# CHAPTER

# 24

# ELECTRICAL POWER

# CHAPTER 24 - ELECTRICAL POWER
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# CHAPTER 24 - ELECTRICAL POWER
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# ELECTRICAL POWER - DESCRIPTION AND OPERATION

1. General (Fig. 1)

   A. Primary DC power is provided by two starter-generator systems. During normal operation, both generators operate in parallel. Secondary DC power is provided by a nickel-cadmium battery. An external DC power source can be connected to the aircraft DC distribution system.

   B. The AC Power is provided only for Electroluminescent Panel located in the cockpit.

   C. Two 50A 28V Electrical Power Sockets can be installed in the passenger compartment. The AUX PWR 1 [2] socket is supplied by the Left [Right] Generator Bus, throught a dedicated 50 Amps RCCB (Remote Control Circuit Breaker) located in the Main Junction Box; each RCCB is maneged by a dedicated Circuit Breaker located in the Copilot CB Panel labeled AUX 1 and AUX 2.

   D. The 14 Vdc auxiliary power system consists of a converter DC / DC 28 - 14 Volts able to supply 8 Amp max at 14 Vdc through 2 sockets of automotive standard. The sockets are installed close to the left / right table in the typical "club" configuration. The system is powered by a 28 Vdc through a 5 Ampere "AUX PWR" circuit breaker installed on the "UTILITY C/B PANEL".

2. Description

   A. An engine-driven DC generator on each engine provides the normal source of 28 V DC to the airplane. Each generator is rated at 28 volts, 400 amperes.

   B. A nickel-cadmium battery provides the secondary source of DC power. The battery has a temperature sensor the signal from which is used for temperature indication and overtemperature warnings.

   C. Two DC-DC power converters are installed and connected on the essential bus and the essential avionics bus. They are installed behind the interiors near pilot circuit breaker panel in the cockpit. The converter enable some equipment to be power supplied during engine start phases.

   D. External DC power can be connected to the airplane through a receptacle on the left side of the airplane. Connection of the external power to the DC distribution system is controlled by the battery switch.

   E. An Emergency Power Supply is installed in order to power supply the emergency system (stand-by instrument, landing gear position lights, emergency lights).

   F. A multi-function display (MFD) is located on the instrument panel. The MFD can indicate:

      – the voltage on the DC busbar system
      – the output of the left generator
      – the output of the right generator

- the battery temperature.
- external power

G. A system test switch can be selected to test the battery temperature sensing system.

H. A battery switch labelled BAT-OFF controls the connection of non-generated DC supplies to the DC busbar network. In the BAT position, the switch controls two relays:

- a battery relay which connects the battery to the battery busbar
- an external power relay which connects the external power to the battery busbar and enables the interconnection of the battery busbar to all DC busbars (Refer also to H.).
- A busbar disconnect switch labelled EMER-NORM-BUS DISC controls the interconnection of the DC busbars. The switch controls three relays which connect the busbars according to the power supply source and the switch setting as follows:
- NORM interconnects all DC busbars on the ground with the weight on-wheels switch made irrespective of the power source, and in flight when a generator is on line.

  **NOTE:** Connecting an external power source by-passes the weight-on-wheels switch to enable all busbars when the airplane is on jacks.

- BUS DISC disconnects the non-essential busbars leaving the battery busbar feeding an essential services busbar only.

  **NOTE:** Loss of both generators in flight has the same effect as the BUS DISC setting.

- EMER connects the dual feed busbars to the battery busbar when only battery power is available and the weight-on-wheels switch is in the flight position.

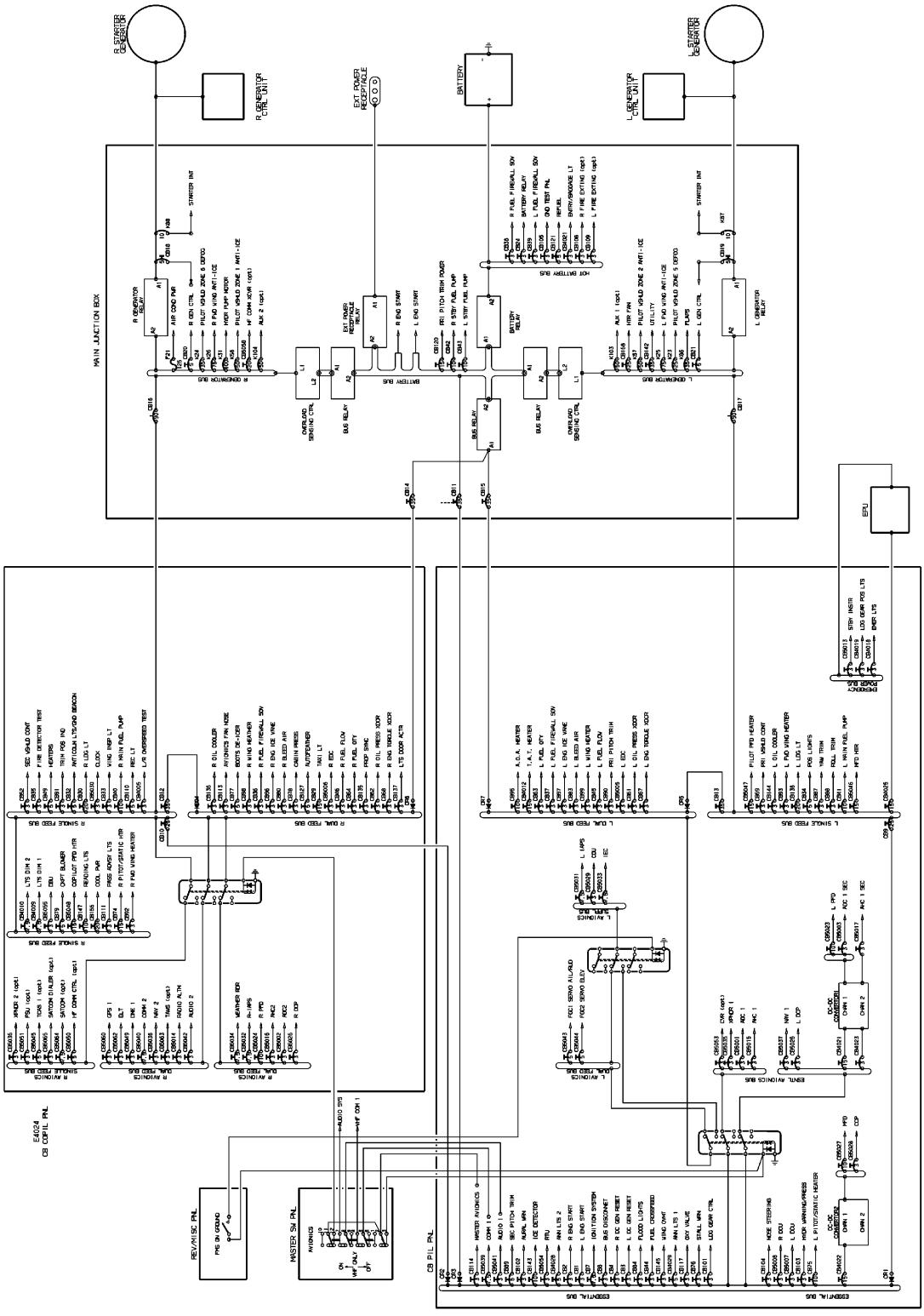

Fig. 1 - Electric Load Distribution- Description

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# ELECTRICAL POWER - MAINTENANCE PRACTICES

## 1. General

A. This section provides safety precautions and general maintenance practices to be observed when working on electrical or electronic systems and components.

## 2. Safety Precautions and General Maintenance Practices

A. WARNING:

- WHEN WORKING ON AN ELECTRICAL SYSTEM, ISOLATE THE SYSTEM TO PREVENT ACTUATION; SO THAT ONLY THE RESPONSIBLE SYSTEM TECHNICIANS CAN OPERATE THE SYSTEM.
- DO NOT WORK ON AN ELECTRICAL SYSTEM WHEN IT IS LIVE (UNLESS SPECIFIED IN MAINTENANCE PRACTICES).
- ALWAYS CONNECT GROUND (EARTHING) CABLE PRIOR TO WORKING ON THE AIRPLANE.
- PRIOR TO REMOVAL OR INSTALLATION OF A COMPONENT, CHECK THAT THE SYSTEM IS ISOLATED.
- ONLY USE SUITABLE INSULATED TOOLS FOR TESTING LIVE SYSTEMS.

B. CAUTION

- DO NOT USE CIRCUIT BREAKERS AS ON/OFF SWITCHES.
- APPLY DUST CAPS TO OPEN CONNECTORS TO PROTECT THEM FROM DAMAGE.
- ENSURE THAT WIRES ARE ALL CLEARLY IDENTIFIED. IF NECESSARY, CLEAN WITH A MOIST CLEANING CLOTH CONTAINING DRY CLEANING SOLVENT OR RENEW WIRE MARKINGS.
- WHEN REPAIRING WIRING WITH DEFECTIVE SCREENING, ENSURE THAT THERE IS GOOD ELECTRICAL CONNECTION BETWEEN THE SCREENING AND THE AIRFRAME.
- CABLE CLAMPS MUST HAVE THE CORRECT DIAMETER AND BE ADEQUATELY LINED WITH RUBBER, PLASTIC, ETC TO PREVENT CHAFING.
- CHECK FOR SIGNS OF CHAFING ESPECIALLY AT BRANCHES. SHARP METAL EDGES DAMAGE INSULATION. FAULTY WIRING PROTECTION AND FAULTY WIRING MUST BE RENEWED.

3. Inspection/Check

A. Inspection and/or checking of the electrical system and components should be conducted in accordance with current inspection intervals as outlined in Chapter 5-00-00 or whenever a closed area is opened for other maintenance purposes.

B. Procedure

(1) Check electrical system

(a) Check electrical wiring for chafing, fraying, and cuts.

(b) Check wire clamps and supports for security.

(c) Check that all wiring is supported clear of sharp metal edges.

(d) Check wiring for liquid impregnation.

(e) Check that terminal connections are secure and that lugs are not cracked or touching adjacent terminal or structure.

(f) Check electrical bonding jumpers for security and for frayed or broken condition.

(g) Check electrical equipment for proper installation, security of mounting, physical damage, and evidence of overheating.

(h) Check security of safety wire on electrical equipment and electrical connectors.

# ELECTRICAL POWER - SERVICING

1. General

The following warnings and cautions apply to connecting electrical power:

**CAUTION:** BEFORE APPLYING ELECTRICAL POWER MAKE SURE THAT ALL SWITCHES ARE IN THE OFF POSITION.

**CAUTION:** BEFORE APPLYING ELECTRICAL POWER ENSURE THAT ALL POSTED SAFETY NOTICES ARE OBSERVED.

**WARNING:** BEFORE WORKING IN THE AVIONICS COMPARTMENT, MAKE SURE THAT THE POWER SUPPLY TO THE WEATHER RADAR IS SAFE.

2. Internal Power - Application

A. Select BUS VOLTS on the MFD.

B. Set the battery switch to BAT.

C. Monitor the battery voltage. If the battery voltage is 23V or less, service or replace the battery.

**NOTE:** The battery must not be serviced installed in the airplane.

3. Internal Power - Removal

A. Select BUS VOLTS on the MFD.

B. Monitor the battery voltage. If the battery voltage has fallen to 23V or below, have the battery serviced or replaced.

C. Set the battery switch to OFF.

D. Set all switches to NORM or OFF.

4. External Power - Application

**CAUTION:** KEEP ALL NAVIGATION/COMMUNICATIONS/RADIO EQUIPMENT TURNED OFF WHEN CONNECTING AN EXTERNAL POWER SOURCE.

**CAUTION:** DO NOT CONNECT A GROUND POWER UNIT IF THE BATTERY VOLTAGE IS 23 VOLTS OR BELOW. SERVICE OR REPLACE THE BATTERY.

**CAUTION:** IT IS NOT ADVISABLE TO CONNECT EXTERNAL GROUND POWER WITH THE BATTERY DISCONNECTED AS THE BATTERY ABSORBS VOLTAGE PEAKS GENERATED BY THE GROUND POWER UNIT.

**CAUTION:** THE EXTERNAL POWER SUPPLY MUST BE REGULATED PER MIL-STD-704D OR EQUIVALENT.

**CAUTION:** THE BATTERY TEMPERATURE MUST BE MONITORED ON THE MFDI WHEN GROUND POWER IS CONNECTED.

A. Make sure that all avionics switches are in the OFF position.

B. Make sure that the battery switch is in the OFF position.

C. Connect the external power to the receptacle.

D. Switch on the ground power unit and set the voltage to 28 ± 0.5 volts.

E. When the ground power unit voltage is stabilized, set the battery switch to BAT.

F. Make sure that the green EXT PWR caption on the annunciator panel is on.

G. Select BAT TEMP on the MFD and observe the trend of battery temperature to preclude overheating. If another setting of the MFDI is required, monitor the BAT TEMP caption on the annunciator panel.

5. External Power - Removal

A. Set the battery switch to OFF.

B. Switch off and remove the ground power supply.

# AC GENERATION - DESCRIPTION AND OPERATION

## 1. General

A. Two Dual Voltage Inverter are located in the cockpit and used only to supply power to Electroluminescent Lighted Panels. (Ref to Chapter 33)

## 2. Description

A. The system consists of two Dual Voltage Inverter that convert DC electrical power into single phase, sinewave, regulated AC electrical power. The nominal input is 28V DC and the nominal outputs of the inverter are 115V AC 400Hz.

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AC GENERATION - MAINTENANCE PRACTICIES

1. Ground Fault Interrupted Test

A. Procedure

(1) Insert a 115VAC/60Hz load (e.g. 100-Watt lamp) on one of the cabin outlet and verify that it is powered.
(2) Push the "TEST GFI" button on the unit.
(3) Verify that the AC power is switched OFF (the lamp extinguishes).
(4) Push the "RESET GFI" button on the unit to set the system.

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# DC GENERATION SYSTEM - DESCRIPTION AND OPERATION

1. General

   A. The airplane primary 28 V DC power requirements are provided by two independent DC generator systems. Secondary sources of 28 V DC power are supplied by a DC battery system and an external power source.

2. Description (Ref. Fig. 1)

   A. The DC generator system consists of two 28.8 volts 400 ampere generators, one installed on each engine. Each generator can supply DC power to the airplane equipment and operate normally in parallel.

   B. The power rating of the generator is such that if one generator fails the remaining generator can still supply the airplane equipment to maintain flight safety.

   C. Additional components are a LH and RH generator control unit which functions to maintain a constant output voltage from each generator during variations in engine speed and electrical load. The control units drive the generators in parallel providing load equalization by regulating each generator excitation.

   D. Overvoltage protection is provided by each control unit to prevent the generator output voltage from exceeding a predetermined value. When an overvoltage condition occurs the control unit disconnects and isolates the generator from the system and de-energizes the respective field relay.

   E. Reverse current protection is provided by opening the main contactor when a reverse current is flowing through the generator interpole windings for a time dependent upon the current magnitude. A reverse current condition can occur during an engine shutdown or can be the result of a failure within the system. The control unit also provides over-excitation protection which opens the main contactor when over-excitation occurs. When a generator channel fails and excitation of the affected generator is insufficient to sustain the total load the generator becomes over-excited without producing a sufficient high voltage to trigger the over-voltage circuit. The paralleling circuits identify the failed channel and the starter-generator is isolated and de-energized.

   F. The DC distribution system operates as a single bus with power being supplied by the battery and both generators. Although the system operates as a single system there is the possibility to separate the left busses from the right busses when required. There are six different types of busses: the essential bus; the LH and RH dual feed generator busses; the LH and RH generator busses; the LH and RH single feed busses; the battery bus and hot battery bus. All the airplane loads are divided among the six bus bars according to their importance and required power. Equipment with duplicate functions are connected to separate busses. During normal operation these busses are connected but when a fault occurs one or more of the busses are automatically disconnected from the power sources to limit damage. The most important busses receive power from two or three independent paths.

G. The essential bus is energized from three sources and is equipped with one circuit breaker and one reverse current blocking diode in each of the three supply circuits. This allows the essential bus to remain active with two independent faults in the supply cables.

H. There are two dual feed generator busses, the LH and the RH. Each dual feed generator bus is energized by two paths equipped each with one reverse current blocking diode and one circuit breaker. Loss of a dual feed generator bus would only occur only after two independent faults in the supply cables.

I. The LH and RH single feed busses are each energized by a single path, each path is protected by a circuit breaker. When a single fault occurs in one of the current paths the respective bus bar is lost.

J. The airplane avionic systems are feed from five avionic busses; Essential Avionics Bus, LH Avionics Dual Feed Bus, LH Avionics Suppl. Bus, RH Avionics Dual Feed Bus and RH Avionics Single Feed Bus. The Essential Avionics Bus, LH Dual Feed Bus and LH Avionics Suppl. Bus are connected to the LH Dual Feed Bus. The RH Avionics Dual Feed Bus are connected to RH Dual Feed Bus, and the RH Avionics Single Feed Bus is connected to RH Single Feed Bus.

K. Two DC-DC power convertors are installed behind the interiors, near pilot circuit breaker panel in the cockpit. The Convertor 1 is feed by Essential Bus, the Convertor 2 is feed by Essential Avionics Bus. The Convertors enable some equipment to be power supplied during engine start phases. The DC-DC power convertors convert a wide input voltage range 10-24 Vdc to a dual regulated 24 Vdc outputs. Are capable of delivering 160 watts and 25 watts continuously for an input voltage range of 10-to 24 vdc and deliver at full load a minimum voltage of 18 Vdc at 8 Vdc input voltage.

L. An Emergency Power Unit (EPU) is installed on the aircraft behind the instrument panel in the cockpit. The EPU supply power to the emergency system (stand-by instrument, landing gear position lights, emergency lights).

3. Operation (Ref. Fig. 1)

A. Two generator MASTER SWITCHES labeled GENERATOR L OFF RESET and GENERATOR R OFF RESET control the LH and RH starter-generators. The generator MASTER SWITCHES have three positions, ON-OFF-RESET and each is spring-loaded to return from the RESET position to the OFF position. The generator is put back on-line after a generator trip by momentarily setting the respective master switch to the RESET position and then to the ON position. Two yellow lights, one for each generator, are located in the annunciator panel and light to indicate that a generator is disconnected.

B. A bus disconnect switch is located on the MASTER SWITCHES panel and is provided to deenergize the bus disconnect relays. The switch is a three position switch decaled NORM, EMER, BUS DISC. When both generators are operating correctly and the switch is in the NORM position all the busses are connected to the generators. With both generators inoperative only the essential bus is connected to the battery. Battery power can however be supplied to the dual feed busses if required, by setting the switch to the EMER position. With the switch in the BUS DISC position the busses are disconnected. When any one of the three bus

disconnect relays is deenergized an yellow caution light BUS DISC lights on the annunciator panel.

C. A master AVIONICS switch located on the pilot switch panel is labelled ON, COM 1 ONLY, and OFF. In the ON position all avionic busses are energized and in the COM 1 position only the primary communication system is energized. The COM 1 position provides radio communication without powering all the avionics sytems.

D. The Emergency Power Unit (EPU) is connected to the Left Single Feed Bus through the EPU 15-amperes circuit breaker located on the Pilot CB Panel.
During normal operation the EPU switch, on the MASTER SWITCHES control panel, is set to ARM, and the Left Single Feed Bus supplies necessary charging voltage to the EPU battery and the following emergency equipment which are connected to the Emergency Power Bus:

- Integrated Stand-by Instrument
- Landing gear position lights
- VHF COMM1 (Emergency Mode Only)
- emergency lighting of ISI bezel and Magnetic Compass

In the event of dual generator failure the EPB power supply is automatically provided by the EPU for about 30 minutes.

The EPU DRAIN amber caution light, on the annuncator panel, comes on when:

- after engine starting the EPU switch, on the MASTER SWITCHES control panel, is set to OFF;
- the Left Single Feed Bus power is unvalable and the EPU begins to supply the Emergency Power Bus (EPU switch set to ARM).
- during the EPU test (EPU switch set to TEST), the battery capacity is less than 50%.

