



INSTRUCTION - PREHEAT INSTALLATION

Document No: TNH3132, REV. C

Dated: NOV-07-2023

TSHB412-3132 SERIES HELI-PREHEAT KIT

ON



212, 412, 412CF, 412EP

PROPRIETARY DATA

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RECORD OF REVISIONS

When updated, this document is changed in its entirety.

REV	DATE	DESCRIPTION	BY	APPROVAL
C	NOV-07-2023	Update with 1000 series documents	MFHB	
B	OCT-02-2016	Move plugs to right side panel # 36 STA 172 WL17 and add optional avionics hold location.	DNE	DNE
A	MAR-18-2016	Initial Release	DNE	DNE

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1. PURPOSE

The purpose of this instruction is to provide guidance for the installation of the Tanis Preheat Kit listed on the cover page of this document.

- It is the responsibility of the technician and/or maintenance/repair facility performing the installation to read this instruction, become familiar with all processes and resolve conflicting issues before proceeding.
- Final judgment regarding the proper installation and inspection details are the responsibility of the authority releasing the aircraft for service.
- Contact Tanis engineering for design change approvals.

Note: This instruction is for the installation of both 115 Volt and 230 Volt kits. Letters before and after the 4 digit drawing numbers are modifiers used for article configuration and maybe omitted in narratives. Example: TEP2653-115/40 = Tanis Element with a Pin connector (2653) 115-volts / 40-watts.

2. REQUIREMENTS

Retrofitting of this aircraft with the Tanis preheat kit is to be accomplished by appropriately qualified technician or maintenance/repair facility. Consumables and installation hardware are not supplied.

- Due to equipment variations, and/or operating requirements review instructions for applicable installation options - for power plugs, AV heater and tailboom, and cable routing - before starting installation
- Installation is to be in accordance with (IAW) current regulatory requirements 14 CFR Part 29, AC 43.13-1 and 2 (as amended) Bell Helicopters BHT-ALL-SRM and BHT-ELEC-SPM, and approved procedures set in place by the installing authority.
- Work is to be performed in a clean environment under standard temperature conditions of 18°C / 65°F to 27°C / 80°F
- Installation requires clear access to various stations throughout the aircraft. This includes aft service holds, tailboom, upper deck, engines, main and tailrotor gearboxes, cabin, and battery hold
- Routing options may require removal and reinstallation of riveted floor panels in crew area
- Installation times vary due to a wide range of variables refer to § 5
- For global standardization and safety of operations shore power inlet is a non-locking blade type NEMA plug (Figure 2)
- Corresponding receptacle (outlet) connector is required on power extension cord (supplied for field installation with 230-volt kits). Approved outlets - TP02872-115, TP02829-230
- The following supplement kit installation:
 - a. Sheet metal alterations, plug door and bracket installations, BHT-ALL-SRM and AC 43.13-1 (as amended) Chapter 4, Section 4 as needed. Use appropriate rivets per installation. For structural installations, rivet layout is patterned after a small patch, similar to Figure 4.16 of AC 43.13-1 (as amended). Assemble wet and seal A/R with PS 870 (PR 1422B-2) or equivalent OEM approved corrosive inhibitor sealant.

- b. Firewall and engine deck penetration, install as appropriate NAS557-3A split grommet (Figure 6) or NAS1834-5-500 (Figure 7) composite insert as per BHT-ALL-SRM-CH03 and 43.13-1 (as amended) Chapter 11, Section 17.
- c. AV heater installation, AC 43.13-2 (as amended) Chapters 1 and 2 for structural consideration and examples equipment mounting options (mounting is to be consistent with installation methods, techniques and practices for avionic components). When installing 80-005-2 floating threaded inserts (Figure 8) reference BHT-ALL-SRM-CH03.
- d. Wiring and cable routing, BHT-ELEC-SPM and AC 43.13-1 (as amended) Chapter 11, §§ 9 through 12 for securing, tying, and clamping, § 15 for grounding and bonding, § 16 for wire marking, and § 17 for feed-through penetrations

2.1 Materials

Installation hardware, sealants, consumables, finish materials, brackets, lacing, and various MS21919 cushion clamps (Table 2), are required and not supplied.

- Pad element bonding sealant is sourced at time of installation
- Field fabrication may be required review §§ 3.6, 4.4 and 5 and drawings in Tables 1 for material requirements and installation options for tailboom disconnect, AV heater, and shore power plugs
- NAS557-3A split grommet – firewall penetration
- NAS1834-5-500 composite insert grommet – firewall penetration
- 80-005-2-12 floating threaded insert – AV heater installation
- DAPCO 2100 type. 1, PS 700, or equivalent OEM approved firewall sealant
- EA934NA (299-974-100 Type II Class 2), EA9309NA (299-974-125 Type I), or equivalent OEM approved potting sealant
- PS 870 (PR 1422B-2) or equivalent OEM approved corrosion inhibitor sealant

2.2 Tools

Various standard aviation hand tools are required and are not supplied.

- Ohmmeter certified to traceable standards
- Wire cutter/stripper
- Deutsch contact remover tool: DT-RT1 or equivalent
- Tanis 4-way indent crimp tool: TU02793
 - Alternate crimp tool, DMC: AF8-TH163 or equivalent

2.3 Power

Power supply and shore power connection (extension cord) supplied by operator.

- Ground based power source capable of supplying or producing required voltage and load for duration of operation is required
- Voltage and load requirements listed § 5, Table 3.

3. DESCRIPTION

Preconditioning is a procedure commonly associated with preheating, a cold weather aviation procedure that is preformed while on the ground prior to flight.

- Preheating increases reliability and safety of operations.
- System is self-regulating, does not operate in flight, and is not connected to or dependent on aircraft systems
- Heated components reach average state of thermal equilibrium in approximately six hours
- Primary preheat system preheats engines and engine oil tanks, main and tailrotor gearboxes, hydraulics and battery, reducing torque oscillations, thermal stress, warm-up, and launch times
- Battery heater reduces battery freeze point depression and allows for higher amperage outputs and proper charge
- AV/Cabin heater allows for proper glass panel activation, reduces condensation, cold weather induced gyroscopic errors, and helps to clear windows of frost, snow and ice

3.1 Physical Attributes

Two shore power plugs each with individual power indication and Circuit Protection Device (CPD) are collocated on the right side of airframe (Figures 1, 2, 9, and 10).

- Plug 1 – Powers primary preheat system that uses a combination of thin pad type electrical resistance elements to heat engines, attached accessories, main and tailrotor gearboxes, oil and hydraulic tanks, and battery(s)
- Plug 2 – Powers AV/Cabin Heater and AC outlet. The heater is a PTC (positive temperature coefficient) forced air heater to heat forward avionic displays.

3.2 Technical Specifications


Electrical values and loads listed in Table 3.

3.3 Weight and Balance

Kit and all installation hardware are weighted before installing

- Approximate installed weights:
 1. System weight: 8.5 pounds (lb) / 3.9 Kilograms (Kg) for arm use centerline of forward engine firewall.
 2. AV/heater weight 1.3 lb / 0.6 kg, for moment arm use location as installed.
- Reference Bell RFM BHT-412-FM-1
- New empty weight and corresponding C.G. location must be determined and entered in the aircraft permanent records

3.4 Operation

 **Caution:** Before connecting system to power complete Functional System Check in § 6 and review Operating Guide.

3.5 Maintenance

Instructions for Continued Airworthiness (Table 1), lists inspection and cleaning procedures. All processes are IAW aircraft/engine manufacturer's recommendations, and 43.13-1 (as amended) Chapter 11, Sections 1, 3, 4, 8, and 9.

The Airworthiness Limitations section of the Federal Aviation Regulations (FAA) specifies inspections and other maintenance required by 14 CFR Part 43.16 and 91.403, unless an alternative program has been approved.

3.6 Options

Specific operational requirements may require alternate component, and/or additional elements. Modifications and/or additional kits are available for installation with base kit.

- Review § 4.4 and 5 for locating options, for power plugs, tailboom disconnect connector, and AV heater
- Additional cabling, components and interconnect kits available
- Circular Shore Power Plug (inlet): TP02770-115 and TP02980-230
- Circuit Protection Device (CPD) - Breakers: MS26574-10, MS3320-10, or Klixon 2TC49-10 for 115V, and W23-X1A1G-10 for 230V
- Sealed power switch: MS35059-22 (8822K20)
- Sealed connectors series 2598 and 2603.
- Firewall Connector Kit: TU03030 and TU03125 (non pressurized firewall and bulkheads)
- Fireproof Grommet Kit: TG01056 (non pressurized firewall and bulkheads)
- Disconnect connector kits: TU02968, TU03047, or TU03127 (5015/38999 crimp type disconnect)
- Contact Tanis Aircraft Products for additional options

4. INSTALLATION

Referenced documents, figures, and tables are located in § 5.

Note: Model 412 EPI installation depicted. Due to model, equipment variations, and/or operating requirements, cable routing suggested.

- Final installation is to be in compliance with § 2 Requirements
- All components are to be installed in a manner that allows for proper inspection and maintenance
- Installation is not to interfere with other systems such as engine or flight controls.
- Record system information as indicated in Operating Guide and ICA
- Preheat system and individual element values are listed in Table 3

4.1 Overview


- (1) Review all instructions and documents listed in Table 1.
- (2) Weigh kit contents, installation hardware (record and track weights and hardware).
- (3) Locate elements, shore power plug, and route cable/wire..
- (4) Record and retain documents as indicated in Operating Guide and ICA.
- (5) Complete Functional System Check and Sign Off (§§ 6 and 7).

4.2 Standards

Review standards below and § 2 Requirements.

- (1) Wires and cables are to be supported by suitable cable ties, clamps, grommets, or other devices at intervals of not more than 6 inches apart except when contained in ducts or conduits.
- (2) Do not allow connectors to free hang.
- (3) Properly secure wires and cables so movement is restricted to the span between the points of support and not on the connectors.
- (4) Supporting devices should be of a size and type capable of supporting wires and cables securely without damage to insulation.
- (5) Adequately support and secure wire and connectors to prevent excessive movement in areas of high vibration.
- (6) Route wiring and cabling with enough slack to compensate for movement of shock mounts.
- (7) Route cable/wire in a manner that ensures system components are not in close proximity to high heat sources and use fire sleeve to protect wiring and connectors in questionable high heat areas.
- (8) Where practical, route wires and cables above fluid lines, and provide separation from fuel lines. Such wiring should be closely clamped and rigidly supported and tied at intervals such that contact between lines and related equipment would not occur in the case of a broken wire and/or a missing wire tie or clamp.
- (9) To compensate for routing options it is acceptable to service loop, racetrack, shorten or lengthen, wires/cables by cutting and re-terminating with appropriate contacts, splice or connector (BHT-ELEC-SPM).
- (10) Check for proper installation of engine and gearbox to airframe ground strap bonding.

4.3 Elements

 **Caution:** Do not connect elements to power until installed, sealant has cured, and § 6 Functional System Check has been completed.

- Verify individual element resistance before installing (Table 3)
- Element positioning and lead orientation may vary from figures
- When locating elements consider oil drip points, lead orientation, and cable routing
- Only install using approved sealants, refer to Bonding Instruction (Table 1)
- Elements must be in full contact through bonding sealant

Abbreviations: Main Rotor Gearbox (MRGB), Intermediate Tailrotor Gearbox (Inter TRGB), Tailrotor Gearbox (TRGB), Engine Combiner Gearbox (C-Box).

Reference Figures in § 5 for examples of element installations.

Qty	P/N	Pad heat element and locations - Refer to Figures § 5.
1	TEP2649-	MRGB – Varies by model (Figures 17, 18, and 19).
3	TEP2650-	MRGB – Varies by model (Figures 17, 18, and 19).
2	TEP2672-	LH and RH Hyd Tank – Any side below nominal oil level (Figures 17 and 19).
1	TEN2672-24	Inter TRGB – Left or right side of case (Figure 20).
2	TEP2712-	LH / RH Eng AGB Top – Left side parallel w/case split (Figures 20 and 22).
2	TEP2715-	LH / RH Eng Heat Exchanger – Bottom (Figures 20 and 22).
1	TEN2730-24-	TRGB – Bottom (Figures 20 and 35).
2	TEP2736-	LH / RH Eng AGB – Tank section below nominal oil level (Figures 21 and 23).
2	TEP2736-	C-Box – Bottom center and below left output (Figures 24 and 33).
1	THP3094-	AV/Cabin Heater – Forward avionics hold (Figures 12, 13, and 14).
1	TBP3086-	Battery – Laced around perimeter with TB02645-07 adapter panel (Figures 13 and 14).

4.4 Cable Routing

This instruction depicts examples for locating junctions, connectors, and routing of cable/leads.

