



INSTRUCTION – PREHEAT KIT INSTALLATION

Subject: TSHMD902-3195-115 and TSHMD902-3195-230

Document No: TNH3195

HELI-PREHEAT KIT – MD900 AND MD902 ENHANCED

Revision: C

Date: AUG-31-2018

RECORD OF REVISIONS

When updated, this document is changed in its entirety.

REV	DATE	DESCRIPTION	BY	CKD
C	AUG-31-2018	Correct Rev A date, revise MRGB and engine elements	DNE	GDO
B	APR-30-2018	Reconfigure MRGB and engine elements add TNG1000	DNE	GDO
A	JUL-21-2017	Initial release	DNE	GDO

Current revision approval: _____

1. PURPOSE

This instruction provides guidance for installation of subject kits listed above.

2. REQUIREMENTS

Subject kit Top-Level Drawing 03195-115 (115-volt kit) or 03195-230 (230-volt kit), and associated parts and documents as listed.

Tools, hardware, and consumables not supplied.

Installation of plug door kit requires sheet metal and finish work.

Pad element bonding sealant supplied separately, refer to TN02788.

3. INSTALLATION

⚠ Caution: Energized elements can cause 2nd and 3rd degree burns. Before connecting power, complete installation and perform Functional System Check.

Technicians and users of this instruction should be familiar with Installation Guide TNG1000.

Component and installation procedures called out in narratives and figures in Section (§) 4.

3.1 Inventory

Start with parts and document inventory, refer to subject kit top level drawing, refer to § 2.

3.2 Weight and Balance

Weight kit before installation. Approximate installed weight (less cabin heater): 7.5 lb. / 3.4. Use upper deck water line at center line of forward engine firewall for Weight and Balance calculations. Refer to TNG1000 for change requirements.

AV Cabin Heater installed weight 1.5 lb / 0.7 kg use location of installation for wt. and bal. calculations (crew cabin deck water line under right seat).

PROPRIETARY DATA

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3.3 Elements

Resistance pad elements located on engine accessory gearboxes (AGB), oil coolers, main rotor gearbox (MRGB), hydraulic modules, and battery. Forced air heater located in crew cabin to heat avionics, instruments and crew cabin, refer to Figures and narratives § 4.

Operational procedures or environment conditions may require alternate or additional elements, contact Tanis engineering.

- a. Before installing elements measure resistance of each, refer to § 4. Table 1.
- b. Pad elements are located on surface of gearboxes and tanks.
- c. Battery heat element secured around parameter of battery.
- a. AV/Cabin Heater located in cabin, refer to 3.4 Electrical.
- b. VAC plug receptacle (outlet) located in cabin, refer to 3.4 Electrical.

3.4 Electrical

Electrical routing and junction locations suggested, final routing to be determined by installer, refer to cable kit wire diagram drawing 03196, Installation Guide TNG1000, Figures and narratives § 4, and route accordingly.

1. Door Kit, Plugs, Indicator Lights, and Circuit Protection Devices (CPD):

Locate door kit and associated parts, plugs, lights, and CPD, in avionics access panel located below right forward crew door. 230-volt kit supplied with extension cord plug adaptor, refer to instruction TN02829.

Plug 1 (left) primary circuit, mechanical and battery heaters.

Plug 2 (right) cabin circuit, AV/Cabin Heater and VAC outlet.

2. VAC power outlet: Location to be determined by installer, suggest locating in passenger compartment in non-structural inspection plate, aft bulkhead or floor. Location varies due to seating configuration, operational requirements, and available space. Note: Installation of AC outlet optional.
3. AV/Cabin Heater: Location to be determined by installer, suggest locating in crew cabin below right seat.
4. Grounding: Attach ground wire airframe with proper metal-to-metal bonding. Resistance of ground connection not to exceed .003 ohms.
5. Junctions: Locate junctions in serviceable areas that allow leads to reach corresponding components. Secure with cushioned clamps, cable-ties, and/or appropriate lacing.

Suggested junction locations:

J-A: Primary circuit junction connected to plug 1, locate in avionics hold on aft bulkhead (adjacent to J-B).

J-B: Cabin circuit junction connect to Plug 2, locate in avionics hold on aft bulkhead (adjacent to J-A).