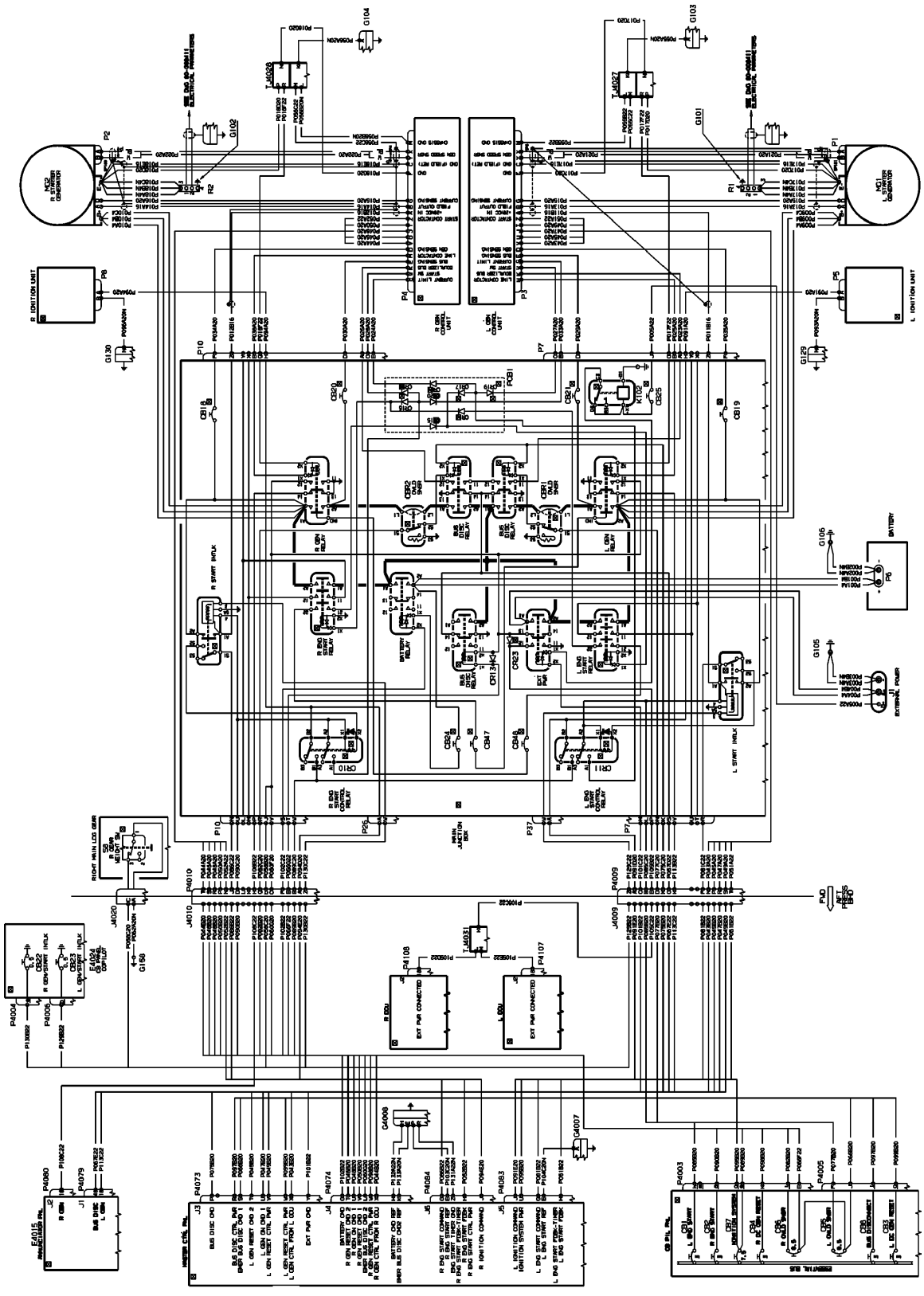


Fig. 1 - DC Power and Start

DC GENERATION SYSTEM - MAINTENANCE PRACTICES

1. Starter-generator - Removal (Refer to Fig. 201)

A. Referenced Information

Maintenance Manual Chapter 54-10-00

B. Procedure

(1) Gain access to the starter-generator. Remove nacelle panel 410AB for the LH engine or 420AB duct 5 for the RH engine (Refer to 54-10-00).

(2) Disconnect the air duct (Refer to Para. 5).

(3) Remove the terminal block cover. Tag and remove the electrical connections. Disconnect the electrical connector from the receptacle.

**CAUTION:** THE UNIT MUST BE SUPPORTED AT ALL TIMES DURING REMOVAL. DO NOT LET THE UNIT HANG WITHOUT THE V-BAND OR ATTACHING HARDWARE FULLY TIGHTENED. UNDUE BENDING LOADS ON THE DRIVE SHAFT SHEAR SECTION CAN DAMAGE THE UNIT.

**CAUTION:** MAKE SURE THAT DURING REMOVAL OF STARTER GENERATOR UNIT NO DAMAGES OCCUR TO POWERPLANT ELEMENTS / SYSTEMS.

(4) Loosen the nut on the T-bolt.

(5) Pivot the T-bolt to release the V-band.

(6) Carefully withdraw the unit off the splined shaft.

2. Starter-generator - Installation (Refer to Fig. 201)

A. Materials

| | |
|---|---|
| Stoddard Solvent | Fed. Spec. P-D-680, Type 1 |

B. Referenced Procedure

Maintenance Manual Chapter 54-10-00.

C. Procedure

**WARNING:** STODDARD SOLVENT IS TOXIC AND COMBUSTIBLE. DO NOT BREATHE VAPORS. USE IN A WELL VENTILATED AREA FREE FROM SPARKS, FLAME AND HOT SURFACES. WEAR SPLASH GOGGLES, SOLVENT RESISTANT GLOVES AND OTHER PROTECTION DEVICE. IN CASE OF EYE CONTACT, FLUSH WITH WATER AND SEEK MEDICAL ATTENTION. IN CASE OF SKIN CONTACT, WASH WITH SOAP AND WATER.

**CAUTION:** MAKE SURE THAT DURING INSTALLATION OF STARTER GENERATOR UNIT NO DAMAGES OCCUR TO POWERPLANT ELEMENTS / SYSTEMS.

(1) Thoroughly clean the drive shaft spline of the unit and the accessory drive pad of the airplane using Stoddard Solvent.

**CAUTION:** DO NOT GREASE DRIVE SHAFT SPLINES.

(2) Replace the "O" ring if cut, cracked or worn.

**CAUTION:** THE UNIT MUST BE SUPPORTED AT ALL TIMES DURING INSTALLATION. DO NOT LET THE UNIT HANG WITHOUT THE V-BAND OR ATTACHING HARDWARE FULLY TIGHTENED. UNDUE BENDING LOADS ON THE DRIVE SHAFT GEAR SECTION CAN DAMAGE THE UNIT.

(3) Engage the drive shaft spline to the accessory drive pad on the engine.
(4) Align the dowel guide pins with the guide holes. Press the unit onto the QAD mounting adapter.
(5) Position the V-band over the mating flanges and latch the T-bolt. Partially tighten the T-bolt nut.
(6) Tap around the circumference of the V-band using a softheaded hammer. Tighten the nut on the T-bolt to 2/3 the recommended torque value stamped on the V-band.
(7) Tap around the circumference of the V-band while tightening the nut on the T-bolt to its recommended torque value as stamped on the V-band.
(8) Check that all electrical terminal lugs and contact surfaces are clean.
(9) Make the electrical connections between the the airplane and the generator terminals.
   (a) LH generator
   – wires P009A4, P009B4, P009C4 to terminal B+.
   – wires P017A4N, P017B4N, P017C4N to terminal E-.
   – wire P017D20 and wire P017E16 to terminal E-.
   – wire P013A16 to terminal A+.
   – wire P015A20 to D.
   (b) RH generator
   – wires P010A4, P010B4, P010C4 to terminal B+.
   – wires P018A4N, P018B4N, P018C4N to terminal E-.
   – wire P018D20 and wire P018E16 to terminal E-.
   – wire P014A16 to terminal A+.
   – wire P016A20 to terminal D.
(10) Connect the electrical connector.
(11) Torque the terminal nuts to the values specified in Figure 1.
(12) Install the terminal cover.
(13) Connect the air duct (Refer to Para. 6).

(14) Perform a Generator Power Cable Routing Inspection as described in this section.
(15) Install nacelle panel 410AB for the LH engine or 420AB for the RH engine.
(16) Do a functional test of the d.c.power generation system.
(17) Check the V-band torque after initial engine start and shutdown. If necessary, tighten the V-band to the proper torque.
(18) Install nacelle panel 410AB for the LH engine or 420AB for the RH engine.

| SIZE | TORQUE VALUES (Pound Inches) |
|---|---|
| 3/8 inch | 220 - 235 |
| 5/16 inch | 125 - 135 |
| No.10 - 32 | 20 - 25 |

Fig. 1 - Terminal Torque Values

3. Generator Control Units - Removal (Ref. Fig. 202)

A. Procedure

(1) Remove the electrical power. Put a warning notice in the flight compartment to tell persons not to apply electrical power.
(2) Open the baggage compartment door (Refer to 52-00-00).
(3) Disconnect connector P3 from the L generator control unit or connector P4 from the R generator control unit.
(4) Remove the four screws (1) attaching the unit to the shelf.
(5) Remove the unit.

4. Generator Control Units - Installation (Ref. Fig. 202)

A. Procedure

(1) Locate the unit on the baggage compartment shelf and fasten with the four screws (1).
(2) Connect the electrical connectors P3 for the L generator control unit or P4 for the R generator control unit.
(3) Close the baggage compartment door (Refer to 52-00-00).
(4) Remove the warning notice in the flight compartment which tells persons not to apply electrical power.
(5) Do a functional test of the DC power generation system.

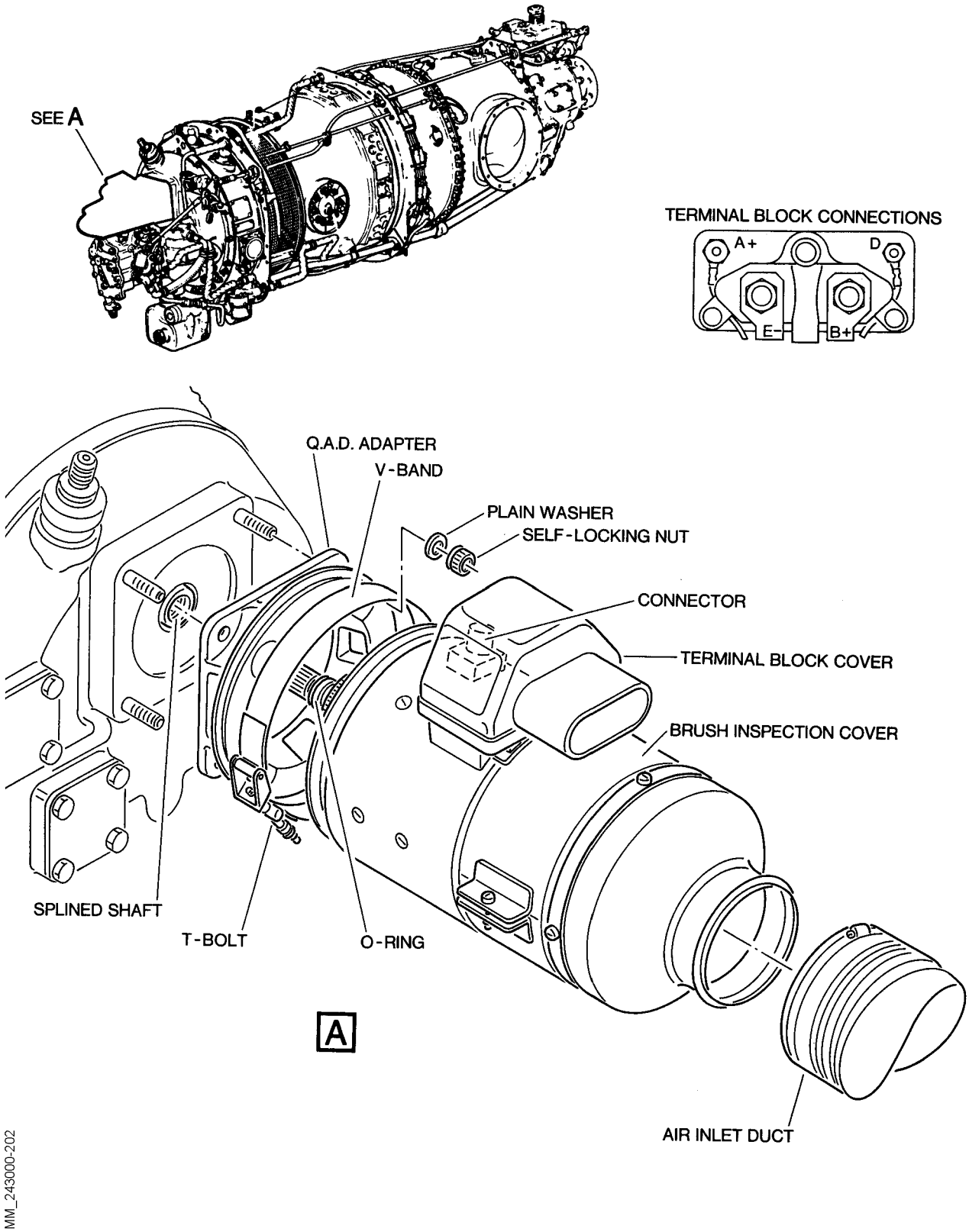



Fig. 201 - Starter-Generator Removal/Installation

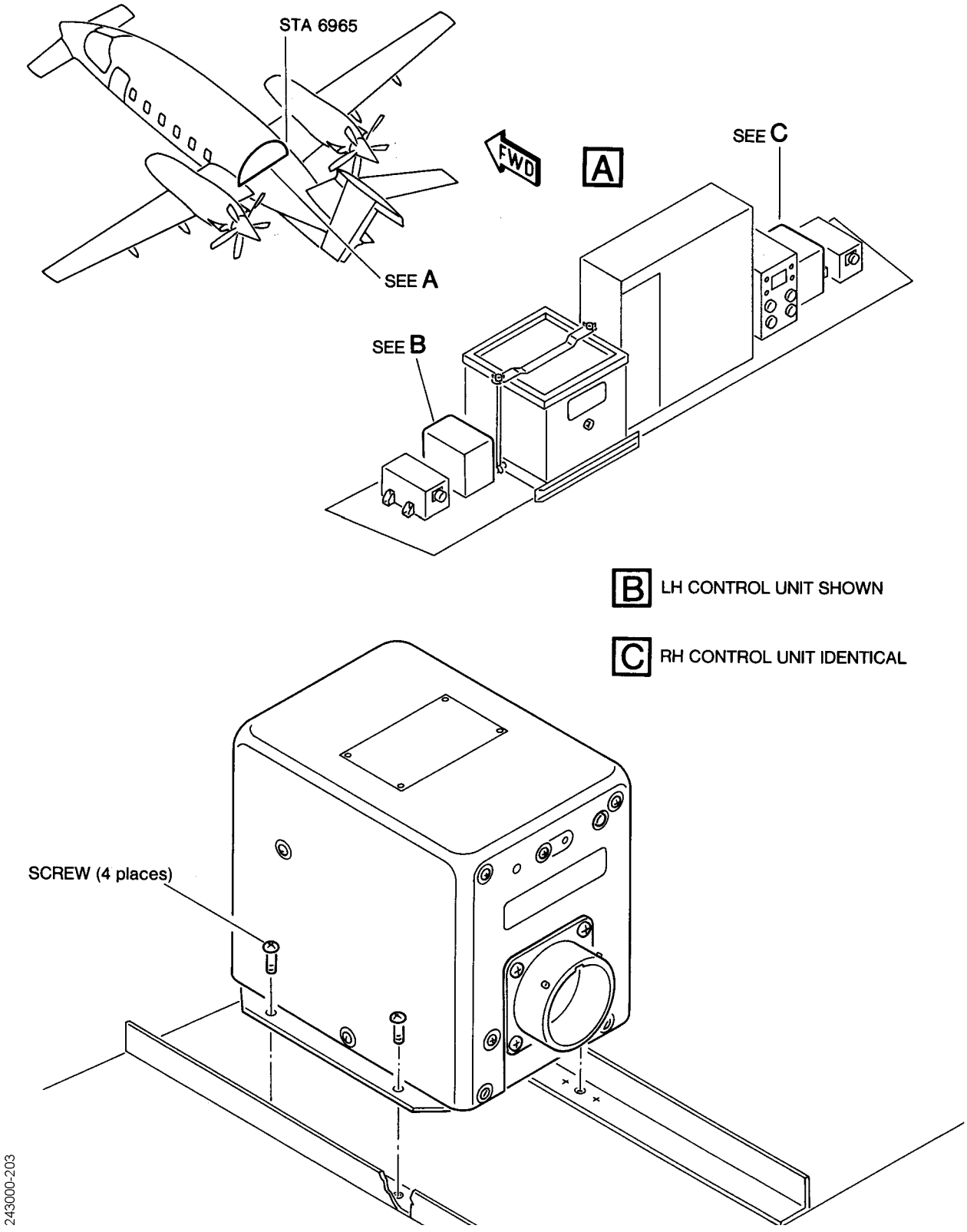



Fig. 202 - Generator - Starter Unit - Removal/Installation

5. Starter-generator Air Duct - Removal (Ref. Fig. 203)

A. Referenced Procedures

Maintenance Manual Chapter 54-10-00

B. Procedure

(1) Remove nacelle panel 410 AB for the LH engine or 420AB for the RH engine (Refer to 54-10-00).

**NOTE:** The air duct is comprised of two rigid parts (5,6) and two flexible tubes (3,8). One flexible tube (3) connects the rigid part (5) to the lower engine nacelle air intake (1) and one flexible tube (8) connects the rigid part (6) to the starter-generator. The rigid parts are bolted together from either side of a firewall (11).

(2) To disconnect the duct (3) from the lower nacelle only, loosen the circlip (2) at the interface of the nacelle (1) and the flexible tube (3). Compress and withdraw the tube from the air intake.

(3) To remove a flexible tube, release the circlips (2,4) or (7,9).

(4) To remove the lower rigid part (5), first remove the interconnecting flexible tube (3). Remove the bolts (16), washers (14) and nuts (13) connecting both rigid parts to the firewall interface (15) and remove the lower rigid part (5).

(5) To remove the upper rigid part (6), first remove the interconnecting flexible tube. Disconnect the lower rigid part(3) from the firewall (15) which will free the upper rigid part.

(6) Remove the two bolts (12) fastening the upper brackets (11) to the structure and remove the upper part.

6. Starter-generator Air Duct - Installation (Ref. Fig. 203)

A. Referenced Information

Maintenance Manual Chapter 54-10-00

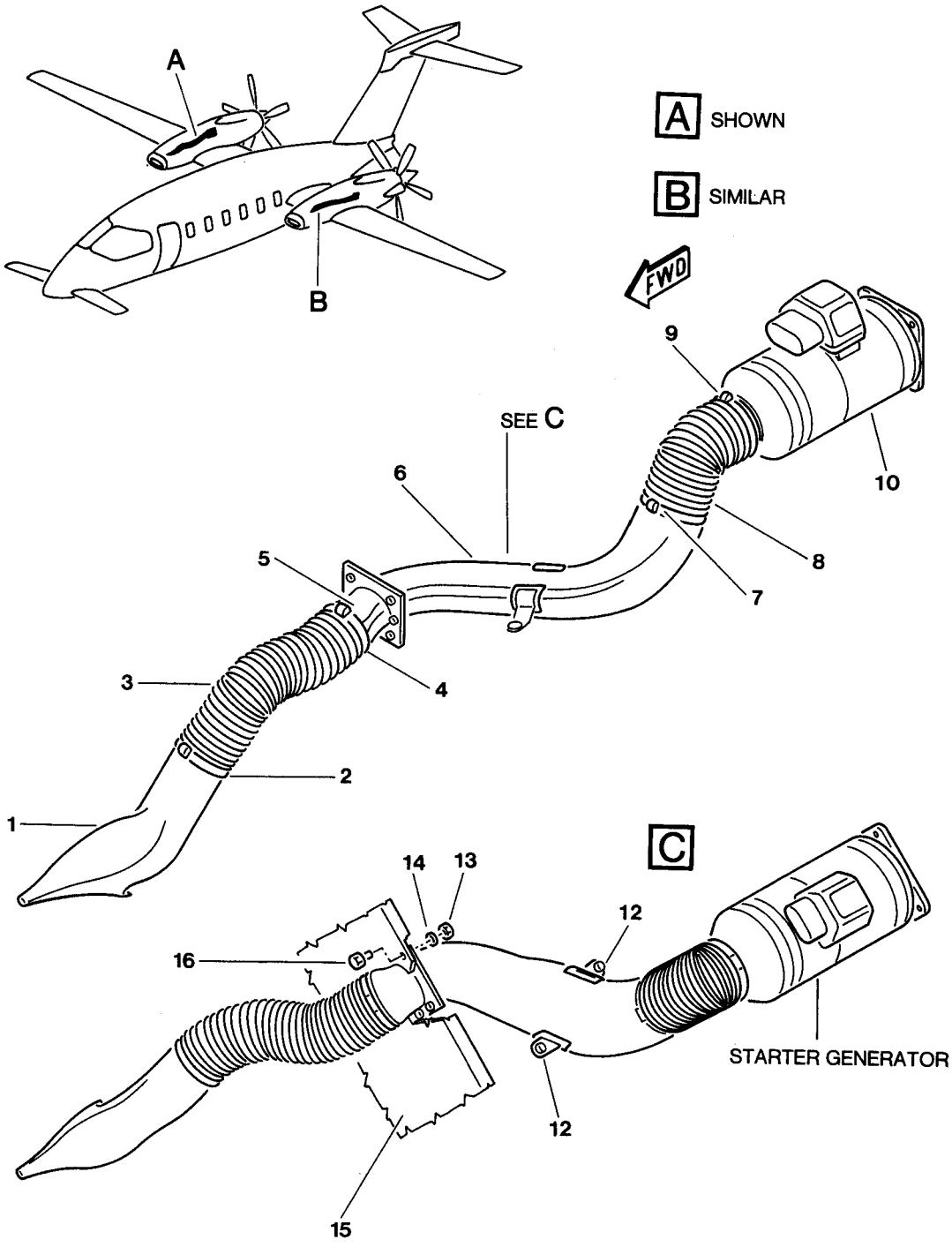
B. Procedure

(1) To connect the upper rigid part (6), first attach the flexible tube (8). Put the part in place and loosely fasten the brackets (11) using the two bolts (12). Connect the flexible tube (8) to the starter-generator (10). Align the lower rigid part (5) and the upper rigid part (6) with the firewall interface and interconnect using the bolts (16), washers (14), and nuts (13). Tighten the firewall fasteners then the two bolts (12).

(2) To connect the lower part, first attach the flexible tube (3). With the upper rigid part in position, align the lower rigid part (5) and the upper rigid part (6) with the firewall interface and interconnect using the bolts (16), washers (14) and nuts (13). Tighten the firewall fasteners then connect the flexible tube (3) to the air intake (1).

(3) Re-check the connections and their fastenings.

(4) Install nacelle panel 410AB for the LH engine or 420AB for the RH engine (Refer to 54-10-00).




