



INSTRUCTION – PREHEAT KIT INSTALLATION

Subject: TSHEC145-2773-115 and TSHEC145-2773-230
Heli-Preheat Kits, Airbus EC145/BK117 w/Arriel Engines

Document No: TNH2773

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RECORD OF REVISIONS

When revised document changed in its entirety.

REV	DATE	DESCRIPTION	BY	CKD
E	DEC-20-2019	AV/Cabin Heater option and 38-inch battery heater.	DNE	GDO
D	NOV-12-2019	Revise description Figure 4.5	DNE	GDO
C	NOV-11-2019	Correct Table 4.1	GDO	DJE

Current revision approval: _____

1. PURPOSE

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

2. REQUIREMENTS

Subject kit top-level drawing, 02773-115 or 02773-230, parts and documents as listed.

- Tools, hardware, consumables, power supply, and extension cords, not supplied.
- Pad element bonding sealant supplied separately refer to TN02788.
- Sheet metal work required, refer to this instruction and related documents.

3. INSTALLATION

⚠ Caution: Energized elements can cause 2nd and 3rd degree burns. **Do Not** connect elements or system to power before completing installation and Functional System Check, TNG1000.

Abbreviations: Accessory gearbox (AGB), Alternating current (AC), Center of gravity (CG), Circuit protection device (CPD), Engine accessory gearbox (MO1), Engine reduction gearbox (MO5), Fuel control unit (FCU), Intermediate tail rotor gearbox (IGB), Main rotor gearbox (MRGB), Original equipment manufacturer (OEM), Section (§), Service Bulletin (SB), Tail rotor gearbox (TRGB), To be determined (TBD), Top-level drawings (TLD).

- Technicians and users of this instruction should be familiar with Installation Guide TNG1000 and related document listed in TLD.

3.1 Inventory

Start with parts and document inventory, refer to subject kit TLD for item list.

PROPRIETARY DATA

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3.2 Weight and Balance

Weigh kit and intended installation hardware before installation. Approximate system weight 8.0 lb. / 3.6 kg. Use centerline of upper deck at forward engine firewall for CG calculations. Refer to TNG1000 for change requirements.

Option supplied separately: AV Cabin Heater estimated installed weight 1.5 lb / 0.7 kg. Use location of installation for CG. Example deck below right front seat or location as installed.

3.3 Elements

Locate elements with reference to narratives and examples in § 4.

- a) Measure resistance of each element before installing, Table 4.1. or 4.2 as applicable.
- b) Battery heat element secure around parameter of battery.
- c) Pad heat elements bond to gearboxes and tanks with sealant, refer to TN02788.
- d) Optional AV/Cabin Heater locate under crew seat or other location TBD.
- e) Alternate or additional elements available if required contact Tanis engineering.

3.4 Electrical

Locate electrical components with reference to narratives and examples in § 4.

- a) Electrical routing suggested final routing TBD by installing authority.
 - b) Refer to cable kit wire diagram drawing 02789, and installation guide TNG1000.
 - c) Wire termination and tooling refer to instructions TN02793 and TN03012.
 - d) 230-volt kit supplied with extension cord plug adaptor, refer to instruction TN02829.
1. Shore power plug (inlet) TP02070-M-115 or TP02839-S-230, lights TLP3039-115 or TLP3039-230, and CPD kits TU03141-B: Refer to individual component installation instructions TN02070, TN03039, drawing 03141, and Figures 4.1. 4.8. 4.9. Plug pinout cable kit wire diagram drawing 02769. Standard configuration below when configured with optional THP3094 series AV/Cabin Heater or other option TBD by installing authority.

Plug 1 (left) primary system circuit, engines, gearboxes, and battery.

Plug 2 (right) accessory circuit (option supplied separately), dedicated AV/Cabin Heater circuit or other TBD.

