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Ref. 0141922E

Emergency Locator Transmitters

INSTALLATION MANUAL
OPERATION MANUAL

KANNAD 406 AF-COMPACT

P/N : S1840501-02 Pack ELT KANNAD AF-COMPACT

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Users are kindly requested to notify **KANNAD** of any discrepancy, omission or error found in this manual.

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INTRODUCTION

The KANNAD 406 AF-COMPACT has been designed to satisfy the requirements of general aviation pilots, built on the long experience of KANNAD ELTs in 406 MHz technology in aviation, maritime and land distress beacons.

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

Servicing instructions of ELT are normally performed by shop personnel. For detailed instructions and identification parts list, refer to CMM 25-63-03.

Servicing and maintenance instructions of RC200 RCP are detailed in ACMM 25-63-21.

For the initial installation, please refer to Initial Installation Manual supplied with KANNAD 406 AF-COMPACT.

Antenna is not repairable and must be replaced if damaged.

FOR REGULATORY REQUIREMENTS, PLEASE CONSULT YOUR NATIONAL AVIATION AUTHORITY.

WARRANTY

1. Scope

The equipment is warranted against all material or manufacturing defect for a period of two years from the date of installation on the aircraft or thirty months for the date of shipment from KANNAD S.A.S. Z.I. des Cinq Chemins BP23, 56520 Guidel, France, whichever occur first.

Work carried out under the warranty shall not have the effect of extending the warranty period.

In respect of this warranty, after a defect has been noted by our services, the sole obligation incumbent upon us shall be the repair of the equipment or the element identified as being defective by our services or possibly its replacement free of charge, to the exclusion of all compensation or damages.

This warranty covers the cost of parts and labour in our factories.

The cost of transportation of the equipment replaced or repaired are the purchaser's exclusive responsibility.

The risks shall be borne by the purchaser.

2. Exclusion

Defects and deterioration caused by natural wear of the product or by external accident (poor maintenance, abnormal conditions of use, etc.) or by modification of the equipment and tools not recommended nor specified by our company, are excluded from the warranty.

Also the warranty shall not cover visible defects which the purchaser wouldn't have formally notified KANNAD within 48 hours of receipt of the equipment.

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.

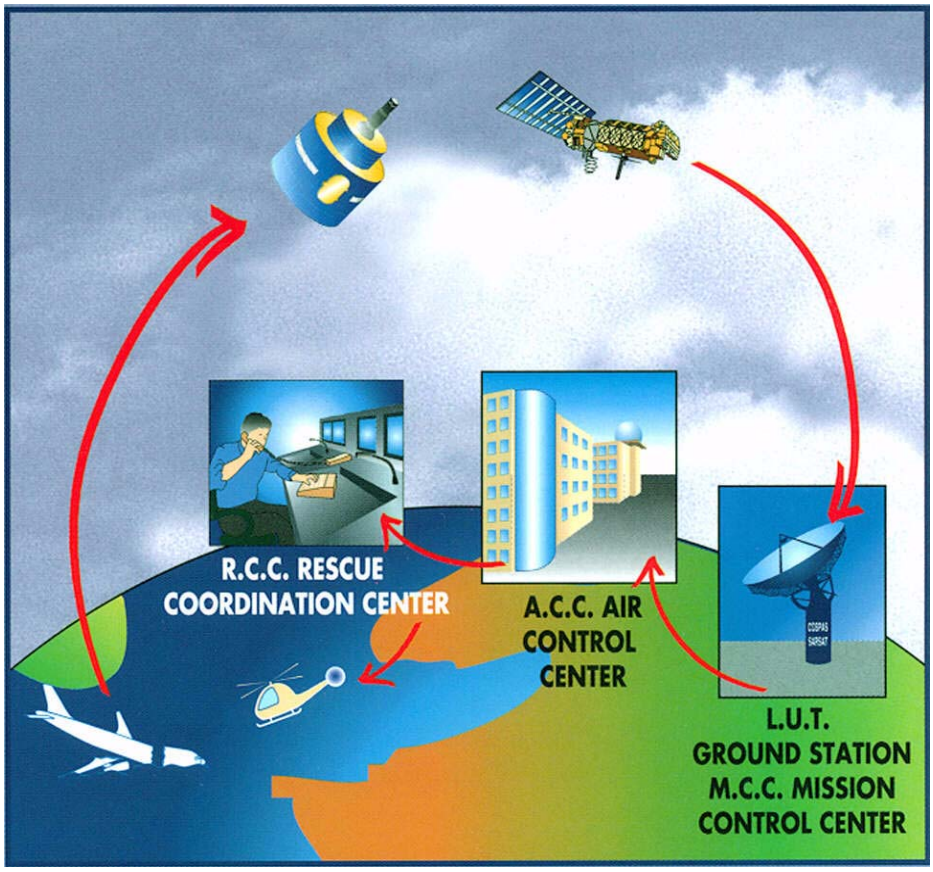


Figure 1: COSPAS-SARSAT System

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 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;
- anti-deflagration;
- 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 achieved 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 ELTs Presentation

The KANNAD 406 AF-COMPACT belongs to the AF type of ELTs which are permanently attached to an aircraft. The KANNAD 406 AF-COMPACT is designed to be installed on fixed wing aircraft or helicopters.

The KANNAD 406 AF-COMPACT Pack is composed of:

1. a transmitter (P/N S1840501-01);
2. a mounting bracket (P/N S1840502-01);
3. an RC200 remote control panel (P/N S1820513-11)(1);
4. a DIN-12 connector (P/N S1820514-03);
5. a SUB D 9-Pin Female connector (P/N S1840506-01).

The approved outside whip (P/N 0145621) or rod (P/N 0124220) antennas are purchased separately.

Note: (1) "ELT controls and displays installed for in-flight use shall be readily accessible from the pilot's normal seated position. The pilot shall have an unobstructed view of displayed data when in the normal seated position." (RTCA DO-183).

The transmitter and bracket 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 3-wire bundle (not supplied).

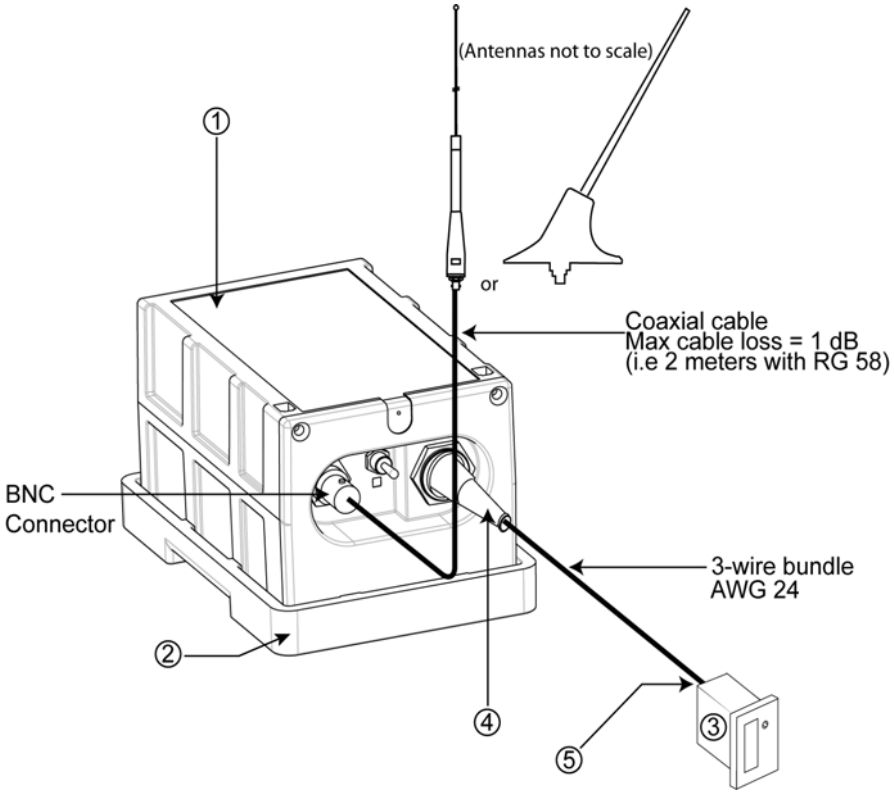


Figure 2: ELT system description

3. LINE REPLACEABLE UNITS

A. Transmitter

The KANNAD 406 AF-COMPACT is an ELT designed to be installed onboard aircraft to transmit a distress signal on frequencies:

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

The KANNAD 406 AF-COMPACT is certified as Automatic Fixed (AF) ELT and only works with the outside antennas described in this manual.

The housing of KANNAD 406 AF-COMPACT transmitter is made of moulded plastic with excellent mechanical resistance (Polycarbonate, light yellow colour).

The ELT housing is designed with no sharp edges.

Figure 3: KANNAD 406 AF-COMPACT Transmitter

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.

Figure 4: KANNAD 406 AF-COMPACT with Mounting Bracket

C. Remote Control Panel

An RC200 remote control panel is available 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 light;

The remote control panel is connected to the ELT via a 3-wire cable equipped with a DIN-12 connector on the ELT side and a D-SUB Female 9Pts connector on the other side.

Note: the 3-wire cable is not supplied.

Figure 5: RC200 Remote Control Panel

D. Outside antenna

The outside antenna can be either of whip (ANT200, P/N 0145621) or rod (ANT300, P/N 0124220) 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 male BNC connector.

IMPORTANT NOTICE: KANNAD recommends a cable with radio electric properties similar or better to those of a RG58 cable.

Note: the 50 Ohm coaxial cable and the male BNC connector are not supplied.

ANT200, Whip Antenna

ANT300, Rod Antenna

Figure 6: Whip and rod antennas

SYSTEM FUNCTIONAL DESCRIPTION AND OPERATION

1. Transmitter Functional Description

A. Transmission

The KANNAD 406 AF-COMPACT 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 the RC200 Remote Control Panel).

The KANNAD 406 AF-COMPACT is designed to transmit on two frequencies (121.5 and 406 MHz). The 121.5 Mhz is 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 MHz with an output power of 100 mW. The modulation is an audio frequency sweeping downwards from 1420 Hz to 490 Hz with a repetition rate of 3 Hz.

During operations, a digital message is transmitted on 406.028 MHz every 50 seconds. The output power on 406 MHz is 5 W.

B. Controls & Connectors

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

1. 3-position switch ARM/OFF/ON;
2. Visual indicator (red);
3. DIN 12 socket for connection to Remote Control Panel, programming dongle or programming equipment;
4. BNC connector for the antenna.

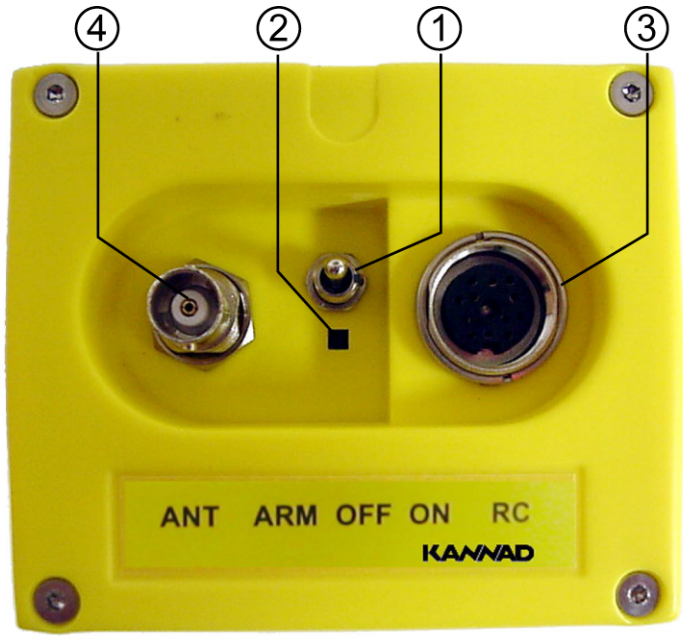


Figure 1: Front Panel

The red light 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 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 transmission;
- silence during 406 transmission.

C. Working mode information

The KANNAD 406 AF-COMPACT 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).

(1)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 or the aircraft is parked for a long period or for maintenance.

(2) Self-Test

The self-test mode is a temporary mode (max duration 15 sec) in which the ELT checks the main characteristics of the transmitter (Battery voltage, Programming...) and enables digital communication with 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 position "ARM");
- when switching to "ON" prior to transmission.

The buzzer operates during the self-test procedure.

After about 10 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).

(3) 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 except when the ELT is removed or the aircraft is parked for a long period or for maintenance.

The Remote Control Panel is energized by the ELT when the ELT's switch is on "ARM" position.

(4) On

This mode is selected:

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

When this mode is selected, the ELT starts transmitting after 50 seconds:

- on 406 MHz (one 406 MHz burst every 50 seconds);
- on 121.5 MHz (continous transmission between each 406 MHz burst).

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

- Red visual indicator:
  - 1 short flash during ELT transmission on 121.5 MHz (every 0.7 seconds);
  - 1 long flash during ELT transmission on 406 MHz (every 50 seconds).
- Buzzer:
  - 1.5 Hz pulse signal (recurrence 0.7 seconds) during ELT transmission on 121.5 MHz.

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 transmitted is recorded. This information is available when the ELT is connected to a programming and test equipment (PR600).

D. Autonomy

The energy is provided by a battery pack composed of a $LiMnO_2$ two-element battery (See pages 108 & 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 duration of the 121.5 transmissions is over 48 hours at -20°C.

Unlike other ELTs, the 406 MHz transmission of KANNAD 406 AF-COMPACT is not stopped after 24 hours and 406 MHz transmission is continuing beyond 48 hours.

The transmitter battery expiry date is fixed at 6 years after manufacturing. If no activation of the ELT occurs during the battery lifetime, it shall be replaced 6 years after date of manufacture(see note below).

NOTE: The useful life time of batteries is twelve (12) years. To be in compliance with FAR regulations, they have to be replaced six (6) years after date of manufacture when 50 percent of their useful life has expired.

E. Electrical interface

When installed onboard, the ELT has to be connected:

- to RC200 Remote Control Panel via a DIN12 socket (J1);
- to an outside antenna via a BNC female connector (J2).

The DIN12 socket is also used to connect programming dongle or programming and test equipment.

J1

DIN 12 socket J1 is dedicated for connection to the Remote Control Panel, to a Programming or Maintenance Dongles or to a programming equipment (PR600).

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

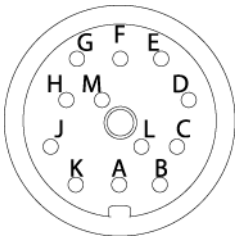
J1	PIN	Signal Name	Destination	Direction
Viewed from Front Face 	J1-A	RCP TEST/RESET	RCP	IN
	J1-B	DONGLE RX	SMM / PGM	IN
	J1-C	DONGLE CS	SMM	OUT
	J1-D	DONGLE SK	SMM	OUT
	J1-E	DONGLE TX	SMM / PGM	OUT
	J1-F	DONGLE ALE2P	SMM	OUT
	J1-G	RCP COMMON	RCP	OUT
	J1-H	RCP BUZZER	Not used	
	J1-J	RCP LED	RCP	OUT
	J1-K	N/C		
	J1-L	DONGLE GND	SMM / PGM	OUT
	J1-M	N/C		

Table 1: J1 connector pin-out

J2

BNC female connector J2 is used to connect the outside antenna through a 50 Ω coaxial cable.

IMPORTANT: The length of the coaxial cable should not exceed 2 meters (6 ft) for a standard RG58 or equivalent coaxial cable. If the cable length exceeds 2 meters, a low loss cable of attenuation less than 1 dB must be used (See Important notice Section D. Outside antenna, page 6).

F. Transmitter Technical Specifications

TYPE
- Two-frequency ELT (121.5 / 406.028 MHz)
- Automatic fixed
- COSPAS-SARSAT Class II (-20°C to +55°C).