- Locate junction
- Route, cut, label, and terminate leads as depicted
- Refer to cable kit wire-diagram drawing 03133, connector instructions TN02793, and additional component instruction listed in Table 1
- Routing is suggested –variations in aircraft model and configuration may require deviation from depicted installation
- Junction and connector locating options:
 - A. Locate with cushioned clamps (Table 2)
 - B. Locate on existing wiring with appropriate lacing or cable ties

1. Shore power plugs (power inlets):

Use one of the following options:

- A. Locate with 2 place door assembly TD03097 in lower right access panel #36 (P/N: 205--32-104-039) just aft of right rear skid strut at approx STA 172, WL 17 (Figure 9).
Center top edge of door assembly with center line of access panel approximately 1.0 inch down from top edge of panel.
Individual component instructions listed in Table 1. Door - TN03097, Plug - TN02070, Indicator Light - TN03039, CPD Fuse Kit - dwg 03131 (Figure 9).
Note: Aft plug position 1 - Main preheat system. Forward plug position 2 - Avionic heater and AC outlet. Placard accordingly (Figures 2 and 9).
- B. Locate plug bracket TU03140 in right rear equipment hold (field fabricated). Bracket is located facing forward in aft bulkhead (Figure 10).
Individual component instructions listed in Table 1. (Plug TN02070 Indicator Light TN03039 Door TN03097).
Note: Top Plug position 1 for main preheat system. Lower plug position 2 for avionic heater and AC outlet. Placard accordingly (Figures 2 and 10).
- C. Shore power plugs may be collocated with approved alternate shore power connections/plug(s).

2. Ground:

Bond ground wires on dedicated ground lug or use plug mounting hardware (Figures 9 and 10, and BHT-ELEC-SPM).

3. Junctions and lead routing:

J-A1 / J-A2: Power junctions, locate in aft right equipment hold - aft side of forward bulkhead 1 ea. MS21919WCH-18 and MS21919WCH-15 clamp (Figures 10 and 34). May require replaced existing screw with 1 ea. MS27039-1-32 or hardware as required.

J-B1: Left engine junction, locate on forward edge of air box with existing hardware and 1 ea. MS21919WCH-15 clamp (Figure 30).

Lead 02 - Left engine, route between power junction J-A1 through engine deck using

existing penetration then forward through firewall with existing wires to corresponding engine junction located on air box. Engine junction lead 02 termite and locate connectors inboard of engine electrical disconnect bracket using existing hardware and MS21919WCH-9 clamp.

Note: Non-HUMS equipped, enter engine hot section using existing connector (1J3) or install deck insert NAS1834-5-500 (Figure 8).

J-B2: Right engine junction, locate on forward edge of air box with existing hardware and 1 ea. MS2191WCH-15 clamp (Figures 27 and 31).

Lead 03 - Right engine, route between power junction J-A1 through engine deck using existing penetration then forward through firewall with existing wires to corresponding engine junction located on air box. Engine junction lead 03 termite and locate connectors inboard of engine electrical disconnect bracket using existing hardware and MS21919WCH-9 clamp.

Note: Non-HUMS equipped lead 04 deck penetration options:

A - Use existing connector - 1J3 left engine 1J4 right engine (Figure 28).

B - Locate deck insert NAS1834-5-500 (Figures 7, 28, and 29).

Note: MRGB lead 04 may be routed with left or right engine lead.

J-B3: C-Box junction, locate on bulkhead brace forward of right fire bottle (Figure 33). Penetrate deck for lead 05 routing from junction through existing deck insert or when required install NAS1834-5-500 insert filling area between insert sealant (Figures 7, 26, 28, and 33), and locate C-box junction and connectors

Suggested hardware:

- 1 ea. MS21919WCH-13 clamp
- 1 ea. MS2191WCH-9 clamp
- 1 ea. MS27039-01-08 screw,
- 1 ea. NAS1149DD0332J washer,
- 1 ea. MS21044N3 nylon lock nut.

J-C1 / J-C2: MRGB junctions and element connectors locate by securing with existing wiring using appropriate lacing or locate on main transmission gearbox.

Suggested hardware if locating with clamps:

Existing:

- 1 ea. MS21042L4 nut
- 1 ea. NAS1149F0432P washer
- 1 ea. NAS1197-416L washer

Add:

- 1 ea. MS21919WCH-13 junction clamp
- 1 ea. MS21919WCH-18 junction clamp
- 1 ea. NAS1197-416L washer
- 1 ea. NAS1149F043P washer

- 1 ea. 412-260-141 bracket
- 1 ea. NAS1149F0432P washer
- 1 ea. MS21042L4 lock nut

For each wire clamp add:

- 1 ea. MS21919WDG-9 clamp
- 1 ea. MS27039-1-07 screw
- 2 ea. NAS1149D0332J washer
- 1 ea. MS21042L3 nylon lock nut.

Lead 04 – MRGB lead, routing options (may be routed with left or right engine leads (02/03):

- A. Penetrate upper inner corner of firewall locating NAS557-3A split grommet (Figure 6) in small triangular area just above and inboard of composite structure, (Figures 30 and 32).
- B. Use existing firewall connector 1J1 (left) or 1J2 (right) and route forward with exciter box wiring (Figure 32).

Lead 04 continues forward from firewall to I-beam. Locate connector kit TU03127 I-beam (Figures 16 and 17), or use existing penetration when available.

Note: Lead 04.

4. Battery heater lead 09, thermal control:

Locate thermal control 6 to 18 inches (15 to 46 cm) from battery(s) using Click Bond cable mount. Locate cable mount on aircraft skin to low and to the right of battery (Figures 13 and 14).

Route battery lead 09 aft with AC outlet lead 27 and AV/Cabin Heater lead 28 forward under floor, routing to be determined at time of installation. Connect with battery control assembly and element, refer to cable wire diagram 03133 (Figure 14).

Battery element installation does not use bonding sealant. Wrap element and adaptor panel around perimeter of vertical surface with flat side toward battery, position element with lead forward. When required modify adaptor panel by cutting from center and fitting around battery connectors and/or contact block. Use cable-ties or appropriate lacing and gently lace element in place alternating tension between ties. While lacing, do not pull too hard this could result in pulling grommets out. For supplemental installation information, reference Battery Installation Instruction TN02800.

5. AC outlet:

Two options for locating outlet (Figure 11):

- A. Right rear cabin bulkhead, lower right corner in existing blanking plate.
- B. Left door bulkhead, aft side.

Lead 27 Aux power, route between power junction in aft equipment hold and AC outlet.

Lead 28 AV/heater, route between AC outlet and AV/heater.

6. AV/Cabin Heater:

Locate in forward avionics hold (Figures 12, 13, and 14).

7. Placards:

Affix supplied placards on door or adjacent to plugs. Placard left (fwd) plug with preheat system placard TU02615-, and right (aft) plug with AV/Cabin Heater placard TU03119-01. Optional field fabricated placard stating at a minimum; "Tanis", and the system voltage is acceptable.

Placard AC outlet (not shown) with field fabricated placard as called out on wire diagram drawing 03133.

8. Inspect:

Verify all connectors are connected and leads are secure.

9. Complete Functional System Check and Sign Off, §§ 6 and 7.

5. TABLES AND FIGURES

TABLE 1 - Installation Documents (Record documents as indicated in Operating Guide and ICA).

03097	Drawing – 2 Place Door
03127	Drawing - Connector Kit (5 contact disconnect)
03128	Drawing – Bracket Tailboom connector
03132	Drawing - Preheat Kit Item List (-115 or -230)
03133	Drawing - Cable Kit Wire Diagram
03140	Drawing - Bracket Shore Power
03141	Drawing - Dual Fuse Kit w/Bracket
03142	Drawing - Bracket AV Heater
03143	Drawing - Bracket Assembly AV Heater
03144	Drawing - Bracket Installation AV Heater
TN02070	Instruction - Flush Mount Plug (2070/2839)
TN02533	Instruction - Flush Mount Plug w/Cap (AC outlets 2989/2988).
TN02782	Instruction - Click Bond Kit
TN02788	Instruction - Bonding (element installation and sealant)
TN02793	Instruction - Connector (termination and assembly)
TN02829	Instruction - Receptacle (supplied with 230-volt kits)
TN02800	Instruction - Battery Heat Installation
TN03039	Instruction - Indicator 8mm
TN03094	Instruction - AV/Cabin Heater Installation
TN03097	Instruction - 2 Place Door Kit
TNH3132	Instruction - Preheat Installation (this instruction)
TCA1000	Instruction of Continued Airworthiness
TPG1000	Operating Guide
TNG1000	Installation Guide

TABLE 2 - Cushioned Clamp Reference (Alternate: MS21919WCH / WCE).

(Clamp sizes vary by manufacturer, properly size for secure fit)

Size	MS number	Application
1/8"	MS21919WDG-2	1 - 2 wire
1/4"	MS21919WDG-4	2 - 3 wire
5/16"	MS21919WDG-5	8mm Indicator light
5/8"	MS21919WDG-10	2 contact connector
7/8"	MS21919WDG-14	3 contact connector and fused link
1"	MS21919WDG-16	4 lead junction
1 3/16"	MS21919WDG-19	6 lead junction (WCH-18)
1 1/2"	MS21919WDG-24	Circular shore power plug

TABLE 3 - System Values +/- 10%

Total preheat system and individual element values +/- 10%.

* Not included in totals; Ohm reading varies due to heater design and PTC element.

115 Volt kit - with Battery **10.8 Amps** **1237 Watts** **10.7 Ohms**
- without battery **10.1 Amps** **1162 Watts** **11.4 Ohms**

Qty	Element Part Number	Location	Wattage	Ohms
1	TEP2649-115/120	MRGB Sump	120	110.2
3	TEP2650-115/120	MRGB - middle and upper case	120	110.2
2	TEP2672-115/37	LH and RH Eng AGB	37	357.4
1	TEN2672-24-115/37	Interm TRGB	37	357.4
2	TEP2712-115/75	LH and RH Eng AGB Top	75	176.3
2	TEP2715-115/18	LH and RH Eng Oil Fuel Heat Ex	18	734.7
1	TEN2730-24-115/65	TRGB - bottom	65	203.5
2	TEP2736-115/80	LH and RH Eng AGB - fwd	80	165.3
2	TEP2736-115/80	C-Box - lower center	80	165.3
1	TBP3086-31-115/75	Battery Element	75	176.3
1	THP3094-500	AV/Cabin Heater- fwd avionics hold	500	(*PTC)

230 Volt kit - with Battery **5.4 Amps** **1237 Watts** **42.8 Ohms**
- without battery **5.1 Amps** **1162 Watts** **45.5 Ohms**

Qty	Element Part Number	Location	Wattage	Ohms
1	TEP2649-115/120	MRGB Sump	120	440.8
3	TEP2650-115/120	MRGB - middle and upper case	120	440.8
2	TEP2672-115/37	LH and RH Eng AGB	37	1429.7
1	TEN2672-24-115/37	Interm TRGB	37	1429.7
2	TEP2712-115/75	LH and RH Eng AGB Top	75	705.3
2	TEP2715-115/18	LH and RH Eng Oil Fuel Heat Ex	18	2938.9
1	TEN2730-24-115/65	TRGB - bottom	65	813.8
2	TEP2736-115/80	LH and RH Eng AGB - fwd	80	661.9
2	TEP2736-115/80	C-Box - lower center	80	661.9
1	TBP3086-31-230/75	Battery Element	75	705.3
1	THP3094-500	AV/Cabin Heater- fwd avionics hold	500	(*PTC)

TABLE 4 - Weight and Balance

Record installed weight, arm, and moment calculations.

For preheat system arm use center line of forward engine firewall, for AV/Heater use arm location as installed.

	<i>WEIGHT LB (KG)</i>	<i>ARM IN (CM)</i>	<i>MOMENT IN (CM)</i>	<i>MOMENT WT x ARM/100 IN (CM)</i>
SYSTEM	+			
AV HEATER	+			

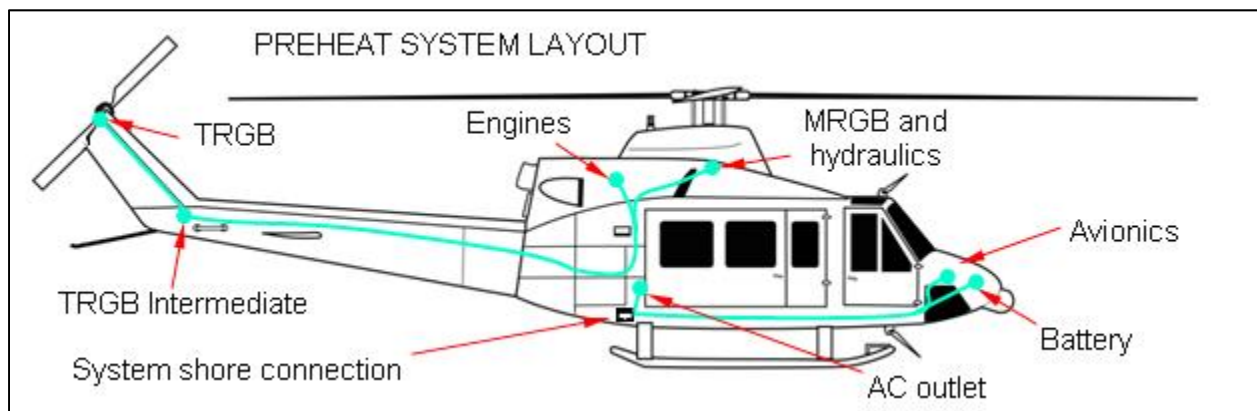


Figure 1 - Overview of Tanis Cold Weather Modification for the Bell 212 and 412 series helicopters. Note: For plug locating options, refer to section 4.4 and following figures.

