ARTEX

ELT/NAV INTERFACE

Description, Operation, Installation and Maintenance Manual

This manual includes data for the equipment that follows:

Component	Part No.	Model No.
ELT/NAV Interface	453-6500	N/A

25-69-10

ARTEX PRODUCTS / ACR ELECTRONICS, INC
DESCRIPTION, OPERATION, INSTALLATION AND MAINTENANCE MANUAL
453-6500
PROPRIETARY INFORMATION

AIRWORTHINESS LIMITATIONS

The Airworthiness limitations section is FAA approved and specifies inspections and other maintenance required under 14 CFR§ 43.16 and 91.403, unless an alternative program has been approved.

IMPORTANT NOTICE

ACR Electronics will be responsible for full distribution and revisions of ICA's (Instructions for Continued Airworthiness). For inquiries regarding the content and currency of this manual, contact ACR Electronics, 5757 Ravenswood Rd, Fort Lauderdale, FL 33312. Telephone (954) 981-3333.

RECORD OF REVISIONS

REVISION	CHANGE	DATE	REVISION	CHANGE	DATE
-	RELEASE	Feb 10/1998			
A	ECO 811	Apr/24/1998			
B	ECO 887	Jul 23/1998			
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D	ECO 1394	May 15/2000			
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E	DCN 1848	Nov 26/2001			
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E	DCN 2033	Jun 18/2002			
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SERVICE BULLETIN LIST

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INTRODUCTION

TASK 25-69-10-990-801

1. Manual Usage

SUBTASK 25-69-10-990-001

A. General

1) This manual describes the operation, installation, and maintenance of the ELT/NAV Interface. This information is provided to ensure initial and continued airworthiness. Information presented in this manual is accurate at time of printing, but is subject to change. Refer to the Artex products web site at www.acrartex.com for the latest information and any updates to this manual.

2) Web links provided in this manual were accurate at time of printing but may be subject to change.

3) Regulatory references contained herein are generally confined to United States and Canadian requirements and, in any case, should not be considered all encompassing. Consult your national aviation authority for applicable requirements.

SUBTASK 25-69-10-990-002

B. Application

1) This manual constitutes supporting data/documentation for the ELT/NAV Interface, including:

   a) Description and Operation

   b) Test and Fault Isolation (includes inspection criteria)

   c) Removal

   d) Installation

   e) Illustrated Parts List

2) In the United States, the ELT/NAV Interface must be installed and maintained in accordance with the requirements herein and 14 CFR, FAR Parts 43, and 91; and other airworthiness requirements, as applicable.

3) In Canada, the ELT/NAV Interface must be installed and maintained in accordance with the requirements herein and Canadian Aviation Regulations (CAR), Part V and other CAR airworthiness requirements, as applicable.

4) ELT/NAV Interface installation and maintenance in all other countries must comply with the requirements herein and applicable national airworthiness requirements.

5) To ensure proper operation, only parts listed in the Illustrated Parts List of this manual or those recommended by ACR Electronics, Inc. may be used as replacement parts for the ELT/NAV Interface.

TASK 25-69-10-990-802

2. Model Description

SUBTASK 25-69-10-990-001

A. ELT/NAV Interface

1) The ELT/NAV Interface provides the means to transmit position data received from the aircraft navigation system to the ELT.

2) The ELT/NAV Interface is available in two installation configurations:

   a) 24-bit auto reprogramming and position data, or

   b) Position data only.

SUBTASK 25-69-10-990-002

B. Compatibility

1) Table 1 lists the ELTs compatible with the ELT/NAV Interface.

ELT MODEL NUMBER	PART NUMBER
110-406 NAV*	453-0421
110-406HM NAV*	453-0422
110-406ED NAV*	453-0424
B406-2*	453-0003
C406-1	453-5002
C406-1HM	453-5003
C406-2	453-5000
C406-2HM	453-5001
B406-4	453-5004
G406-4	453-5012
G406-1*	453-5100
G406-2*	453-5102
*Discontinued Product	

Table 1 ELT Compatibility List

TASK 25-69-10-990-803

3. Approvals

SUBTASK 25-69-10-990-001

A. Certification

1) FAA TSO C126 System Component

   NOTE: Details of TSO certification for the ELT/NAV Interface are available in the "TSO Qualification Test Report for the ELT/NAV Interface System" (Document 6288).

   a) The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within TSO standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only if performed under 14 CFR Part 43 or the applicable airworthiness requirements.

2) JTSO-2C126

SUBTASK 25-69-10-990-002

B. RTCA DO-160C Compliance

1) DO-160C Environmental Categories: C1-204A204204XRXXXXXBABA204BXXX

2) A breakdown of the DO-160C environmental categories is provided in Table 2 on page 12.

CATEGORY	SECTION	DESCRIPTION
C1	4.0	Temperature/Altitude
-	4.5.4	In-Flight Loss of Cooling
204	5.0	Temperature Variation
A	6.0	Humidity
204	7.0	Shock
204	8.0	Vibration
X	9.0	Explosion
R	10.0	Waterproofness
X	11.0	Fluids Susceptibility
X	12.0	Sand and Dust
X	13.0	Fungus
X	14.0	Salt Spray
X	15.0	Magnetic Effect
B	16.0	Power Input
A	17.0	Voltage Spike
B	18.0	Audio Frequency Susceptibility
A	19.0	Induced Signal Susceptibility
204	20.0	Radio Frequency Susceptibility
B	21.0	Emission of Radio Frequency Energy
X	22.0	Lightning
X	23.0	Lightning Direct Effects
X	24.0	Icing

Table 2 Environmental Categories Breakdown

TASK 25-69-10-990-804

4. List of Acronyms, Abbreviations, and Definitions

SUBTASK 25-69-10-990-001

Term	Definition
AC	Advisory Circular – A Federal Aviation Administration (USA) bulletin with special information. For the purposes of this document, the acronym AC does not refer to electrical alternating current.
AWG	American Wire Gauge – An electrical wire diameter standard. Look for this acronym in front of or following a wire size number.
CAR	Canadian Aviation Regulations – The rules and regulations governing the manufacture, certification, operation, maintenance, and alteration of aircraft in Canada.
CFR	Code of Federal Regulations – The general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government. Title 14, "Aeronautics and Space" contains the FARs.
COSPAS-SARSAT	The international search and rescue consortium that governs the international satellite-based search and rescue distress alert detection and information distribution system. For a complete description go to the official web site for the International COSPAS-SARSAT Program.
DER	Designated Engineering Representative – An individual qualified and designated by the FAA to approve, or recommend approval, of technical data to the FAA.
Drip Loop	Extra wire length used to form a U-shaped bend in a wire or cable. Water or other fluids will flow down to the bottom of the loop and drip off. Electrical connections are made at the top of the loop.
ELT	Emergency Locator Transmitter – ELTs are installed on aircraft and used to send emergency signals to the SAR satellite system. The word "Beacon" is associated with these devices.
EMI	Electromagnetic Interference – An undesirable disturbance that affects an electrical circuit due to either electromagnetic conduction or electromagnetic radiation emitted from an external source. Also called radio frequency interference or RFI.
EUROCAE	European Organization for Civil Aviation Equipment – EUROCAE documents are widely referenced as a means of compliance to European Technical Standard Orders (ETSOs) and other regulatory documents.
FAA	Federal Aviation Administration – The United States government agency for aircraft safety and regulation.
FAR	Federal Aviation Regulations – The rules and regulations governing the manufacture, certification, operation, maintenance, repair, and alteration of aircraft in the United States.
Form 337	FAA Form 337 is required anytime a major repair and/or major alteration is performed on an aircraft. Refer to FAR, Part 43, Appendix A and the definitions of Major Repair/Alteration contained in FAR, Part 1 for guidance.

FSDO	Flight Standards District Office – FAA district offices responsible for aircraft certification, operation, maintenance, and modification issues, approvals and enforcement.
MIL	The three-letter acronym that stands for "Military" and proceeds military specifications and standards numbers (e.g., MIL-W-xxxx would indicate a wire specification and MIL-STD-xxxx would indicate a standard).
P/N	Part Number – Refers to an ACR Electronics, Inc. part number, unless otherwise noted. Part numbers are also indicated with parentheses (e.g., XXX-XXXX).
Plug	The term "Plug", within the context of this document, refers to the male half of an electrical connector.
RECEPTACLE	The term "Receptacle", within the context of this document, refers to the female half of an electrical connector.
RTCA	Radio Technical Commission for Aeronautics – Organization that makes recommendations for airworthiness. Refer to http://www.rtca.org/aboutrtca.asp for more information.
SAR	Search and Rescue
TSO	Technical Standard Order – A TSO is a minimum performance standard issued by the FAA for specified materials, parts, processes, and appliances used on civil aircraft.
UTC	Coordinated Universal Time – A time standard based on International Atomic Time. UTC is the time system used in aviation and is often associated with Greenwich Mean Time (GMT) and/or "Zulu" time.

TASK 25-69-10-990-805

5. References

SUBTASK 25-69-10-990-001

A. Regulatory Documents

1) The following regulatory documents are referred to herein. When referring to such documents, it is the manual user's responsibility to ensure they are using the latest revision or release of such documents. To that end, the revision designator of specific document numbers has not been included, with the exception of the RTCA document listing, which reflects the revision level of the documents at the time of TSO testing and certification.

2) Except in the case of a printed manual, reference documents available on-line or source locations are linked to applicable web sites.