MM_243000-204

Fig. 203 - Starter-generator Air Duct - Removal/Installation

7. Starter-Generator Brushes - Inspection/Check

A. Referenced Information

Maintenance Manual Chapter 54-10-00

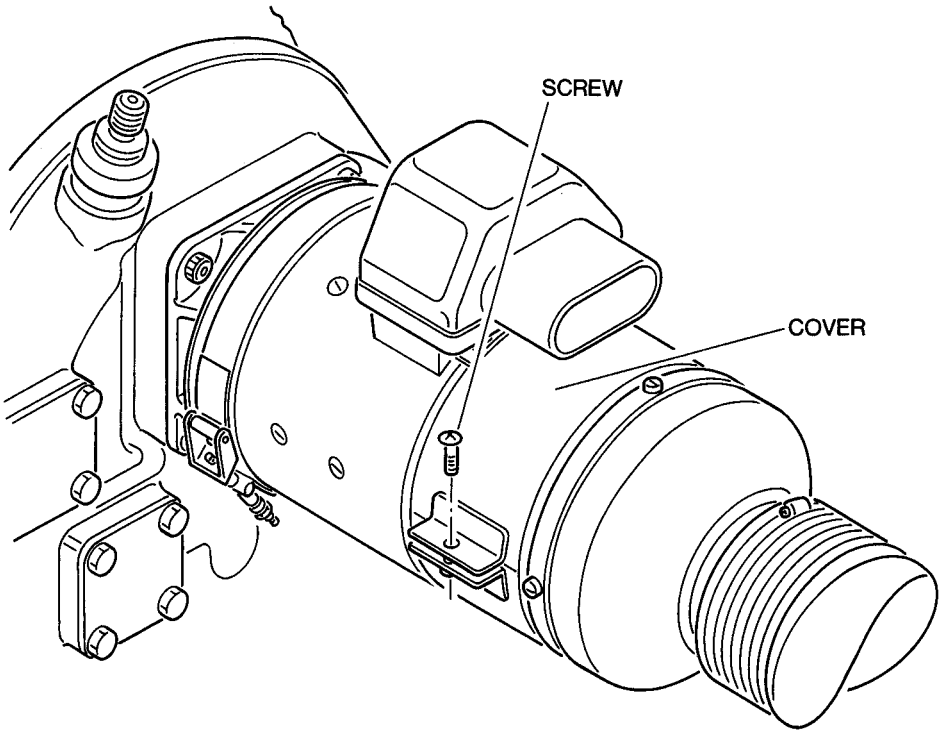
B. Procedure

(1) Remove nacelle panel 410AB for the LH engine or 420AB for the RH engine (Refer to 54-10-00).
(2) Remove the starter-generator (Refer to Para. 1).
(3) Remove the brush inspection cover (Refer to Fig. 204).
(4) Remove the brushes.

**NOTE:** Prior to removing the brushes, identify their location on the unit. Reinstalled brushes must be returned to their original location.

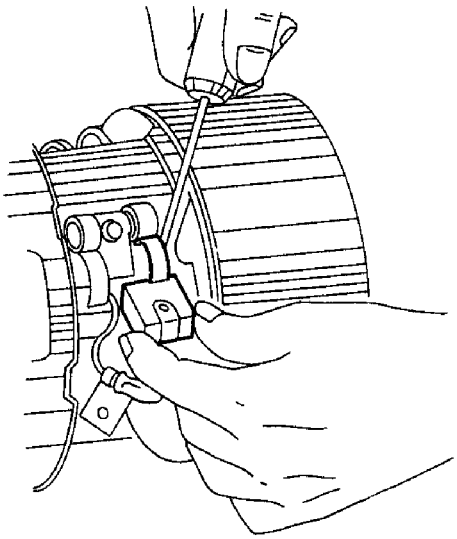
(a) Remove the screws securing the brush leads to the brush holders.
(b) Lift the brush springs (Refer to Fig. 205) using a stiff wire hook and remove the brushes.

(5) Inspect the brushes (Refer to Fig. 206)
(a) Determine the remaining life on the brush.
(b) Check for cracks, chips, frayed leads, loose rivets and loose connections.



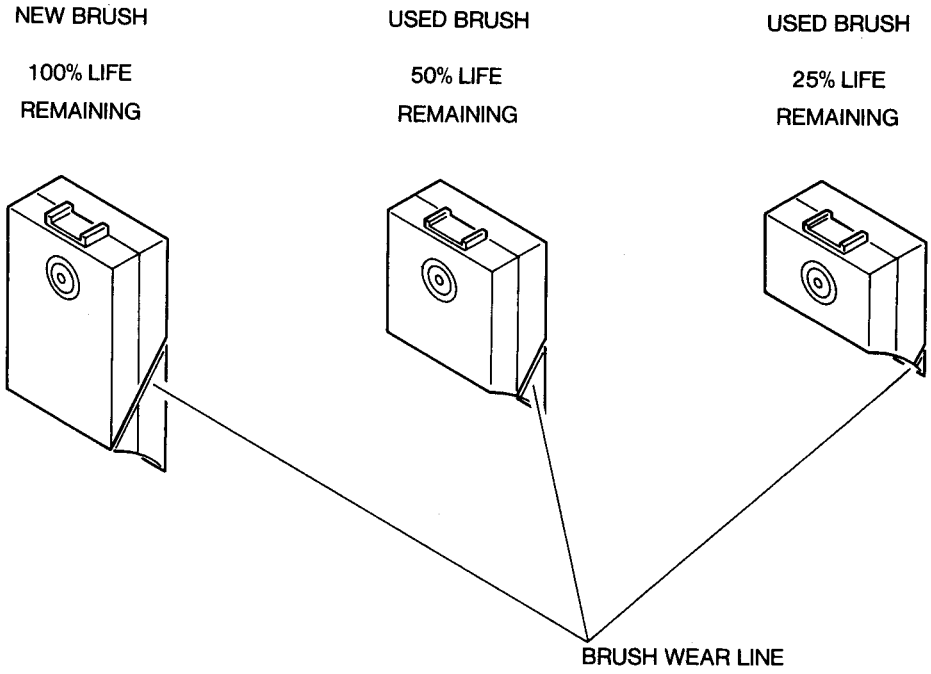

MM_243000-205

Fig. 204 - Brush Inspection Cover



MM_243000-206

Fig. 205 - Lifting Brush Springs




MM_243000-207

Fig. 206 - Brush Wear Limits

(6) Reinstall the original brushes. (Refer to Fig. 207)

**NOTE:** Replace brushes as a set. If one brush is defective, or if the wear limit will be exceeded before the next scheduled inspection, replace the entire set of brushes off airplane. Refer to the manufacturers' instructions.

(a) Inspect the brush holders for cracks, wear and clean-liness. Carefully insert brushes in their original location on the brush holder assembly. Ensure the shorter side of the brush will be the first to contact the commuter when the armature is rotated in its normal direction (Refer to Fig. 207).

**CAUTION:** RAPID RELEASE OF THE BRUSH SPRINGS CAN DAMAGE THE BRUSHES.

(b) Inspect the brush springs for proper tension and looseness. Gently lower the brush springs onto the top of the brush.

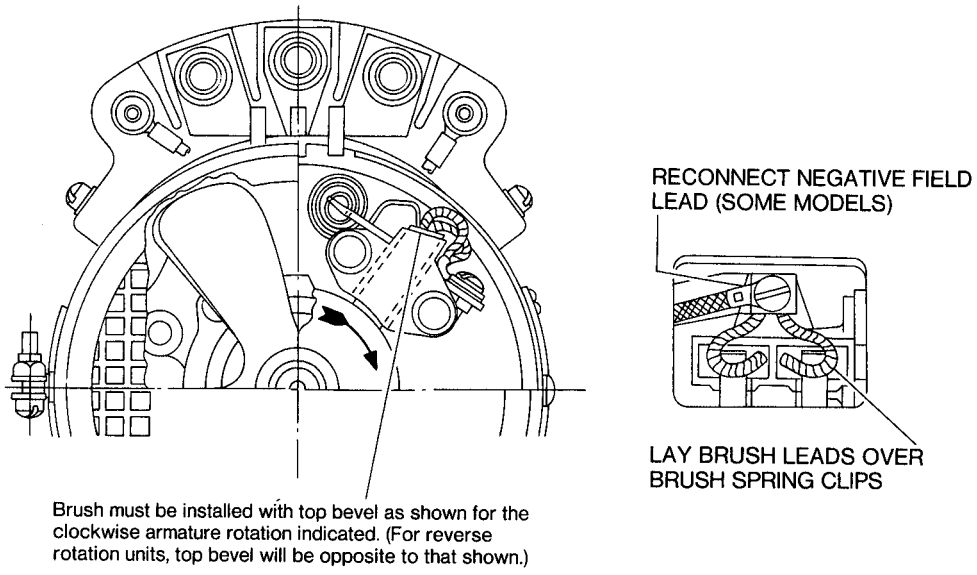
(c) Position the brush leads over the brush spring clips.

(7) Install the brush inspection cover.

(a) Install the brush cover so that the terminal block cover is properly seated in the housing recess.

(8) Install the starter-generator (Refer to Para. 2).

(9) Do a functional test of the DC generating system.




MM_243000-208

Fig. 207 - Correct Position of Brushes, Leads and Screws

8. DC Generating System Functional Test

A. Referenced Information

Maintenance Manual Chapter 71-00-00

B. Procedure

(1) Perform an engine dry motoring cycle (Refer to 71-00-00). Make sure that the normal start speed is attained.

(2) After the designated cooling period has elapsed, start the engine (Refer to 71-00-00). Monitor the starting mode.

(3) After the engine rpm has stabilized, select the GENERATOR switch to RESET then L or R as appropriate. Monitor the generating modes for stable operation of the starter-generator.

**NOTE:** If a problem occurs, shutdown the engine and check all connections and wiring. If no fault is found, remove and overhaul the starter-generator.

9. Generator Power Cables Routing - Inspection (*All airplanes SN 1105 thru SN 1180)*

A. Referenced Information

Wiring Manual Chapter 20-20-00

Maintenance Manual Chapter 24-00-00

Maintenance Manual Chapter 24-30-00

Maintenance Manual Chapter 54-10-00

B. Procedure

(1) Remove the electrical power (Refer to 24-00-00).

(2) Remove the LH Nacelle Upper Panel 410AT (Refer to 54-10-00).

(3) Locate the LH Generator Power Cables coming out of the Generator Terminal Board (Refer to Fig. 209).

(4) Check for cable insulation general conditions (i.e. traces of rubbing, wear, cuts).

(5) Check for Cable bending radius.

(6) Check for clearances between these cables and adjacent structure and parts, in particular:

- Ignition exiter.
- Oil Cooler Inlet Anti-Ice Valve and fittings.
- Engine Air Intake De-Icer bleed air line fittings.
- Main wing Anti-Ice Shut-off Valve and relevant bracket, and bleed air line fittings.
- Accessory Gearbox Oil piping / fittings.
- Electrical Connector (P4025) Bracket on wing upper skin (P4026 for RH Engine).
- All flammable fluid carrying pipes.

(7) A minimum clearance of 6.35 mm (1/4 of inch) is required from any part having a sharp edge as the closet point to the cable(s).

(8) A minimum clearance of 6.35 mm (1/4 of inch) is required from any flammable fluid carrying pipe, unless the pipe or the cable are shrouded with suitable sleeves.

(9) If the above checks are positive, reinstall the LH Nacelle Upper Panel 410AT (Refer to 54-10-00).

10. Generator Power Cables - Repositioning *(All airplanes SN 1105 thru SN 1180)*

A. Referenced Information

Wiring Manual Chapter 20-20-00

Maintenance Manual Chapter 24-00-00

Maintenance Manual Chapter 24-30-00

Maintenance Manual Chapter 54-10-00

B. Procedure

(1) Remove the RH Nacelle Upper Panel 410AT (Refer to 54-10-00) and repeat steps 3 to 8 on the RH side (Refer to Fig. 210 for cables location).

(2) If a damage of the heat shrinkable sleeve if found, but not affecting the cable insulation, remove the electrical Connector from the Receptacle on the Generator (Refer to 24-30-00), and insert a 4 inch long, 1" diameter heat shrinkable sleeve on the damaged area. Then reinstall the Connector.

(3) If a damage of the insulation of one or more Cables is found (Refer to Fig. 211) contact Piaggio Aero Industries for replacement.

(4) If a clearance of less than 6.35 mm (1/4 of inch) is observed from a sharp edge, reroute the Power Cables to maximize the clearance and ensure that the clamping of the Power Cables is sufficient to avoid any cable mouvement; clamps can be added or, if already installed, can be doubled according to Wiring Manual Sect. 20-00-00, paying attention to the minimum allowed bending radius. Clamp P/N MS21919CH16 is suitable for clamping the two cable bundles together; use of high temperature plastic tie wrap (e.g. TYZ25M wrap) is allowed to double existing clamps. Refer to Fig. 212 for examples of clamps installation.

(5) If a clearance of less than 6.35 mm (1/4 of inch) is observed from any flammable fluid carrying pipe, protect the Cable with an insulating sleeve (P/N AS1072-12SIL-FG, that shall be installed after removing the electrical Connector from the Receptacle on the Generator, Refer to 24-30-00); re-route the Power Cables to maximize the clearance and ensure that the clamping of Power Cables is sufficient to avoid any Cable movement. Clamps can be added or, if already installed, can be doubled acccording to Wiring manual Sect 20-20-00, paying attention to the minimum allowed bending radius. Clamp P/N MS21919CH16 is suitable for clamping the two cable bundles together; use of high temperature plastic tie wrap (e.g. TYZ25M wrap) is allowed to double existing clamps. Refer to Fig. 212 for examples of clamps installation.

(6) Refer to 54-10-00 and reinstall the LH/RH Nacelle Upper Panel 410AT / 420AT.

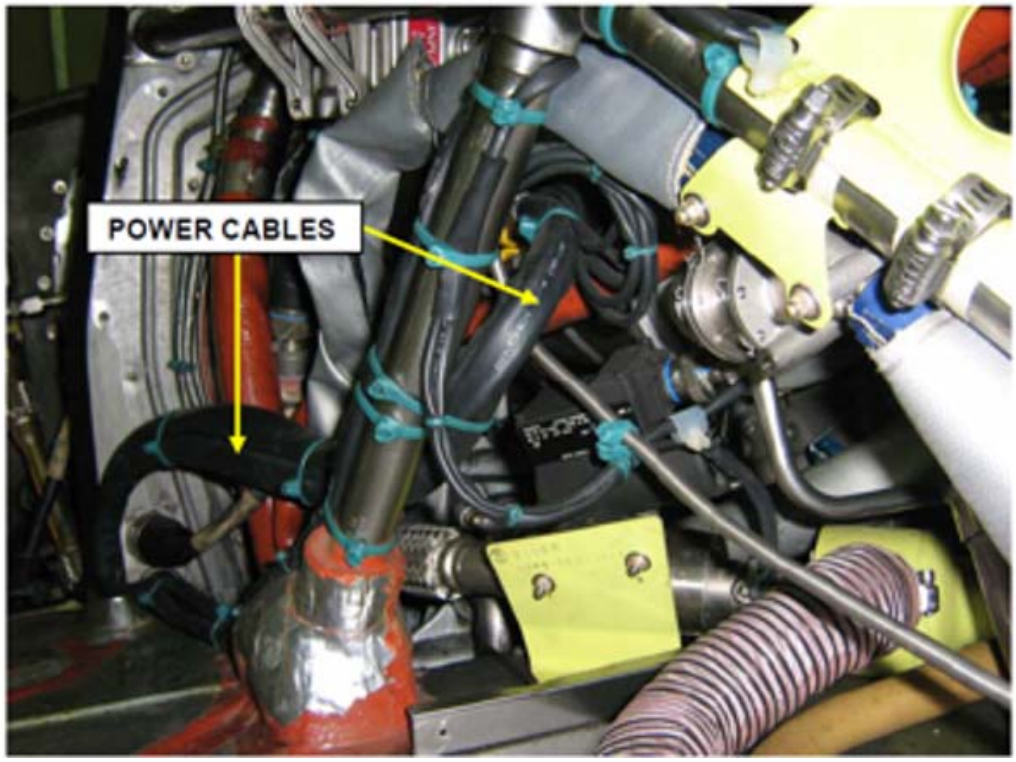



Fig. 208 - Left Engine

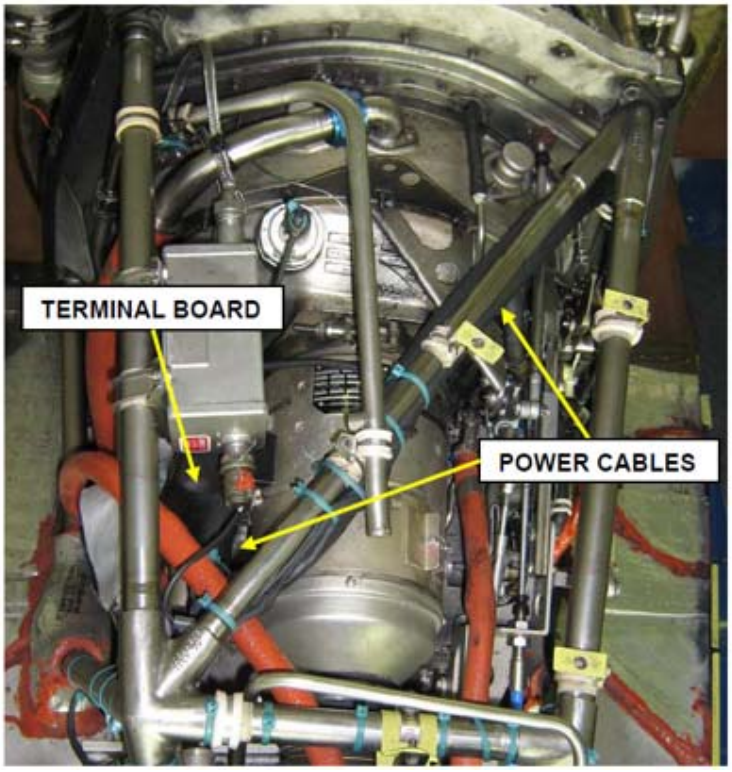



Fig. 209 - Right Engine

Fig. 210 - Damaged Power Cable

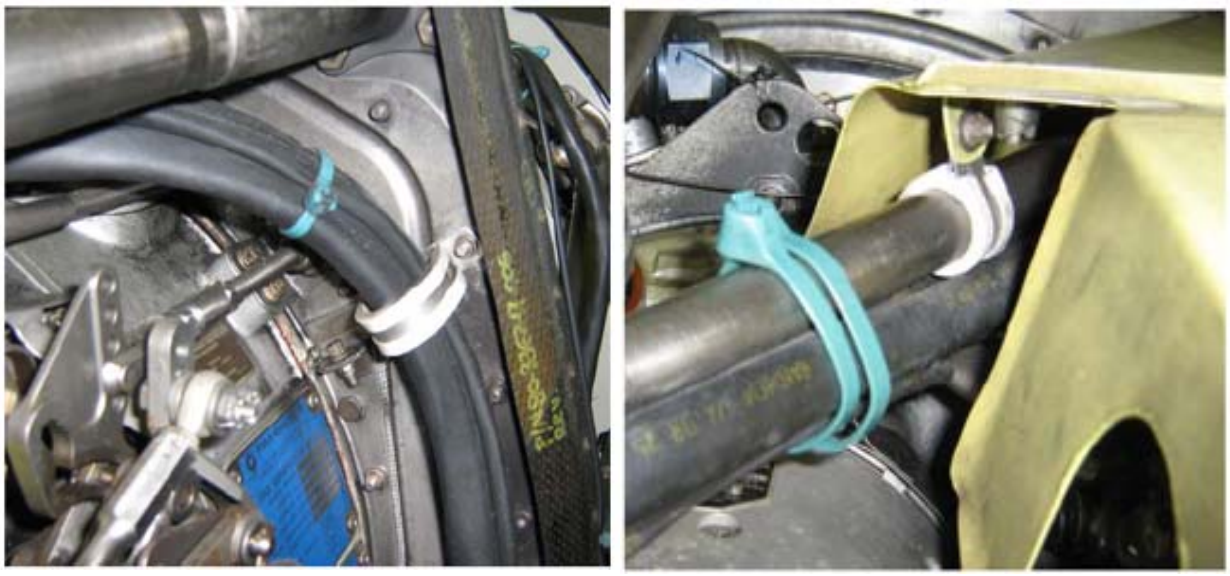


Fig. 211 - Examples of clamp doubling

11. Generator Power Cable Routing - Inspection *(Airplane SN 1181 and subsequent)*
(Refer to Fig. 213)

A. Procedure

(1) Verify that the left and Right Engine Starter Generator Cables are correctly installed (Sheath, Clamps and Cable Straps) and the clearance between these cables and adjacent structure, particularly between A/I Valve.


Fig. 212 - Generator Power Cables - Inspection (*Airplane SN 1181 and subsequent)*

12. Generator Power Cables - Repositioning *(Airplane SN 1181 and subsequent)* (Refer to Fig. 214 and 215)

A. Left Engine Starter Generator Connection - Procedure

(1) Place the Generator Cables (1, 2) and the Generator Cable Terminal End (3) at the hole located on the wing (Refer to Fig. 214 Sheet 1 of 7).

