

INTEGRA ARINC e-NAV

**DESCRIPTION, INSTALLATION,
OPERATION MANUAL**



P/N S1850581-01

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

Please report to our customer support:

E-mail: support@mcmurdogroup.com

Tel.: +33 (0)2 97 02 49 00

CONTENTS

1. SYSTEM PRESENTATION.....	1
1.1. <i>General</i>	1
1.2. <i>INTEGRA ARINC e-NAV Presentation</i>	1
1.3. <i>Concept</i>	3
2. INTEGRA ARINC e-NAV INSTALLATION.....	4
3. INTEGRA ARINC e-NAV CONNECTION.....	5
3.1. <i>Connectors and Cables</i>	5
3.2. <i>Connection to On Board 28V DC Power Supply</i>	5
3.3. <i>Connection to On Board GPS Equipment</i>	5
3.4. <i>Connection to INTEGRA (ER-N) ELT</i>	5
4. FIRST POWER UP PROCEDURE.....	6
4.1. <i>Check of the ELT</i>	6
4.2. <i>Check of on board GPS equipment</i>	6
4.3. <i>Position Data Verification</i>	6
4.3.1. <i>Tester Connection</i>	6
4.3.2. <i>Test preparation</i>	7
4.3.3. <i>Validation Procedure</i>	7
4.3.3.1. <i>SELF TEST</i>	7
4.3.3.2. <i>Data Position Check</i>	8
5. OPERATION.....	9
6. TECHNICAL CHARACTERISTICS.....	10
6.1. <i>Weight and Dimensions</i>	10
6.2. <i>ARINC Frames Specifications</i>	10
6.3. <i>Environmental Characteristics</i>	11
6.4. <i>Temperatures Specifications</i>	12
6.5. <i>Electrical Characteristics</i>	12
6.6. <i>Compatibility List</i>	12
6.6.1. <i>ELT</i>	12
6.6.2. <i>Mounting Brackets</i>	12
6.6.3. <i>GPS</i>	12
7. CONNECTING DIAGRAM.....	13
8. SERVICING.....	14

LIST OF FIGURES

Figure 1: INTEGRA ARINC e-NAV Overview	1
Figure 2: Example of INTEGRA ARINC e-NAV installed on Mounting Bracket	2
Figure 3: INTEGRA ARINC e-NAV Concept.....	3
Figure 4: INTEGRA ARINC e-NAV Installation	4
Figure 5: 19 Pin female plug, View from Back Face of Inserts	5
Figure 6: Beacon Tester Connection with ELT	6
Figure 7: Connecting Diagram	13

1. SYSTEM PRESENTATION

1.1. General

INTEGRA ARINC e-NAV is an External Navigation Device (END) used for INTEGRA (ER-N) ELTs family and navigation equipment through ARINC 429/743.

INTEGRA ARINC e-NAV External Navigation Device is used to store GPS data coming from an on-board GPS ARINC429/ARINC743 output.

The position data is transmitted in the 406 MHz distress message as soon as the ELT is activated.

This manual contains information to install and operate the INTEGRA ARINC e-NAV, Part Number S1850581-01.

1.2. INTEGRA ARINC e-NAV Presentation

The INTEGRA ARINC e-NAV is composed of:

1. A housing to protect the electronic PCB.
2. An identification of the Firmware version on the cover of the housing.
3. A LED to indicate the INTEGRA ARINC e-NAV status.
4. A 19 Pin male socket to connect the INTEGRA ARINC e-NAV to the ELT, A/C +28V DC and on board GPS.
5. Two fixing supports to attach the housing to a mounting bracket.
6. An identification label on the top of the housing.

