

**EBC-502HM**

**INSTRUCTION  
AND  
MAINTENANCE  
MANUAL**

**EMERGENCY BEACON CORPORATION**

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**MADE IN THE USA**

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## SECTION 1 GENERAL DESCRIPTION

The EBC-502HM is an Emergency Locator Transmitter (ELT) designed for helicopter installation. It meets the requirements of TSO-C91a in the Portable (P) and Automatic Portable (AP) categories (See Figure 1). It is designed to be mounted in the cabin of the aircraft, within reach of the pilot or co-pilot. As with all EBC ELTs, the increased survivability needs of cabin mounting have been met. The electronics and the activation system are completely encapsulated, and extra protection has been provided for the crystal. Our encapsulation method provides added protection against shock and moisture. The ELT transmits simultaneously on the civil 121.5 MHz and the military 243.0 MHz emergency frequencies.

One of the unique characteristics of helicopter performance is that in the event of a loss of power, a helicopter may not necessarily go down nose first and may not have any forward motion. This may render a single axis G-switch ineffective. The EBC-502HM has two special G-switches that can sense deceleration forces from all directions. It is therefore uniquely suited for helicopter use. These 360° spherical switches are identical to those used and proven in our original helicopter ELTs, our EBC 302HM or EBC 302VRHMJ-121.5 or EBC 302VRHMJ-243.0 ELTs. They will not trigger during a hard landing.

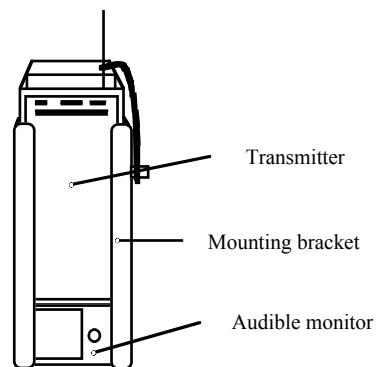
The EBC-502HM is also ideally suited for all military fixed wing aircraft thereby providing the military with a universal unit designed for their special needs.

The EBC-502HM is equipped with a separate audible monitor seated below the ELT within the mounting bracket. It is linked to the ELT via a DC power connector, thus eliminating the need for a wire harness. The audible monitor is powered by its own battery and will emit loud pulsing tones whenever the ELT is transmitting. This is used to alert the pilot or others in the vicinity of an ELT activation.

A self test lamp is provided as a simple means of testing the ELT for proper signal output.

**IMPORTANT: TESTING SHOULD NOT BE DONE WITH NIGHT-VISION GOGGLES ON. DO TEST BEFORE START-UP!**

The EBC-502HM's toggle switch is recessed within the ELT to protect it against inadvertent activation or damage.



**FIGURE 1: EBC-502HM**

## **SECTION 2 TOGGLE SWITCH FUNCTIONS**

### **ON position:**

Placing the toggle switch in this position (near the antenna) activates the ELT. It will simultaneously transmit an emergency distress signal on 121.5 MHz and 243.0 MHz frequencies.

### **ARM position:**

This position (center position) is the normal operating mode of the ELT; the ELT is on standby. It will activate if it senses deceleration forces typical of an accident. **NOTE: BE SURE TO REMOVE THE SHORTING PLUG (ATTACHED TO LANYARD) BEFORE TAKING OFF. THIS STEP SHOULD BE INSERTED INTO THE START-UP CHECKLIST BEFORE FLIGHT!**

### **OFF/TEST position:**

This position deactivates the transmitter. To deactivate, momentarily hold the switch in this position (near the test lamp) and quickly release. This position is spring loaded and the switch will return to the "ARM" position (center position) when it is released. If you physically have to move the switch to the center position, then you have not deactivated the ELT. The OFF/TEST position is also used to test the transmitter for proper signal output. Please refer to Section 7 for more information.

