NARCO AVIONICS INC.
270 Commerce Drive
Fort Washington Pennsylvania,U.S.A.,19034

ELT-10

AND

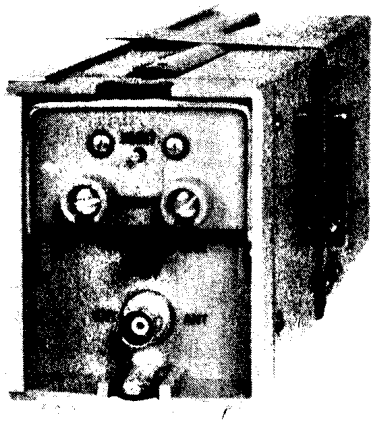
ELT-10 WITH CARRIER BURST

EMERGENCY LOCATOR TRANSMITTER

OWNER'S MANUAL

INSTALLATION and OPERATOR'S MANUAL

03716-0603



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1.1 INTRODUCTION

The Narco ELT 10 System is an automatically activated Emergency Locator Transmitter consisting of the ELT 10 Assembly and an Antenna Assembly. An optional remote switch may also be part of the System.

The ELT 10 may be manually activated via its front panel ON-OFF-ARM switch and/or via the optional remote switch when an emergency is imminent or for testing. When activated, the ELT 10 will radiate an omnidirectional RF signal on the international distress frequencies of 121.5 MHz and 243.0 MHz. The radiated signal is modulated with a "distinctive" audio swept tone.

The Narco ELT 10 is for "AVIATION EMERGENCY USE ONLY".

The Narco ELT 10 Emergency Locator Transmitter is designed, manufactured, and tested under the strictest quality control procedures.

1.1.1 Approvals

FAA TSO-C91, Type (AF)
FCC Part 87 (including 25 KHz occupied bandwidth)

Canadian DOT airworthiness approved.
Canadian DOC RSS 147, Issue 2 certified - #285472011 F, Type F

1.1.2 Design Features

. Single Unit Transmitter containing an alkaline battery power supply
. "Reserve Power" battery pack
. Optimum performance fixed type antenna
. Sealed "G" switch
. Remote switch activation capability

1.1.3 Equipment List

Item No.	Description	Part No.
1	ELT 10 Emergency Locator Transmitter Assy. (TSO'd) Consisting of: ELT 10 (Transmitter and battery pack) and its Mounting Bracket Assy.	03716-0300
2	ELT 10 Fixed Antenna Assy. (TSO'd) (60" long). .	01652-0101
3	ELT 10 Fixed Antenna Assy. (TSO'd) (84" long). .	01652-0102
4	Optional Remote Switch Kit	03716-0500

1.1.3.1 Optional Antennas (FAA/DOT Approved)

Dorne and Margolin
Model DMQ 18-1/A
Model DM ELT 8.2 Flexible Antenna and DM ELT 8.3 Cable
Model DMQ 18-3 Antenna and DMU 60-1 Cable

*Communications Components Corp.
Model ELT-10-214-2 and ELT-10-209 coax cable (not to exceed 60")
Model ELT-10-234 (coax cable not to exceed 48")

*The CCC antennas are approved for use with Narco ELT 10 Chassis level BBB or later.

1.1.4 Narco ELT 10 Replacement Parts List

Item	Description	Part No.
1	ELT 10 Alkaline Battery Pack	50659-0001
2	Transmitter PC Board Assy.	01651-0101
3	"G" Switch	61586-0001
4	Mounting Bracket Assy.	01650-1307

1.2 SPECIFICATIONS

1.2.1 ELT 10 Performance Data

Operating Frequencies:	121.5 and 243.0 MHz ± .005%
Operating Life:	52 hours, minimum @ 75 mw Min. PERP
Modulation Characteristics:	Type of emission 100% Amplitude Modulated (A9) Audio Frequency downward sweep not less than 700 Hz between the limits of 1600 and 300 Hz Sweep Repetition Rate...between 2 and 4Hz
Modulation Duty Cycle:	33% minimum to 55% maximum
Transmitter Duty Cycle:	continuous
Peak Effective Radiated Power (PERP):	75 mw minimum on each frequency
Occupied Bandwidth:	25 KHz maximum
Operating Temperature Range:	-20°C to +55°C meets all performance requirements

Environment which the ELT 10 is designed to withstand:

Temperature	-65°C to +71°C (Storage)
Altitude	50,000 ft.
Vibration	10G, 5 Hz to 2,000 Hz
Shock	50G, 11 milliseconds
Humidity	95% for 48 hours

Automatic Activation:

a. will not activate with less than 5G, 11 ms force applied
b. automatically activated when a force in excess of 5 (+2, -0) Gs for a duration of 11 (+5, -0) milliseconds or greater is applied in a direction longitudinal to the aircraft axis from the front.
c. will remain activated when subjected to 50G, 11 ms force in any direction.