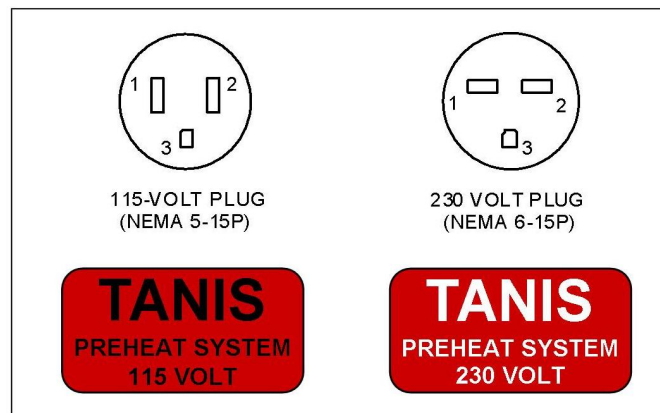


Figure 2 - Shore power plugs and placards. Field fabricated placard that states at a minimum, *Tanis* and the system voltage requirement (*115 Volt* or *230 Volt*) is acceptable. Placard is to be affixed adjacent to plug door, or on the inside or outside of door. Placard AC outlet as called out on wire diagram drawing 03133. Note: AC power outlet requires fabricated placard.

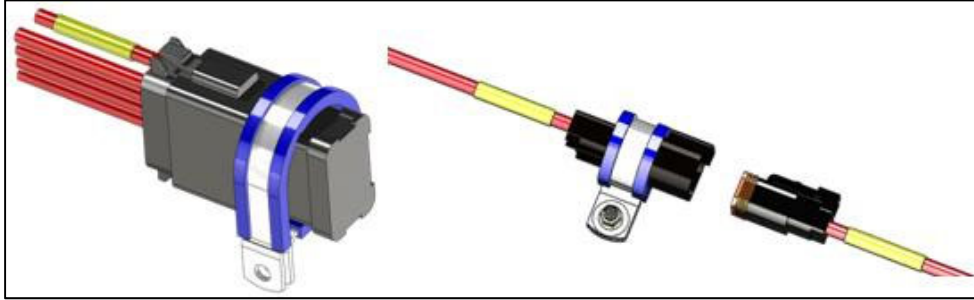


Figure 3 - Secure junction and connectors with appropriate lacing, cable ties, and/or clamp (Table 2).



Figure 4 - Generic element with 6-inch lead, connector and yellow label with part number.

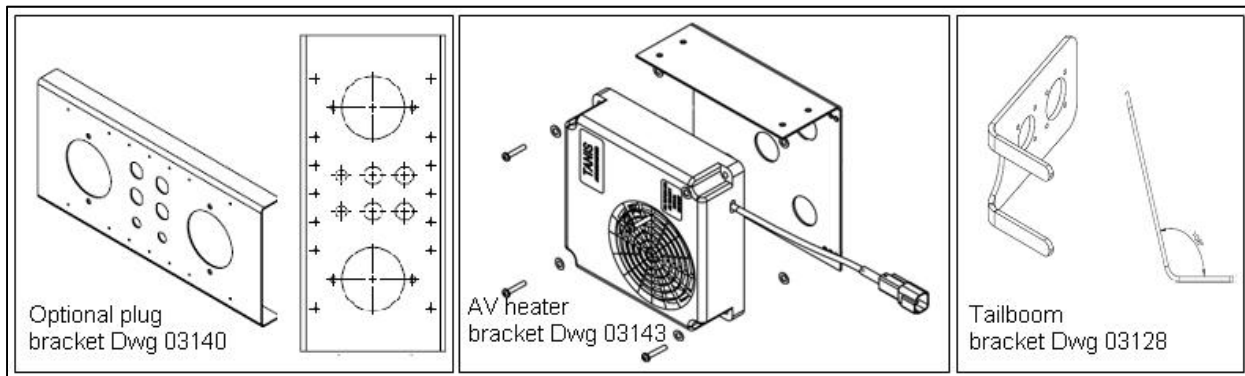


Figure 5 – Optional brackets field fabricated as required. Plug bracket above (03140) suggested for use on aircraft equipped with emergency floatation devices, door TD03097 supplied with kit may be used. When installation on float equipped replace winged studs with flush hardware (Figure 9).

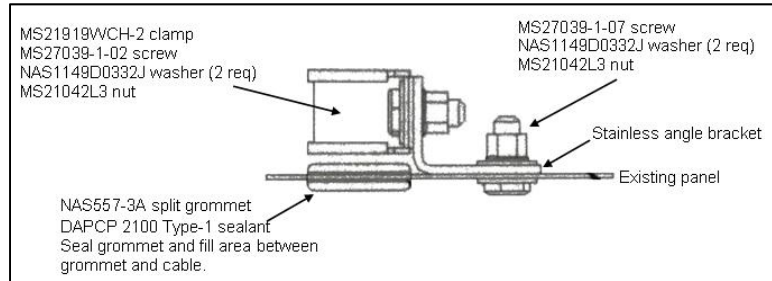


Figure 6 – NAS557-3A split grommet refer to BHT-ALL-SRM-CH03, sealed with DAPCO 2100 type. 1, PS 700, or equivalent OEM approved firewall sealant. Seal grommet and fill area between grommet and cable with sealant.

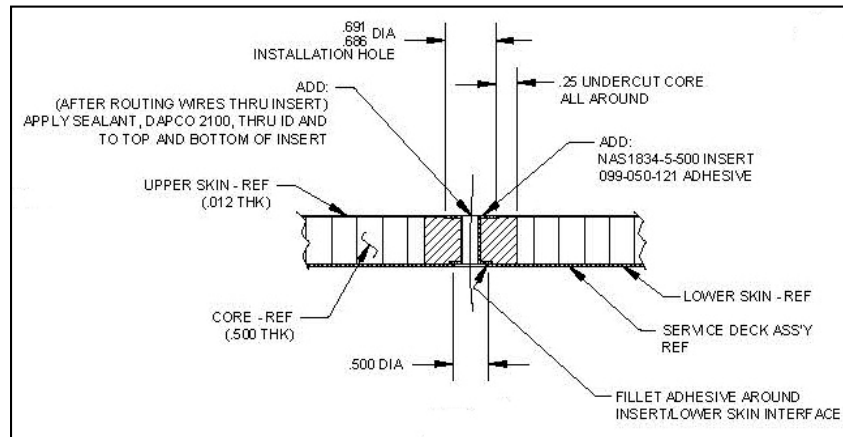


Figure 7 – NAS1834-5-500 composite deck insert refer to BHT-ALL-SRM-CH03. Pot with Hysol EA934NA (299-974-100 Type II Class 2), EA9309NA (299-974-125 Type I) or equivalent OEM approved sealant pot with adhesive and seal with DAPCO 2100 type. 1, PS 700, or equivalent OEM approved firewall sealant. Seal and fill area between in insert and cable with sealant.

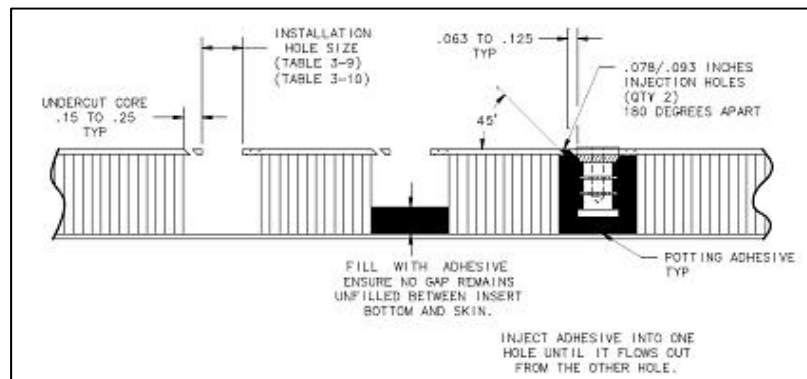


Figure 8 – 80-005-2 floating insert refer to BHT-ALL-SRM-CH03. AV Heater bracket, locate 4 each 80-005-2-8 or -12 threaded inserts in shelf (size accordingly based on shelf thickness). Pot with Hysol EA934NA (299-974-100 Type II Class 2), or EA9309NA (299-974-125 Type I) or equivalent OEM approved sealant.

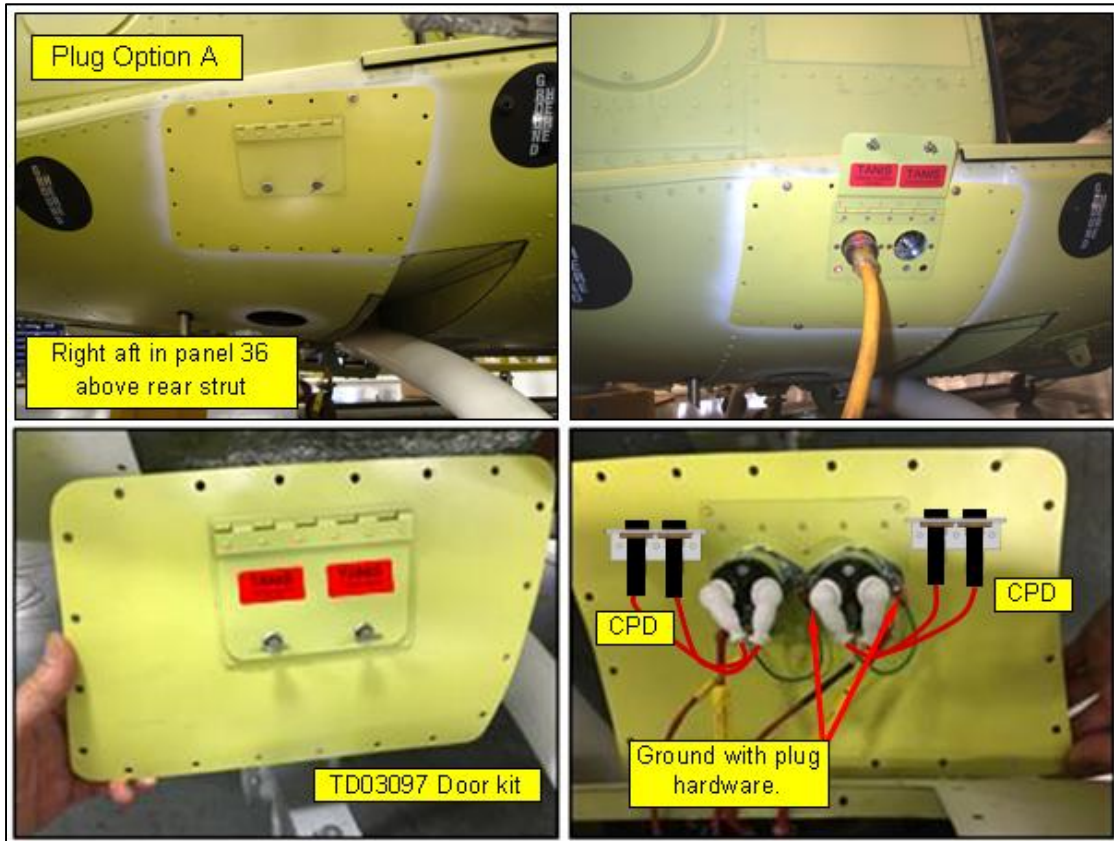


Figure 9 – Power plug option:

A (supplied) - Locate plugs in door kit TD03097, lower right side above skid strut in panel #36, approximat STA 172, WL 17. Circuit Protections Device (CPD) fuse kits, TU03141-B dwg 03141 located on backside of panel, one kit each plug.

Center top edge of door assembly (doublers) with centerline of access panel approximately 1.0 inch down from top edge of panel. Location in panel may vary due to environmental ducting or other equipment installations. Verify clearances of plugs and CPD kits when fitting door to panel.

Individual component instructions listed in Table 1. (Door TN03097, Plug TN02070 Indicator Light TN03039, and CPD kits drawing 03141).

Locate ground wires with plug mounting hardware.

Note: Aft plug position 1 for main preheat system. Forward plug position 2 for avionic heater and AC outlet.

Placard plug 1 with system placard TU02615, and plug 2 with AV/Cabin Heater placard TU03119-01. Placards may be mounted adjacent to door, or on or inside as depicted in figure above outside of door.

Note: Winged latch studs may be replaced (required when float equipped) with appropriate slotted or cross recess pan head studs (V26S or 26S) sized accordingly, or install option B (03140) depicted in Figure 10.

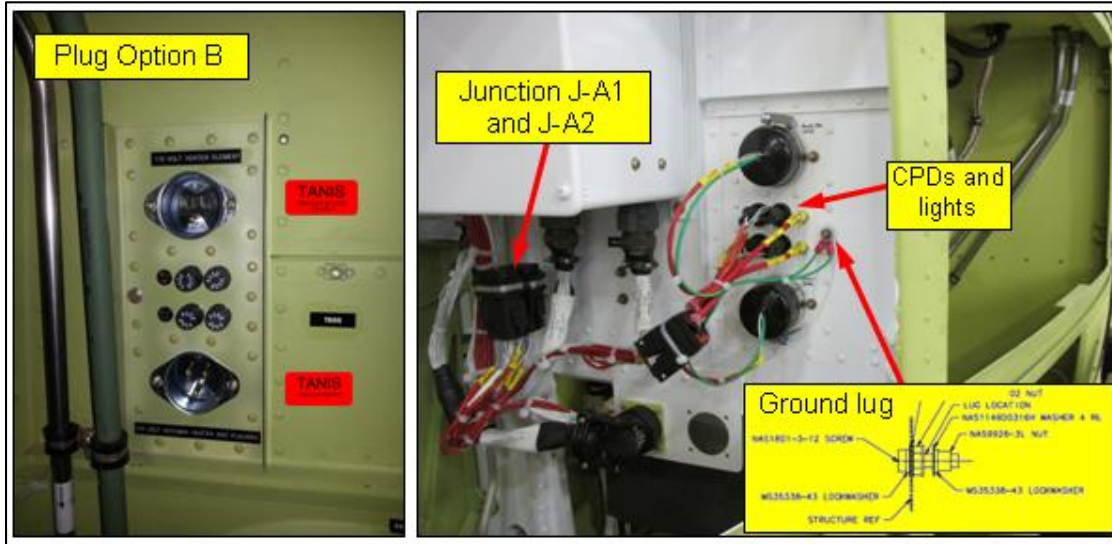


Figure 10 – Power plug option:

B (field fabricated) - Locate plugs in field fabricated plug bracket drawing 03140, right rear equipment hold. Plug bracket located facing forward in aft bulkhead. Individual component instructions listed in Table 1. (Plug TN02070 Indicator Light TN03039, and CPD kits drawing 03141).