Locate plug(s) on right aft side with one of the following options:

- A: Back of right aft step, refer to Figures 4.1 and 4.8.
- B: Door kit TD03097, refer to Figures 4.1 and 4.9. Cover plate installed when accessory plug 2 not used.
- C: Other configuration TBD by installing authority.

Note: Preheat kit supplied with 2-place door kit TD03097 for use as needed and CPD fuse kit TU03141-B, includes bracket for use as needed. When configuring plug 2 circuit match CPD type (TU03141-B) or use optional TL03013-BK, CPD - Fused Link w/Spare Lead. For additional CPD options refer to installation guide TNG1000.

2. Ground wire: Verify OEM engine/airframe bonding straps are installed. Attach ring crimp end of green 22759-181 to existing ground lug or other applicable ground location on airframe and terminate in shore plug. Connection not to exceed .003 ohms, refer to TNG1000.
3. Engine Deck Penetration/Firewall Connectors: TU03125, locate one connector kit in each engine deck outboard of engine adjacent to existing disconnects, refer to drawing 03125 and Figure 4.10.
4. Tail Boom Connector: TU03127, locate in tail boom connector plate with existing disconnects or use alternate connectors, refer to wire diagram and Figure 4.11.
5. Cable Kit: TCH2789 locate junctions (J-A through J-F) in serviceable areas that allow leads to reach corresponding components. Secure with cushioned clamps, cable-ties, and/or appropriate lacing, refer to examples in Figure 4.12.
 - J-A and J-B: Distribution junctions, locate inside rear compartment near aft side of plugs and CPD (fuse) kit TU03141-B.
 - J-C and J-D: Left and right engine junctions, locate below corresponding engine compartment adjacent to corresponding deck connector kits TU03125.
 - J-E and J-F: Left and right MRGB junctions, locate outboard of MRGB near left and right oil tanks on or near corresponding tank brackets, left and right sides.
6. Leads: Route with reference to wire diagram and terminate accordingly. When possible route with existing wiring and use existing bulkhead and panel penetrations. Secure with cushioned clamps, cable-ties, and/or appropriate lacing, refer to Figure 4.12.
 - 01: Power lead with CPD, locate CPD in serviceable area in baggage hold or near plug 1, route power from junction J-A through CPD to plug 1.
 - 02: Indicator light lead, route from CPD to light.
 - 03, 04: Engine junction leads, route from corresponding engine junctions to junction J-A.
 - 05: Jumper lead connects distribution junctions J-A and J-B.
 - 06, 07: Left and right MRGB junction leads, route from corresponding junction through deck using existing penetration into cabin ceiling and aft with existing wiring to junction J-A. When required penetrate and seal deck following OEM procedures.
 - 08, 09, 10: Left engine element leads, route from elements through firewall connector to left engine junction.
 - 11, 12, 13: Right engine element leads, route from elements through firewall connector to right engine junction.
 - 14: Left engine oil tank element lead, route from tank element to left MRGB junction J-E.
 - 15, 16: Left MRGB element leads, route from elements to left MRGB junction J-E.
 - 17: Right engine oil tank element lead, route from tank element to right MRGB junction J-F.
 - 18, 19: Right MRGB element leads, route from elements to right MRGB junction J-F.
 - 20: IGB element lead, route between element and junction J-B through tail boom disconnect connector.

- 21: TRGB element lead, route between element and junction J-B through tail boom disconnect connector. Note: TRGB element supplied unterminated to allow for positioning and securing connector on boom structure.
- 22: Battery heater lead, route between battery station and junction J-B. Lead connects to control cable assembly with thermal control. Position battery element connector for disconnect during maintenance. Locate thermal control 6 - 18 inches / 15 - 45 cm from battery, in battery environment, secure controller with cable anchor TU02782, refer to TN03046. may be removed seasonally. Cap when lead when not in use (gray sealing caps DT04-2P-C017 supplied for use as needed).

Optional AV/Cabin Heater: Requires dedicated circuit refer to cable kit wire diagram and TN03094. Suggested location below right crew seat or other TBD by installing authority. Heater and thermostat may be removed seasonally.