Manual Activation:

Activated by switch located on ELT's front panel or by the optional remote switch.

1.2.2 Narco Fixed Antenna - ELT

Type	vertical monopole attached to outside of aircraft - top loaded
Radiation Pattern	omnidirectional
Impedance	50 ohms nominal at both frequencies
Operating Speed	250 knots (288 mph) IAS maximum
Cable	A/U Coax, with BNC connector termination

1.2.3 Weights and Measurements

Weights:

ELT 10 Assy (ELT 10 and Mounting Bracket Assy). . 3.9 lbs. (1.8 Kg)

Narco Fixed Antenna (Connector, coax cable, antenna). . . . . 0.2 lbs. (91 grams)

Measurements: Refer to Figure 1.

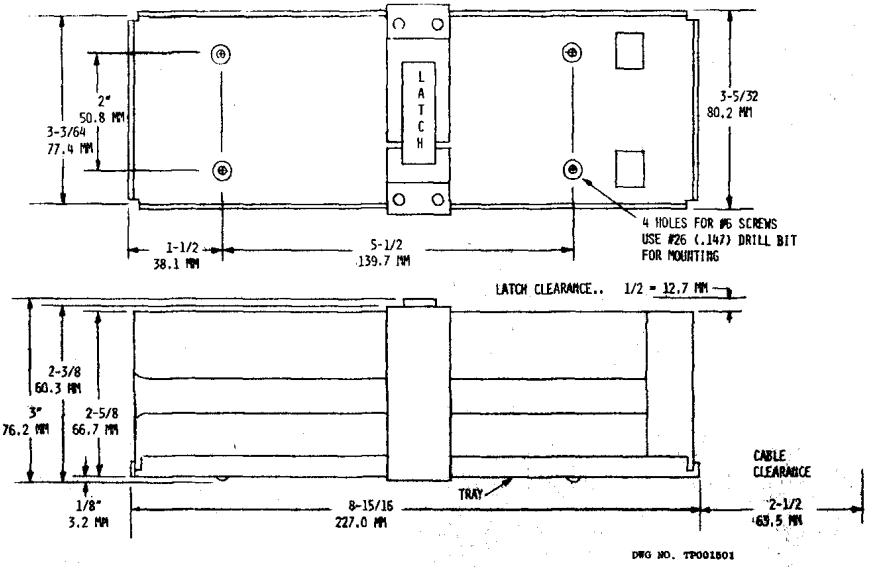


FIGURE 1. ELT 10 ASSY INSTALLATION

1.3 LICENSE DATA

The Federal Communications Commission requires that the operator of the transmitter in this equipment hold a Restricted Radio-Telephone Operator Permit, or higher class license. A permit may be obtained by any U.S. citizen from the nearest field office of the F.C.C.: no examination is required.

If the aircraft has a current Private Aircraft Radio Station License, no further Station licensing is required for the installation of the Emergency Locator Transmitter.

If the aircraft does not have a Private Aircraft Radio Station License one must be obtained by filing F.C.C. Form 404.

1.3 LICENSE DATA Continued

The ELT 10 may be installed, used, and tested for up to 30 days without a station license after filing the F.C.C. Form and while awaiting receipt of the station license, providing a copy of the submitted F.C.C. Form 404 is kept in the aircraft.

*There are several proposed rule changes pertaining to ELT's under consideration by the F.C.C. that affect licensing.

It was proposed that Section 87.183 (1) be modified to permit the single frequency assignment of 121.5 MHz to aircraft stations when used only for an emergency locator transmitter. No application filing fee would be required if an authorization for an ELT only is requested. The present rule requiring radio operation only by a person holding an operator's permit would be eliminated with respect to ELT's.

The licensee should inquire at the time of licensing to see if these rules are in effect.

1.3.1 Other

Installation and use in countries other than U.S.A. shall be in accordance with that country's licensing regulations and in conjunction with this manual.