PCB Cover View

LED / Socket View

Top View

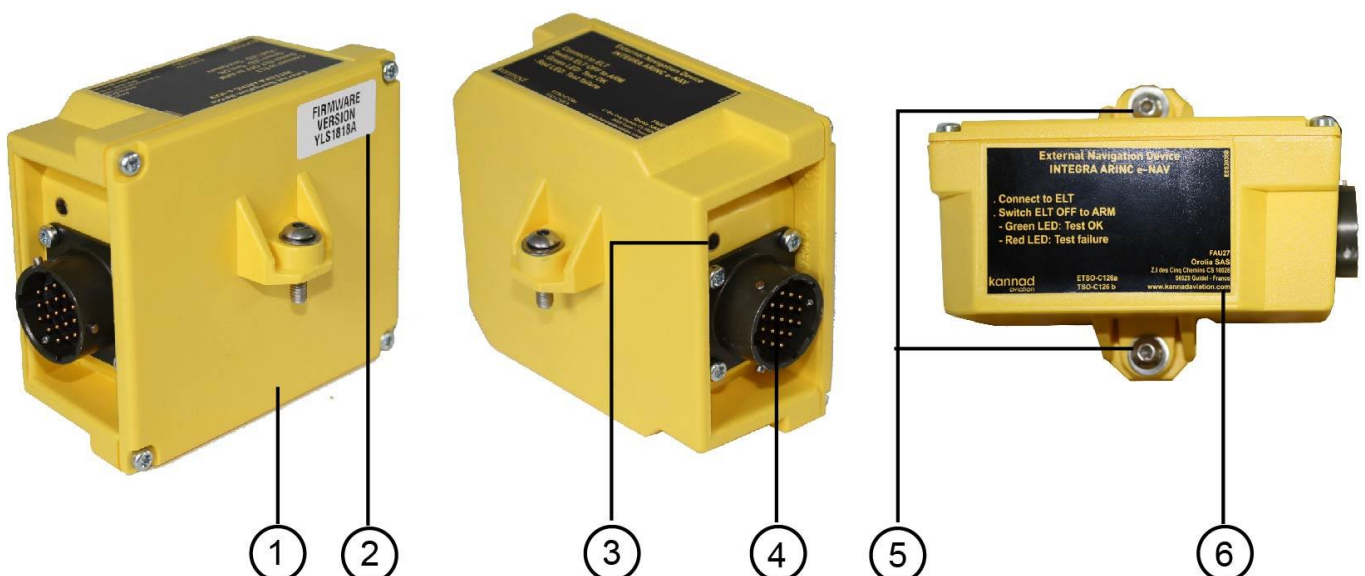


Figure 1: INTEGRA ARINC e-NAV Overview

The INTEGRA ARINC e-NAV is to be mounted on a specific INTEGRA ELT mounting bracket:

- Bracket Universal for INTEGRA ARINC e-NAV for ELT (AP), P/N S1850551 – 01 when connect to an AP INTEGRA (ER-N) or AP-H INTEGRA (ER-N) ELT, or
- Bracket Universal for INTEGRA ARINC e-NAV for ELT (AF), P/N S1850551 – 02 when connected to an AF INTEGRA (ER-N) or AF-H INTEGRA (ER-N) ELT.



Figure 2: Example of INTEGRA ARINC e-NAV installed on Mounting Bracket

1.3. Concept

The 19 Pin male socket has to be connected to 3 separate cables:

- On Board 28 VDC power supply,
- ARINC frames of the On Board GPS equipment.
- DIN-12 plug of the ELT.

In addition, the ELT has to be connected to the Remote Control Panel and to the external antenna.

