



DOC06330F

Emergency Locator Transmitter

Orolia S.A.S.

INSTALLATION MANUAL OPERATION MANUAL



KANNAD 406 AP-H

P/N: S1820502-04

P/N: S1820511-01

P/N: 0124206

KANNAD 406 AP-H transmitter

Mounting bracket, 1 strap

ANT100, auxiliary antenna

Users are kindly requested to notify Orolia Customer Support of any discrepancy, omission or error found in this document.

Please register a support ticket via the Orolia website:

<https://www.orolia.com/support/>

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INTRODUCTION

The instructions in this manual provide the information necessary for the installation and the operation of KANNAD 406 AP-H ELT.

Servicing instructions ([Refer to SERVICING page 601](#)) are normally performed by shop personnel.

For servicing and maintenance instructions, refer to relevant CMM.

For regulatory requirements, please consult your national aviation authority.

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SYSTEM OVERVIEW

1. COSPAS-SARSAT System

A. Description

Launched in the early eighties by the four founder countries (Canada, France, Russia, USA), the COSPAS-SARSAT system provides satellite aid to search and rescue (SAR) operations for maritime, aeronautical and terrestrial vehicles anywhere in the world.

It uses distress beacons fitted on mobiles and a constellation of LEO and GEO satellites which relay the 121.5 / 243 MHz signals and process the 406 MHz signal to ground stations (LUT) where the beacon positions are determined (with a precision of 10 NM with 121.5 / 243 signals and less than 2 NM with 406 signals).

Several types of beacons are designed to match the various applications of the COSPAS-SARSAT system:

- EPIRB (Emergency Position Indicating Radio Beacon) for maritime applications.
- ELT (Emergency Locator Transmitter) for aeronautical applications.
- PLB (Personal Locator Beacon) for land expeditions.

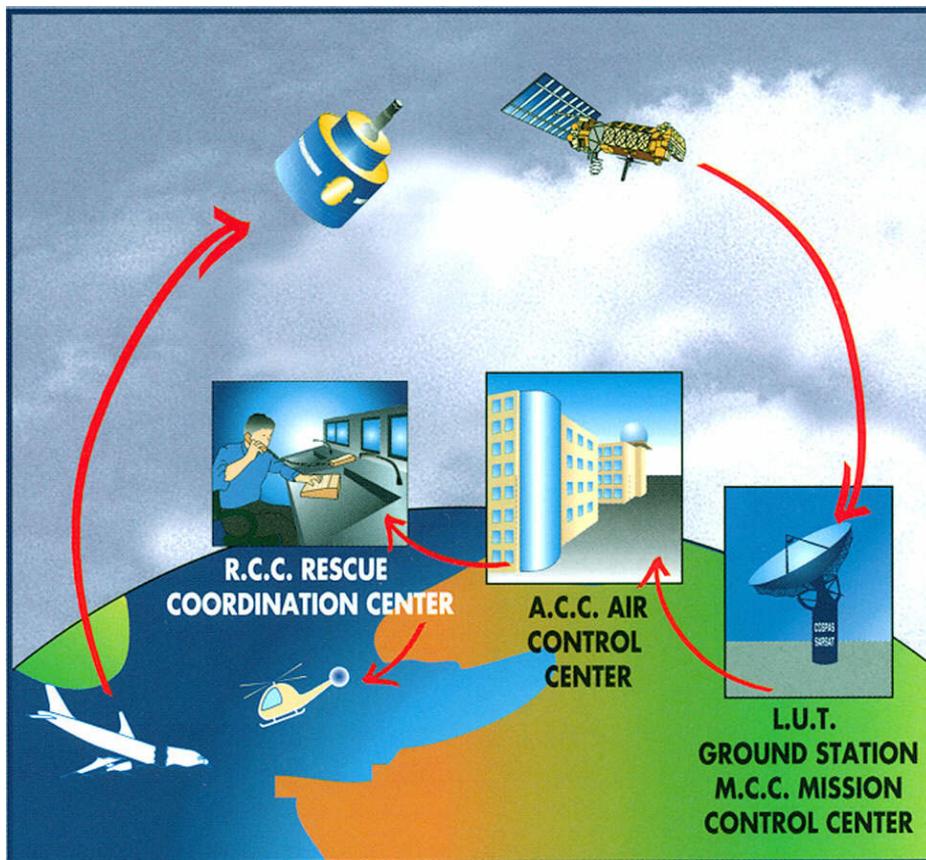


Figure 1: COSPAS-SARSAT System

B. World coverage with the COSPAS-SARSAT system

The major improvement is the use of the COSPAS-SARSAT system for processing aeronautical emergencies.

The difference with the 121.5 / 243 MHz is that the 406 MHz transmission carries digital data which enable the identification of the aircraft in distress and facilitate SAR operation (type of the aircraft, number of passengers, type of emergency).

The 406 MHz message is transmitted to the COSPAS-SARSAT satellites. This message is downloaded to one of the 64 ground stations (44 LEOLUTs and 20 GEOLUTS).

The aircraft is located by Doppler effect by the LEO satellites with a precision better than 2 NM (4 km) at any point of the earth.

C. Environmental improvements of ELTs

The certification of an ELT includes a range of severe mechanical tests:

- resistance to flame;
- impact and crush tests;
- resistance to 100 G and 500 G shocks;
- watertightness;
- antideflagration;
- extreme temperatures (-20°C to 55°C for more than 48 hours).

D. G-Switch (shock detectors)

The shock detectors equipping old automatic ELTs are the cause of a large number of false alarms. Major work has consisted in studying aircraft crashes (study made by the “Crash Research Institute”) and evaluating the acceleration amplitudes involved. As a consequence, G-Switch specifications have been modified to optimize the accuracy of the crash detection.

2. KANNAD 406 AP-H Presentation

The KANNAD 406 AP-H belongs to the AP type of ELTs which are intended to be rigidly attached to the aircraft before the crash, but readily removable from the aircraft after a crash.

The KANNAD 406 AP-H is designed to be installed **on helicopters only**.

The KANNAD 406 AP-H is composed of:

1. a transmitter;
2. a mounting bracket;
3. a remote control panel (mandatory if ELT controls are not available from the pilot's position, refer to RTCA/DO-183, RTCA/DO-204, EUROCAE ED-62);
4. an outside antenna;
5. a "Programming Dongle" for pin-programming function (option);
6. CS144 Interface Module (option);
7. an auxiliary antenna (for use as a survival beacon).

The transmitter, bracket, Programming Dongle and CS144 Interface Module are installed in the aircraft near the tail. The outside antenna is mounted on the fuselage near the tail. The remote control panel is installed in the cockpit and connected to the ELT with a 4 or 5 wire bundle.

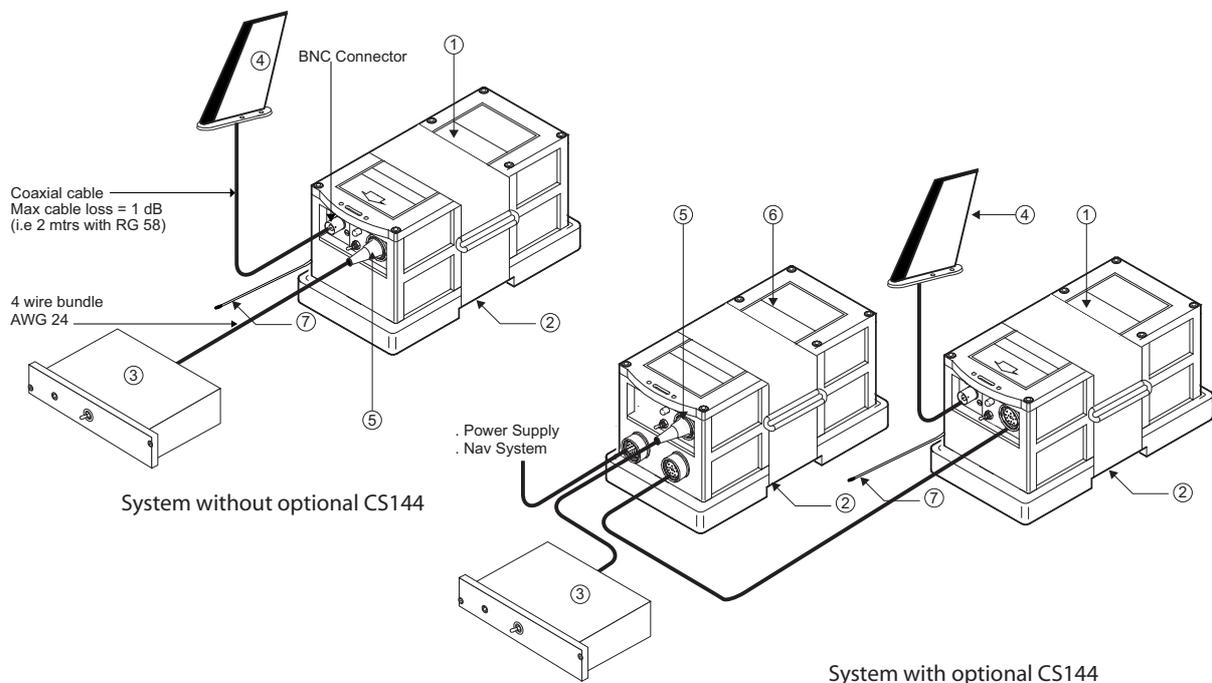


Figure 2: ELT system description

3. LINE REPLACEABLE UNITS

A. Transmitter

The KANNAD 406 AP-H is an ELT designed to be installed on board helicopters to transmit a distress signal on 3 frequencies:

- 406 MHz (COSPAS-SARSAT frequency) for precise pinpointing and identification of the aircraft in distress.
- 121.5 and 243 MHz used for homing in the final stages of the rescue operations.

It is certified as an Automatic Portable (AP) ELT and works with a three frequency outside antenna when installed on board the aircraft or with a small whip antenna (auxiliary antenna) when used as a survival ELT.

B. Bracket

The bracket installed near the tail is designed to fix the ELT with a Velcro® strap. This enables quick removal of the ELT for maintenance or exchange.

C. Remote Control Panel

A remote control panel can be supplied for installation in the cockpit in order to enable the pilot to monitor and control the ELT status.

The following controls are to be found on the panel:

- 3-position switch (ON, ARMED, RESET&TEST);
- red or amber visual indicator;
- beeper (on certain versions).

The remote control panel is connected to the ELT via a 4 or 5-wire cable equipped with a “Programming Dongle” or a DIN 12 connector on the ELT side and the connector corresponding to the Remote Control Panel version on the other side.

D. External antenna

The external antenna, also installed near the tail, can be either rod or blade type according to aircraft speed.

Connection to the ELT will be carried out with a 50 Ohm coaxial cable (RG58 for example) ended with a BNC connector.

IMPORTANT: Orolia S.A.S. recommends a cable with radio electric properties similar or better to those of a RG58 cable.

4. Design features

The KANNAD 406 AP-H is made of moulded plastic with excellent mechanical resistance (ASA/PC, light yellow colour).

The housing is designed with no sharp edges.