3) United States

   a) AC 20-130, "Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors"

   b) AC 20-138, "Airworthiness Approval of Global Navigation Satellite System (GNSS) Equipment"

   c) AC 43-9, "Maintenance Records"

   d) AC 43-210, "Standardized Procedures for Requesting Field Approval of Data, Major Alterations, and Repairs"

   e) AC 43.9-1, "Instructions for Completion of FAA Form 337"

   f) AC 43-13-1, "Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair"

   g) AC 43.13-2, "Acceptable Methods, Techniques, and Practices - Aircraft Alterations"

   h) FAR, Part 43, "Maintenance, Preventive Maintenance, Rebuilding, and Alteration"

   i) FAR, Part 91, "General Operating and Flight Rules"

4) Canada

   a) CAR, Part V, "Airworthiness"

   b) CAR, Part VI, "General Operating and Flight Rules"

5) COSPAS-SARSAT

   a) C/S G.005, "Cospas-Sarsat Guidelines on 406 MHz Beacon Coding, Registration and Type Approval"

   b) C/S S.007, "Handbook of Beacon Regulations"

6) RTCA – The following documents are available for purchase at RTCA's web site www.rtca.org, or by mail:

   a) DO-160C, "Environmental Conditions and Test Procedures for Airborne Equipment"

   b) DO-178B, "Software Considerations in Airborne Systems and Equipment Certification"

   c) DO-182, "Emergency Locator Transmitter (ELT) Equipment Installation and Performance"

   d) DO-183, "Minimal Operational Performance Standards for Emergency Locator Transmitters - Automatic Fixed-ELT (AF), Automatic Portable-ELT (AP), Automatic Deployable-ELT (AD), Survival-ELT (S) Operating on 121.5 and 243.0 MHz"

   e) DO-204, "Minimal Operational Performance Standards for 406 MHz Emergency Locator Transmitters (ELT)"

SUBTASK 25-69-10-990-002

B. **Other Documents**

1) The following documents are available on-line at the Artex products web site at www.acrartex.com, or from ACR Electronics, Inc. upon request.

a) 570-1000, "ELT Test Set (ETS) Operation Manual"

b) 6288, "TSO Qualification Test Report for the ELT/NAV Interface System"

DESCRIPTION AND OPERATION

TASK 25-69-10-870-801

1. Description

SUBTASK 25-69-10-870-001

A. Overview

1) The ELT/NAV Interface is integrated into the ELT system. See Figure 1 ELT/NAV Interface System Integration.
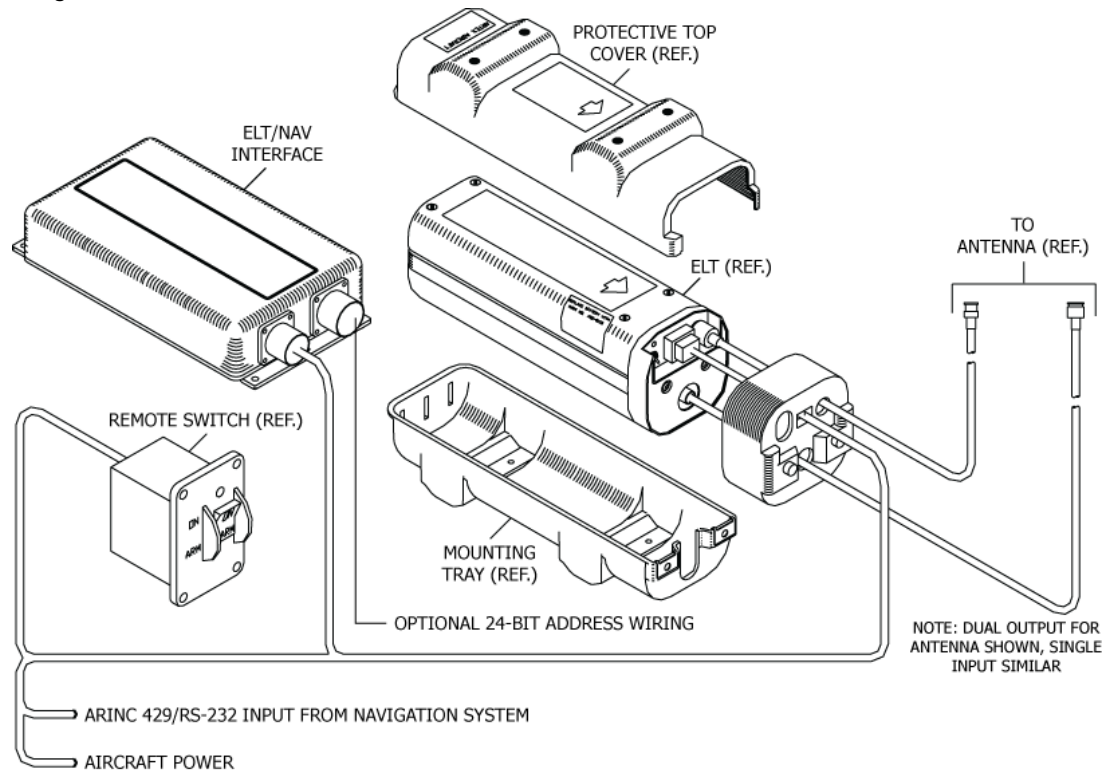
Figure 1 ELT/NAV Interface System Integration

2) The ELT/NAV Interface is designed to work with "ELT with 24-bit Address" and "ELT with Serial Number" location protocols. In both cases, the ELT/NAV Interface provides position coordinates (latitude and longitude) to the ELT.

   a) For aircraft using an "ELT with 24-bit Address" location protocol, the ELT/NAV Interface also provides the means to reprogram an ELT automatically in the event an ELT programmed with a different 24-bit address aircraft ID has been placed in the aircraft.

   b) For aircraft using an "ELT with Serial Number" location protocol, the ELT/NAV Interface reprogramming receptacle (P1) is capped and the unit only provides position data to the ELT.

SUBTASK 25-69-10-870-002

B. Physical Description

1) The ELT/NAV Interface components are housed in a 0.125 inch (3.2 mm) thick aluminum chassis; finished with a chromate conversion primer and a safety orange, high solids epoxy or polyurethane finish. See Figure 2 ELT/NAV Interface Isometric View.
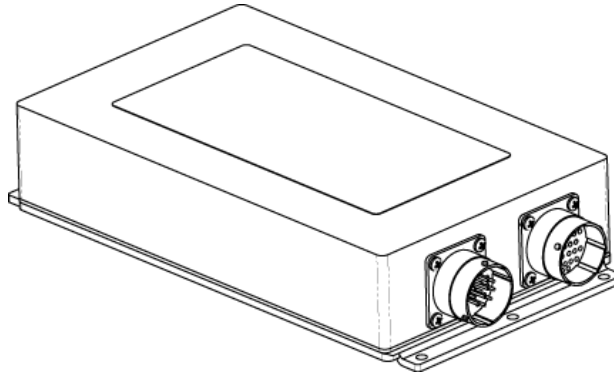
Figure 2 ELT/NAV Interface Isometric View

SUBTASK 25-69-10-870-003

C. Position Data Functionality

1) The ELT/NAV Interface receives position coordinates (latitude and longitude) from the aircraft onboard navigation system.

2) The ELT/NAV Interface is capable of receiving data from the aircraft navigation system via the following protocols:

3) ARINC 429 - See SUBTASK 25-69-10-870-001 on page 20 for requirements.

4) RS-232 - See SUBTASK 25-69-10-870-002 on page 20 for requirements.

5) The ELT/NAV Interface converts the position data to a format compatible with the ELT and forwards the data to the ELT via a second RS-232 port.

6) The ELT must be programmed with a location protocol (long message format) in order to receive, assimilate, and broadcast position data provided by the ELT/NAV Interface.

7) The ELT stores the position data in RAM and broadcasts the position data, along with identification data, when the ELT is activated.

8) Position data is continually updated and overwritten in the ELT RAM as long as the ELT is idle and waiting for an activation signal.

9) If power to the ELT/NAV Interface is lost, the ELT holds the last known position data for 30 seconds and the ELT must be activated within that time frame to transmit position information.

SUBTASK 25-69-10-870-004

D. **24-Bit Address Reprogramming Functionality**

    CAUTION: THE PROGRAMMING AND LABELING OF THE ELT MUST MATCH THE AIRCRAFT IN WHICH IT IS INSTALLED. REMARK THE ELT PRODUCT LABEL AS NECESSARY TO REFLECT NEW PROGRAMMING AND/OR COUNTRY OF REGISTRY. CONTACT THE LOCAL REGULATORY AUTHORITIES RESPONSIBLE FOR ELT REGISTRATION AND REFER TO THE APPLICABLE ELT ABBREVIATED COMPONENT MAINTENANCE MANUAL FOR ELT REGISTRATION REQUIREMENTS.

1) The ELT/NAV Interface provides the means to reprogram ELTs with 24-bit address location protocol programming.

2) This capability facilitates swapping ELTs from one aircraft to another when performing routine maintenance, etc., without losing a significant amount of time reprogramming ELTs.

3) If the ELT is not programmed with a 24-bit address location protocol, the ELT/NAV Interface will not reprogram the ELT.

TASK 25-69-10-870-802

2. Navigation System Interface Requirements

SUBTASK 25-69-10-870-001

A. ARINC 429 Latitude and Longitude Data Input

1) The ELT/NAV Interface will accept signals "A" and "B" from any ARINC 429 navigation system.

2) The interface looks for labels "310" (latitude) and "311" (longitude), which contain position data.

3) The interface accepts data at:

    a) High speed,

    b) Low speed,

    c) GAMA high speed, or

    d) GAMA low speed.

4) ARINC 429 output speed must not change during ELT/NAV Interface operation.

5) The interface automatically detects output speed after turn-on and locks on after 20 seconds.

6) ARINC 429 is the preferred output for navigation systems that support both ARINC 429 and RS-232 output.

SUBTASK 25-69-10-870-002

B. RS-232 Latitude and Longitude Data Input

    CAUTION: DO NOT CONNECT ARINC 429 AND RS-232 INPUTS AT THE SAME TIME.

1) For navigation systems that output only RS-232, the ELT/NAV Interface accepts the following RS-232 format only.

    a) Baud Rate (fixed): 9600

    b) Parity: None

    c) Data Bits: 8

    d) Stop Bits: 1

2) The RS-232 format must have:

    a) Start of Text (STX),

    b) "A" identifier for latitude,

    c) "B" identifier for longitude, and

    d) End of Text (ETX).

3) The RS-232 format expects carriage returns, but will not operate if there are line feeds.

TASK 25-69-10-870-803

3. Operation

SUBTASK 25-69-10-870-001

A. Position Data Processing

1) Operation of ELT/NAV Interface position data processing (i.e., receive, convert, and transmit) is automatic and requires no operator interface other than activating the +28 VDC power source.