## **DISABLING THE AUTOMATIC ACTIVATION FEATURE**

Remove the shipping wire (wire next to test lamp with tag attached). Since military equipment is subjected to continuous handling while on the ground, false alarms due to handling can be very troublesome. The EBC-502HM additionally incorporates a shorting plug attached to the lanyard. When inserted into the shorting jack terminals next to the test lamp, the automatic activation feature is disabled allowing maintenance to be performed without the worry of an accidental activation. **MAKE SURE THAT THE SHORTING PLUG IS REMOVED BEFORE FLIGHT**, otherwise the unit will not be ready for automatic operation. **THIS STEP SHOULD BE INSERTED INTO THE START-UP CHECKLIST BEFORE FLIGHT.** Be sure that the shorting plug is inserted after flight - this, too, should be inserted into the shut-down checklist.

## **SECTION 3 ELT INSTALLATION**

RTCA Document DO-183<sup>1</sup> paragraph 3.1.8 describes the mounting requirements which must be followed when choosing a location on which to mount an ELT. It reads as follows:

THE ELT SHALL BE MOUNTED TO PRIMARY AIRCRAFT LOAD CARRYING STRUCTURES SUCH AS TRUSSES, BULKHEADS, LONGERONS, SPARS, OR FLOOR BEAMS (NOT AIRCRAFT SKIN). THE MOUNTS SHALL HAVE A MINIMUM STATIC LOCAL DEFLECTION NO GREATER THAN 2.5mm (0.1 INCH) WHEN A FORCE OF 450 NEWTONS (100 lbs) IS APPLIED TO THE MOUNT IN THE MOST FLEXIBLE DIRECTION. DEFLECTION MEASUREMENTS SHALL BE MADE WITH REFERENCE TO ANOTHER PART OF THE AIRFRAME NOT LESS THAN 0.3 METER (1 FOOT) NOR MORE THAN 1.0 METER (3 FEET) FROM THE MOUNTING LOCATION.

### **INSTALLATION INSTRUCTIONS:**

1. The EBC-502HM must be installed by a certified airframe mechanic. This installation must be entered in the aircraft log book.
2. The EBC-502HM can be installed in any convenient location within the cockpit/ cabin area of the helicopter provided the following requirements are met<sup>2</sup>.
3. The EBC-502HM antenna must be vertical with as much of the antenna visible through a window as possible when viewed from the outside of the aircraft. The minimum dimension of the window where the ELT is mounted should be 12 inches in height and 13 inches in width.
4. The antenna should be at least one inch away from any metal window part.

5. The EBC-502HM mounting bracket must be securely attached as per the above DO-183 requirements. After selecting a suitable location meeting all of the above requirements, drill and mount the EBC-502HM mounting bracket<sup>3</sup>. Please refer to Figure 2 for an installation suggestion.
6. The shipping wire must be removed before the ELT is installed into its mount. Do not discard. Keep it near the ELT for future use. Install the "shorting plug" that is on the lanyard in the terminals next to the test light. This should be removed before flight and inserted again after flight.  
The shorting plug disables the automatic activation feature of the ELT and is only to be used when not in flight.

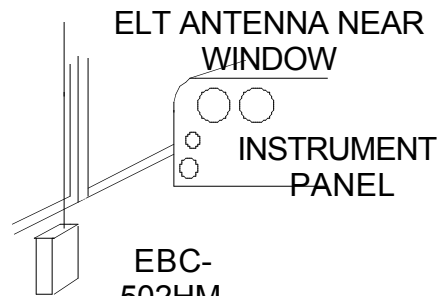


FIGURE 2: EBC-502HM INSTALLATION SUGGESTION

#### SECTION 4 FINAL INSTALLATION CHECK

DO NOT ACTIVATE THE TRANSMITTER UNTIL YOU THOROUGHLY UNDERSTAND HOW TO DEACTIVATE IT! Please refer to Section 7.

1. Before the ELT is installed into its mounting bracket, the following tests must be performed. It is recommended that such test receive prior approval from the nearest control tower. FAA and FCC<sup>4</sup> regulations require that transmitter tests be performed only during the first 5 minutes of each hour and last no longer than 3 audio sweeps.