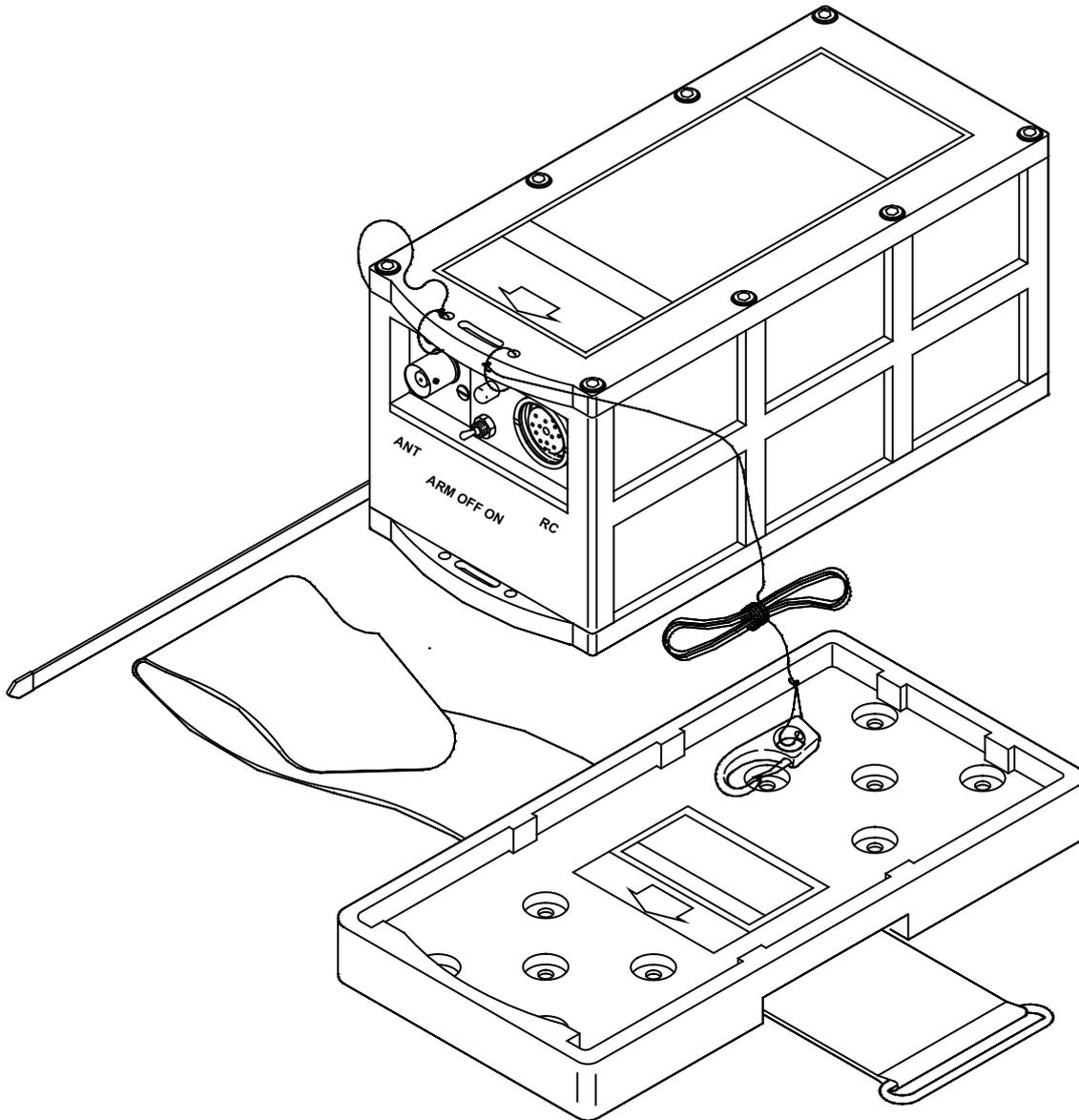


Figure 3: KANNAD 406 AP-H with mounting bracket

5. Compatibility list

A. Remote control panels (RCP)

Orolia Designation	Orolia P/N
RC100 KIT	S1820513-03
RC150 KIT	S1820513-07
RC200	S1820513-11
RC200-NVG	S1820513-14
RC300	S1820513-09
RC400	S1820513-05
RC500-320	S1820513-02
RC600 NVG (Y)	S1820513-12
RC600 NVG (W)	S1820513-13
RC800	S1820513-15
RC810	S1820513-23

B. DIN-12 connector or programming dongles

Orolia Designation	Orolia P/N
DIN-12 connector	S1820514-03
Programming dongle	S1820514-01
Programming dongle A320	S1820514-04
Programming dongle A330-340	S1820514-05
Programming dongle Assy	S1820514-06

C. ELT-NAV System Interface

Orolia Designation	Orolia P/N
CS144-RS	S1825502-01
CS144-A	S1825502-02
Connecting cable for CS144-RS or CS144-A	S1825502-03

D. External antennas

Orolia Designation	Manufacturer	Orolia P/N
ANT100	PROCOM	0124206
WHIP ANTENNA AV200	RAMI AV-200	0146150
ROD ANTENNA AV300	RAMI AV-300	0146151
ROD ANTENNA ANT300	CHELTON 1327-82	0124220
ROD ANTENNA ANT410	DAYTON GRANGER ELT 720063	N/A
ROD ANTENNA ANT560	DAYTON GRANGER ELT10-696-1	0145787
BLADE ANTENNA ANT700	CHELTON 2632-82	1002063
N/A	ARTEX 110-340	N/A
N/A	HR-SMITH 10-118-32	N/A

NOTE: ANT100 can be only used as auxiliary antenna when the ELT is used as portable equipment.

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SYSTEM FUNCTIONAL DESCRIPTION AND OPERATION

1. Transmitter

The KANNAD 406 AP-H can be activated either automatically when the crash occurs (thanks to a shock sensor) or manually (thanks to a switch on the transmitter itself or on a Remote Control Panel).

The KANNAD 406 AP-H is designed to transmit on three frequencies (121.5, 243 and 406 MHz). The two basic emergency frequencies (121.5 and 243 MHz) are mainly used for homing in the final stages of the rescue operations. The 406 MHz frequency is used by the COSPAS-SARSAT satellites for precise pinpointing and identification of the aircraft in distress.

Once activated, the transmitter operates continuously on 121.5 and 243.0 MHz with an output power of 100 mW on each frequency. The modulation is an audio frequency sweeping downwards from 1420 Hz to 490 Hz with a repetition rate of 3 Hz.

During the first 24 hours of operation, a digital message is transmitted on 406.025 MHz every 50 seconds. The output power on 406 MHz is 5 W.

The KANNAD 406 AP-H can transmit two types of messages on 406 MHz:

- 112 bits for a short message (identification only);
- 144 bits for a long message (identification + aircraft position).

The long messages are generated by a separate interface module (called CS144) connected to the ELT and either NAV equipment of the aircraft by RS232, RS422 or RS485 link or to an ARINC429 bus.

2. Controls

The following controls are to be found on the ELT front panel (from left to right):

1. 3-position switch ARM/OFF/ON;
2. Red visual indicator;
3. DIN 12 connector for connection to Remote Control Panel, CS144 interface module, dongle or programming equipment;
4. BNC connector for the antenna.

IMPORTANT: The switches are protected against inadvertent operation by a locking latch. To operate the switches, the lever shall be pulled to unlock then set to position.

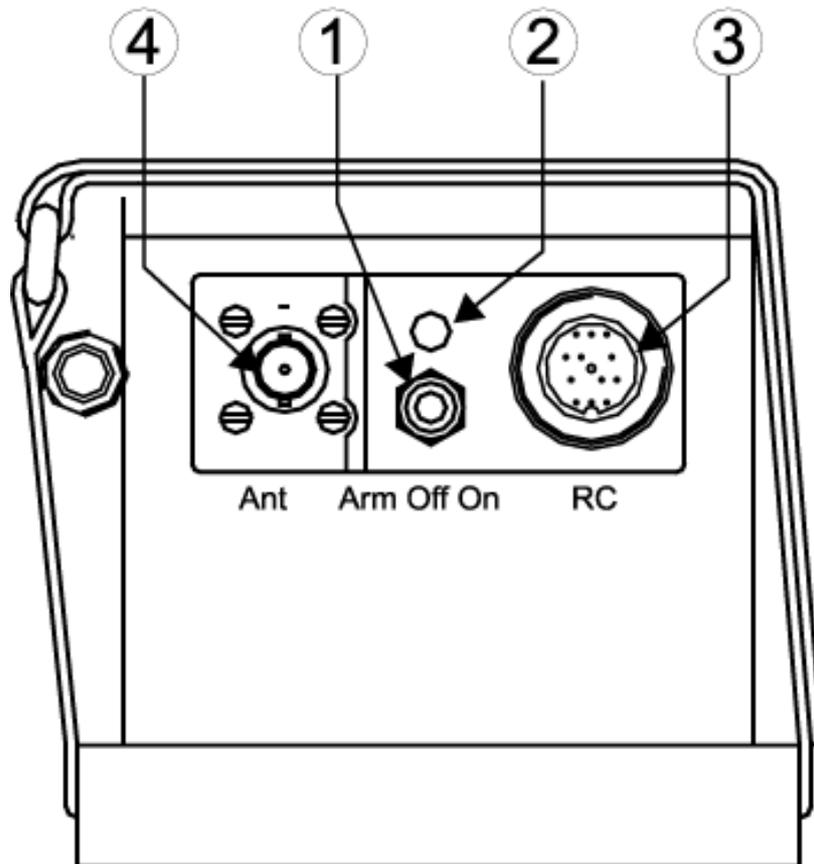


Figure 101: Front Panel

The red visual indicator gives an indication on the working mode of the beacon:

- after the self test: a series of short flashes indicate the self test failed, one long flash indicates a correct self test;
- in operating mode: periodic flashes during 121.5 / 243 transmission;
- long flash during 406 transmission.

A buzzer gives audio information on the beacon working:

- continuous tone during self test;
- 2 beeps per second during 121.5 / 243 transmission;
- silence during 406 transmission.

3. Working mode information

CAUTION: WHEN OPERATING THE ARM/OFF/ON SWITCH, PULL LEVER TO UNLOCK AND SET TO POSITION.

The KANNAD 406 AP-H has 4 different modes:

- Off.
- Self-test (temporary mode).
- Armed (standby mode to enable automatic activation by the shock sensor or by the remote control panel).
- On (transmission).

Transmission is effective if the beacon is activated (either manually on the ELT control panel, remotely by the “ON” switch on the remote control panel or automatically by the shock sensor).

A. Off

The ELT is off when the switch is in position “OFF”. No part of the ELT is energized. This mode must **only** be selected when the ELT is removed from the aircraft or parked for a long period or for maintenance.

B. Self-Test

The self-test mode is a temporary mode (max duration 5 sec) in which the ELT checks the main characteristics of the transmitter (Battery voltage, Programming) and enables digital communication with a programming and test equipment.

This mode is selected:

- when switching from “OFF” to “ARM”;
- when switching to “RESET / TEST” on the Remote Control Panel (provided that the switch of the ELT is in the “ARM” position);
- when switching to “ON” prior to transmission.

The buzzer operates during the self-test procedure.

After about 3 seconds, the test result is displayed on the visual indicator as follows:

- One long flash indicates valid test.
- A series of short flashes indicates false test result.

The number of flashes indicates the type of failure:

- 3 + 1 = LOW BATTERY VOLTAGE.
- 3 + 2 = LOW TRANSMISSION POWER.
- 3 + 3 = FAULTY VCO LOCKING (FAULTY FREQUENCY).
- 3 + 4 = NO IDENTIFICATION PROGRAMMED.

It is recommended to test the ELT regularly in order to detect any possible failure ([Refer to A. Periodicity, page 301](#))

The number of self-tests carried out is recorded. This information is available when the ELT is connected to a programming and test equipment (PR600).

C. Armed

In order to enable activation by the G-Switch or with the Remote Control Panel, the ELT must be in standby mode with the switch in the “ARM” position

This mode is mandatory during flight. The ELT should remain in the “ARM” position all the time except when the ELT is removed from the aircraft or parked for a long period or for maintenance.

The Remote Control Panel is energized by the ELT when switched to “ARM”.

D. On

This mode is selected:

- manually by switching to position “ON”;
- by switching the Remote Control Panel switch to position “ON” (provided that the ELT switch is in the “ARM” position);
- when a crash occurs (provided that the ELT switch is in the “ARM” position).

When this mode is selected, the ELT starts transmission:

- on 121.5 MHz & 243 MHz immediately (continuous transmission);
- on 406 MHz after 50 seconds (406 burst every 50 sec during 24 hours).

The red visual indicator on the ELT (and on the remote control panel if installed) flashes and the buzzer operates.

