) before aler-
ting the RCC. This is to determine if the alarm from the EPIRB for some reason is a
false alarm, and an expensive rescue operation can be avoided. Because of this it is
important that the ships data is correct in the shipping register or in the EPIRB data-
base.

Tron 40S purchased in some countries will have a registration form attached to it, it is
important that this registration form is completed by the owner and returned to the
place the EPIRB was purchased or to the address specified on the registration form.

Other countries use the already available shipping register to obtain the necessary
information for a vessel in distress, in these countries the ship is already registered
and no registration form is necessary, however it is vital that the coding of the Tron
40S is kept up to date with datas on the ship (nationality, call sign, etc.), to minimise
the time from an alarm to the start of the search and rescue operation.
Reprogramming the Tron 40S can be done at authorised JOTRON agents in more
than 180 different places throughout the world.

If you are a resident of the United States, you must register this beacon with the
National Oceanic and Atmospheric Administration (NOAA) using the registration
card included with the unit. Fill out the form and send it to:
SARSAT Beacon Registry, NOAA-SARSAT, E/SP3, FB4, Room 3320, 5200 Auth Road,
Suitland, MD 20746-4304
Vessel owners shall advise NOAA in writing upon change of vessel or EPIRB
ownership. Transfer of EPIRB to another vessel, or any other change in registration
information, NOAA will provide registrants with proof of registration and change of
registration postcards.
2. TECHNICAL SPECIFICATIONS

2.1 GENERAL

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<th>Description</th>
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<td>Battery</td>
<td>Lithium, 5 years service life.</td>
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<tr>
<td>Housing</td>
<td>Polycarbonate w/ 10% glassfibre</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Height: 379 mm</td>
</tr>
<tr>
<td></td>
<td>Max diameter: 180 mm</td>
</tr>
<tr>
<td></td>
<td>Weight app.: 2.0 kg</td>
</tr>
<tr>
<td>Materials</td>
<td>Polycarbonate.</td>
</tr>
<tr>
<td>Compass safe distance</td>
<td>1.5 m</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-20°C to + 55°C</td>
</tr>
<tr>
<td>Operating life</td>
<td>Minimum 48 hours at -20°C</td>
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2.2 COSPAS/SARSAT TRANSMITTER

<table>
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<th>Item</th>
<th>Description</th>
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<tr>
<td>Frequency</td>
<td>406.025 MHz ± 2 ppm</td>
</tr>
<tr>
<td>Output power</td>
<td>5W ± 2 dB</td>
</tr>
<tr>
<td>Protocols</td>
<td>Tron 40S: Maritime, Serialised, Radio Callsign</td>
</tr>
<tr>
<td>Modulation</td>
<td>Phase modulation 1.1 ± 0.1 rad</td>
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<tr>
<td>Data encoding</td>
<td>Bi Phase L</td>
</tr>
<tr>
<td>Stability</td>
<td>Short term ≤ 10°</td>
</tr>
<tr>
<td></td>
<td>Medium term ≤ 10°</td>
</tr>
<tr>
<td></td>
<td>Residual noise ≤ 3x10°</td>
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<td></td>
<td>Bitrate: 400 b/s</td>
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<tr>
<td>Antenna</td>
<td>Built in, omnidirectional.</td>
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2.3 HOMING TRANSMITTER

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<tr>
<td>Frequency</td>
<td>121.500 MHz</td>
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<tr>
<td>Output power</td>
<td>Up to 100 mW, depending on model.</td>
</tr>
<tr>
<td>Modulation</td>
<td>A9,AM sweep tone between 300Hz and 1600Hz.</td>
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<tr>
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<td>Sweep range 700 Hz.</td>
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<tr>
<td></td>
<td>Sweep rate 2.5 Hz.</td>
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<tr>
<td>Stability</td>
<td>10 ppm over temperature range.</td>
</tr>
<tr>
<td>Antenna</td>
<td>Built in, omnidirectional.</td>
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2.4 BRACKET [FIG. 8]

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<thead>
<tr>
<th>Item</th>
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<tbody>
<tr>
<td>Materials</td>
<td>Luran S/ ABS</td>
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<tr>
<td>Dimensions</td>
<td>See (FIG. 8)</td>
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<tr>
<td></td>
<td>Depth w/Beacon intalled: 200 mm</td>
</tr>
<tr>
<td></td>
<td>Weight: app. 1.6 kg</td>
</tr>
<tr>
<td>Release mechanism</td>
<td>Hydrostatic release</td>
</tr>
<tr>
<td></td>
<td>unit Hammar H20</td>
</tr>
<tr>
<td></td>
<td>with Jotron special bolt</td>
</tr>
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</table>
3 FUNCTIONAL DESCRIPTION