2.1 PILOT'S GUIDE

2.1.1 Emergency Procedures

The ELT should only be activated for test (See the Functional Testing Section 2.2) or when an emergency landing is imminent. If the pilot has time prior to touch down, he should use his high power communications transmitter tuned to 121.5 MHz and make as many MAYDAY CALLS for assistance as possible using standard MAYDAY procedures.

MAYDAY Procedure

1. MAYDAY, MAYDAY, MAYDAY
2. Aircraft identification - 3 times
3. Type of Aircraft
4. Position or estimated position (state which)
5. Heading (True or Magnetic) (state which)
6. True or estimated airspeed (state which)
7. Altitude
8. Fuel remaining in hours and minutes
9. Nature of distress
10. Pilot's intention (bail out, ditch, crash landing, etc.)
11. Assistance desired
12. Two, 10 second dashes with mike button followed by aircraft identification and OVER.

NOTE: The ELT 10 may block communication on 121.5 MHz when it is activated; do not activate the ELT 10 manually until all possible communications have been completed. After landing, the ELT 10 can be manually activated and SHOULD be activated if the landing was "soft". The ELT 10 transmitter contains an impact "G" switch that will automatically activate the transmitter when an emergency landing of sufficient "G" force is encountered.

2.1.2 General Operation Instructions

AFTER ELT HAS BEEN USED IN AN
EMERGENCY SITUATION THE BATTERY MUST BE REPLACED

THESE INSTRUCTIONS APPLY TO AVIATION EMERGENCY USE ONLY
UNAUTHORIZED OPERATION IS PROHIBITED

	TRANSMITTER "ON"	TO SWITCH "OFF" AND RESET FOR "AUTO" MODE
AUTOMATIC MODE (applicable to all installations)	Transmitter circuit is automatically activated when aircraft is subjected to specified shock loading. ON-OFF-ARM switch must be in ARM position.	Gain access to ELT. Depress RESET pushbutton. Check that ON-OFF-ARM switch is set to ARM.
MANUAL MODE (after gaining access to ELT 10)	Set ELT's ON-OFF-ARM switch to ON	Set ON-OFF-ARM switch to OFF; then set to ARM.
REMOTE MODE (if option is installed)	In cabin, set Pilot's Remote ON-ARM switch to ON. NOTE: ELT's ON-OFF-ARM switch must be in ARM position.	In cabin, set Pilot's Remote ON-ARM switch to ARM.
	TO SWITCH OFF	RESETTING FOR AUTOMATIC OPERATION
INADVERTENT ACTIVATION	Gain access to ELT. Set ON-OFF-ARM switch to OFF.	Depress ELT's RESET pushbutton; then set ON-OFF-ARM switch to ARM.

NOTE: ELT 10 must be reset by depressing RESET button after any automatic activation.

PORTABLE DEPLOYMENT

The ELT 10 is equipped with a blade antenna for portable deployment when necessary i.e. when external antenna or cable has failed.

1) Remove ELT 10 from aircraft.
2) Extend blade antenna fully.
3) Set switch to "ON".
4) Stand or hold with antenna vertical.

2.1.2.1 Additional Notes

As in all radio transmissions you don't hear your broadcast going out over the air, for the same reasons you will not hear your ELT transmitting when the "G" switch is activated or when you position the ON-OFF-ARM switch to ON. (If your aircraft receiver is functioning, the receiver may be tuned to 121.5 MHz and you will then be able to hear your signal.)

Under normal temperatures (60 to 80°F/15.6 to 26.7°C) the ELT will continue to emit signals for over 7 days although not at full strength.

2.1.2.1 Additional Notes, Continued

The ELT should operate in temperatures of -4 to +131°F (-20° to 55°C) although at extremes, some performance is lost.

Occasionally an ELT may be activated as a result of hard landings, bumping over a hangar threshold, equipment malfunctions, etc. All ELT's are subject to this inadvertent activation in varying degrees since they are designed to detect and activate upon shock forces.

Historical data collected by government agencies clearly indicate that the Narco ELT 10 has a remarkable low incident rate of inadvertent activations and probably the lowest of all ELT's as a percentage of equipped aircraft. Nevertheless, inadvertent activations can and will happen.

Add the ELT to your preflight and postflight check list. This will be a great aid to the efficiency of Search and Rescue Operations by reducing the number of false alarms. This clearly is in the best interest of all of us who fly.

