Emergency Position Indicating Radio Beacon MP-406

Owner’s manual

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1.1 INTRODUCTION

1.1.1 Marine Emergency Position Indicating Radio Beacon (EPIRB) is intended for transmitting of emergency radio messages in case of distress situation within COSPAS-SARSAT International satellite system. It's designed in accordance with IMO requirements, and complies with class 2 of COSPAS-SARSAT specification, and rules of Russian Maritime Register of Shipping.

1.1.2 EPIRB is available in two versions:

Version 1. MP-406 with automatic release device (open-deck version).

Version 2. MP-406 with manual activation (deck-house version).

1.1.3 Open-deck version of EPIRB MP-406 is designed for installation on open deck of vessel with supplying the possibility of automatic activation on depth of 4 meters, and also for manual release from

1.1.4 Manual version of EPIRB MP-406 is designed for installation in deck house etc, EPIRB can be released only manually.

1.1.5 The EPIRB design allows its operation in lifeboats, or during its free floatation on water surface. EPIRB can be fixed in operational position in lifeboat with help of including 7m line.

1.1.6 Activation of EPIRB is allowed only in case of distress situation. Beginning of the rescue works in case of false activation of EPIRB will result administrative and financial responsibility.

1.2 EPIRB OPERATION WITHIN COSPAS-SARSAT SYSTEM

1.2.1 After activation EPIRB begins transmission of distress messages on frequency of 406MHz. Each message with duration of 0.44s is transmitted with period of 50 seconds. The information message is transmetted with 400 bits per second with help of phase modulation of carrier frequency. The content of distress message is determining in accordance with C/S T.001 and C/S G.001 specification requirements. Reprogramming of EPIRB distress message is provided without EPIRB disassemble.

The satellite is receiving the message and carrier frequency. The message and frequency codes, added with code of time of receive are retransmitted to coastal station, where they are processed and decoded and location of distress is determined. The received information is immediately transmitted to regional search and rescue services.

1.2.2 In pauses between messages the home transmitter is activated and transmits signals on international emergency frequency of 121,5 MHz. That signals could be received by nearby airplanes or vessels and are used for short-distance search.

1.2.3 The search of EPIRB in night is provided by built-in light-emitting beacon with illumination not less then 0.75 candle. The light-emitted beacon is automatically activated in dark time after EPIRB activation.

1.3 EPIRB REGISTRATION

1.3.1. To provide timely and efficient search and rescue operations each EPIRB before it usage must be registered in regional COSPAS-SARSAT centre.

Unregistered EPIRBs are not serviced by COSPAS-SARSAT system and emergency signals transmitted by such EPIRB are not passed to search and rescue services

1.3.2. For registration or re-registration of the EPIRB when it is moved in another vessel or emergency message's protocol is changed you should send the following data to the regional center:

EPIRB identification code
Type of used protocol
Name of the EPIRB's model
Ship's call sign
Ship's name
Number of crew members
Ship-owner's data: address, phone, fax and etc.
Phone, fax, telex for contact.

1.4 DESCRIPTION

1.4.1. Main components of EPIRB MP-406:

a. EPIRB – Emergency Position Indicating Radio Beacon (Annex 1, Figure 1);
b. ARD – Automatic Release Device (Annex 1, Figure 2);
c. Bracket (Annex 1, Figure 3);
d. Antenna (Annex 1, Figure 1);
e. Power supply unit (Annex 1, Figure 4).

1.4.2. On top of EPIRB under transparent cap are located:

f. light-emitting diode «406/121»;
g. light-emmited beacon;

h. light-sensitive device, used for reprogramming of EPIRB information and for activation of light-emitted beacon in dark time.

On top side of EPIRB the 7m floating line is fixed. The bottom part of EPIRB is intended for power supply unit allocation.

On bottom side of EPIRB two water sensors are located to activate the EPIRB when it's immersed to water.

Ring rubber gaskets between top and bottom parts of EPIRB, top and bottom covers provide watertightness of EPIRB.

Under bottom cover, that has pitted surface, the switcher is located to switch in three positions "ON", "OFF", "TEST". It's protected from unpremeditated activation by holder.

There are short instruction about EPIRB activation and testing on Russian and English on EPIRB surface.

There is light-reflecting covering on top cover of EPIRB with width of 25 centimeters.

1.4.3 EPIRB has 406,028MHz and 121,5 MHz transmitters, antenna and power supply unit. Power supply unit consists of two lithium batteries LSH-20.

1.4.4 The automatic release device is intended for installation in it of EPIRB to provide free floating of EPIRB from depth of 4 meters, and also for manual release of EPIRB from it. The hydrostat Hammar H20 is used to provide automatic release.