J-C: Upper deck distribution junction, locate on right forward MRGB truss.

J-D and J-E: Left and right engine junctions, locate on forward outboard side of respective AGB using existing fitting and hardware.

J-F and J-G: Left and right MRGB junctions (MRGB, oil cooler, hydraulic modules), locate on respective MRGB trusses.

6. **Lead Routing:** Route between respective junctions, components, and elements with existing wiring using existing penetrations when available. Secure with cushioned clamps, cable-ties, and/or appropriate lacing.

Leads 01 through 20 - Primary circuit leads powered through plug 1 and junction J-A.

Leads 22 through 25 - Cabin circuit leads powered through plug 2 and junction J-B, cabin heater and VAC outlet.

7. Battery thermal control cable assembly (lead 04): Locate thermal control (TLP3046-) in battery box 6 to 18 inches (15 to 46 cm) or as far as practical from battery from battery, connect to control cable assembly. Secure thermal control with supplied Click Bond cable anchor or cable tie with existing wiring.
8. Placard: Affix supplied or field fabricated placard in visible location adjacent to power plug.

3.5 Completion

1. Inspect: Visually inspect and verify components are connected and secure.
2. Check: Perform Functional System Check, refer to Installation Guide TNG1000.
3. Record: Record and retain data as indicated in Instructions for Continued Airworthiness TCA1000 and Operating Guide TPG1000.

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 1. Electrical values.

115-volt and 230-volt system and individual element values.

Resistance tolerance +/- 10%.

* AV heater tested separately ohm value varies due to PTC element design refer to AV heater instructions TN03094 and TNG1000.

** Total with battery, thermal control in closed condition (below freezing) refer to Functional System Check located in Installation Guide TNG1000.

115-volt TSHMD902-3195-115			Total (plugs 1 and 2):	9.9 Amps	1142 Watts
** Total with battery heater (plug 1):			5.6 Amps	642 Watts	20.6 Ohms
Total without battery heater (plug 1):			5.1 Amps	582 Watts	22.7 Ohms
Qty	Element Part Number	Element type and location		Watts	Ohms
*1	THP3094-500	AV Cabin Heater	each:	500	(PTC)
**1	TBP2646-31-115/60	Battery heat element	each:	60	220.4
1	TEP2656-115/80	Pad, AGB RH (left engine)	each:	80	165.3
2	TEP2678-115/50	Pad, Oil coolers	each:	50	264.5
2	TEP2688-115/20	Pad, Hyd Modules	each:	20	661.3
2	TEP3166-115/80	Pad, AGB RH and MRGB RH	each:	80	165.3
1	TEP3181-115/120	Pad, MRGB LH	each:	120	110.2
2	TEP3230-115/41	Pad, AGB LH	each:	41	322.6

230-volt TSHMD902-3195-230			Total (plugs 1 and 2):	5.0 Amps	1142 Watts
Total with battery heater (plug 1):			2.8 Amps	642 Watts	82.4 Ohms
**Total without battery heater (plug 1):			2.5 Amps	582 Watts	90.9 Ohms
Qty	Element Part Number	Element type and location		Watts	Ohms
*1	THP3094-500	AV Cabin Heater	each:	500	(PTC)
**1	TBP2646-31-230/60	Battery heat element	each:	60	881.7
1	TEP2656-230/80	Pad, AGB RH (left engine)	each:	80	661.3
2	TEP2678-230/50	Pad, Oil coolers	each:	50	1058.0
2	TEP2688-230/20	Pad, Hyd Modules	each:	20	2645.0
2	TEP3166-230/80	Pad, AGB RH and MRGB RH	each:	80	661.3
1	TEP3181-230/120	Pad, MRGB LH	each:	120	440.8
2	TEP3230-230/41	Pad, AGB LH	each:	41	1290.2

