



INSTRUCTION – PREHEAT KIT INSTALLATION

Subject: TSHAW119-2862-115, Heli-Preheat Kit – 115 Volt
TSHAW119-2862-230, Heli-Preheat Kit – 230 Volt
A119 and AW119 w/ one PWC PT6B-37A engine.

Document No: TNH2862
Revision: E
Date: AUG-16-2021

RECORD OF REVISIONS

When updated, this document is changed in its entirety.

REV	DATE	DESCRIPTION	BY	CKD
E	AUG-16-2021	Format, Add 1000 series documents, 3179 & 3181 pads	DNE	GDO
D	FEB-06-2015	Update instructions for LED light and reroute lead for TEN2715-36-	GDO	DNE
C	ARP-16-2013	Add Appendix A, AW shoreline modification	GDO	DNE

Current revision approval: _____

1. PURPOSE

This instruction is for the Subject parts listed above. Refer to Installation Guide: TNG1000 for acronyms, descriptions, options, regulatory guidance, and fundamental technical procedures.

2. REQUIREMENTS

Subject kit Top-Level Drawing (TLD): 02862-115 or 02862-230, parts and documents as listed.

Users of this instruction are to be familiar w/ Installation Guide: TNG1000 and Related Documents listed in TLD.

- Tools, hardware, and consumables, power supply and extension cords, not supplied.
- Pad element bonding sealant supplied separately, requires 3 - 5 oz. / 90 - 150 ml, refer to Bonding Instruction: TNDC730.
- Installation requires sheet metal work, refer to drawings: 02929, 02933, and 02935, and Figure 4.13.

3. INSTALLATION

⚠ Caution: Energized elements can cause 2nd and 3rd degree burns.

Do Not connect power to elements or system before installed and Functional System Check in Installation Guide: TNG1000 has been completed.

Option supplied separately:

AV/Cabin Heat Kit p/n: TU03323, for parts listing refer to drawing: 03323. For additional options refer to Installation Guide: TNG1000.

3.1 Inventory

Start w/ parts and document inventory, refer to TLD: 02862-115 or 02862-230 (supplied by voltage) and drawing: 02861 for Items supplied w/ Cable Kit.

PROPRIETARY DATA

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3.2 Weight and Balance

Weigh kit and intended installation hardware before installation. Refer to Weight and Balance section in Installation Guide: TNG1000 for Wt & BI change requirements.

Approximate installed weights:

- Heli-Preheat Kit: 8.5 lb. / 3.8 Kg. CG location STA 3850 (Ref. OEM Flight Manual and Weighing Record).
- Option AV/Cabin Heater (supplied separately): 1.5 lb / 0.7 kg, for CG use location(s) as installed.

3.3 Elements

 Only use approved bonding sealant DC 730 white fluorosilicone refer to instruction TNDC730.

Locate elements w/ reference to narratives and examples below and Figures in § 4.

- Elements are supplied by voltage; narratives may exclude reference after dash (-).
- Placement of pad heat elements may differ from examples.
- Measure resistance of each element before installing, refer to values in Table in § 4.
- Pad heat elements: Bond to gearboxes and tanks w/ sealant, refer to TNDC730.
- Battery heat element (heated Do Not Cut): Installation does not use bonding sealant. Wrap element around perimeter of battery flat side in, position clear of bracketing, connectors, and chafe points. Use supplied adapter panel as needed to extend element length or fit around battery connections, non-heated cut as required. Gently lace in place w/ supplied cable-ties or appropriate lacing, positioning element connector for disconnect during battery maintenance. Excessive tension may cause damage or result in pulling out grommets, refer to Figure 4.9.
- After locating elements, secure lead midway between element and connector.
- Options (supplied separately):
 - AV/Cabin Heat Kit p/n: TU03323, location TBD refer to Instruction: TN03323. Suggested location on lower bulkhead behind crew seats or space permitting, under avionics panel, refer to TN03323.
 - ISAT or other remote avionics heater, element(s) may vary by application refer to Figure 4.11.
- Should alternate or additional elements be required contact Tanis engineering.

3.4 Electrical

Locate electrical components w/ reference Cable Kit drawing: 02861, narratives and examples below and Figures in § 4.

- Routing suggested, final routing TBD by user.
- Verify engine to airframe bonding straps are installed.
- Parallel circuit may be reconfigured to accommodate routing requirements.
- Terminate cable/leads and junctions' w/ reference to Instruction: TN02793 and TN03012.
- 230-volt kit supplied w/ extension cord plug adaptor, refer to instruction TN02829.

- f) Pursuant AC 43.13-1 (as amended) Chapter 11. Wires and cables are to be supported by suitable cable ties, clamps, grommets, or other devices at intervals of not more than 6-inches / 15.25-centimeters, except when contained in ducts or conduits.
- g) When needed, to limit movement of cable-ties use self-fusing silicone tape (SFT) around connectors and/or cabling. Available separately p/n: TU03076-05R or equivalent.
- h) Option: AV/Cabin Heater circuit: Requires dedicated plug. Location and routing TBD by user. Refer Heater Instruction: TN03323 and Cable Kit drawing 02861.
- i) Only connect power after completing Functional System Check w/ ohmmeter, § 3.5.

Shore Power Kit (door kit) p/n: TD02935: Locate in right side of baggage compartment per drawing: 02935. Refer to Figures 4.13, 4.14 and 4.15.

Door Switch p/n: 1PB5 (supplied in door kit) refer to Instruction: TN02991. Alternate: Door Switch p/n: TU03273 locate w/ reference to Instruction: TN02991.

Plug (power inlet) p/n: TP02070-M-115 or TP02839-S-230 (supplied w/ preheat kit by voltage), locate in Shore Power Kit, refer to Instruction: TN02070.

Light p/n: TLP3039-115 or TLP3039-230 (supplied w/ preheat kit by voltage), locate in Shore Power Kit refer to Instruction: TN03039.

Circuit Protection Devices (CPD-breakers) 2-each p/n: MS26574-10 or W23-X1A1G-10 (supplied w/ preheat kit by voltage), locate in Shore Power Kit refer to drawing 02935.

Engine Firewall Connector Kit p/n: TU02929: Locate in right side of engine firewall/pan refer to drawing: 02929 and Figures 4.13 and 4.16.

Tail Boom Connector Kit p/n: TU02933: Locate at tail boom disconnect station, refer to drawing: 02933 and Figures 4.13 and 4.17.

Cable Kit p/n: TCH2861: route and terminate IAW Cable Kit wire diagram drawing: 02861 (refer to drawing: 02861 for Items supplied w/ Cable Kit and inventory accordingly).

Junctions and cable leads: Locate junctions in serviceable areas and route leads w/ existing wiring and lines, secure w/ cushioned clamps, appropriate lacing and/or cable-ties. To compensate for routing leads may be cut or spliced, service looped, race-tracked, shortened, or lengthened w/ appropriate splice or connectors, refer to AC43.13-1 (as amended) Chapter 11, and Connector and Junction Instructions: TN02793 and TN03012.

J-A: Locate on right side of baggage compartment above power plug Figure 4.18.

J-B below engine pan right forward adjacent to engine Firewall Connector refer to drawing: 02929 and Figure 4.19.

J-C and J-D right side of upper deck adjacent to hydraulic tanks refer to Figure 4.19.

Ground wire (green): Verify OEM engine and gearbox to airframe bonding straps are installed. Attach ring crimp end to airframe or existing ground lug and terminate in shore power plug. Connection not to exceed .003 ohms, refer to Grounding § in Installation Guide: TNG1000.