3.1 GENERAL
The Tron 40S consists of upper and lower house mounted together with an equator ring with gasket and locking pin. 
Tron 40S may be split into the following main parts:

1. EPIRB module with antenna
2. Battery module
3. Equator ring with gasket.

3.1.1 EPIRB MODULE WITH ANTENNA
The EPIRB module consists of two printed circuit boards, which are mounted in the upper housing:

1. The main board w/ Xenon flash and an indicator LED
2. Antenna board. (121.5 / 406 MHz)

For automatic activation of the EPIRB module, put the Tron 40S in the upright position into the water, and the transmission starts when the seawater completes the circuit between the two external electrodes (sea water contacts).
When the Tron 40S is mounted in the automatic release bracket mechanism, there is a safety switch in the EPIRB module, a reed contact activated by a magnet at the bracket, which disables the seawater contacts.

If the 40S mounted in the automatic release bracket is submerged in water, the hydrostatic release mechanism will release the Tron 40S at a depth of 2-4 meters. The transmission will start when the circuit between the seawater contacts is closed and the Tron 40S is out of the bracket.
The EPIRB module may be manually activated with the main switch, and is then independent of seawater contacts. The EPIRB module will also operate while placed in the bracket when manually activated.

The Tron 40S may easily be released from the mounting bracket manually. The main switch is also located on the main board. The housing is made of polycarbonate.
3.1.2 Battery Module

The Battery module is feeding the EPIRB module with 14.4VDC power to keep the EPIRB transmitters active for 48 hours when activated, and for test sequences.

The battery module consists of four SAFT LSH20 Lithium-Thionyl chloride (Li-SOCL2) batteries connected in series and is attached inside the lower house.

The housing is made of polycarbonate. In the lower part of the housing there is one reed contact which is activated by a magnet in the release mechanism. This is the safety switch which prevent the seawater contacts to activate the beacon while placed in the release mechanism.

There is a brass weight which gives stability while floating.

The seawater contacts is also mounted in the battery module, and is connected to the electronic unit via the battery connector.

The batteries is mounted in with a plastic battery holder.

3.1.3 Equator Ring With Gasket

The two parts of the housing are held together by the equator ring, and is locked with a U-shaped bolt of stainless steel and a split pin. Between the two halves of the housing there is a gasket made of neoprene.
4. INSTALLATION

BRACKETS
Five different brackets are currently available for the Tron 40S. MB5 and MB4 are the manual brackets. FB5, FB4 and FBH4 are the automatic brackets. The manual brackets comes without the hydrostatic release mechanism and is used to store the beacon inside the wheelhouse or other protected places. The automatic brackets are mounted in a free space outside where the beacon can be released automatically. MB5 and FB5 are delivered with protective cover.

4.1 FLOAT FREE BRACKET FB5 AND FB4

**WARNING:**
DO NOT INSTALL THE EPIRB NEAR STRONG MAGNETIC FIELDS THAT COULD ACTIVATE THE BEACON.

When the Tron 40S is mounted in the float-free bracket, FB5 or FB4, it will operate as an automatic float free unit. Since the release of the EPIRB will be automatic it is important to mount the bracket in a place where there are no obstacles that can endanger the automatic release of the EPIRB. The location where the bracket is mounted should be as high as possible on the vessel, and well protected from environmental conditions such as direct sea-spray, chemicals, oil, exhaust and vibrations. The location must also be easily accessible for testing and maintenance.

4.2 FLOAT FREE BRACKET FBH4

See fig. 8 for installation. The float free bracket FBH4 must be connected to the fixed installation (230V AC, 10A) through the thermostat connection box according to the connection diagram below.

**CONNECTION DIAGRAM**

4.3 MANUAL BRACKET MB5 AND MB4

When the Tron 40S is mounted in the MB5 or MB4 bracket, it will operate as a manual unit. This bracket is similar to the FB5 and FB4 bracket but does not have the hydrostatic release mechanism. This bracket is typically used to store the EPIRB inside the wheel house or other protected areas of the ship. When the Tron 40S is mounted in the MB5 or MB4 bracket, it must be manually removed before any operation can take place, therefore the bracket should be mounted in an easily accessible place where it can be reached in a hurry in case of an emergency.