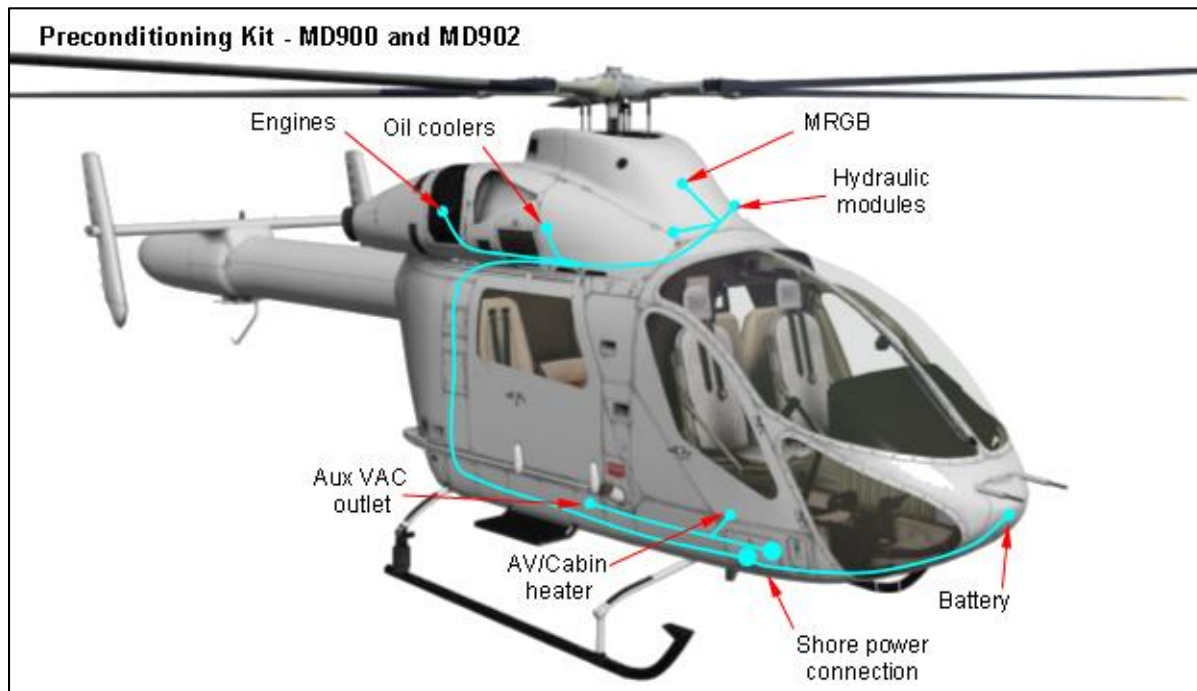


Figure 1. Overview of preconditioning kit for MD900/902 series helicopters.



Figure 2. Example of generic pad element with 6-inch lead and pin connector. For sealant and installation procedures of all pad elements, refer to bonding instruction TN02788.



Figure 3. Left engine elements (without AC compressor):
Left: TEP3230-, locate on AGB LH cover plate below FCU box.
Right: TEP2656-, locate on AGB RH cover plate right of starter generator.



Figure 4. Right engine elements (with AC compressor):
Left: TEP3230-, locate on AGB LH cover plate below FCU box.
Middle and right: TEP3166-, locate horizontally on AGB RH case below AC compressor.

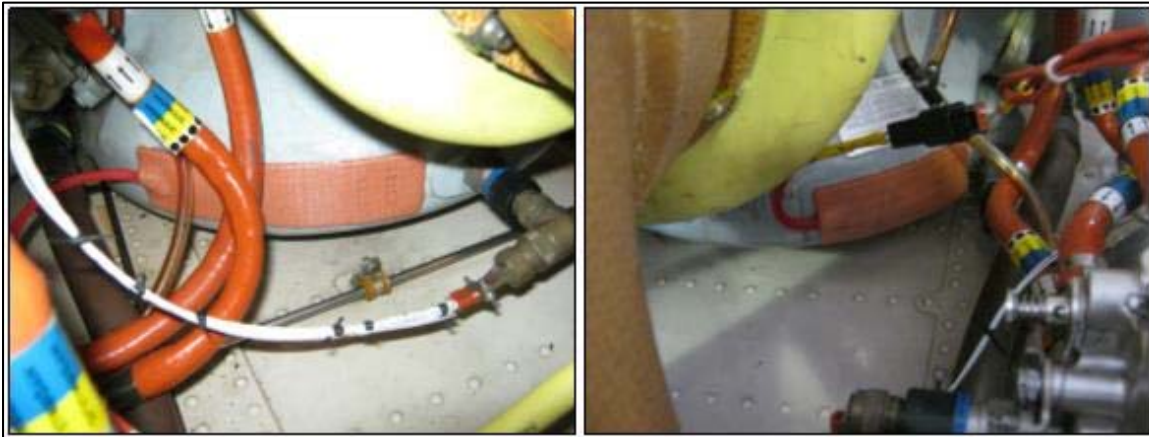


Figure 5. MRGB elements:
Left: TEP3181-, locate horizontally on MRGB LH, low and to left.
Right: TEP3166-, locate horizontally on MRGB RH low and to right.