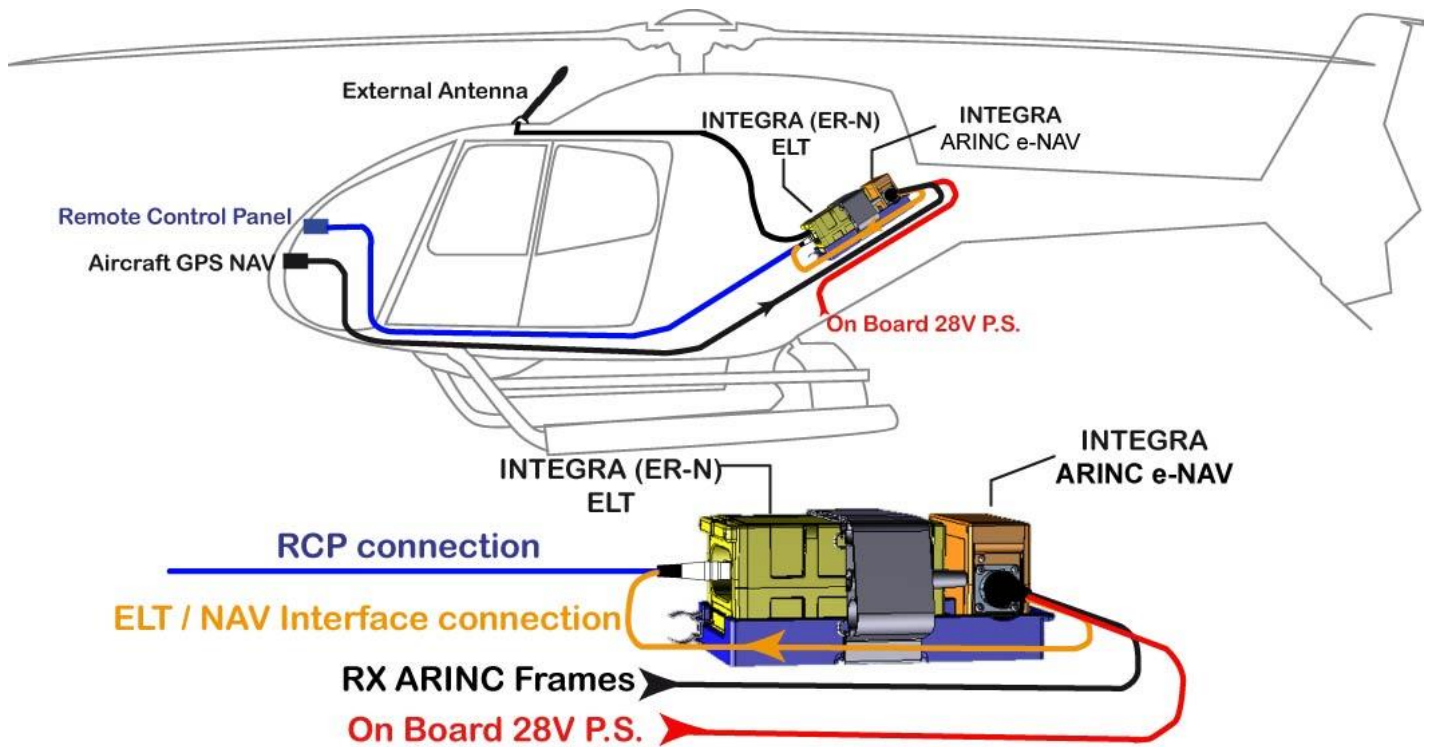


Figure 3: INTEGRA ARINC e-NAV Concept

2. INTEGRA ARINC e-NAV INSTALLATION

1. On the Bracket Universal, place INTEGRA ARINC e-NAV housing onto its supports either with its connector on the left side or on the right side.
2. Fix the INTEGRA ARINC e-NAV onto the mounting bracket with the 2 captive screws and tighten to a torque of 1.4 Newton per meter using a torque driver with a 2.5 mm Allen bit.
3. Place the INTEGRA (ER-N) ELTs onto the Bracket.
4. Secure the INTEGRA (ER-N) ELTs into its bracket [refer to relevant INTEGRA (ER-N) ELT manual].