Battery Heater circuit: Locate Thermal Control p/n: TLP3046-05 (supplied w/ preheat kit), 6 to 18 inches from battery element. Route battery heater lead from junction J-D w/ battery cables or existing wiring to battery station and connect to Control Cable Assembly p/n: TL03217-C (supplied w/ cable kit). Locate Control Cable Assembly in area that allow leads

to connect to battery element and controller, refer Cable Kit wire diagram drawing: 02861 and Figures 4.9 and 4.10, and Instruction: TN03046.

Option: AV/Cabin Heater circuit requires dedicated plug, refer to Cable Kit wire diagram.

Placard: Affix supplied Placard: p/n: TU02615- near system shore plug. Alternate user supplied placard stating at a minimum “Tanis” and required voltage, may be used in place of supplied placard(s).

3.5 Completion

1. Inspect: Visually inspect and verify components are installed IAW this instruction and all components are connected and secure.
2. Check: Perform Functional System Check, refer to Installation Guide TNG1000.
3. Record: Pursuant 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 type certificate.
 - b) Record and Retain Data as indicated in ICA: TCA1000 and Operating Guide: TPG1000.
 - c) Complete Registration/Warranty Card, go to: <https://www.tanisaircraft.com/warranty-card-registration>

4. TABLES AND FIGURES

This section contains technical information and examples of typical installations, actual installation may vary due to existing equipment or operating requirements.

TABLE 4.1. 115 Volt Electrical Values

System and individual element value tolerances +/- 10%.

* Battery heater circuit normally open, closed below +5°C / 41°F refer to TN03046.

** Option: Remote avionics heat element (configured w/ battery heat circuit).

*** Option: - AV/Cabin Heater values vary due to heater design refer to Instruction: TN03323.

Plug 1. 115 Volt			Total:	7.0 Amps	803 Watts	16.5 Ohms
* Without battery heater:				6.3 Amps	728 Watts	18.2 Ohms
Qty	Element Part Number	Location			Watts	Ohms
* 1	TBP3086-31-115/75	Battery	each:		75	176.3
** 1	TEP3188-115/20	ISAT (varies supplied separately)	each:		20	661.3
1	TEN2715-36-115/18	Eng Heat Exchr	each:		18	734.7
1	TEN2867-60-115/75	Eng AGB LH	each:		75	176.3
1	TEN2868-36-115/120	Eng AGB RH	each:		120	110.2
2	TEP2658-115/7.5	Hyd Tanks	each:		7.5	1763.3
1	TEP2865-115/120	MRGB Conical LH FRT	each:		120	110.2
1	TEP2866-115/70	MRGB Conical LH AFT	each:		70	188.9
1	TEP2869-115/110	Eng AFT RGB	each:		110	120.2
1	TEP3179-115/40	MRGB Brake Case	each:		40	330.6
1	TEP3179-24-115/40	TRGB	each:		40	330.6
1	TEP3181-115/120	MRGB Conical RH	each:		120	110.2

Option (supplied separately refer to drawing 02861):

Plug 2. 115 Volt			** 6.0 Amps each			
Qty	Part Number	Location		Watts	** Ohms	
*** 1 or 2	THP3094-series	Avionics/Cabin	each:	500	(PTC)	

TABLE 4.2. 230 Volt Electrical Values

System and individual element value tolerances +/- 10%.

* Battery heater circuit normally open, closed below +5°C / 41°F refer to TN03046.

** Option: Remote avionics heat element (configured w/ battery heat circuit).

*** Option: - AV/Cabin Heater values vary due to heater design refer to Instruction: TN03323.

Plug 1. 230 Volt			Total:	3.8 Amps	803 Watts	65.9 Ohms
* Without battery heater:				3.2 Amps	728 Watts	72.7 Ohms
Qty	Element Part Number	Location		Watts	Ohms	
* 1	TBP3086-31-230/75	Battery	each:	75	705.3	
** 1	TEP3188-230/20	ISAT (varies supplied separately)	each:	20	2645.0	
1	TEN2715-36-230/18	Eng Heat Exchr	each:	18	2938.9	
1	TEN2867-60-230/75	Eng AGB LH	each:	75	705.3	
1	TEN2868-36-230/120	Eng AGB RH	each:	120	440.8	
2	TEP2658-230/7.5	Hyd Tanks	each:	7.5	7053.3	
1	TEP2865-230/120	MRGB Conical LH FRT	each:	120	440.8	
1	TEP2866-230/70	MRGB Conical LH AFT	each:	70	755.7	
1	TEP2869-230/110	Eng AFT RGB	each:	110	480.9	
1	TEP3179-230/40	MRGB Brake Case	each:	40	1322.5	
1	TEP3179-24-230/40	TRGB	each:	40	1322.5	
1	TEP3181-230/120	MRGB Conical RH	each:	120	440.8	

Option (supplied separately refer to drawing 02861):

Plug 2. 230 Volt			** 6.0 Amps each			
Qty	Part Number	Location		Watts	** Ohms	
*** 1 or 2	THP3094-series	Avionics/Cabin	each:	500	(PTC)	

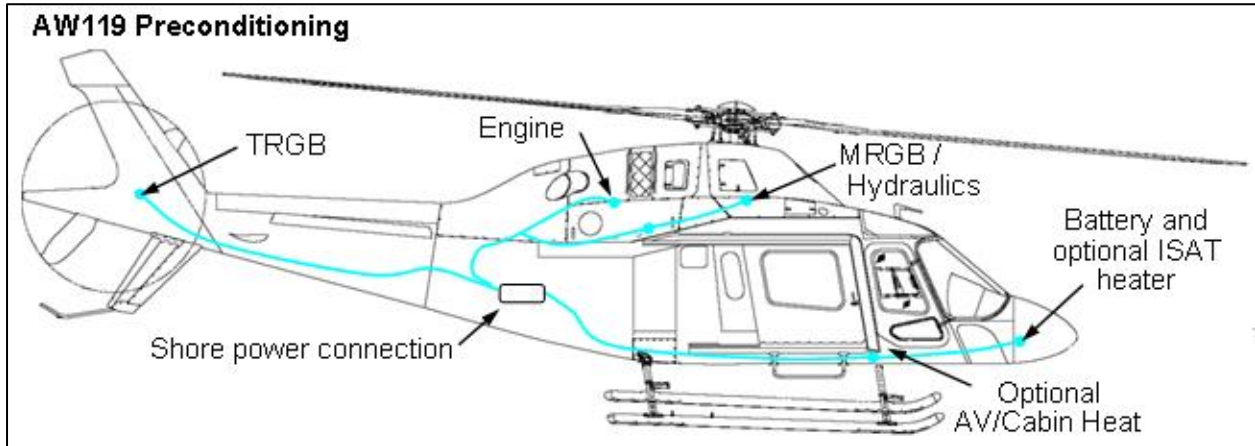


Figure 4.1. Heli-Preheat Kit layout. Ground operated, connected to external shore power. Voltage requirement Placarded on or near door.