Figure 6. TEP2678-, locate one on each oil cooler below vernatherm valve.



Figure 7. TEP2688-, locate one on each hydraulic unit, low around bottom of circular module.

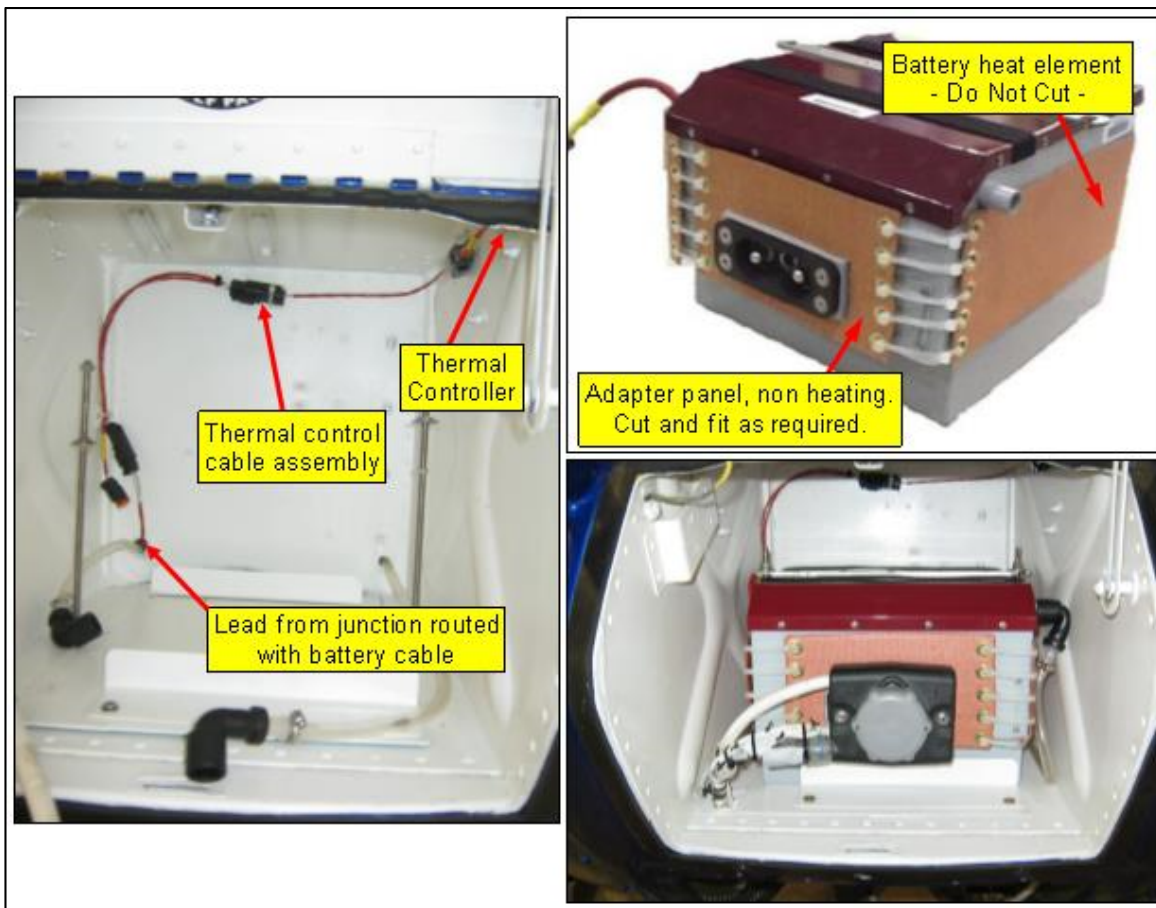


Figure 8. Battery heater installation. Control cable assembly located at rear of battery box, Thermal control TLP3046- located at top left of box secured with cable-ties and Click Bond cable anchors TU02782, refer to instructions TN03046 and TN02782. TBP2646-31- battery element and TB02645-07 adaptor panel fitted around battery. Adapter panel cut to fit around contact block, Do Not cut element. Use cable-ties or appropriate lacing and gently lace element and panel in place around perimeter of battery. Alternate tension between lacing and grommets. Be careful not to pull too hard, this could result in damage the element or in pulling grommets out.



Figure 9. Example VAC plug receptacle (power outlet) installation. Location to be determined by installer, suggest locating in passenger compartment or in aft bulkhead, in non-structural inspection plate. Location varies due to seating configuration, operational requirements, and available space. Placard per cable kit wire diagram 03196 and refer to TN02533.

Note: Installation of VAC outlet optional.