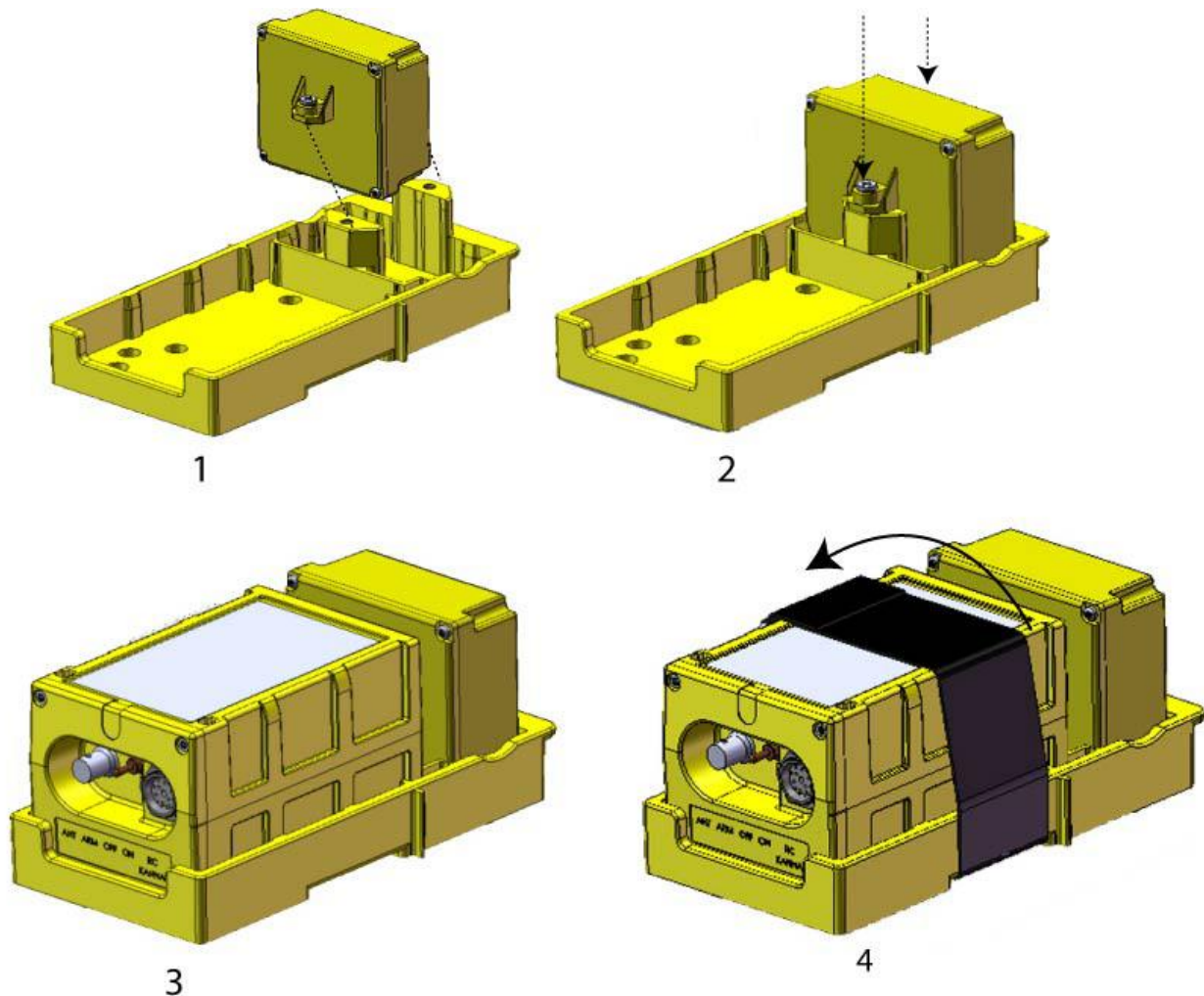


Figure 4: INTEGRA ARINC e-NAV Installation

3. INTEGRA ARINC e-NAV CONNECTION

3.1. Connectors and Cables

3 separate shielded cables have to be wired to the plug connected to the 19 Pin male socket.

- A 2-Wire cable to connect INTEGRA ARINC e-NAV to the On Board 28 V DC power supply.
 - A 2-Wire cable to connect INTEGRA ARINC e-NAV to the On Board GPS equipment
 - A 6-Wire cable to connect INTEGRA ARINC e-NAV to the ELT
- Wires of AWG24 gauge should be preferred.