2) The following conditions must be true for ELT/NAV Interface position data processing to function:

   a) +28 VDC aircraft power must be applied to the unit (i.e., the power source must be switched on).

   b) The aircraft navigation system must be on and transmitting position data to the ELT/NAV Interface.

3) Once the ELT is activated, it stops receiving position data; however, the ELT/NAV Interface continues to transmit as long as it has power and is receiving position data.

SUBTASK 25-69-10-870-002

B. 24-Bit Address Reprogramming

1) Operation of the ELT/NAV Interface 24-bit address reprogramming function is automatic and requires no operator interface other than activating the +28 VDC power source.

2) When +28 VDC power is applied to the ELT/NAV Interface, it reads the ELT 24-bit address data and compares it to the 24-bit address data hard wired to the ELT/NAV Interface.

3) If a difference in 24-bit address programming is found, the ELT/NAV Interface reprograms the ELT to the data read from the hard wired installation.

4) When the two sets of 24-bit address data are identical, the ELT/NAV Interface takes no action.

5) If the ELT is programmed with a protocol other than 24-bit address, the ELT/NAV Interface attempts to reprogram the ELT with new aircraft identification data and fails.

   a) If P1 (i.e., 24-bit address) is connected to the ELT/NAV Interface and the ELT is programmed with a protocol other than 24-bit address, an error will be displayed by the ELT and remote switch LEDs.

   b) See SUBTASK 25-69-10-750-002 on page 30 and Table 6 on page 32.

TASK 25-69-10-870-804

4. Specifications

SUBTASK 25-69-10-870-001

A. Physical and Environmental

    1)   Table 3 lists the ELT/NAV Interface physical and environmental specifications.

PARAMETER	CHARACTERISTIC
Temperature (Storage)	-55° C to +85° C
Temperature (Operating)	-20° C to +55° C
Altitude	55,000 ft (16,764 m)
Vibration	10 g from 5 Hz to 2,000 Hz
Shock	500 g for 4 ms
Crashworthiness	100 g for 23 ms
Humidity	95% for 50 hrs
Impact	55 lbs from 6 in. (24.9 kg from 152 mm)
Crush	1,000 lbs (453.6 kg)
Spurious Emissions	Per RTCA/DO-204
Flammability	Self-Extinguishing
Weight	2.8 lbs (1.27 kg)
Dimensions	9.3 x 5.0 x 1.9 in. (236 x 127 x 48 mm)

Table 3 Physical and Environmental Specifications

SUBTASK 25-69-10-870-002

B. Input/Output

1) Table 4 lists the ELT/NAV Interface input/output specifications.

PIN	DESCRIPTION	CHARACTERISTIC
P2-1	Power Input	+28 VDC ±5 VDC 300 mA max.
P2-2	5.6 VDC Output	Vmax = 6.0 VDC Vmin = 5.3 VDC
P2-3	ARINC 429-A Input (Auto Speed Select)	High/Low Standard or GAMA
P2-4	ARINC 429-B Input (Auto Speed Select)	High/Low Standard or GAMA
P2-5	Not Used	N/A
P2-6	Not Used	N/A
P2-7	Not Used	N/A
P2-8	RS-232 RX	RS-232
P2-9	TX Output	RS-232
P2-10	RX Input	TTL
P2-11	ELT/NAV Ground	Aircraft Ground
P2-12	ELT Ground	Aircraft Ground
P1-1 thru 24	24-bit Address Input	Ground =1 Open = 0
P1-25 and 26	24-bit Address Return	24-bit Ground

Table 4 Input/Output Specifications

25-69-10

SUBTASK 25-69-10-870-003

C. **Electrical**

1) Table 5 lists the ELT/NAV Interface electrical specifications.

PARAMETER	CHARACTERISTIC
Power Input	Per RTCA/DO-160C
Voltage Spike	Per RTCA/DO-160C
Audio Frequency Susceptibility	Per RTCA/DO-160C
Induced Signal Susceptibility	Per RTCA/DO-160C
Radio Frequency Susceptibility	Per RTCA/DO-160C and DO-204
Emission of RF Energy	Per RTCA/DO-160C

Table 5 Electrical Specifications

TEST AND FAULT ISOLATION

TASK 25-69-10-750-801

1. General

SUBTASK 25-69-10-990-001

A. Applicability

1) This section only covers inspection, testing, and fault isolation procedures specific to the ELT/NAV Interface.

2) Refer to the applicable ELT abbreviated component maintenance manual associated with the ELT/NAV Interface to coordinate the requirements herein with the requirements for inspection, test, and fault isolation of the ELT system as a whole.

SUBTASK 25-69-10-990-002

B. Regulatory Requirements

1) The ELT/NAV Interface is considered an integral part to the ELT system, and as such is subject to the periodic inspection and testing required by the regulatory authorities governing the installation, operation, and maintenance of ELT systems.

2) Refer to the applicable ELT abbreviated component maintenance manual associated with the ELT/NAV Interface for references to the regulatory requirements.

3) Inspection and testing of the ELT/NAV Interface must be accomplished in conjunction with and on the same schedule as the ELT and other system components.

TASK 25-69-10-750-802

2. Periodic Inspection

SUBTASK 25-69-10-220-001

A. Inspection Procedures

1) Remove the ELT/NAV Interface in accordance with SUBTASK 25-69-10-050-001 on page 33.

2) Perform a visual inspection of the chassis exterior, checking for:

   a) Damage to the finish,

   b) Corrosion,

   c) Excessive wear of the mounting holes, and

   d) Cracks in the mounting flanges.

3) Perform a visual inspection of the mounting hardware for condition and corrosion.

4) Perform a visual inspection of the connectors, checking for:

   a) Corrosion,

   b) Bent or broken pins, and

   c) Security of wires in the pins and pins in the connector socket.

   NOTE: A slight tug on each wire will reveal a wire loose in the pin (i.e., bad crimp) or an improperly seated pin in the connector socket.

5) Inspect the P2 interface wiring between the ELT/NAV Interface and the ELT for:

   a) Security,

   b) Evidence of damage, and

   c) Evidence of insulation deterioration.

6) Inspect the P1 24-bit address wiring between the ELT/NAV Interface and ground or 24-bit address switch block for:

   a) Security,

   b) Damage,

   c) Insulation deterioration, and

   d) Grounding points for corrosion.

7) Reinstall the ELT/NAV Interface in accordance with SUBTASK 25-69-10-450-002 on page 37.

TASK 25-69-10-750-803

3. Periodic Testing

SUBTASK 25-69-10-750-001

A. Position Data ELT Self-Test

1) This is a recommended periodic test.

2) The following test procedure incorporates the steps necessary to confirm operation of the ELT/NAV Interface into the "Installed Transmitter Test" procedure defined in the applicable ELT abbreviated component maintenance manual.

3) This test procedure initiates the ELT self-test routine, a part of which checks for position data.

4) Perform the following functional check within the first 5 minutes after the hour (UTC), as required by AC 43.13-1, Chapter 12, § 12-22, Note 3.

   a) Notify any nearby control tower of your intentions.

   b) Turn on the aircraft navigation system and verify it is receiving valid position data.

   c) Verify the ELT/NAV Interface is powered up and has at least 30 seconds to initialize.

   d) Tune a receiver, usually the aircraft transceiver, to 121.5 MHz.

   NOTE: An AM radio may be used to receive the signal.

   e) Activate the ELT by placing the cockpit remote switch in the "ON" position. The LED will begin flashing continuously.

   f) Listen for 3 audible sweeps on the receiver, which takes about 1 second.

   g) Verify the buzzer sounds immediately upon activation.

   h) Return the cockpit remote switch to the "ARM" (OFF) position while paying close attention to LED activity when the ELT enters the "ARM" condition. If the ELT is working properly, the LED will stay on for approximately 1 second and then turn off.

   i) Refer to Table 6 on page 32 if the LED displays a 5-flash error, which indicates the ELT is not receiving position data.

   NOTE: Refer to the troubleshooting guide in the applicable ELT abbreviated component maintenance manual for a complete breakdown of error codes, causes, and possible solutions.

5) If verification of the position data contained in the 406 MHz message is desired, perform the post-installation position data functional test in SUBTASK 25-69-10-750-001 on page 28.

TASK 25-69-10-750-804

4. Post-Installation Functional Testing

SUBTASK 25-69-10-990-001

A. General

CAUTION: ANY ELT RUNNING V133 SOFTWARE (SEE PRODUCT LABEL) MUST BE TESTED IN AN RF CONTAINER, SCREEN ROOM, OR CONNECTED TO A DUMMY LOAD VIA THE ANTENNA COAX CONNECTION, BECAUSE THE V133 SOFTWARE TRANSMITS A FIXED TEST MESSAGE AT ELT RESET, NECESSITATING A "LIVE" BROADCAST TO READ THE ACTUAL MESSAGE. ANY ELT RUNNING V134 OR V135 SOFTWARE TRANSMITS THE ACTUAL 406 MHZ MESSAGE AT RESET AND MAY BE TESTED IN SITU.

1) This task consists of three subtask testing requirements:

   a) A position data test, which verifies ELT/NAV Interface position data functionality by reading and validating position data broadcast by the ELT.

   b) 24-bit address programming test, which verifies ELT/NAV Interface 24-bit address reprogramming functionality by initiating reprogramming and checking for an error indication.

   c) 15-digit hex ID determination, which reads the programmed hex ID, country, and country code broadcast in the 406 MHz message and provides instructions for relabeling and re-registering the ELT, as applicable.

SUBTASK 25-69-10-750-001

B. Position Data Verification Test

CAUTION: DO NOT ALLOW THE ELT TO STAY ACTIVE LONGER THAN 40 SECONDS DURING THIS TEST. AFTER APPROXIMATELY 50 SECONDS THE ELT WILL BROADCAST A 406 MHZ BURST AND THIS SIGNAL WILL BE INTERPRETED AS A VALID EMERGENCY SIGNAL BY THE COSPAS-SARSAT SATELLITE SYSTEM.