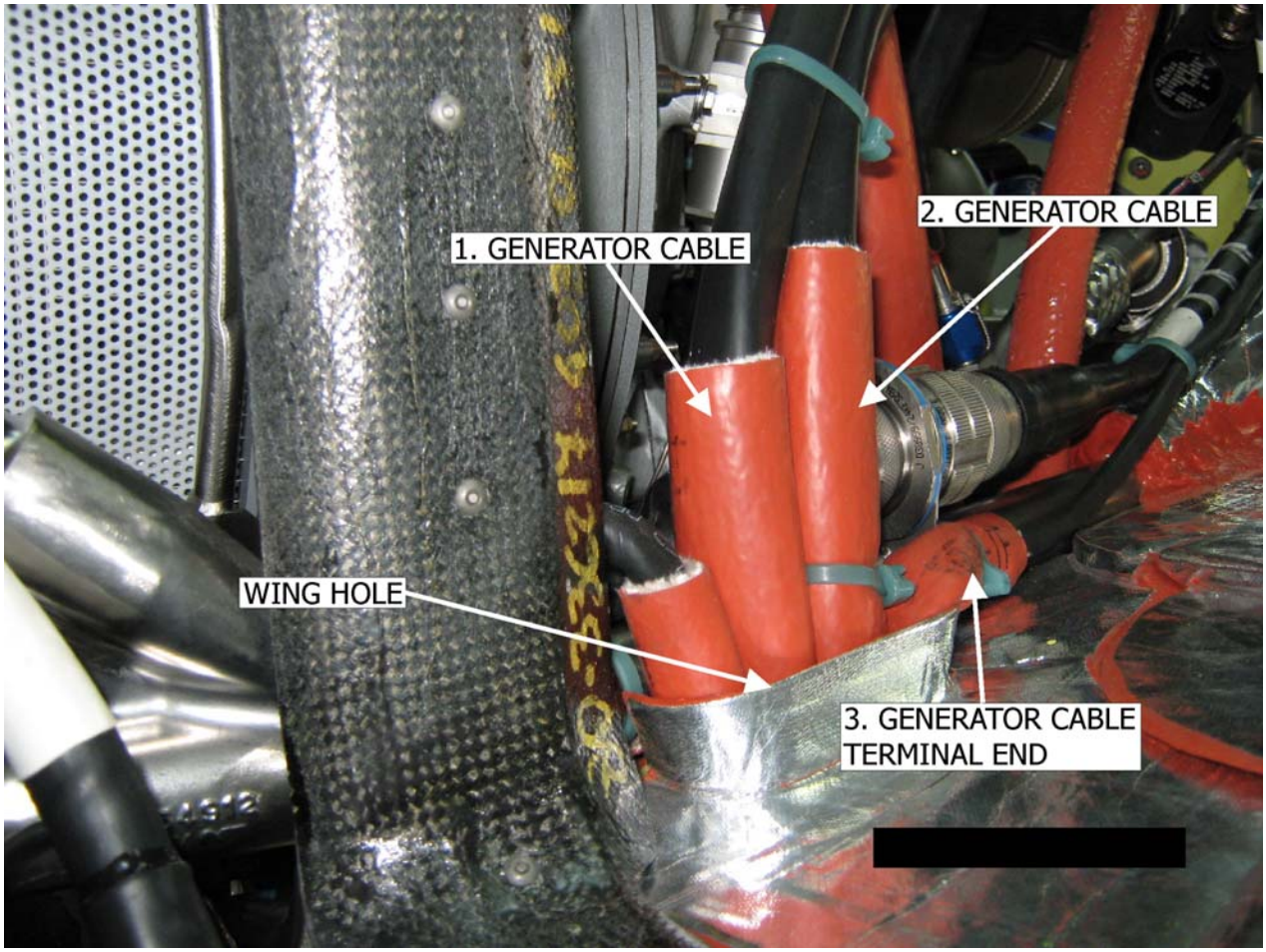



Fig. 214 - LH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 1 of 7)

(2) With reference the hole located on the wing, verify that the Generator Cable (1) are about 930mm, and the Generator Cable (2) are about 830mm.

(3) Place in its own position the Generator Cables and secure it to the insulate oil duct by two Clamps (4, 5). The Clamps are connected together with Bolt (6), Washer (7) and Nut (8) (Refer to Fig. 214 Sheet 2 of 7).
Between the wing upper surface and the two Clamps (4, 5) must be a 200mm distance about.
Before perform the following procedures, insert on the Ground Generator Cable Point (A) (Refer to Fig. 214 Sheet 2 of 7), a 150mm sheath.

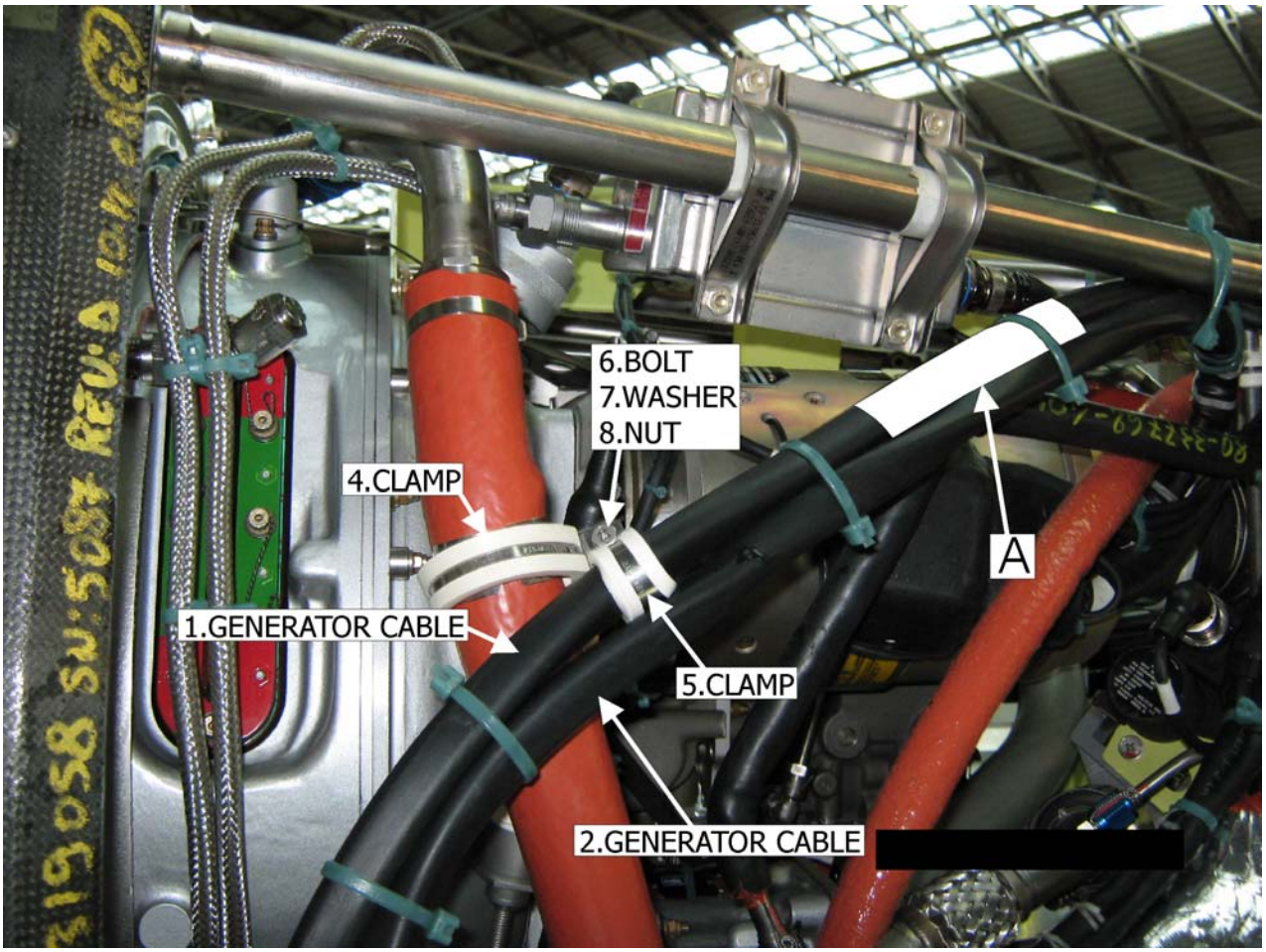



Fig. 214 - LH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 2 of 7)

(4) Insert Generators Cables to the Generator Cables Terminal End Rubber Protection Cowling (Refer to Fig. 214 Sheet 3 of 7).

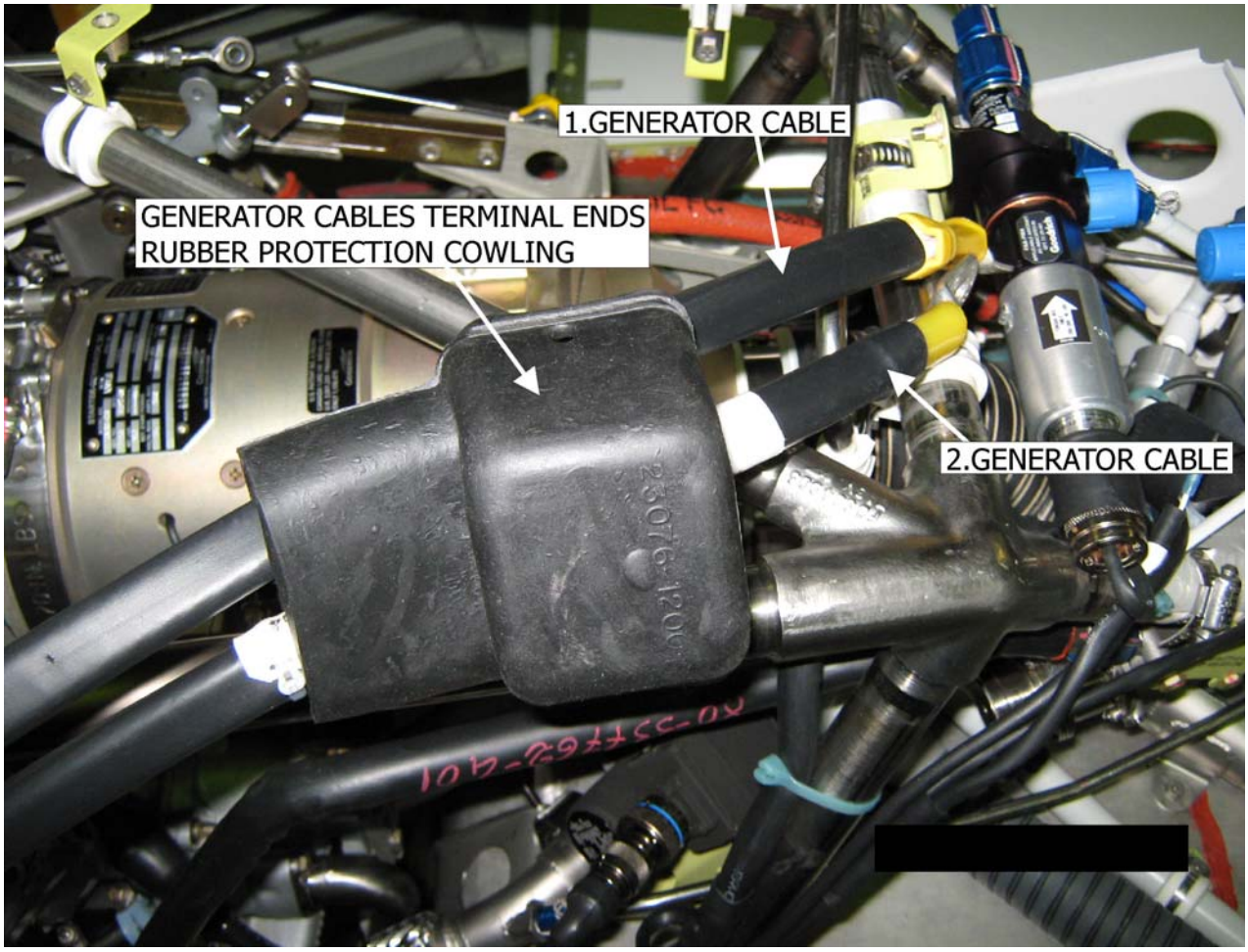



Fig. 214 - LH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 3 of 7)

(5) Insert the Power Generator Cables on the Generator Stud. Insert the cables labelled "A", "D" and "E-" in the Rubber Protection Cowling and connect it to the respective terminal ends on the Starter Generator Terminal Board (Refer to Fig. 214 Sheet 4 of 7).

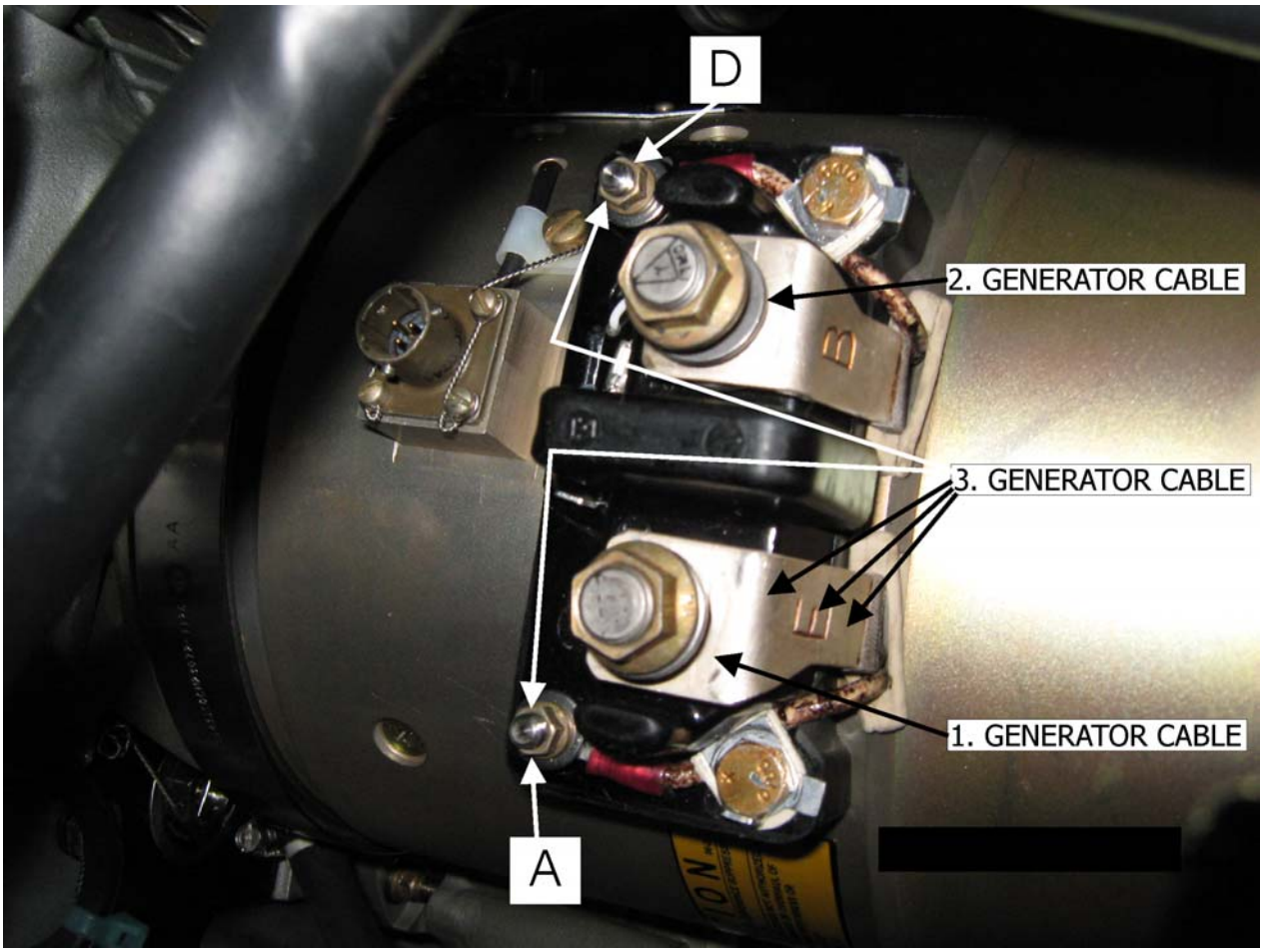



Fig. 214 - LH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 4 of 7)

(6) Perform the connection Generator Cables on the "A" and "B" Generator Stud as follows (Refer to Fig. 214 Sheet 5 of 7):
   (a) Insert the Generator Cable Terminal End in the Stud.
   (b) Insert the Three Electrical Cable labelled "E-" in the Stud.
   (c) Insert the Washer in the Stud.
   (d) Insert the Lock Washer in the Stud.
   (e) To screw the Nut in the Stud and tighten to fasten the Electric Terminal to the Stud..

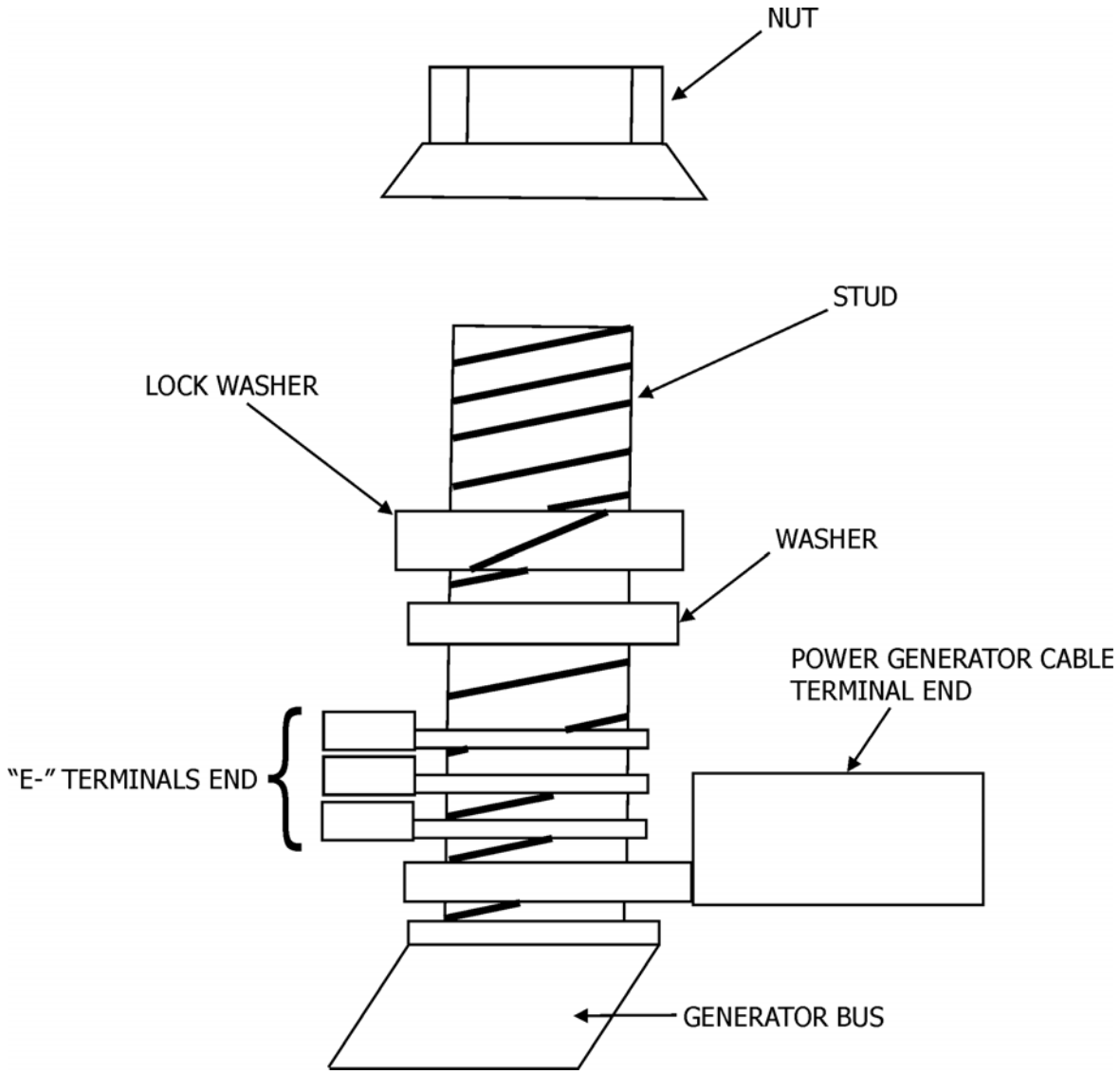



Fig. 214 - LH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 5 of 7)

(7) Install the Clamps to secure the Generator Cables as shown in Fig. 214 sheet 6 of 7 and Fig. 214 sheet 7 of 7.


Fig. 214 - LH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 6 of 7)

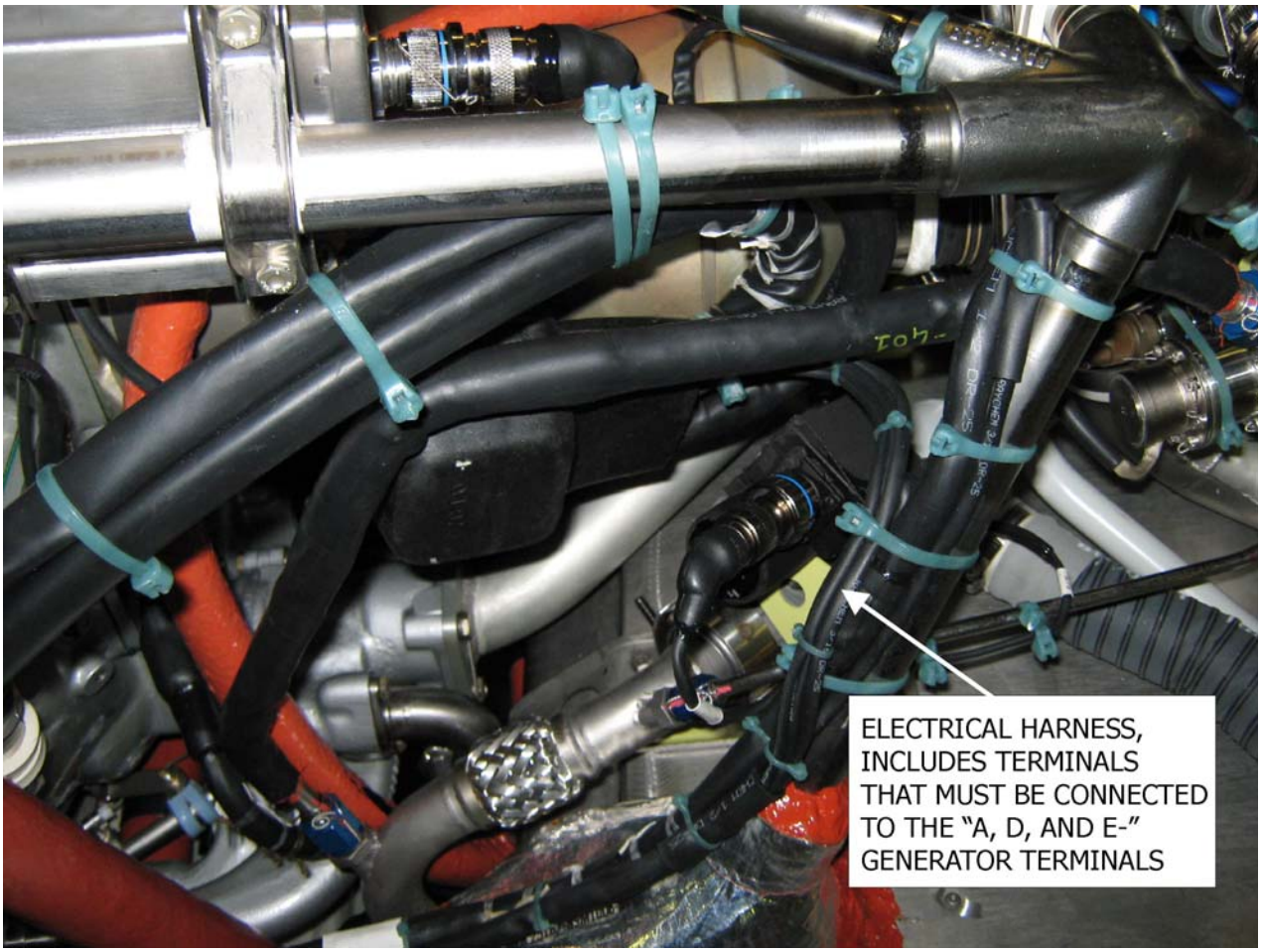



Fig. 214 - LH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 7 of 7)

B. Right Engine Starter Generator Connection - Procedure

(1) Place the Generator Cables (1, 2) and the Generator Cable Terminal End (3) at the hole located on the wing (Refer to Fig. 215 Sheet 1 of 7).