- 7. Placard(s): Affix supplied placard TU02615- adjacent to corresponding system plug or field fabricate alternate per operator requirements, minimum listing: *Tanis Preheat* and voltage requirement (*115-* or *230-Volt*).

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 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 and Functional System Check located in Installation Guide TNG1000.

** Option supplied separately: AV/Cabin heater ohms and inrush amperage vary due to heater design, refer to instructions TN03094 and TN03235.

115 Volt Kit: Plugs 1 and 2

Total power requirement 14.3 Amps.

Recommend 20 Amp 115 VAC continuous power source: 10-amps per plug.

Plug 1. Engines, gearboxes, battery			Total:	8.3 Amps	952 Watts	13.9 Ohms
* Without battery heater:				7.6 Amps	878 Watts	15.1 Ohms
Qty	Element Part Number	Element Location		Watts	Ohms	
* 1	TBP2648-38-115/74	Battery	each:	74	178.7	
1	TEN2673-24-115/28	TRGB	each:	28	472.3	
2	TEP2671-115/57	Engine MO1	each:	57	232.0	
2	TEP2673-115/28	Engine oil tank	each:	28	472.3	
1	TEP2718-115/28	IGB	each:	28	472.3	
2	TEP2733-115/53	MRGB Aft	each:	53	249.5	
2	TEP2737-115/33	Engine MO1	each:	33	400.8	
2	TEP2739-115/120	Engine MO5	each:	120	110.2	
2	TEP2739-115/120	MRGB Front	each:	120	110.2	

** Plug 2. AV/Cabin Heater			6.0 Amps			
Qty	Part Number	Location		Watts	Ohms	
** 1	THP3094 series	Crew cab	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 and Functional System Check located in Installation Guide TNG1000.

** Option supplied separately: AV/Cabin heater ohms and inrush amperage vary due to heater design, refer to instructions TN03094 and TN03235.

230 Volt Kit: Plugs 1 and 2

Total power requirement 7.1 Amps.

Recommend 12 Amp 230 VAC continuous power source: Plug 1, 7.0-amp, Plug 2, 5-amp

Plug 1. Engines, gearboxes, battery			Total:	4.1 Amps	952 Watts	55.6 Ohms
* Without battery heater:				3.8 Amps	878 Watts	60.3 Ohms
Qty	Element Part Number	Element Location		Watts	Ohms	
* 1	TBP2648-38-230/74	Battery	each:	74	714.9	
1	TEN2673-24-230/28	TRGB	each:	28	1889.3	
2	TEP2671-230/57	Engine MO1	each:	57	928.1	
2	TEP2673-230/28	Engine oil tank	each:	28	1889.3	
1	TEP2718-230/28	IGB	each:	28	1889.3	
2	TEP2733-230/53	MRGB Aft	each:	53	998.1	
2	TEP2737-230/33	Engine MO1	each:	33	1603.0	
2	TEP2739-230/120	Engine MO5	each:	120	440.8	
2	TEP2739-230/120	MRGB Front	each:	120	440.8	

** Plug 2. AV/Cabin Heater			Total:	3.0 Amps		
Qty	Part Number	Location		Watts	Ohms	
** 1	THP3094 series	Crew cab	each:	500	(PTC)	



Figure 4.1. Preconditioning kit overview.