Figure 10. AV/Cabin Heater THP3094-500. Location varies due to seating configuration. Suggest locating as shown, in crew cabin below right front seat with four supplied Click Bond stud mounts CB4000E3CR16 1-inch 10-32 or equivalent CB3000 or 4000 series studs round or trimmed base (-750). Surface preparation: Lightly abrade glossy surfaces with scotch bright or equivalent, to improve the adhesive bond. Just prior to adhesive application, clean surfaces with CB911 solvent wipe, then to prevent redistribution of contaminants dry with a clean dry cloth before solvent evaporates. Do Not use shop towel, rags or paper wipes contaminated with oil, soap, or reclaimed solvents.

Optional method for locating AV heater uses 8 each TU03239-02 Dual Lock™ Strips 1x2, mated and located at each corner, strips supplied separately. Clean contact surfaces of mounting location and AV heater with CB911 solvent wipe then to prevent redistribution of contaminants dry with a clean dry cloth before solvent evaporates. Do Not use shop towel, rags or paper wipes contaminated with oil, soap, or reclaimed solvents.

For additional AV heater installation information refer to instruction TN03094.

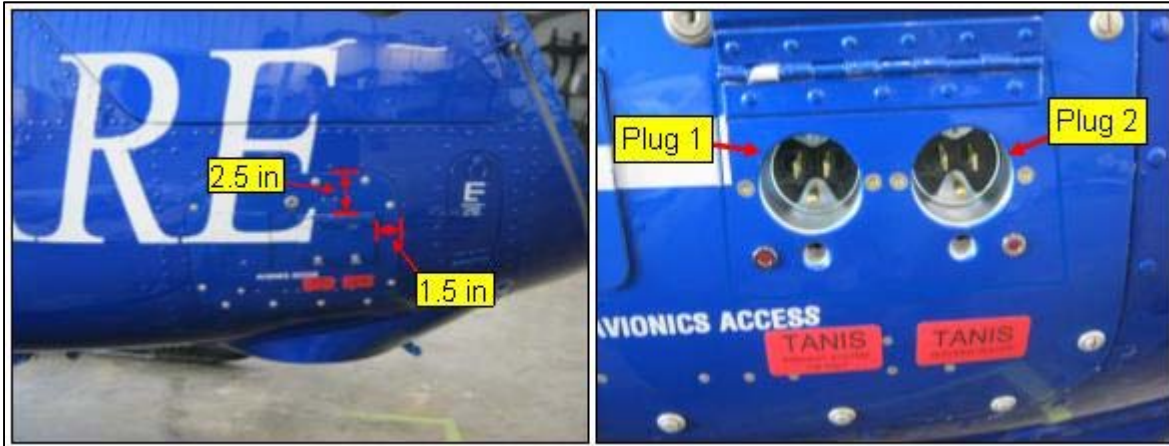


Figure 11. Example of plug door and plugs. Locate in avionics panel (900F2307022-101) below forward right crew door. Plug-1 primary preheat system, placard TU02615-. Plug-2 cabin heater and optional VAC outlet, placard TU03119-01. Door doubler is positioned approximately 2.5 inches down from top edge and 1.5 inches from right edge of panel.