2.1.3 Preflight

1. Inspect that the antenna, the ELT 10, and that all connections are secure.
2. Inspect that there are no signs of corrosion in vicinity of the ELT.
3. Check that ELT's manual switch and remote switch are in the "ARM" position before flight.
4. Test for normal operation by listening with an aircraft communications receiver. See Section 2.2. Refer also to FAA Advisory Circular AC91-44A of 12/12/80 and FAR 91.52.

2.1.4 Postflight

Turn communications receiver on, Set it to 121.5 MHz. If an ELT tone is heard, check immediately that it is not you. Do not change receiver settings. (If no tone was heard, it can be presumed that your ELT was not inadvertently activated.)

Check out method:

1. Set your ELT switch to ON for a moment. If there was no change in the tone, it is probably YOU! The RESET button must be pushed and/or the ON-OFF-ARM switch in the Control Head must be set to ARM. See Step 3 below.

Alternate check out method:

1. Check position of manual control head switch (ON-OFF-ARM) or remote switch (ARM-ON) is set to ARM.
2. If ELT tone is still heard, locate the ELT 10 and press the RESET button. This resets the automatic "G" switch, thus deactivating the ELT transmitting circuit and the tone will cease.
3. If the ELT tone is still heard, position the manual control head switch to OFF. If the tone is heard, it is not you. If the tone ceased, your ELT was at fault.
   Having had to switch to OFF to cease the tone (transmission) it can be presumed that your ELT's "G" switch has malfunctioned. Have your Narco Authorized Service Station check your ELT.

2.2 FUNCTIONAL TESTING

The ELT 10 is FOR AVIATION EMERGENCY USE ONLY. However, should an operational check for the ELT be desired, follow the procedure outlined here.

a. Conduct the test only within the time period made up of the first 5 minutes, AFTER any hour or advise the nearest FAA Air Traffic Control Facility (Tower, FSS, etc.) prior to the test.

b. Monitor the transmission with a VHF receiver in your aircraft or that in a nearby aircraft. If neither is available, request the FAA/DOT Facility to listen for your transmission.

c. The monitoring VHF receiver should be turned ON and channeled to 121.5, its volume control should be positioned to the center of its range.

d. A distinctive downward swept tone should be heard from the monitoring receiver when the switch of the ELT, or the ELT remote switch is set to ON.

e. Set the switch to ON for approximately one second then return it to ARM.

f. The ELT 10 should have been activated. If the tone was heard, the ELT 10 is functioning properly. If the tone was not heard, the problem could be one of the following:

   . Check that the external antenna connector is secure... retest.

   . Check that the remote switch connections are secure and that the ELT 10's ON-OFF-ARM switch is set to ARM...retest.

   . Check that the battery is still within its dated use period.

g. If the ELT 10 still does not transmit, obtain services from a Narco Authorized Repair Station for further test and/or repair.

3.1 INSTALLATION INSTRUCTIONS

3.1.1 General Aircraft Installations

The installation must be performed in accordance with FAA requirements AC 43.13.2 and other applicable airworthiness directives.

In Canada, Part II, Chapter III of the DOT Engineering and Inspection Manual. CAUTION: Installation in pressurized aircraft constitutes a major modification. Consult Department of Transport Regional Officer before proceeding.

3.1.2 Location, Mounting, and External Surface Marking

The location of the ELT 10 is important for maximum protection in the event of a damaged aircraft due to an emergency landing. If possible, mount away from the aircraft skin to reduce the effects of damage due to external sources. DO NOT mount the ELT 10 in the bilge as plugged drain holes could cause total sustained submersion and possible ELT failure. The fixed antenna should be located on the outside of the aircraft as close as possible to the ELT 10 to provide a one foot loop in the coax cable.

Ideally, the ELT 10 should be located as far aft as possible, such as in the central tailcone section, and near an inspection access panel for convenience, allowing for testing and servicing.

Ensure that the location chosen provides rigidity and is not subject to excessive vibration in flight which might activate the ELT 10.

The ELT 10 requires the use of an approved external antenna in all installations. Refer to Sections 1.1.3 and 1.1.3.1 for list of approved antennas.

3.1.2.1 Mounting Location

The Mounting Bracket Assembly may be installed on a horizontal or vertical surface as long as the longitudinal (lengthwise) axis of the ELT is parallel ($\pm 10^{\circ}$) to the longitudinal axis of the aircraft. (For helicopters, see Section 3.1.4).

When mounting to sheet metal between .020 and .040 inches thick, 1/2 inch minimum diameter flat washers should be used at each mounting screw (4).