1) Perform the following procedure within the first 5 minutes after the hour (UTC), as required by AC 43.13-1, Chapter 12, § 12-22, Note 3.

   a) Notify any nearby control tower of your intentions.

   b) Turn on the aircraft navigation system and verify it is receiving valid position data.

   c) Verify the ELT/NAV Interface is powered up and has at least 30 seconds to initialize.

   d) Set the 453-1000 ELT Test Set (ETS) beacon reader to receive and decode the ELT digital message. Refer to the ETS operating manual (570-1000) for ETS operating instructions and additional details.

   NOTE: The ETS antenna should be within 30 feet of the aircraft 406 MHz antenna.
   NOTE: A beacon reader equivalent to the ETS may be used, provided it is capable of receiving and decoding the 406 MHz digital message.

   e) Activate the ELT by placing the control switch or remote switch in the "ON" position.

   f) Allow the ELT to transmit for approximately 5 seconds.

   g) Deactivate the ELT and read the test message broadcast at "turn off".

   NOTE: The test message broadcast by the ELT at "turn-off" contains all the information in an actual distress message, except there is a special digital prefix that informs COSPAS-SARSAT satellites to ignore the message.

2) Message examples are shown in Figure 3 Examples of Location Protocol 406 MHz Messages.
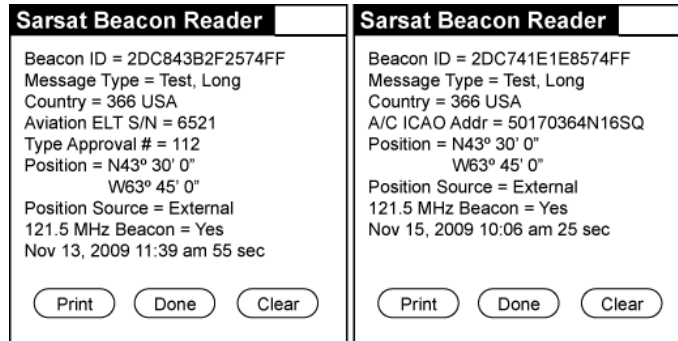
Figure 3 Examples of Location Protocol 406 MHz Messages

3) The left hand example in Figure 3 Examples of Location Protocol 406 MHz Messages is an ELT programmed for "Standard Location Protocol ELT with Serial Number". The right hand example is an ELT programmed for "Standard Location Protocol ELT with 24-bit Address".

   a) Actual messages will vary depending on the protocol and information programmed into the ELT.

   b) If the ELT is programmed with a location (long message) protocol and disconnected from the ELT/NAV Interface or the aircraft navigation system is not transmitting position data, the message will indicate "Position Invalid" in lieu of position data. See Figure 4 406 MHz Location Message without Position Data.
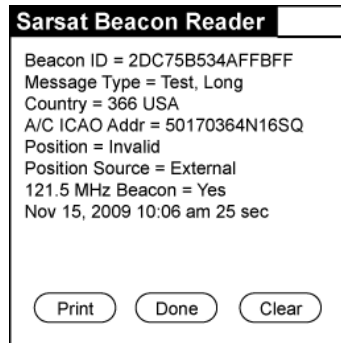
Figure 4 406 MHz Location Message without Position Data

4) Repeat the activation and deactivation cycle if the ETS fails to read the message on the initial try. The 406 MHz oscillator may not be warmed up.

5) If continued attempts to read the message fail, check the ELT for self-test error codes and refer to the applicable ELT manual.

SUBTASK 25-69-10-750-002

C. **24-Bit Address Reprogramming Verification Test**

This test procedure verifies the ELT/NAV Interface has updated the aircraft 24-bit address ID in the ELT programming.

1) Apply power to the ELT/NAV Interface, while the ELT remains off (i.e, inactive). Re-programming takes place within 30 seconds of power up.

2) Monitor the ELT for the next 2 minutes.

    a) The LEDs on the ELT and remote switch will begin to flash rapidly if reprogramming was NOT successful. See Table 6 on page 32 for troubleshooting guidelines.

    b) If the LEDs remain off after two minutes, the ELT has been reprogrammed. Proceed to SUBTASK 25-69-10-750-001 on page 31.

TASK 25-69-10-750-805

5. Post-Reprogramming Check

SUBTASK 25-69-10-750-001

A. 15-Digit Hex ID Verification

1) 15-digit hex ID verification should be performed any time an ELT is installed in an aircraft to verify the ELT is properly labeled and registered.

2) Perform the following procedure within the first 5 minutes after the hour (UTC), as required by AC 43.13-1, Chapter 12, § 12-22, Note 3.

   a) Notify any nearby control tower of your intentions.

   b) Verify the ELT/NAV Interface is powered up and has at least 30 seconds to initialize.

   NOTE: The aircraft navigation system is NOT turned on for this test. For ELT registration purposes, the 15 digit hex ID shall contain the "default" value of no position data (i.e., always FFBFF)

   c) Set the 453-1000 ELT Test Set (ETS) beacon reader to receive and decode the ELT digital message. Refer to the ETS operating manual (570-1000) for ETS operating instructions and additional details.

   NOTE: A beacon reader equivalent to the ETS may be used, provided it is capable of receiving and decoding the 406 MHz digital message.

   d) Place the ETS within 30 feet of the aircraft 406 MHz antenna.

   e) Activate the ELT by placing the control switch or remote switch in the "ON" position.

   f) Allow the ELT to transmit for approximately 5 seconds.

   g) Deactivate the ELT and read the test message broadcast at "turn-off". A message example is shown in Figure 4 406 MHz Location Message without Position Data on page 29.

3) The 15 digit hex ID (i.e., Beacon ID) displayed by the ETS is compared to the hex ID on the ELT. If identical, no further action is necessary. If different:

   a) Enter the new hex ID on label P/N 591-0999 and affix it to the ELT over the existing hex ID on the product label.

   b) If country and country code have changed, enter the new information on label P/N 591-0429-01 and affix it to the ELT over the existing information on the product label.

   c) Re-register the ELT. Refer to the applicable ELT manual for specific ELT registration information and instructions.

TASK 25-69-10-810-801

6. Fault Isolation

SUBTASK 25-69-10-810-001

A. Troubleshooting Guidelines

1) Table 6 provides ELT troubleshooting guidelines for installation and operational issues.

SYMPTOM	PROBABLE CAUSE	POSSIBLE SOLUTION
ELT and remote switch LED display 5-flash error (No navigation data present)	Aircraft navigation system off	Turn on navigation system
	No power to ELT/NAV Interface	Turn on power
		Check breaker/fuse
	Faulty interface wiring or connections	Check for frayed insulation causing short or ground
		Verify integrity of all crimp and solder connections
		Check wiring continuity and repair as necessary
ELT and remote switch LED flash rapidly within two minutes after ELT/NAV Interface power up (24-bit address not accepted)	ELT not programmed for 24-bit address location protocol	Program ELT with 24-bit address location protocol
	Faulty interface wiring or connections	Check for frayed insulation causing short or ground
		Verify integrity of all crimp and solder connections
		Check wiring continuity and repair as necessary

Table 6 Troubleshooting Guide

REMOVAL

TASK 25-69-10-050-801

1. **ELT/NAV Interface**

SUBTASK 25-69-10-050-001

A. **Removal**

    1) See Figure 5 ELT/NAV Interface Removal.

    2) Disconnect ELT/NAV Interface plugs:

        a) P2, and

        b) P1, if installed.

    3) Install connector covers to protect the ELT/NAV Interface receptacles.

    4) Remove the screws attaching the ELT/NAV interface to the mounting structure.
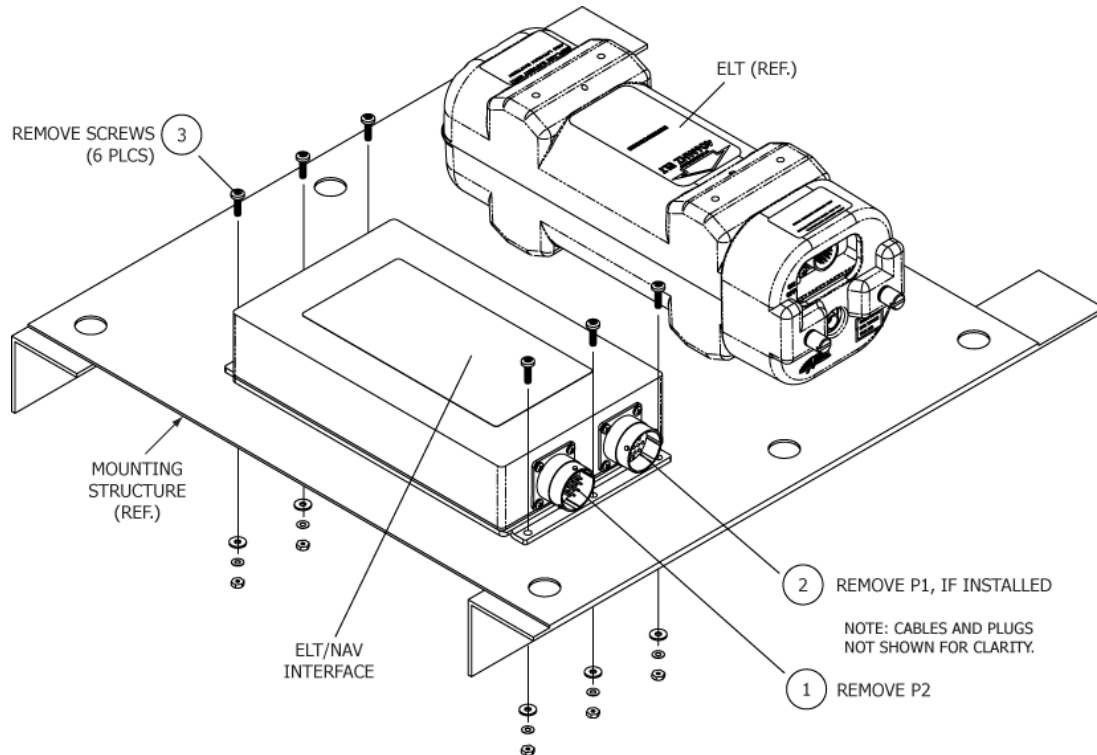
Figure 5 ELT/NAV Interface Removal

TASK 25-69-10-500-801

2. Material or Equipment Return

SUBTASK 25-69-10-510-001

A. Shipment Information

1) If any material or equipment is to be returned to the factory, under warranty or otherwise, ACR Electronics, Inc. must be notified prior to shipment with the following information:

   a) Model and serial number of equipment being returned,

   b) Date purchased,

   c) Date placed in service,

   d) Number of hours in service,

   e) Nature and cause of failure, and

   f) Remarks, if any.