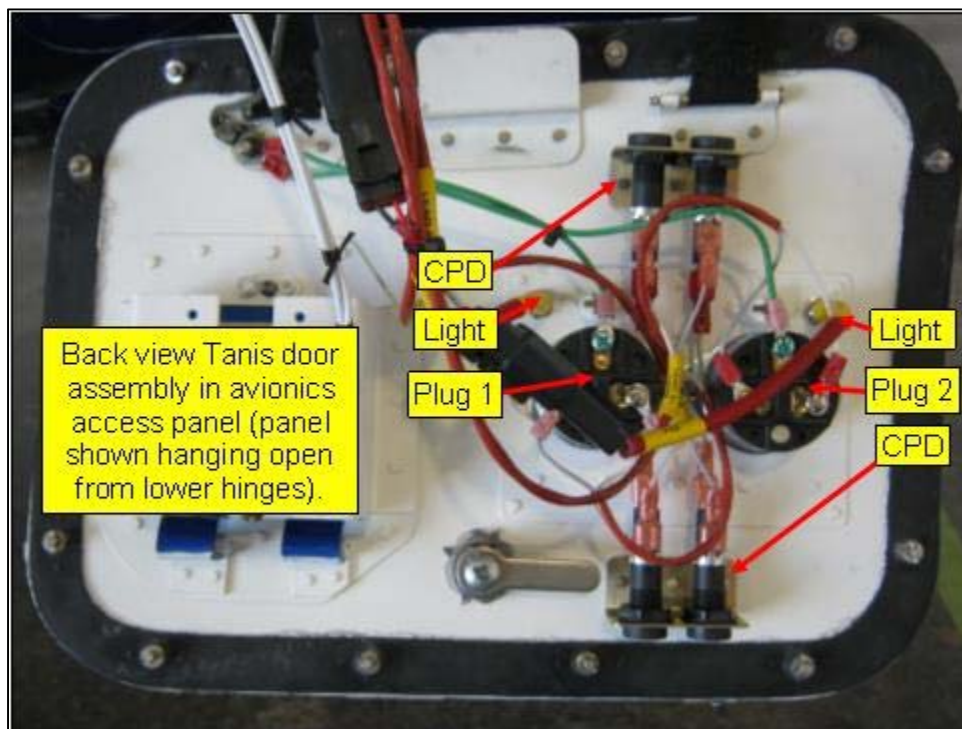


Figure 12. Rear view of avionics access panel with plugs and supporting hardware installed. Install each with reference to the following:

Cable Kit: TCH3196, refer to drawing 03196.

Door Kit: TD03097, refer to drawing 03097 and instruction TN03097.

Plug: TP02070-M-115 (TP02839-S-230), refer to instruction TN02070.

Light: TLP3039-06-115 (TLP3039-230), refer to instruction TN03039.

CPD: TU03141-B dual fuse kit with bracket, refer to drawing 03141.



Figure 13. Example of mounting for junctions J-A and J-B and routing from avionics bay aft under floor with engine control cables and existing wiring to upper deck.