When mounted to sheet metal less than .020 inch thick, the sheet metal should be reinforced with .030 inch thick pads, one square inch minimum (or 1-1/4 inch OD washers), at each mounting screw (4).

If the pad or washer is bonded to the aircraft sheet metal and acts as a doubler plate, any combination that brings the total cross section thickness to .040 inch or greater is acceptable.

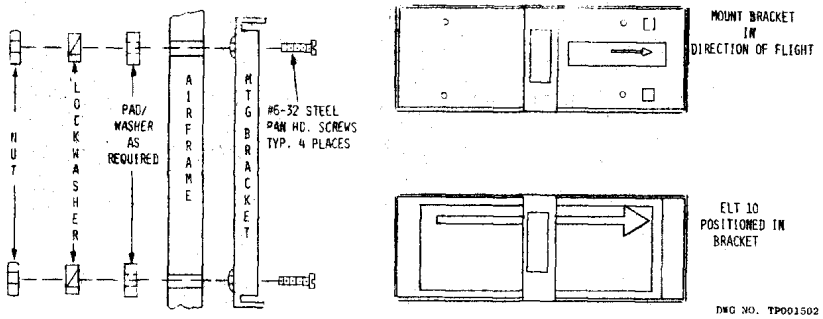


FIGURE 2. MOUNTING BRACKET/AIRFRAME

3.1.2.2 Install the ELT 10

Place the ELT 10 into the mounting bracket assembly. The mounting bracket and the ELT 10's case are tapered. With the ELT's ARROW and the bracket's ARROW both pointing forward, these two parts mate.

Secure the mounting strap.

3.1.3 Antenna Installation

NOTE: When selecting the antenna location, observe the following:

- Mount the antenna as far aft as possible.
- Mount the antenna as far from the communication antenna as possible (2 ft. - 0.6m minimum).
- Distance between the ELT 10 and the antenna should normally not exceed two feet (0.6m).
- Include a minimum one foot (0.3m) loop in the cable.

Refer to Figure 3 for antenna installation details.
Refer to Figure 3A for connecting fixed antenna to the ELT 10.

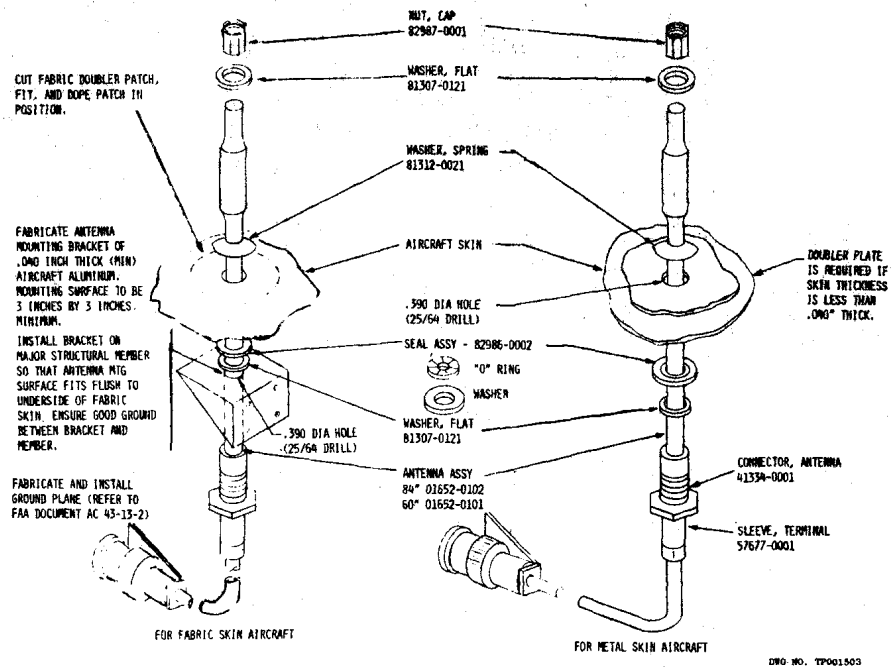
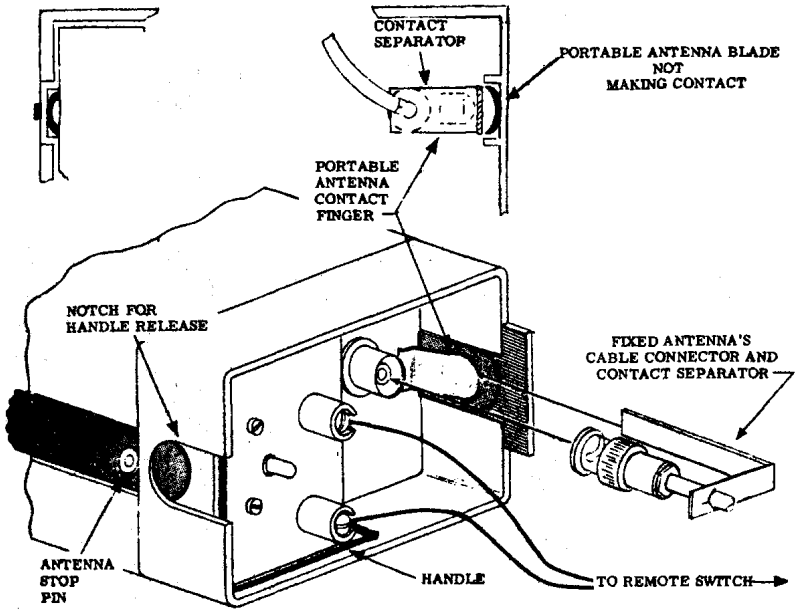