- A: Set communications receiver or portable radio to 121.5MHz.
- B: Place toggle switch in the ON position. The distinctive ELT swept tone should be heard over the radio receiver.
- C: Deactivate the ELT by holding the toggle switch in the spring loaded OFF/TEST position, and then quickly releasing and allowing it to return to the center (ARM) position.
- D: To test the G-switch circuitry, with the toggle switch in the "ARM" position. Hold the ELT vertical with the antenna pointed towards the sky and with your arm fully extended horizontally. Swing the beacon around your body (like a forehand tennis swing) as fast as possible, keeping the antenna pointed vertically towards the sky. This may take some practice since it takes a great deal of force to simulate a crash (see note 1, p. 5). Proper activation is indicated when the PEOW-PEOW signal is heard through the radio.
- E: Deactivate ELT by placing the toggle switch in the spring loaded OFF/TEST position, then quickly releasing it.

2. Slide the audible monitor into the mounting bracket and then the ELT. Be certain that the connectors on the ELT and audible monitor mate with one another. Press down on the ELT until it is fully seated within the bracket.
3. To test the audible monitor, place the ELT toggle switch in the ON position and listen for loud pulsing tones from the audible monitor, then deactivate and rearm the ELT (momentarily hold the toggle switch in the spring loaded OFF/TEST position, then quickly release it).

## **SECTION 5 PERIODIC INSPECTIONS**

The following inspection procedures are based on FAA ACTION NOTICE A8150.3 EMERGENCY LOCATOR TRANSMITTER RECOMMENDED SUPPLEMENTAL INSPECTION PROCEDURE (PART 91 OPERATIONS)<sup>4</sup>. The FCC mandates that the transmitter test be performed only during the first 5 minutes of each hour and last no longer than 3 audio sweeps of the ELT signal. This test must be performed a minimum of once a year. (Those parts of FAA ACTION NOTICE A8150.3 which are not applicable to the EBC-502HM ELT have been omitted or amended in this restatement).

1. Remove ELT from the mount and inspect the mounting hardware for stability. All required mounting hardware should be reinstalled and secured.
2. Open unit and inspect the ELT. Verify that the ELT battery is a factory-approved GS-52 battery, and check its expiration date (battery should be changed every 2 years).

WARNING: THE EBC-502HM WAS CERTIFIED TO TSO-C91a AS A COMPLETE SYSTEM WHICH INCLUDED A GS-52 BATTERY PACK. TO MAINTAIN COMPLIANCE WITH TSO-C91a, A GS-52 BATTERY PACK MUST BE USED. THE USE OF ANOTHER BATTERY PACK MAY ADVERSELY AFFECT PERFORMANCE AND WOULD VOID THE WARRANTY OF THE ELT.

3. To test the G-switch circuitry, it will be necessary to perform two (2) tests. Hold the ELT vertical with the antenna pointed up and with your arm fully extended horizontally. It may be necessary to fold and secure the antenna to prevent it from whipping around. Swing the ELT around your body (like a forehand tennis swing) in the horizontal plane as fast as possible, keeping the ELT pointed up. This may take some practice since it takes a great deal of force to simulate a crash (see note 1 below). Proper activation is indicated when the PEOW-PEOW signal is heard through the radio. Reset the ELT. Next, hold the ELT in a horizontal position with the antenna pointed away from you, and swing in the same manner as before. Listen for proper activation. Reset the ELT.
4. Reinstall the ELT into its mount. Confirm that the audible monitor and ELT connectors are properly mated.
5. Activate the ELT using the ELT "ON" switch. The ELT should be heard on the airplane's VHF radio communications receiver when tuned to 121.5 MHz. The audible monitor should emit a loud intermittent tone whenever the ELT is activated.

WARNING! DO NOT USE THE AUDIBLE MONITOR AS A TEST DEVICE! IT IS SOLELY AN INDICATING DEVICE, AND HAS NO DIAGNOSTIC FUNCTION.

6. To test the transmitter electronics, hold the toggle switch in the spring loaded OFF/TEST position and observe the test lamp. A pulsing variation in lamp intensity should be observed. (See note 2 below).
7. Verify that all switches are properly labeled and positioned.