In case of accidental activation, the ELT can be reset either by switching it to “OFF” or by switching to “RESET” on the Remote Control Panel.

The number of 406 MHz bursts effectively transmitted is recorded. This information is available when the ELT is connected to a programming and test equipment (PR600).

4. Endurance

The energy is provided by a battery pack composed of 3 LiMnO₂ D cells (See pages 107 & 602 for Kit battery reference).

Lithium cells, lithium batteries and equipment containing such batteries are subjected to regulations and classified under class 9 as from 1st of January 2003.

The endurance of the 121.5/243 transmission is close to 100 hours at -20°C with new batteries.

In the worse conditions possible, a distress is pinpointed 5.5 hours maximum after the ELT activation and the position is subsequently updated (if necessary) every 2 hours.

As it is therefore preferable to keep the battery power for 121.5/243 MHz homing frequency transmission for the rescue operations, the 406 MHz transmission is deliberately stopped after 24 hours to extend the 121.5/243 transmission for as long as possible.

The transmitter battery expiry date is fixed at 7 years from date of cell manufacturing (CDOM). If no activation of the ELT occurs during the battery lifetime, it shall be replaced before or at battery expiry date^(see note below).

NOTE: The expiry date takes into account FAR 91-207 (i.e. batteries to be replaced when 50 percent of their useful life has expired).

5. Electrical characteristics

Transmitter power supply: 3 x LiMnO₂ D type cells.

A. Electrical interface

When installed on board, the ELT has to be connected:

- to a Remote Control Panel via a DIN12 connector;
- to an external antenna via a BNC connector.

The DIN12 connector is also used to connect a programming dongle, a CS144 interface or a programming and test equipment.

J1

This connector is dedicated for connection to the Remote Control Panel, to the Programming or Maintenance Dongles, to a CS144 interface and/or to the programming equipment (PR600).

IMPORTANT: Shielded cables are recommended. The required wires are AWG24.

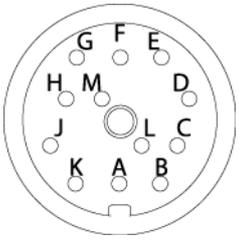
J1	PIN	Signal Name	Destination	Direction
<p>Viewed from Front Face</p> 	J1-A	RCP TEST/RESET	RCP	IN
	J1-B	DONGLE RX	SMM / PGM	IN
	J1-C	DONGLE CS	SMM	OUT
	J1-D	DONGLE SK	SMM	OUT
	J1-E	DONGLE TX	SMM / PGM	OUT
	J1-F	DONGLE ALE2P	SMM	OUT
	J1-G	RCP COMMON	RCP	OUT
	J1-H	RCP BUZZER	RCP(*)	OUT
	J1-J	RCP LED	RCP	OUT
	J1-K	RCP ON	RCP	IN
	J1-L	DONGLE GND	SMM / PGM	OUT
	J1-M	N/C		

Table 1: J1 connector pin-out

(*)This wire is not used with some versions of Remote Control Panels. For precise information, refer to Remote Control Panel technical description.

J2

Connector J2 is used to connect the external antenna through a 50 Ω coaxial cable for use as fixed ELT or the auxiliary antenna for use as survival ELT.

6. Technical Specifications

TYPE

- Three-frequency ELT
(121.5 / 243.0 / 406.025 MHz)
- Automatic fixed
- COSPAS-SARSAT Class 2
(-20°C to +55°C).

406 MHz TRANSMISSION

- Frequency: 406.025 MHz +/- 2 kHz
- Output power: 5W (37 dBm +/- 2 dB)
- Modulation type: 16K0G1D (Biphase L encoding)
- Transmission duration:
440ms (short message) every 50 sec. compatible with long message transmission (520ms)
- Endurance: Over 24 hours at -20°C

121,5/243 MHz TRANSMISSION

- Frequencies:
121.5 MHz +/- 6 kHz
243.0 MHz +/- 12 kHz
- Output power: 100 to 400 mW (20dBm to 26 dBm) for each frequency
- Modulation type: 3K20A3X
- Modulation rate: between 85 and 100%
- Frequency of modulation signal:
1420 Hz to 490 Hz with decreasing sweep
- Endurance: Over 48 hours at -20°C

CONTROLS

- ARM / OFF / ON switch
- Bright red visual indicator
- BNC antenna connector
- DIN12 connector for remote control panel (RCP) and pin programming option.
- Buzzer

G-SWITCH SENSOR

Mechanical G-switch sensor at 45° compliant with EUROCAE ED62 specifications.

BATTERY

KIT BAT300, P/N : S1820516-99

3 x LiMnO₂ D type cells for transmitter power supply

Expiry date: 7 years from date of cell manufacturing (CDOM)

HOUSING

Material: Molded plastic

Color: Yellow (color compounded)

Transmitter dimensions:

172 mm x 82 mm x 82 mm

Overall dimensions:

max 290 mm x 115 mm x 95 mm

Weight: typical 1235 g / max 1300 g (including battery)

Tightness: O-rings

ENVIRONMENTAL CONDITIONS

RTCA DO-160D / EUROCAE Ch1 to 25

[D1]XBA[ED62][YLMC]AWXXXXZXXXZ

WL[(A1)(A2)(A3)XX]XXA

Note: chapters 6, 8, 9 & 10 according to DO160C.

QUALIFICATIONS

ETSO-2C91a & ETSO-2C126

(EUROCAE ED62)

TSO-C91a & TSO-C126 (RTCA DO183 & DO204)

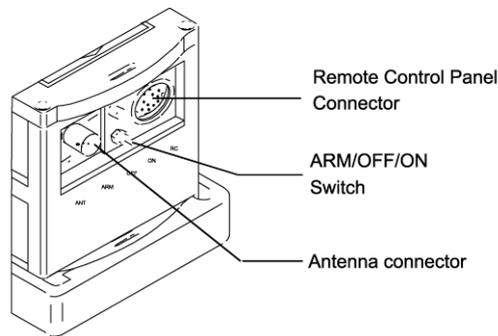
7. Activation

CAUTION: WHEN OPERATING THE ARM/OFF/ON SWITCH, PULL LEVER TO UNLOCK AND SET TO POSITION.

A. Standby mode for automatic activation

In order to be automatically activated by the crash sensor, the ELT must be in standby mode. This mode is mandatory during the flight. We recommend to switch the ELT off only when the aircraft is parked for a long period or for a maintenance operation.

- Check that the antenna is correctly connected.
- Switch to “ARM”.



To operate the ELT with the Remote Control Panel, ensure that:

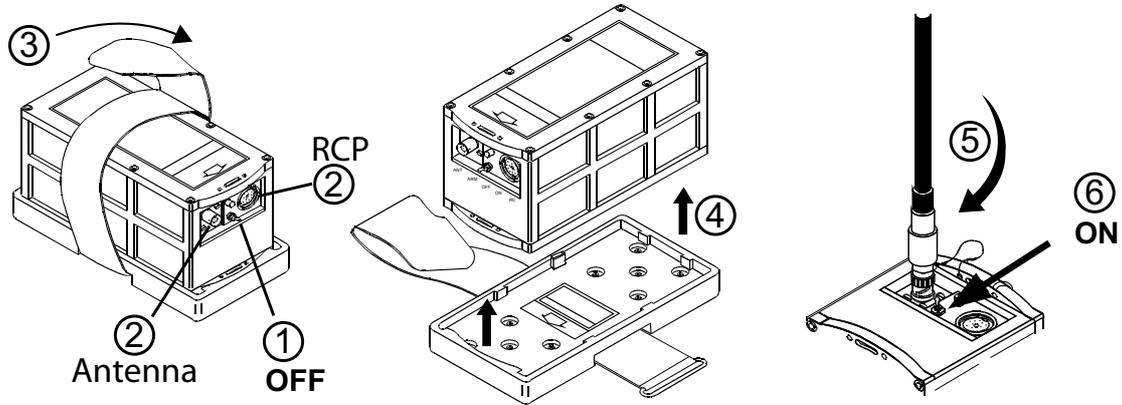
- The ELT switch is in the “ARM” position.

B. Manual activation as fixed ELT

- Check that the external antenna is correctly connected.
- Switch to “ON” (either on the ELT or on the Remote Control Panel):
 - The ELT starts with the self-test sequence.
 - 121.5 / 243 MHz transmission starts immediately after the self-test.
 - 406 MHz starts after 50 seconds (406 burst every 50 sec during 24 hours).
 - During transmission, buzzer operates and visual indicator flashes.

C. Manual activation as survival ELT

The KANNAD 406 AP-H can be used external the aircraft in survival version. A tether is used to fix the transmitter to a liferaft in case of ditching.



1. Switch to "OFF".
2. Disconnect the external antenna (ANT) and the Remote Control Panel (RC).
3. Unfasten the Velcro® strap.
4. Remove the transmitter and the auxiliary antenna from the bracket.
5. Connect the auxiliary antenna (ANT).
6. Switch to "ON":

IMPORTANT: Put the antenna in a vertical position.

- The ELT starts with the self-test sequence.
- 121.5 / 243 MHz transmission starts immediately after the self-test.
- 406 MHz transmission starts after 50 seconds.
- During transmission, buzzer operates and visual indicator flashes periodically.

8. Reset

CAUTION: WHEN OPERATING THE ARM/OFF/ON SWITCH, PULL LEVER TO UNLOCK AND SET TO POSITION.

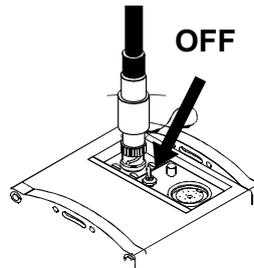
It is possible to stop the ELT in case of unintentional activation.

Regulations state that no transmission must be interrupted unless every means are used to contact and inform the Air Traffic Controller of this action.

IMPORTANT: As 406 MHz transmission is effective 50 seconds after the ELT activation, if it is reset within this delay, no further radio contact will be necessary.

A. Manual reset

- Switch to “OFF”.



B. Reset with Remote Control Panel

- The switch has to be in the “ARM” position on the ELT.
- Switch to “RESET & TEST” on the remote control panel.

9. Self-Test

[Refer to 1. Self-test, page 301](#)

INSTALLATION / REMOVAL

CAUTION: WHEN OPERATING THE ARM/OFF/ON SWITCH, PULL LEVER TO UNLOCK AND SET TO POSITION.

1. Registration and Programming

The ELT must be registered prior to installation on board.

The registration card available from the local registration authority must be completed and returned to this authority.

The “Programming Datasheet” (DIM0300) must be completed and returned to your distributor.

Any change of ownership shall also be declared and registered with the local registration authority and with the distributor.

The KANNAD 406 AP-H is fully compatible with the four programming protocols defined by the COSPAS-SARSAT C/S G005 document:

- Serialised Number.
- Aircraft 24 bit Address (the same as MODE S ATC or TCAS).
- Aircraft Operator Designator + serialised number up to 4096.
- Aircraft Nationality and Registration marking (Tail Number). This identification consists of up to 7 alphanumeric characters.

Programming of the ELT can be carried out either:

- by Orolia S.A.S. or the distributor (order must include programming details).
- in the shop with a programming equipment (PR600 and Kannad e-Prog software).
- on board the aircraft with a programming equipment or programming dongle.

This operation takes less than 2 minutes and does not need any hardware operation. The identification is simply downloaded in the ELT when connected to the programming equipment via the DIN 12 connector.

A. Pin programming option

The KANNAD 406 AP-H offers pin-programming capabilities to facilitate maintenance operations especially in case of removals and/or replacement.

A special DIN 12 connector with a Serial Memory Module (called “Programming Dongle”) is connected to the ELT when installed on board. This Programming Dongle contains the identification information of the aircraft and remains on board the aircraft. When an unprogrammed ELT is installed and connected to this Programming Dongle and the “ELT” is switched to “ARM”, it automatically updates its own memory with the identification data contained in the Programming Dongle memory.