FIGURE 3. FIXED ANTENNA INSTALLATION



ELT(AP) AND ELT(AF) WITH ANTENNA
INACTIVATED FOR USE WITH FIXED ANTENNA
FIGURE 3A

3.1.3.1 Arming the ELT

Remove switch guard and connect antenna BNC to the ELT's BNC receptacle. Insert the plastic contact separator between the blade antenna and contact finger.

Press "RESET" button firmly, then release.

Set the ELT 10's ON-OFF-ARM switch to ARM.

Affix caution placard to instrument panel in clear view of pilot.

Make functional check per Section 2.2.

3.1.4 Helicopter Installation

The ELT 10 assembly must be located on or close to the primary structure supporting the rotor shaft and transmission. In selecting location of ELT 10, consideration should be given for future access for testing and servicing.

The mounting bracket and ELT 10 must be mounted so that flight arrows (marked on the ELT's case and bracket) are inclined approximately 45° downward in the forward direction in the fore and aft plane.

To install ELT 10 assembly in helicopter perform the same procedure given in the sections of 3.1 for fixed wing aircraft. However, the ELT 10 must be oriented as shown in Figure 4.

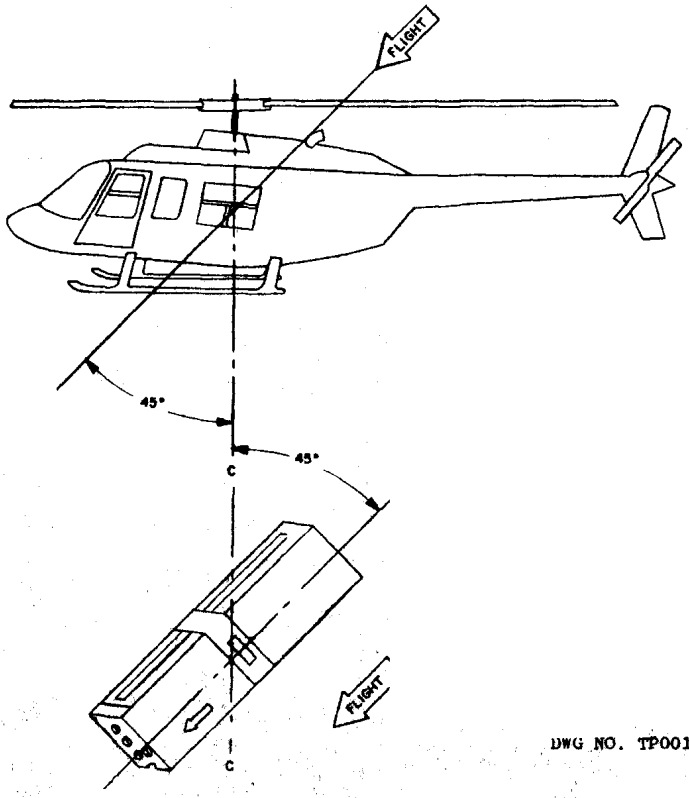


FIGURE 4. ELT 10 INSTALLATION IN HELICOPTER

3.2 EXTERNAL MARKING

The external surface of the aircraft (or helicopter) should be marked to indicate ELT location.

Such marking is recommended for installations in the USA and are REQUIRED in Canada.