Locate ground wires with plug mounting hardware.

Placard plug 1 (top) with system placard TU02615, and plug 2 (lower) with AV/Cabin Heater placard TU03119-01.



Figure 11 – AC outlet options A and B:

A - Locate lower right side of aft passenger compartment.

B - Locate on aft side of left door bulkhead. Reference instruction TN02533, placard called out on wire diagram drawing 03133.

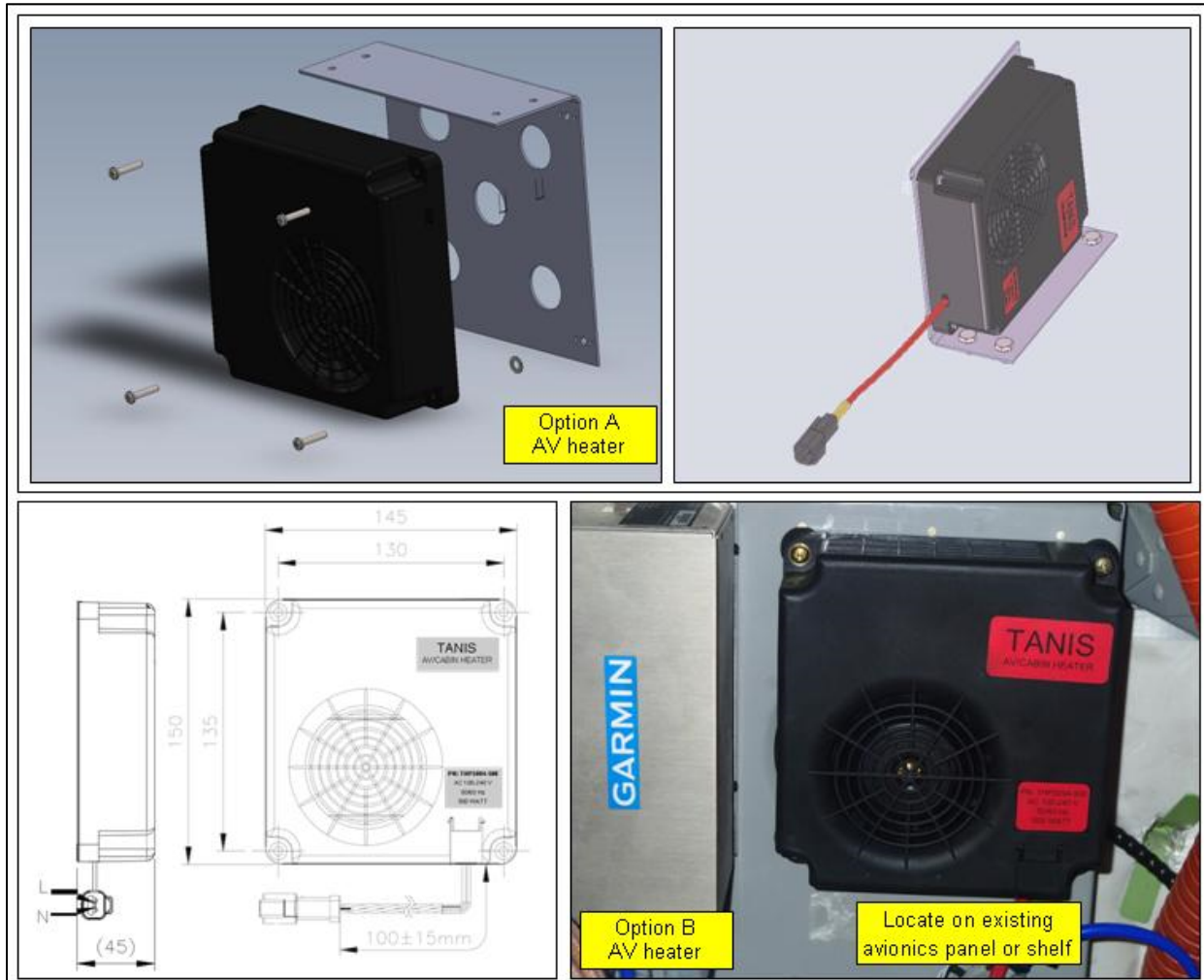


Figure 12 – AV heater mounting options in forward avionics hold, reference heater instruction TN03094:

- A – Locate on TU03143 bracket (Figures 8, 12, and 13), bracket field fabricated per drawings 03142, 03143, and 03144. Locate on shelf with 4 each 80-005-2-8 or -12 threaded inserts, sized per installation (Figure 8). Installation varies by aircraft configuration.
- B – Locate on existing avionics shelf or plate (Figures 8 and 14), install with flat washers as standoff ref dwg 03144.

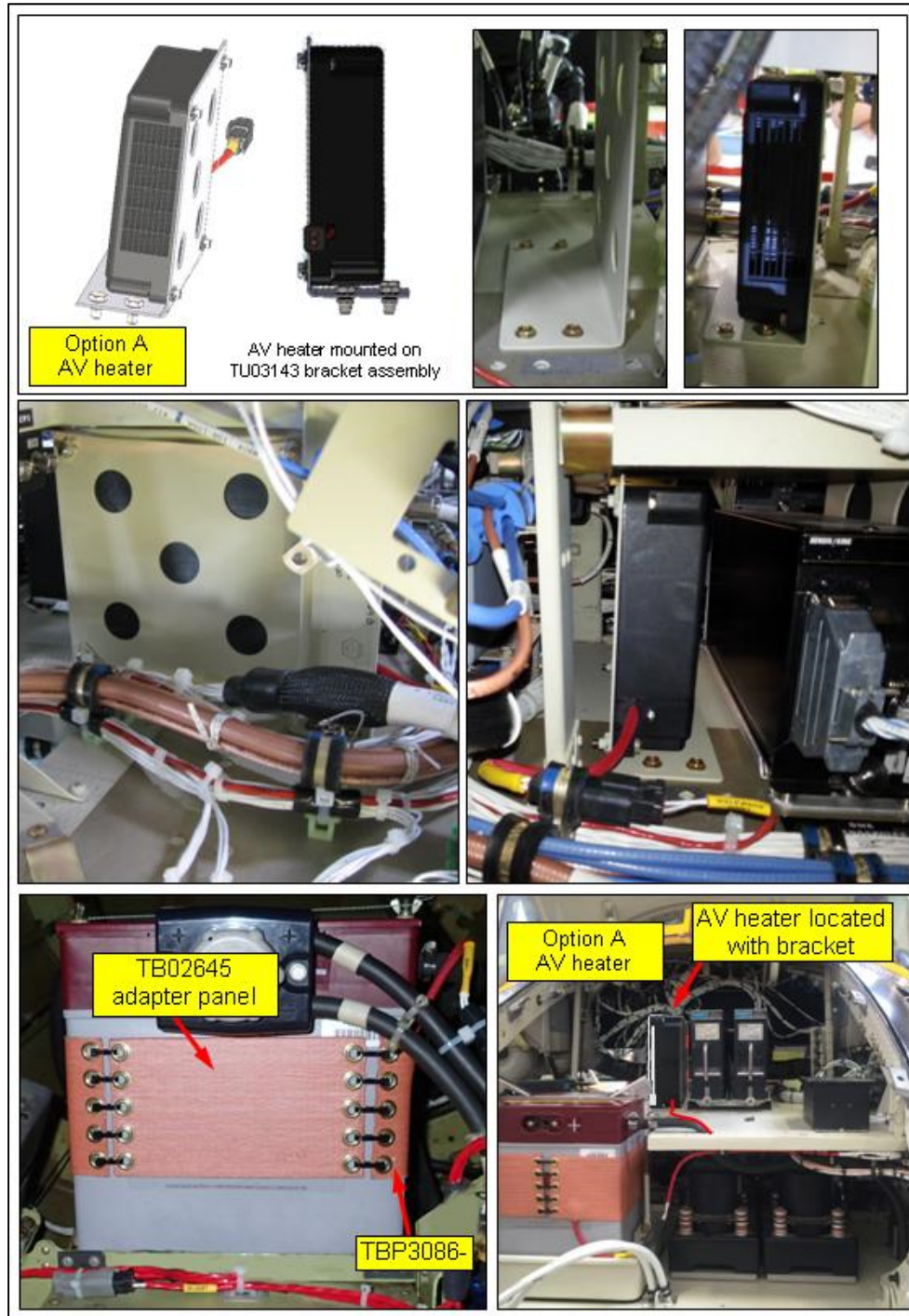


Figure 13 – Option A: Example AV heater and battery element and adapter panel secured with cable ties. Battery thermal control mounted on in skin 6 to 18 inches from battery with CB92 kit.

A – AV heater located on TU03143 bracket with 4 each 80-005-2-12 threaded inserts use flat washer for standoff spacers, and secure with appropriate hardware (drawing 03144 and Figure 6).

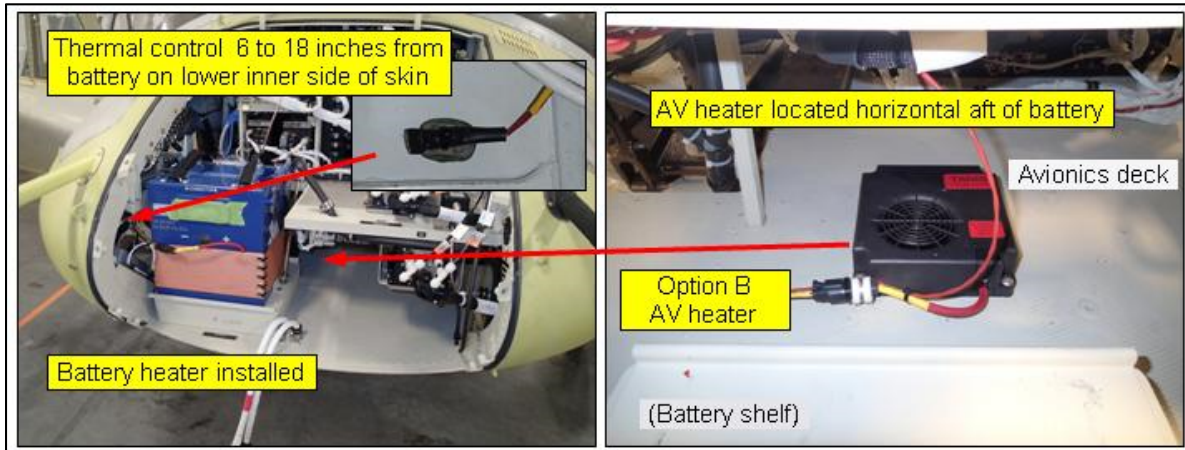


Figure 14 – Option B: Example AV heater and battery heater installation. Battery thermal control on this installation mounted on in skin to right of battery with CB92 kit.

B - AV heater located horizontally behind battery. Heater may be mounted on bottom or top, or vertically on existing structural shelf/panel or plate. Locate on honeycomb shelf with 4 each 80-005-2-12 threaded inserts use flat washer for standoff spacers, and secure with appropriate hardware (drawing 03144 and Figure 6).

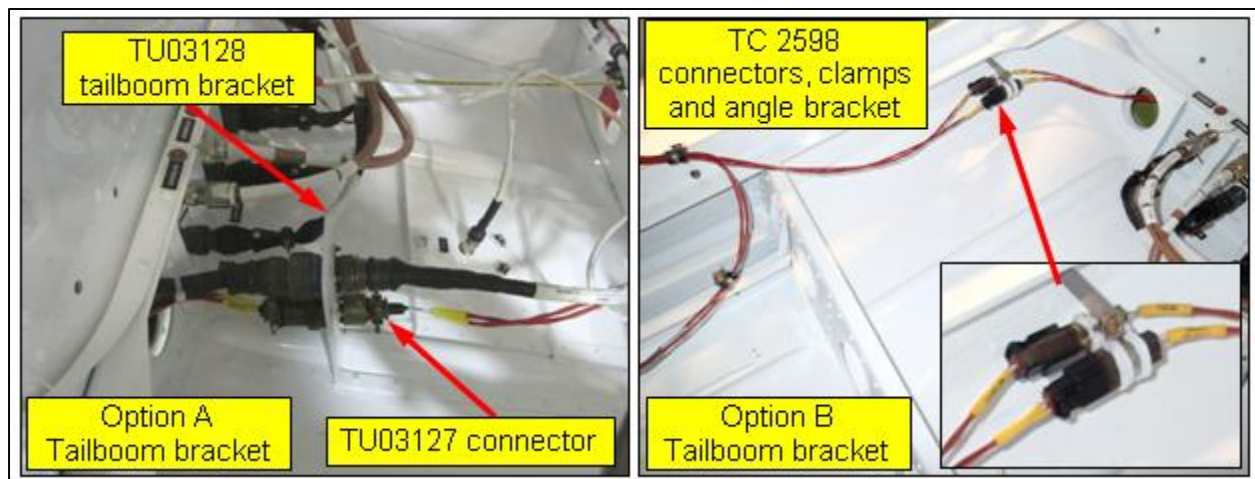


Figure 15 – Tailboom discount options for leads 07 and 08:

A – Locate connector kit TU03127 in TU03128 field fabricated bracket (per dwg 03128). Locate bracket on rib as shown and rivet in place installing TU03127 connector in lower position. If HUMS kit installed remove HUMS connector and bracket and replace with TU03128. Install all parts wet coating bracket and connector faying surfaces, and rivet with PS 870 (PR 1422B-2) or equivalent OEM approved corrosion inhibitor sealant.