NOTES:

1. This is not a precise check; thus, it only indicates that the G-switches are working.
2. This is not a measured check. It is an indication that the ELT is radiating a sufficient signal to aid search and rescue

**SECTION 6  
OPERATING LIMITATIONS and BATTERY REPLACEMENT**

FAR 91.207(c) requires that the battery in the ELT must be replaced before the replacement date marked on the EBC-502HM or when the transmitter has been in use for more than one cumulative hour. We recommend replacement six months sooner if the ELT is stored in a location where the average ambient temperature is normally above 80 degrees Fahrenheit. The battery should not be stored in a location where the ambient temperature is above 110 degrees Fahrenheit.

**WARNING:** The EBC-502HM is designed to be used with battery pack, P/N GS-52. The ELT will not meet the requirements of TSO-C91a if used with another type of battery. If the battery is not connected exactly as stated, the ELT will be damaged. GS-52 battery packs are available from Emergency Beacon Corporation. **CAUTION:** Use only factory-approved replacement battery, MODEL GS-52 (alkaline) or ELT warranty will be null and void.

**GS-52 BATTERY REPLACEMENT PROCEDURE:**

1. Verify that the ELT is off.
2. Unscrew the 4 back cover screws and remove cover.
3. Observe the manner in which the battery is situated within the ELT. The new GS-52 battery must be installed in the same physical orientation as the current GS-52 battery.
4. Remove the plastic wire nuts from the old GS-52 battery by turning them counterclockwise. Remove the old GS-52 battery .
5. Remove insulation from the new GS-52 battery wires and place battery in the ELT.
6. Twist red wire from ELT and red wire from the GS-52 battery together and screw on plastic wire nut.
7. Twist black wire from ELT and black wire from the GS-52 battery together and screw on plastic wire nut.
8. Reinstall back cover and replace 4 cover screws.
9. Install new "REPLACE BATTERY BEFORE" label on the side of the ELT.
10. The replacement date must be entered in the aircraft maintenance record.

**AUDIBLE MONITOR BATTERY REPLACEMENT:**

The battery in the audible monitor **MUST** be replaced every time the battery in the ELT is replaced. For best performance, use an Eveready or Duracell alkaline 9 volt transistor battery, which may be purchased at your local drugstore.

## PROCEDURE:

1. Unscrew the 4 back cover screws and remove cover.
2. Remove the old battery and replace with new one.
3. Reinstall cover and screws.

**WARNING:** Before the ELT can be considered ready for use, the functional tests and procedures described in section 4, Final Installation check, **MUST** be performed.

## SECTION 7 OPERATING INSTRUCTIONS

The EBC-502HM **MUST** be installed in the aircraft with the audible monitor to meet the requirements of TSO-C91a. The battery in the audible monitor must be replaced every time the battery in the ELT is replaced.

DO NOT ACTIVATE THE TRANSMITTER UNLESS YOU THOROUGHLY UNDERSTAND HOW TO DEACTIVATE IT!

THE TRANSMITTER CAN BE DEACTIVATED BY MOMENTARILY HOLDING THE TOGGLE SWITCH HANDLE IN THE SPRING LOADED **OFF/TEST** POSITION AND QUICKLY RELEASING IT, ALLOWING IT TO RETURN TO THE CENTER POSITION. SETTING THE SWITCH TO THE **ARM** POSITION FROM THE **ON** POSITION WILL NOT DEACTIVATE THE TRANSMITTER. KEEP IN MIND THAT THE **OFF/TEST** POSITION IS SPRING LOADED AND THE SWITCH WILL RETURN ON ITS OWN TO THE CENTER POSITION WHEN RELEASED. IF YOU PHYSICALLY HAVE TO MOVE THE SWITCH TO THE CENTER POSITION, THEN YOU HAVE NOT DEACTIVATED THE TRANSMITTER.

The emergency signal should be monitored on the aircraft communications radio set to 121.5MHz.

### TO MANUALLY ACTIVATE THE ELT

Move the toggle switch handle to the "ON" position. The audible monitor should emit a loud intermittent beep approximately once a second.