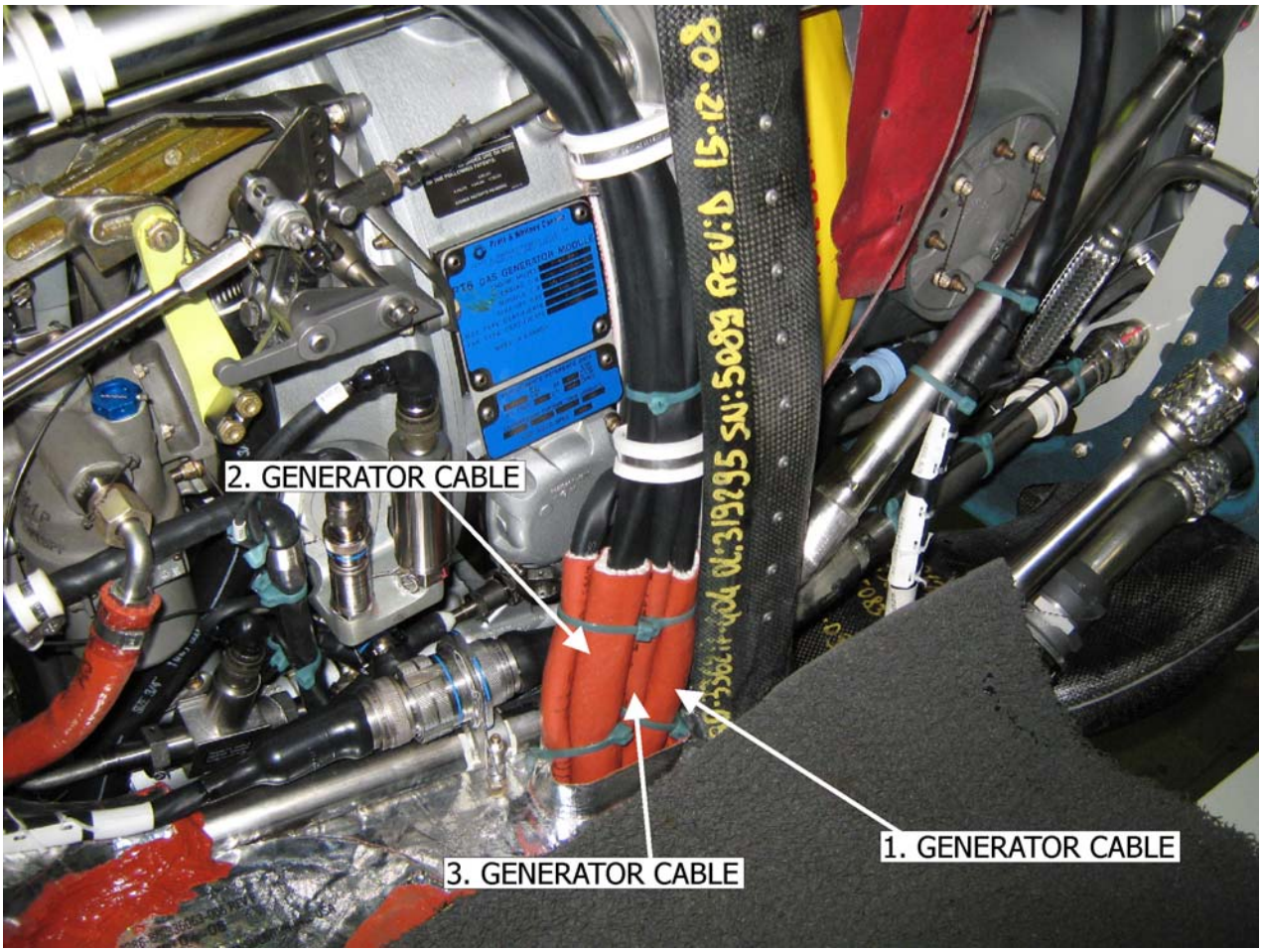



Fig. 215 - RH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 1 of 7)

(2) With reference the hole located on the wing, verify that the generator cable (1) are about 1080mm, and the generator cable (2) are about 1020mm.

(3) Place in its own position the Generator Cables and secure it to the engine mount frame with two Clamps (4, 5)(Refer to Fig. 215 Sheet 2 of 7).

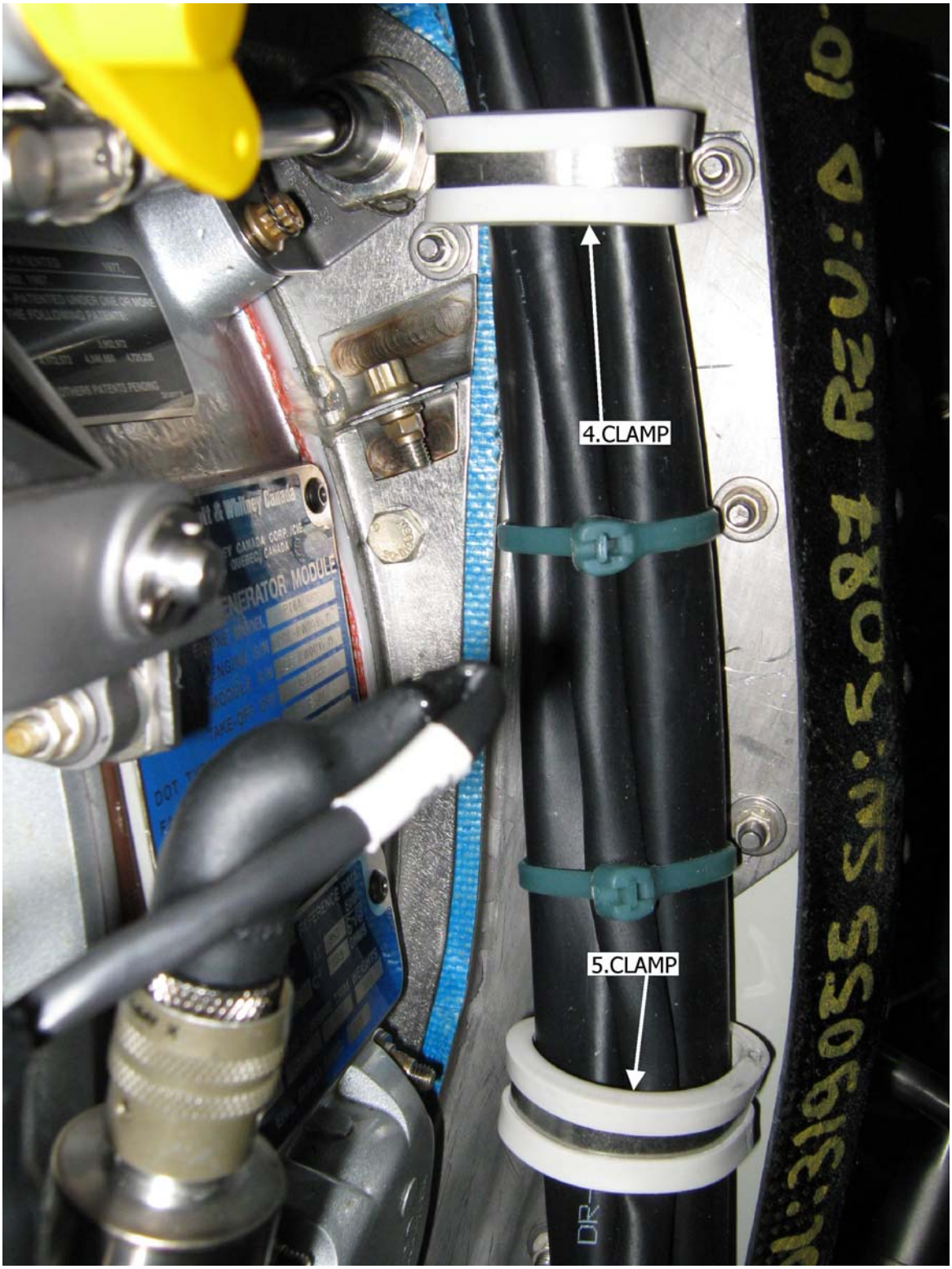



Fig. 215 - RH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 2 of 7)

(4) Insert Generators Cables to the Generator Cables Terminal End Rubber Protection Cowling (Refer to Fig. 215 Sheet 3 of 7).

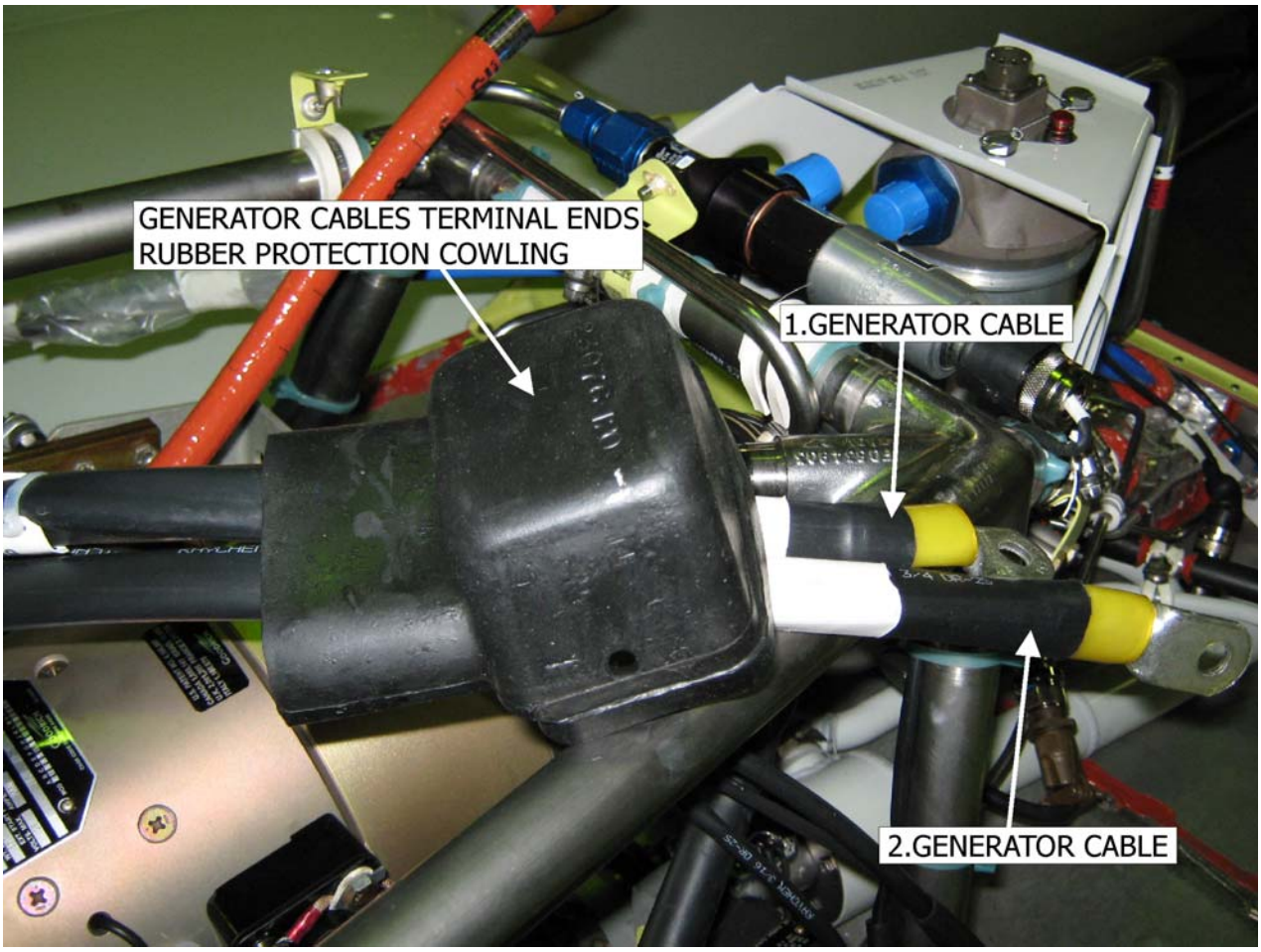



Fig. 215 - RH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 3 of 7)

(5) Insert the Power Generator Cables on the generator Stud. Insert the cables labelled "A", "D" and "E-" in the Rubber Protection Cowling and connect it to the respective terminal ends on the Starter Generator Terminal Board (Refer to Fig. 215 Sheet 4 of 7).

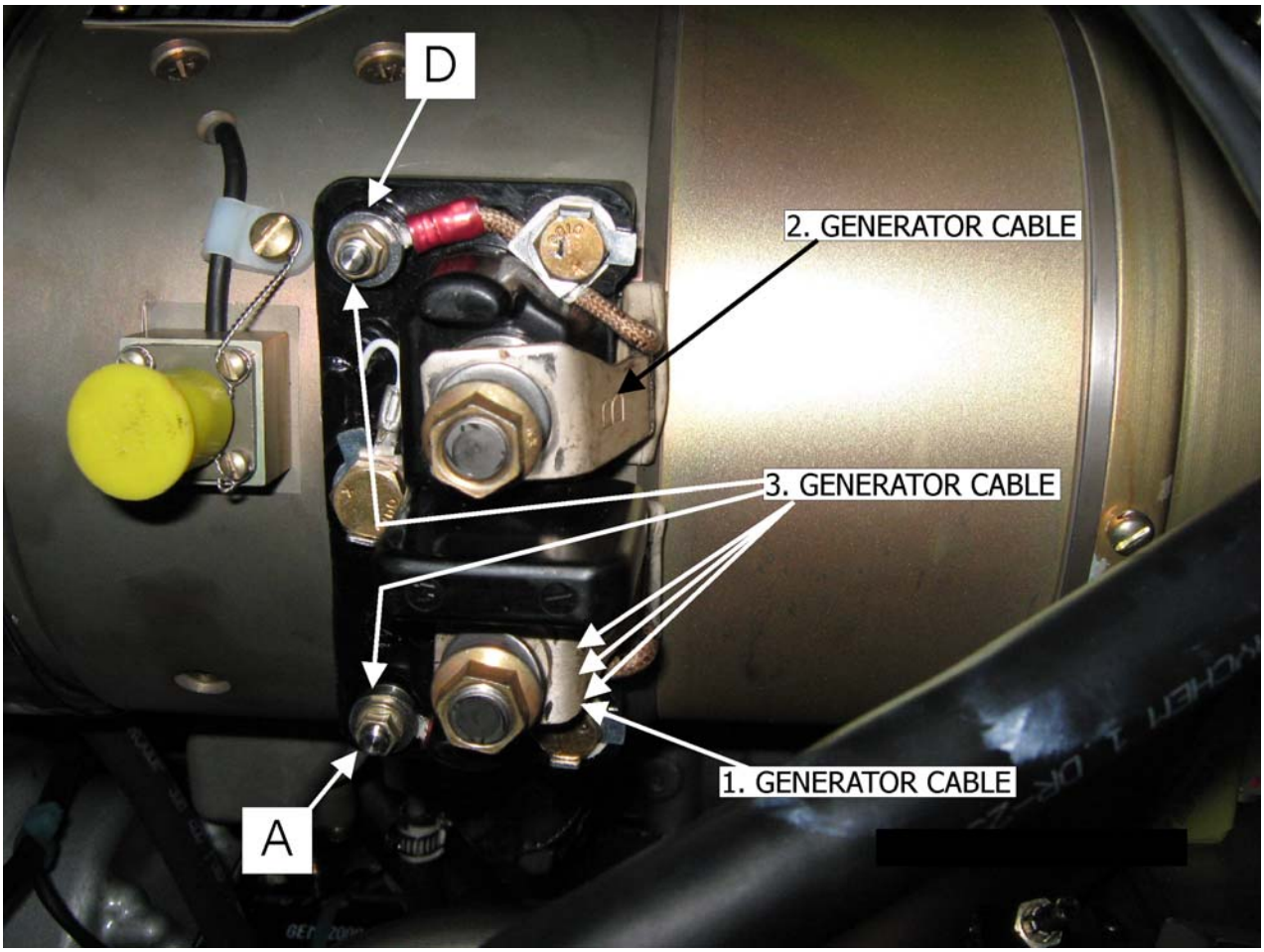



Fig. 215 - RH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 4 of 7)

(6) Perform the connection generator cables on the "A" and "B" Generator Stud as follows (Refer to Fig. 214 Sheet 5 of 7):
  (a) Insert the Generator Cable Terminal End in the Stud.
  (b) Insert the Three Electrical Cable labelled "E-" in the Stud.
  (c) Insert the Washer in the Stud.
  (d) Insert the Lock Washer in the Stud.
  (e) To screw the Nut in the Stud and tighten to fasten the electric terminal to the Stud.

(7) Install the Clamps to secure the Generator Cables as shown in Fig. 214 sheet 6 of 7 and Fig. 215 sheet 5 of 7, Fig. 215 sheet 6 of 7 and Fig. 215 sheet 7 of 7. .

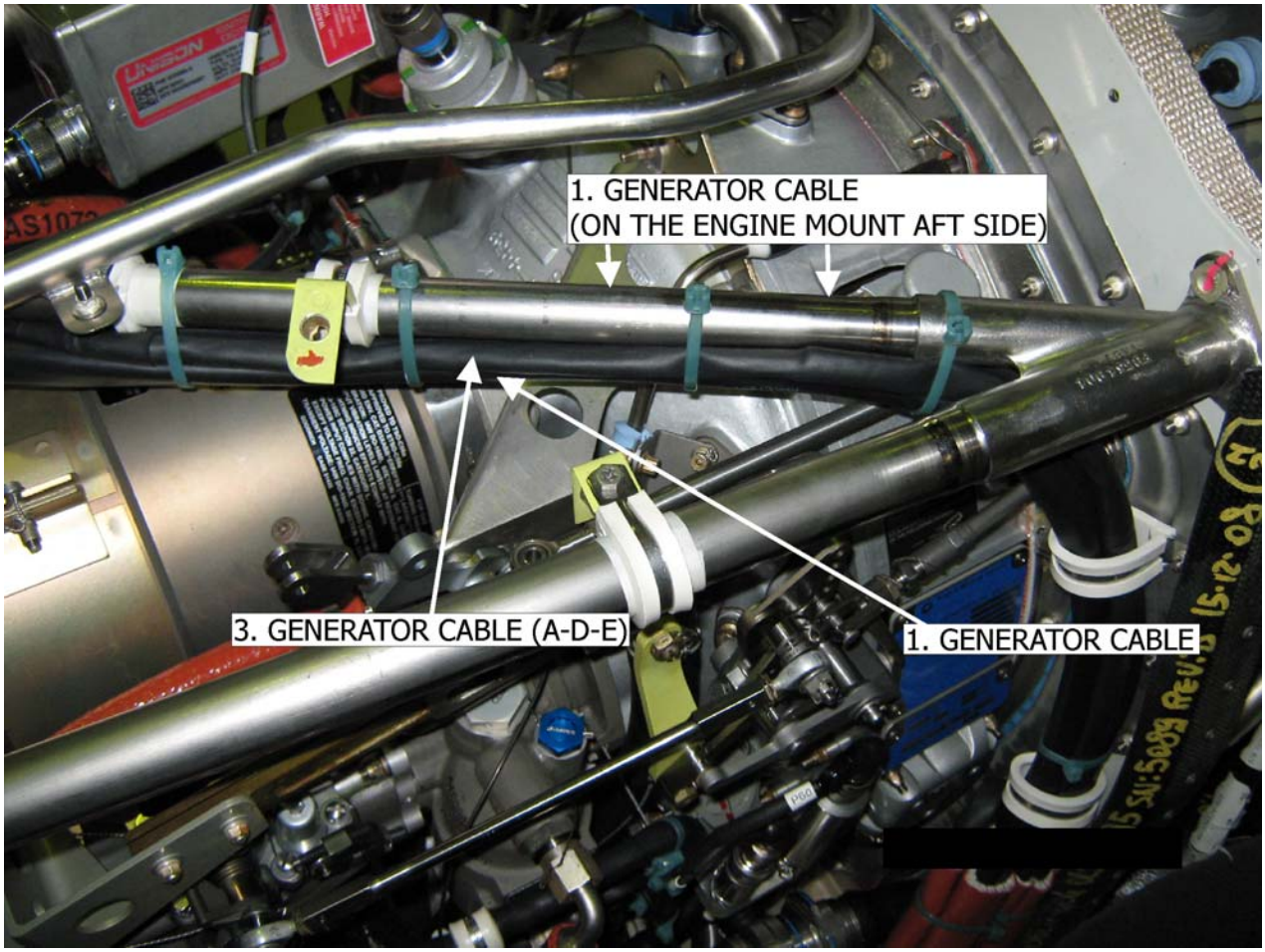



Fig. 215 - RH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 5 of 7)