The bracket is mounted with 4x6mm bolts according to the drawing. Use the bolts supplied with the bracket. The bracket could be mounted in either an upright or horizontal position, whichever is the best regarding maintenance and operation.
5. OPERATING INSTRUCTIONS
The Tron 40S is designed to be operated either manually or automatically. The EPIRB is always armed, that is the EPIRB will automatically start to transmit when the EPIRB is out of the bracket and deployed into water. In the lower part of the EPIRB there is an automatic safety switch. This switch prevents the seawater-contacts from operating the EPIRB (caused by ice, sea-spray etc.) as long as the EPIRB is placed in its bracket.
See 6.4 Error codes.

5.1 MANUAL OPERATION [FIG. 2]

Warning
USE ONLY DURING SITUATIONS
OF GRAVE AND IMMINENT DANGER

For operation of the beacon in the bracket please follow instructions 1 to 6.
To manually remove the beacon from the bracket, pull out the locking pin on the clamp and open the retaining rod that holds the beacon.
Tie the beacon lanyard to you or to the survival craft and then follow instructions 1 to 6, or put beacon in the water to activate it.
It is not recommended to operate the beacon inside a liferaft or under a cover or canopy. Do NOT tie the lanyard to the ship in distress, as this will prevent the unit to functioning if the ship sinks.

1. Break the seal and pull the locking pin holding the main activator switch.
2. Push slider to move switch to ON/EMERGENCY position.
3. The switch is spring loaded and will automatically go to the ON/EMERGENCY position.
4. The LED indicator, located at the top of the EPIRB, will start flashing indicating that the EPIRB is operating. In addition the strobe light will start to operate. The LED indicator will turn off after a few seconds.
5. If possible keep the EPIRB in an open area, away from any metal objects (ship construction etc.) that may limit the satellite coverage.
6. Transmission can be stopped by turning the switch to READY position.
5.2 AUTOMATIC OPERATION (FB4/FBH4/FB5) [FIG. 3]
1. The Tron 40S will automatically release from the bracket, float to the surface and start to transmit, when the EPIRB in its bracket is deployed into water at a depth of app. 2-4 meters (6 - 13 feet).

2. Alternatively the EPIRB can be manually released from the bracket and put into the water.

3. Transmission will continue until the EPIRB is lifted out of the water, and dried off. The transmission can also be stopped by placing the EPIRB in the bracket.

5.3 MANUAL TEST OF THE EPIRB [FIG. 4]
To perform the self-test, the EPIRB has to be removed from the bracket.

FB4 bracket: Remove EPIRB from the bracket by pulling out the locking pin on the clamp and open the retaining rod that holds the beacon.

FB5 bracket: Release FB5 to top cover by removing the locking split pin and special washer.

WARNING! The EPIRB can drop out of the FB5 bracket when releasing top cover.

1. Press the spring-loaded switch on top of the EPIRB to the TEST position. Keep hands and other objects away from the upper part of the EPIRB (away from the antenna).

2. A successful test will consist of a series of blinks on the LED test-indicator, followed by a continuous light and a strobe flash after app. 15 seconds.

3. If the EPIRB fail to end up with a continuous light, this indicates a fault in the EPIRB. See 6.4 EPIRB module error message.

4. Release the switch and put the EPIRB back into the bracket. What the self test actually does is first to wait app. 15 seconds to allow the reference oscillator inside the EPIRB to warm up. Then a short burst is transmitted by the 121,5 MHz transmitter, while the output level of the transmitter is checked. Finally, a test signal is transmitted by the 406 transmitter. During this test signal the battery voltage, output power and frequency is checked.

While testing the 406 MHz transmitter a test message is transmitted, this test message is coded with a special synchronisation code and will not be detected by the COSPAS/SARSAT satellites. The purpose of this test message is to control the actual coding of the EPIRB. This can be done with the JOTRON test unit Tron DEC/UniDEC or an other EPIRB checker.
6. MAINTENANCE AND TROUBLESHOOTING

6.1 EPIRB MODULE / BATTERY MODULE
The EPIRB shall be tested and approved as required by SOLAS regulation IV/15.9.2 of SOLAS 1974 as amended with, in accordance with MSC/Circ.1039 guidelines for shore-based maintenance of Satellite EPIRBs within 5 years if: Passenger ships (>12 passengers) and cargo ships (>300GT) engaged in international voyages, shall perform Shore-Based Maintenance (SMB) as follows:
- Latest by the date of the EPIRB label with this text, or the battery label, whichever is first.
- When this EPIRB becomes due for SBM in accordance with national requirements.

6.1.1 CHANGE OF BATTERY
If the Tron 40S is the main EPIRB on board the ship, the rules of SBM apply, and the battery must be changed at an SBM authorized workshop.
If the Tron 40S is the second EPIRB on board the ship, authorized personnel can change the battery on board.