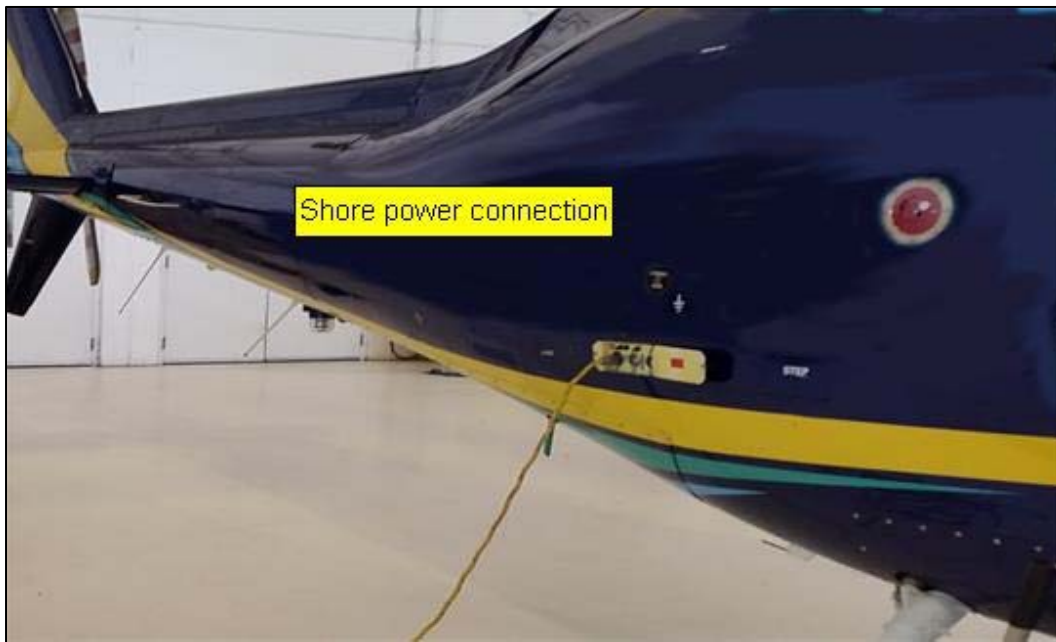


Figure 4.2. Right aft-side, shore power door (external AC power connection).

Plug 1 (left): Main preheat system.

Plug 2 (middle): AV/Cabin Heat Kit (option).

Plug 3 (right): TBD (shown with blanking plate).

Door equipped with crew annunciator switch.

BEFORE STARTING ENGINE verify cockpit caution message - **EXT PWR ON** - is out, not illuminated.

Note: For Operating Guide system and plug reference suggest adding this page or similar to Operating Guide: TNG1000.

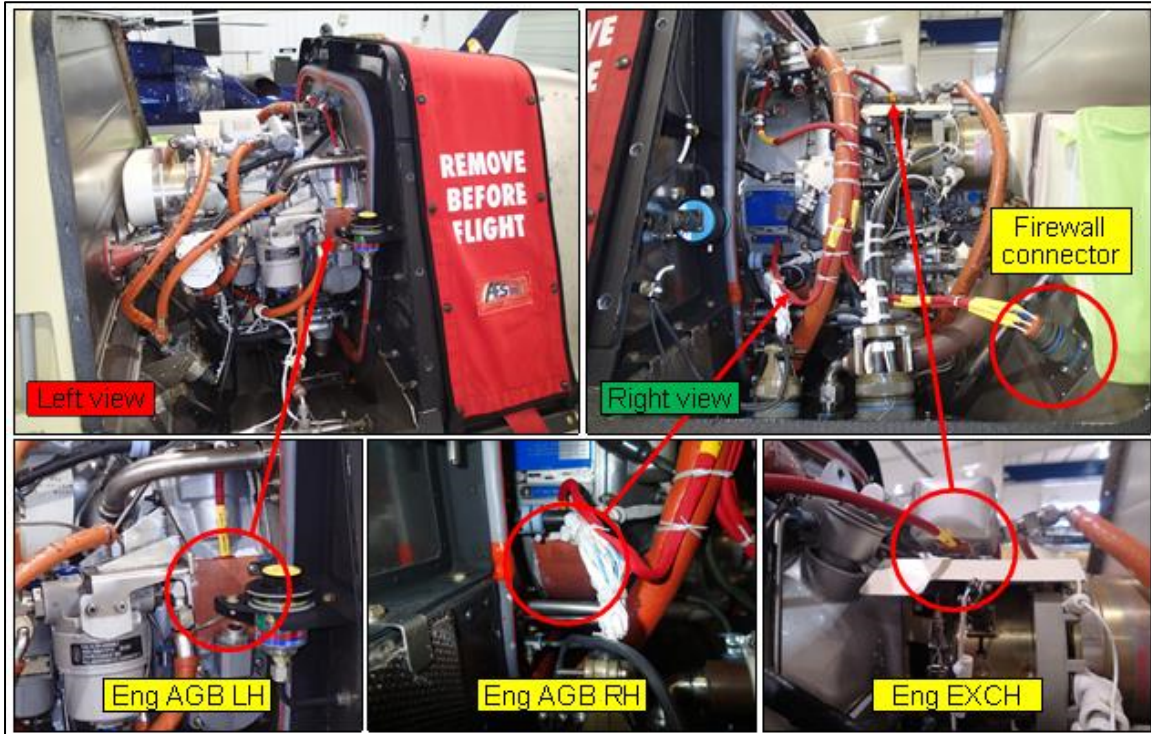


Figure 4.3. Engine accessory gearbox and heat exchanger Pad Heat Elements:

Eng LH AGB p/n: TEN2867- Locate low on left tank section lead up for routing to firewall connector.

Eng RH AGB p/n: TEN2868- Locate low on right tank section below placard lead up for routing to firewall connector.

Eng EXCH p/n: TEN2715- Locate on lower surface of engine fuel/oil heat exchanger lead outboard for routing to firewall connector.



Figure 4.4. Engine RGB Pad Heat Element p/n: TEN2869- Locate on low on case below output lead right to connect w/ lead from J-A.