B – Locate optional disconnect connectors called out in wire diagram drawing 03133, laced with existing wiring or located with clamps and angle bracket as shown.



Figure 16 - MRGB connector TU03125 located in upper left or right I beam depending on routing option. Use pre-cut factory holes when available.

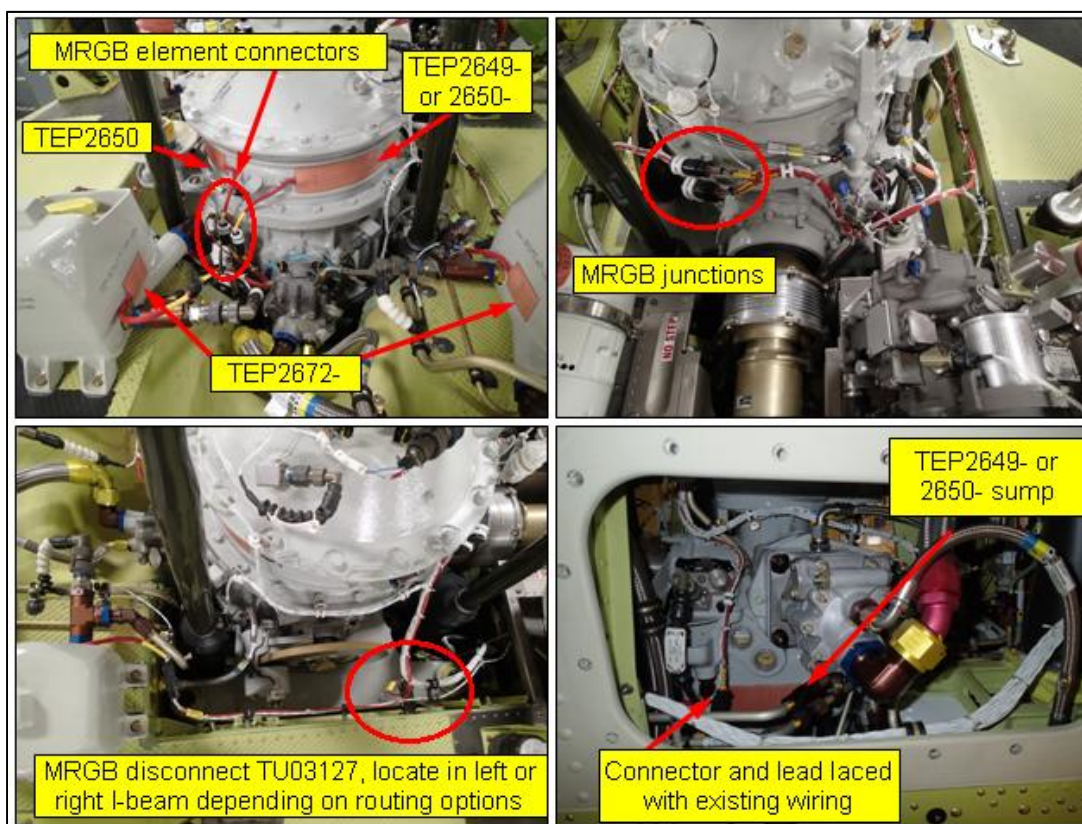


Figure 17 - Examples of MRGB and hydraulic tank elements and lead routing.

Four elements located on MRGB, one TEP2649- and three TEP2650.

Two TEP2672- element one each hydraulic tank below nominal oil level.

TU03127 connector located in upper I beam, left or right based on routing option, when available use factory cut holes for locating connector (Figure 16).

MRGB junction and element connectors located with clamps or laced with existing wiring.

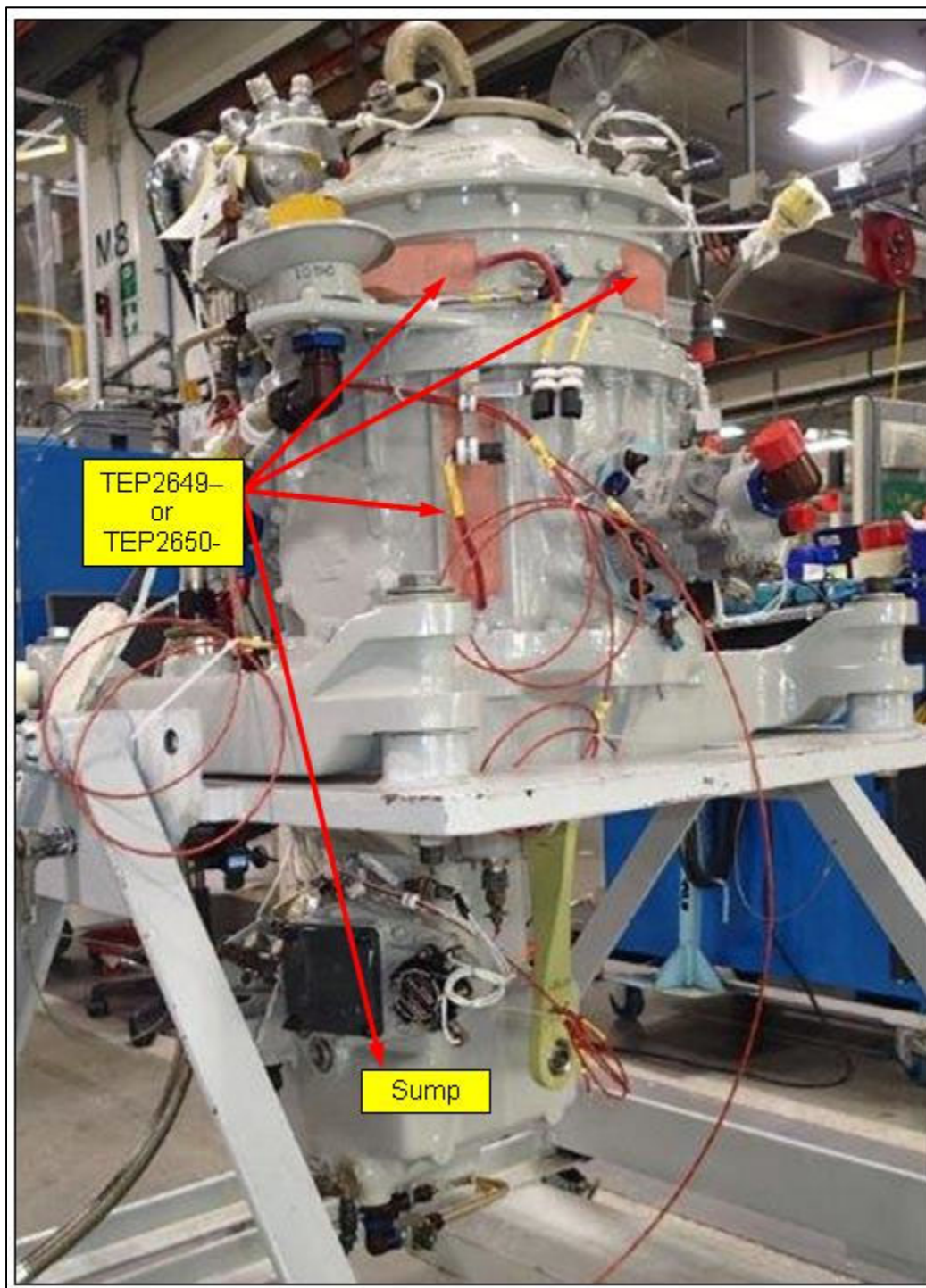


Figure 18 – Examples elements located on the MRGB; locations vary depending on gearbox configuration. Example shows junctions and element connectors mounted on transmission using existing hardware mounting points.

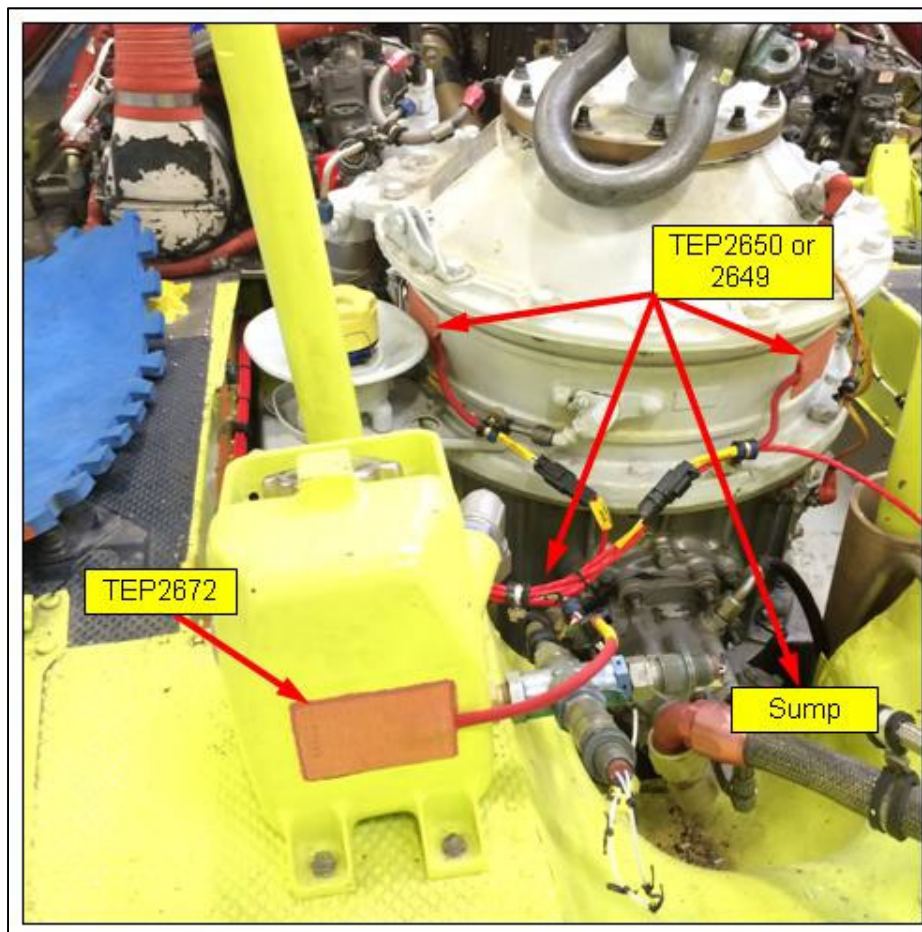


Figure 19 - Examples of MRGB elements (locations may vary). Locate Hydraulic tanks elements below nominal oil level (locations may vary). Junctions and connectors shown located on existing wiring secured with lacing.

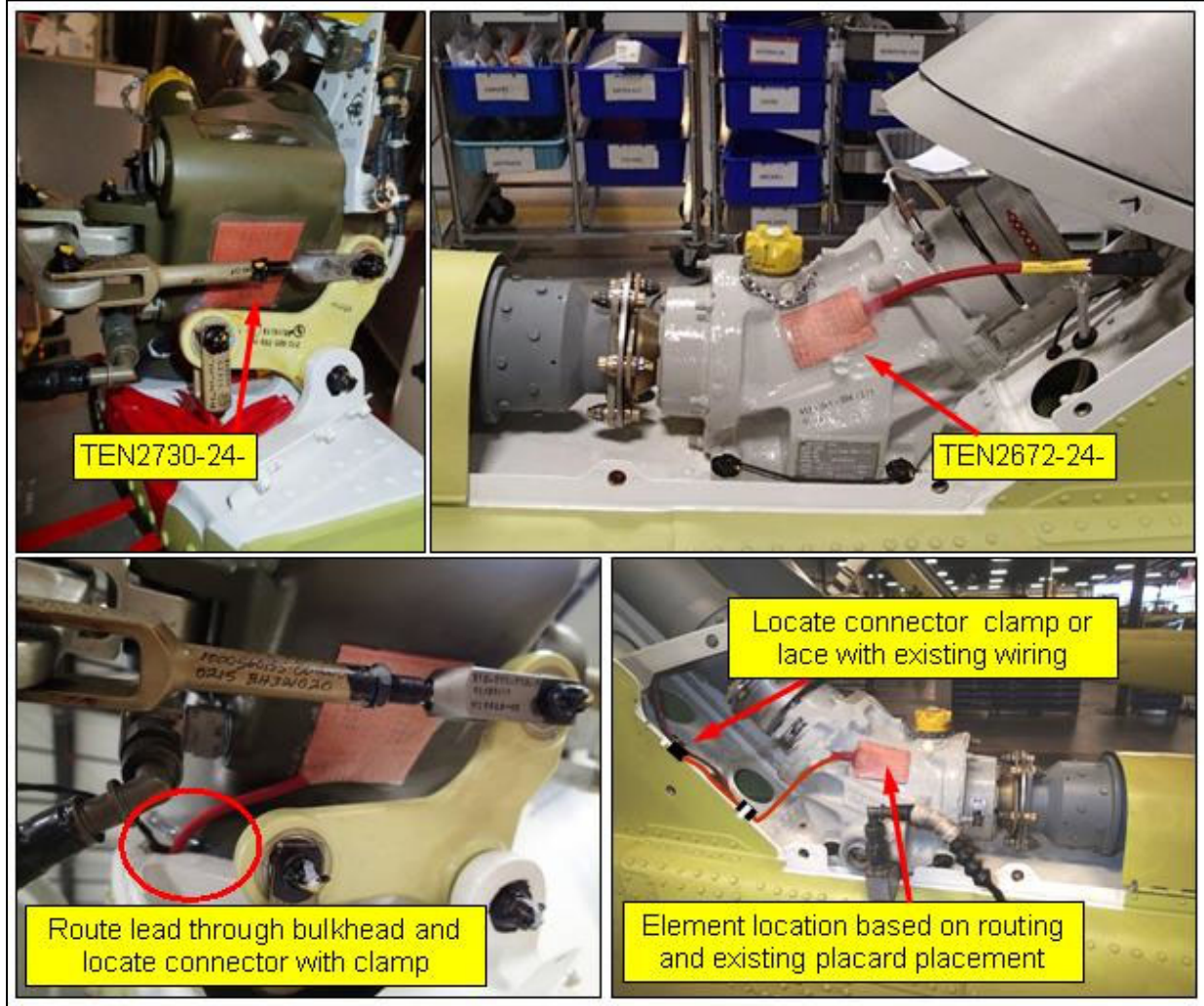


Figure 20 – Locate one TENS2730-24- on bottom of TRGB, route lead through bulkhead, terminate and secure with existing wiring. Locate one TENS2672-24- on intermediate gearbox (left or right side) on flat surface clear of placards, terminate and secure with existing wiring.