A 19 Pin female plug reference SOURIAU 851 06 R 14 19 S 50 shall be used to connect the INTEGRA ARINC e-NAV (this plug is not provided)

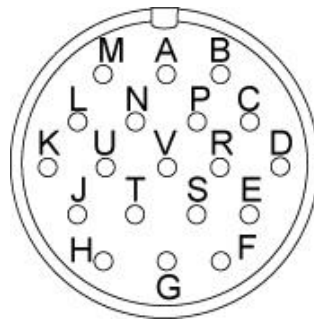


Figure 5: 19 Pin female plug, View from Back Face of Inserts

3.2. Connection to On Board 28V DC Power Supply

[Refer to Section 7, Connecting Diagram](#)

3.3. Connection to On Board GPS Equipment

[Refer to Section 7, Connecting Diagram](#)

3.4. Connection to INTEGRA (ER-N) ELT

- Fabricate a 6-wire cable long enough to reach the INTEGRA (ER-N) ELT.
- On the ELT side, connect a DIN-12 connector, P/N S1820514-03 (Not supplied).

IMPORTANT: It is not possible to use a programming dongle in this cable.

[Refer to Section 7, Connecting Diagram](#)

4. FIRST POWER UP PROCEDURE

This procedure can only be performed by the installer, as it requires specific equipment such as a WS TECHNOLOGIES BT100 or any equivalent COSPAS-SARSAT beacon decoder (AEROFLEX IFR 4000 opt1 for example) capable of being connected to the BNC connector of the ELT in order to decode a COSPAS-SARSAT digital message at 406.037 MHz.

4.1. Check of the ELT

- Make sure that the ELT is programmed with a location protocol.

4.2. Check of on board GPS equipment

1. Check that the RX ARINC link of the aircraft GPS equipment is activated (refer to the GPS equipment relevant manual).
2. Switch the GPS equipment to ON.
3. Wait for the acquisition of a GPS valid position on the GPS equipment.

4.3. Position Data Verification

CAUTION: Position data verification can only be checked if the ELT is activated. Never perform position data verification by checking the position data with the external antenna connected; in this case the 406 MHz would be received by the Cospas-Sarsat Satellites and interpreted as a real distress message. To avoid that, connect your beacon decoder to the external antenna output socket.

4.3.1. Tester Connection

1. Disconnect the antenna cable from the ELT antenna socket
2. Connect a Cospas-Sarsat tester to the antenna socket of the ELT as shown on figure 6 below:

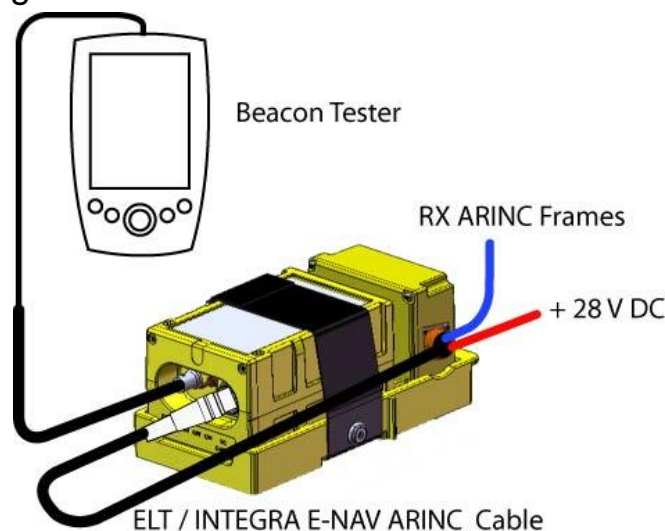


Figure 6: Beacon Tester Connection with ELT

4.3.2. Test preparation

CAUTION: On INTEGRA (ER-N) ELT, if both internal and external GPS sources are available, the internal source is used.

- To check the external GPS, make sure that the internal GPS is not locked. Depending on the sky view, the internal GPS sometimes locks even before the first burst at 50 seconds.
- To make sure that the internal GPS will not lock, obstruct the top of the ELT to make sure it doesn't face the sky.

NOTE: The best way is to wrap the ELT in aluminum or copper foil.

4.3.3. Validation Procedure

NOTE: For ELT operation, refer to the relevant ELT Operation Manual.