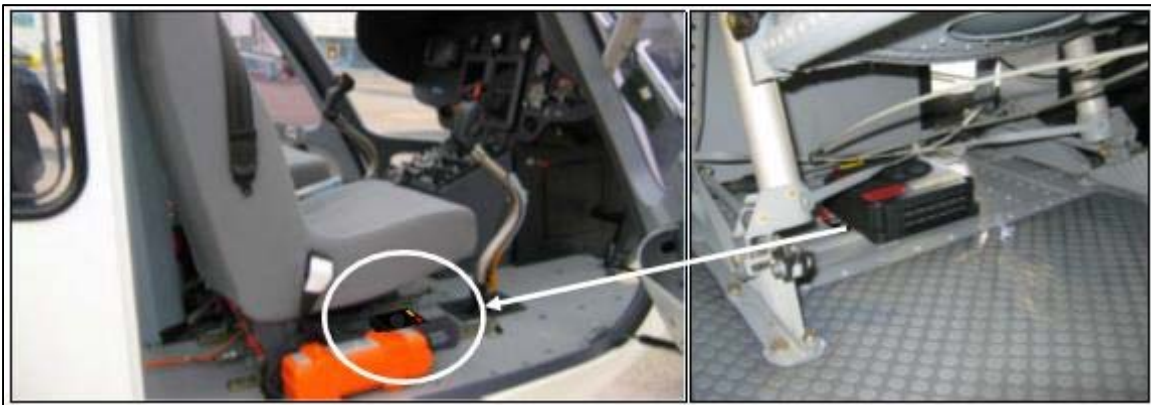


Figure 4.2. Option supplied separately: THP3094 series AV/Cabin Heater and TLP3235 Thermostat. Locate on deck below right crew seat with heater outflow forward, or location TBD by installer, may vary due to seating configuration. TU03262 stud mount kits available for mounting. AV heater and thermostat may be removed seasonally. Power supplied through plug 2 routed into crew cab with existing wiring, refer to wire diagram 02789. For installation procedures and requirements refer to AV heater and thermostat instructions TN03094 and TN03235.

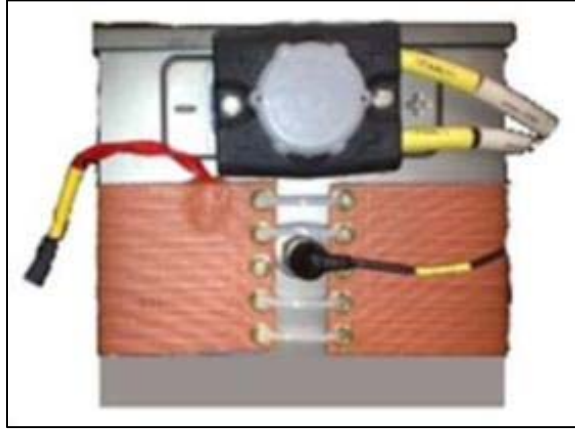


Figure 4.3. TBP2648-38- Battery element (generic example shown). Secure around battery position clear of bracketing, connectors, and chafe points. Use cable ties or appropriate lacing. Gently lace in place alternating tension between ties. Excessive tension may cause damage or result in pulling grommets out. Note: Due to varying battery configuration and/or location alternate elements, and/or adaptor panel, available.

Thermal control cable assembly TL03217-C, secure with existing wiring, on battery cables or as required. Position element connector for disconnect during maintenance, locate thermal control TLP3046-05 in battery environment or compartment 6 to 18 inches from battery when possible. Use cable anchor TU02782 or secure with existing cabling, refer to instructions TN03046. Battery element may be removed seasonally (gray sealing cap DT04-2P-C017 supplied for use as needed).