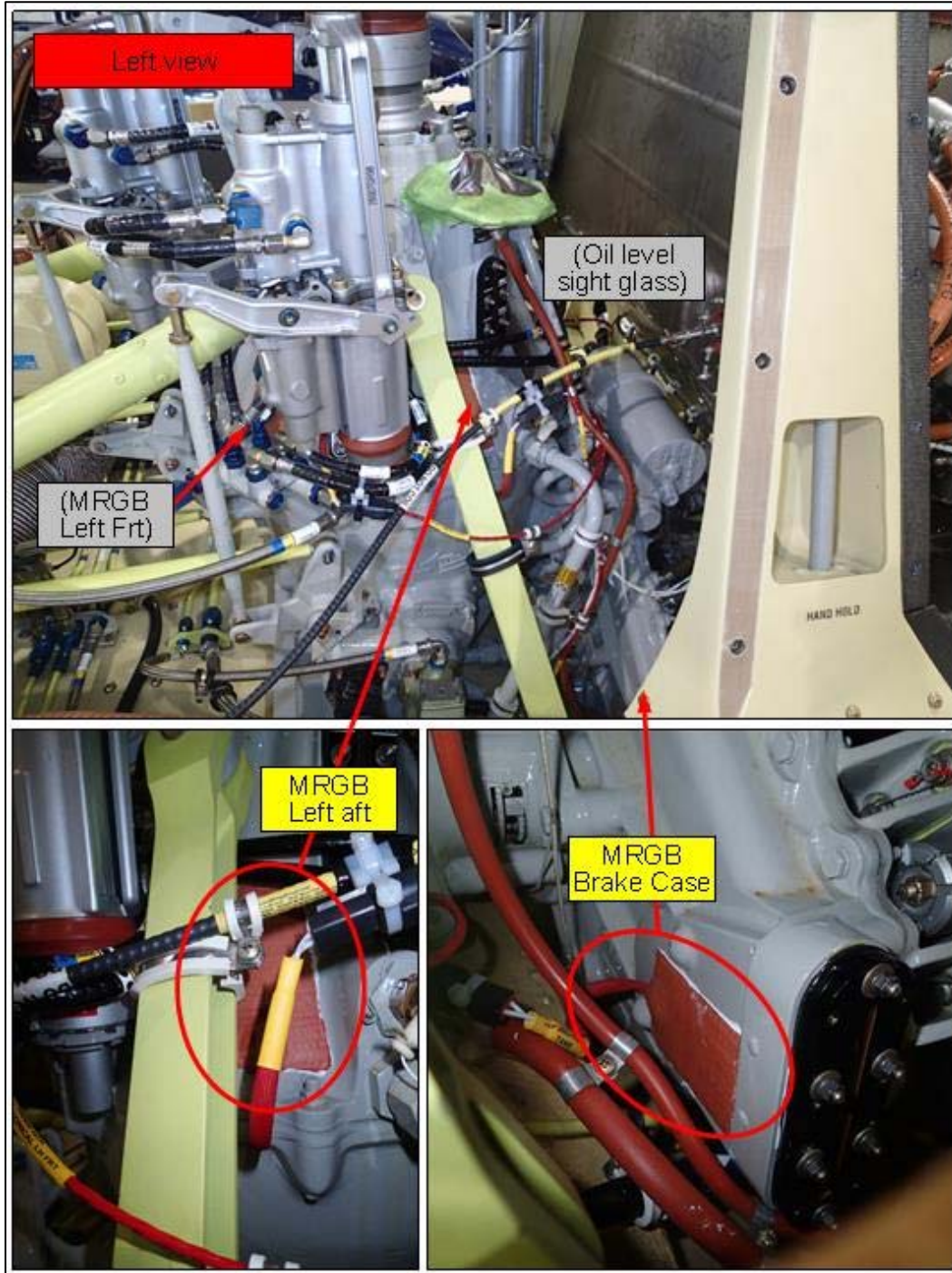


Figure 4.5. Main rotor gearbox left Pad Heat Elements:

MRGB Conical LH AFT p/n: TEP2869- Locate on case above case split between manifold lead aft to connect w/ lead from junction J-C.

MRGB Conical LH FRT p/n: TEP2865- Locate on case behind left hydraulic manifold lead aft to connect w/ lead from junction J-C.

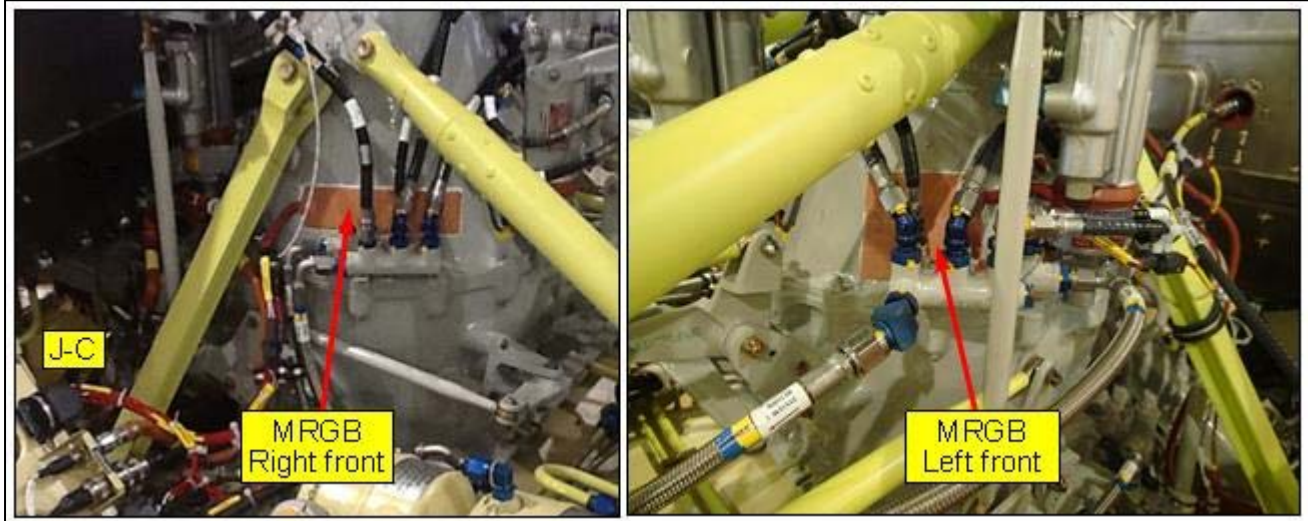


Figure 4.6. Main rotor gearbox front Pad Heat Elements:

MRGB Conical RH FRT p/n: TEP3181- Locate on case behind right hydraulic manifold lead aft to connect w/ lead from junction J-C.

MRGB Conical LH FRT p/n: TEP2865- Locate on case behind left hydraulic manifold lead aft to connect w/ lead from junction J-C.

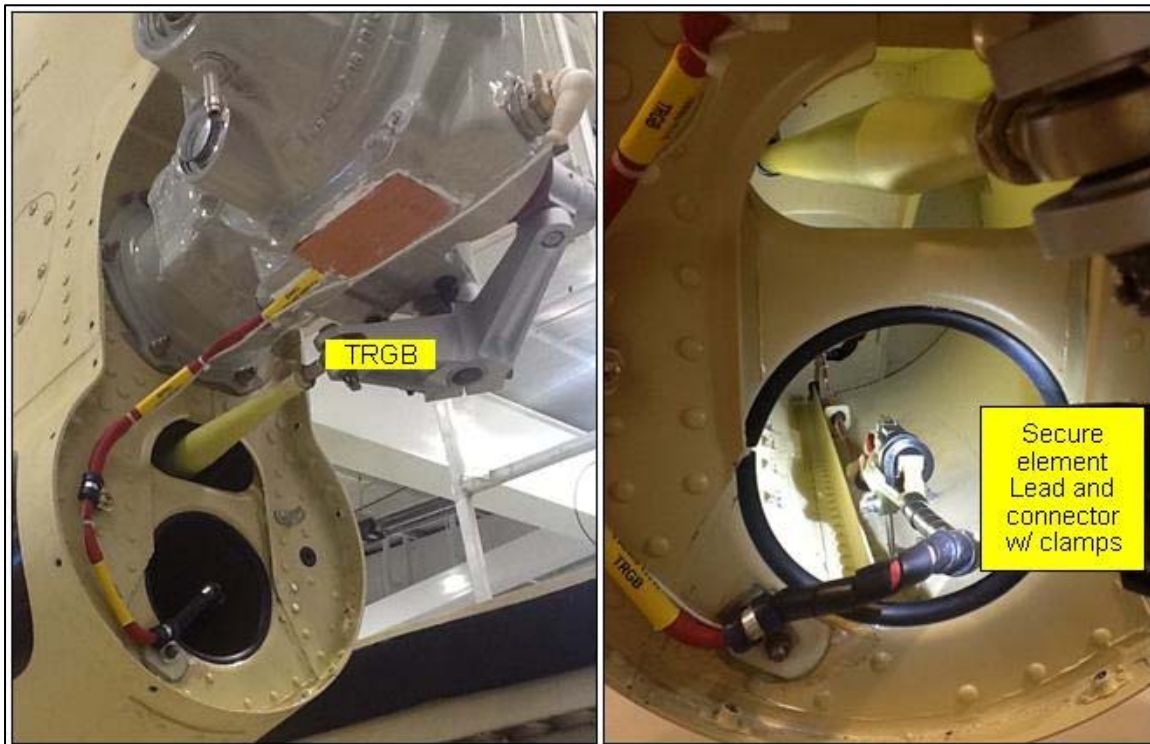


Figure 4.7. Tail Rotor Gearbox Pad Heat Element p/n: TEP3179-24- Locate on bottom of TRGB lead forward route w/ chip light wire, secure lead and connector w/ clamps. Do Not drill longeron or boom skin, mount clamps w/ Tanis Stud Mount Kit p/n: TU03262 (supplied separately) or equivalent CB4000 series Click Bond Stud Mount (trim base as needed). Connect to lead from junction J-A / tail boom disconnect.