406 MHz TRANSMISSION
- Frequency: 406.028 MHz+/-1 kHz
- Output power: 5W (37 dBm +/- 2 dB)
- Modulation type: 16K0G1D (Biphase L encoding)
- Transmission duration: 440ms (short message) every 50 sec.
- Autonomy: Over 48 hours at -20°C

121.5 MHz TRANSMISSION
- Frequencies: 121.5 MHz +/- 6 kHz
- Output power: 100 to 400 mW (20dBm to 26 dBm)
- Modulation type: 3K20A3X
- Modulation rate: > 85 %
- Frequency of modulation signal: 1420 Hz to 490 Hz with decreasing sweep
- Autonomy: Over 48 hours at -20°C

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

G-SWITCH SENSOR
Mechanical G-switch sensor compliant with EUROCAE ED62 specifications

BATTERY
KIT BAT200, P/N: S1840510-01
$LiMnO_2$ two-element battery for transmitter power supply
Replacement 6 years after date of manufacture

HOUSING
Material: Polycarbonate
Color: Yellow (color compounded)
Transmitter dimensions:
131 x 86 x 75.4 mm
(5.157 x 3.385 x 2.968 inches)
Overall dimensions (with mounting bracket):
max 140 x 98 x 86.4 mm
(5.512 x 3.858 x 3.4 inches)
Weight including batteries:
- typical 850 gr. (1.874 lb);
- max 875 gr. (1.929 lb).

Tightness: O-ring

ENVIRONMENTAL CONDITIONS
RTCA DO-160E / EUROCAE Section 4 to 26:
[ED62]X[ED62]A[ED62][SYLMC]EYXXX XZXXX[ZC][ED62]B[XXXXX]XXX[ED62]

QUALIFICATIONS
ETSO-2C91a & ETSO-2C126 (EASA)
TSO-C126
COSPAS-SARSAT TAC N° 167

FOR USE OUTSIDE OF THE USA OR EASA RULES, CONTACT YOUR LOCAL CIVIL AVIATION AUTHORITY.

2. Remote Control Panel RC200 Functional Description

A. General

The RC200 Remote Control Panel is designed to be installed in the cockpit to enable the pilots to control the ELT onboard.

The RC200 enables the remote control of the primary functions of the KANNAD Emergency Locator Transmitters (Manual activation, Reset, Test) as well as visual monitoring.

B. RC200 Controls and Connector

The following elements are to be found on the RC200 Remote Control Panel:

1. On / Armed / Reset-Test, a 3-position switch.
2. Red led annunciator.
3. J1, single male 9-pin D-SUB connector.
4. Warning stating: FOR AVIATION EMERGENCY USE ONLY. UNAUTHORIZED OPERATION PROHIBITED.

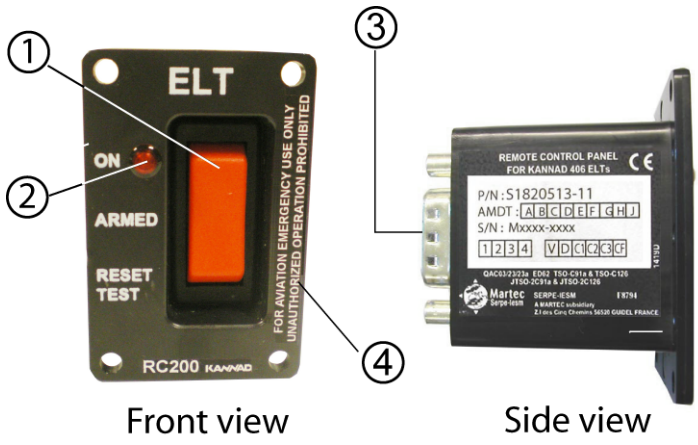


Figure 2: RC200, Controls and Connectors

C. RC200 Working mode information

The RC200 enables remote control and remote monitoring of the KANNAD 406 AF-COMPACT **provided that the ELT switch is in armed position**.

(1)Remote Control

Remote control is accomplished through a 3-position switch:

- ON (transmission) enables manual activation of the ELT.
- ARMED (stand by mode to enable automatic activation by the shock sensor) is an idle position. **Unless there is an emergency, the switch must stay in this position.**
- RESET-TEST is used either to stop the ELT transmission if activated or to perform a self-test.

The "OFF" mode is not available on the remote control panel but directly on the ELT itself by switching it in "OFF" position.

(2) Monitoring

Monitoring is accomplished through a led operating in the same way as the ELT visual indicator:

- Transmission:
  - 1 short flash during ELT transmission on 121.5 MHz (every 0.7 s.);
  - 1 long flash during ELT transmission on 406 MHz (every 50 seconds).
- Self-test:
  - 1 short flash at the beginning of the self-test sequence;
  - 3 + N flashes at the end of the self-test sequence if the ELT is faulty (N depends of type of failure, Refer to (2) Self-Test, page 103);
  - 1 long flash at the end of the self-test sequence if the ELT is correct.

D. RC200 Technical Characteristics

(1)Mechanical characteristics

The RCP housing is to be fixed:

- either on the instrument panel with 4 rivets bush (not supplied);
- or below the instrument panel with a special mounting tray (supplied).

(a) Material

- Material: Moulded plastic.
- Color: Black with matt finish.

(b) Overall Dimensions

Refer to 2. RC200 Outline Dimensions, page 502

Outline dimensions: 33 x 50 x 43 mm (1.3 x 1.97 x 1.69 inches).

(c) Weight

Approx. 40 gr. (0.088 lbs).

(2) Electrical Characteristics

The RC200 RCP is energized by the ELT when the ELT's switch is on ARM position.

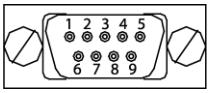
- Switch:
  - ON / ARM / RESET-TEST 3-position switch.
  - Type of contacts: alloyed silver.
  - Conductive material: Silver-plate alloyed copper.
  - RESET: unstable position
- Led annunciator:
  - Color: red.
  - Peak - Wavelength: 635 nm.
  - Viewing angle: 50 degrees.

(3) Electrical Interfaces

A single male 9-pin D-SUB connector (J1) enables to connect the RC200 remote control panel to the KANNAD 406 AF-COMPACT with a 3-wire cable (AWG 24, shielded recommended).

On the ELT side, the wires are soldered to a male DIN 12 connector.

On the RCP side, the wires are connected to a female 9 pin D-SUB connector.

Sub-D 9-pin Male		Signal name	Destination
Viewed from Front Face 	1	Not used with KANNAD AF Compact	
	2	RCP BUZZER(1)	ELT
	3	BUZZER GND(1)	BUZZER
	4	RCP RESET	ELT
	5	RCP ON	ELT
	6	Not used with KANNAD 406 AF-Compact	
	7		
	8	RCP COMMON	ELT
	9	RCP LED	ELT

Note: (1) RCP buzzer functionnality not featured by this model.

Table 2: J1, D-SUB 9-pin Male Pin-out

Receptacle	
Standard designation	D-SUB - Male - 9-pin
Number of pins	9
Locking device	Inserts, Threaded UNC 4-40
KANNAD	0127012

Table 3: D-SUB 9-pin Male Characteristics

Mating connector	
Standard designation	D-SUB - Female - 9-pin
Number of pins	9
KANNAD	S1840506-01

Table 4: D-SUB 9-pin female, Mating Connector Characteristics

E. RC200 Technical Specifications

(1)Photovoltaic Relay

- Insulation: 1 KV
- Commutation 1A 60V

(2) Environmental specifications

- Operating temperature: - 20°C to + 55°C (DO160D section 4 category A2).
- Storage temperature: - 55°C to + 85°C (DO160D section 4 category A2).
- Magnetic effect: According to DO-160D section 15 category Z.

F. Antennas Technical Specifications

(1)ANT 200

ANT200 is a whip dual frequency antenna for aircraft up to 250 kts.

- Frequencies: 121.5 / 406 MHz.
- Impedance: 50 ohms.
- VSWR:
  - 2.0:1 or better at 121.5 MHz.
  - 1.5:1 or better at 406 MHz.
- Weight: 170 gr. max (0.375 lb).
- Temperature: -65°C to +71°C
- Connector: BNC female
- Mount: Ø 13 mm hole required (0.515 in.).
- Overall dimensions: 634.5 x 25 mm max (24.98 x 1 in.).
- Antenna height: 609.6 mm (24 in.).
- Speed rating: 250 Knots

Refer to 3. ANT200 Outline Dimensions, page 503.

(2) ANT 300

- Frequencies: 121.5 / 243 / 406 MHz.
- Impedance: 50 ohms.
- VSWR (relative to 50 ohms): ≤1.7:1
- Weight: 150 gr. (0.33 lb).
- Connector: BNC female.
- Overall dimensions: 342 x 122 x 62 mm (13.47 x 4.8 x 2.44 in.).
- Antenna height: 395 mm (15.56 in.).
- Speed rating: up to 300 - 350 kts

Refer to 4. ANT300 Outline Dimensions, page 504.

3. Equipment limitations

None

4. Activation

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 off the ELT is removed or 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 the "ARM" position .

B. Manual activation

- Check that the 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 then, after 50 sec., transmits on:
    - 406 MHz (one 406 MHz burst every 50 seconds);
    - 121.5 MHz (continous transmission between each 406 MHz burst).
  - During transmission, the buzzer operates and the red visual indicator flashes.

5. Reset

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 notice: 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 " then "ARM".

B. Reset with Remote Control Panel

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

6. Self-Test

Refer to 1. Self-test, page 301

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INSTALLATION / REMOVAL

1. Registration

A. General

The ELT must be registered prior to installation onboard.

When a 406 MHz ELT is installed in an aircraft, it is imperative that the aircraft owner register the ELT. Each 406 MHz ELT contains a unique identification code that is transmitted to the satellite. This helps the “Rescue Coordination Center” (RCC) determine whether an emergency actually has occurred. The unique identification permits accessing a data base.

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

The "Programming Datasheet" (DIM00300) 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.

B. Registration in USA

Mail or Fax your registration form to:

NOAA/SARSAT

NSOF, E/SP3

4231 Suitland Road

Suitland, MD 20746

or Save Time! Register your beacon online at:

www.beaconregistration.noaa.gov

All online registrations will be entered into the National 406 MHz Beacon Registration Database on the same day of entry. Registration forms received via postal mail will be entered within 2 business days of receipt. For online registrations, a confirmation letter with your completed registration information form will be sent immediately via e-mail or fax (if provided). Confirmation letters sent via postal mail should arrive within two weeks. Once your registration confirmation is received, please review all information. Any changes or updates to your registration information can be done via the internet, fax, e-mail or postal mail. If you do not receive your registration confirmation from NOAA on the same day you submit it over the internet or within two weeks if you submit it by postal mail, please call NOAA toll-free at: 1-888-212-SAVE (7283) or 301-817-4515 for assistance.

After initial registration (or re-registration) you will receive a NOAA Proof of

Registration Decal by postal mail. This decal is to be affixed to the beacon and should be placed in such a way that it is clearly visible. If for some reason you do not receive the registration decal within two weeks, please call NOAA toll-free at: 1-888-212-SAVE (7283) or 301-817-4515.

Failure to register, re-register (as required every two years), or to notify NOAA of any changes to the status of your 406 MHz beacon could result in penalties and/or fines being issued under Federal Law. The owner or user of the beacon is required to notify NOAA of any changes to the registration information at any time. By submitting this registration the owner, operator, or legally authorized agent declares under penalty of law that all information in the registration information is true, accurate, and complete. Providing information that is knowingly false or inaccurate may be punishable under Federal Statutes. Solicitation of this information is authorized by Title 47 - Parts 80, 87, and 95 of the U.S. Code of Federal Regulations (CFR). Additional registration forms can be found on the NOAA-SARSAT website at:

www.sarsat.noaa.gov or at: www.beaconregistration.noaa.gov

C. Registration in Canada

Beacon information is held in the Canadian Beacon Registry maintained by the National Search and Rescue Secretariat for use in search and rescue operations. Online access to the Registry is available for all beacon owners to register new beacons or to update their beacon information. You can add or update your beacon information by accessing the registry directly, sending in a completed registration form or by talking to one of our beacon registry representatives.

You can access the registry:

- online: beacons.nss.gc.ca
- by email: beacons@nss.gc.ca
- by fax: 1-613-996-3746
- by telephone: 1-800-727-9414 or 1-613-996-1616

The registration information must be updated when the aircraft ownership changes as per the Canadian Airworthiness Notice AN B029 (refer to following link):

http://www.tc.gc.ca/civilaviation/maintenance/AARPC/ANs/B029.htm

This information must be recorded on the ELT LOG SHEET (ref. DIM08013) supplied with the ELT, fields Programming Log.

Additional information and registration forms can be found on the Canadian NSS website at:

http://www.nss.gc.ca/site/cospas-sarsat/INTRO_e.asp

2. Programming

A. "Pin programming" option

The KANNAD 406 AF-COMPACT offers pin-programming capabilities to facilitate maintenance operations especially in the 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 onboard. This Programming Dongle contains the identification information of the aircraft and remains onboard 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 onboard".

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 owner, the following equipment are required:

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

Figure 1: Maintenance Dongle

3. ELT transmitter installation procedure

NOTE: Intial installation (bracket installation and first wiring is described in Initial installation manual, DOC07089 supplied with the pack).

1. Mount the transmitter on the bracket "Flight direction" arrow pointed towards the front of the aircraft (Refer to 6. KANNAD 406 AF-COMPACT, axis of installation, page 506).
2. Slide the self-stripping strap through the buckle. **Ensure the buckle is correctly positioned (indifferently on right or left side of ELT) regarding the horizontal center line of ELT as shown Detail A.**
3. Fasten the self-stripping strap tightly.

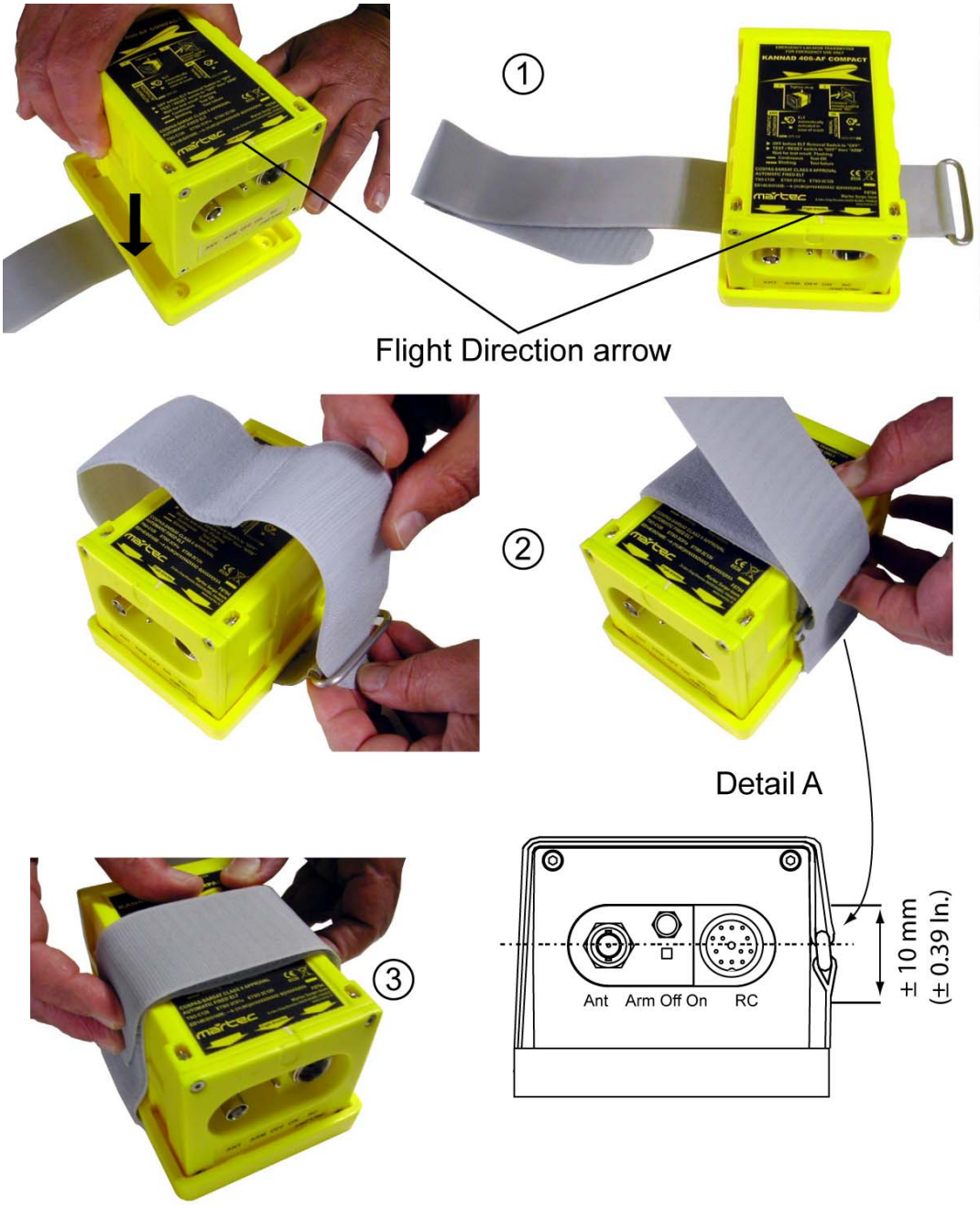

Figure 2: Installing the transmitter on the bracket

4. ELT transmitter Connection

1. Connect the cable of the outside antenna to the BNC connector of the front panel.
2. Connect the DIN12 connector of the Remote Control Panel cable to the DIN 12 socket of the front panel.
3. Set the 3-position switch of the front panel to ARM.