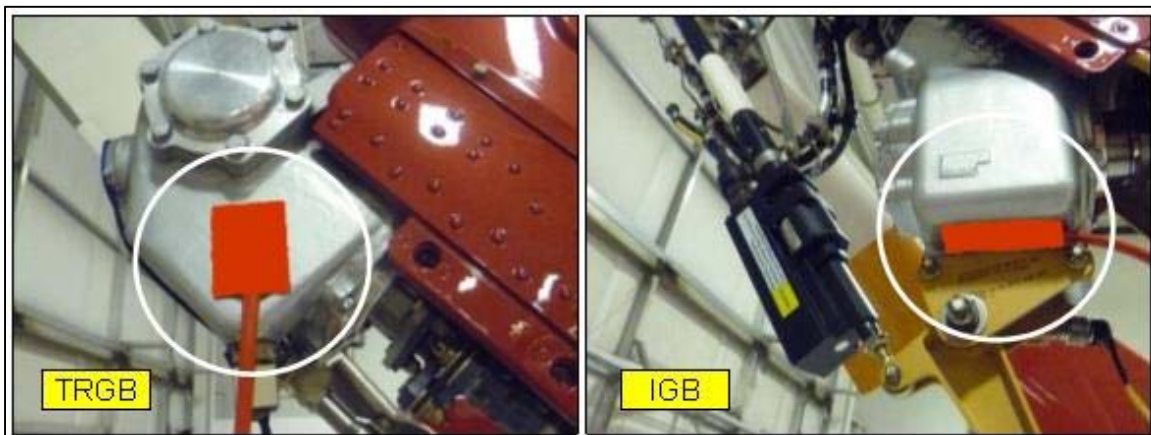


Figure 4.4. TRGB and IGB elements:

TEN2673-24- locate on right side of TRGB lead down to follow chip light to boom, lead supplied unterminated to allow for mounting of connector with clamp on tail boom, cut and terminate as required.

TEP2718- locate on bottom of IGB lead forward to follow chip light wire to boom.



Figure 4.5. MRGB elements:

TEP2733- locate 2 elements on aft side on flat circular areas adjacent to left and right inputs, position lead to follow existing wiring.

TEP2739- locate 2 elements on forward side below left and right outputs.

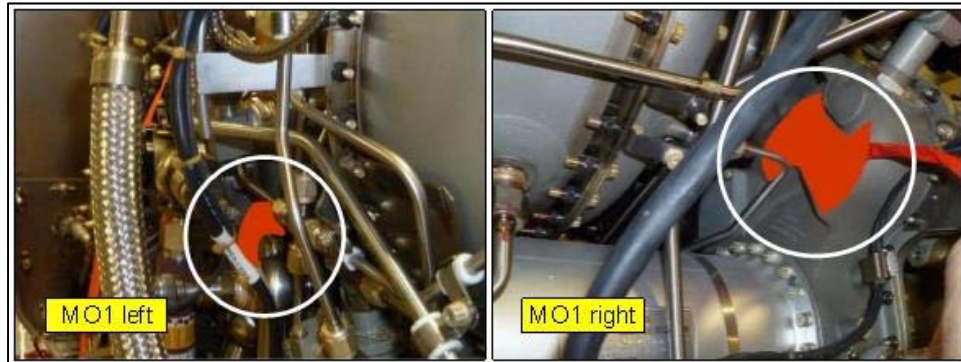


Figure 4.6. Engine MO1 elements, one each engine:

TEP2737- locate one on left aft side below oil filter lead down.

TEP2671- locate on right aft side opposite of starter/generator lead right.



Figure 4.7. Engine MO5 and oil tank elements, one each engine and oil tank:

TEP2739- locate on aft lower surface of MO5 lead right.

TEP2673- locate one on each engine oil tank below nominal oil level position for lead routing best routing with existing lines and/or wiring.