6.1.2 REPLACING THE BATTERY MODULE [FIG. 7]
To change the battery, the lower Tron 40S assembly is replaced with a new one. The battery module consists of the complete lower half of the Tron 40GPS and is to be replaced every 5 years. The marking on the battery module show the expiry date. A new battery comes complete and is easily replaced by opening the equator ring between the top and bottom of the EPIRB. The battery must be replaced if the EPIRB is activated for any purpose other than test.
Replacing the battery module should be done by skilled technicians only - preferable by a JOTRON agent. Your closest JOTRON agent with TronSTAT facilities has been specially trained to perform the necessary operation and is also able to do an extended test of the EPIRB, ensuring that the EPIRB operates within the specifications.

1. Remove the EPIRB from its bracket.
2. Remove the equator ring by pressing it out from the housing.
3. Separate the two halves of the EPIRB housing.
4. Unplug the 6 pin connector that comes from the lower EPIRB housing.
5. Control that the new battery module is marked with p/n 97780 and has a new expiration date approximately 5 years from purchase.
6. Fit a new gasket on top of the battery module and reconnect the 6 pin connector, be sure that the connector is fitted properly. A noticeable «click» should be heard when the connector is in place.
7. Please make sure that the enclosed silicagel bag is fastened inside the emergency product, with the supplied strips into/between holes in the black cover. IMPORTANT: Cut the strips X-96898 after mounting of silicagel to avoid the strips to come between rubber gasket and top housing.

8. Please also fit the enclosed anti corrosion adhesive tape to the inside the battery before assembly of the unit.

9. Orientate the two halves of the EPIRB the following way:
   An orientation tab is fitted on both halves of the EPIRB, These tabs must be placed carefully on top of each other.

10. Make sure that the gasket is properly in place, and replace the equator ring using a special tool to tighten it together.

11. Replace the U-shaped bolt and a new split pin to secure the bolt in the equator ring.

12. Remount EPIRB in its bracket.

6.1.3 BATTERY DISPOSAL
Dispose in accordance with applicable regulations, which vary from country to country. (In most countries, the thrashing of used batteries is forbidden and the end-users are invited to dispose them properly, eventually through non-profit organizations, mandated by local governments or organized on a voluntary basis by professionals). Lithium batteries should have their terminals insulated prior to disposal.

6.1.4 INCINERATION
Incineration should never be performed by battery users but eventually by trained professionals in authorized facilities with proper gas and fumes treatment.

6.1.5 LAND FILLING
Leachability regulations (mg/l)

<table>
<thead>
<tr>
<th>Component</th>
<th>Leachability</th>
<th>EC limit</th>
<th>EPA</th>
<th>Other*</th>
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<tbody>
<tr>
<td>Iron</td>
<td>100</td>
<td>EC limit</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Nickel</td>
<td>100</td>
<td>500</td>
<td>2</td>
<td>0,5</td>
</tr>
</tbody>
</table>

* applicable to France

6.1.6 RECYCLING
Send to authorized recycling facilities, eventually through licensed waste carrier.
6.2 HYDROSTATIC RELEASE REPLACEMENT

For details see:

6.2.1 REPLACING THE RELEASE MECHANISM IN FB4/FBH4 BRACKET [FIG. 5].

The hydrostatic unit fitted on the float free bracket [FB4/FBH4] must be replaced every 2 years. Marking on the hydrostatic unit shows the expiry date. The hydrostatic comes complete with a new bolt and accessories.

1. Remove the EPIRB from its bracket by pulling out the locking pin on the clamp and open the retaining rod that holds the beacon.
2. Unscrew the plastic bolt [FIG 5] (1) by screwing it counterclockwise and remove the hydrostatic release mechanism [FIG 5] (2).
3. Check expiration date on the new hydrostatic release mechanism. The date should be approximately 2 years from the date of purchase.
4. Mount the new hydrostatic release mechanism. The unit is fixed to the bracket with a plastic bolt containing washer, rubber seal, washer, O-ring.
5. Secure the plastic bolt by hand force only!

6.2.2 REPLACING THE RELEASE MECHANISM IN FB5 BRACKET [FIG. 6].

1. Release FB5 top cover by removing the locking split pin and special washer. [FIG. 6a]  
**WARNING! The EPIRB can drop out of the FB5 bracket when releasing top cover.**
2. Press down the spring-loaded bracket plate and remove the hydrostatic unit by sliding it out of its locking slot. [Fig.6b]
3. Check the expiry date of the new hydrostatic release mechanism. [Fig.6c] The date should be approximately two years from the date of purchase.
4. Install a new hydrostatic unit by pressing down the spring loaded bracket plate and sliding the unit into its locking slot. [Fig.6b]
5. Replace the EPIRB and the FB5 top cover.