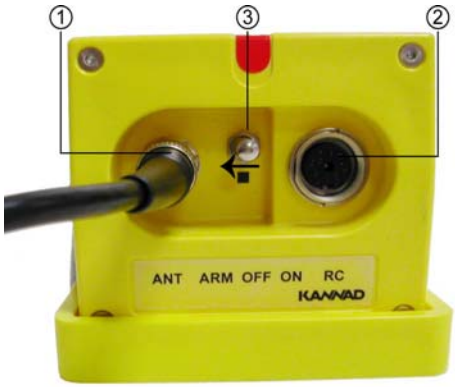

Figure 3: Installation, controls and connectors

- Perform the first power up procedure (See below).

5. First power up

Note: Antenna and RCP must be connected.

Caution: never switch to ARM or ON if neither antenna cable nor 50 ohm load is connected to the ELT (1. BNC connector), ***risk of ELT damage.***

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 B. RCP operational tests, page 302.
3. 406 & 121.5 MHz transmission tests (optional):
   Refer to C. 406 and 121.5 MHz transmission test, page 303.

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 RC200 Remote Control Panel.
  Note : switching to ON directly on the ELT front panel will also activate the ELT.

6. Removal

1. Switch the ELT to OFF.
2. Disconnect the outside antenna from the BNC connector of the ELT.
3. Disconnect the DIN 12 Connector of Remote Control Panel 3-wire bundle from the DIN12 socket of the ELT.
4. Unfasten the self-stripping strap.
5. Remove the transmitter from the bracket.

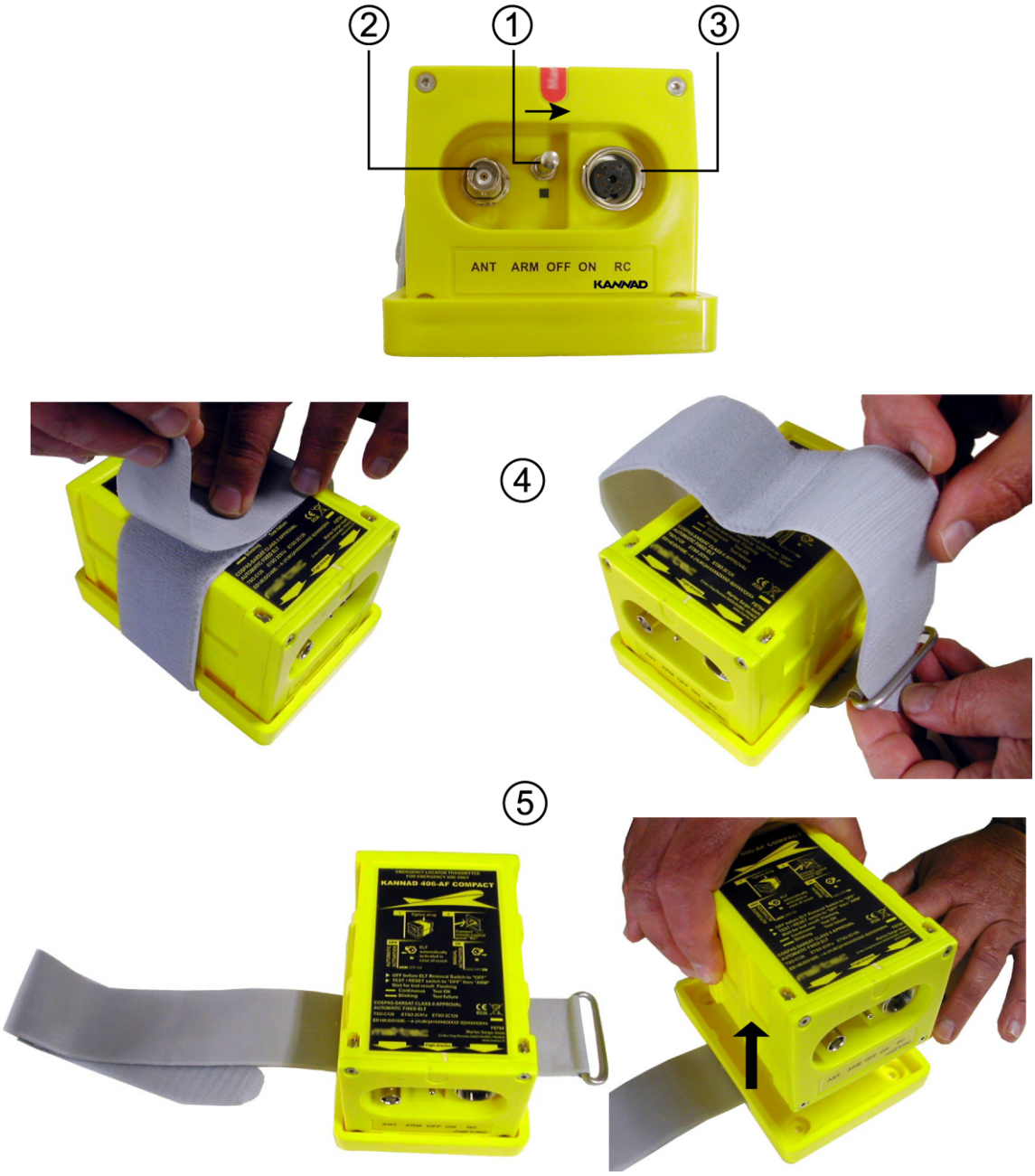

Figure 4: Removing the transmitter

CHECK

1. Self-test

A. Periodicity

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

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

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 position "ARM").
  - The buzzer operates during the whole Self-test procedure.
  - After a few seconds, the test result is displayed with the LED as follows:
    - One long flash indicates that the system is operational and that no error conditions were found.
    - A series of short flashes indicates the test has failed.

Remark: 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. Operational tests

These tests must be performed by maintenance personnel when performing the first power up procedure or to check RCP monitoring and control (Refer to B. RCP operational tests) or transmitter (Refer to C. 406 and 121.5 MHz transmission test).

A. ELT operational tests

NOTE: ELT operational tests only provide the aircraft operator with an indication that the ELT is transmitting; however, a positive result cannot be interpreted as meaning that the ELT meets all operational parameters.

- 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. RCP operational tests

Check correct operation of RCP LED annunciator by switching ELT and RCP as described in the sequential procedure Figure 301: RCP LED operation (with ELT switch in the "ARM" position).

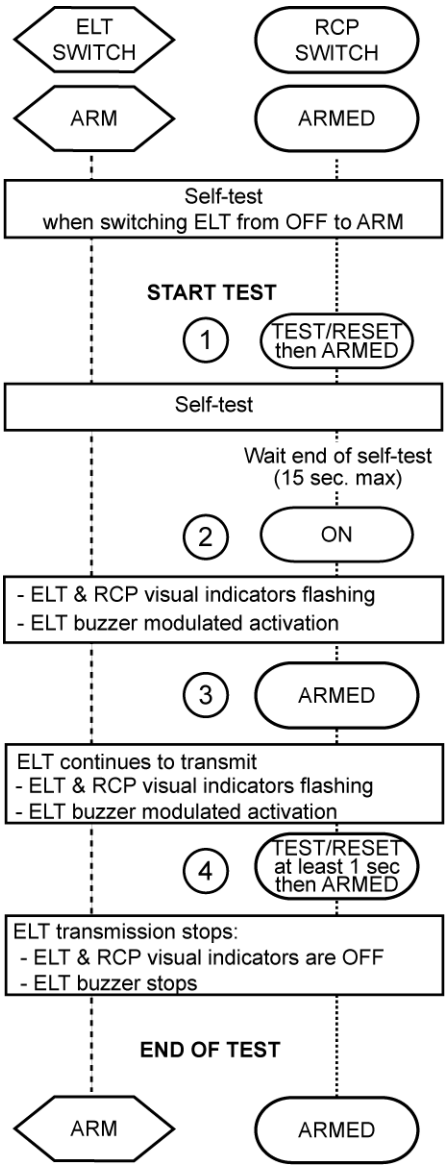

Figure 301: RCP LED operation

C. 406 and 121.5 MHz transmission test

NOTE: Transmissions tests only provide the aircraft operator with an indication that the ELT is transmitting; however, a positive result cannot be interpreted as meaning that the ELT meets all operational parameters.

(1) 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 Cospas-Sarsat Decoder:

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

(2) 121.5 MHz

This check shall only be conducted during the first five minutes of any UTC, (co-ordinated universal time) hour, and restricted in duration to not more than five seconds. Be sure to notify any nearby control tower of your intentions.

This test must be carried out with a VHF receiver (Aircraft VHF receiver may be used).

- 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 ARM position);
- Listen to the two 121.5 MHz "sweep tones" **during not more than the first five seconds** then stop transmission (see imporant notice below):
  - either on ELT: OFF position then ARM position;
  - or on the Remote Control Panel: press TEST and RESET (the ELT shall be in ARM position).
  - continue to listen to 121.5 MHz for a few seconds to ensure that the ELT does not continue to transmit after the test is terminated.

IMPORTANT: Do not allow test duration to exceed 5 seconds. If the ELT operates for approximately 50 seconds, a 406 MHz signal is transmitted and is considered valid by the satellite system.

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TROUBLESHOOTING

1. General

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

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:
  Replace battery: refer to CMM 25-63-03 for tests and repair.

(2) 3+2 flashes

- Low RF power:
  Check 406 MHz power: refer to CMM 25-63-03 for tests and repair.

(3) 3+3 flashes

- Faulty VCO locking (faulty frequency):
  Check frequencies: refer to CMM 25-63-03 for tests and repair.

(4) 3+4 flashes

- No identification programmed
  Check programming: refer to CMM 25-63-03 for tests and repair.

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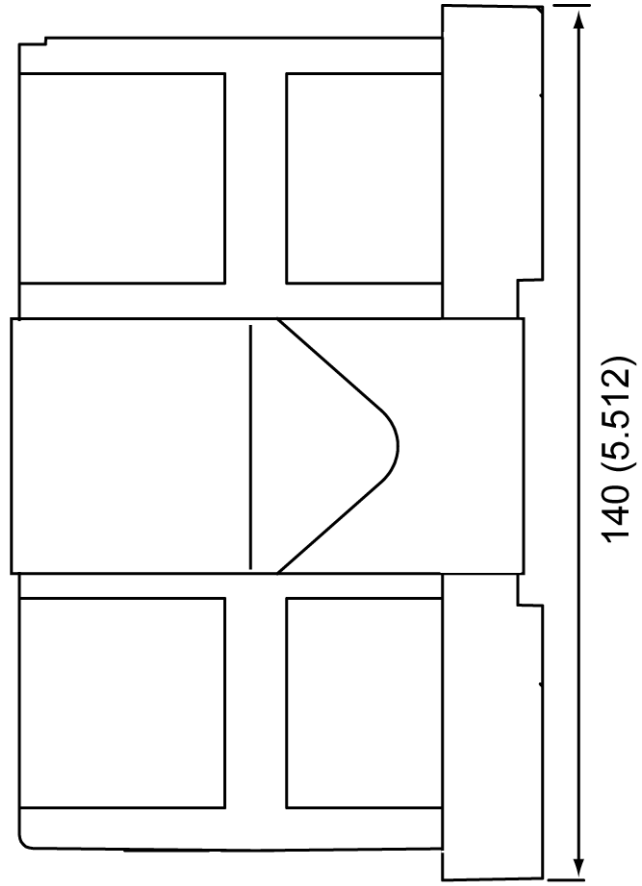
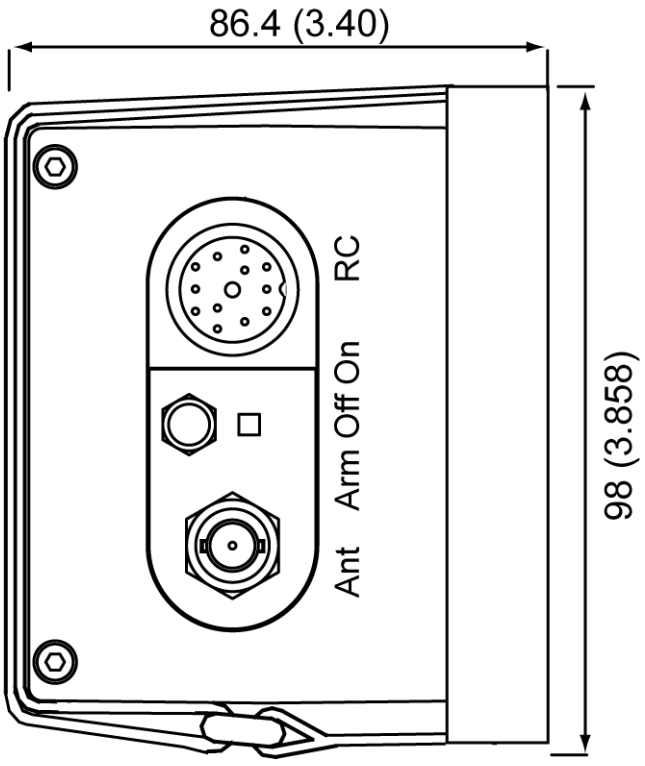
SCHEMATICS & DIAGRAMS