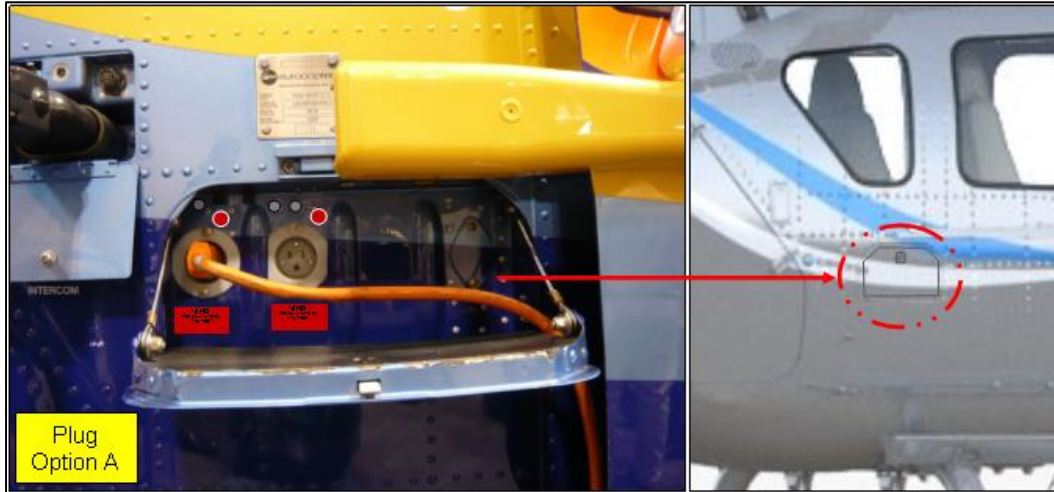


Figure 4.8. Option A: Shore power plug, light and CPD located in aft of right step.

Reinforce back of step panel with TD02750-2 (0.040 2024-T4) doubler supplied with door kit TD03097, or field fabricate similar, fit as required.

Plug, light, and CPD: Locate with reference to instructions TN02070, TN03039, and drawing 03141. Note: CPD panel mounted in rear of step near corresponding plug CPD angle bracket TU03153 not used.

Placard: Plug 1, with placard TU02615-. Plug 2, when installing optional AV heater locate placard TU03119-01. * Fuse holders, field fabricate placard for 12-amp fuses.

Ground wire: Bond, using existing airframe ground lug, or with plug mounting hardware.

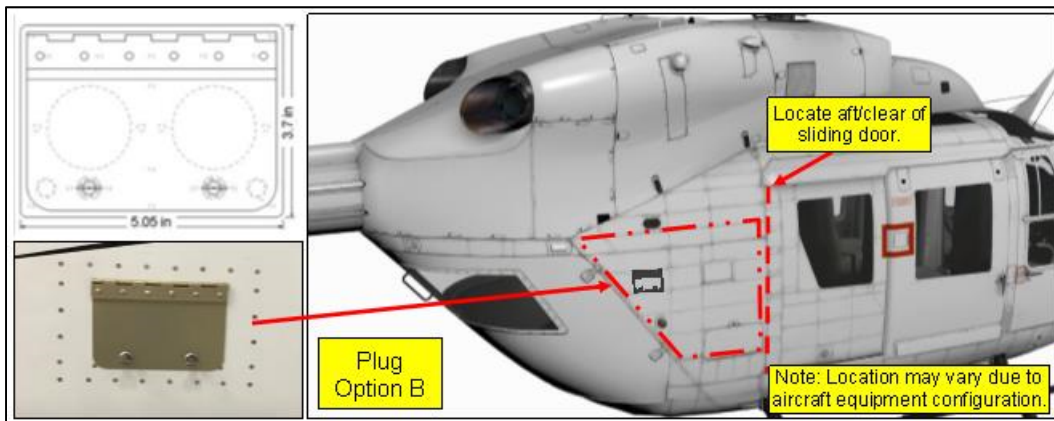


Figure 4.9. Option B: Door kit TD03097 right rear, aft of sliding door. Location will vary due to aircraft configuration and side panel stringer spacing, refer to drawings 03097 and 03141, and instruction TN03097.

Plug light, and CPD: Locate in door kit, refer to instructions TN02070 and TN03039, and drawing 03141. Locate CPD fuse kit TU03141-B in serviceable area near rear of plug, location TBD by installing authority.

Placard: Plug 1, with placard TU02615-. Plug 2, when installing optional AV heater locate placard TU03119-01. * Fuse holders, field fabricate placard for 12-amp fuses.

Ground wire: Bond, using existing airframe ground lug, or with plug mounting hardware.