1.4.5 The bracket is the same device as the automatic release device, intended for EPIRB istallation, but requires manual release of EPIRB before activation.

1.4.6 In accordance with specification the EPIRB MP-406 is available in two variants.

1. EPIRB MP-406 with automatic activation:
- EPIRB
- Automatic Release Device
2. EPIRB with manual activation:
- EPIRB
- Manual Release Bracket

1.4.7 Main parameters of EPIRB MP-406:

2. frequency instability on 406MHz frequency:
- short-term (100 ms) - not more then 2×10^{-9};
- middle-term (15 min) – not more then 1×10^{-9};
3. Power on 406 MHz frequency – from 3,2 to 7,8 W.
4. Power on 121,5 MHz – not less then 50 mW.
5. The content of emergency message is in accordance with used protocol and should be agreed before order.
6. Sweep-tone on 121,5 MHz.
7. Light-emitted beacon.
8. After activation EPIRB provides the transmitting of emergency message during 48 hours on 406,028 MHz frequency and on 121,5MHz.
9. The probability of no-failure operation during 48 hours is 0.96.

4.1.5. The dimensions and weight are stated in Table 1.

Table 1

Device	Dimension, mm	Weight, kg	Notes
1. EPIRB MP-406 (Auto)	≤ 460x140x180	≤ 2,2	With antenna
2. EPIRB MP-406 (Manual)	≤ 460x140x130	≤ 2,0	With antenna
3. Automatic Release Device	≤ 290x180x80	≤ 1,2	With hydrostat
4. Manual Release Bracket	≤ 290x140x80	≤ 1,0	

1.5 EPIRB INSTALLATION

1.5.1. Extract the EPIRB from package. Check the presence of main components in accordance with packing list.

To install the EPIRB MP-406 with automatic release device do the following operations:

1.5.2.1. Place the EPIRB MP-406 on open deck to provide the possibility of free emersion when it's emerged in depth of 4 meters. Avoid any deck blocks that could hindrance to EPIRB emersion.

1.5.2.2. Extract the EPIRB from Automatic Release Device

1.5.2.3. Fix vertically the Automatic Release Device case with help of screws. Note that hydrostat should be directed down.

1.5.2.4. Connect the antenna to EPIRB, tightly screw it to plug on top of EPIRB.

1.5.2.5. Carry out the complex test of EPIRB in accordance with COSPAS-SARSAT requirements.

1.5.2.6. Install the EPIRB in Automatic Release Device. Note that the antenna should be on top. The operation mode switch should be in “OFF” position.

1.5.3. To install the EPIRB MP-406 with manual activation do following operations:

1.5.3.1. Place the EPIRB in deck–house but not closer then 1 meter to hydrocompass.

1.5.3.2. Extract the EPIRB from bracket.

1.5.3.3. Connect the antenna to EPIRB, tightly screw it to plug on top of EPIRB

1.5.3.4. Fix vertically the bracket on wall of deck-cabin with help of screws.

1.5.3.5. Carry out the complex test of EPIRB in accordance with COSPAS-SARSAT requirements.

1.5.3.6. Install the EPIRB in bracket. Note that the antenna should be on top. The operation mode switch should be in “OFF” position.

1.6 EPIRB ACTIVATION

1.6.1. Automatic activation

1.6.1.1. EPIRB MP-406 is automatically activated during free emersion from depth of 4 meters after release from automatic release device.

1.6.1.2. EPIRB is automatically activated after it emerged to water by water sensor. EPIRB can be thrown from deck to water surface after its manual release from bracket or automatic release device. (not high then 20 meters).

1.6.2. Manual activation.

1.6.2.1. To activate the EPIRB manually installed in bracket:

a. Upholding the EPIRB by case, pull out the pin and release the EPIRB from bracket.

b. Turn the switcher to “ON” position.

After EPIRB activation one long flash of light-emitted beacon and alternately flashing of “402/121” flashes by red color and then by green color show that EPIRB operates normally.

1.6.2.2. After manual activation EPIRB can be installed in lifeboat. Avoid any conducting things in radius of 1.5 meters or things shaded the antenna in tilt angles from 7 to 70 degrees.

1.6.2.3. After manual activation EPIRB can be also emerged to water. But note that you should fix it to lifeboat with help of 7m floating line.

1.7 TESTING OF EPIRB

1.7.1. Testing of EPIRB is controlling of EPIRB efficiency by built-in flashes and invert message on 406 MHz frequency.

1.7.2. To test the EPIRB:

c. Extract the EPIRB from automatic release device (bracket)

d. Release holder and turn the switch to “TEST” position.