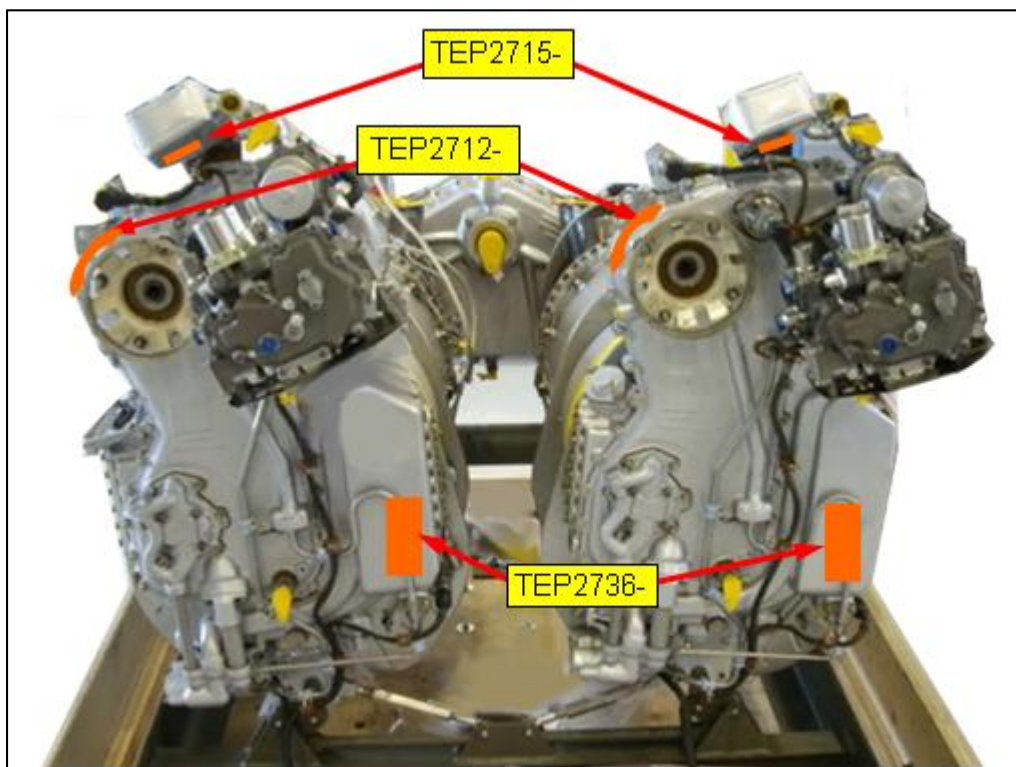


Figure 21 - Front view of left and right engine elements. Locate one each: TEP2712- above outputs, TEP2715- bottom fuel oil heat exchangers, and TEP2736- engine AGB tanks.

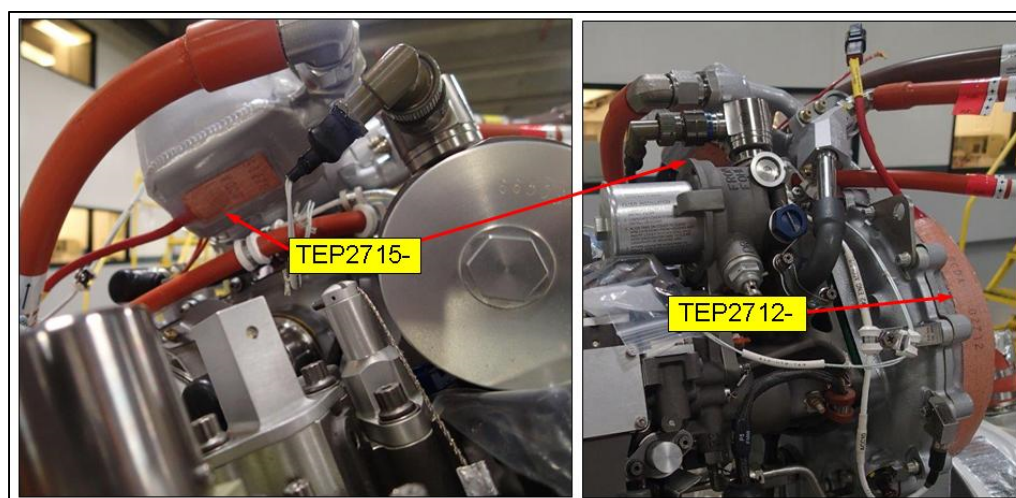


Figure 22 - Examples of left and right heat exchanger and case element locations.

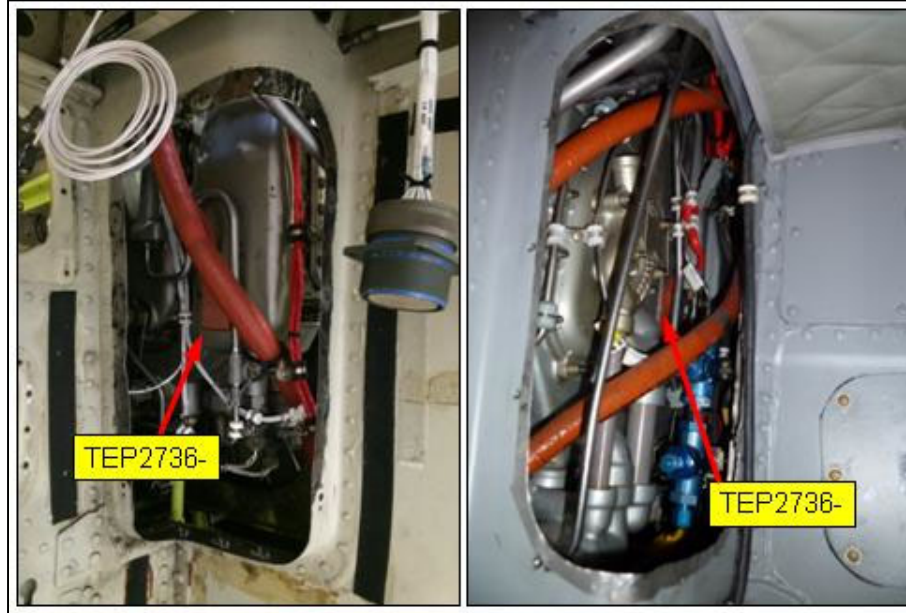


Figure 23 - Examples of left and right AGB tank elements, viewed through maintenance panels located in passenger compartment.

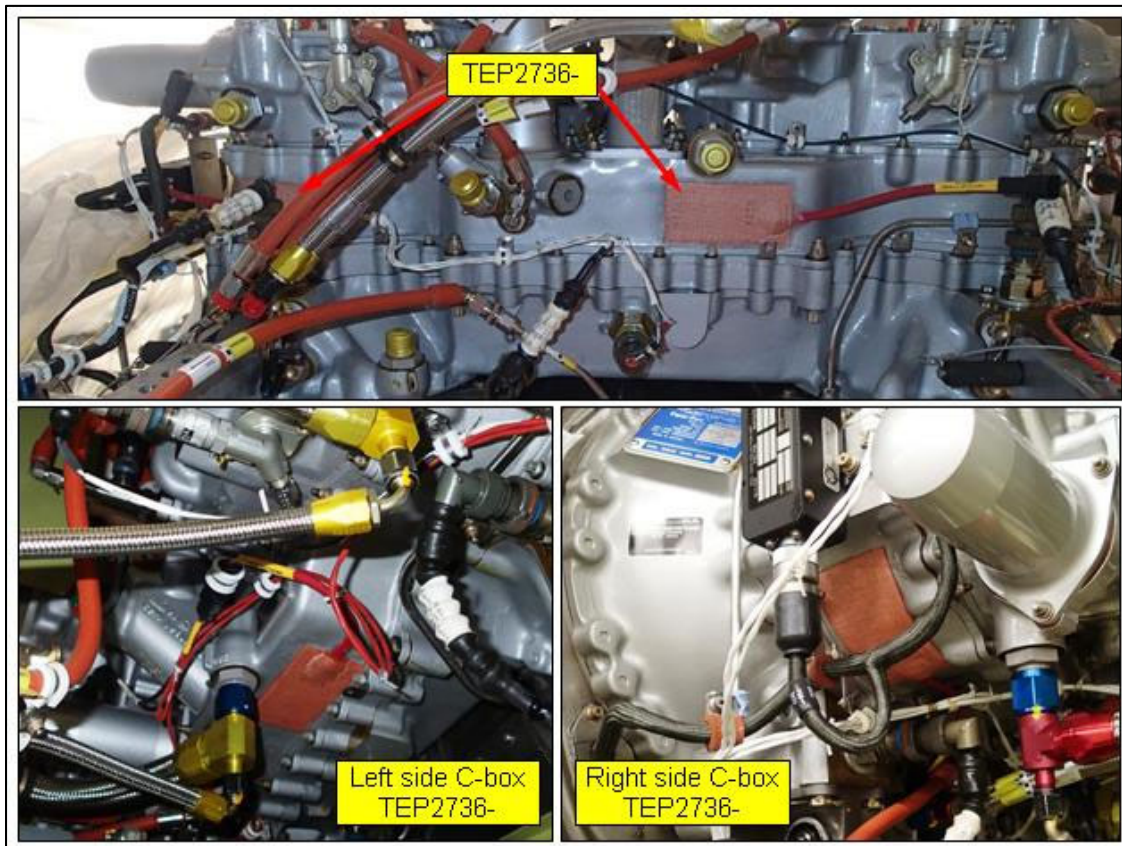


Figure 24 –Two TEP2736- elements located on bottom of C-Box. Suggested locations shown actual locations may vary.



Figure 25 – Junctions J-A1 and J-A2 located with clamps. Use existing spacer and screw (may require longer screw). Junctions located in this area for plug-mounting options A and B. Location may vary due to existing equipment.

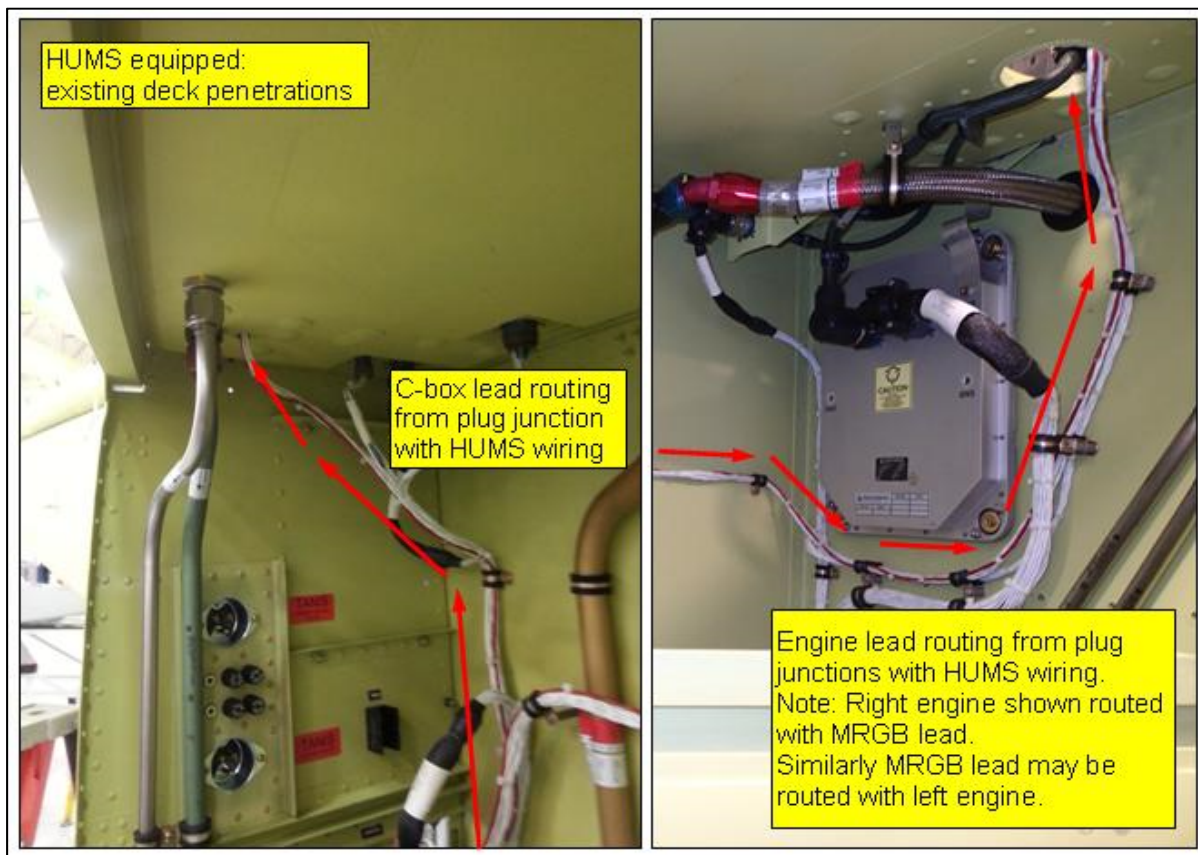


Figure 26 – Examples of right engine deck penetrations, C-box and engine junction leads. Left and right engine routed similarly with exiting wiring.