1. After having performed all wiring tasks as indicated in [Section 3.INTEGRA ARINC e-NAV CONNECTION](#), connect the 19 Pin female plug to the 19 Pin male socket of INTEGRA ARINC e-NAV.
2. Connect the 2-Wire RX ARINC Frames cable to the On Board GPS equipment..
3. Connect the 2-Wire +28 V DC cable to the +28 V DC On Board Power Supply
4. Connect the DIN-12 connector of the ELT cable to the DIN-12 Plug of the ELT

4.3.3.1. SELF TEST

1. Switch the ELT from OFF to ARM.
2. After 5 seconds the LED of INTEGRA ARINC e-NAV switches ON:
 - GREEN: +28V DC is correct and ARINC Frame is valid,
 - Red: +28V DC is not correct and/or ARINC Frame is not valid.
3. After 5 seconds, the LED switches OFF

4.3.3.2. *Data Position Check*

1. Switch the ELT to ON.
2. 2 tests bursts are transmitted with default position (no position).
3. Wait 50 seconds until the first 406 MHz burst containing the GPS position is transmitted by the ELT.
4. Read the position data on the Cospas-Sarsat tester.
5. Check that this position matches the GPS equipment's position

IMPORTANT: depending on the protocol used, the position transmitted by the ELT is rounded off to 4 seconds or 4 minutes (see table below extracted from CS G005 standard):

Identification data	Location Data	Protocols
Unique ELT Serial Number	4 minutes	User Location ⁽¹⁾
	4 seconds	Standard Location
Aircraft Operator Designator & Serial Number	4 minutes	User Location ⁽¹⁾
	4 seconds	Standard Location
Aircraft 24-bit Address	4 minutes	User Location ⁽¹⁾
	4 seconds	Standard Location
Aircraft Registration Marking	4 minutes	User Location
Serial Number Assigned by Administration	4 seconds	National Location ⁽¹⁾

NOTE (1): These protocols are not available by default in Kannad e-Prog Software

6. Switch the ELT to OFF.
7. Disconnect the Cospas-Sarsat tester.
8. Connect the antenna cable to the antenna socket of the ELT.
9. If the aircraft is in operational condition, switch the ELT to ARM; otherwise keep the ELT on OFF (see **CAUTION** below).
CAUTION: OFF mode must only be selected when the ELT is removed from the aircraft or when the aircraft is parked for a long period or for maintenance.

5. OPERATION

NOTE: For ELT operation, refer to the relevant ELT Operation Manual.

All connections with the INTEGRA ARINC e-NAV are already done.

- If the ELT switch is on OFF position, switch the ELT to ARM.
- If the ELT switch is on ARM position, perform a self-Test by switching ELT to OFF, then to ARM.
 - After 5 seconds the LED of INTEGRA ARINC e-NAV switches ON:
 - GREEN: +28V DC is correct and ARINC Frame is valid,
 - Red: +28V DC is not correct and/or ARINC Frame is not valid.
 - After 5 seconds, the LED switches OFF.
- In the meantime, the ELT performs a Self-Test.
- Check that the result of the ELT Self-Test is not faulty.

NOTE: Position will be transmitted only in the ELT is activated (manually by switching to ON position or automatically if a crash occurs). The current position will be transmitted about 50 seconds after ELT activation.

6. TECHNICAL CHARACTERISTICS

6.1. Weight and Dimensions

- Dimensions: 85 x 74 x 40 mm (3.346 x 2.913 x 1.574 in)
- Weight: 176 g. (0.388 lbs) typical

6.2. ARINC Frames Specifications

The format of frames accepted by INTEGRA ARINC e-NAV are as follows:

ARINC Bits	32	31->30	29->9	8->1
Content	Parity	SSM	Latitude/longitude	Label

Latitude and longitude are encoded on 21 bits and use both Data field (bits 29-11) and SDI field (10 and 9 bits). Parity bit can be checked or not by INTEGRA ARINC e-NAV.

ARINC RX1: ARINC positive input

ARINC RX2: ARINC negative input

Automatically manages both ARINC429/ARINC743 data rate: 12.5 kbits/s and 100 kbits/s.

NOTE: the data rate shall not be changed after power up.