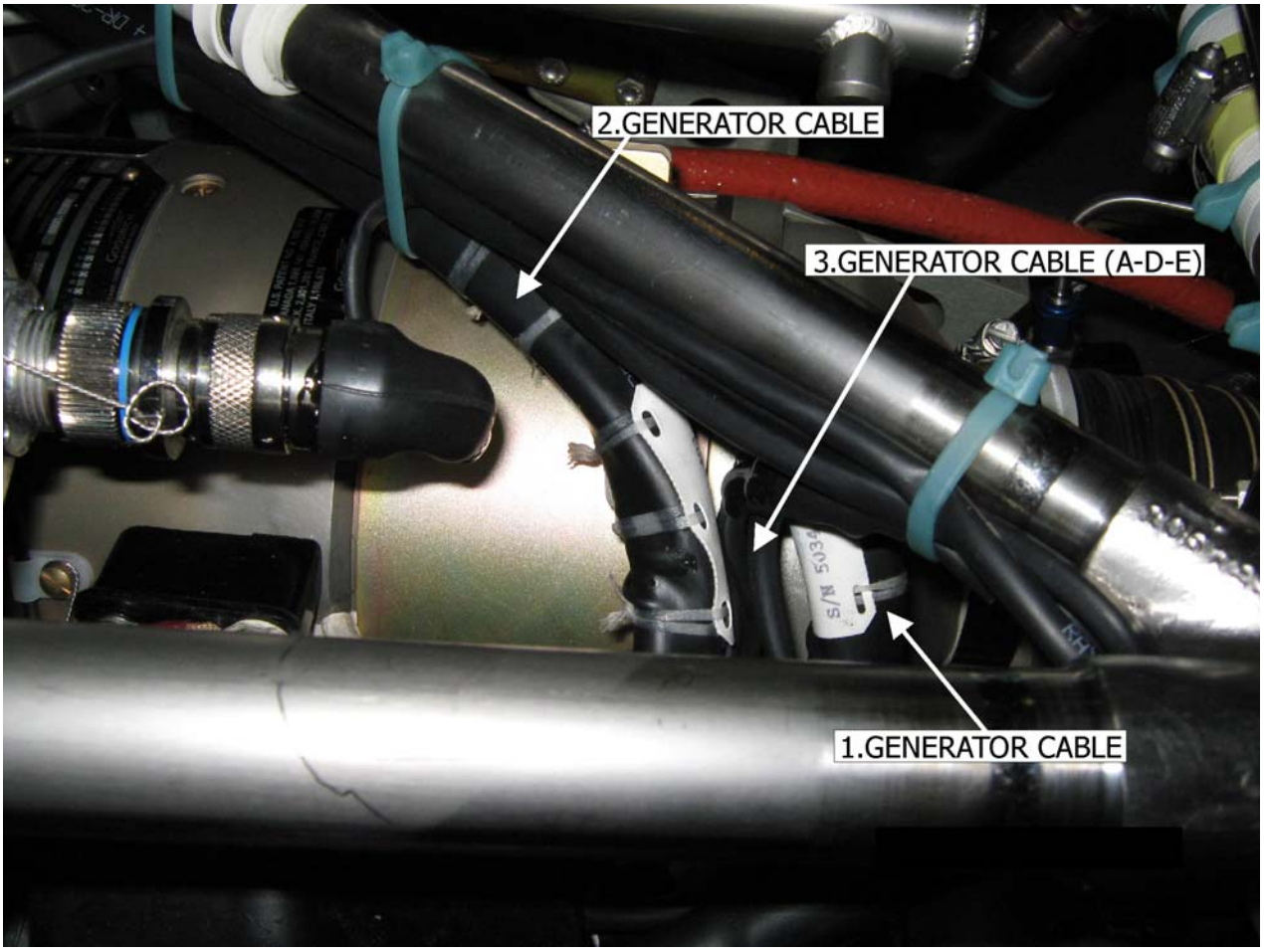



Fig. 215 - RH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 6 of 7)

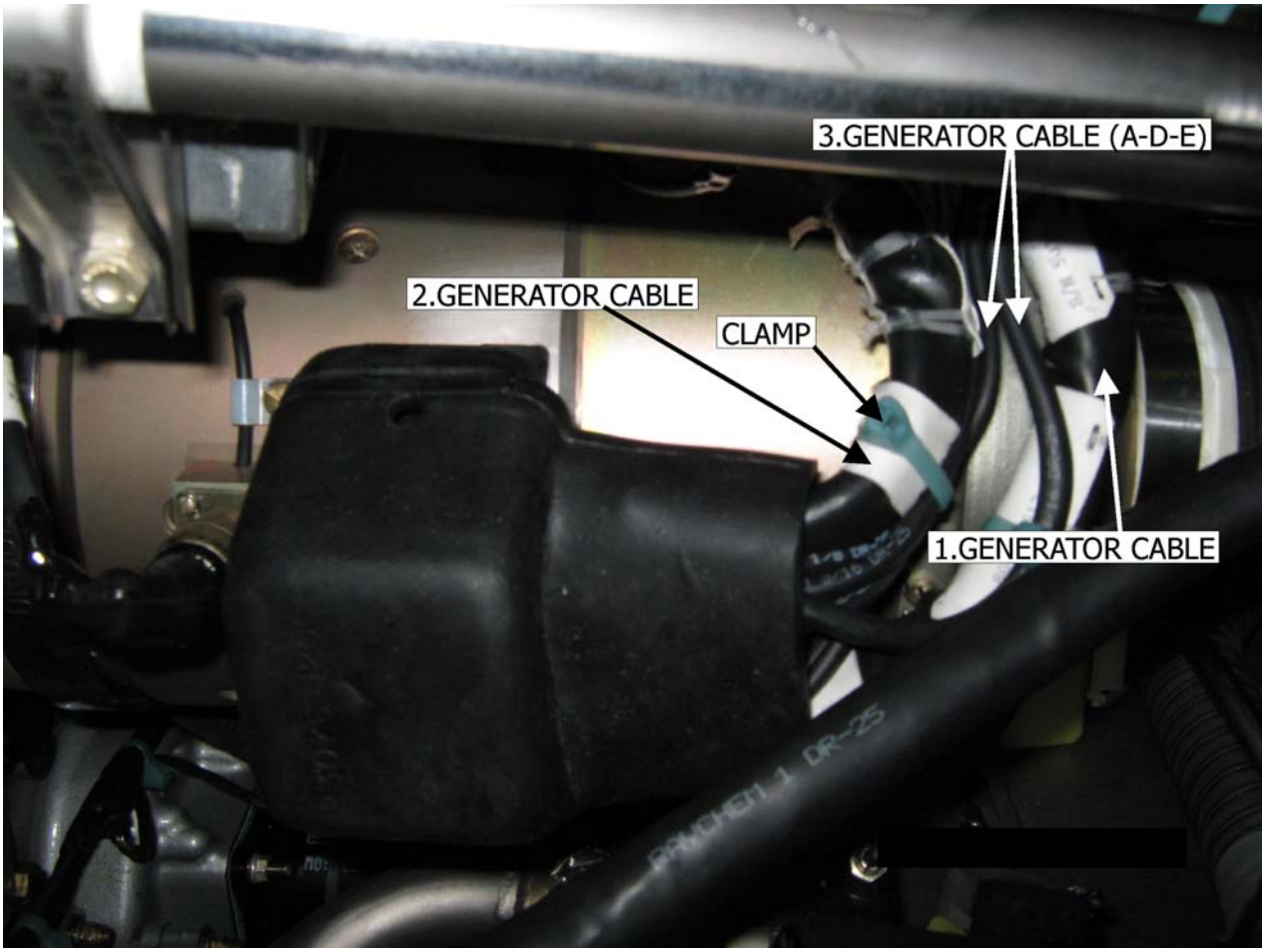



Fig. 215 - RH Generator Power Cables - Repositioning *(Airplane SN 1181 +)*(Sheet 7 of 7)

13. Emergency Power Unit (EPU) - Removal(Refer to Fig. 216)

A. Fixtures, Test and Support Equipment

| | |
|---|---|
| Blanking caps | Not Specified |

B. Referenced Procedures

Maintenance Manual Chapter 25-10-00

C. Procedure

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:
EPU

(2) Remove the pilot seat (Refer to 25-10-00)
(3) Pull out EPU Battery CB (6) located on the EPU case.

(4) Disconnect the Electrical Connector (4) and install the blanking cap on the on board connector.
(5) Loosen the Hold Down Nut (3) and disengage the Emergency Power Unit (EPU)(1) from the Support (2).
(6) Grasp the handle and pull out EPU from the Support (2).

14. Emergency Power Unit (EPU) - Installation(Refer to Fig. 216)

A. Referenced Information

Maintenance Manual Chapter 25-10-00

B. Procedure

(1) Make sure, as necessary that:
- There is no electrical power on the airplane
- The system is safe
- Access is available.

(2) Place the Emergency Power Unit (EPU) (1) on the Support (2).
(3) Secure the EPU to the Support (2) with the Hold Down Nut (3).
(4) Remove the blanking cap from the electrical connector.
(5) Connect the Electrical Connector (4).
(6) Push in EPU Battery CB (6) located on the EPU case.
(7) Install the pilot seat (Refer to 25-10-00)

15. Emergency Power Unit (EPU) - Operational Check

Procedure

(1) Set the battery switch to ON.
(2) Check that the EPU switch (located on the Master Switch Panel) is set to OFF.
(3) Check that the EPU DRAIN caution light is ON.
(4) Set the EPU Switch to TEST position and hold for at least 5 seconds.
(5) Check that the EPU DRAIN amber caution light is OFF while holding the switch in the TEST position.
(6) Set the EPU switch to ARM.
(7) Check that the EPU DRAIN amber caution light is OFF.
(8) Set the EPU switch to OFF.
(9) Set the battery switch to OFF.

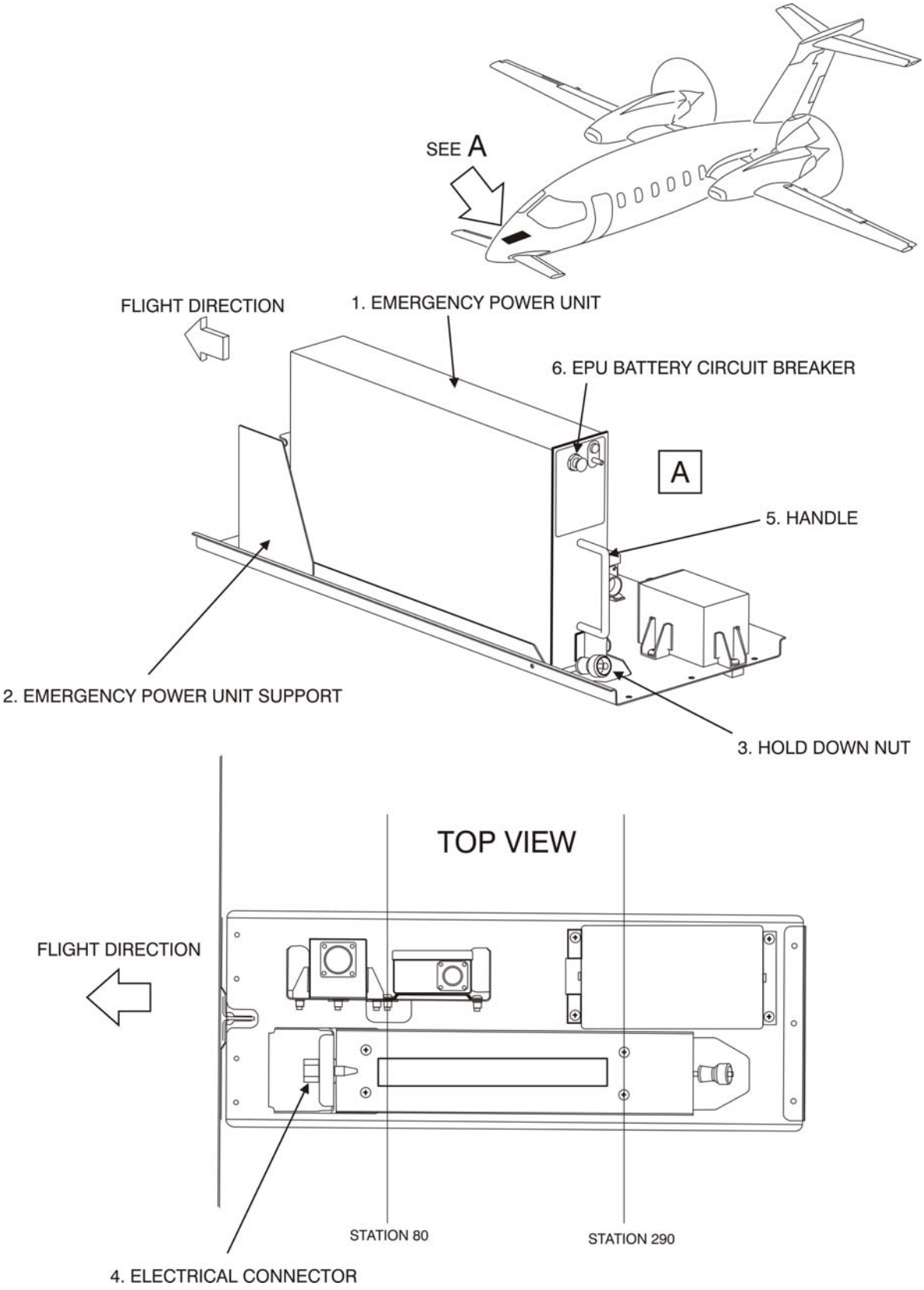



Fig. 216 - Emergency Power Unit - Removal / Installation

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# BATTERY SYSTEM - DESCRIPTION AND OPERATION

## 1. General

A. The standard battery installed to the airplane is Marathon, which supplies a 38 ampere-hour, 25.2-volt, 20 cell nickel-cadmium battery installed on a shelf in the baggage compartment. The ratings are manufacturer's ones (MARATHON).

B. The battery can be stored for long periods of time in any state of charge without damage. The battery will incur a temporary loss of capacity in inactive storage dependent upon the ambient temperature in which the battery is stored. The higher the temperature the greater loss of charge; at lower temperatures the loss will be much less (Refer to Chapter 12-00-00 for Servicing).

## 2. Description (Ref. Fig. 1)

A. The battery consists of 20 interconnected cells in a stainless steel case with a top cover and is vented to atmosphere through a hose which connects the battery case to a vent on the underside of the airplane. The vent is scarfed to induce a flow of air in the hose which draws air over the battery.

B. A signal from a battery temperature sensor is processed by the Data Concetrator Unit. The battery temperature is shown on System Page of the Multi Function Display. If the battery temperature rises above 120°F the digital readout on MFD is green and on the Annunciator Panel a yellow caution BAT TEMP comes on , if the battery temperature is >120°F and <150° the digital readout on MFD is yellow, if the temperature is >150°F the digital readout on MFD is red and a red warning labelled BAT OVHT on the Annunciator Panel comes on.

C. The battery is directly connected to a HOT BATTERY BUSbar and connected to the BATTERY BUSbar through contacts of a battery relay. The contacts of the relay close when the battery switch is set to BAT.

## 3. Operation (Ref. Fig. 1)

A. When the battery switch is set to BAT, a ground signal is applied to energize the battery relay (K2). With the relay energized, battery power is applied from the HOT BAT BUSbar to the BATTERY BUSbar.

B. The battery temperature can be visualized on the MFD.When on the System Page compare BATT °F push the button nearest at the script for visualized the Bat temp. If at any time during flight or ground operation, including engine start, an overheat warning comes on, the battery must be removed from the airplane at the first opportunity and serviced (Refer to 12-00-00).

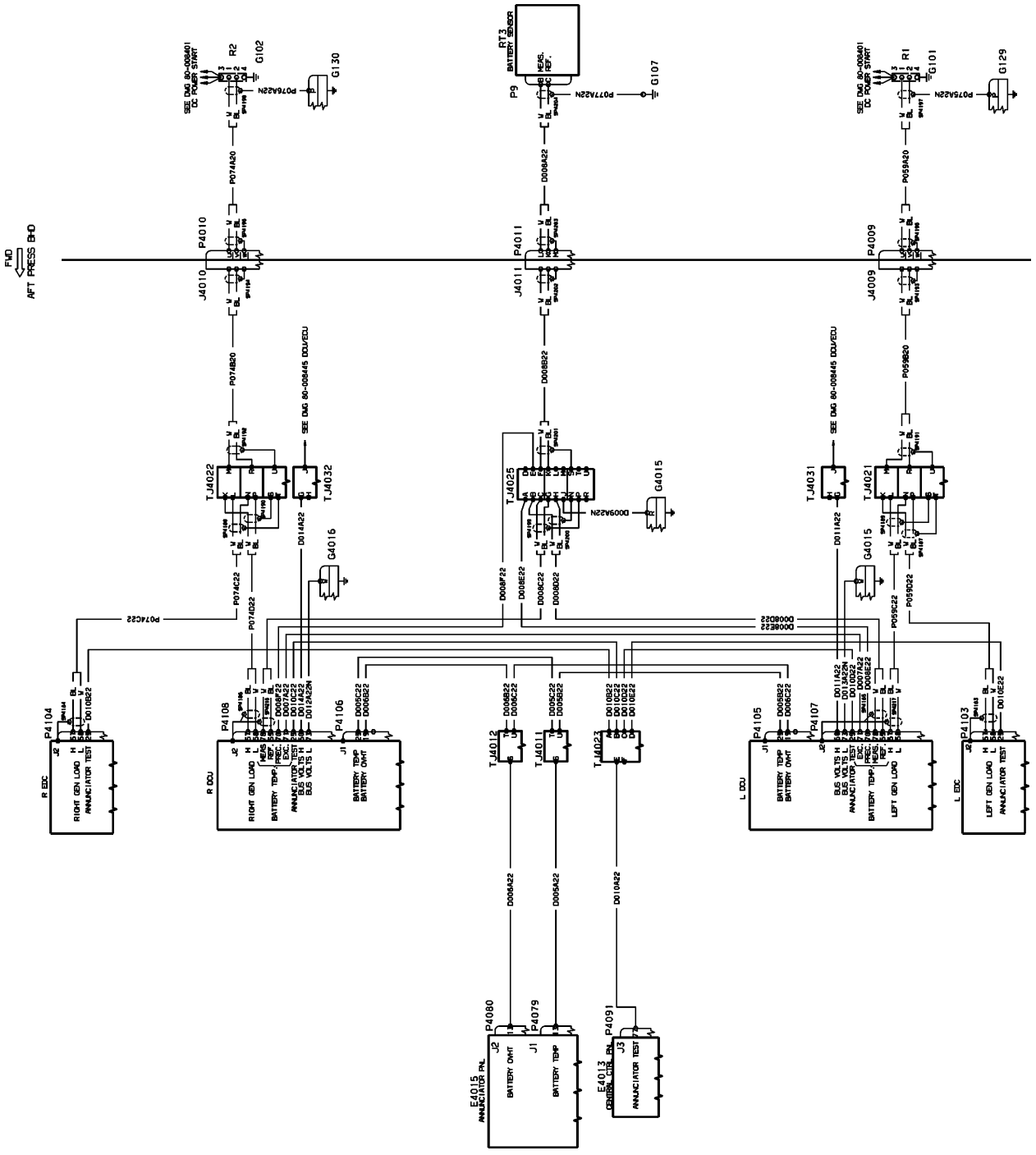

Fig. 1 - Battery Temperature System - Schematic

BATTERY SYSTEM - MAINTENANCE PRACTICES

1. General

A. To extend the life of the battery, the battery should be removed from the airplane and a complete discharge and recharge cycle be performed in accordance with current inspection intervals (Refer to 05-00-00).

B. Battery Maintenance Precautions

**WARNING:** ALKALINE ELECTROLYTE IS HARMFUL TO HUMAN SKIN. AFTER CONTACT, IMMEDIATELY RINSE AREA WITH WATER. NEUTRALIZE WITH A SOLUTION OF 6 OUNCES (170 g) OF BORIC ACID TO ONE GALLON (4 1/2 LITERS) OF WATER OR ONE PART OF VINEGAR TO THREE PARTS OF WATER THEN WASH WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING TO PREVENT SLOW BURNS TO SKIN.

**CAUTION:** ACID AND ALKALI DO NOT MIX. DO NOT USE TOOLS, JARS OR INSTRUMENTS THAT HAVE CONTACTED ACID, WITH ALKALINE BATTERIES.

**CAUTION:** ALKALINE ELECTROLYTE HAS A STRONG EFFECT ON MOST METALS. IN CASE OF SPILLS, IMMEDIATELY NEUTRALIZE AREA WITH EITHER A SOLUTION OF 6 OUNCES (170 g) OF BORIC ACID WITH 1 GALLON (4 1/2 LITERS) OF WATER OR A SOLUTION OF ONE PART OF VINEGAR TO THREE PARTS OF WATER. DO NOT FLUSH WITH WATER BEFORE NEUTRALIZING AS THIS WILL ONLY ENLARGE THE AREA OF CONTAMINATION. DO NOT NEUTRALIZE BATTERY.

**CAUTION:** DO NOT USE A WIRE BRUSH TO CLEAN CELLS. USE A BRISTLE BRUSH AND WATER. REMOVE BATTERY FROM AIRPLANE WHEN USING WATER.

**CAUTION:** UNDER NO CIRCUMSTANCES SHOULD THE BATTERY BE LIFTED BY ITS ELECTRICAL CONNECTOR.

(1) The battery is alkaline type and requires absolute cleanliness. Avoid any contamination.

(2) The battery should be removed from the airplane for discharging, recharging, liquid level adjustment, disassembly and re-assembly of cells. Refer to Chapter 12-00-00.

2. Battery - Removal (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

| | |
|---|---|
| Access platform, 3 feet (1 meter) | Not specified |

B. Referenced Information

Maintenance Manual Chapter 52-00-00

C. Procedure

(1) Set the battery switch to OFF.
(2) Open the baggage compartment door (Refer to 52-00-00). Put the access platform in position.
(3) Disconnect the battery quick-disconnect from receptacle (3).
(4) Disconnect the battery temperature connector from the receptacle (4).
(5) Loosen the clamp (10) and remove the vent hose head from the stub (11).
(6) Release the quick-fasteners (6) and remove the retaining bar (5).
(7) Cut and remove the locking wire (2).
(8) Unscrew the two wing nuts (1) to release the stays (7) from the hold down bar (13) attached to the battery cover. Move the stays away from the hold down bar.
(9) Remove the battery.