If the light-emitted beacon flashes three times it confirms the normal operation of power supply unit and information message is correct.

If “406/121” indicator flashes with green color and then with red it confirms the correct operation of 121 and 406 MHz channels.

During further 30 seconds “406/121” indicator flashes with green. During this time the correct operation of light-emitted sensor. The EPIRB should be placed to dark room or covered with opaque material – light-emitted beacon flashes with period rate not more then 3 seconds.

e. Turn the switch to “OFF” position.

1.7.3 The test of electrical parameters of EPIRB should be carried out annually with help of EPIRB Tester.

Note: To test the electrical parameters of EPIRB, it can be used EPIRB Tester of any manufacturer with type approval on such inspections.

1.8 Technical maintenance

1.8.1. Technical maintenance is carried out by manufacturer or in service centers certified by manufacturer and Register.

1.8.2. Technical maintenance includes external examination, operation test, replacement of power supply unit and hydrostat of automatic release device, and preparing of EPIRB for extended storage.

1.8.3. External examination includes the check of:

- Presence of damages on case of EPIRB and automatic release device (bracket).
- Presence and quality of marking on case of EPIRB, automatic release device (bracket).
- Accordance of installed power supply elements with certified by manufacturer.
- Date of next replacement of power supply elements.
- Date of next replacement of hydrostat of automatic release device.
- Presence and condition of line, reliability of its connection to EPIRB.

1.9 Replacement of power supply elements

1.9.1. The replacement of power supply units is carried out by service centers certified by manufacturer and Register.

1.9.2. To replace the power supply units it's necessary to follow next actions:

- To test the voltage of each element by connecting to it the 1,6 Ohm resistor during 10÷15 seconds. The element voltage should be not less then 3,05V. The elements with voltage lower then 3,05V is should not be used in EPIRB. Also LSH-20 power supply element installed in EPIRB should not be expired.
- Unscrew the bottom cover of EPIRB. Then switcher of operation modes should be taken away.
- With help of screwdriver unscrew six bonding screws to release the bottom part of EPIRB.
- Install new power supply elements, observing polarity stated on power supply unit.
- Fix the bottom of power supply unit to its case by six screws.
- Install the operation modes switcher to its place. Note that it must be coincided with "OFF" position marked on case of EPIRB.
- Install and tightly screw the bottom cover of EPIRB.

1.9.3. Carry out the complex test in accordance with COSPAS-SARSAT requirements.

Note: The replacement of power supply elements should be carried out together with complex test if the expire date of power supply elements is less then 12 months.

1.10 Hydrostat replacement.

1.10.1. To replace the hydrostat it's necessary to follow next actions:

- Unfix the automatic release device.
- With help of spanner ease off the bonding female screw of plastic ring-bolt. Take off the plastic ring-bolt.
- Detach the clip from the ring-bolt of hydrostat.
- With help of screwdriver unscrew two bonding screws and release the hydrostat
- Install new hydrostat in automatic release device and fix it by two bonding screws to case of automatic release device.
- Return the plastic ring-bolt of new hydrostat to its place and fix it to case of automatic release device by screwing the female screw on it. Cut off the needless prominent part and smooth out remain part. Note the extension of remain part should be not less 5 mm.
- Fix the clip of automatic release device on ring-bolt of hydrostat.
- Install EPIRB to automatic release device in accordance with figure 2, Annex 1

1.11. Transportation and storage

1.11.1 The EPIRB MP-406 has no special transportation requirements. Its lithium battery has been tested under the "Transportation of Dangerous Goods" regulations and has been declared as non-hazardous for transportations purposes.

1.11.2. In case of long (more then one year) storage period it is recommended to disconnect the power supply unit and storage the EPIRB in room shielded from precipitation or other aggressive atmosphere forcing at temperature range from 5 to°C, and relative humidity not more then 80

1.11.3. Power supply unit should be stored at temperature not more then 30°C and relative humidity not more 80 %.

1.12 Preparation for extended storage (more then 1 year)

1.12.1. Test the efficiency of EPIRB in accordance with item 1.7

1.12.2. Extract the power supply elements. Power supply elements should be kept separately.

1.12.3. Unfix the automatic release device (bracket).

1.12.4. Degrease and coat with new greasing all achromatic surface of automatic release device (bracket).

1.12.5. Release the antenna from case of EPIRB.

1.12.6. Install the EPIRB in automatic release device (bracket).

1.12.7. Pack up the EPIRB.

2.1 EPIRB INFORMATION

2.1.1. EPIRB MP-406 is Emergency Position Indicating Radio Beacon operating within COSPAS-SARSAT system, certificate #_____

2.1.2. EPIRB MP-406 is manufactured under class 2 of operation (guaranteed range of operation temperature is between –20 …+55°C

2.1.3. Power supply unit: LSH-20 lithium batteries manufactured by SAFT

Date of Manufacture "_____" _____ ____year.