Signed/Status Matrix (SSM) field shall contain bits 11		
Bit N°		Meaning
31	30	
0	0	Failure Warning
0	1	No Computed Data
1	0	Functional Test
1	1	Normal Operation

Possible labels are the following	
Label	Meaning
110	ARINC743 Latitude
111	ARINC743 Longitude
310	ARINC429 Latitude
311	ARINC429 Longitude

6.3. Environmental Characteristics

ENVIRONMENTAL CATEGORIES FORM FOR INTEGRA e-NAV ARINC

Qualification Tests Title	ED62A references (when applicable)	DO-160F	
		Section	Category
Temperature / Altitude	ED-62A (SPECIAL) Class1	4.0	As per ED-62A
Low Temperature	ED-62A (SPECIAL) -40°C	4.5.1	As per ED-62A
High Temperature Activation	ED-62A (SPECIAL) +55°C	4.5.2 /3	As per ED-62A
In Flight Loss of Cooling	N/A	4.5.4	X
Altitude	ED-62A (SPECIAL) 50,000 ft	4.6.1	As per ED-62A
Decompression	ED-62A (SPECIAL)	4.6.2	As per ED-62A
Overpressure	§ 4.4.3 / ED-62A	4.6.3	As per ED-62A
Temperature variation		5	B
Humidity		6	C
Ops. shocks and crash safety	ED-62A (SPECIAL)	7	As per ED-62A
Vibrations	Fixed Wings	8	R (C&C1)
	Helicopters		U(G) ⁽¹⁾
Explosion proofness	N/A	9	X
Waterproofness		10	R
Fluid susceptibility	N/A	11	X
Sand and dust	N/A	12	X
Fungus	N/A	13	X
Salt spray		14	S
Magnetic effect		15	A
Power input		16	Z
Voltage spike conducted susceptibility		17	A
Audio frequency conducted susceptibility		18	Z
Induced signal susceptibility		19	ZC
Radio frequency susceptibility		20	Conducted: T Radiated: L
Radio frequency emission		21	H
Lightning transient susceptibility		22	A2G33
Lightning direct effects	N/A	23	X
Icing	N/A	24	X
ESD		25	A
Fire, Flammability	ED-62A (SPECIAL FLAME)	26	As per ED-62A

Environmental Categories

- Fixed wings versions: RTCA DO-160G / EUROCAE ED14G chapters 4 to 26
 - [ED62A]X[ED62A]C[ED62A][R(C&C1)U(G)]XRXXXSAZAZ[ZC][TL]H[A2G33]XXA[ED62A]
 - Helicopters versions: RTCA DO-160G / EUROCAE ED14G chapters 4 to 26
 - [ED62A]X[ED62A]C[ED62A][U(G)]XRXXXSAZAZ[ZC][TL]H[A2G33]XXA[ED62A]
- Storage temperature: -55 °C to +85 °C

6.4. Temperatures Specifications

- Operating: -40 °C to +55 °C (Class 1)
- Storage: -55 °C to +85 °C

6.5. Electrical Characteristics

- Power supply: Aircraft +28 VDC
- Consumption: 7 mA typical, 12.5 mA max@28 V (established mode).
300 mA max. (Power up).

6.6. Compatibility List

6.6.1. ELT

- INTEGRA AP (ER-N): P/N S1850501-03
- INTEGRA AF (ER-N): P/N S1851501-03
- INTEGRA AF-H (ER-N): P/N S1852501-03
- INTEGRA AP-H (ER-N): P/N S1854501-03

6.6.2. Mounting Brackets

- Universal Mounting Bracket for INTEGRA ARINC e-NAV for ELT (AP):
P/N S1850551- 01
- Universal Mounting Bracket or INTEGRA ARINC e-NAV for ELT (AF):
P/N S1850551 - 02

6.6.3. GPS

- All GPS compatible with ARINC 429 / 743 standards
- Data rate: 12.5 kbits/s or 100 kbits/s.

7. CONNECTING DIAGRAM

NOTE: RCP mating connectors and relevant RCP pin-out inputs are defined in the INTEGRA ELT initial installation Manual supplied with the ELT.

For complete instructions and specifications, this manual can be found on Kannad Aviation download area.