Note: Non-HUMS equipped models install NAS1834-5-500 insert (Figure 7) for C-box lead\ . Use existing engine connector or insert for engine junction lead routing.

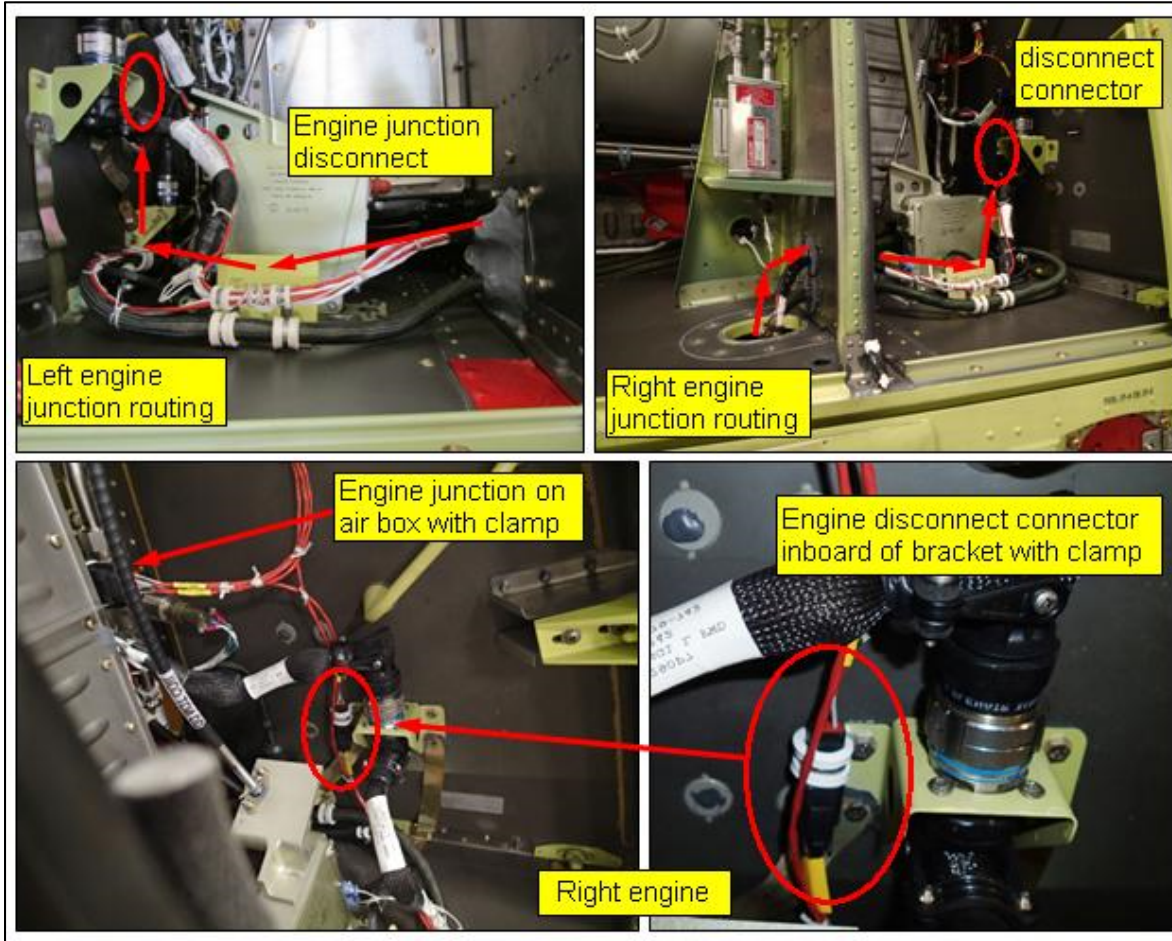


Figure 27 – Examples of left and right engine, and MRGB, lead routing and connector locations.

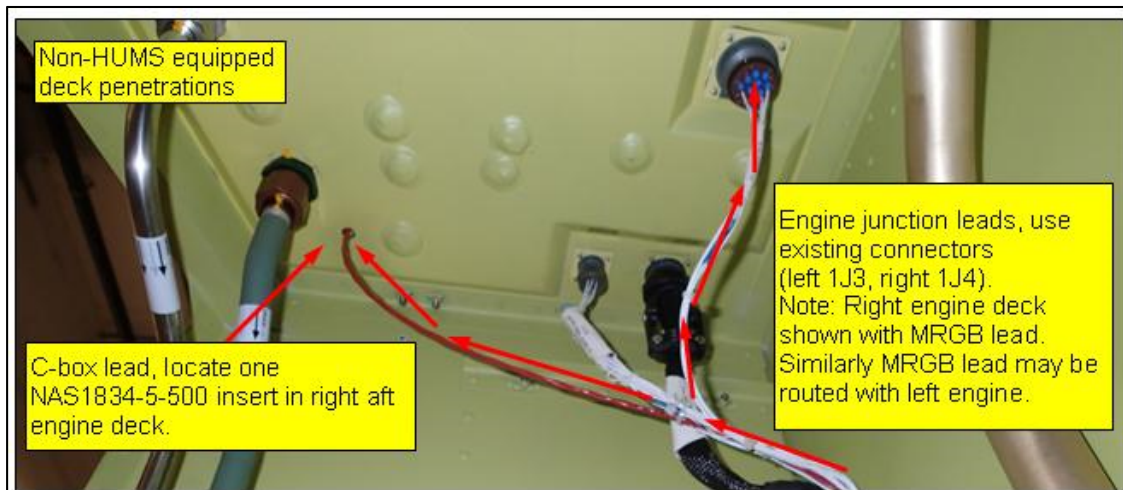


Figure 28 – Non-HUMS equipped. Locate insert (Figure 8) for C-box lead. Left and right engine junction lead routed through corresponding engine deck using existing connector. MRGB lead may be routed with left or right engine lead. NAS1834-5-500 insert may be installed as deck pass-through below exciter box (Figure 29)

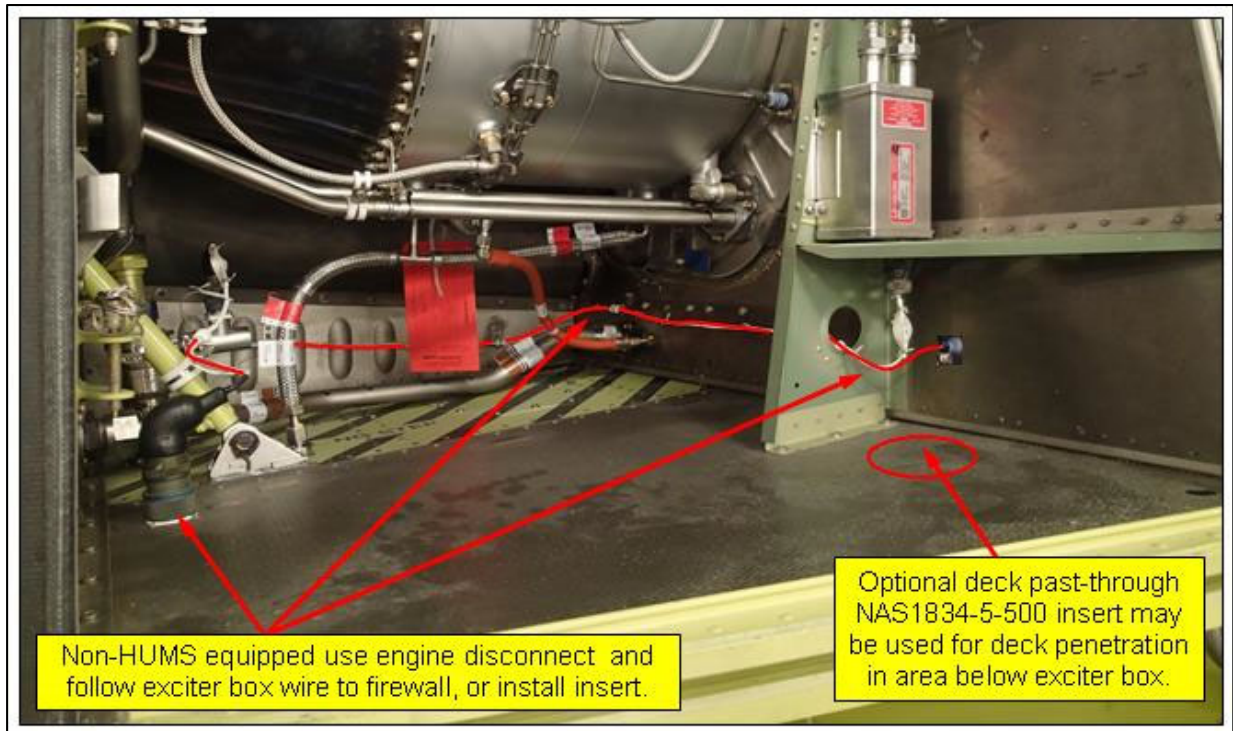


Figure 29 – Non HUMS equipped, use existing engine deck connectors, 1J3 left and 1J4 right. Penetrate firewall into air box section with split grommet (Figure 6).

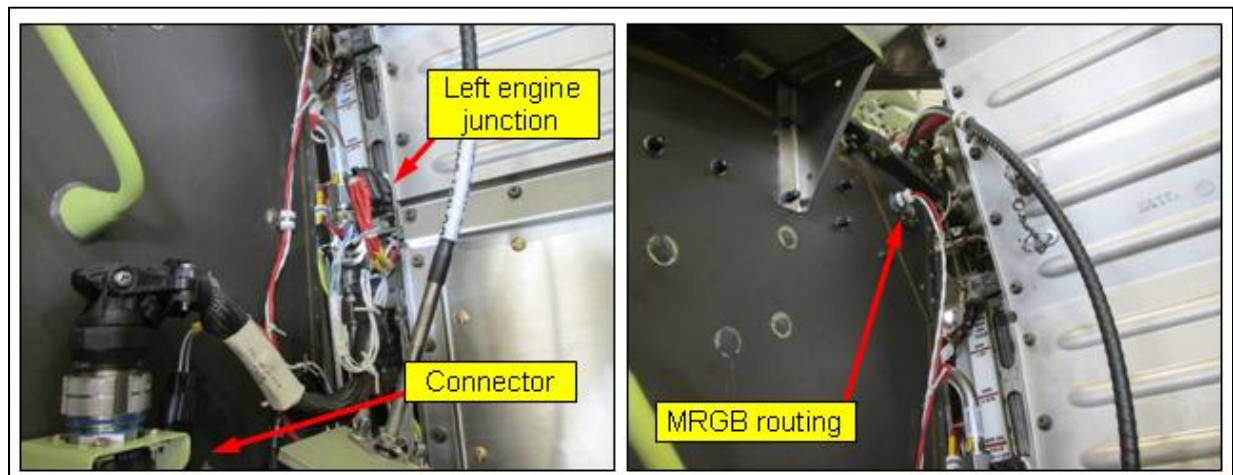


Figure 30 - Examples of HUMS equipped cable routing on left engine. Note: example depicts MRGB lead routed through left engine firewall (inboard upper right non-composite area) using split grommet (Figure 6). MRGB lead may be routed similarly through right engine firewall. Alternate routing option uses existing firewall connector 1J1 left, 1J2 right) located just inboard and forward of location shown.