When the ELT is removed from the aircraft, it keeps its identification data.

For maintenance purposes, it is possible to delete the identification information of the ELT by connecting a “Maintenance Dongle” to the ELT. Any accidental transmission with this “maintenance dongle” will not involve SAR operation as the identification code transmitted is recognised by COSPAS-SARSAT as “not on board”.

When a maintenance dongle is connected:

- Country code is **227** (France).
- Protocol is **Test**.
- Identification number is **SI + 5 digits** (the last 5 digits of CSN number) or **K + 6 digits** (the 6 digits of the CSN number).

If the pin programming option is selected by the operator, the following equipment are required:

- a “Programming Dongle” on each aircraft;
- a “Maintenance Dongle” on each ELT spare.



Figure 1: Maintenance Dongle

2. ELT Installation

A. Installation recommendations

“The ELT shall not be installed within 60cm (2 ft) of a compass or flux gate.

The distance between ELT and antenna shall be determined so that, according to the coaxial cable chosen, the cable lost should be ≤ 1 dB at 400 MHz.

The ELT front panel should be easily accessible to connect the outside antenna and the remote control panel device and to check the ELT good operation (controls and lights).”

(1) FAA Recommendations

Installation must be made by qualified personnel in accordance with FAA regulations. Duplicating a previous installation may not be acceptable. Refer to:

FAA - Advisory Circular 43.13-2A (Acceptable Methods, Techniques, and Practices - Aircraft Alterations), specifically, Chapters 1, 2, 11 and 13.

(2) TSO C126a Section 5 b. Application Data Requirements

“The conditions and tests for TSO approval of this article are minimum performance standards. Those installing this article, on or in a specific type or class of aircraft, must determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only according to 14 CFR part 43 of the applicable airworthiness requirements”.

(3) RTCA DO-182 Recommendations

“All ELT system components which must survive to a crash intact,...should be attached to the airframe in such a manner that the attachment system can support a 100g load... in the plus and minus directions of the three principal axes of the aircraft.”

(4) RTCA DO-204a Requirements

“The ELT unit shall be mounted to primary aircraft load-carrying structures such as trusses, bulkheads, longerons, spars or floor beams (not aircraft skin) or a structure that meets the requirements of the following test. The mounts shall have a maximum static local deflection no greater than 2.5 mm when a force of 450 Newtons (100 lbf) 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 m or more than 1.0 m from the mounting location. Typical approaches for adding shelf and rail platform mounting provisions to

aircraft structure as shown an FAA Advisory circular 43.13-2(), Chapter 2."

B. Bracket installation

- Determine the location of the ELT on board according to FAR/RTCA recommendations.
- The G-Switch axis shall be directed to sense the primary crash pulse along the longitudinal axis of the aircraft. Reference to the G-Switch is given by the arrow "Sens du Déplacement / Flight direction".

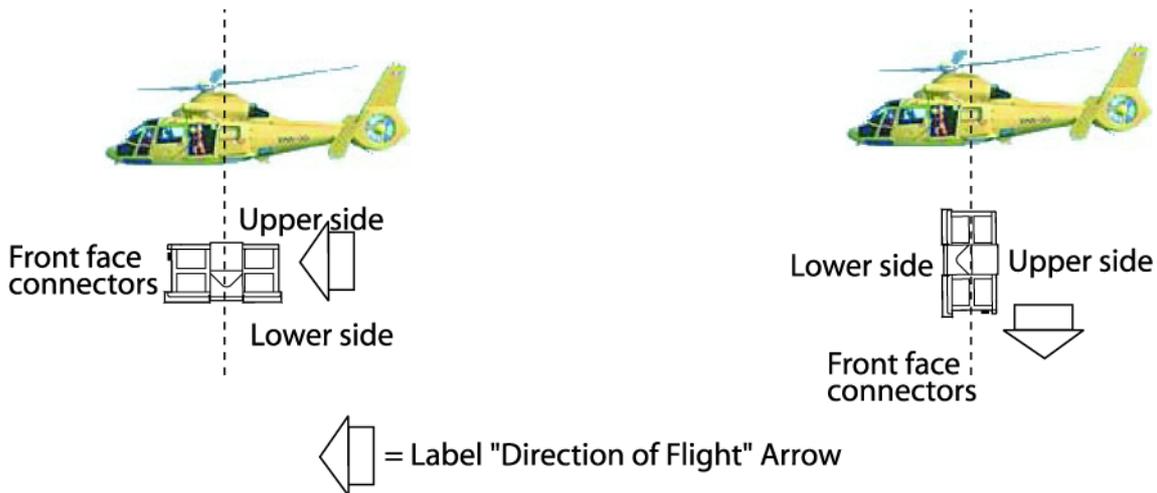


Figure 2: KANNAD 406 AP-H, installation

IMPORTANT: The KANNAD 406 AP-H is designed to be installed on board helicopters only.

The "Direction of Flight " arrow shall point towards the front or the bottom of the helicopter (and not pointing 45° downwards) with maximum tolerance of 15°:

- If the KANNAD 406 AP-H is installed with the "Direction of Flight " arrow pointing towards the front of the helicopter, the ELT shall be mounted with the upper side pointing towards the top of the helicopter.
- If the KANNAD 406 AP-H is installed with the "Direction of Flight " arrow pointing towards the bottom of the helicopter, the ELT shall be installed with the lower side pointing towards the front of the helicopter.

Drill 4 holes Ø 6 mm in the aircraft structure according to "Drilling mask". Holes 4,5,6,7 shall be preferred.

If the aircraft structure is not solid enough to withstand a 500 kg traction on the bracket, a reinforcement plate (not supplied) should be installed as shown [Figure 3: Bracket installation](#).

Fix the bracket with the 4 screws, 8 washers and 4 nylstop nuts supplied.

IMPORTANT: tighten to a torque between 4 and 5 Newton x meter.

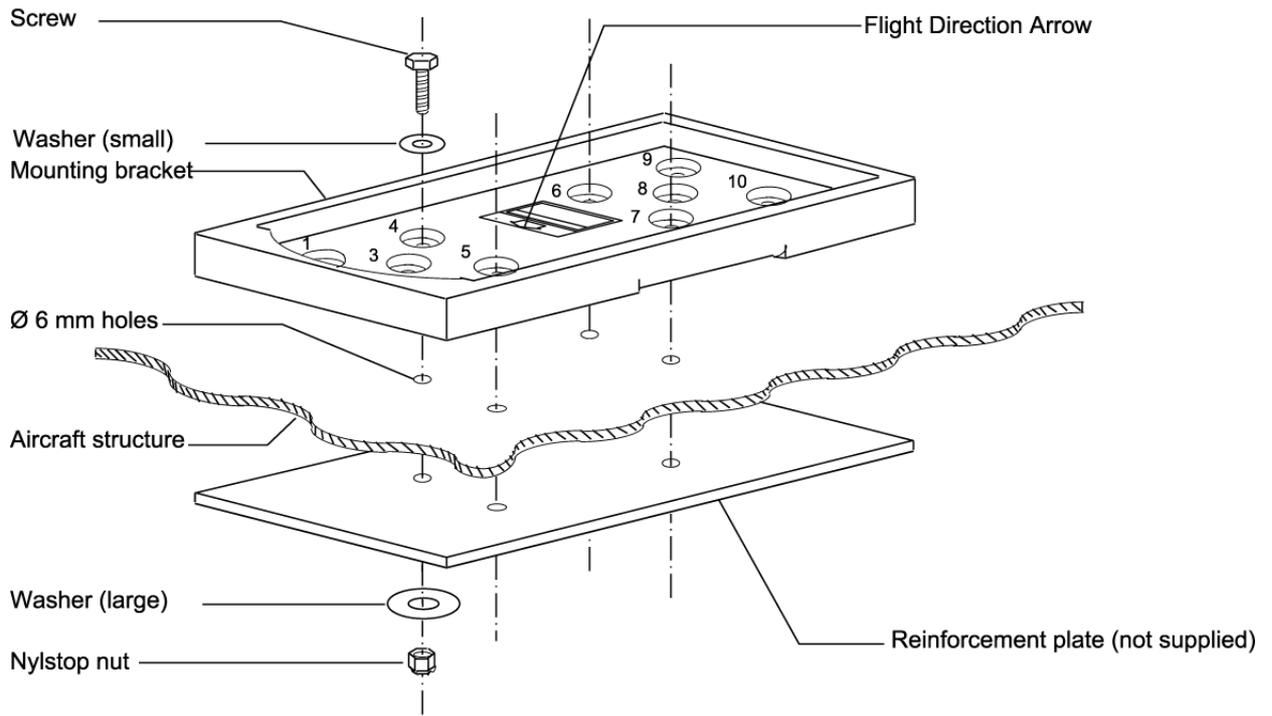


Figure 3: Bracket installation

C. Transmitter and auxiliary antenna installation

CAUTION: WHEN OPERATING THE ARM/OFF/ON SWITCH, PULL LEVER TO UNLOCK AND SET TO POSITION.

- Verify that the ELT identification label matches the aircraft tail number.
- Mount the transmitter on the bracket.
- Slide the self-stripping strap through the buckle and fasten it tightly.

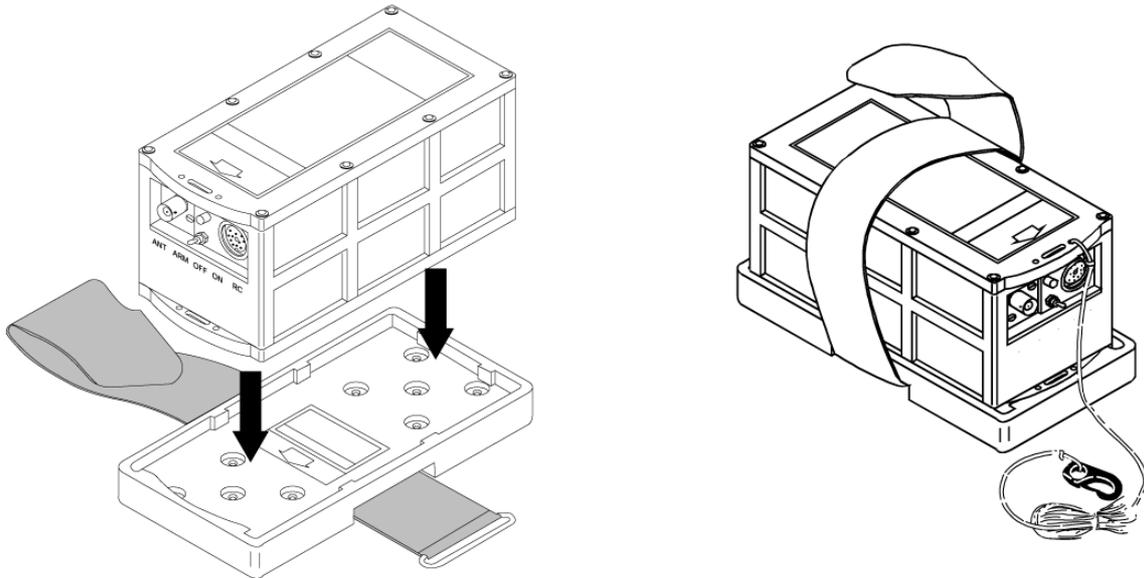
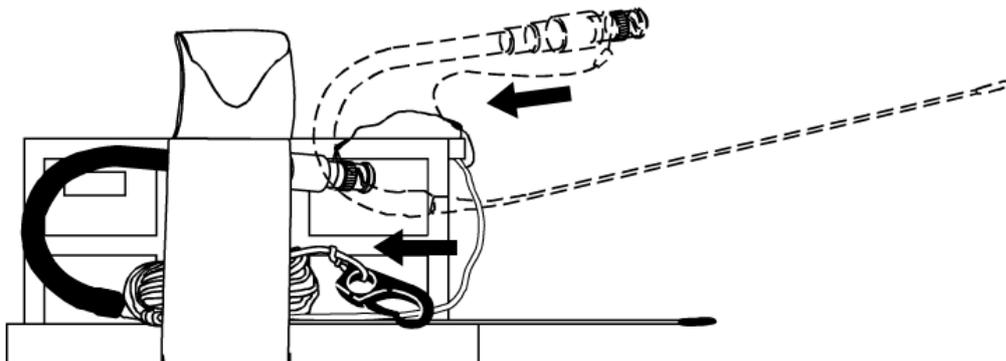


Figure 204: Installing the transmitter on the bracket

CAUTION: AN INCORRECT TIGHTENING OF THE HOOK AND LOOP FASTENER COULD LEAD TO AN UNSAFE SITUATION BY THE ELT PREVENTING THE TRANSMISSION OF THE DISTRESS MESSAGE

IMPORTANT: Once installed in the mounting bracket, the installer must be sure that the transmitter is firmly attached in its bracket by trying to extract it manually, thereby verifying there is no play and that it remains attached when extraction from the bracket is attempted.