SUBTASK 25-69-10-580-001

B. Return Material Authorization

1) Upon receipt of such notice, ACR Electronics will issue a Return Material Authorization (RMA) number which then authorizes return of the material or equipment to the following address:

Repair and Overhaul

ACR Electronics, Inc.

5757 Ravenswood Road

Fort Lauderdale, FL 33312

Phone: (954) 981-3333

Fax: (954) 983-5087

   a) Failure to obtain a RMA number and provide the details listed in SUBTASK 25-69-10-510-001 may cause unnecessary delay and/or rejection of the returned material or equipment.

   b) All material or equipment returned to the factory must be freight prepaid.

   c) Acceptable methods of shipment for international return are Airborne, Burlington Air, DHL, Emery, Federal Express, UPS International, and World Wide only.

   NOTE: Do not use "International Commercial Airlines", such carriers may cause a loss of returned material or equipment.

TASK 25-69-10-450-801

1. Regulatory Requirements and Guidelines

SUBTASK 25-69-10-990-001

A. Applicability

1) The regulatory requirements and guidelines for ELT installations discussed in the following subtasks are applicable to installation of the ELT/NAV Interface and must be applied to the ELT/NAV Interface. Where the word "ELT" is used in the following subtasks, read "ELT/NAV Interface".

SUBTASK 25-69-10-990-002

B. TSO C126, Paragraph D

1) TSO approval of the ELT does not constitute installation approval. All installations are subject to field approval for a given airframe by either an approved FAA DER or FAA FSDO. For installations outside the US, contact your local civil aviation regulatory agency for details.

SUBTASK 25-69-10-990-003

C. FAA

1) This manual constitutes supporting data, as described in AC43.9-1, Paragraph 6.h.(2) and AC 43-210, Chapter 2, Paragraph 201(a)(6), and as such may be used as support for FAA field approval of the ELT/NAV Interface installation.

2) In addition to the procedures outlined herein and in accordance with FAR Part 43, the installer must adhere to the aircraft manufacturer's instructions and recommendations and the guidelines provided by FAA Advisory Circular AC 43.13-2 "Acceptable Methods, Techniques, and Practices - Aircraft Alterations", specifically Chapters 1 through 3, 11, and 13.

3) By signing the aircraft logbook, and FAA Form 337, the installer is stating the installation has been performed in accordance with current FAR requirements and the procedures outlined herein. The completed Form 337 is provided to the FAA and also becomes a permanent part of the aircraft maintenance records in accordance with AC43-9, Paragraph 17.

SUBTASK 25-69-10-990-004

D. Canada

1) All installations must be performed in accordance with Canadian Aviation Regulations (CAR) Part V, Subparts 37, 51, and 71.

SUBTASK 25-69-10-990-005

E. Other Countries

1) Installations in aircraft outside of the United States and Canada, must be performed in accordance with applicable regulatory authority rules and regulations.

SUBTASK 25-69-10-990-006

F. RTCA

1) DO-204, § 3.1.8 guidelines for mounting a ELT:

   a) The ELT shall be mounted to primary aircraft load carrying structures, such as trusses, bulkheads, longerons, spars, or floor beams.

   b) The mounts shall have a maximum static local deflection no greater than 0.1 inches (2.5 mm) when a force of 100 lbs (450 newtons) is applied to the mount in the most flexible direction. Deflection measurements shall be made with reference to another part of the aircraft not less than 1 foot (0.3 meters) nor more than 3 feet (1.0 meters) from the mounting location.

2) DO-182, § 6.2.2.b recommends that:

   a) To maximize the probability of the ELT transmitting a detectable signal after a crash, all ELT system components, which must survive a crash intact, e.g., transmitter and external antenna, should be attached to the airframe in such a manner that the attachment system can support a 100 g load, (ELT weight x 100, ELT antenna weight x 100, etc.) applied through the center of gravity of the component (ELT, antenna, etc.) in the plus and minus directions of the three principal axes of the aircraft.

   b) Post-crash critical components of the ELT system, e.g., transmitter and external antenna, should be mounted as close to each other as possible.

TASK 25-69-10-450-802

2. Mechanical

**SUBTASK 25-69-10-450-001**

A. Chassis Location

> CAUTION: AVOID LOCATING THE ELT/NAV INTERFACE WHERE IT MAY BE SUBJECTED TO UNPROTECTED EXPOSURE TO HARSH CHEMICAL FLUIDS, SUCH AS DEICING COMPOUNDS. THESE TYPES OF CHEMICALS MAY CAUSE DAMAGE TO FASTENERS AND ELECTRICAL COMPONENTS, AS WELL AS ELECTRICAL CONNECTOR CORROSION.

1) Mount the ELT/NAV Interface within 2 feet (610 mm) of the ELT, such that the interface harness does not exceed 3 feet (914 mm) including strain relief.

2) The ELT/NAV Interface chassis and ELT are mounted to the same support structure in most installations.

SUBTASK 25-69-10-450-002

B. Chassis Installation

1) Coordinate ELT/NAV Interface chassis installation with ELT installation whenever possible. If the ELT/NAV Interface is an add-on to an existing ELT installation, extend/modify the existing ELT support structure to accommodate the ELT/NAV Interface.

2) See Figure 6 ELT/NAV Interface Outline and Dimensions.
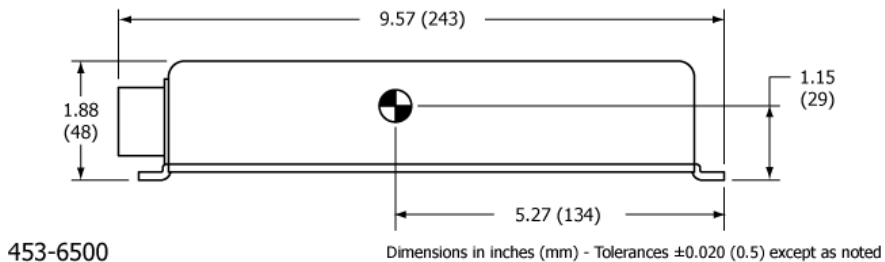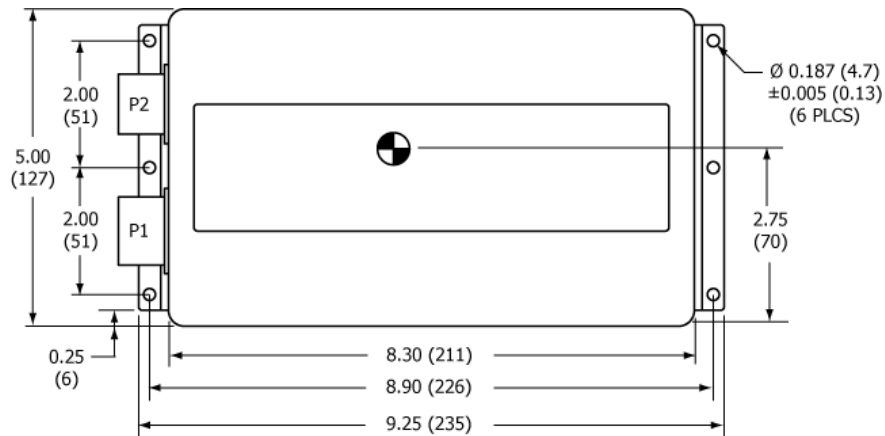
Figure 6 ELT/NAV Interface Outline and Dimensions

3) Align the ELT/NAV Interface on the mounting structure.

4) Mark the six holes needed for mounting, using the unit as a pattern. Hole pattern dimensions are also illustrated in Figure 6 ELT/NAV Interface Outline and Dimensions.

25-69-10

5) Drill the six mounting holes with a #19 or 4.25 mm drill.

6) Install the ELT/NAV Interface chassis with the 8-32 x 5/8″ SS pan head Philips screws, flat washers, lock washers, and nuts provided in the installation kit (455-6500), as shown in Figure 7 ELT/NAV Interface Mechanical Installation.

NOTE: The use of substitute mounting hardware is acceptable provided the hardware used meets or exceeds the strength and corrosion resistance of the original hardware.

a) Torque to 12 ±1 lb-in (136 ± 11 N•cm).
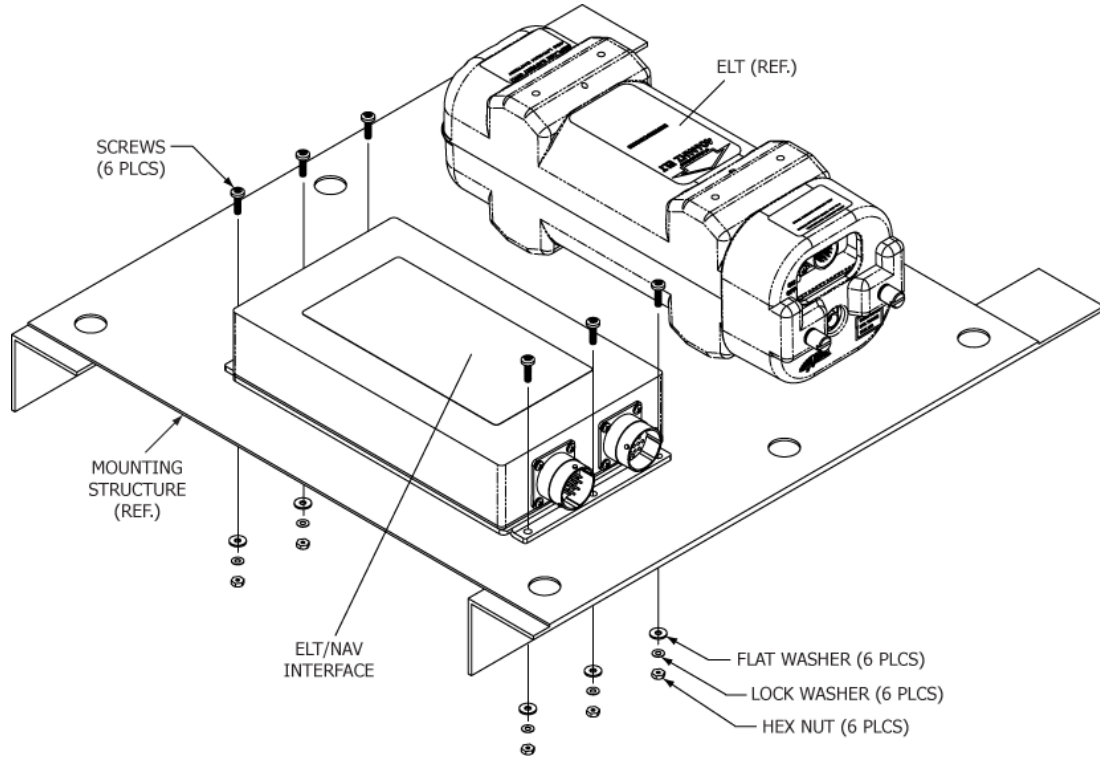
Figure 7 ELT/NAV Interface Mechanical Installation