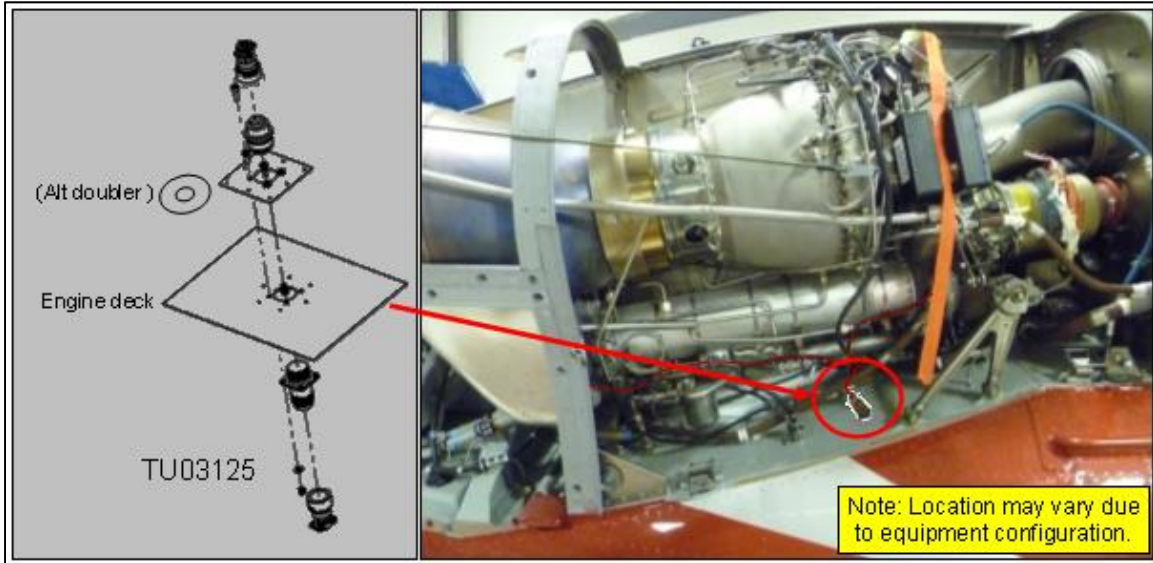


Figure 4.10. Generic example of TU03125 firewall connector kit located in engine deck outboard of engine adjacent to existing disconnects/deck penetrations. Location TBD by installing authority, refer to drawing 03125, use supplied doubler, alternate round doubler, or field fabricate as required.

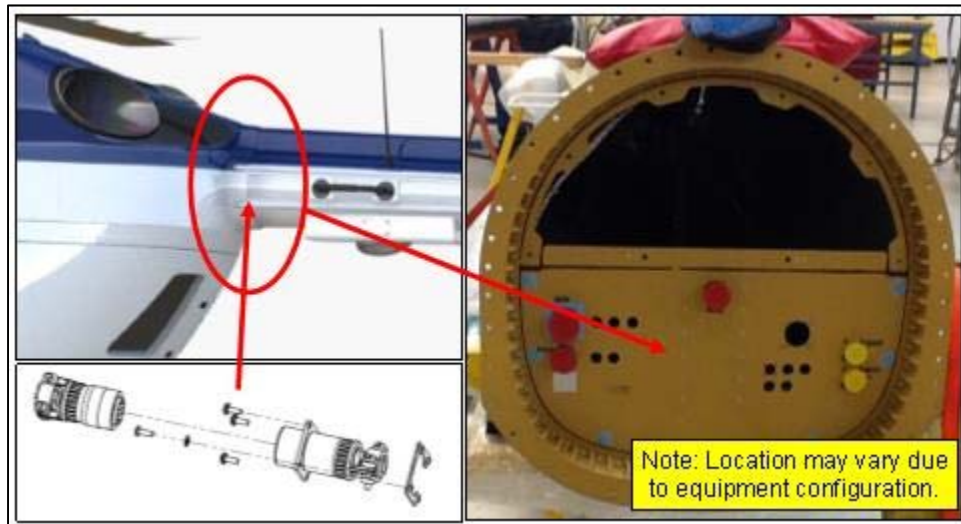


Figure 4.11. Bulkhead connector kit TU03127, locate with reference to drawing 03127. directionally in tail boom disconnect plate adjacent to existing disconnects or location TBD by installing authority, or use alternate connectors referenced in cable kit wire diagram.