- Fold the antenna and slide it under the Velcro® strap.



- Connect the external antenna to the BNC connector (Refer to Figure 5:

Installation, controls and connectors) as shown [Figure 2: ELT system description page 3](#).

NOTE (regarding the external antenna): *The specific installation (tightening torque, etc.) of the external antenna is not covered by this manual. Refer to antenna manufacturer's instructions. General instructions for an external antenna installation are detailed [3. Antenna Installation page 208](#).*

- Connect the Remote Control Panel (or CS144) to the DIN12 connector (Refer to [Figure 5: Installation, controls and connectors](#)) as shown [Figure 2: ELT system description page 3](#).

NOTE: The DIN 12 connector shall be tighten by hand.

- Set the 3-position switch (Refer to [Figure 5: Installation, controls and connectors](#)) to ARM.

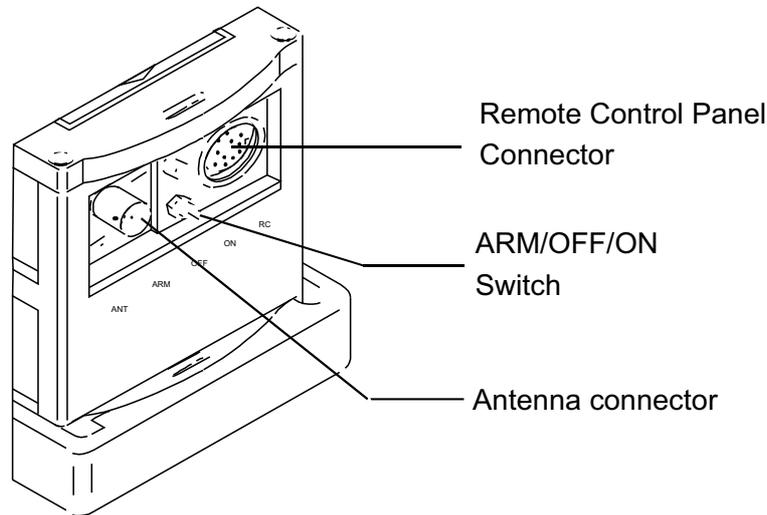


Figure 5: Installation, controls and connectors

- Perform the first power up procedure (Refer to [4. First power up, page 210](#)).

3. Antenna Installation

The external antenna can be either of whip, rod or blade type according to aircraft speed. Use only approved antennas.

Connection to the ELT will be carried out with a 50 Ohm coaxial cable (RG58 for example) ended with two male BNC connectors.

A. Antenna Installation Recommendations

(1) FAA Recommendations

Installation must be made by qualified personnel in accordance with FAA regulations. Duplicating a previous installation may not be acceptable. Methods for installing antenna are outlined in AC43.13-12, refer to:

FAA - Advisory Circular 43.13-2A (Acceptable Methods, Techniques, and Practices - Aircraft Alterations), specifically, Chapters 1, 3, 11 and 13.

(2) RTCA DO-204 Requirements for ELT location

“ELT antennas should be located away from other antennas to avoid disruption of antenna radiation patterns.”

“Idealistically, for the 121.5 MHz ELT antenna, 2.5 meter separation is sufficient separation from VHF communications and navigation receiving antennas to minimize unwanted interferences.”

“ELT antennas should be vertically polarized when the aircraft is in the normal flight attitude.”

“ELT antenna mounting surface should be able to withstand a static load equal to 100 times the antenna weight applied at the antenna mounting base in all directions.”

“The antenna should be mounted as close to the respective ELT as applicable. The proximity of the ELT antenna to any vertically-polarized communications antenna shall be such as to minimize radio frequency interference and radiation pattern distortion of either antenna. Coaxial cable connecting the ELT antenna installation should not cross the aircraft production breaks and should have vibrations proof RF connectors on each end. The coaxial connecting the ELT transmitter to the external Antenna should be secured to the aircraft structure and when the coaxial cable is installed and the connectors are mated, each end should be have some slack.”

B. Antenna installation procedure

The antenna must be mounted on the top of the aircraft to assure maximum visibility of satellites. The upper aft portion of the fuselage should be preferred. It should be mounted away from projections such as a propeller, tail surfaces, or the shadow of large antennas. It is the responsibility of the installation agency to determine the appropriate and adequate antenna installation.

Locate a position on the fuselage according to [Refer to \(2\) RTCA DO-204 Requirements for ELT location, page 208](#):

A double plate may be necessary for the antenna to meet rigidity specifications in Section [\(2\) RTCA DO-204 Requirements for ELT location page 208](#).

A 9 Kilogram force (20 pound force) applied in all direction should not cause an appreciable distortion in the aircraft skin.

Each of the approved antennas requires a ground plane. On fabric-covered aircraft or aircraft with other types on nonmetallic skins, a ground plane must be added. This can be accomplished by providing a number of metal foil strips in a radial position from the antenna base and secured under the fabric or wood skin of the aircraft. The length of each foil radial should be at least equal to the antenna length and width at least 1 inch due to the diameter of the antenna. The ground plane must be connected to the shield of the antenna connector.

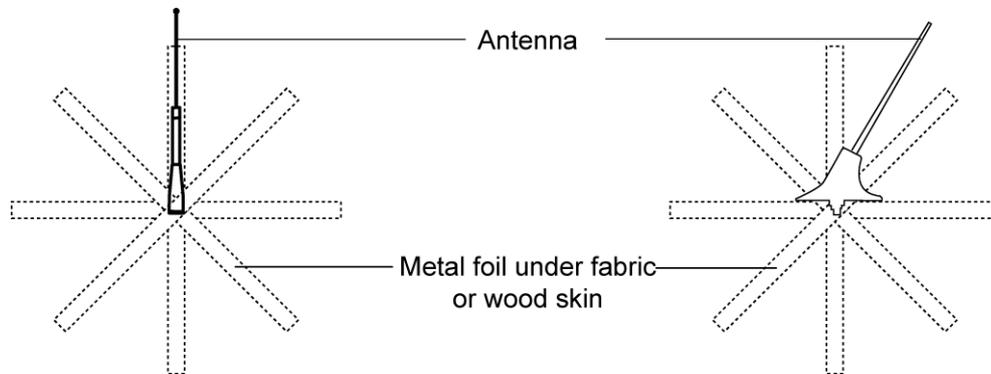


Figure 6: Antenna ground plane for non metallic aircraft

According to the antenna to be installed, use the appropriate outline drawings and drilling masks to determine the hole pattern and drill size ([Refer to SCHEMATICS & DIAGRAMS, page 501](#)).

Fabricate a 50 Ohms coaxial cable long enough to reach between the ELT installation location and the antenna location.

IMPORTANT: The length of the coaxial cable should not exceed 2.7 meters (9 ft) for a standard RG58 or equivalent coaxial cable. If the cable length exceeds 2.7 meters, a low loss cable of attenuation less than 1 dB@400 MHz must be used (See Important notice, [D. External antenna page 4](#)).

Fit both ends of coaxial cable with a waterproof Male BNC connector (not supplied), reference RADIALL R141007 or equivalent.

Connect one Male BNC connector to the antenna Female BNC socket.

4. First power up

CAUTION: WHEN OPERATING THE ARM/OFF/ON SWITCH, PULL LEVER TO UNLOCK AND SET TO POSITION.

Perform the following tests:

1. ELT operational tests:
 - connect RCP to J1 and outside antenna to J2;
 - switch the ELT from OFF to ARM;
 - check that the Self-Test result is OK (one long flash).
2. RCP operational tests:
[Refer to 3. RCP operational tests, page 303.](#)
3. 406 & 121.5 MHz transmission tests (optional):
[Refer to 4. 406 and 121.5 MHz transmission test, page 304.](#)

At the end of the first power up procedure, switch the ELT to ARM.

The ELT is now in stand by mode and ready to be activated either automatically by G-Switch sensor if a crash occurs or manually by RCP (if any).

NOTE : switching to ON directly on the ELT front panel will also activate the ELT.

5. Removal

CAUTION: WHEN OPERATING THE ARM/OFF/ON SWITCH, PULL LEVER TO UNLOCK AND SET TO POSITION.

- Switch the ELT to OFF (Refer to Figure 5: Installation, controls and connectors).
- Disconnect the Remote Control Panel (or CS144) from the DIN12 connector (Refer to Figure 5: Installation, controls and connectors).
- Disconnect the outside antenna from the BNC connector (Refer to Figure 5: Installation, controls and connectors).
- Unfasten the self-stripping strap.
- Remove the auxiliary antenna.
- Remove the transmitter from the bracket.

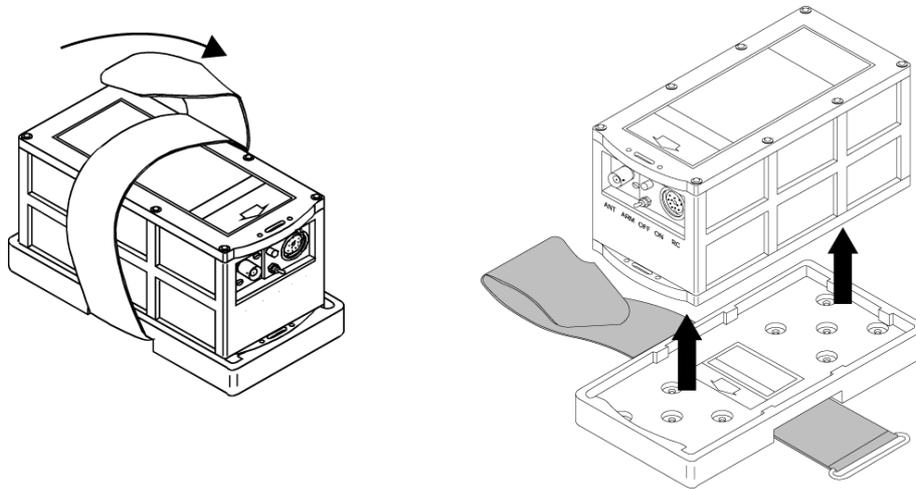


Figure 7: Removing the transmitter

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CHECK

CAUTION: WHEN OPERATING THE ARM/OFF/ON SWITCH, PULL LEVER TO UNLOCK AND SET TO POSITION.

1. Self-test

A. Periodicity

It is recommended by the manufacturer to test the ELT to detect any possible failure.

It is recommended to perform a self-test once a month by pilot or maintenance personnel from the cockpit (Remote Control Panel) but it **should not be done more than once a week.**

However, each self-test consumes energy from the battery. Should self-tests be carried out more often than the maximum allowed, the battery life-time might be shorter than specified.

Do not perform Self-test without the antenna connected.

B. Self-test procedure

- Check that the antenna is correctly connected.
- Switch from position “OFF” to position “ARM” or press “RESET & TEST” on the Remote Control Panel (ensure that the ELT switch is in the “ARM” position).
 - The buzzer operates during the whole Self-test procedure.
 - After a few seconds, the test result is displayed with the visual indicator as follows:
 - One long flash indicates that the system is operational and that no error conditions were found.
 - A series of short flashes^(see note below) indicates the test has failed.