**WARNING! DO NOT USE THE AUDIBLE MONITOR AS A TEST DEVICE! IT IS SOLELY AN INDICATING DEVICE WITH NO DIAGNOSTIC FUNCTION.**

### TEST LAMP FEATURE

Normal power output and modulation may be tested by holding the switch in the spring loaded OFF/TEST position and observing the test light. A pulsing variation in lamp intensity should be observed. A steady lamp indication or no lamp indication can mean a possible fault in the transmitter or a weak battery pack. Have a certified mechanic check the battery pack for proper voltage. If the battery is weak, replace it. If this does not correct the problem, contact the factory, or refer to section 8 for shipping instructions.

NOTE: Some units will not give a lamp indication unless the antenna is grasped near its top. This is acceptable. **NOTE: Testing should NOT be done with night-vision goggles on. DO TEST BEFORE START-UP!**

### REMOVING THE ELT FROM ITS BRACKET

Remove the ELT by pulling on the lanyard cord. Whenever the ELT is removed from its mount for a non-emergency, the audible monitor must remain connected to the ELT; otherwise, an inadvertent activation may go unnoticed. We highly recommend that the shipping wire supplied for shipping

purposes be saved and used every time the ELT is temporarily removed from the aircraft. The shipping wire disables the crash sensor.

#### REMOVING THE AUDIBLE MONITOR FROM THE MOUNTING BRACKET

Remove the ELT from its mount and then remove the audible monitor.

#### INSTALLING THE ELT AND AUDIBLE MONITOR

Install the audible monitor into the bracket until it is fully seated in its mount, then install the ELT. Be certain to properly mate the connectors and that the ELT is fully seated on the monitor.

NOTE: In an emergency, when exiting the aircraft with the ELT, removal of the audible monitor is not necessary; its sole function is that of an indicating device. It is not required for the emergency operation of the ELT.

### **SECTION 8 REPAIRS**

The EBC-502HM is not field repairable because the circuit board, switch, etc., are totally encapsulated. The only authorized repair facility is the EBC factory (FAA MMF 111-120). Should repairs become necessary, send the beacon to the factory. A note describing the problem or giving other pertinent information would aid in troubleshooting. Emergency Beacon Corporation will evaluate the unit and contact the owner with a repair estimate. There is a nominal fee for this inspection.

#### SHIPPING INSTRUCTIONS:

1. Disconnect and separately tape the battery leads before shipping. This will prevent the battery leads from shorting. Ship the disconnected battery enclosed in the ELT.
2. Enclose a note describing the problem. Be sure to give your name, address and phone number.
3. Pack well and insure.

Shipping costs to and from the factory are paid by the customer.

Send the unit to : Emergency Beacon Corporation; 15 River Street, New Rochelle, NY 10801, USA

**SECTION 9  
EBC-502HM SPECIFICATIONS**

<b>Range- Satellite</b> .....	1200+ miles
<b>Range-Search Aircraft</b> .....	line of sight
<b>Operating Life</b> .....	More than 48 hrs.
<b>Operating Temperature</b> .....	-20°C to +55°C
<b>Battery Type and Shelf Life</b> .....	Alkaline/4 years
<b>Frequencies</b> .....	121.5 MHz and 243.0 MHz simultaneously
<b>Frequency Stability</b> .....	+/-0 005%
<b>Modulation</b> .....	Swept Tone 1600 Hz to 300 Hz 2-4/second
<b>Modulation Duty Cycle</b> .....	33% min., 55% max
<b>Modulation Percentage</b> .....	100%
<b>Peak Effective Radiated Power</b> .....	minimum 50 mW for 50 hours at -20°C
<b>Automatic Activation</b> .....	360° spherical
<b>Altitude</b> .....	50,000 ft.
<b>Decompression</b> .....	8000 ft. to 40,000 ft.
<b>High Pressure</b> .....	-15,000 ft.
<b>Humidity</b> .....	95%, 50 hours
<b>Shock performance</b> .....	1000 G's, 6 axis
<b>Vibration</b> .....	10 G's
<b>Immersion Test</b> .....	Withstands 24 hours in salt water