**NOTE:** Do not carry the battery by the cover clips (12).

3. Battery - Installation (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

| | |
|---|---|
| Access platform, 3 feet (1 meter) | Not specified |

B. Materials

| | |
|---|---|
| Lockwire | MS20995C32 |
| Clamp | MS35842-10 |

C. Referenced Procedures

Maintenance Manual Chapter 52-00-00

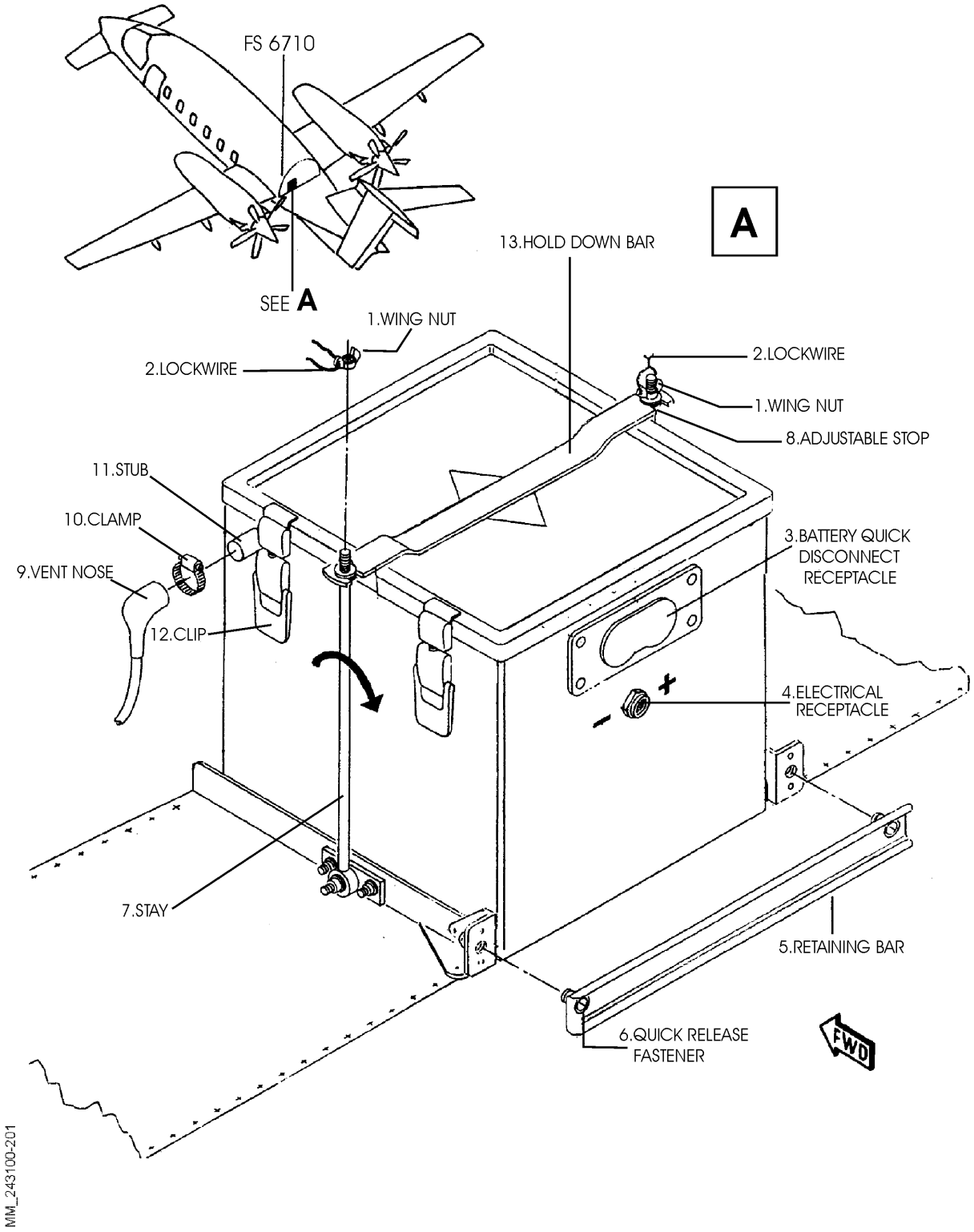


Fig. 201 - Battery - Removal/Installation

D. Procedure

(1) Locate the battery on the shelf so that it contacts the rear stop (1).
(2) Raise the stays (7) so that they engage in the cut-outs of the holddown bar (13).
(3) Tighten each wingnut (1) until they firmly clamp the stay to hold the battery in position. If necessary, adjust the adjustable stop (8) on the stay. Do not overtighten the wingnut seeking for grip, bring the stop up to the hold down bar. Safety the wing nuts with lockwire (2) using the double twist method.
(4) Attach the retaining bar (5) using the quick release fasteners (6).
(5) Put the vent pipe hose (9) on the vent stub (11). Secure with the clamp (10).
(6) Connect the temperature sensor electrical connector to the electrical receptacle (4).
(7) Connect the battery quick disconnect to the receptacle (3).
(8) Set the battery switch to BAT.
(9) Select the MFD System Page and make sure that the battery voltage is a minimum of 23.5 volt.
(10) Perform the Battery Temperature Sensor Operational Check.
(11) Remove the access platform and close the baggage compartment door (Refer to 52-00-00).

4. Battery Stay and Plate - Removal (Ref. Fig. 202)

A. Procedure

(1) Remove the battery (Refer to Para. 2).
(2) Remove the nut (8) and the washer (7).
(3) Pull the stay (2) off the plate (4).
(4) Remove the nuts (6), the washers (5) and the screws (3).
(5) Remove the plate (4).

5. Battery Stay and Plate - Installation (Ref. Fig. 202)

A. Materials

| | |
|---|---|
| Sealant | PR1431 |

B. Procedure

(1) Apply sealant to the interface of the plate (4) (Refer to 51-00-00).
(2) Attach the plate (4) to the rail using the screws (3), the washers (5) and the nuts (6).
(3) Attach the the stay (2) to the plate (4) using the washer (7) and the nut (8).
(4) Install the battery (Refer to Para. 3).

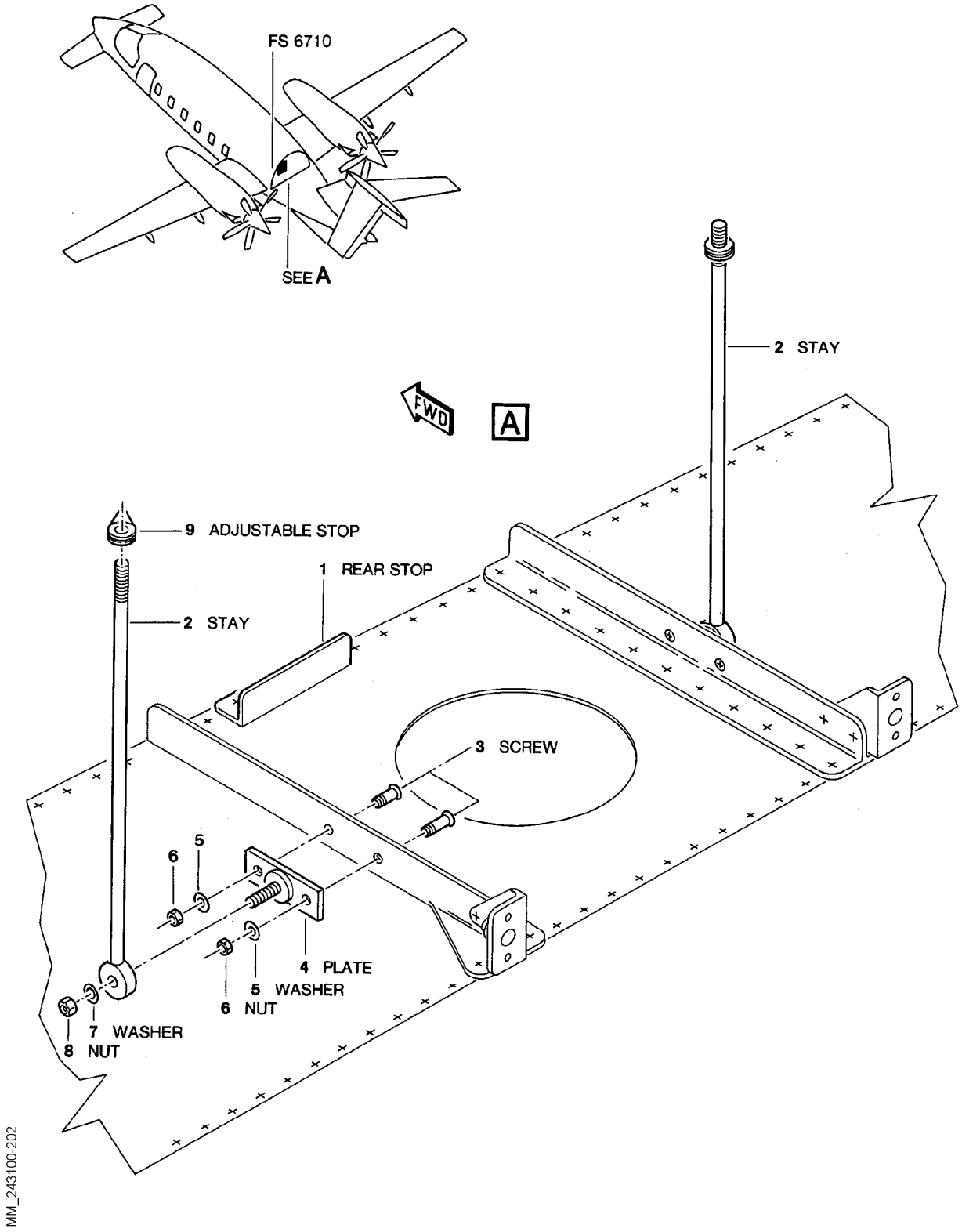


Fig. 202 - Battery Stay and Plate Removal/Installation

6. Battery Ventilation Hose - Removal (Ref. Fig. 203)

A. Fixtures, Test and Support Equipment

| | |
|---|---|
| Access platform, 3 feet (1 meter) | Not specified |

B. Referenced Procedures

Maintenance Manual Chapter 52-00-00
Maintenance Manual Chapter 24-30-00

C. Procedure

(1) Open the baggage compartment door (Refer to 52-00-00). Put the access platform in position.
(2) Remove the LH generator control unit (Refer to 24-30-00).
(3) Remove panel 281 BZ in the baggage compartment.
(4) Disconnect the vent tube (11) from the battery. Remove the clamp (1) and pull the adaptor (2) off the battery case stub.
(5) Enter the main landing gear wheel well.
(6) Disconnect the hose (11) from the external vent pipe (5). Remove the clip (3) and the clamp (4).
(7) Remove and discard the seven clips (11) and blocks (9) attaching the hose and withdraw the hose upwards through the baggage compartment shelf.

7. Battery Ventilation Hose - Installation (Ref. Fig. 203)

A. Fixtures, Test and Support Equipment

| | |
|---|---|
| Access platform, 3 feet (1 meter) | Not specified |

B. Materials

| | |
|---|---|
| Clamp | SST2S |
| Clamping block | TA1S8 |

C. Referenced Information

Maintenance Manual Chapter 52-00-00
Maintenance Manual Chapter 24-30-00

D. Procedure

(1) Thread the hose through the shelf and attach the adapter (2) to the battery case stub using the adjustable collar (1).
(2) Attach the hose to the external vent pipe using the clamp (3) and the clip (4).
(3) Connect the hose to the remaining fastening points using new blocks (9) and clips (10).
(4) Install the LH generator control unit (Refer 24-30-00).
(5) Close the baggage compartment door (Refer to 52-00-00). Remove the access platform.

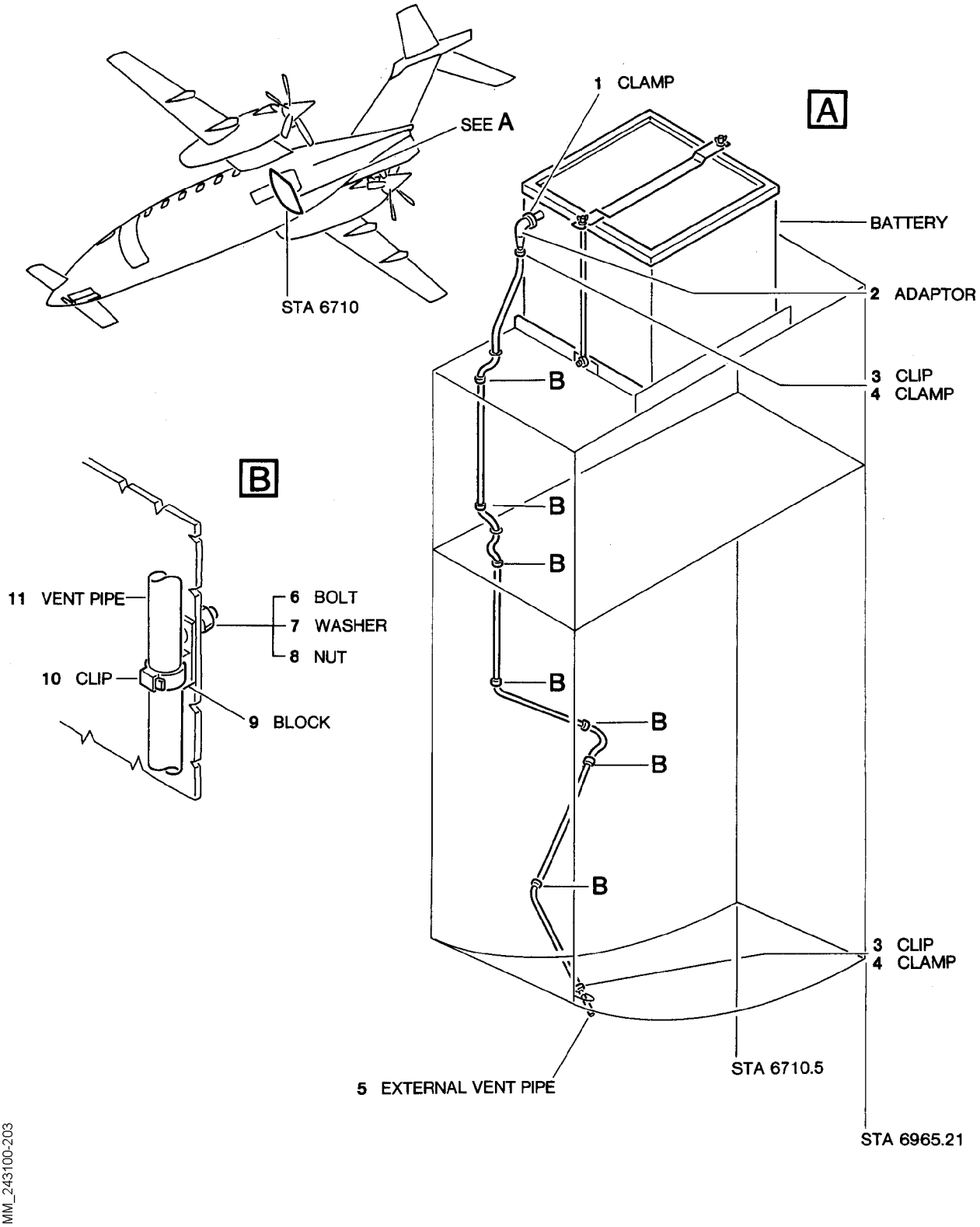


Fig. 203 - Battery Ventilation Hose

8. Inspection/Test

A. Inspection

(1) Inspect the battery installation for signs of corrosion. If signs of corrosion are present, remove the battery and neutralize the area.

9. Battery Temperature Sensor - Removal

A. Procedure

(1) Set the battery switch to OFF.
(2) Remove the battery (Refer Para. 2).
(3) Disconnect the temperature sensor wiring. Disconnect and remove the temperature sensor.

10. Battery Temperature Sensor - Installation

A. Referenced Information

Maintenance Manual Chapter 52-00-00

B. Procedure

(1) Remove the Battery as described in this section.
(2) Connect the temperature sensor to the battery.
(3) Install the Battery as described in this section.
(4) Connect the electrical connector to the receptacle.
(5) Perform a Battery Temperature Sensor - Operational Test.
(6) Close the baggage compartment door (Refer to 52-00-00).

11. Battery Capacity Test and Deep Cycle

For the Battery Capacity Test and Deep Cycle refer to : MARATHON - NORCO AEROSPACE for Nickel Cadmium Battery - Aircraft Battery ATA - 24 - 34 - 00 Components Maintenance Manual last revision.

12. Battery Temperature Sensor - Operational Test

A. Procedure

(1) Set the battery switch to BAT.
(2) Select ANN on the SYS TEST panel and press the pushbutton located in the center of the selector knob.
(3) Check that the amber BAT TEMP and red BAT OVTH annunciator lights comes ON.
(4) Release the pushbutton located in the center of the selector knob and check that the amber BAT TEMP and red BAT OVTH annunciator lights goes OFF.

**NOTE:** The battery temperature is displayed on the MFD System Page.

(5) Check the battery temperature value consistency in comparison with the outside air temperature.
(6) Set the battery switch to OFF.

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# EXTERNAL POWER - DESCRIPTION AND OPERATION

## 1. Description

A. An External Unit may be used in conjunction with battery to power the utilities with the aircraft on the ground and to start the engines.This power unit can be coconnected to the electrical system by means of a special socket. on the LH side of the airplane, under the wing.

B. The External Power Status display consist of a textual message on the System Page of the Multi Function Display that indicates when external power is connected to the aircraft.

## 2. Operation

A. A relay connects this socket to the system only if energised (by means of a separate line) by the external source and subsequent to closure of the Battery Switch (BAT OFF) on the pilot panel., at the same time causing the green EXT PWR light on the MFD ti vome on. To prevent the connection from being made with inverted polarity, the socket is designed in such a way that if incorrectly inserted the connection to the system will not enable. (Ref. Fig. 1)

B. A green EXT POWER annunciation is displayed on the System Page when the External Power Connected discrete input is true. A green EXT POWER annunciation is displayed below R-LSK-4, flashing for 5 seconds, then steady on all formats other than the System Page when External Power Connected input is true. Automatic Source selection between data sources is provided. L DCU is priority source. R DCU is secondary source (Fig. 2)

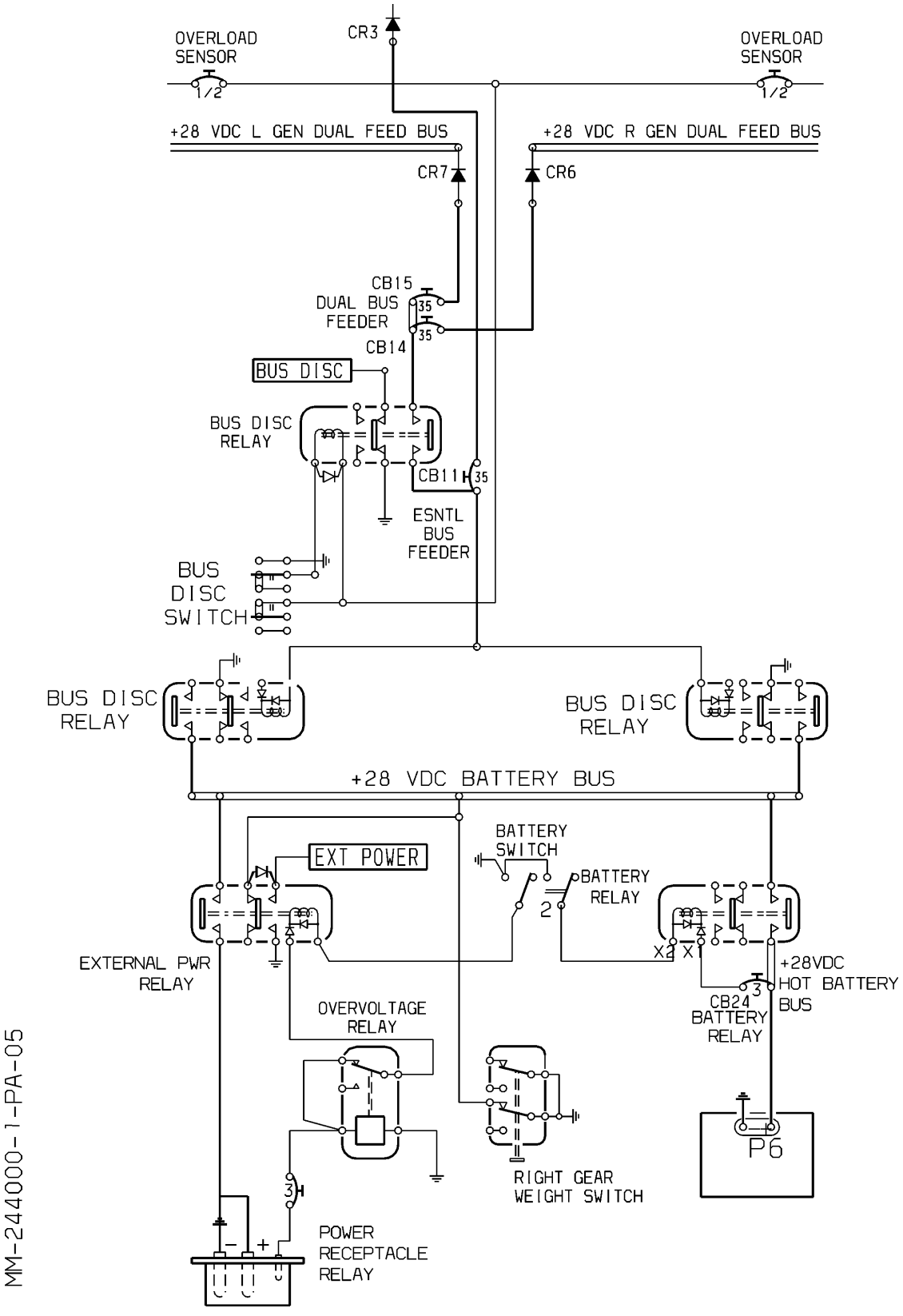
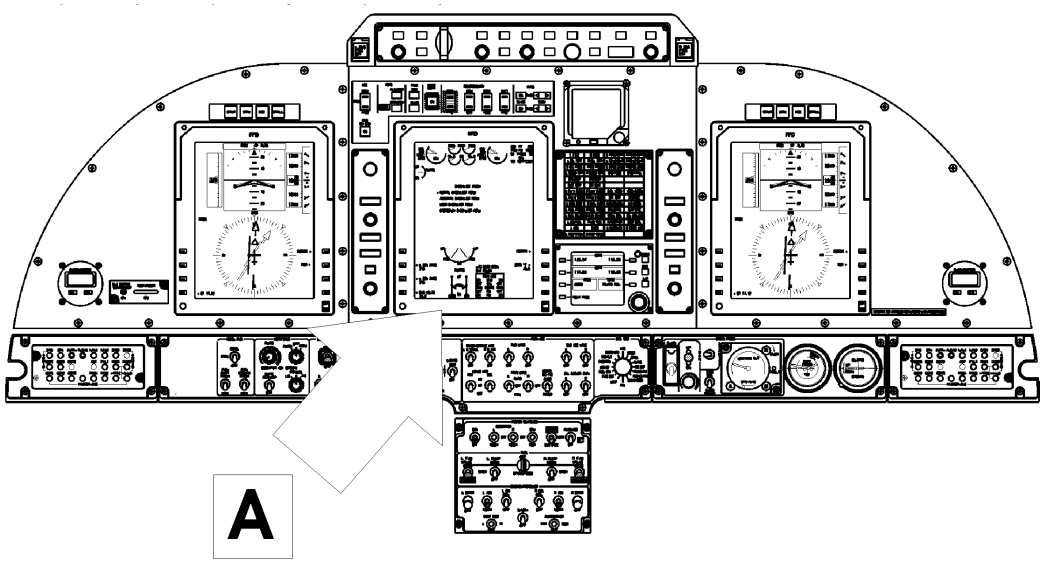