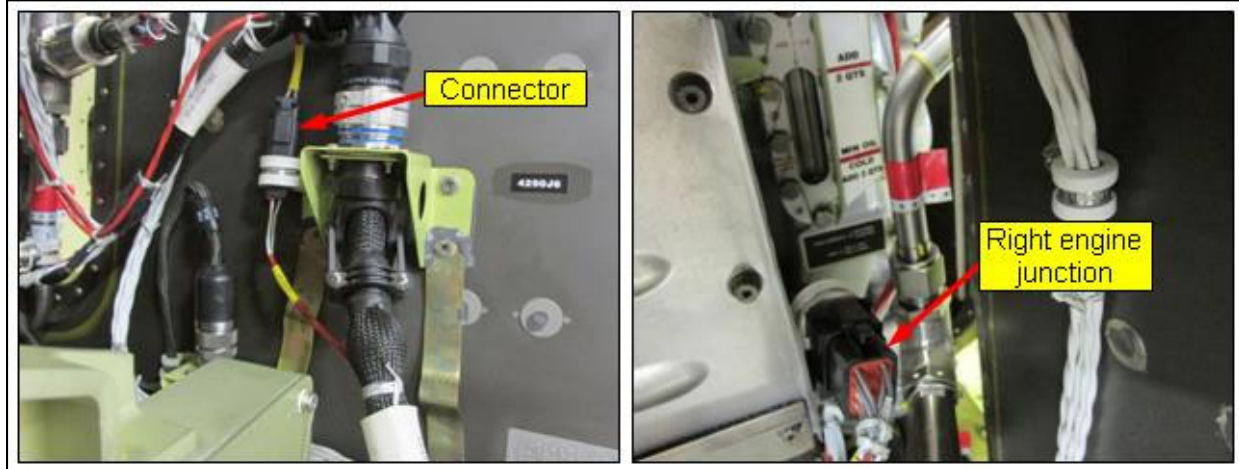


Figure 31 - Examples of right engine lead connector (locate with clamp on aft side of forward firewall with HUMS connector bracket), and engine junction located with clamp on forward side air box using existing hardware.

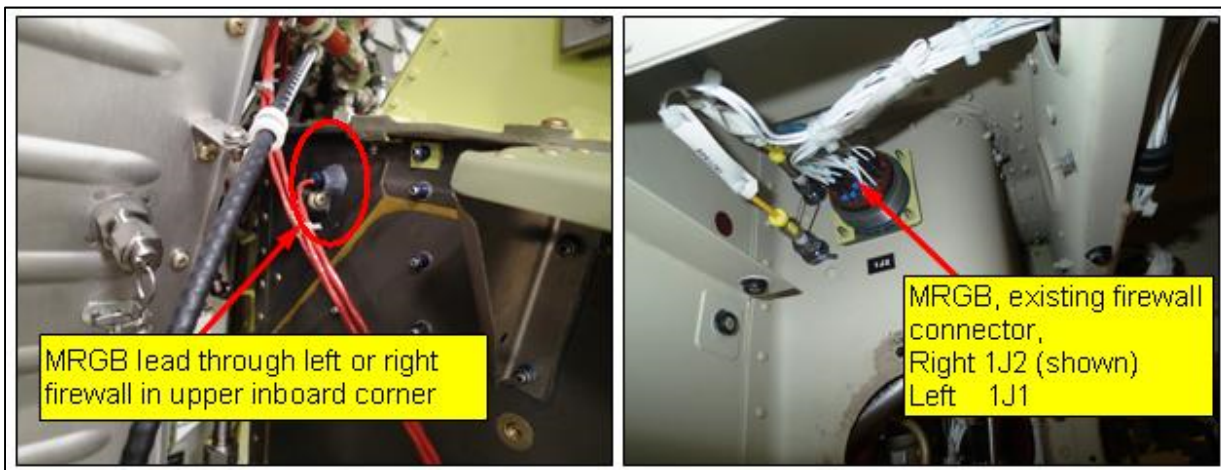


Figure 32 – Options for routing of MRGB lead, route through left or right firewall. Option A locate split grommet (Figure 6) in upper inboard corner of left or right firewall, or use existing firewall connector (1J1 left or 1J2 right).

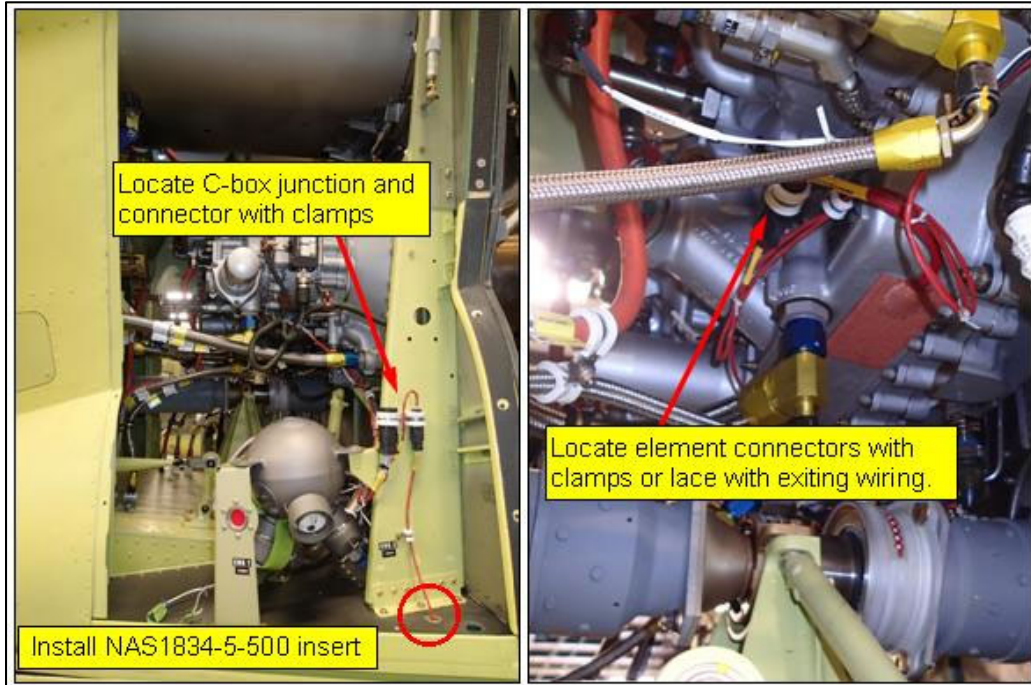


Figure 33 – C-box: Locate insert in deck (Figure 7). Route lead 05 through insert, junction and junction connector located on left firewall support with clamps. Element connectors located on gearbox with clamps or laced with existing wiring.

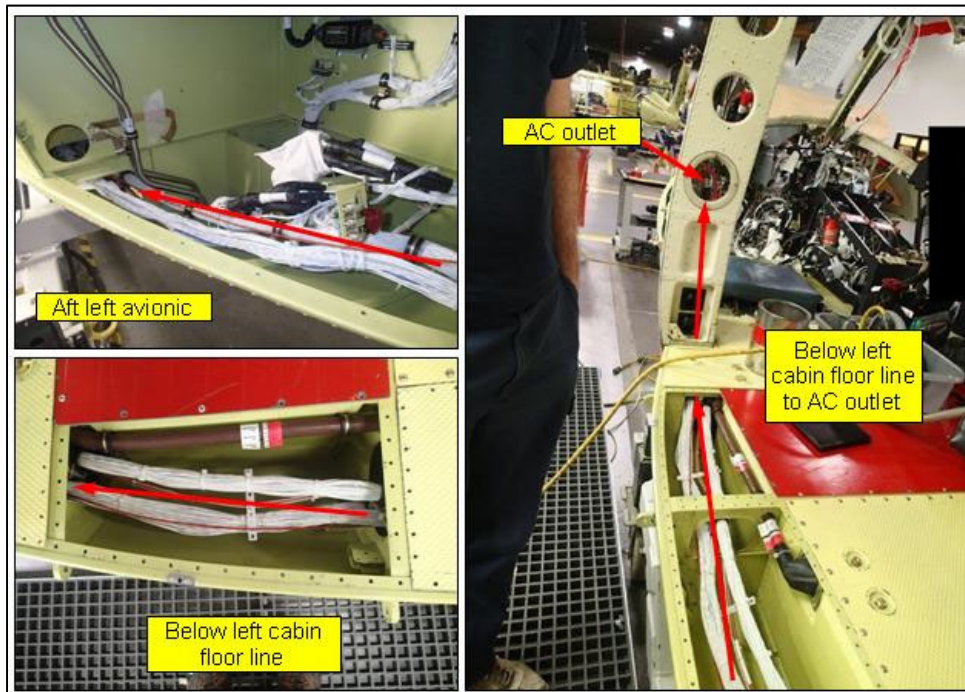


Figure 35 - Example of lead 27 for AC outlet located in left door bulkhead (Option B). Options for AC outlet shown in Figure 11. AV heater lead 28 routed between AC outlet and AV heater located in forward avionics hold.

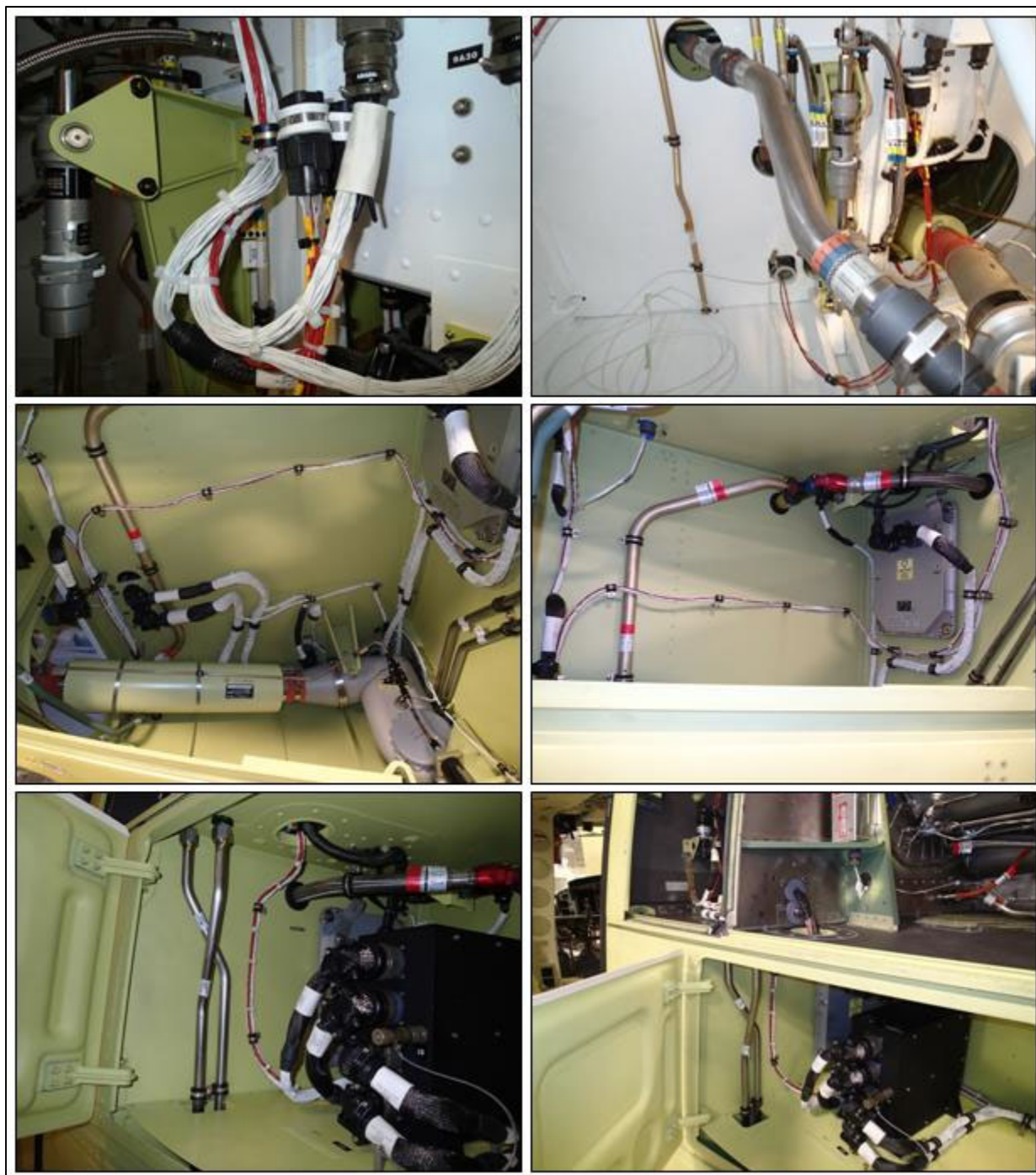


Figure 34 – Examples of routing from main power junctions in aft equipment hold forward and through left and right equipment holds to engines. MRGB lead 04 routed with left or right engine junction lead (Figures 30 and 32).



Figure 35 – Example of routing for tailrotor elements, leads 07 and 08. Leads routed together through tailboom disconnect with existing wiring.

6. FUNCTIONAL SYSTEM CHECK



Caution: Contact with hot element can cause 2nd degree burns.

Refer to Installation Guide TNG1000 and below.

1. Inspect: Visually inspect and verify kit is installed IAW this instruction.
2. Check: Perform Functional System Check, refer to Installation Guide TNG1000.
3. Record: IAW 14 CFR part 43.9, and/or other procedures set in place record installation.
 - a) Wt & BI and equipment list, amend as required under aircraft certificate.
 - b) Record and Retain Data as indicated in ICA: TCA1000 and Operating Guide: TPG1000.
 - c) Complete Warranty card Registration:
<https://www.tanisaircraft.com/warranty-card-registration/>

7. SIGN OFF

The undersigned found the system installed and operating correctly.

Date: ____ / ____ / ____

Preheat Kit

Part Number: _____

Serial Number: _____

Airframe

Manufacturer: _____

Model: _____

Serial Number: _____

Registration: _____

Engine

Manufacturer: _____

Model: _____

Serial Numbers: _____ / _____

System test performed by: _____
(Signature)

(Printed name, title and certificate number, if applicable)

***** NOTHING FOLLOWS *****