3.3 REMOTE SWITCH

As the ELT 10 assembly is usually mounted out of the pilot's reach, an aircraft panel mounted remote switch is recommended. Narco Remote Switch Kit is available (Part No. 03716-0500).

Pilot's Remote Switch (Optional) Installation (Figure 5).

(1) Connect two aircraft quality wires to the two terminals of the ON-ARM switch mounted on the instrument panel.

(2) Set ON-ARM switch to ARM.

(3) Connect the two wires from the ON-ARM switch to the two screws above the words ON and ARM on the ELT 10 Front Panel.

To conform to regulations, the remote switch MUST have a guard to prevent accidental activation and a warning label affixed adjacent to the switch. Narco's Remote Switch Kit contains such a switch and warning use label. See Figure 5 for part number.

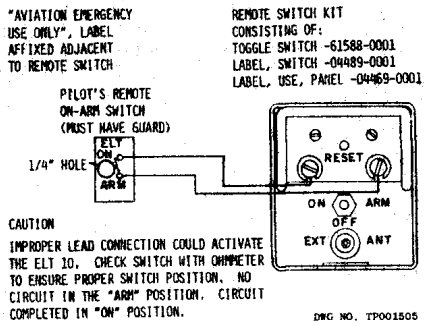


FIGURE 5. PILOT'S REMOTE SWITCH (OPTIONAL) INSTALLATION

4.1 MAINTENANCE

Maintenance of the ELT 10 is directed to five areas:

1. General security of the ELT 10 Antenna, mounting bracket locking latch, and interconnection(s)
2. Check out for proper operation
3. Timely battery replacement
4. Replacement of the Transmitter PC Board Assy
5. Replacement of the "G" Switch

4.1.1 Security

Security of the ELT is defined as assuring that the system is properly secured to the aircraft. Check:

1. Snugness of mounting bracket latch.
2. That the mounting bracket itself is firmly mounted.
3. That the antenna is firmly mounted.
4. That the BNC connection(s) are clean and "locked on".
5. That the optional remote switch and its leads are secure.

4.1.2 Operation Check

Refer to and use the procedure outlined in Section 2.2.

4.1.3 Battery Pack

Use only Narco Alkaline Battery Pack, Part No. 50659-0001, available thru Narco Authorized Repair facilities.

The only power supply for the ELT 10 is the sealed 13.5 alkaline battery pack. The pack is the lower portion of the ELT 10.

The battery pack is not rechargeable.

4.1.3.1 Battery Pack Replacement

Replace the battery pack for any of the following reasons:

1. After use in any emergency.
2. After an inadvertent activation of unknown duration.
3. When the total of all known transmissions (activations) exceed one hour.
4. On or before replacement date marked on the battery pack.
5. Visual inspection shows signs of leakage, corrosion, or non-secure battery leads.
6. If the ELT 10 is stored in an area where the temperature is normally above 100°F (30°C), the battery pack should be replaced at no greater than 12 month intervals. Storage at temperatures in excess of 130°F (55°C) must be avoided.

WARNING

Ensure that no short circuit of battery terminals can occur.

WARNING

Do not recharge, short circuit, or expose battery pack to high temperatures or fire.

4.1.3.2 Replacement Procedure

The ELT 10 must be removed from the aircraft to replace the battery pack.

Set ELT 10's ON-OFF-ARM switch to OFF. Disconnect antenna cable and remote switch wires, if installed, and remove ELT 10 from mounting bracket.

4.1.3.2 Replacement Procedure, Continued

The battery pack is the lower section of the ELT 10. The upper section contains the controls and the transmitter PC board. These two sections can be separated.

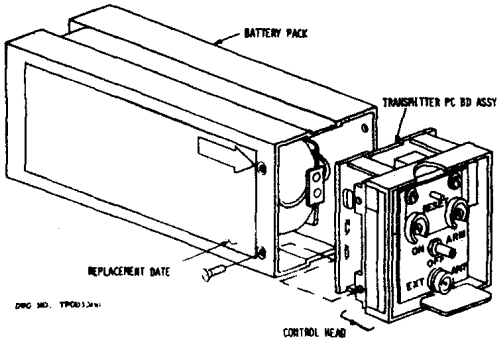


FIGURE 6. BATTERY PACK

To replace the battery pack, proceed as follows:

a. Remove 4 screws from the two sides of the lower section (two on one side and two on its opposite side) that are located just below the seam.

b. Carefully separate the upper section from the lower section.

c. Unsnap the battery connector from the base of the transmitter board.