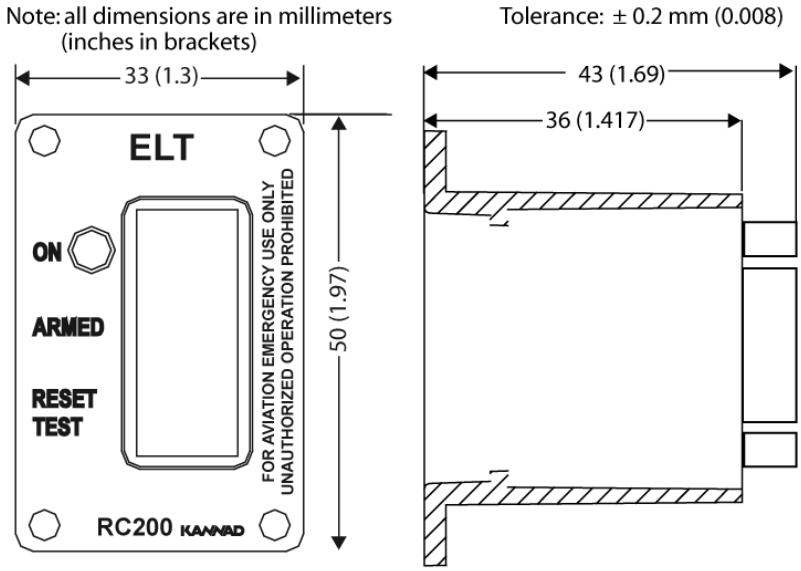
1. ELT Outline Dimensions

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

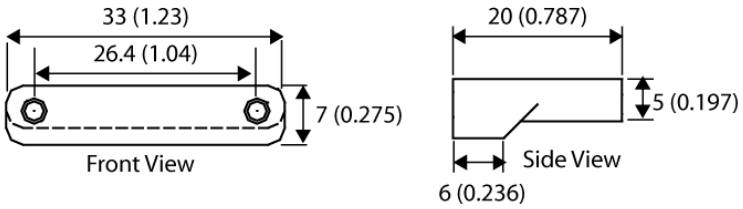




2. RC200 Outline Dimensions



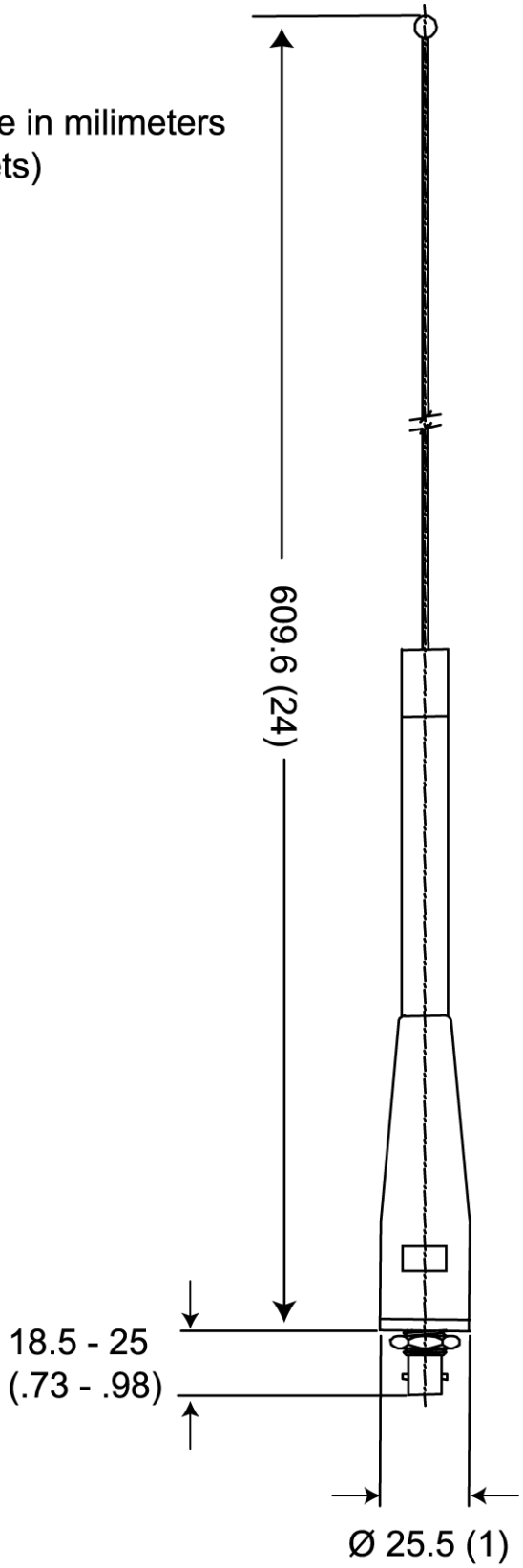
CONTROL PANEL



MOUNTING TRAY

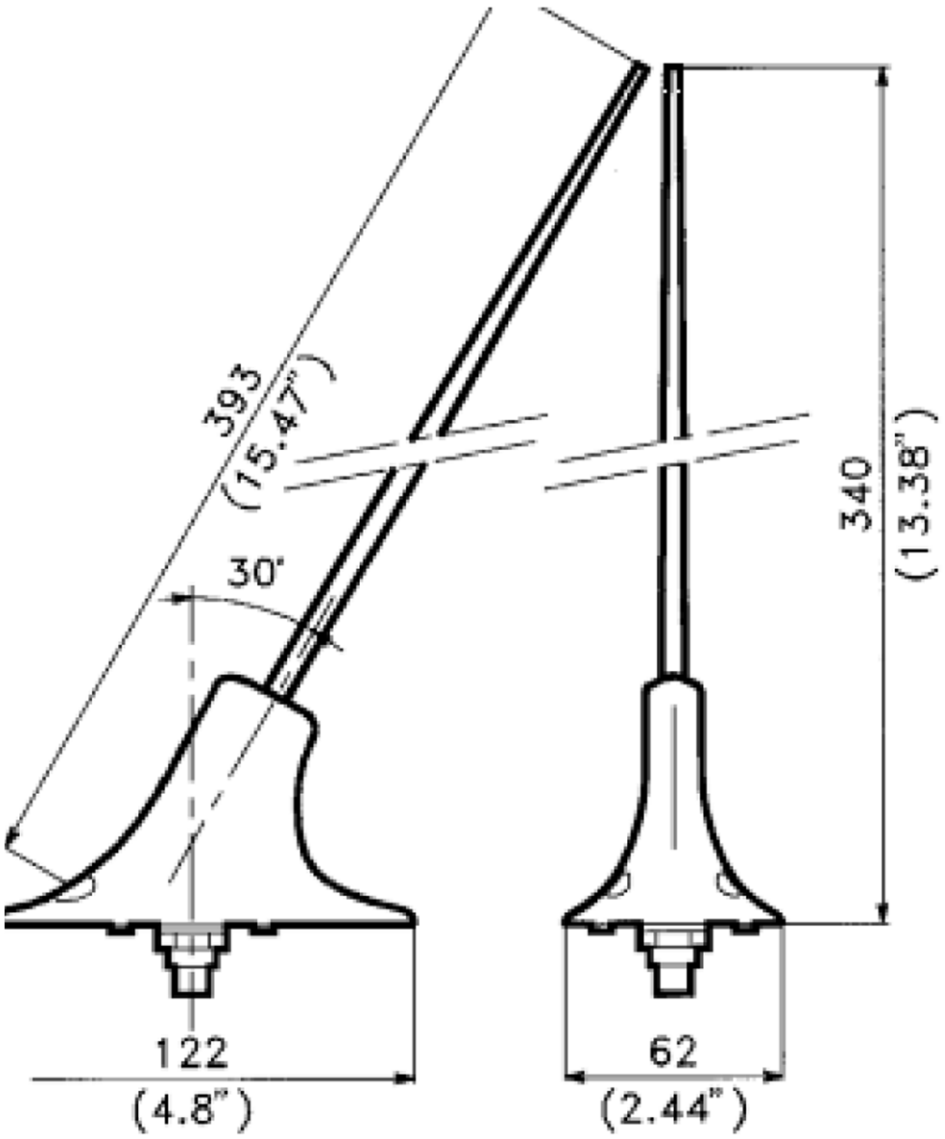
3. ANT200 Outline Dimensions

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

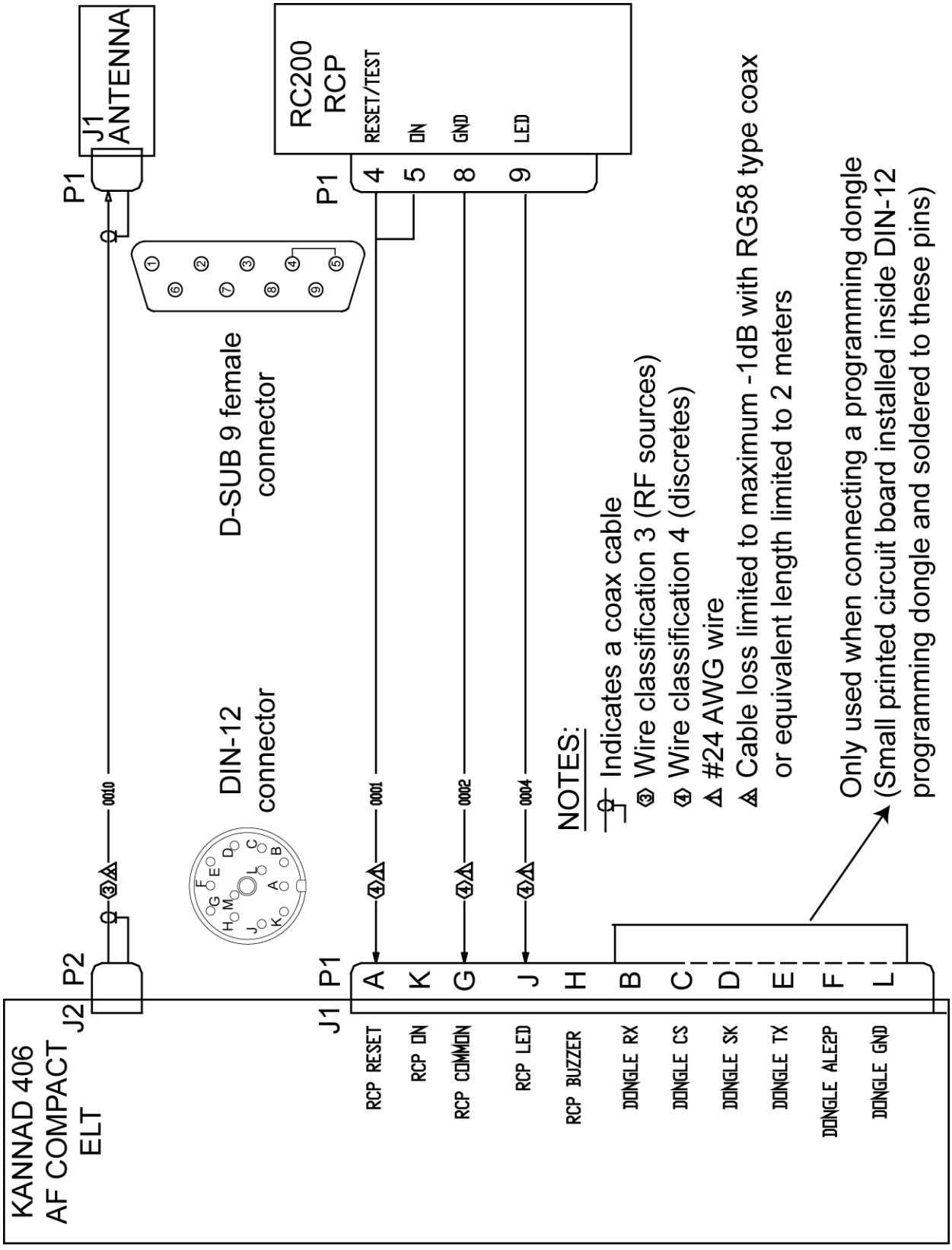


4. ANT300 Outline Dimensions

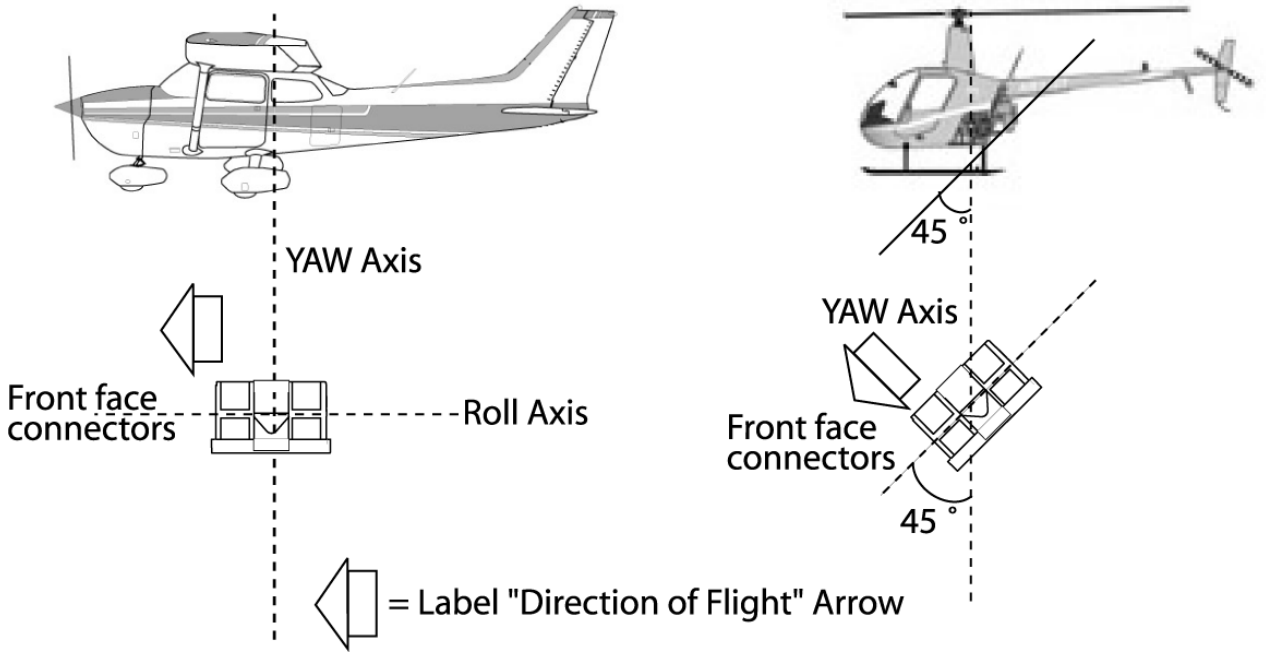
Note: all dimensions are in millimeters
(inches in brackets)



5. Wiring


J1 ANTENNA
P1
RC200 RCP
RESET/TEST
DN
GND
LED
4
5
8
9
P1
D-SUB 9 female connector
DIN-12 connector
0010
0001
0002
0004
P2
J2
J1 P1
A K G J H B C D E F L
RCP RESET
RCP DN
RCP COMMON
RCP LED
RCP BUZZER
DONGLE RX
DONGLE CS
DONGLE SK
DONGLE TX
DONGLE ALE2P
DONGLE GND
KANNAD 406 AF COMPACT ELT
NOTES:
Indicates a coax cable
③ Wire classification 3 (RF sources)
④ Wire classification 4 (discretes)
⚠ #24 AWG wire
⚠ Cable loss limited to maximum -1dB with RG58 type coax or equivalent length limited to 2 meters
Only used when connecting a programming dongle (Small printed circuit board installed inside DIN-12 programming dongle and soldered to these pins)

6. KANNAD 406 AF-COMPACT, axis of installation



SERVICING

1. Maintenance Schedule

Periodic inspection and battery replacement can only be carried out by an accredited PART 145 or FAR 145 maintenance station.

IMPORTANT: Inspections must be recorded on the ELT LOG SHEET (ref. DIM08013) supplied with the ELT, fields Periodic Inspection log page 2/2.

A. Periodic inspection

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

Some Civil Aviation Authorities may require the ELT be tested periodically**(1)**. In this case, it is recommended to check the following parameters:

- Proper installation.
- Operation of the controls and crash sensor.
- Transmitted signals.
- Battery corrosion.
  Note: Due to the technology used for our beacon and battery pack, any corrosions beween two battery replacements is unlikely to happen.However if this inspection is required by Civil Aviation Authority, this check is detailed in CMM 25-63-03 page block CHECK page 5001.