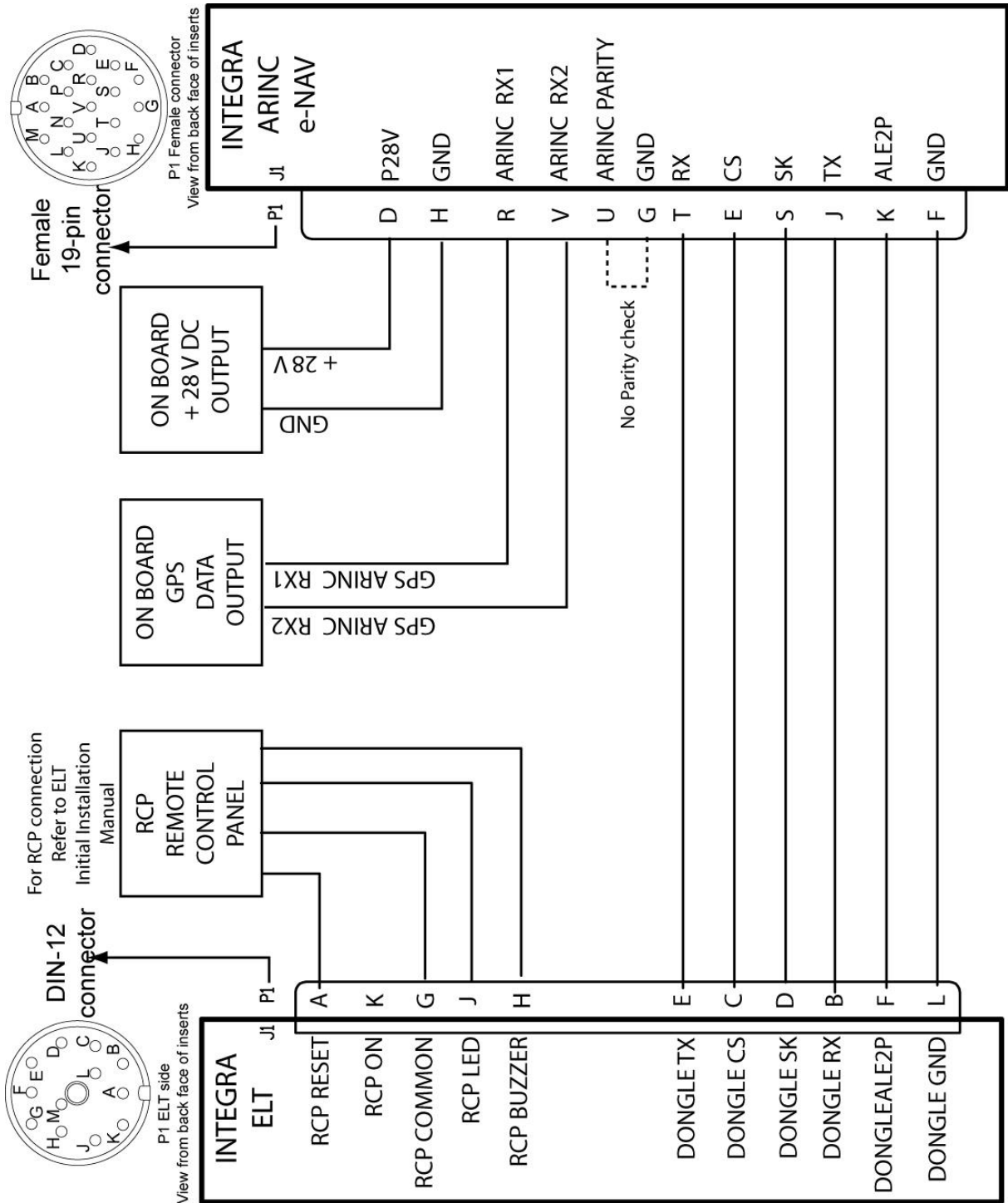


Figure 7: Connecting Diagram

8. SERVICING

Maintenance is on demand only. No periodic inspection is required.

Orolia S.A.S.

Z.I. des Cinq Chemins CS10028
56520 GUIDEL
FRANCE

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

Fax: +33 (0)2 97 02 65 00 20

Website: www.mcmurdogroup.com

Email: info@mcmurdogroup.com

DOC13033B