TASK 25-69-10-450-803

3. Wiring

SUBTASK 25-69-10-990-001

A. General Considerations and Recommendations

<u>CAUTION</u>:   IF GROUND OR OTHER CONNECTIONS ARE BROKEN OR OTHERWISE DAMAGED, THE ELT IS STILL CAPABLE OF AUTOMATIC ACTIVATION; HOWEVER, ELT/NAV INTERFACE OPERATION MAY BE AFFECTED AND POSITION DATA MAY NOT BE TRANSMITTED TO THE ELT.

<u>CAUTION</u>:   INCORRECT TERMINATION OF THE WIRING IN THE CONNECTORS MAY DAMAGE THE ELT/NAV INTERFACE. VERIFY THE WIRING AGAINST THE WIRING DIAGRAM AND PERFORM A CONTINUITY CHECK TO CONFIRM GOOD CONNECTIONS AND PROPER PIN LOCATIONS.

1) The following wiring and grounding considerations and recommendations are applicable:

    a) Minimum 22 AWG wire size for interface wiring.

    b) Shielding is recommended to help prevent EMI and RF interference.

    c) Use high quality conductor meeting MIL-W-16878, M22759, M27500, or a commercial equivalent acceptable for use in aircraft applications.

    d) Provide a "Drip Loop" at the ELT/NAV Interface plug and ELT receptacle to divert moisture from the connections. See SUBTASK 25-69-10-990-001 on page 13 for a definition.

    e) All grounds must be common to aircraft ground.

2) Maximum interface and data line wire lengths are:

    a) Interface Harness - 3 feet (0.9 m)

    b) ARINC 429 - 360 feet (110 m)

<u>NOTE</u>:   Ground shield at every break. ELT/NAV Interface plug strain relief is not an acceptable ground.

    c) RS-232 - 50 feet (15 m)

3) Minimum 24 AWG wire size for 24-bit address reprogramming ground wires.

4) Switch block, if used, must be located less than 3 feet (0.9 m) from the ELT/NAV Interface and wiring must not exceed 3 feet (0.9 m) including strain relief.

SUBTASK 25-69-10-450-001

B. ELT and Navigation System Interfaces

CAUTION: DO NOT CONNECT THE ELT/NAV INTERFACE POWER WIRE DIRECTLY TO THE BATTERY. THE UNIT DRAWS POWER WHENEVER POWER IS APPLIED TO IT AND COULD DRAIN THE AIRCRAFT BATTERY WHEN NOT IN USE.

1) See Figure 8 ELT/NAV Interface Wiring Diagram.
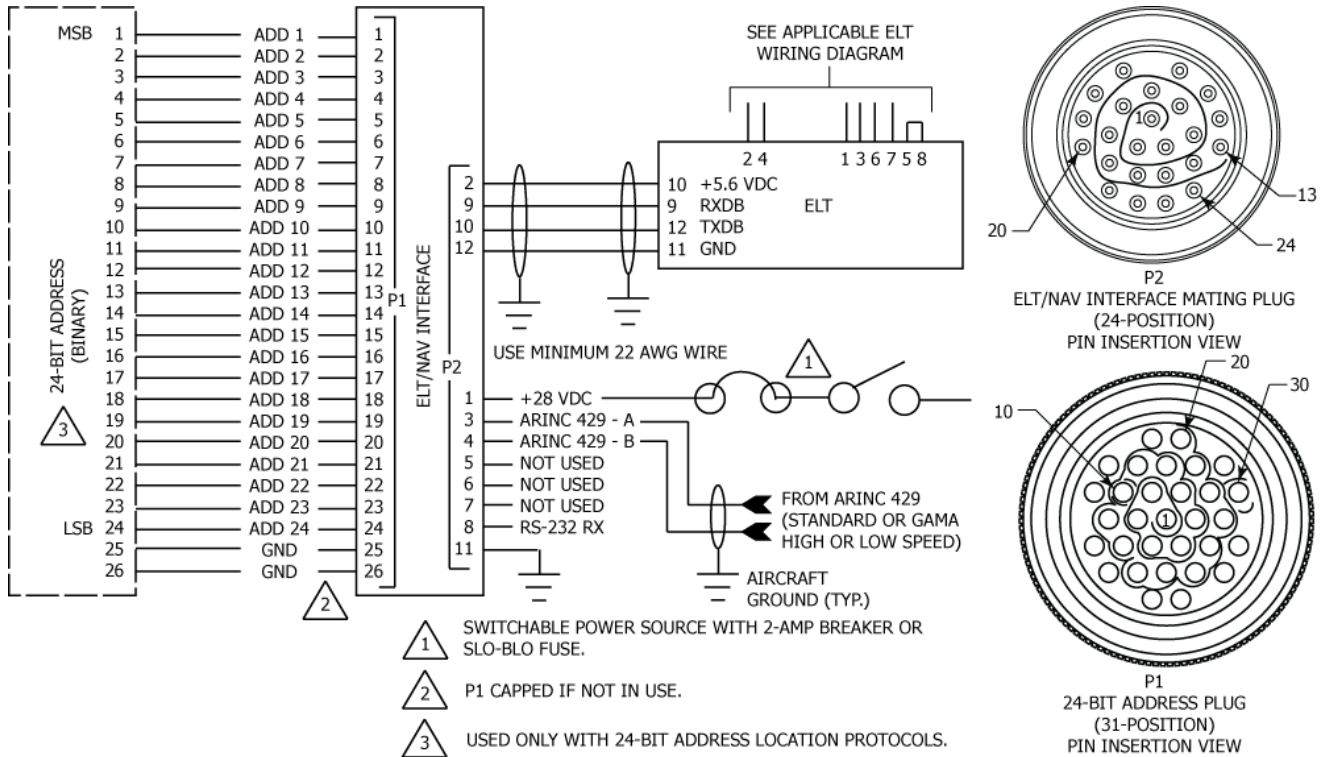
Figure 8 ELT/NAV Interface Wiring Diagram

2) Fabricate a shielded 4-wire harness long enough to reach between the ELT/NAV Interface and the ELT, including strain relief and drip loop.

   a) Strip approximately 0.15 in. (3 mm) of insulation from the ELT receptacle end of the four cable wires and 0.19 in. (5 mm) from the ELT/NAV Interface end.

   b) Dress and tin the bare wire ends to prevent the strands from fraying during terminal crimping operations.

3) Fabricate a shielded, twisted pair ARINC 429 data cable.

   NOTE: Single. shielded wire for RS-232 data line.

   a) Strip approximately 0.19 in. (5 mm) of insulation from the ELT end of the twisted pair.

   b) Dress and tin the bare wire ends to prevent the strands from fraying during terminal crimping operations.

   c) Prepare the twisted pair wires at the navigation system end in accordance with the navigation system manufacturer's written instructions.

4) Fabricate a ground wire of sufficient length to reach from the ELT/NAV Interface to a suitable aircraft ground location.

   a) Strip approximately 0.19 in. (5 mm) of insulation from each end of each of the ground wire.

   b) Dress and tin the bare wire ends to prevent the strands from fraying during terminal crimping operations.

5) Fabricate a power wire of sufficient length to reach from the ELT/NAV Interface to a suitable aircraft +28 VDC, switchable power source.

6) Crimp male terminal pins (151-6627) on the harness wire ends at the ELT.

   NOTE: Use Molex crimp tool 63811-3300, or an equivalent tool for 0.062 in. terminal pins.

7) Crimp or solder contact sockets 151-2100 on the ELT/NAV Interface end of the following wires:

   a) 4-wire harness,

   b) Power wire,

   c) Ground wire, and

   d) Twisted pair data wires (ARINC 429) or RS-232 data wire.

8) Feed the wires going to the ELT through the ELT mounting frame cap. See Figure 9 Wiring Installation at ELT End.

9) Install the wires at the ELT end into the Molex receptacle. See Figure 9 Wiring Installation at ELT End and Figure 8 ELT/NAV Interface Wiring Diagram on page 40.