*Note **(1)**: As indicated in the Canadian operating rule, Standard 625 ".... the ELT shall be checked at intervals not exceeding 12 months, in accordance with Appendix G of Chapter 571 of the Airworthiness Manual..".*

(1) Proper installation

- Remove ELT from its mounting bracket: Refer to § 6. Removal, page 206
- Inspect the mounting bracket and the ELT: Ensure the mounting bracket and the ELT are free of cracks or other obvious damage.
- Inspect the connection: Visually inspect all connector pins.

(2) Operation of the control crash sensor

- Refer to CMM 25-63-03 page block TESTING AND FAULT ISOLATION, TASK 25-63-03-700-801-01 (Beacon operating tests).

(3) Transmitted signals

- Refer to CMM 25-63-03 page block CHECK, TASK 25-63-03-220-801-A01 (Special inspection)

(4) Batteries corrosion

- Refer to CMM 25-63-03 page block TESTING AND FAULT ISOLATION, TASK 25-63-03-700-801-01 (Beacon operating tests)

(5) Check of 121.5 MHz frequency

- Re-install the ELT
  Refer to § 3. ELT transmitter installation procedure, page 204.
- Check 121.5 MHz frequency using the aircraft tune receiver.
  Refer to § C. 406 and 121.5 MHz transmission test, page 303.

B. 6-year inspection

Replacement of battery pack is mandatory every 6 years (Refer to § 2. Battery replacement requirements, page 604).

Testing of the following elements and parameters of the ELT is mandatory every 6 years together with the battery pack replacement.

- Visual control of the housing and accessories
- Operation of the controls and crash sensor
- Measurement of 406 and 121.5 MHz output power and frequencies.
- Verification of digital message (coding).

6-year inspection must be performed in the order listed below.

(1) Visual control of the housing and accessories

- Remove ELT from its mounting bracket.
  Refer to § 6. Removal, page 206
- Inspect the mounting bracket and the ELT.
  Ensure the mounting bracket and the ELT are free of cracks or other obvious damage.
- Inspect the connection.
- Visually inspect all connector pins.

(2) Operation of the controls and crash sensor

Refer to CMM 25-63-03 page block TESTING AND FAULT ISOLATION, TASK 25-63-03-700-801-01 (Beacon operating tests).

(3) Measurement of output powers, frequencies and verification of digital message

Refer to CMM 25-63-03 page block TESTING AND FAULT ISOLATION, TASK 25-63-03-700-801-01 (Beacon operating tests).

(4) Current draw measurement in ARM and ON positions (optional)

This test is required by Canadian Regulation according to CAR571, Appendix G (c)(3)(d): Refer to CMM 25-63-03 page block TESTING AND FAULT ISOLATION, TASK 25-63-03-700-801-01 (Beacon operating tests).

(5) Battery pack replacement

CAUTION: USE ONLY ORIGINAL AND APPROVED BATTERY PACK (see 2. Battery replacement requirements).

Refer to CMM 25-63-03 page block DISASSEMBLY, TASK 25-63-03-000-801-A01 and page block ASSEMBLY, TASK 25-63-03-400-802-A01

(6) Check of 121.5 MHz frequency

- Re-install the ELT
  Refer to § 3. ELT transmitter installation procedure, page 204.
- Check 121.5 MHz frequency using the aircraft tune receiver.
  Refer to § C. 406 and 121.5 MHz transmission test, page 303.

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 inadvertant activation of unknown duration.

Only original and approved battery pack included in battery KIT BAT200 (P/N S1840501-01) supplied by KANNAD can be installed. [SAFT-FRIWO , Lithium Manganese Dioxide, 2 x M20 (D-type) cells]

PLEASE CONTACT YOUR LOCAL DISTRIBUTOR

KANNAD refuse all responsibility and invalidate all warranty should other packs be installed.

Battery available from any KANNAD distributor or dealer.

KANNAD
Z.I. des Cinq Chemins BP23
56520 GUIDEL - FRANCE
Telephone: +33 (0)2 97 02 49 49 Fax: +33 (0)2 97 65 00 20
Web: http://www.kannad.com - E-mail: contact.aviation@kannad.com
Support: support.sar@kannad.com Tel.: +33 (0)2 97 02 49 00

List of distributor available on our Web site:
http://www.kannad.com

NOTES

NOTES

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Fax : +33 (0) 2 97 65 00 20

DOC06006E
Ref: 0141922E

DOC07089C
Ref: 0144618C

INITIAL INSTALLATION MANUAL

KANNAD 406 AF-COMPACT

ELT FOR GENERAL AVIATION

406 MHz EMERGENCY LOCATOR TRANSMITTER

121.5 MHz HOMING FREQUENCY

INSTALLATION INCLUDING:
REMOTE CONTROL PANEL, MOUNTING BRACKET AND CONNECTORS

www.kannad.com

KANNAD

KANNAD - ZI des Cinq Chemins BP23- 56520 Guidel-France
Tel: +33 2 97 02 49 49 / Fax: +33 2 97 65 02 19 / contact.aviation@kannad.com

TABLE OF CONTENTS

1. Introduction

The instructions in this manual provide the information necessary for the initial installation of KANNAD 406 AF-COMPACT ELT system.

2. KANNAD 406 AF-Compact System Presentation

A. System overview

PACK KANNAD 406 AF-COMPACT (P/N S1840501-02) is composed of:

1. a transmitter (P/N S1840501-01)(1);
2. a mounting bracket (P/N S1840502-01);
3. an RC200 remote control panel (P/N S1820513-11);
4. a DIN-12 connector (P/N S1820514-03);
5. a SUB D 9 Pts Female connector (P/N S1840506-01).

The approved outside whip (P/N 0145621) or rod (P/N 0124220) antennas are purchased separately.

Note: (1) when ELT transmitter KANNAD 406 AF-COMPACT (P/N S1840501-01) is ordered separately, optional items 2, 3, 4 and 5 are not supplied.

The transmitter and bracket 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 3-wire bundle (not supplied).

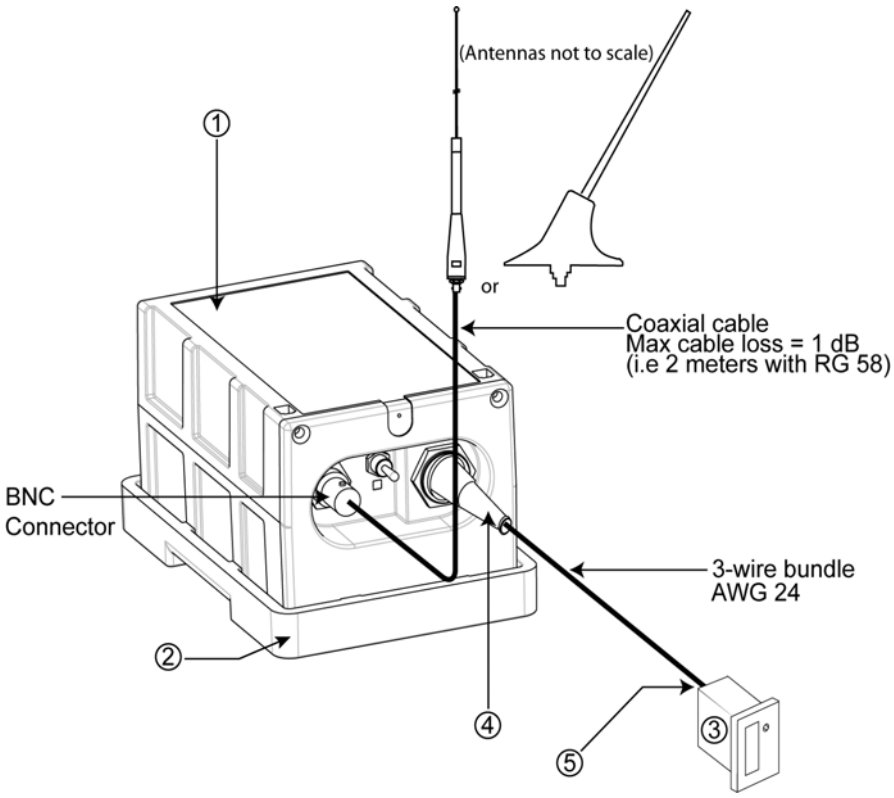


Figure 1: ELT system description

B. Transmitter and bracket

The ELT must be installed into its own mounting 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.

Figure 2: KANNAD 406 AF-COMPACT with Mounting Bracket

C. Remote Control Panel

Note: supplied with Pack KANNAD 406 AF-COMPACT (P/N S1840501-02).

An RC200 remote control panel is available for installation in the cockpit in order to enable the pilot to monitor and control the ELT status.

The remote control panel is connected to the ELT via a 3-wire cable equipped with a DIN-12 connector on the ELT side and a D-SUB Female 9Pts connector on the other side.

Note: the 3-wire cable is not supplied.

Figure 3: RC200 Remote Control Panel

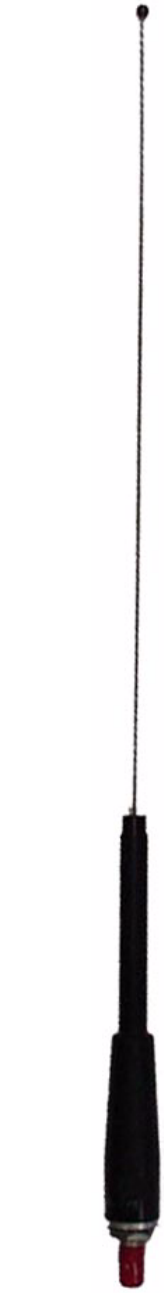
D. Outside antennas

The outside antenna can be either of whip (ANT200, P/N 0145621) or rod (ANT300, P/N 0124220) 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 male BNC connector.

IMPORTANT NOTICE: KANNAD recommends a cable with radio electric properties similar or better to those of a RG58 cable.

Note: the 50 Ohm coaxial cable and the male BNC connector are not supplied.



ANT200, Whip Antenna

ANT300, Rod Antenna

Figure 4: Whip and rod antennas

3. Registration

A. General

The ELT must be registered prior to installation onboard.

When a 406 MHz ELT is installed in an aircraft, it is imperative that the aircraft owner register the ELT. Each 406 MHz ELT contains a unique identification code that is transmitted to the satellite. This helps the “Rescue Coordination Center” (RCC) determine whether an emergency actually has occurred. The unique identification permits accessing a data base.

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

The "Programming Datasheet" (DIM00300) 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.

B. Registration in USA

Mail or Fax your registration form to:

NOAA/SARSAT

NSOF, E/SP3

4231 Suitland Road

Suitland, MD 20746

or Save Time! Register your beacon online at:

www.beaconregistration.noaa.gov

All online registrations will be entered into the National 406 MHz Beacon Registration Database on the same day of entry. Registration forms received via postal mail will be entered within 2 business days of receipt. For online registrations, a confirmation letter with your completed registration information form will be sent immediately via e-mail or fax (if provided). Confirmation letters sent via postal mail should arrive within two weeks. Once your registration confirmation is received, please review all information. Any changes or updates to your registration information can be done via the internet, fax, e-mail or postal mail. If you do not receive your registration confirmation from NOAA on the same day you submit it over the internet or within two weeks if you submit it by postal mail, please call NOAA toll-free at: 1-888-212-SAVE (7283) or 301-817-4515 for assistance.

After initial registration (or re-registration) you will receive a NOAA Proof of Registration Decal by postal mail. This decal is to be affixed to the beacon and should be placed in such a way that it is clearly visible. If for some reason you

do not receive the registration decal within two weeks, please call NOAA toll-free at: 1-888-212-SAVE (7283) or 301-817-4515.

Failure to register, re-register (as required every two years), or to notify NOAA of any changes to the status of your 406 MHz beacon could result in penalties and/or fines being issued under Federal Law. The owner or user of the beacon is required to notify NOAA of any changes to the registration information at any time. By submitting this registration the owner, operator, or legally authorized agent declares under penalty of law that all information in the registration information is true, accurate, and complete. Providing information that is knowingly false or inaccurate may be punishable under Federal Statutes. Solicitation of this information is authorized by Title 47 - Parts 80, 87, and 95 of the U.S. Code of Federal Regulations (CFR). Additional registration forms can be found on the NOAA-SARSAT website at:

www.sarsat.noaa.gov or at: www.beaconregistration.noaa.gov

C. Registration in Canada

Beacon information is held in the Canadian Beacon Registry maintained by the National Search and Rescue Secretariat for use in search and rescue operations. Online access to the Registry is available for all beacon owners to register new beacons or to update their beacon information. You can add or update your beacon information by accessing the registry directly, sending in a completed registration form or by talking to one of our beacon registry representatives.

You can access the registry:

- online: beacons.nss.gc.ca
- by email: beacons@nss.gc.ca
- by fax: 1-613-996-3746
- by telephone: 1-800-727-9414 or 1-613-996-1616

The registration information must be updated when the aircraft ownership changes as per the Canadian Airworthiness Notice AN B029 (refer to following link):

http://www.tc.gc.ca/civilaviation/maintenance/AARPC/ANs/B029.htm

This information must be recorded on the ELT LOG SHEET (ref. DIM08013) supplied with the ELT, fields Programming Log.

Additional information and registration forms can be found on the Canadian NSS website at:

http://www.nss.gc.ca/site/cospas-sarsat/INTRO_e.asp

4. ELT Installation

A. ELT and bracket installation recommendations

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

Use cable of loss ≤ 1dB.

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 C126 Paragraph D Requirements

"The conditions and tests required for TSO approval of this ELT are minimum performance standards. It is the responsibility of those desiring to install this ELT on a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. The article may be installed only if further evaluation by the applicant documents an acceptable installation and it is approved by the Administrator".

(3) RTCA DO-182 Recommandations

"*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-204 Requirements

"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 maximum static local deflection no greater than 2.5 mm (0.1 inch) when a force of 450 Newton (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 meters (1 foot) nor more than 1.0 meter (3 feet) from the mounting location."

B. Bracket installation procedure

- Determine the location of the ELT onboard according to paragraph A. ELT and bracket installation recommendations page 6.
- 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 "Flight direction" on the label affixed to the top of the ELT.

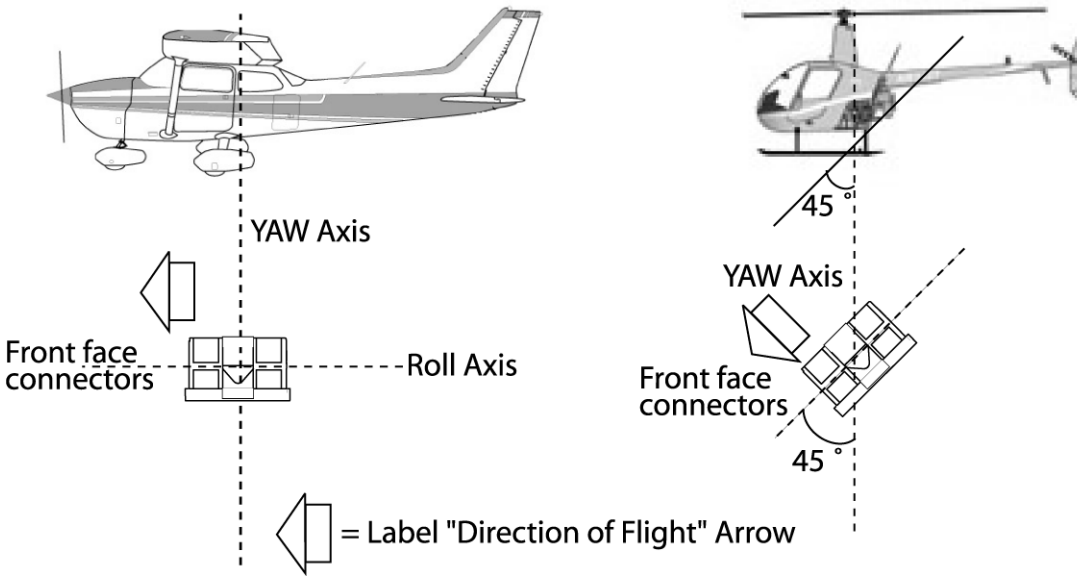


Figure 5: KANNAD 406 AF-COMPACT, axis of installation

(1) Fixed wing aircraft

The G-Switch sensor axis shall be pointed to sense the primary crash pulse along the longitudinal axis of the aircraft (with maximum tolerance of 15°). Consequently, the KANNAD 406 AF-COMPACT shall be mounted with the arrow of the "Flight direction" label pointed towards the front of the aircraft.