**Physical**

<b>Size</b> .....	2.5" W x 2" D x 8.5"H
<b>Weight</b> .....	2.75 lbs
<b>Case</b> .....	Aluminum
<b>Finish</b> .....	Flat black, non-infrared reflective
<b>Antenna</b> .....	Flexible, stainless steel whip extends 19" above the top of the unit

**TWO YEAR WARRANTY**

FOR YOUR RECORDS:

Type of Equipment: \_\_\_\_\_

Model No. \_\_\_\_\_

Serial No. \_\_\_\_\_

Date Purchased: \_\_\_\_\_

Dealer: \_\_\_\_\_

**PLEASE NOTE: ALL WARRANTIES ARE NULL AND VOID IF NON-FACTORY APPROVED BATTERIES ARE EVER USED IN YOUR ELT.**

The EMERGENCY BEACON CORPORATION instrument you purchased is conservatively designed and was carefully inspected before shipment. Properly operated in accordance with the instructions furnished, it will provide you with trouble-free service. Should repairs become necessary, write or call EMERGENCY BEACON CORPORATION describing symptoms of faulty operation. Instructions will be sent to you for obtaining service, if factory judges necessary, authorization for shipment will be given to you. Do not ship without first obtaining this authorization. Pack well and insure when shipping. Repairs will be made without charge for materials and labor within two years from date of warranty registration. Transportation charges both ways are to be borne by the customer. Beyond this warranty period fair charges will be made for service by skilled personnel using factory approved/new parts. This warranty is void if:

- 1- Damaged in transit.
- 2- Abused in any way.
- 3- Repair is attempted by persons not authorized by EBC.
- 4- Unapproved battery is installed.

EMERGENCY BEACON CORPORATION (EBC), 15 River Street, New Rochelle, New York USA 10801  
Phone: (914)235-9400 (EBC); Phone: (914)576-2700; FAX: (914)576-7075.

(CUT HERE AND RETURN TO FACTORY)

**TWO YEAR WARRANTY REGISTRATION**

Model No: \_\_\_\_\_ Serial No: \_\_\_\_\_

Date Purchased: \_\_\_\_\_

How did you hear of this product? \_\_\_\_\_

What persuaded you to purchase it? \_\_\_\_\_

Dealer: \_\_\_\_\_ City: \_\_\_\_\_

My name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Return this portion to: EMERGENCY BEACON CORPORATION  
15 RIVER STREET  
NEW ROCHELLE, NY 10801, USA

**PLEASE NOTE: ALL WARRANTIES ARE NULL AND VOID IF NON-FACTORY APPROVED BATTERIES ARE EVER USED IN THE ELT.**

Footnotes:

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<sup>1</sup> - DO-183, Minimum Operational Performance Standards for Emergency Locator Transmitters. RadioTechnical Commission for Aeronautics, 1140 Connecticut Avenue, N.W., Suite 1020, Washington, DC 20036. May 13, 1983.

<sup>2</sup> Due to the extreme compatibility of the 502HM with the SARSAT satellite system the unit puts out a useful signal from virtually any place it is mounted in the helicopter. While the absolute best results are obtained when the unit is mounted in the cockpit area, eminently satisfactory results have been obtained from the most unexpected mounting locations. EBC ELTs have been picked up by the satellites when radiating from car trunks, junk yards and sealed UPS trucks.

<sup>3</sup> The bracket must be secured to a central portion of the helicopter so that if a force of 100 pounds is applied to the ELT it will not move more than 1/4 of 1 inch. Greater movement would suggest that the beacon mounting is not firm enough and establishes a possible false alarm situation in conditions of severe vibration or turbulence. In many cases various military organizations have come up with suggested mounting areas that have been thoroughly researched and found to be preferred locations for specific aircraft. These mounting instructions are available from ATCOM in St. Louis. They should be consulted as a supplement to the instructions included with the unit.

<sup>4</sup> - Emergency Locator Transmitters (ELT's) - Recommended Supplemental Inspection Procedure (Part 91 Operations), Action Notice A 8310.1. Federal Aviation Administration General Aviation Airworthiness Alerts, Federal Aviation Administration, 800 Independence Avenue, Washington, DC 20591, Approval Date - September 23, 1988.