If self-test fails, contact the distributor as soon as possible. Unless a waver is granted, flight should be cancelled.

NOTE: The number of flashes gives an indication of the faulty parameter detected during the self-test.

3+1	LOW BATTERY VOLTAGE
3+2	LOW RF POWER
3+3	FAULTY VCO LOCKING (FAULTY FREQUENCY)
3+4	NO IDENTIFICATION PROGRAMMED

2. ELT operational tests

A. Installation without programming dongle

- connect RCP to J1 and outside antenna to J2;
- switch the ELT from OFF to ARM;
- check that the Self-Test result is OK (one long flash).

B. Installation with Programming Dongle

- connect the outside antenna to J2;
- switch the ELT from OFF to ARM;
- check that the Self-Test fails (3+4 flashes);
- if not, connect a maintenance dongle to J1:
 - Switch the ELT from OFF to ARM;
 - Check that the Self-Test fails (3+4 flashes);
 - Remove the maintenance dongle from J1.
- connect the “Programming Dongle” to J1;
- switch the ELT from OFF to ARM:
the buzzer operates during the whole self-test procedure, after a few seconds the LED displays the result.
- check that the Self-Test result is OK (one long flash).

3. RCP operational tests

Check correct operation of RCP LED and external buzzer by switching ELT and RCP as described in the sequential procedure hereunder (with ELT switch in the “ARM” position).

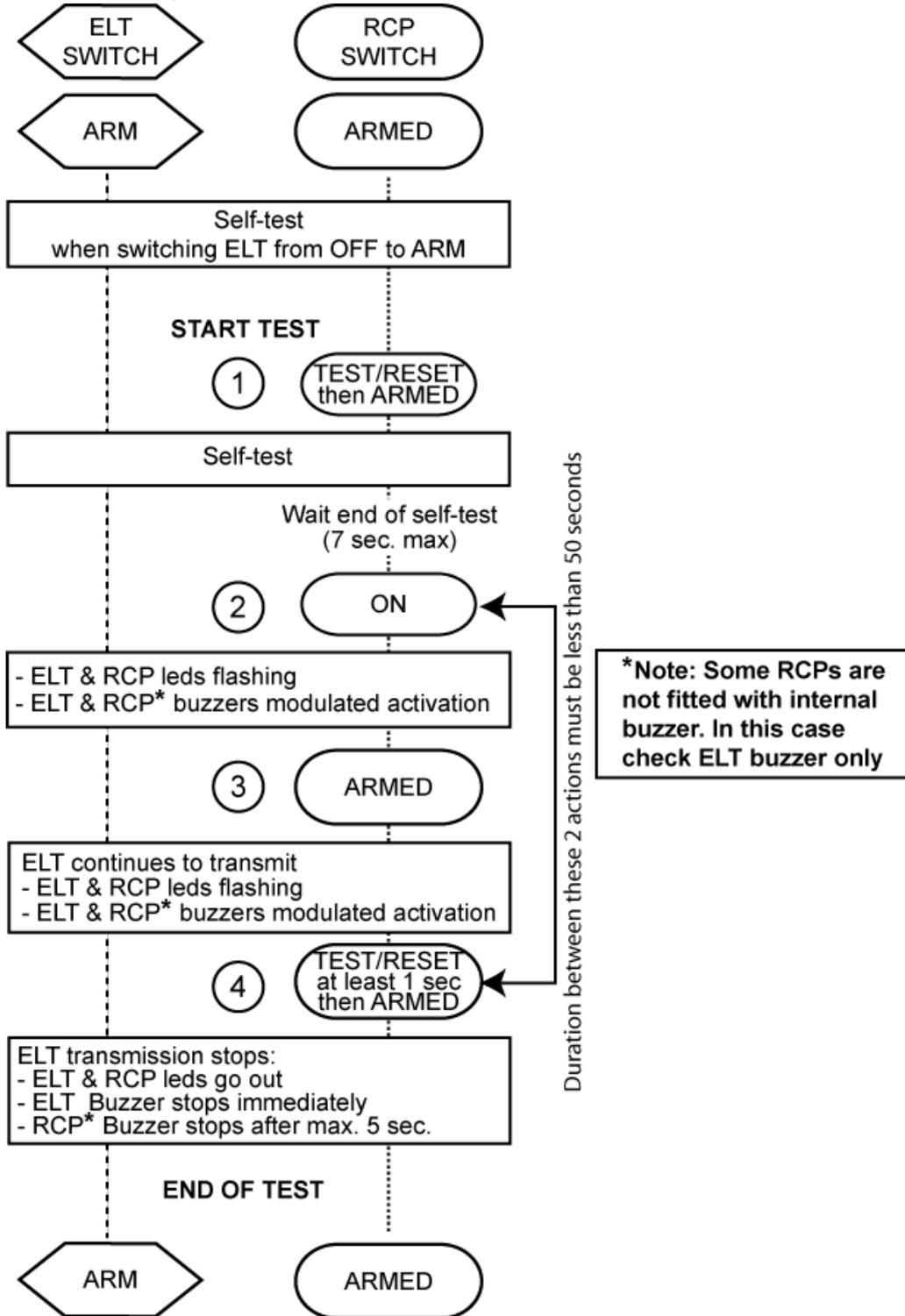


Figure 301: RCP LED and buzzer operation

IMPORTANT: (2) before switching the RCP to ON, wait for the end of the self-test.

4. 406 and 121.5 MHz transmission test

A. ELT-Antenna link

ELT -Antenna link can be checked by testing VSWR.

Orolia S.A.S. recommends the use of SWR3000 VSWR meter manufactured by PROCOM or IFR 4000 Opt1 manufactured by AEROFLEX.

Refer to manufacturer's user manual for a VSWR measurement.

B. 406 MHz

This test must be carried out with a COSPAS-SARSAT decoder.

- Perform self-test (Press RESET and TEST on the RCP or switch ELT from OFF to ARM).
- Check with the COSPAS-SARSAT decoder that, except for the 5th and the 6th digits, the decoded message is identical to the programmed message.

NOTE: The message transmitted during self-test sequence always begins with FF FE D0 whereas a programmed message begins with FF FE 2F.

Example of message programmed in ELT:

FF FE 2F 53 C3 24 97 38 0B A6 0F D0 F5 20

Example of same message decoded by SARTECH ARG5410:

FF FE D0 53 C3 24 97 38 0B A6 0F D0 F5 20

C. 121.5 MHz

IMPORTANT: this test must only be carried out between H and H+5 minutes. Do not exceed 30 seconds of transmission.

This test must be carried out with a VHF receiver.

- Tune VHF receiver to 121.5 MHz;
- Start transmission:
 - either on ELT: ON position;
 - or on the RCP: ON position (the ELT shall be in the ARM position);
- Listen to the 121.5 MHz "sweep tone";
- Stop transmission:
 - either on ELT: OFF or ARM position;
 - or on the Remote Control Panel: press TEST and RESET (the ELT shall be in the ARM position).

TROUBLESHOOTING

1. General

Procedure for fault isolation on board uses the visual indicator of the ELT's front panel. This visual indicator is activated by a self-test capability within the ELT.

Repair and battery replacement can only be carried out by PART 145 / FAR 145 avionics workshops (or equivalent agreement according to local regulations).

Additional approval from Orolia is required. Refer to Service Letter SL S18XX50X-25-02 Maintenance Policy for KANNAD ELTs.

2. Faults on Self-test

A. Visual indicator

When the self-test is carried out, the number of flashes gives an indication of the faulty parameter detected during the self-test.

(1) 3+1 flashes

- Low battery voltage:
Check battery, refer to relevant CMM for tests and repair.

(2) 3+2 flashes

- Low RF power:
Check 406 MHz power, refer to relevant CMM for tests and repair.

(3) 3+3 flashes

- Faulty VCO locking (faulty frequency):
Check 406 MHz frequency, refer to relevant CMM for tests and repair.

(4) 3+4 flashes

- No identification programmed
refer to relevant CMM for tests and repair.

NOTE: for CMM download and other servicing instructions, refer to Service & Support section of Orolia's Web site: <https://www.orolia.com/support/>

3. Other faults detected

A. Buzzer

(1) Buzzer does not operate

- Refer to refer to relevant CMM for tests and repair^(see note above).

(2) Buzzer operates permanently when ELT in ARM mode

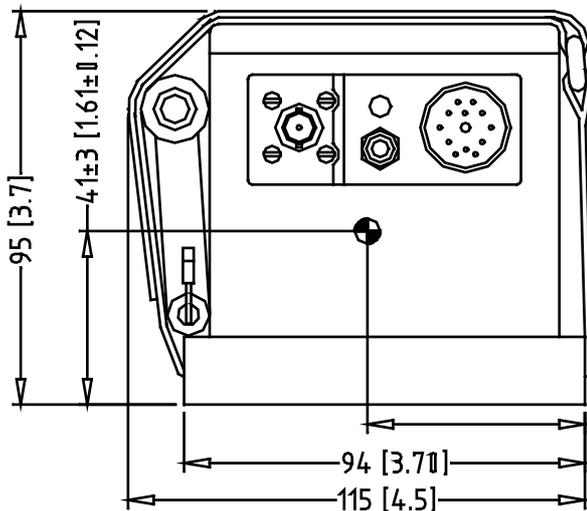
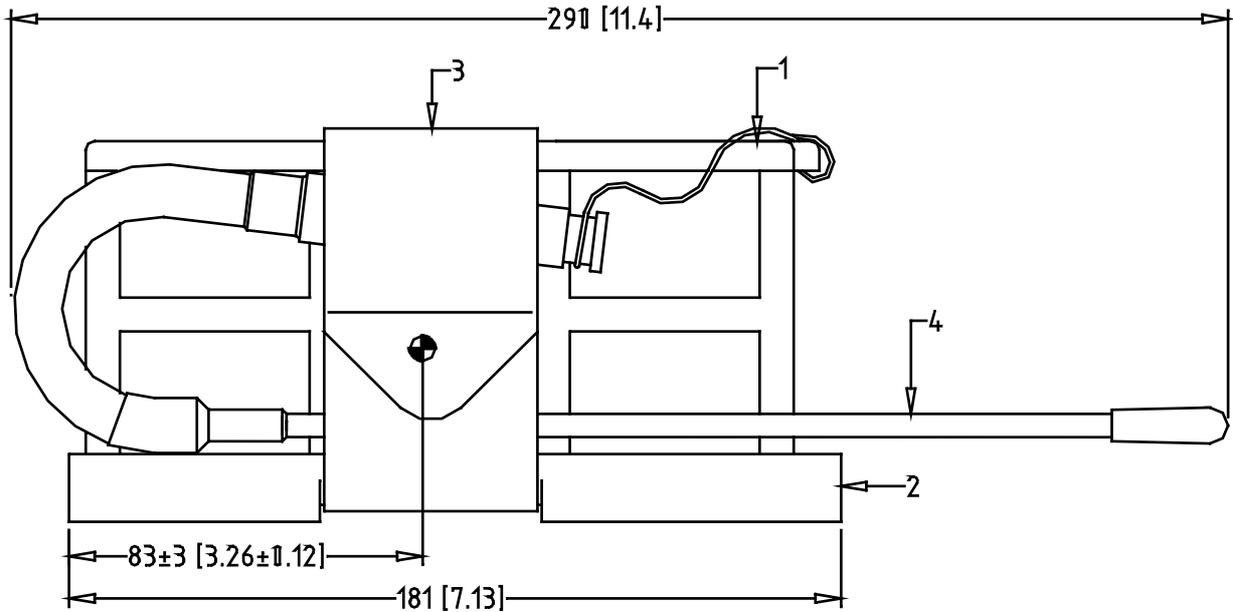
- refer to relevant CMM for tests and repair^(see note above).