(2) Helicopters

KANNAD 406 AF-COMPACT may be installed on helicopter. The ELT unit should be mounted:

- with the front face connectors pointing downwards at a 45° angle to the yaw axis;
- and with "Flight direction" arrow towards the front of the helicopter.

NOTE: Should the KANNAD 406 AF-COMPACT be installed onboard helicopter, it will be necessary to make a special mounting base to install the ELT.

- Drill 4 holes Ø 6 mm in the aircraft structure according to "Drilling mask" (Refer to Mounting bracket drilling Mask, page 20). Inner holes (1, 2, 3, 4) 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 6: 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.**
- Verify that the ELT identification label matches the aircraft tail number.

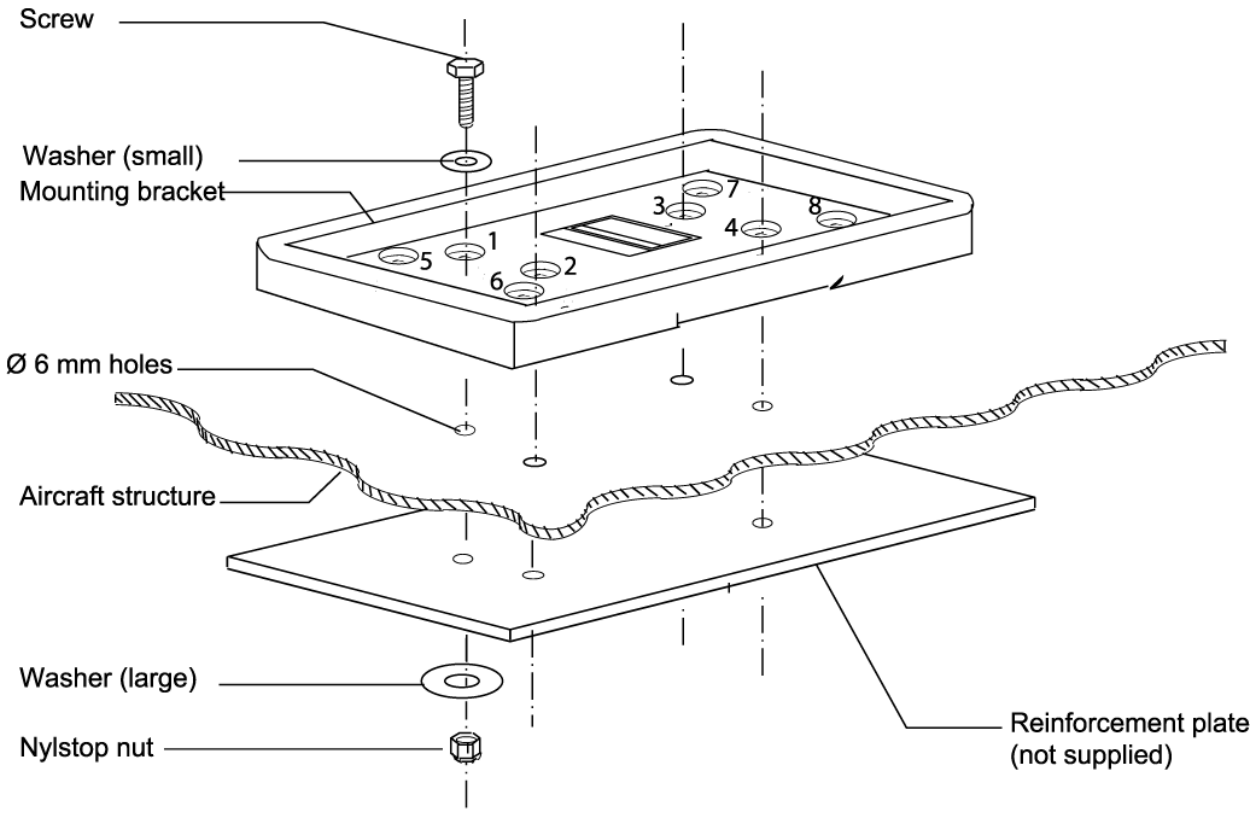


Figure 6: Bracket installation

C. ELT installation procedure

1. Mount the transmitter on the bracket "Flight direction" arrow pointed towards the front of the aircraft (Figure 5: KANNAD 406 AF-COMPACT, axis of installation).
2. Slide the self-stripping strap through the buckle. **Ensure the buckle is correctly positioned (indifferently on right or left side of ELT) regarding the horizontal center line of ELT as shown Detail A.**
3. Fasten the self-stripping strap tightly.

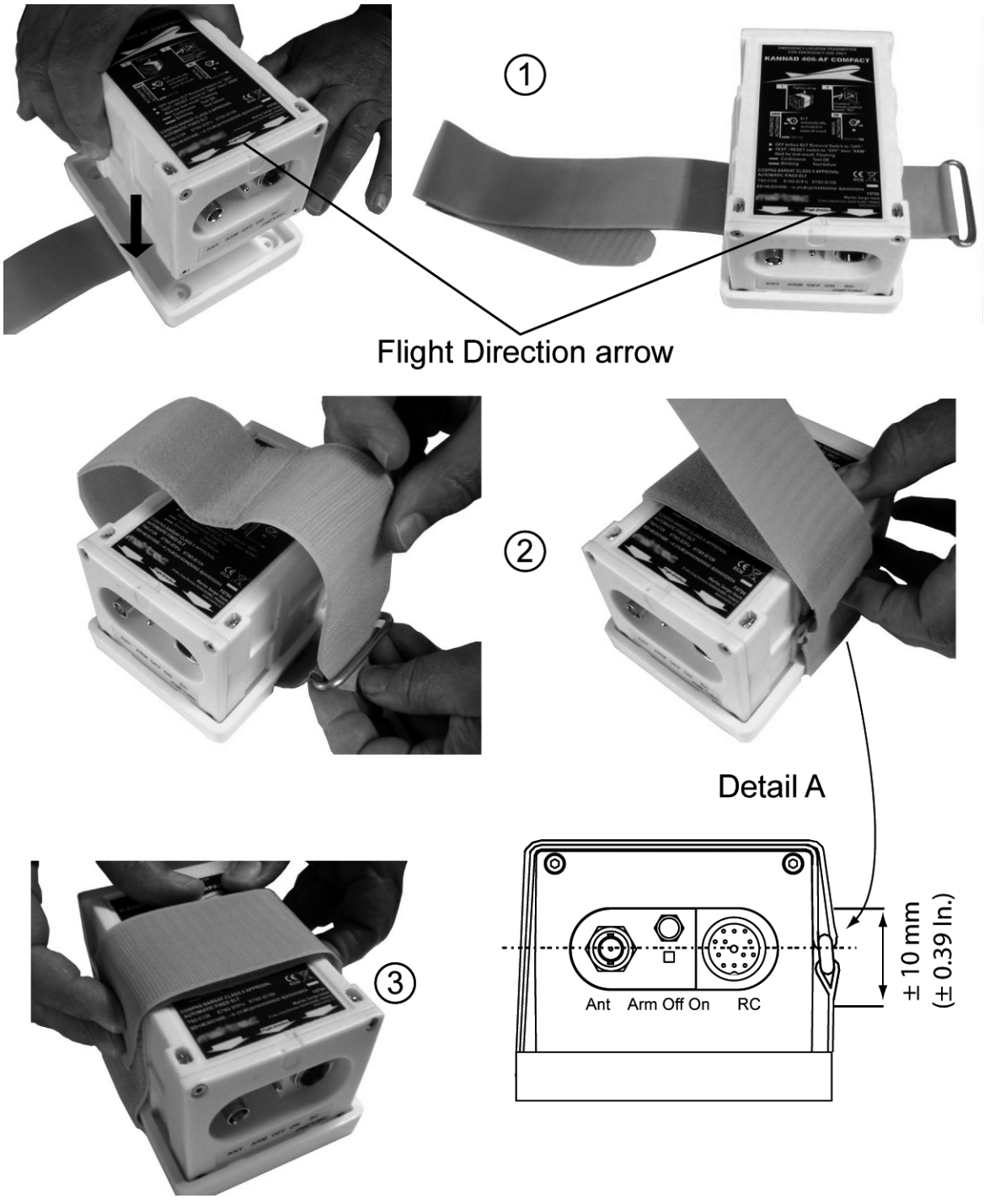


Figure 7: Installing the transmitter on the bracket

5. Antenna Installation

Use only whip (ANT200) or rod (ANT 300) approved antennas.

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. 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

"*The antenna shall be mounted to provide either right-hand circular or vertical polarization when the aircraft is in the normal flight attitude.*"

"*The antenna shall be installed as close to the unit as possible. The proximity of the ELT antenna to any vertically-polarized communications antenna shall be such as to minimize radio frequency interference and radiation pattern distorsion of either antenna.*"

"*The antenna mounting surface shall be able to whistand a static load equal to 100 times the antenna's weight applied at the antenna mounting base along the longitudinal axis of the aircraft".*

B. Antenna mounting location

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.

Locate a position on the fuselage where:

- the antenna can be installed vertically with at least antenna length [(0.61 meter, 24 inches for ANT200); (0.39 meter, 15.47 inches for ANT300)] clearance from other antennas (specially VHF) mounted on the aircraft,
- when installed, the coaxial cable of the antenna will not cross any major structural sections in the aircraft so that, in the event of a crash, the ELT and the antenna are in the same section (placing the antenna directly above the ELT unit being the best solution).

If the ELT transmitter and outside antenna are on opposite sides of an airframe production break, the components should be secured to each other by a tether that can support a 100 G load (ELT weight x 100). The interconnecting antenna-to-ELT cable should have sufficient slack on both ends that it will not

be subjected to any tensile load and should be tied loosely to the tether.

C. Antenna installation procedure

Ensure that the antenna mounting location meets the requirements as described B. Antenna mounting location.

A double plate will most likely be necessary for the antenna to meet rigidity specifications in B. Antenna mounting location.

A 9 Kilogram force (20 pound force) applied in all direction should not cause an appreciable distorsion 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 [(0.61 meter, 24 inches for ANT200); (0.39 meter, 15.47 inches for ANT300)].

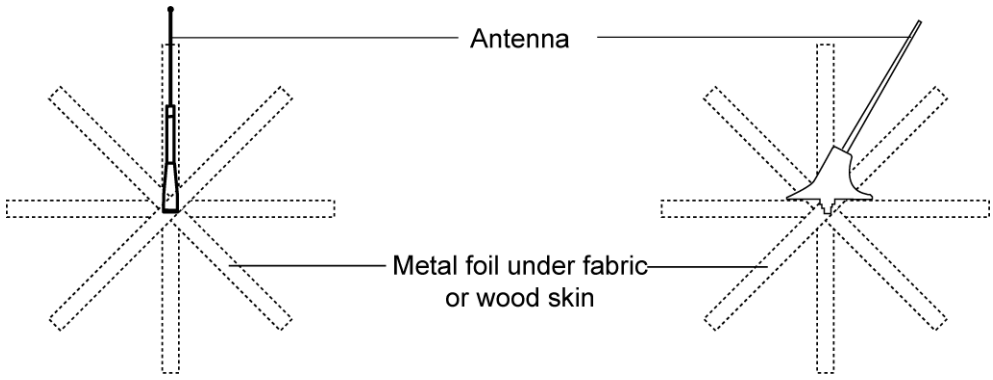


Figure 8: Antenna ground plane for non metallic aircraft

According to the antenna to be installed, use the appropriate outline drawings and drilling masks to determine the hole patern and drill size (Refer to RC200 Outline Dimensions, page 21 or Refer to ANT300 Outline Dimensions and drilling mask, page 24).

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 meters (6 ft) for a standard RG58 or equivalent coaxial cable. If the cable length exceeds 2 meters, a low loss cable of attenuation less than 1 dB must be used (See Important notice, Outside antennas, page 3).

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.

6. RCP installation

Note: supplied with Pack KANNAD 406 AF-COMPACT (P/N S1840501-02). Skip this step if installing only KANNAD 406 AF-COMPACT transmitter (P/N S1840501-01).

A. RCP Installation Recommendations

The RC200 shall be readily accessible from the pilot's normal seated position. If possible, the RC200 should be installed in the cockpit in an area that is not directly exposed to sun rays.

B. RCP Installation Procedure

The RC200 is designed to be installed:

- either on the instrument panel with 4 screws (rivets bush recommended, not supplied);
- or below the instrument panel with a special mounting tray (supplied).

(1) Installation on the instrument panel

- Determine RC200 location on the instrument panel:
- Make a cutout on the instrument panel according to the Drilling mask (Refer to RC200 Drilling Mask, page 22).
- Mark the 4 holes needed for the RC200 using the drilling mask or the RC200 as a guide.
- Drill the 4 marked holes, diameter depending on rivets bush used.
- Install the RC200 by fitting it into the cutout.
- Secure the RC200 (4 rivets bush recommended).
  Note: Rivets bush are not supplied.

(2) Installation below the instrument panel

Figure 9: Installation of RC200 with mounting tray

Determine RC200 location below the instrument panel (be sure the location meets the requirements established in RTCA-DO-204).

- According to the "area to be drilled" (1) of the mounting tray (3), determine the location of the screws or rivets (2) used to secure the mounting tray (3) to the instrument panel (4).
- Drill 2 holes on the mounting tray and on the instrument panel, diameter depending on screws or rivets used.
- Secure the mounting tray (3) to the instrument panel (4).
- Secure the RC200 (5) to the mounting tray (3) with the 2 screws (6) supplied (torque 0.8 Nm).

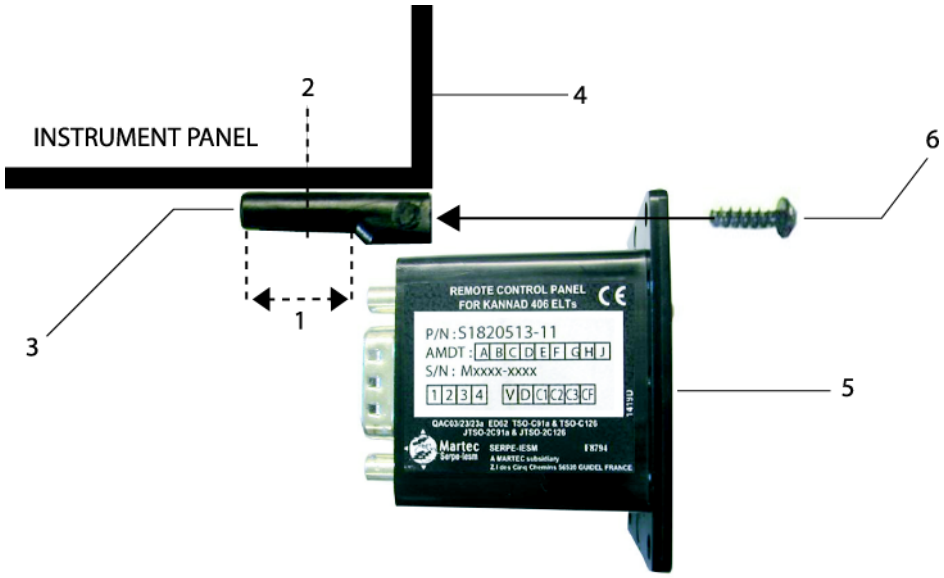


Figure 9: Installation of RC200 with mounting tray

(3) Connection

Fabricate a 3-wire bundle (AWG 24, shielded preferred) long enough to reach between the ELT installation location and the cockpit RCP location.