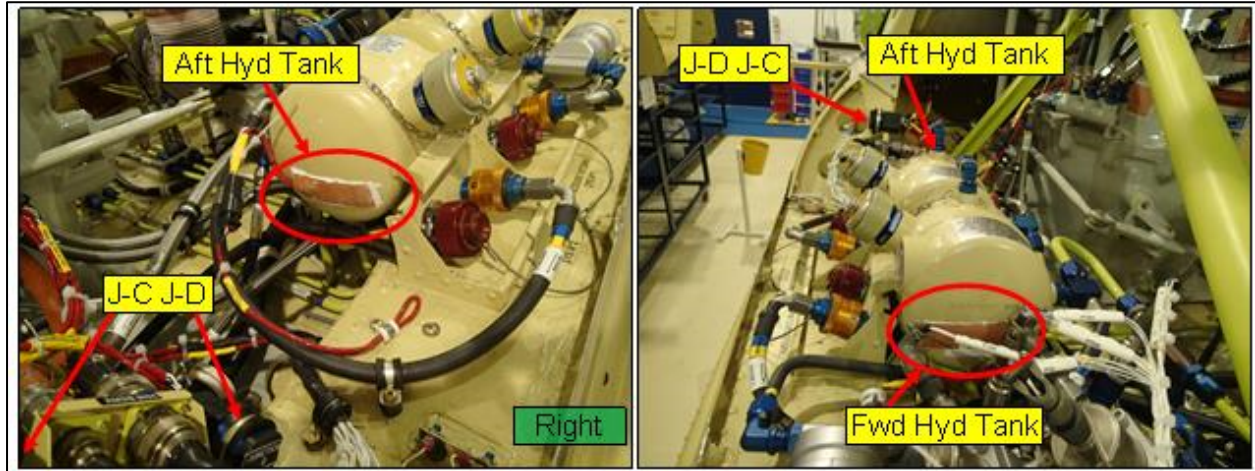


Figure 4.8. Hyd Tank elements p/n: TEP2658- one on each tank below nominal oil level, or end back side, position leads for routing.

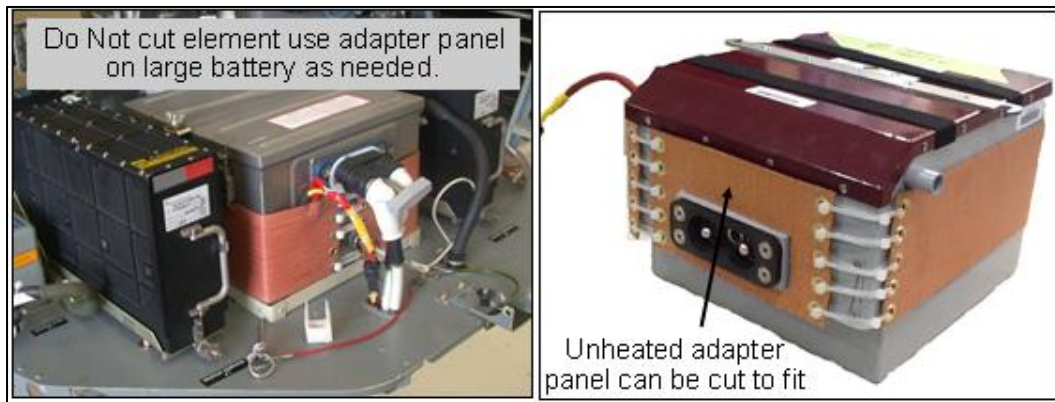


Figure 4.9. Battery Heat Element p/n: TBP3086-31- and Adapter Panel p/n: TB02645-07, use adaptor panel as needed, installation does not use bonding sealant. Verify fit before installing, alternates elements listed on drawing: 02800.

Wrap Battery Heat Element and when needed Adapter Panel (unheated Adapter Panel may be cut to fit), around perimeter of battery flat side in. Position clear of bracketing, connectors, and chafe points, position connector for disconnect during battery maintenance. Gently lace in place with supplied cable-ties or appropriate lacing. Excessive tension may cause damage or result in pulling grommets out. Battery element may be removed seasonally (when not in use install connector Sealing Cap p/n: DT04-2P-C017 (supplied) on harness.

Note: Due to varying battery configuration and/or location alternate elements available refer to drawing 02800 for available substitutions.

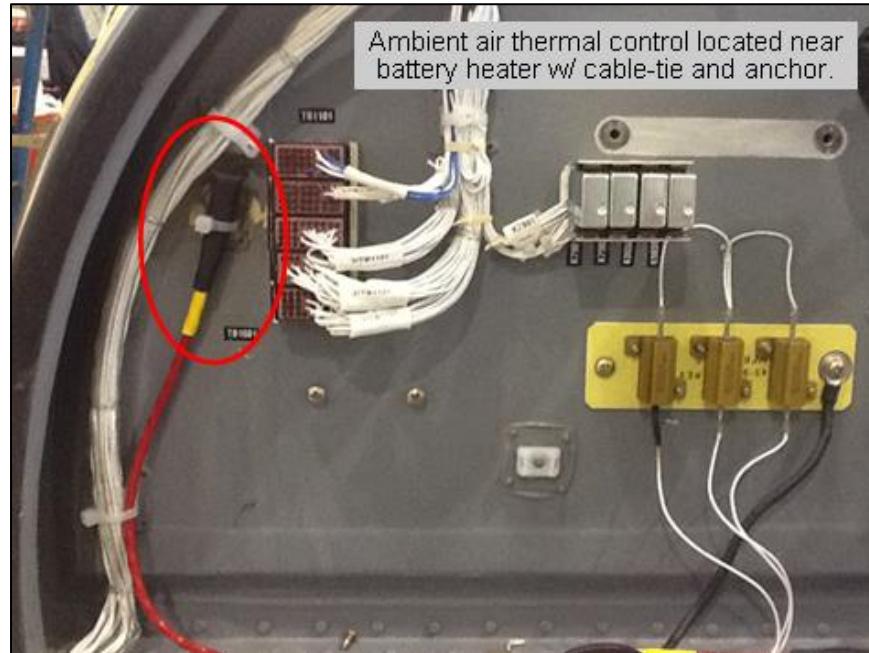


Figure 4.10. Locate ambient air Thermal Control p/n: TLP3046-05 in battery environment, 6 to 18 inches from battery, secure on existing wiring w/ cable-tie/lace refer to Instruction: TN03046 or use supplied Cable-Tie Anchor p/n: TU02782, refer to Instruction: TN02782.