**Be sure that the top cover is locked at the bottom end and that the top end are fixed at hydrostatic release mechanism rod.**

Replace the special washer and the locking split pin. [Fig.6a]
6.3 TRON 40S SELF TEST

- Remove the beacon from the bracket.

  **FB4 bracket:** Remove EPIRB from the bracket by pulling out the locking pin on the clamp and open the retaining rod that holds the beacon.

  **FB5 bracket:** Release FB5 to top cover by removing the locking split and special washer.

**WARNING! The EPIRB can drop out of the FB5 bracket when releasing top cover.**

- Press the springloaded main switch of the EPIRB to the TEST position. Keep hands and other objects away from the upper part of the EPIRB (away from the antenna).
- A successful test will consist of a series of blinks on the LED testindicator, followed by a continuous light and a strobe flash after app. 15 seconds.
- If the EPIRB fail to end up with a continuos light, this indicates a fault in the EPIRB.
- Release the switch and put the EPIRB back into the bracket.

**Every Month:**

Perform EPIRB self-test.

What the self-test actually does is to send out a short test signal on 121.5 and 406.025MHz, testing the output of the transmitter. While transmitting the test signal, the battery voltage, output power and phase lock is tested. During the test of the 406MHz transmitter a test message is transmitted, this test message is coded with a special synchronization code and will not be recognized as real alert by the COSPAS/SARSAT satellites. Carry out visual inspection for defects on both the Tron 40S and Bracket. The Tron 40S should be easily removed and replaced in the Bracket. Make sure that the Tron 40S and Bracket is not painted or otherwise covered with chemicals, oil, etc. Check the expiry date of the EPIRB Battery and the Hydrostatic Release Mechanism. Check the presence of a firmly attached lanyard in good condition and that it is neatly stowed and is not tied to the vessel or the mounting bracket. If the Tron 40S is the main EPIRB on board, these rules must be followed:

**Every 12th month:**

If the Tron 40S is the main EPIRB on board and the ship falls under the SOLAS regulations of SBM, these rules must be followed: Perform extended annual test according to IMO’s MSC/Circ.1040 (Annual testing of 406 MHz satellite EPIRBs) as required by SOLAS IV/15.9. This test can be carried out by one of Jotron’s authorized representatives or any other service provider in possession of a Tron UNIDEC, Tron DEC or any other Cospas/Sarsat EPIRB tester/decoder.
**Every 2nd Year:**
Hydrostatic Release Mechanism including Plastic Bolt on the Float Free Brackets must be replaced. (Check expiry date on label).

**Every 5th Year:**
See paragraph 6.1.

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### 6.4 EPIRB Module Error Messages

If the self-test detects a fault in the EPIRB module one or more of the following indications are shown:

1. Flashing LED for 15 sec. followed by one (1) flash, no Xenon flash:
   Error: Low power on 406 MHz transmitter

2. Flashing LED for 15 sec. followed by two (2) flashes, no Xenon flash:
   Error: Low battery voltage

3. Flashing LED for 15 sec. followed by three (3) flashes, no Xenon flash:
   Error: Low power on 121.5 MHz transmitter

4. Flashing LED for 15 sec. followed by four- (4) flash, no Xenon flash:
   Error: PLL on 406 Transmitter out of lock

5. Five (5) flashes, no Xenon flash:
   Error: EPIRB module not programmed or programming not complete
7. FIGURES

FIG. 1 SIGNAL DETECTION [1.2.1, 1.2.2]
FIG. 2
MANUAL OPERATION [5.1]
FIG. 3
AUTOMATIC OPERATION [5.2]

FIG. 4
SELFTEST [5.3, 6.2.1]
FIG. 5  
REPLACING THE RELEASE MECHANISM IN FB4/FBH4 BRACKET [6.2.1]

FIG. 6  
REPLACING THE RELEASE MECHANISM IN FB5 BRACKET [6.2.2]

[FIG. 6A]  
[FIG. 6B]  
[FIG. 6C]
FIG. 7 [6.1.2]
REPLACING THE BATTERY MODULE
FIG. 8 [2.4, 4.4] MOUNTING OF BRACKETS [FB4, FBH4, MB4, FB5, MB5]
8 SERVICE AGENTS

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