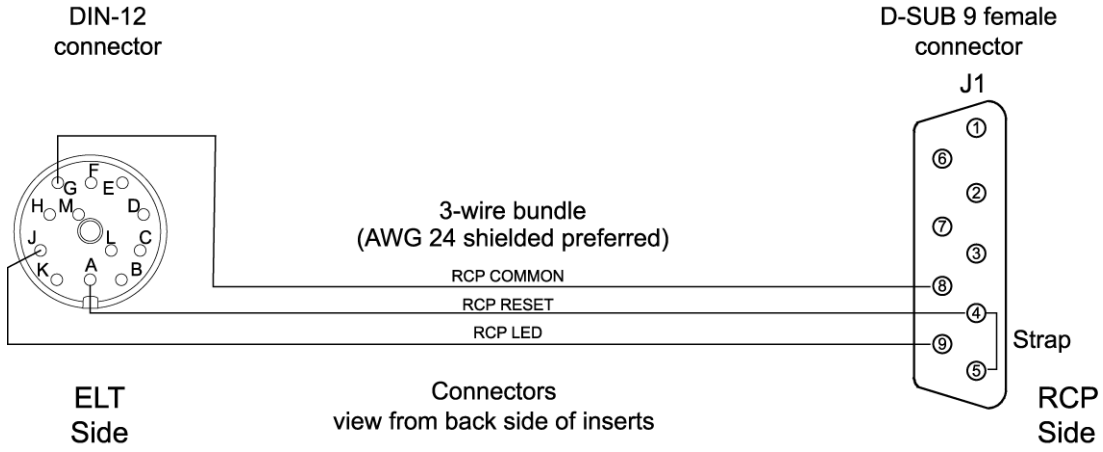


Figure 10: Wiring of 3-wire bundle

Slide heat-shrinkable sleeves on both sides of each wire.

On the ELT side:

- Solder the wires to the DIN12 connector supplied with the pack:
  - solder the wires to pins G (RCP COMMON), A (RCP RESET) and J (RCP LED) of the connector.
  - Put heat-shrinkable sleeves to protect the pins

On the RCP side:

- Strap pins 4 and 5 of the female 9-pin D-SUB connector supplied with the pack.
- Solder the wires to the female 9-pin D-SUB connector as follows:
  - Pin 8 (RCP COMMON) has to be connected to Pin G (RCP COMMON) of the ELT;
  - Pin 4 (RCP RESET) has to be connected to Pin A (RCP RESET) of the ELT;
  - Pin 9 (RCP LED) has to be connected to Pin J (RCP LED) of the ELT.
  - Put heat-shrinkable sleeves to protect the pins.
- Connect the female 9-pin D-SUB connector to the male 9-pin D-SUB socket of the RC200.

7. ELT Connection

1. Connect the cable of the outside antenna to the BNC connector of the front panel.
2. Connect the DIN12 connector of the Remote Control Panel cable to the DIN 12 socket of the front panel
   Note: only for Pack KANNAD 406 AF-COMPACT, P/N S1840501-02.
3. Set the 3-position switch of the front panel to ARM.

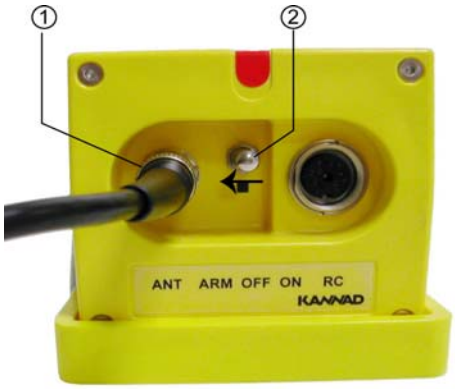


Figure 11: Installation, controls and connectors

- Perform the first power up procedure (see below).

8. First power up procedure

Do not perform these tests without the antenna connected.

Caution: never switch to ARM or ON if neither antenna cable nor 50 ohm load is connected to the ELT (1. BNC connector), ***risk of ELT damage.***

A. ELT perational tests

NOTE: ELT operational tests only provide the aircraft operator with an indication that the ELT is transmitting; however, a positive result cannot be interpreted as meaning that the ELT meets all operational parameters.

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

Remark: 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

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

B. RCP operational tests

Note: Pack KANNAD 406 AF-COMPACT (P/N S1840501-02) only. Skip this step if installing KANNAD 406 AF-COMPACT transmitter (P/N S1840501-01) without RCP.

Check correct operation of RCP LED annunciator by switching ELT and RCP as described in the sequential procedure Figure 12: RCP LED operation (with ELT switch in the "ARM" position).

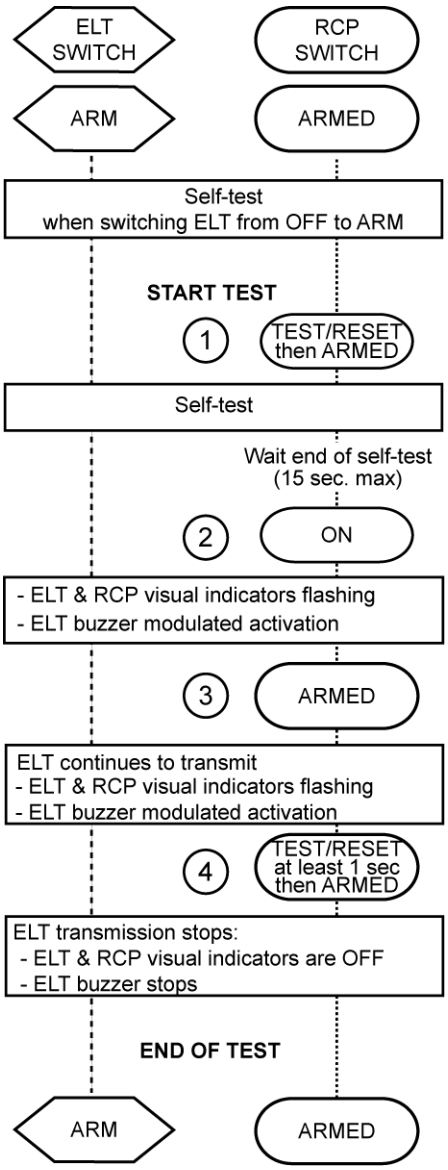


Figure 12: RCP LED operation

C. 406 and 121.5 MHz transmission test

NOTE: Transmissions tests only provide the aircraft operator with an indication that the ELT is transmitting; however, a positive result cannot be interpreted as meaning that the ELT meets all operational parameters.

(1) 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 Cospas-Sarsat Decoder:

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

(2) 121.5 MHz

This check shall only be conducted during the first five minutes of any UTC, (co-ordinated universal time) hour, and restricted in duration to not more than five seconds. Be sure to notify any nearby control tower of your intentions.

This test must be carried out with a VHF receiver (Aircraft VHF receiver may be used).

- 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 ARM position);
- Listen to the two 121.5 MHz "sweep tones" **during not more than the first five seconds** then stop transmission (see imporant notice below):
  - either on ELT: OFF or ARM position;
  - or on the Remote Control Panel: press TEST and RESET (the ELT shall be in ARM position).
  - continue to listen to 121.5 MHz for a few seconds to ensure that the ELT does not continue to transmit after the test is terminated.

IMPORTANT: Do not allow test duration to exceed 5 seconds. If the ELT operates for approximately 50 seconds, a 406 MHz signal is transmitted and is considered valid by the satellite system.

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

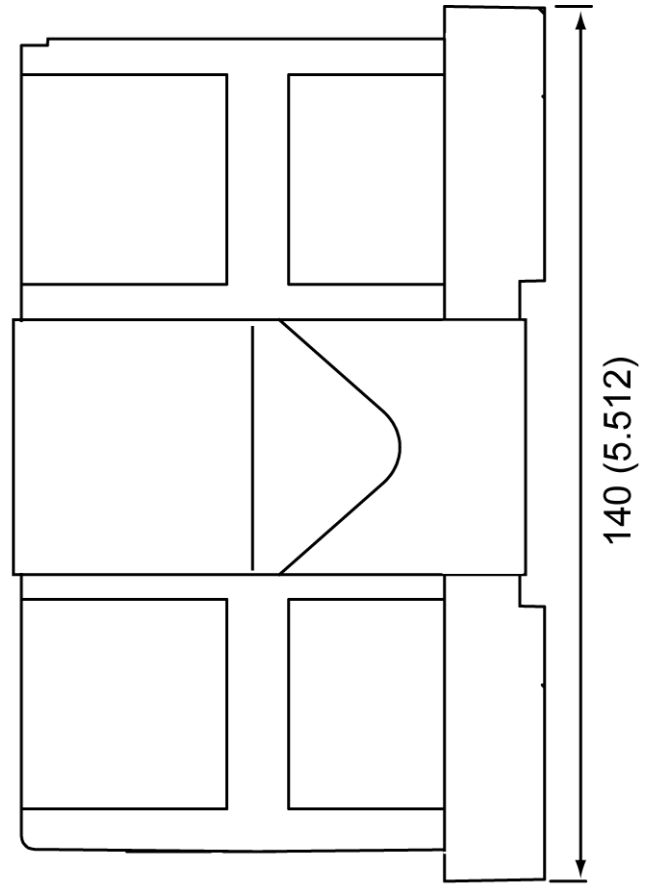
The ELT is now in stand by mode and ready to be activated:

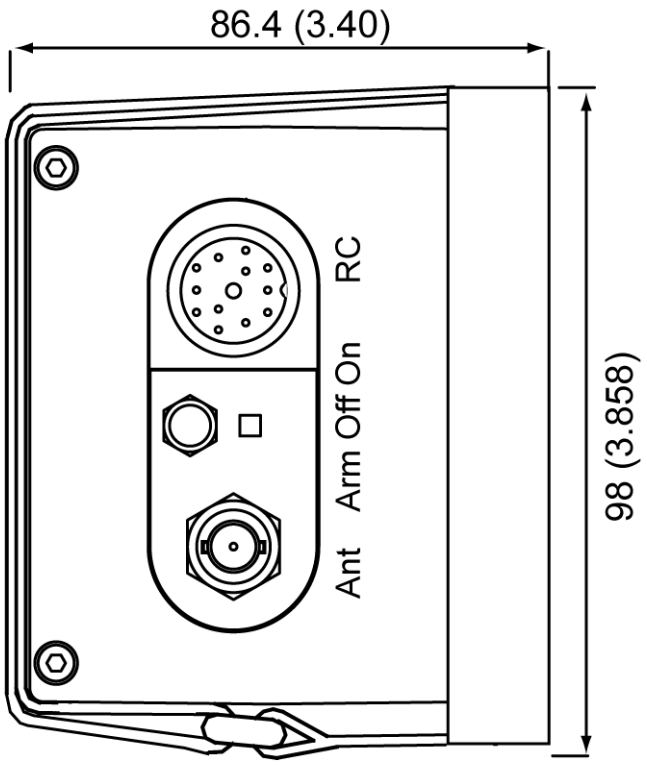
- either automatically by G-Switch sensor if a crash occurs;
- or manually by RC200 Remote Control Panel.
  Note : switching to ON directly on the ELT front panel will also activate the ELT.