   NOTE: Terminal pins may be removed from the receptacle using Molex extraction tool 11030002, or equivalent.
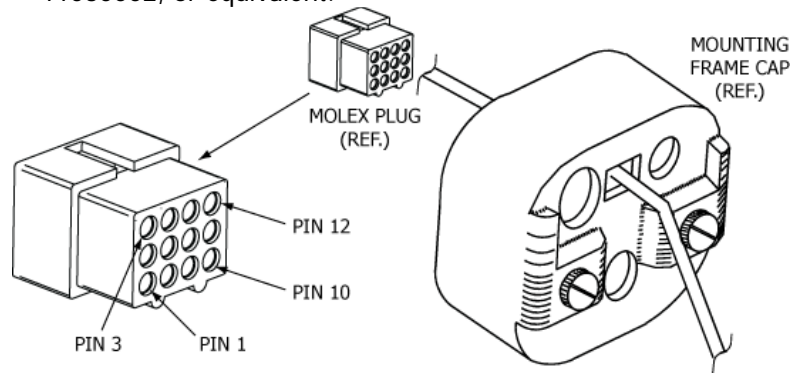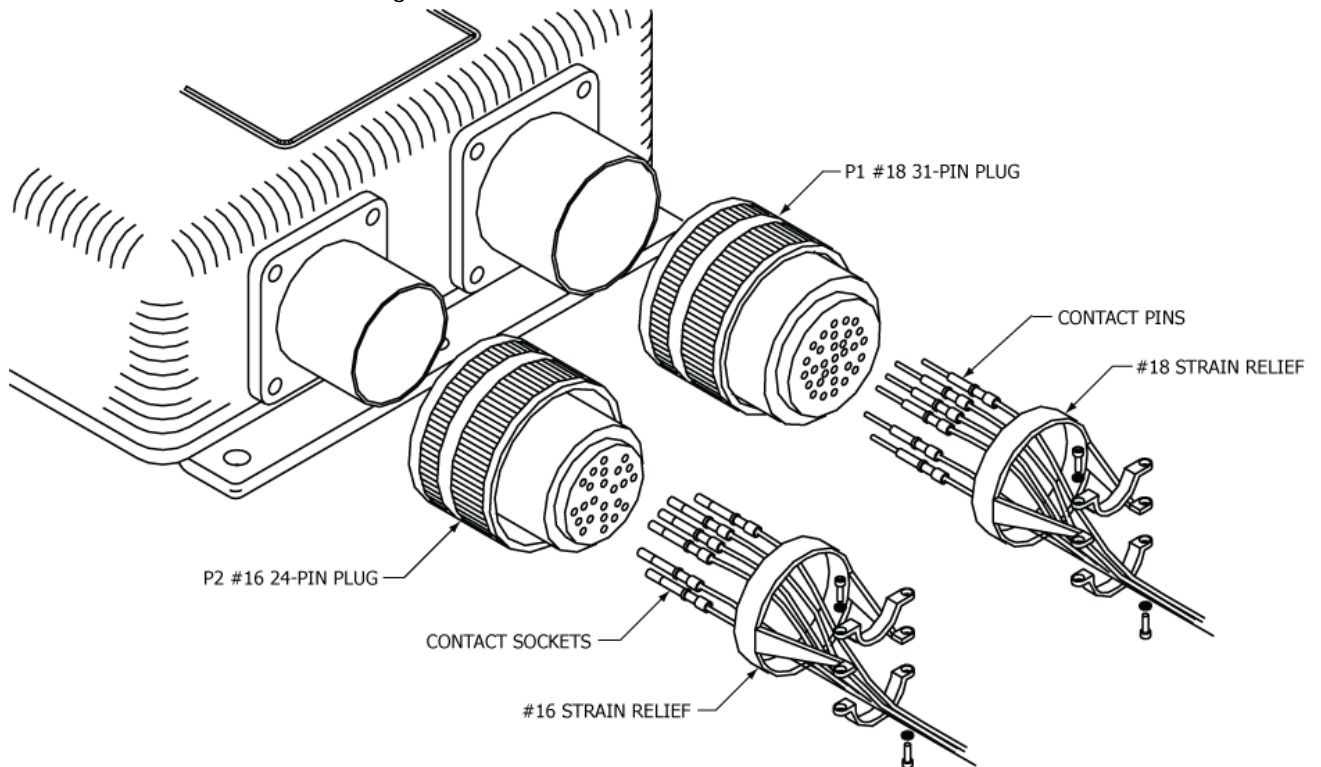

Figure 9 Wiring Installation at ELT End

10) Once all tests have been completed satisfactorily, seal the ELT receptacle in accordance with the applicable ELT manual.

11) Feed the interface wires at the ELT/NAV Interface end through the 183-6503 strain relief. See Figure 10 ELT/NAV Interface Wiring Installation.

Figure 10 ELT/NAV Interface Wiring Installation

12) Install the following wires at the ELT/NAV Interface end in the 150-6503, 24-position plug (P2):

   a) The 4 interface harness wires,

   b) ARINC 429 twisted pair (or RS-232 data wire),

   c) +28 VDC power wire, and

   d) Airframe ground wire.

13) Insert spare 151-2100 contact sockets and 151-2102 sealing plugs into unused plug positions.

14) Install strain relief on the plug and tighten the wire clamp.

15) Connect the ground wires to the airframe in accordance with the aircraft manufacturer's written instructions or as described in AC 43.13-1, Chapter 11, § 15, as applicable. See Figure 8 ELT/NAV Interface Wiring Diagram on page 40.

16) Tie all shields to aircraft ground in accordance with the aircraft manufacturer's written instructions or as described in AC 43.13-1, Chapter 11, § 15, as applicable. See Figure 8 ELT/NAV Interface Wiring Diagram on page 40.

   NOTE: Keep shield drain as short as possible.

17) Support the wiring by clamping or other suitable means, such that the wiring is properly supported and protected from chaffing and strain. Refer to the aircraft manufacturer's written instructions or as described in AC 43.13-1, Chapter 11, § 9 through 12, as applicable.

18) Connect the P2 plug to the ELT/NAV Interface.

19) Install the 150-6504 protective cap on the ELT/NAV Interface P1 plug, if the 24-bit address reprogramming option is not used.

20) Test the installation in accordance with the procedure in SUBTASK 25-69-10-750-001 on page 28.

SUBTASK 25-69-10-450-002

C. 24-Bit Address Reprogramming – Hard Wire Method

1) The 24-bit address is composed of binary "1s" and "0s", with a "1" electrically grounded to the airframe and "0" electrically open.

2) Encoding is accomplished by either "hard wiring" the respective "1" pins to ground or by using a 24-bit address switch block, which internally grounds selected addresses. Hard wiring is the preferred method. See SUBTASK 25-69-10-450-003 on page 44 for 24-bit address switch block instructions.

3) Determine the appropriate binary 24-bit address based on the octal or hexadecimal ID code assigned to the aircraft. See Figure 11 Octal/Hexadecimal to Binary Conversion.

Example No. 1: Converting ICAO address 50134057 (octal) to binary 24-bit address

ICAO Octal Address to 24-Bit Binary																							
5			0			1			3			4			0			5			7		
1	0	1	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	1	0	1	1	1	1

MSB ADDRESS 1   LSB ADDRESS 24

Example No. 2: Converting ICAO address A0B82F (hexadecimal) to binary 24-bit address

ICAO Hex Address to 24-Bit Binary																							
A				0				B				8				2				F			
1	0	1	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	1	0	1	1	1	1

MSB ADDRESS 1   LSB ADDRESS 24

OCTAL/BINARY EQUIVALENTS

Octal	Binary
0	0 0 0
1	0 0 1
2	0 1 0
3	0 1 1
4	1 0 0
5	1 0 1
6	1 1 0
7	1 1 1

HEXADECIMAL/BINARY EQUIVALENTS

Hex	Binary	Hex	Binary
0	0 0 0 0	8	1 0 0 0
1	0 0 0 1	9	1 0 0 1
2	0 0 1 0	A	1 0 1 0
3	0 0 1 1	B	1 0 1 1
4	0 1 0 0	C	1 1 0 0
5	0 1 0 1	D	1 1 0 1
6	0 1 1 0	E	1 1 1 0
7	0 1 1 1	F	1 1 1 1

Figure 11 Octal/Hexadecimal to Binary Conversion

4) Prepare the number of ground wires (binary "1") necessary to encode the 24-bit address as follows:

    a) Strip approximately 0.19 in. (5 mm) of insulation from each end of each of the ground wire.

    b) Dress and tin the bare wire ends to prevent the strands from fraying during terminal crimping operations.

5) Crimp contact pins 151-2101 onto one end of each wire.

6) Insert the contact pins into the appropriate pin locations of the 150-6502 plug (P1). See Figure 8 ELT/NAV Interface Wiring Diagram on page 40.

7) Verify each pin is inserted into the pin location on the P1 plug that corresponds to the appropriate bit address. See Figure 8 ELT/NAV Interface Wiring Diagram on page 40.

8) Connect the other end of each wire to pins P1-25 and P1-26, which are grounded through the chassis. If the wires are spliced, fabricate the splices in a manner acceptable to the aircraft manufacturer or as described in AC 43.13-1, § 13.

    NOTE: Split the wires between P1-25 and P1-26, such that the number of wires going to each pin are divided evenly.

9) Insert spare 151-2100 contact sockets and 151-2102 sealing plugs into unused plug positions.

10) Install the 183-6502 strain relief on the plug and tighten the wire clamp. See Figure 10 ELT/NAV Interface Wiring Installation on page 42.

11) Connect the P1 plug to the ELT/NAV Interface.

12) Test the installation in accordance with SUBTASK 25-69-10-750-002 on page 30.

SUBTASK 25-69-10-450-003

D.   24-Bit Address Reprogramming – Switch Block Method

1) Locate and install the 24-bit switch block less than 3 feet (0.9 m) from the ELT/NAV Interface in accordance with the manufacturer's written instructions.

2) Prepare twenty-six (26) wires as follows:

   a) Strip approximately 0.19 in. (5 mm) of insulation from the P1 plug end of each wire.

   b) Dress and tin the bare wire ends to prevent the strands from fraying during terminal crimping operations.

3) Prepare the switch block end of each wire in accordance with the switch block manufacturer's written instructions.

4) Crimp contact pins 151-2101 onto the plug end of each wire.

5) Insert the contact pins into the 150-6502 plug (P1). See Figure 8 ELT/NAV Interface Wiring Diagram on page 40.

6) Feed the wires through strain relief 183-6502. See Figure 10 ELT/NAV Interface Wiring Installation on page 42.

7) Install the strain relief on the P1 plug and tighten the wire clamp.

8) Identify the wires such that the pin locations and switch block terminations correspond to the 24-bit addresses shown in Figure 8 ELT/NAV Interface Wiring Diagram on page 40.

9) Connect the other end of each wire to the switch block in accordance with the switch block manufacturer's written instructions.

10) Verify the wiring P1 plug pin locations and block switch positions are correct based on the applicable 24-bit address. See Figure 8 ELT/NAV Interface Wiring Diagram on page 40.

11) Support the wiring by clamping or other suitable means, such that the wiring is properly supported and protected from chaffing and strain. Refer to the aircraft manufacturer's written instructions or as described in AC 43.13-1, Chapter 11, § 9 through 12, as applicable.