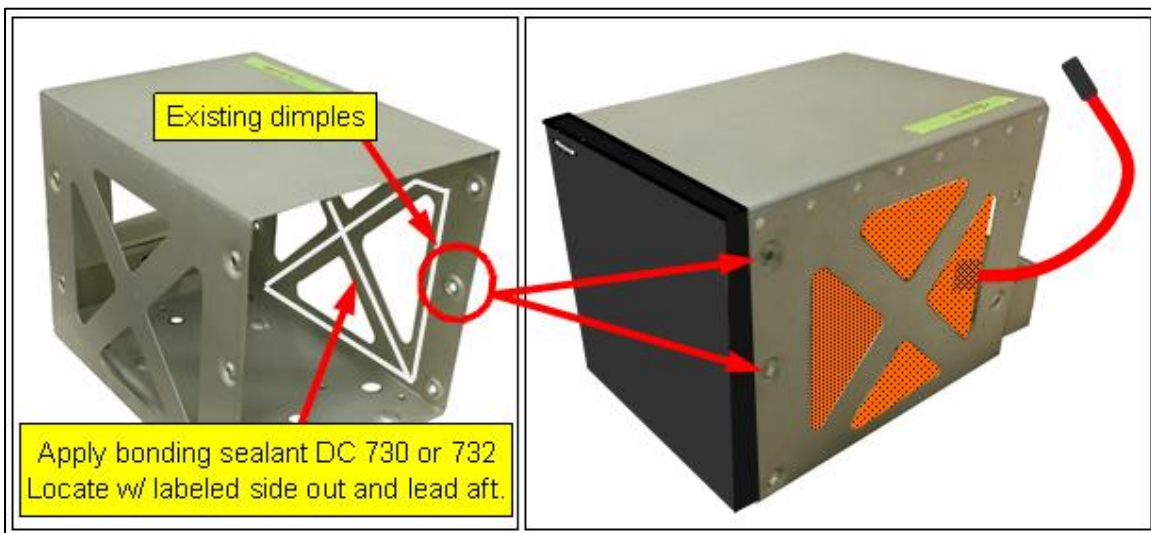


Figure 4.11. Example of optional ISAT heater p/n: TEP3188- (supplied by voltage) or other remote avionics located in nose compartment. Heater to be configured by application. Power supplied through battery heat control cable assembly by replacing single Thermal Control Cable Assembly p/n: TL03217-C with dual lead assembly p/n: TL03217-B (24-inch leads) or p/n: TL03217-D (12-inch leads).

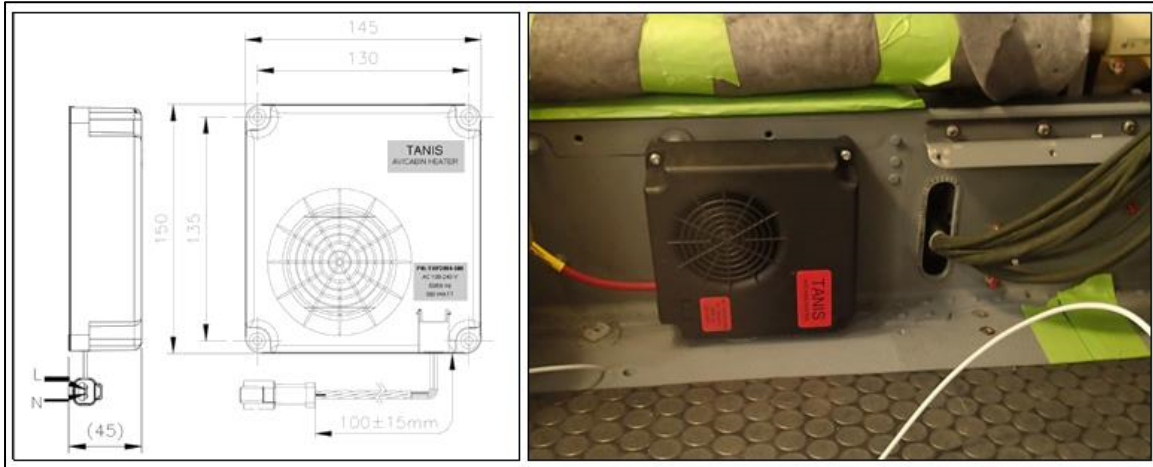


Figure 4.12. Example of optional AV/Cabin Heater THP3094- located behind crew seat on aft side of bulkhead secured using 4-each Stud Mount Kits p/n: TU03262. Heater is available in kit that includes cabling and adjustable thermostat, AV/Cabin Heat Kit p/n: TU03323. Refer to Cable Kit wire diagram drawing 02861 and Heater Instruction TN03323 and/or TN03094.

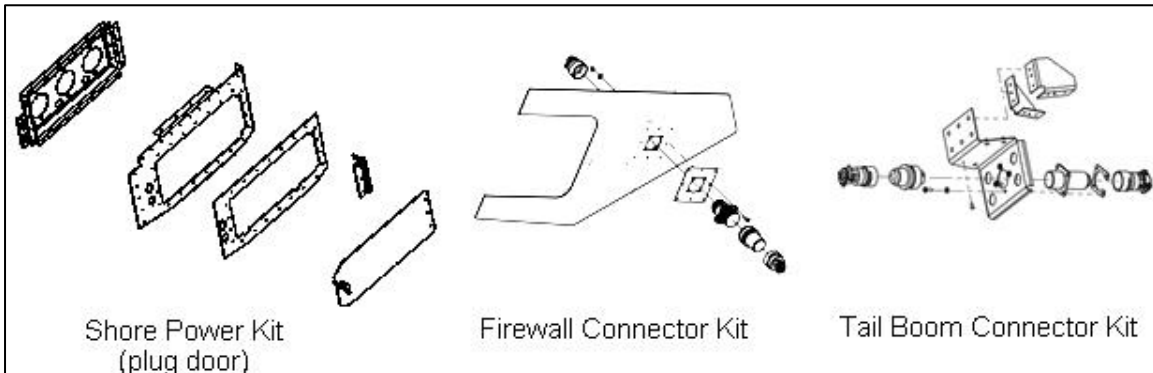


Figure 4.13. Sheet metal kit for plug door, firewall and tail boom disconnect supplied refer to Figures 4.14, through 4.17.

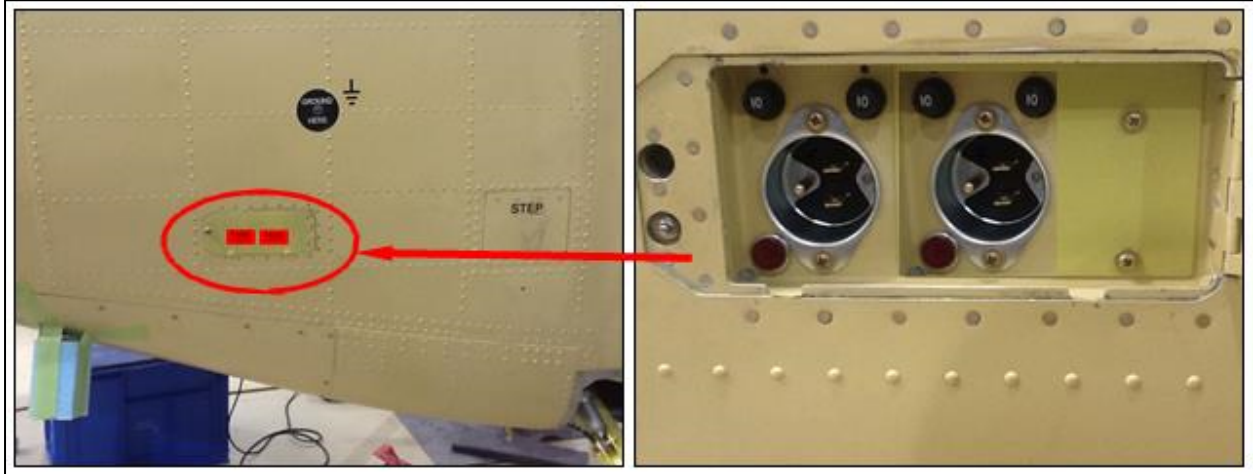


Figure 4.14. Shore Power Kit (door kit): p/n: TD02935, locate low on right side aft of rear inspection step (REF: STA 4960.0 WL 570.0) refer to drawing: 02929.