9. Schematics and diagrams

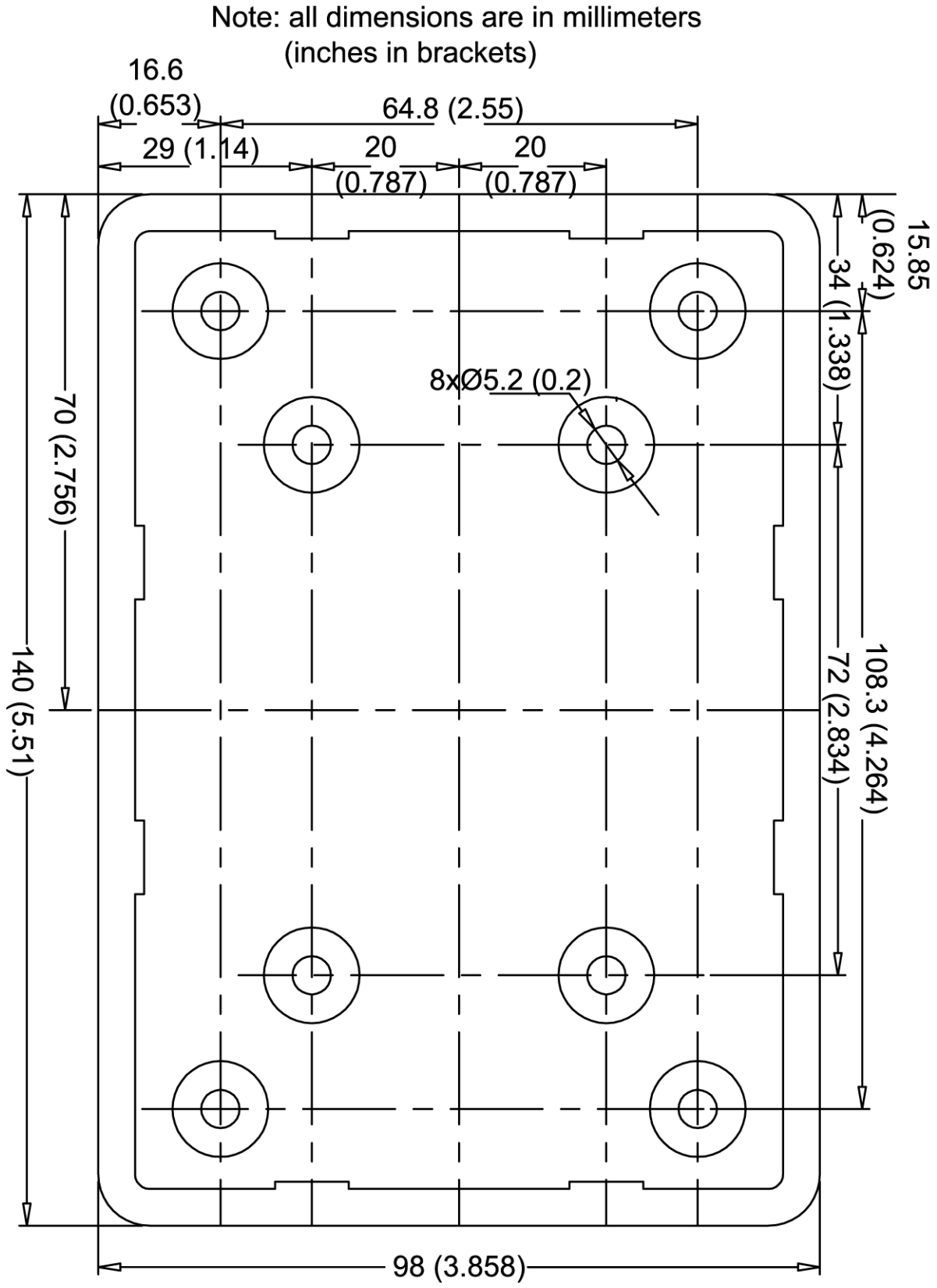
A. ELT Outline Dimensions

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

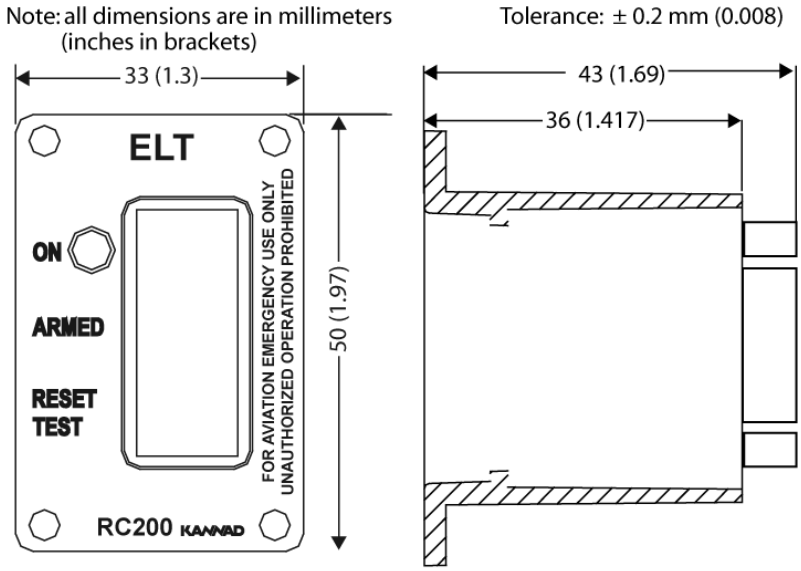




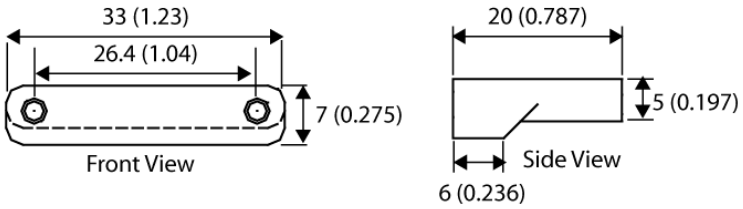
B. Mounting bracket drilling Mask



C. RC200 Outline Dimensions

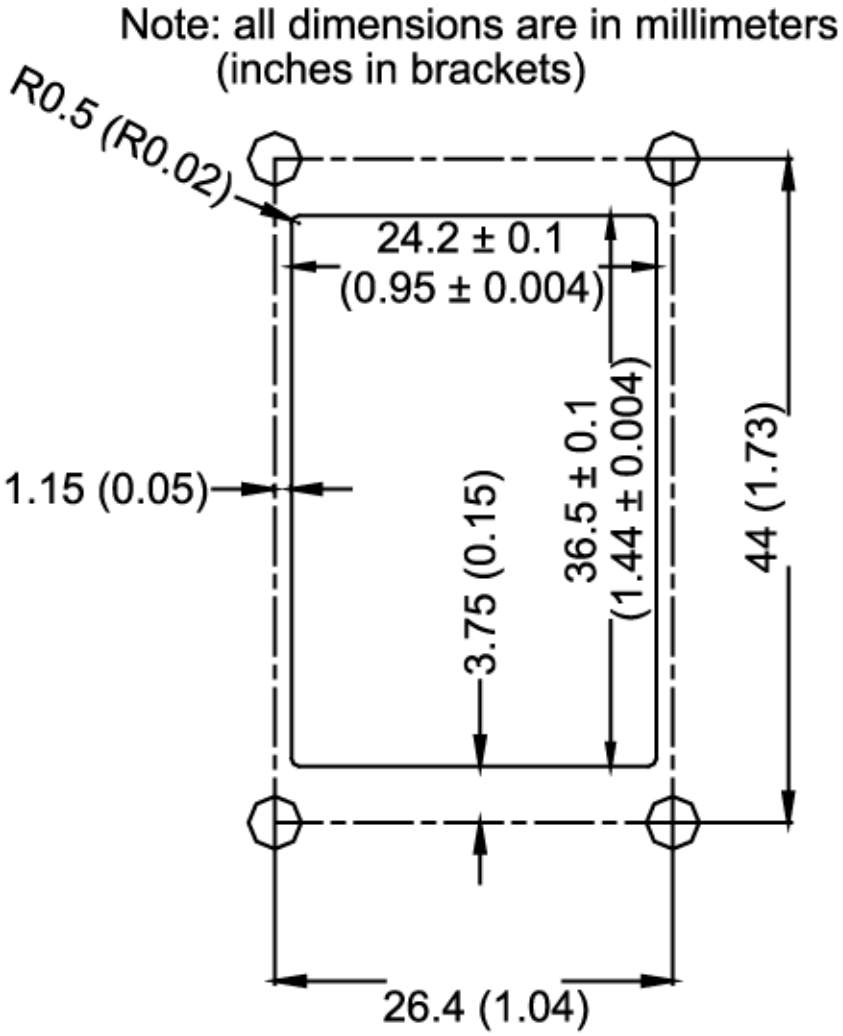


CONTROL PANEL



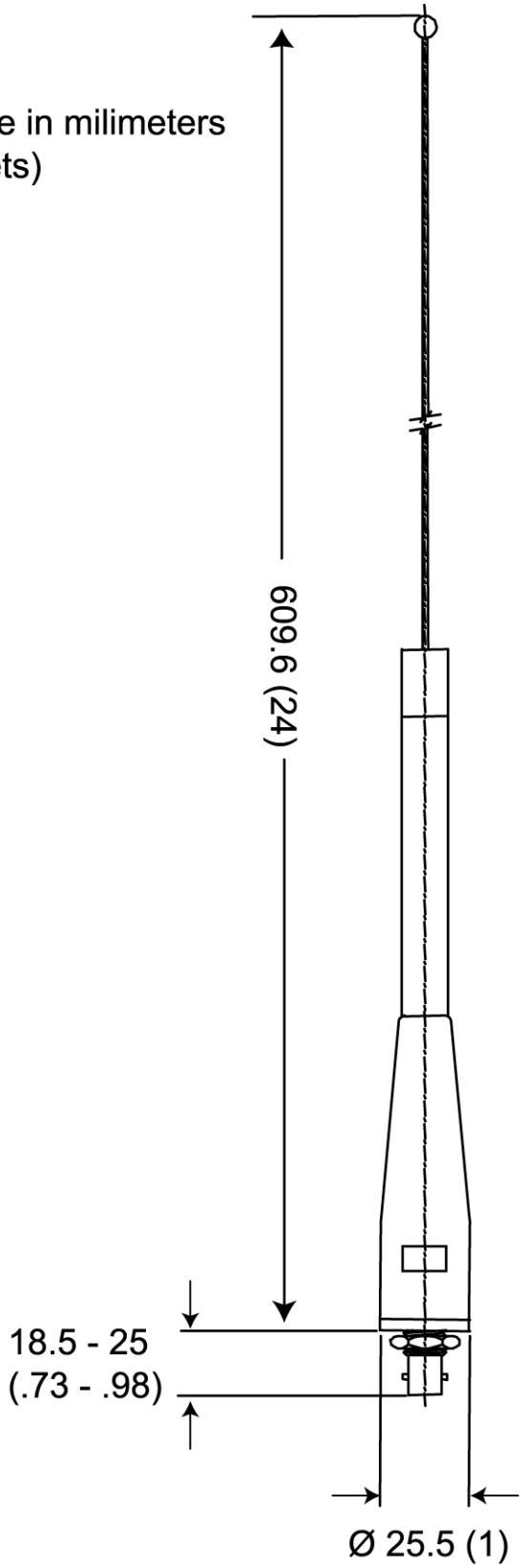
MOUNTING TRAY

D. RC200 Drilling Mask



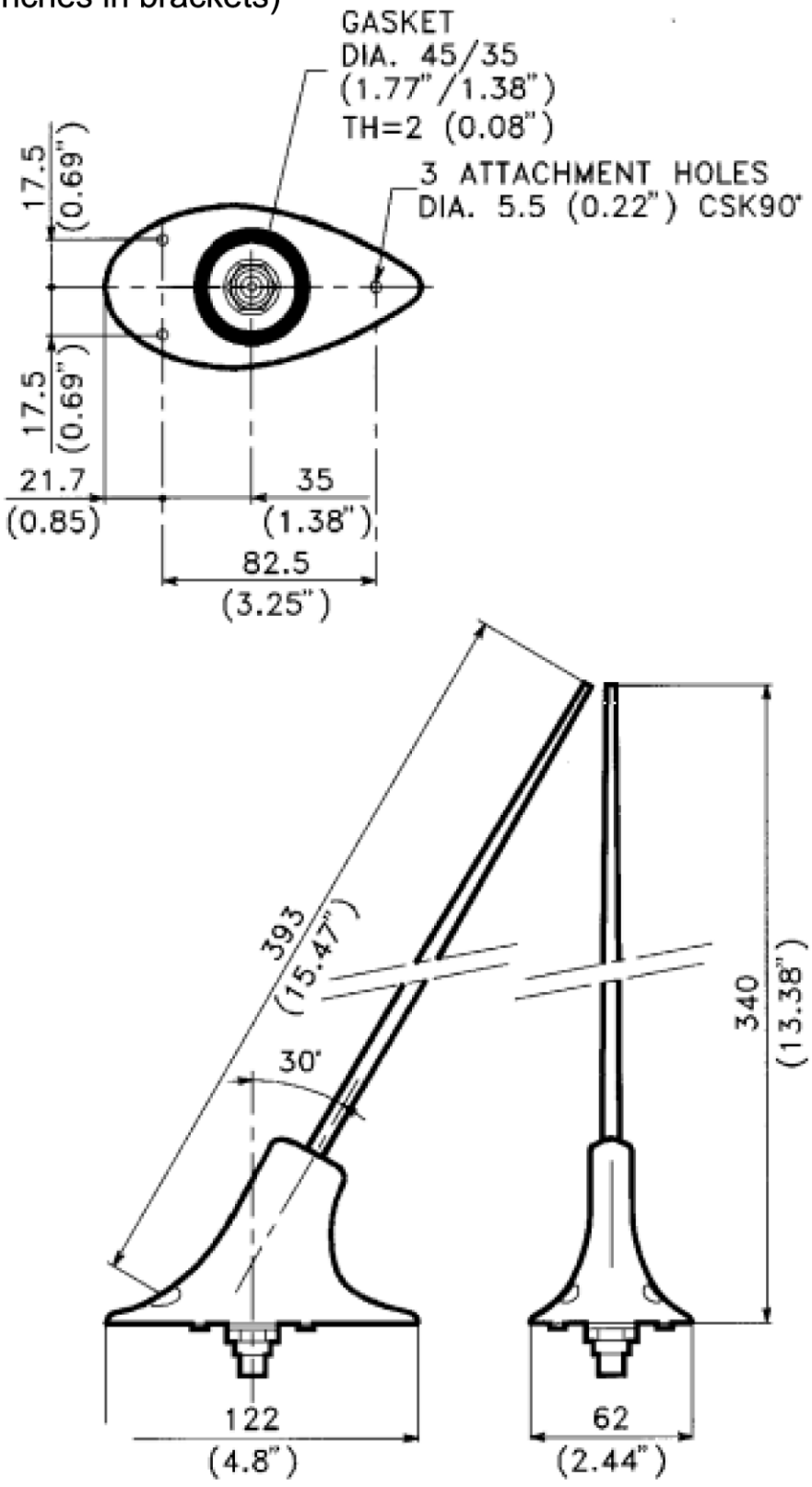
E. ANT200 Outline Dimensions

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

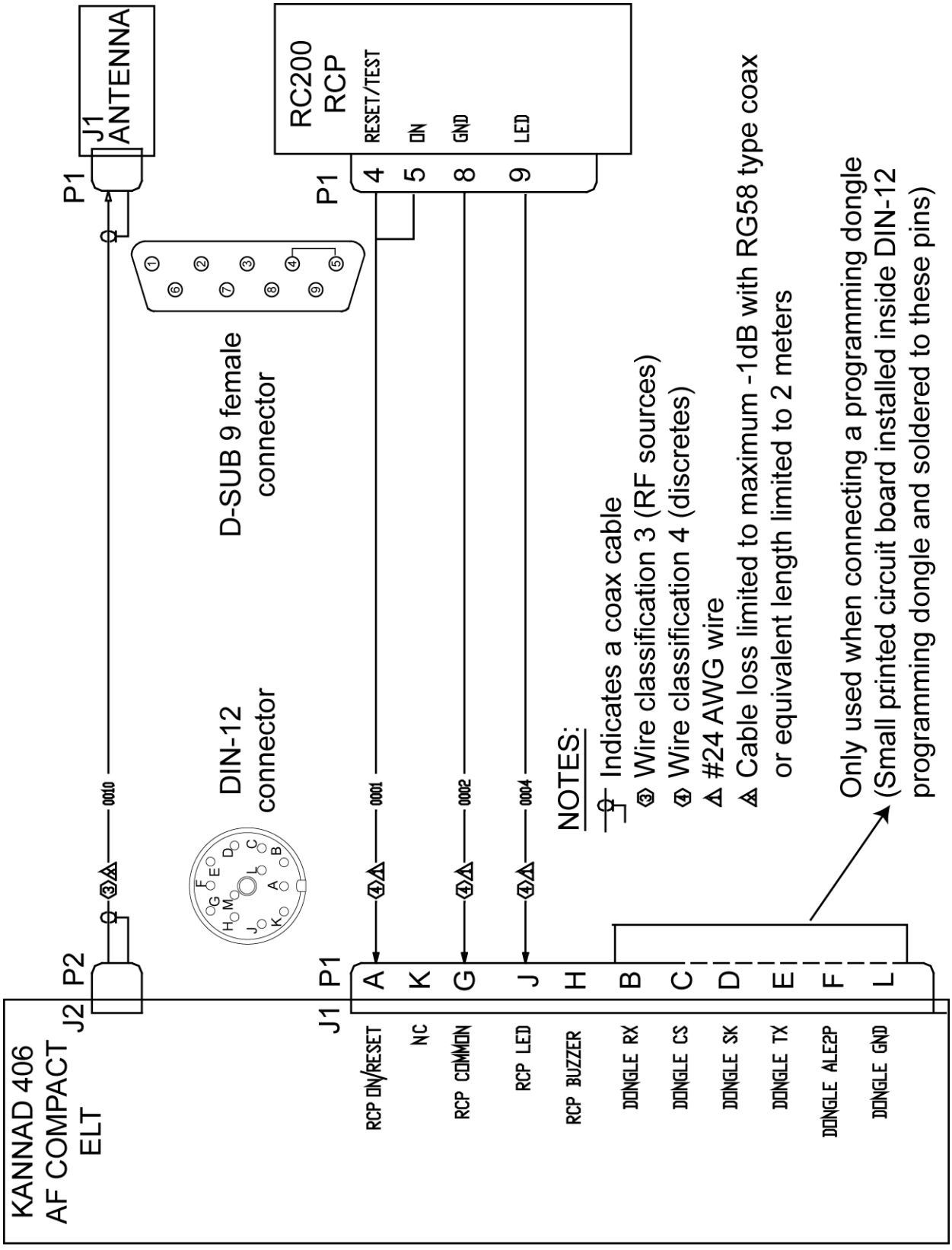


F. ANT300 Outline Dimensions and drilling mask

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



G. Wiring


J1
ANTENNA
P1
RC200
RCP
RESET/TEST
DN
GND
LED
4
5
8
9
P1
D-SUB 9 female
connector
DIN-12
connector
0010
0001
0002
0004
P2
J2
P1
J1
A
K
G
J
H
B
C
D
E
F
L
RCP DN/RESET
NC
RCP COMMON
RCP LED
RCP BUZZER
DONGLE RX
DONGLE CS
DONGLE SK
DONGLE TX
DONGLE ALE2P
DONGLE GND
KANNAD 406
AF COMPACT
ELT
NOTES:
Indicates a coax cable
③ Wire classification 3 (RF sources)
④ Wire classification 4 (discretes)
△ #24 AWG wire
△ Cable loss limited to maximum -1dB with RG58 type coax
or equivalent length limited to 2 meters
Only used when connecting a programming dongle
(Small printed circuit board installed inside DIN-12
programming dongle and soldered to these pins)

Manufactured by

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Fax : +33 (0) 2 97 65 00 20

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