12) Connect the P1 plug to the ELT/NAV Interface.

13) Determine the appropriate binary 24-bit address based on the octal or hexadecimal ID code assigned to the aircraft. See Figure 11 Octal/Hexadecimal to Binary Conversion on page 43.

14) Set the 24-bit address switch block switches as appropriate for the 24-bit address binary code determined in the previous step.

15) Test the installation in accordance with SUBTASK 25-69-10-750-002 on page 30.

ILLUSTRATED PARTS LIST

TASK 25-69-10-990-801

1. Introduction

SUBTASK 25-69-10-990-001

A. Purpose

1) This illustrated parts list (IPL) illustrates and lists the spare parts, with attaching hardware, applicable to the ELT/NAV Interface.

2) Parts and components not listed herein, are not field replaceable and repairs requiring parts outside the scope of this manual must be accomplished by the manufacturer.

SUBTASK 25-69-10-990-002

B. IPL Usage Guide

1) If the part number is not known:

   a) Find the part in the IPL Figure illustration.

   b) Note the item number assigned to the part.

   c) Refer to the associated parts list and find the item number in the "Fig # & Item" column.

2) If the part number is known:

   a) Refer to the parts list and find the part in the "Part #" column.

   b) Note the figure number and item number assigned to the part.

   c) Refer to the illustration in the applicable IPL figure to find attaching hardware and related assembly parts.

3) In cases where multiple item numbers are shown on an illustration for the same item, there is more than one part number option associated with that item.

TASK 25-69-10-990-802

2. Manufacturer Name and Address

SUBTASK 25-69-10-990-001

A. Ordering Information

1) Approved parts may be ordered from ACR Electronics, or any authorized dealer.

CONTACT INFORMATION

Sales, Artex Products / ACR Electronics, Inc.

5757 Ravenswood Rd

Fort Lauderdale, FL 33312-6645, USA

Phone: (954) 981-3333

Fax: (954) 983-5087

TASK 25-69-10-990-803

3. Explanation of Detailed Parts List Entries

SUBTASK 25-69-10-990-001

A. Fig # & Item Column

1) The first number at the top of the column is the figure number of the corresponding illustration.

2) The right hand number is the item number in the associated figure.

3) A dash (–) in front of an item means the part is not illustrated.

4) Alpha-variants A through Z (except I and O) are assigned to item numbers, when necessary to identify added parts, alternate parts, and service bulletin modified parts.

SUBTASK 25-69-10-990-002

B. Part # Column

1) This column contains the manufacturer's part number for each part.

SUBTASK 25-69-10-990-003

C. Nomenclature Column

1) This column contains descriptive nomenclature for each part, service bulletin numbers affecting the part, and obsolete part numbers.

2) The indenture system used in the "Nomenclature" column indicates the relationship of one part to another, as follows:

> 1 2 3
>
> End Item or Major Assembly
>
> ATTACHING PARTS
>
> Attaching Parts for End Item or Major Assembly
>
> * * *
>
> . Detail Parts for End Item or Major Assembly
>
> . Subassemblies
>
> ATTACHING PARTS
>
> . Attaching Parts for Subassemblies
>
> * * *
>
> . . Detail Parts for Subassemblies
>
> ATTACHING PARTS
>
> . . Attaching Parts for Detail Parts
>
> * * *

25-69-10

3) Assemblies, subassemblies, and detail parts subject to modification, deletion, addition, or replacement by an issued service bulletin, are annotated to indicate both pre- and post-service bulletin configurations. The term (PRE SB XXXX) in the "Nomenclature" column designates the original configuration, and the term (POST SB XXXX) identifies assemblies and parts after the modification has been completed.

4) The terms defined below are used when applicable to indicate the interchangeability of parts.

TERM	ABBREVIATION	DEFINITION
Alternate	ALT	The listed part is alternate to, and interchangeable with, other parts within the same item number variant group or other item numbers if designated.
Superseded By	SUPSD BY	The part is replaced by and is not interchangeable with the item number designated in the notation.
Supersedes	SUPSDS	The part replaces and is not interchangeable with the item number designated in the notation.
Replaced By	REPLD BY	The part is replaced by and is interchangeable with the item number designated in the notation.
Replaces	REPLS	The part replaces and is interchangeable with the item number designated in the notation.

SUBTASK 25-69-10-990-004
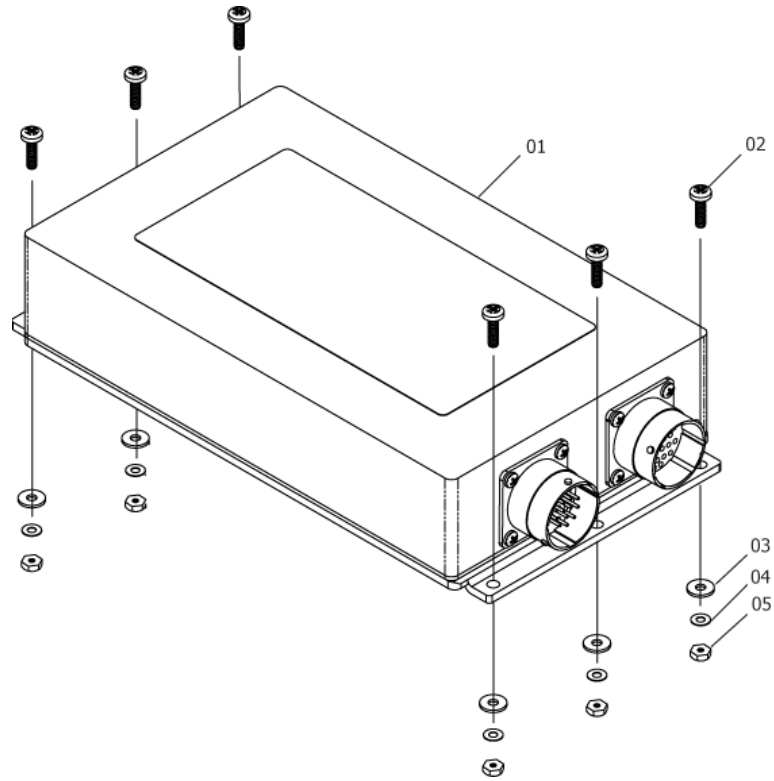
D. UPA (Units Per Assembly) Column

1) The quantity shown in this column represents the units required for one next higher assembly or, when referring to attaching parts, the quantity to attach one such item.

2) The abbreviation RF (reference) indicates the end item assembly is listed for reference purposes.

TASK 25-69-10-990-804

4. Detailed Parts List

Figure 12 ELT/NAV Interface Installation

FIG #	ITEM	PART #	1234 NOMENCLATURE	UPA
12	01	453-6500	Main Assembly, ELT/NAV Interface	1
			ATTACHING PARTS	
	02	201-0810	Screw, PHP 8-32 x 5/8" SS	6
	03	246-0008	Washer, Flat 1/2" SS #8	6
	04	247-0800	Washer, Lock Internal Tooth SS #8	6
	05	241-0832	Nut, 8-32 x 1/4" Hex SS	6
			***	
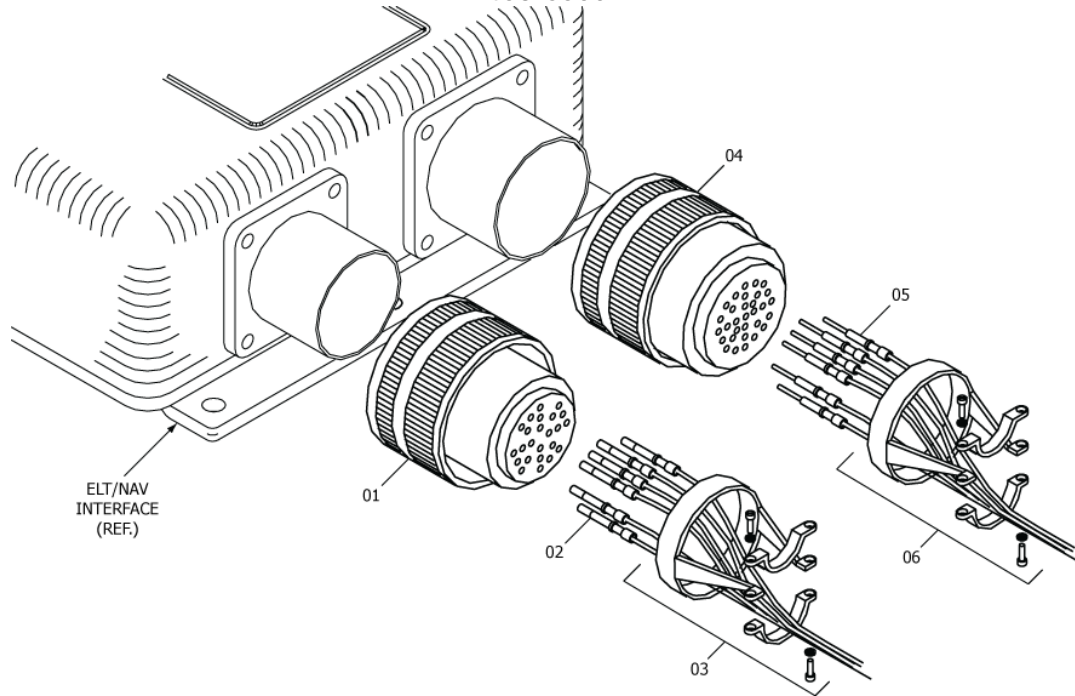
Figure 13 Electrical Components

FIG #	ITEM	PART #	1234 NOMENCLATURE	UPA
13	01	150-6503	Connector, #16 Circular (24-Position)	1
			***	
	02	151-2100	. Contact, Socket #20	26
	03	183-6503	Strain Relief, #16	1
			***	
	04	150-6502	Connector, #18 Circular (31-Position)	1
			***	
	05	151-2101	. Contact Pin, #20	33
	06	183-6502	Strain Relief, #18	1
			***	
	–	151-2102	. Plug, Sealing #20	42
			***	
	–	150-6504	Protective Cap, 31-Position Connector	1
			***	