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SCHEMATICS & DIAGRAMS

1. Outline Dimensions

Note: all dimensions are in millimeters
(inches in bracket)



ITEMLIST		
IDENT	DESCRIPTION	PART NUMBER
1	ELT MODEL KANNAD 406 AP H	S1821 512 14
2	MOUNTING BRACKET	S1821 511 11
* 3	VELCRO STRAP	S1821 512 11
** 4	AUXILIARY ANTENNA	HAF 11118

* PART OF S18 21 511 11

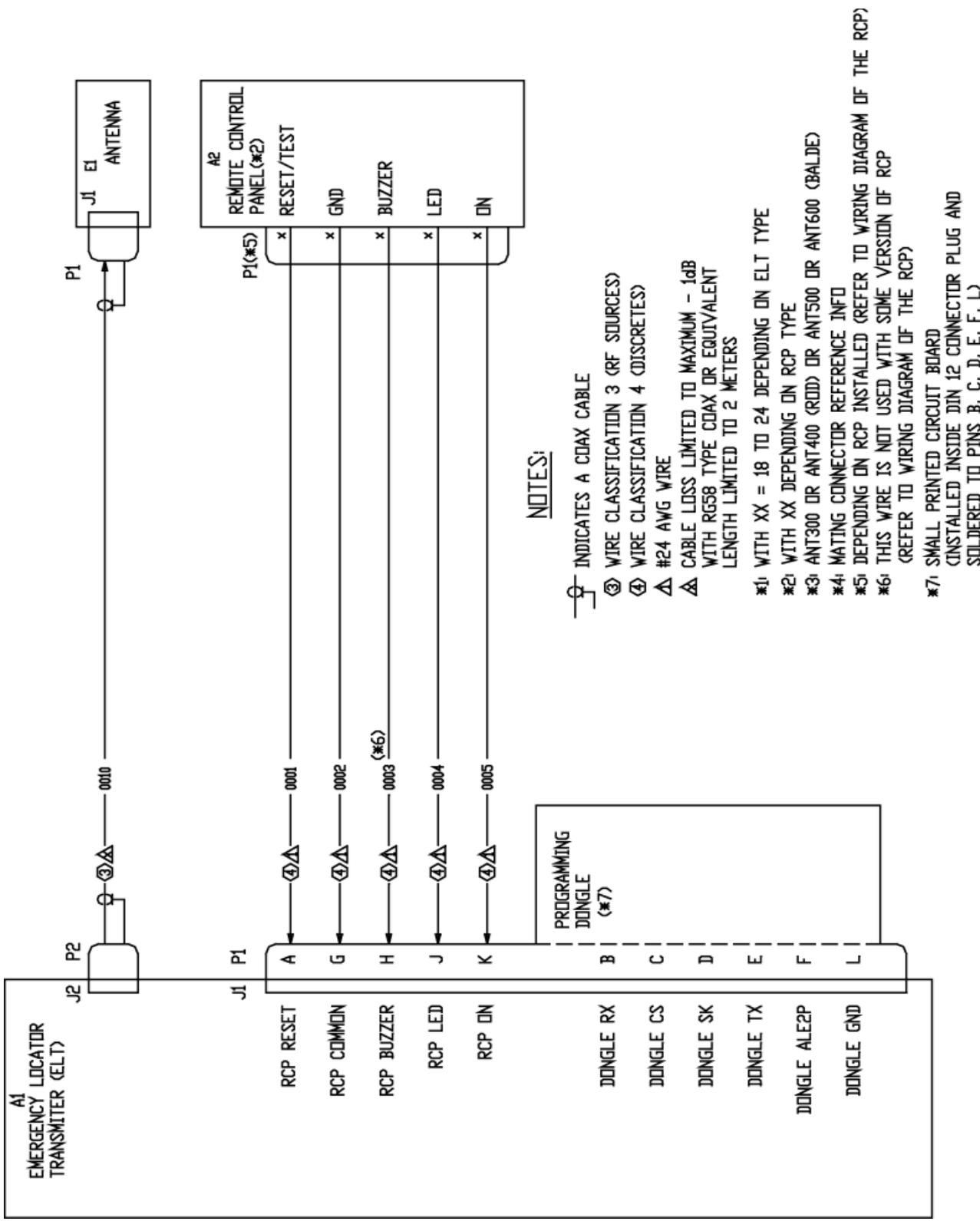
** PART OF S18 21 512 14

WEIGHT:

TYPICAL: 1235g MAX.:1311g

● CENTER OF GRAVITY

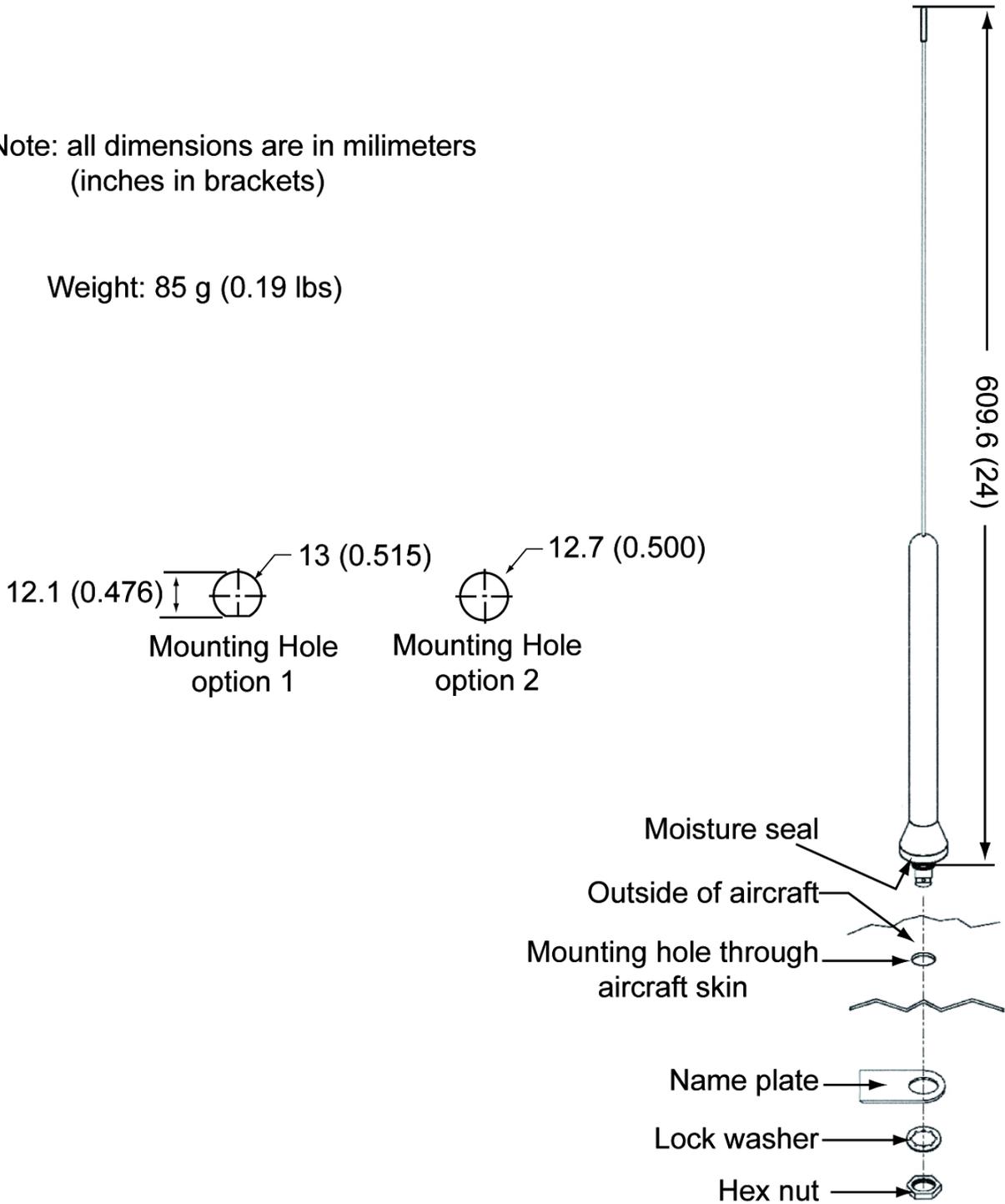
3. Wiring



4. ANT AV200, outline dimensions and drilling mask

Note: all dimensions are in millimeters
(inches in brackets)

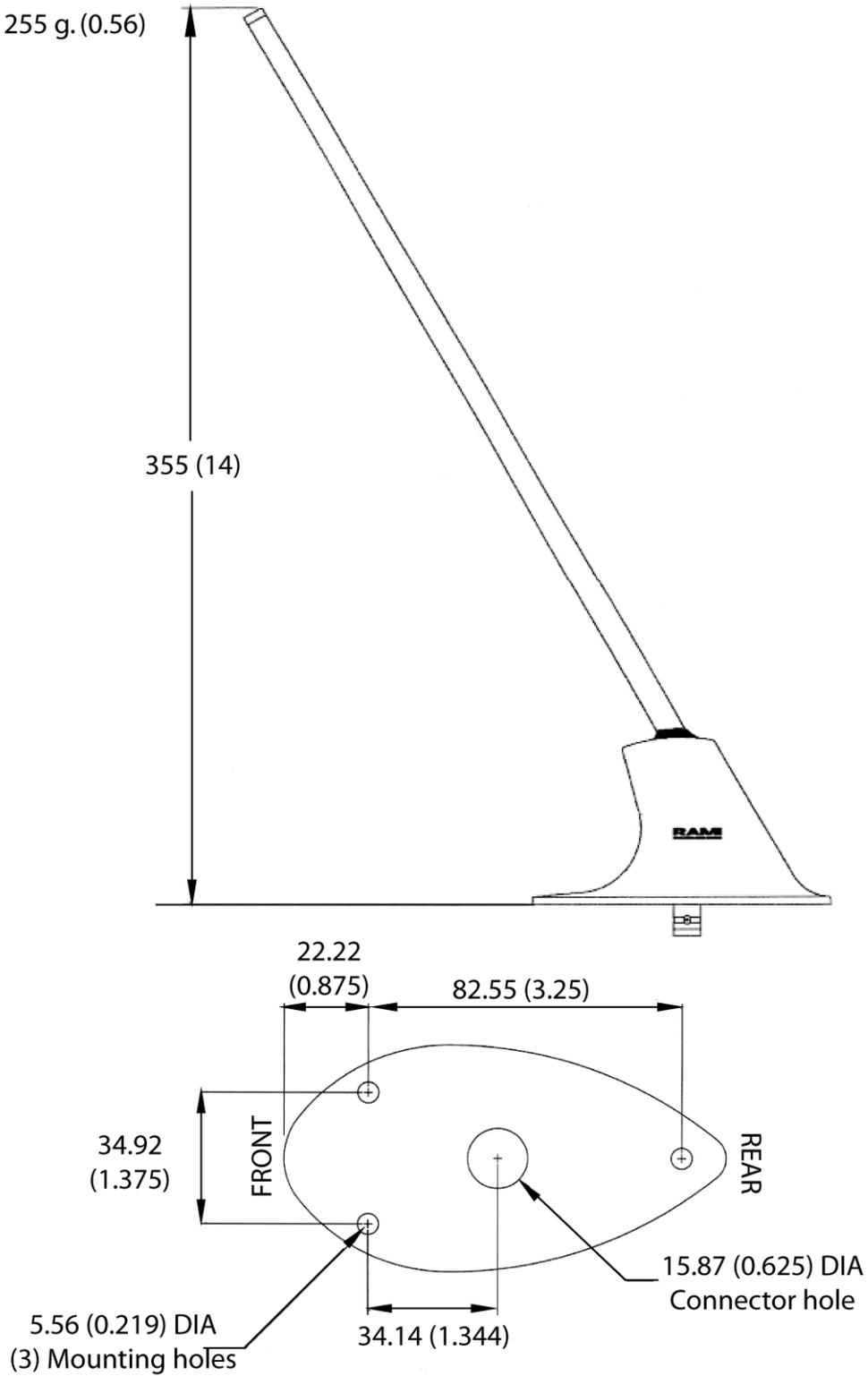
Weight: 85 g (0.19 lbs)