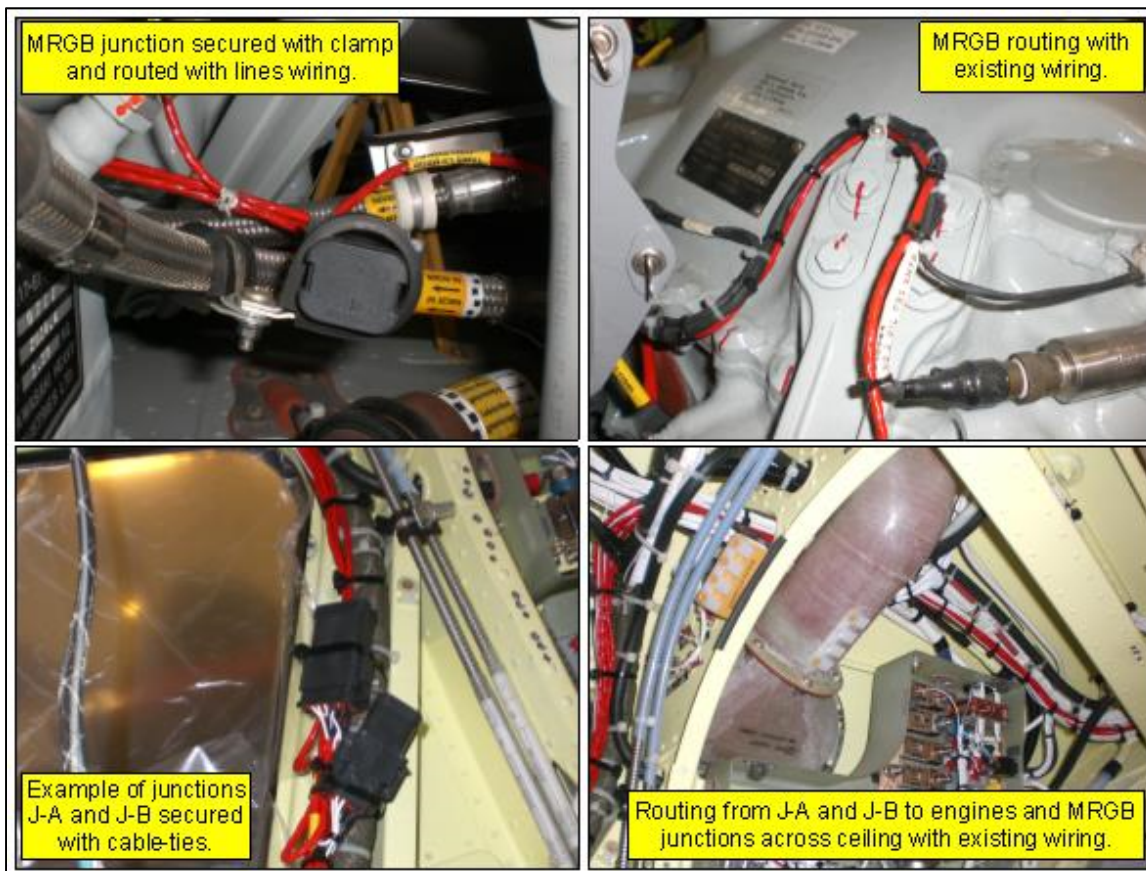


Figure 4.12. Examples of electrical, routing suggested final TBD by installing authority. Refer to TNG1000 for regulatory guidance and additional installation information.

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