d. Remove protective tape from new battery pack connector and snap to the connector on the transmitter board. Be sure the connector is firmly pressed in place and properly seated.

e. Apply a bead of sealant around the perimeter of the (upper) section where it will join the battery case. It should be applied continuously around the perimeter to assure there are no gaps.

f. The upper and lower sections go together only one way because of the position of the screw holes. Orient the upper and lower sections so the screw holes line up. Then slide the two sections together just enough to bring the screw holes in line.

g. Apply a very small amount of sealant to the countersink of each screw hole.

h. Replace the four screws, being careful to tighten only until snug. Use fingers only on the screwdriver. Overtightening will strip the retainer inserts.

i. Wipe away excess sealant with facial tissue.

j. Replace removed lead(s) and remount ELT 10 (ARROW TOWARD DIRECTION OF FLIGHT) and then set the control to ARM.

k. Perform the tests described in Section 2.2.

4.1.4 Transmitter PC Board

1. Separate the upper section of the ELT 10 from its lower section.
2. Disconnect the battery section (lower) by unsnapping the snap-off battery pigtail terminals from the bottom of the transmitter PC board.
3. Inspect and test battery pack (interim inspections only).
4. Apply 14V to transmitter PC board battery terminals. Check for proper ELT operation.
5. Visually inspect components not on transmitter PC board.

Should the transmitter PC board be found defective by a Narco Authorized Repair Station, a new replacement pretested transmitter PC board can be obtained from Narco (Part No. 01651-0101).

Removal and Replacement of Transmitter PC Board

1. Note location and unsolder three lead connections (See Figure 7).
2. Remove the four screws securing the board to the control head.
3. Orientate and install new board (solder 3 leads - secure 4 screws).
4. Test assembly as in Step 4 of the Replacement Procedure.
5. Firmly connect the snap-on battery pack terminals.
6. Refer to Section 4.1.3.2's final steps (d to k) to complete the replacement.

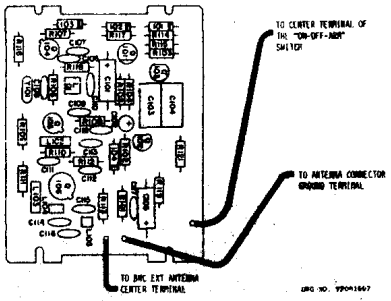


FIGURE 7. PRINTED CIRCUIT BOARD CONNECTIONS

4.1.5 "G" Switch

The "G" switch is mounted by two sets of hardware to the control head's front panel.

To replace the "G" switch the ELT must be removed from the aircraft, separate the upper and lower sections, and remove screws and lift the transmitter PC board from the control head's mounts. Previous sections have described disassembly to this point.

4.1.5 "G" Switch, Continued

"G" switch replacement:

a) Position transmitter PC board to give full and clear access to the "G" switch's hardware and contacts.

b) Unsolder 4 leads from switch.

c) Using a slot drive screwdriver and a 3/16 nut driver, remove hardware.

d) Note disassembly sequence of hardware and gasket (black).

e) Exchange switch and reassemble.

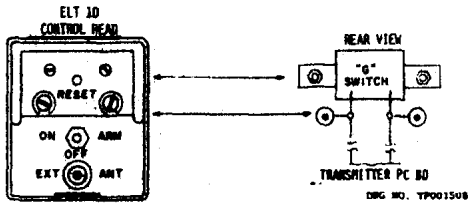


FIGURE 8. "G" SWITCH

5.1 Restrictions and Limitations

A. The ELT 10 Emergency Locator Transmitter is for "AVIATION EMERGENCY USE ONLY."

B. The remote ON-ARM switch must be installed with a GUARD and left in the ARM position except for testing and emergency use.

C. Testing the ELT 10 must be performed according to the latest FAA and/or FCC directives. In Canada, follow DOT/DOC regulations.

D. Only the ELT whip antennas listed in Sections 1.1.3 and 1.1.3.1 are TSO'd and approved by Narco to be used with the ELT 10.

E. The battery pack must be replaced according to the date marked on the ELT 10 label or after one (1) cumulative hour of use. This conforms with the half-life and use requirements of FAA TSO-C91, and DOT airworthiness requirements.

F. The battery pack must be replaced with Narco alkaline battery pack, Part No. 50659-0001.

G. When the transmitter is activated, it may be necessary to confine voice communications to channels several megahertz removed from the emergency frequencies of 121.5 and 243. Interference with communications can occur due to the unique modulation characteristics required.