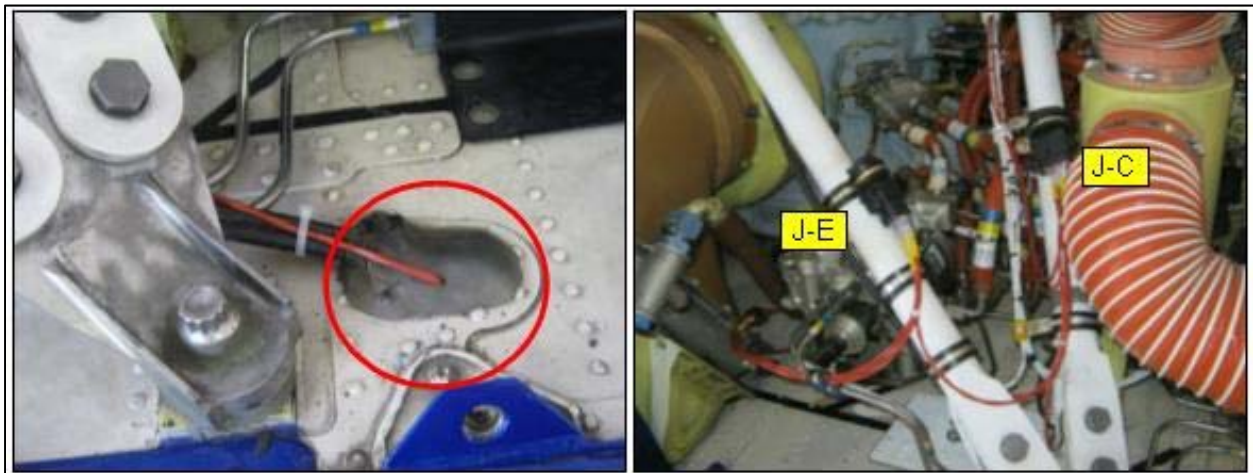


Figure 14. Examples lead 03 routed through upper deck with engine control cables, deck sealant (ProSeal) penetrated with awl and resealed, lead routed to right forward MRGB truss assemblies. Upper deck junctions J-C located on right forward truss and right MRGB junction J-E located on adjacent truss.



Figure 15. Examples left MRGB junction J-D respective left MRGB truss and leads routed with existing wiring to respective elements.

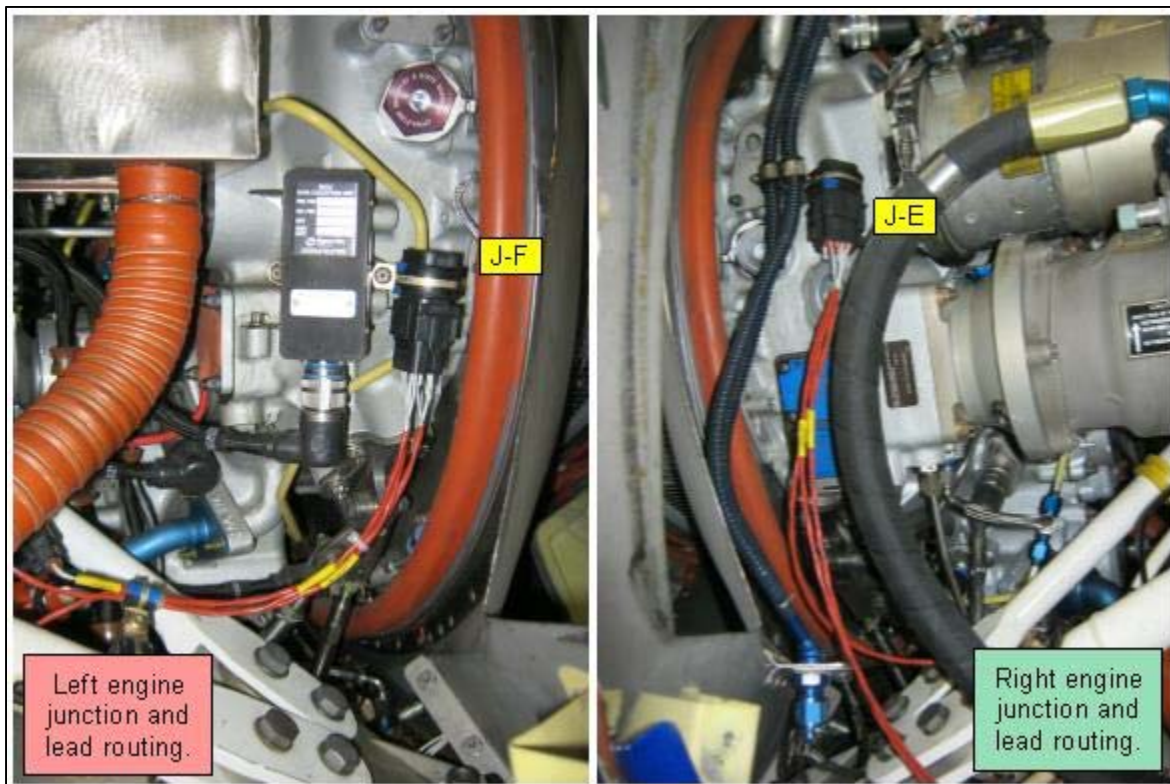


Figure 16. Examples left and right engine junctions J-F and J-E located on respective engine accessory gearboxes located with existing hardware, leads routed to corresponding elements.

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