5. ANT AV300, outline dimensions and drilling mask

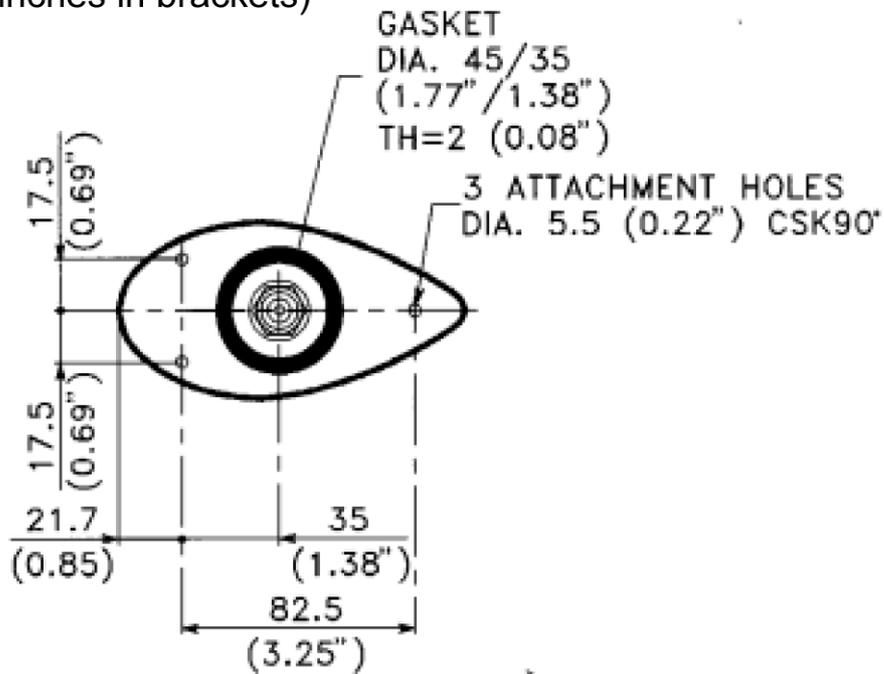
Note: all dimensions are in millimeters (inches in brackets)

Weight: 255 g. (0.56)

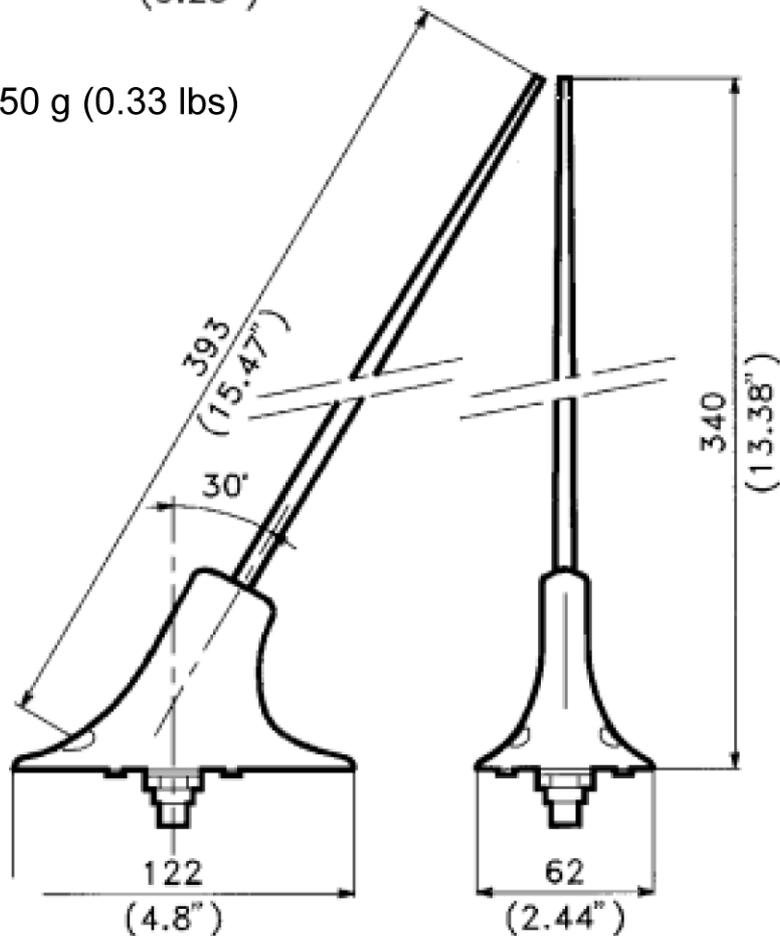


6. ANT300, outline dimensions and drilling mask

Note: all dimensions are in millimeters
(inches in brackets)

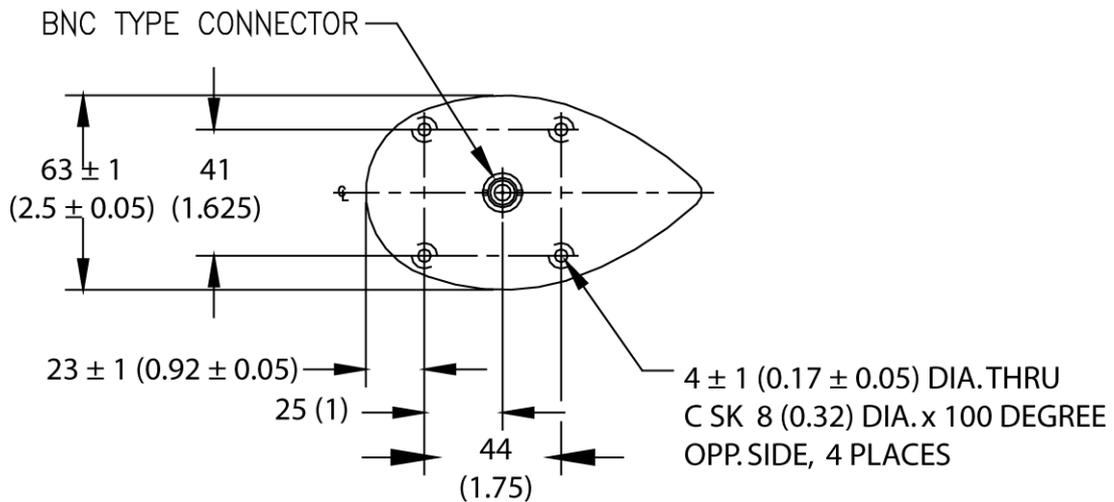
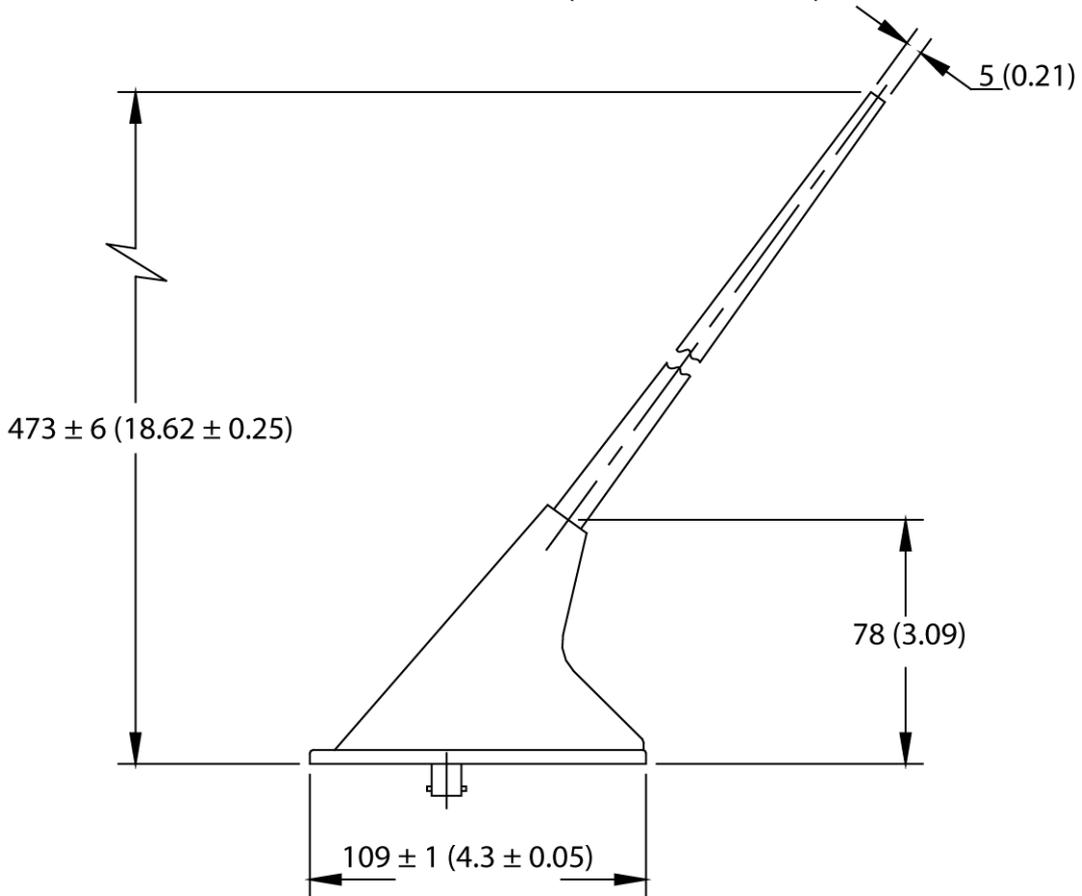


Weight: 150 g (0.33 lbs)



7. ANT 410, outline dimensions and drilling mask

Note: all dimensions are in millimeters (inches in brackets)



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SERVICING

1. Maintenance Schedule

Battery replacement:

carried out by a PART 145 or FAR 145 (or equivalent) maintenance station as described in Service Letter SL S18XX50X-25-02 Maintenance Policy for KANNAD ELTs.

Periodic inspection:

depending if the ELT is opened or not, PART 145 or FAR 145 (or equivalent) may be required. Refer to local regulations

A. Periodic inspection

Note: (if required by the relevant Civil Aviation Authority).

Some Civil Aviation Authorities may require the ELT be tested periodically. In this case, refer to Service Letter SL S18XX50X-25-12 “Guidelines for periodic inspection” available on the Support section of Orolia website.

B. Battery replacement

Testing of the various elements of the ELT is mandatory when the battery is replaced:

- For battery replacement intervals, [Refer to 2. Battery replacement requirements](#), page 602.
- The testing procedure associated with the battery replacement is described in the level 2 CMM 25-63-05.

For CMM download and other servicing instructions, refer to the Support section of Orolia website: <https://www.orolia.com/support/>.

2. Battery replacement requirements

Battery replacement is mandatory:

- after more than 1 hour of real transmission (cumulated duration);
- before or on the battery expiration date;
- after use in an emergency;
- after an inadvertent activation of unknown duration.

Only original and approved battery pack included in battery KIT BAT300 supplied by Orolia S.A.S. can be installed.

The battery replacement can only be carried out by a Kannad Approved Service Center.

For more information, refer to Kannad ELT Maintenance Policy available on Orolia website.

Orolia S.A.S. refuses all responsibility and invalidates all warranty should unapproved maintenance be carried out.

List of KANNAD Battery Replacement Center is available on our Website:

<https://www.orolia.com/support/>

Orolia S.A.S.

Z.I. des Cinq Chemins CS10028

56520 GUIDEL - FRANCE

Telephone: +33 (0)2 97 02 49 49

Web: <https://www.orolia.com>

Support: <https://www.orolia.com/support/>

Distributed by



Manufactured by

Orolia S.A.S

Z.I. des Cinq Chemins CS10028

56520 GUIDEL - FRANCE

Phone: +33 (0) 2 97 02 49 49

Web: <https://www.orolia.com>

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