Option: Field fabricated Door Kit p/n: TD03187 Drawing: 03187. Location is higher up on right side (REF: STA 5210.0 WL 1006.0) refer to Figure 4.15.

Plug 1 (left): Main preheat system. Placard w/ System Placard p/n: TU02615- or placard w/ field fabricated placard stating at a minimum “Tanis” and required voltage.

Plug 2 (middle): AV/Cabin Heat Kit (option supplied separately). Placard w/ AV/Cabin Heater placard p/n: TU03119-01 or placard w/ field fabricated placard as applicable.

Plug 3 (right): Location for TBD shown with blanking plate. When plug installed placard accordingly.

Door Switch p/n: 1PB5 (supplied w/ door kit) locate in door kit, refer to Instructions: TN02991 and drawing 02929.

Alternate: Door Switch p/n: TU03273 installed w/ reference to Instruction: TN03273 or Instruction: TN02991.

Plug (power inlet) p/n: TP02070-M-115 or TP02839-S-230 (supplied w/ preheat kit by voltage) locate in Shore Power Kit, refer to Instruction: TN02070.

Light p/n: TLP3039-115 or TLP3039-230 (supplied w/ preheat kit by voltage) locate in Shore Power Kit refer to Instruction: TN03039.

Circuit Protection Devices (CPD-breakers) 2-each p/n: MS26574-10 or W23-X1A1G-10 (supplied w/ preheat kit by voltage) locate in Shore Power Kit refer to drawing 02935.



Figure 4.15. Optional Door Kit, field fabricated w/ reference to drawing: 03187 (REF: STA 5210 WL 1006). Uses same plug and placard configuration as Shore Power Kit p/n: TD02935 Figure 4.12.

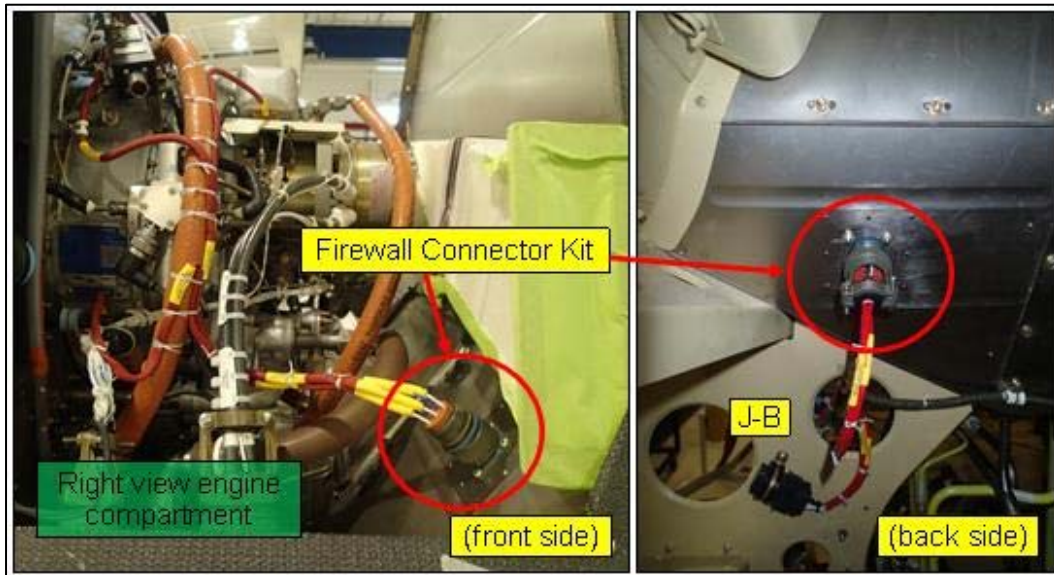


Figure 4.16. Firewall Connector Kit p/n: TU02929 locate in right side of forward engine firewall refer to drawing: 02929. Alternate p/n: TU03125, drawing: 03125.

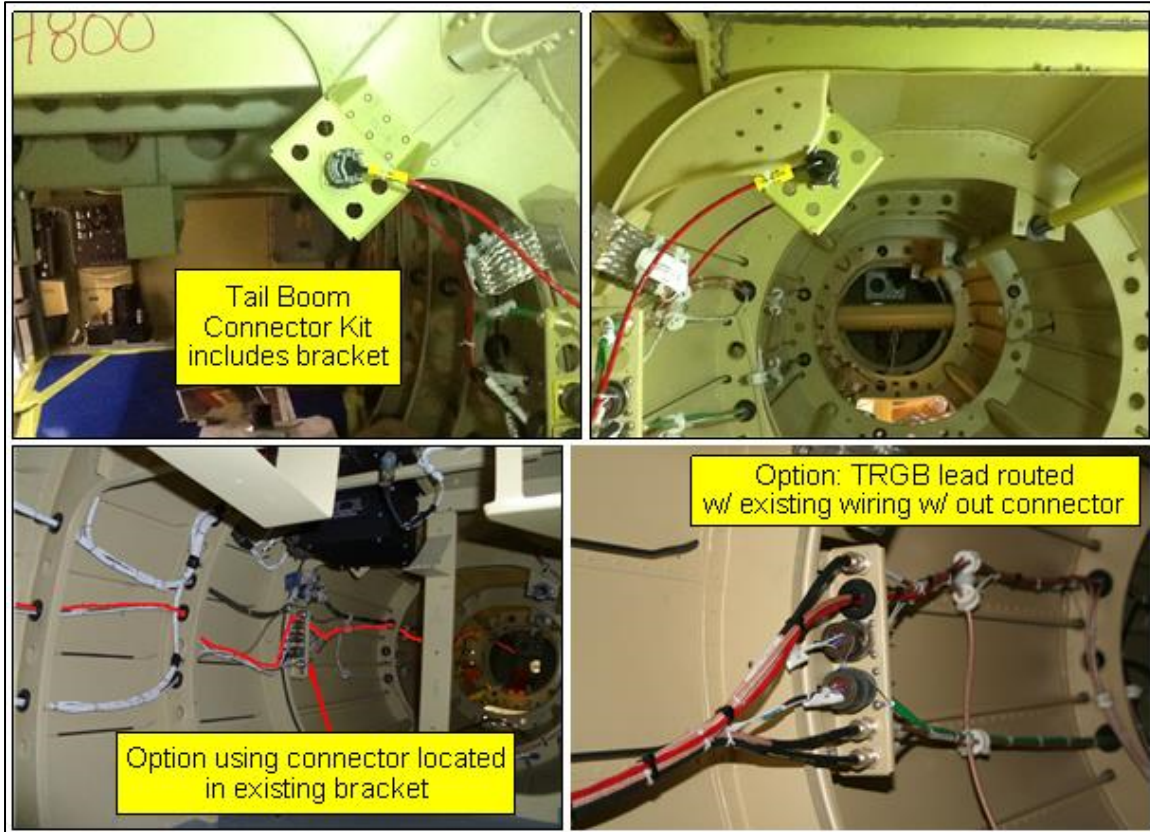


Figure 4.17. Tail Boom Connector Kit p/n: TU02933, locate at tail boom disconnect station w/ supplied bracket refer to drawing: 02933 or locate connector in existing connector bracket.