Enterprise-manufacturer_____

_____

Factory number_____

Delivery mode _____

Identifier (from 25 to 85 bit)_____

Call sign/MMSI/Serialized number_____

Marine user protocol (underline required):

1. The sea user's protocol with the identification code of MMSI
2. The sea user's protocol with the vessel's call sign
3. The special protocol with the vessel's call sign
4. The protocol with individual serial number that is given by the manufacturer

2.2 TECHNICAL SPECIFICATION

2.2.1. Main technical specifications parameters are in table 1.

Table 1. Technical specification

Parameter name	Parameter point	Notes
	Required	
1. 406 MHz Transmitter		
1.1. Output power at load Z = 50 Ohm, W	from 3,15 to 8	
1.2. Carrier frequency, kHz	406028 ± 2	
1.3. relative instability of frequency during 15 min, not more: drift standard deviation short-term	 $\pm 1 \bullet 10^{-9}$ $3 \bullet 10^{-9}$ $2 \bullet 10^{-9}$	
1.4. Phase deviation, grad	± 63 ± 6,3	
1.5. Rise and droop of modulation, mks	from 50 ± 20 to 150 ± 20	
1.6. Skewness, not more, %	5	
1.7. Message transfer rate, baud	400 ± 4	
1.8. Preamble length, ms	160 ± 1,6	
1.9. Message length, ms	440 ± 4	
1.10. Repetition cycle, s	50 ± 2,5	
1.11. Power rise time, not more, ms	5	
2. 121,5 MHz Transmitter		
2.1. Peak power, not less, mW	70	
2.2. Carrier frequency, kHz	121500 ± 5	
2.3. Frequency sweep limits of amplitude manipulation, Hz	200…1700	
2.4. Modulation range, not less, Hz	700	
2.5. AM Depth, not less %	85	
3. BEACON FLASH		
3.1. Flash repetition cycle, not more, s	3	

2.3 WARRANTY

2.3.1 Manufacturer warrants that this product will be free of detects in materials and workmanship for a period of 12 months from the date of purchase.

2.3.2 Manufacturer will not be liable to the buyer under the above warranty:

for any defect arising from fair wear and tear, willful damage, negligence, abnormal working conditions, failure to follow manual instructions(whether oral or writing)

for parts, materials or equipment not manufactured by manufacturer in respect of which buyer shall only be entitled to the benefit of any warranty or guarantee given by the manufacturer

for battery storage life which is specifically excluded from warranty

2.3.3 In order to be valid, claims must be made under above warranty in writing as soon as practicable after discovery of the defect or failure and within the warranty period referred to above. Proof of purchase will be required. The claim should be sent together with the product in question to the address of manufacturer.

2.3.4 Following valid warranty claim manufacturer shall be entitled to repair or replace the product (or part) in question free of charge, or at manufacturer's sole discretion to refund to the buyer the price or the product (or a proportional part of the price). Manufacturer shall not be liable to a buyer who is not a consumer for any other loss or damage (whether indirect, special or consequential loss of profit or otherwise) costs, expenses or other claims for compensation that arise out of or in connection with this product. In the case of a consumer manufacturer shall only be liable where other loss or damage is foreseeable.

2.3.5 All enquires relating to this warranty should be sent to address of manufacturer.

2.4 DATE OF BATTERY REPLACEMENT

2.4.1 EPIRB MP-406 uses lithium battery pack. Typically this will have to be replaced every 5 years. The exact battery expiry date is marked on EPIRB

2.4.2 The battery expiry date should be checked regularly. You will need to replace the battery when:

- The expiry date has been reached
- EPIRB has been used in an emergency situation
- A false activation exceeds 2 hours of use

2.4.3 The battery is a one shot device. It is not rechargeable or user replaceable. Battery replacement should be carried out by service agent. Lithium batteries have special disposal requirements. Never incinerate lithium battery. Never dispose one at sea.

Date of replacement	Post, family, signature of responsible person

2.5 DATE OF HYDROSTAT REPLACEMENT

2.5.1 The hydrostat has 2 years replacement interval. The expiry date, which is marked on the hydrostat and on the enclosure side label should be checked regularly.

2.5.2 When hydrostat expires you can obtain a replacement at a local chandler, or direct from manufacturer. Manufacturer will supply an hydrostat kit complete with breakable plastic rod, date labels and instruction sheet.

Date of replacement	Post, family, signature of responsible person

2.6 NOTES