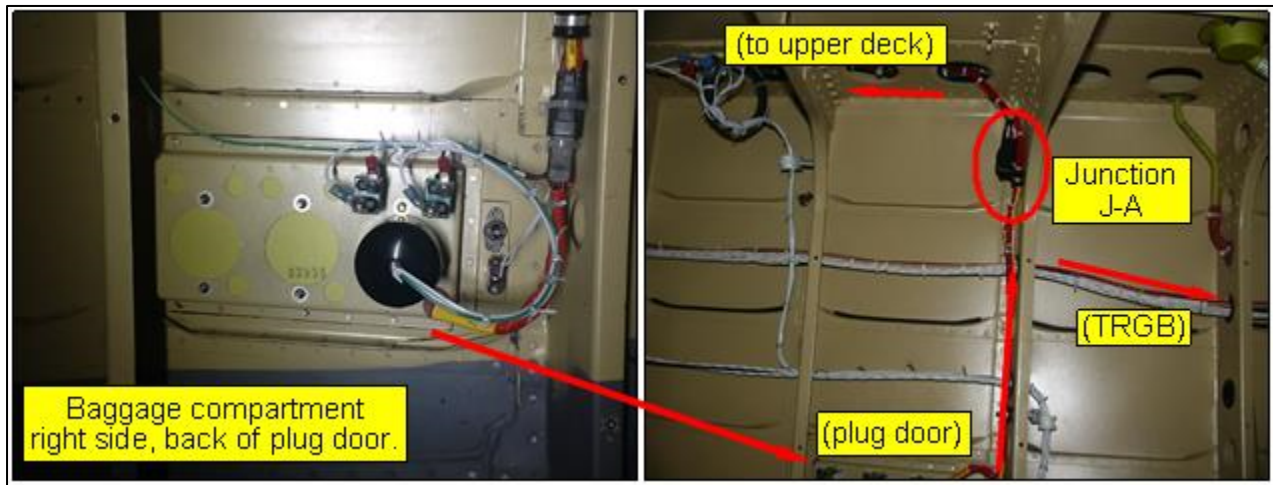


Figure 4.18. Example of junction J-A located on right side of baggage compartment above plug door. Refer to Cable Kit wire diagram drawing: 02861.

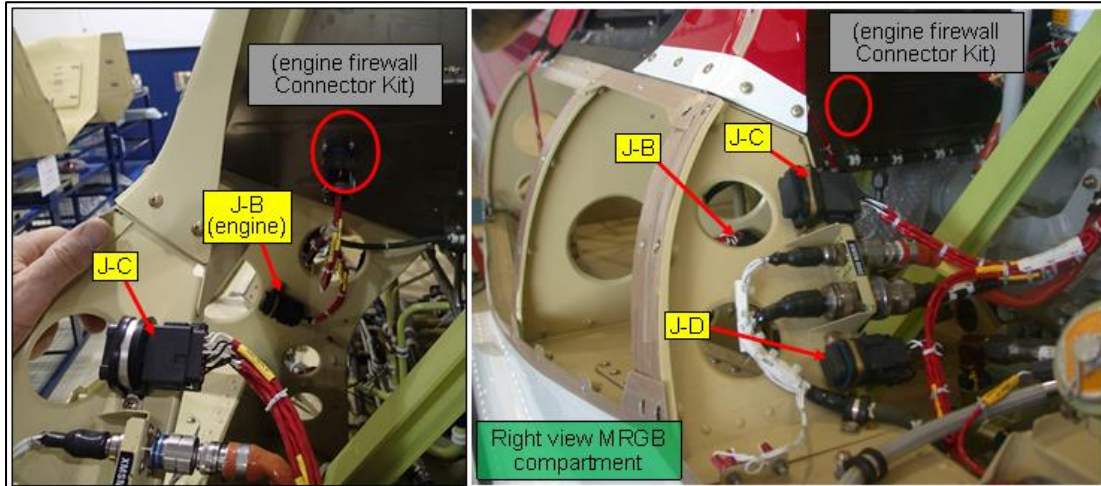


Figure 4.19. Example of upper deck junctions J-B, J-C, and J-D, located on right side w/ cushioned clamps.

Junction J-B locate on structure below engine connector refer to Figure 4.16.

Junctions J-C and J-D locate on structure w/ existing connectors aft for hydraulic tanks adjacent to existing connectors.

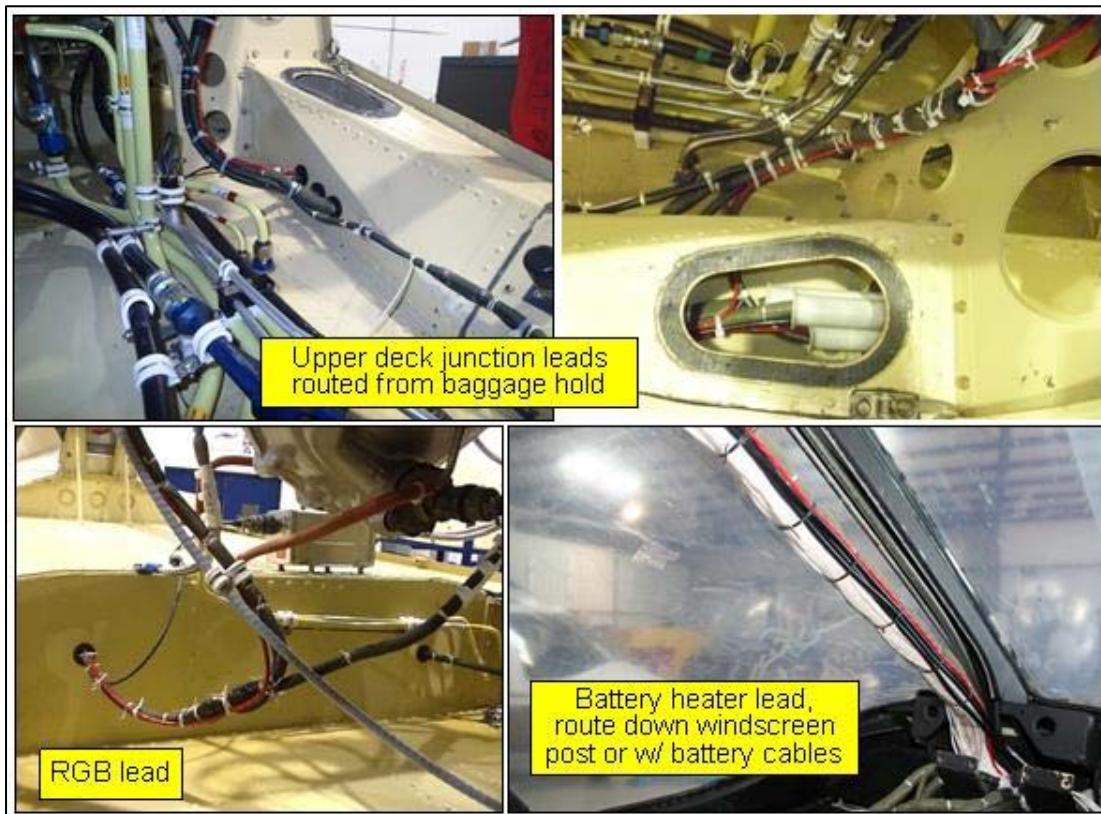


Figure 4.20. Examples of cable routing, due to variations in equipment and aircraft configuration routing to be determined by user, refer to Cable Kit wire diagram drawing: 02861.

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