Fig. 1 - External Power - Schematic



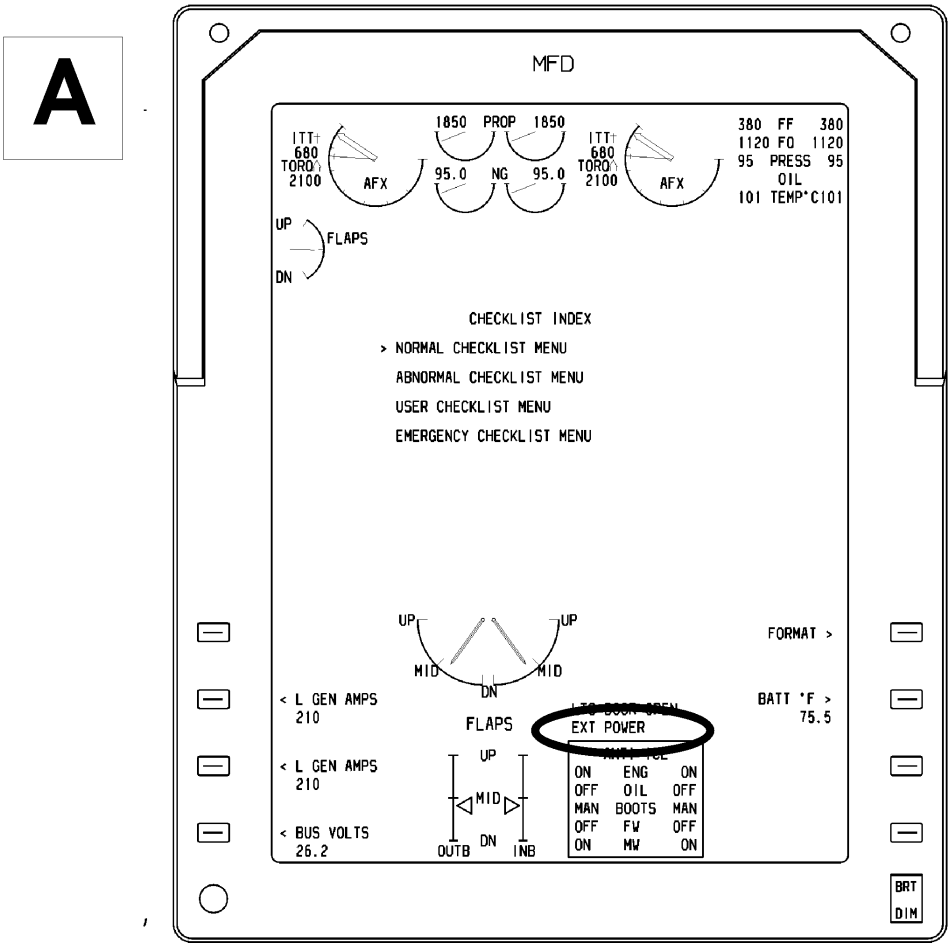




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Fig. 2 - External Power -System Page

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# EXTERNAL POWER - MAINTENANCE PRACTICES

1. Maintenance Precautions

**CAUTION:** DO NOT CONNECT A GROUND POWER UNIT IF THE BATTERY VOLTAGE IS 23 VOLTS OR BELOW. SERVICE OR REPLACE THE BATTERY.

**CAUTION:** IT IS NOT ADVISABLE TO CONNECT EXTERNAL GROUND POWER WITH THE BATTERY DISCONNECTED AS THE BATTERY ABSORBS VOLTAGE PEAKS GENERATED BY THE GROUND POWER UNIT.

**CAUTION:** THE EXTERNAL POWER MUST BE REGULATED PER MIL-STD-704D OR EQUIVALENT.

**CAUTION:** THE BATTERY TEMPERATURE MUST BE MONITORED ON THE MFDI WHEN GROUND POWER IS CONNECTED.

2. Procedure

A. General The following procedure is for connecting an external power supply to an airplane with the battery fitted.

(1) Make sure that all avionics switches are in the OFF position.
(2) Make sure that the battery switch is in the OFF position.
(3) Connect the external ground supply to the receptacle.
(4) Switch on the ground power unit and set the voltage to 28 + - 0.5 volts.
(5) When the ground power unit voltage is stabilized, set the battery switch to BAT.
(6) Make sure that the System Page of the MFD shows EXT PWR .
(7) Visualize BAT TEMP on the MFD and observe the trend of battery temperature to preclude overheating. If another setting of the MFD is required, monitor the BAT TEMP caption on the annunciator panel.

3. External Power Receptacle - Removal (Ref. Fig. 201)

A. Referenced Information

Maintenance Manual Chapter 24-30-00
Maintenance Manual Chapter 52-00-00

B. Procedure

(1) Open the luggage compartment door (Refer to 52-00-00) and disconnect the battery (Refer to 24-30-00).
(2) Tag and disconnect the wiring. Disconnect the ground strap.
(3) Remove the attaching screws and the receptacle.

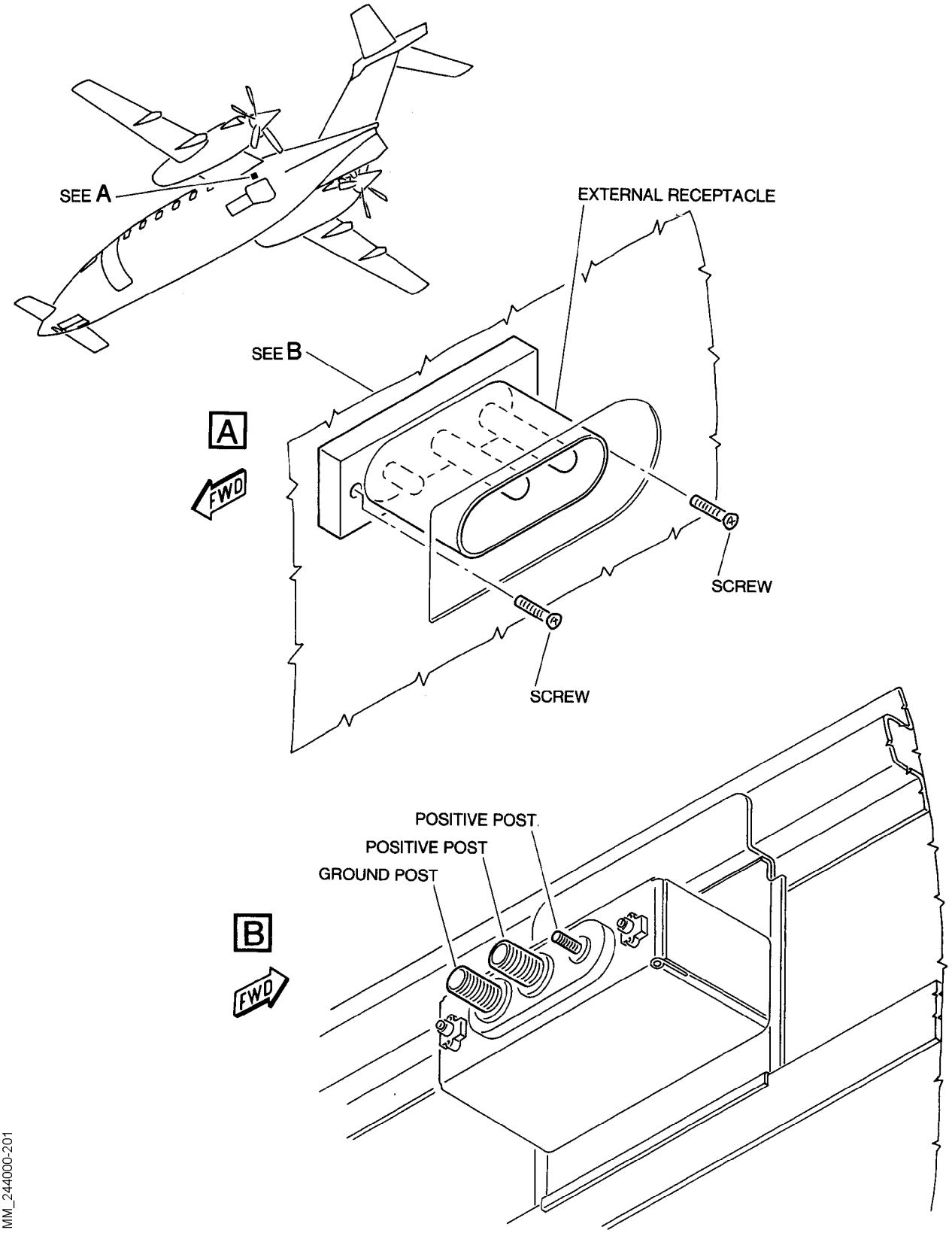


Fig. 201 - External Power Receptacle

4. External Power Receptacle - Installation (Ref. Fig. 201)

A. Referenced Information

Maintenance Manual Chapter 24-30-00
Maintenance Manual Chapter 52-00-00

B. Procedure

(1) Install the receptacle and secure with the screws.
(2) Connect the electrical wiring.
(3) Reconnect the battery (Refer to 24-30-00). Close the baggage compartment door (Refer to 52-00-00).
(4) Connect an external power supply (Refer to Para. 2).
(5) Set the battery switch to BAT.
(6) Set on the MFD the System Page that shown BUS VOLTS and make sure that external power voltage is displayed on the MFD.
(7) Set the battery switch to OFF.

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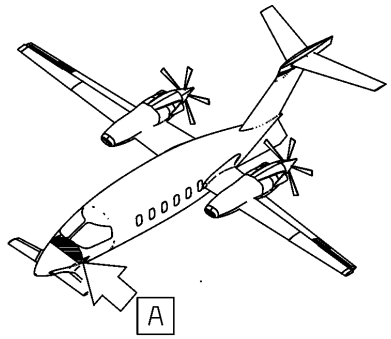
# AC ELECTRICAL LOAD DISTRIBUTION - DESCRIPTION AND OPERATION

## 1. Description

A. The Variable AC Power feed 115 VAC only to the following panels: ( Fig. 1- 2).

- Central Control Panel
- Master Control Panel
- Pilot Panel
- Copilot Panel
- Reversionary Misc. Panel
- Light Control Panel
- Lights Dimming Panel
- Pilot Circuits Breaker Panels
- Copilot Circuits Breaker Panels
- Trim Switch Panel
- Throttle Quadrant Panel
- Flap Control Panel



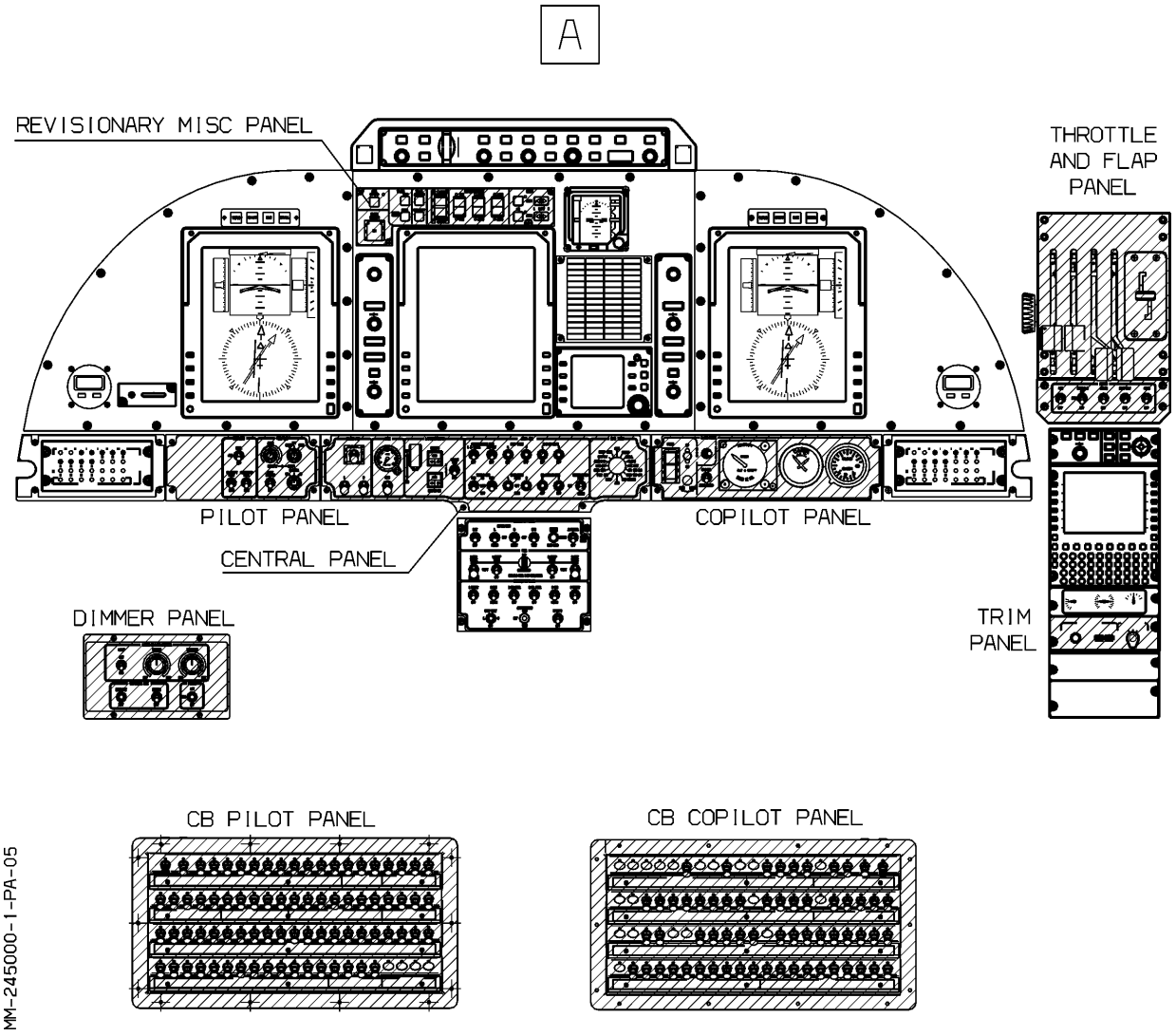




Fig. 1 - AC Power Electro Luminescent Panels (Variable AC Power)

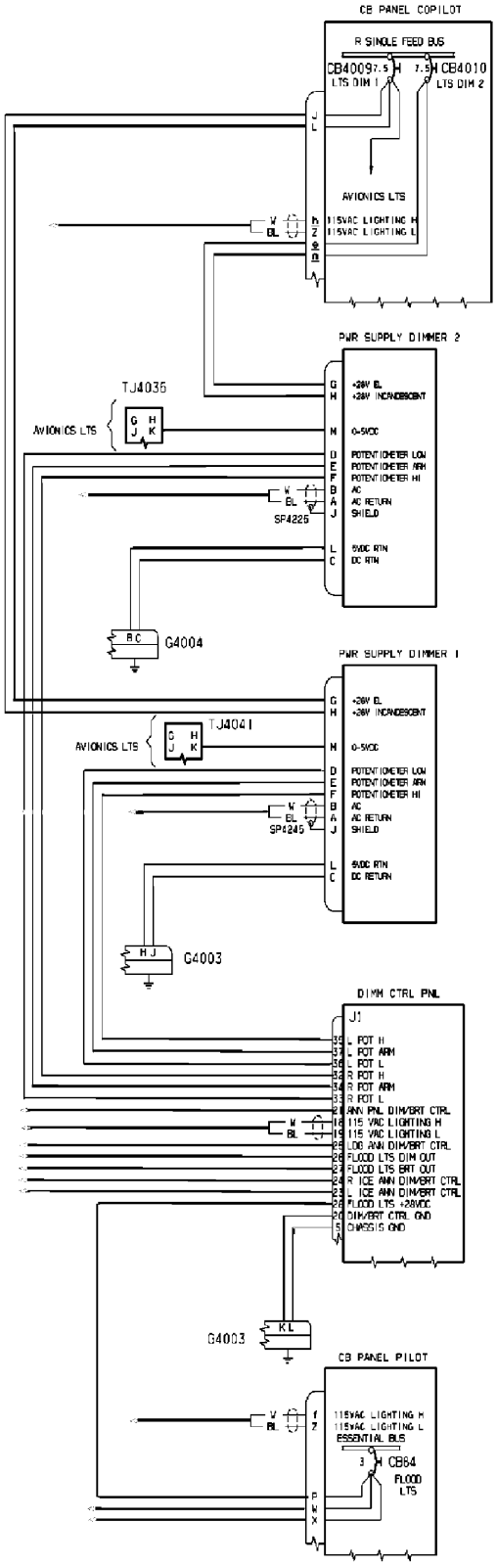



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Fig. 2 - AC Electrical Load Distribution

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# DC ELECTRICAL LOAD DISTRIBUTION - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 1, 2 and 3)

The DC electrical load is distributed from busbars protected by current limiters, circuit breakers, and isolating diodes. The distribution system is so designed that a failure in one supply source will not impair the serviceability of another. The distribution network is normally supplied by two DC generators acting in parallel or the aircraft battery in the absence of generated power.

The main feeder busbars are:

- a HOT BATTERY busbar directly connected to the battery
- a BATTERY BUSbar switched to the hot battery busbar
- an ESSENTIAL BUSbar fed directly from the battery busbar and by a single feed from each generator busbar
- a LH and RH GEN BUSbar fed from the battery busbar until the associated generator comes on line
- a LH and RH DUAL FEED BUSbar supplied from the associated generator busbar and from the battery busbar
- a LH SINGLE FEED BUSbar and the two RH SINGLE FEED BUSbars supplied from the associated generator busbar.

Busbars dedicated to avionics are supplied through relays which connect an avionic busbar to the essential busbar or a dual feed busbar when switched by the AVIONICS master switch.

The avionic busbars are:

- two ESNTL AVIONICS BUSbars fed from the essential busbar
- a L AVIONICS DUAL FEED BUSbarand the L AVIONICS SUPPL. BUSbar fed from the L dual feed busbar
- a R AVIONICS SINGLE FEED BUSbar fed from the right single feed busbar.
- two R AVIONICS DUAL FEED BUSbars fed from the R dual feed busbar

Each busbar is protected according to the importance to flight safety of the system it supplies:

- The essential busbar is fed from three sources, each individually protected by relays and diodes against a failure in one or both of the others.
- The dual feed busbars are fed from two sources again protected by relays and diodes against a failure of the other.
- A single source busbar is redundant on the side of the feed source failure, left or right.
- Avionic busbar supplies depend on the busbar to which they are connected remaining energized and remain connected to the busbar following a failure to the switching side of the controlling relay.

In normal operation all multiple feed busbars are interconnected through three busbar disconnect relays. The relays are to protect the battery source from a failure in a generated source detected by an overload sensor between each generator busbar and the

battery busbar. Operation of an overload sensor opens the busbar disconnect relays causing a BUS DISC caution light (yellow) on the annunciator panel to come on.

Setting a switch on the MASTER SWITCHES panel from NORM to BUS DISC has the same effect. Setting the switch to EMER energizes a relay (K5); the BUS DISC annunciator will remain light but feed will be restored from the battery busbar to the dual feed busbars.

Setting the switch to NORM restores the automatic system. On the ground, when the generators are inoperative, the ground signal required to operate the relays is provided by a weight-on-wheels switch on the right gear leg. With the airplane on jacks the weight-on-wheels switch releases. To restore the ground signal, connect an external ground power unit and switch on the battery.

A main junction box is on a shelf in the baggage compartment. The main junction box contains the HOT BAT BUS, the BAT BUS, the L GEN BUS and the R GEN BUS together with the external power relay (K1), the battery relay (K2), the right and left generator relays (K6 and K7), the right and left generator busbar disconnect relays (K4 and K3) and several units for the starting system.

A power distribution panel is on the right and on the left of the flight deck. The power distribution panel on the left includes the pilot circuit breaker panel, the ESSENTIAL BUS, the L DUAL FEED BUS and the L SINGLE FEED BUS. The power distribution panel on the right includes the copilot circuit breaker panel, the R DUAL FEED BUS and the R SINGLE FEED BUS.

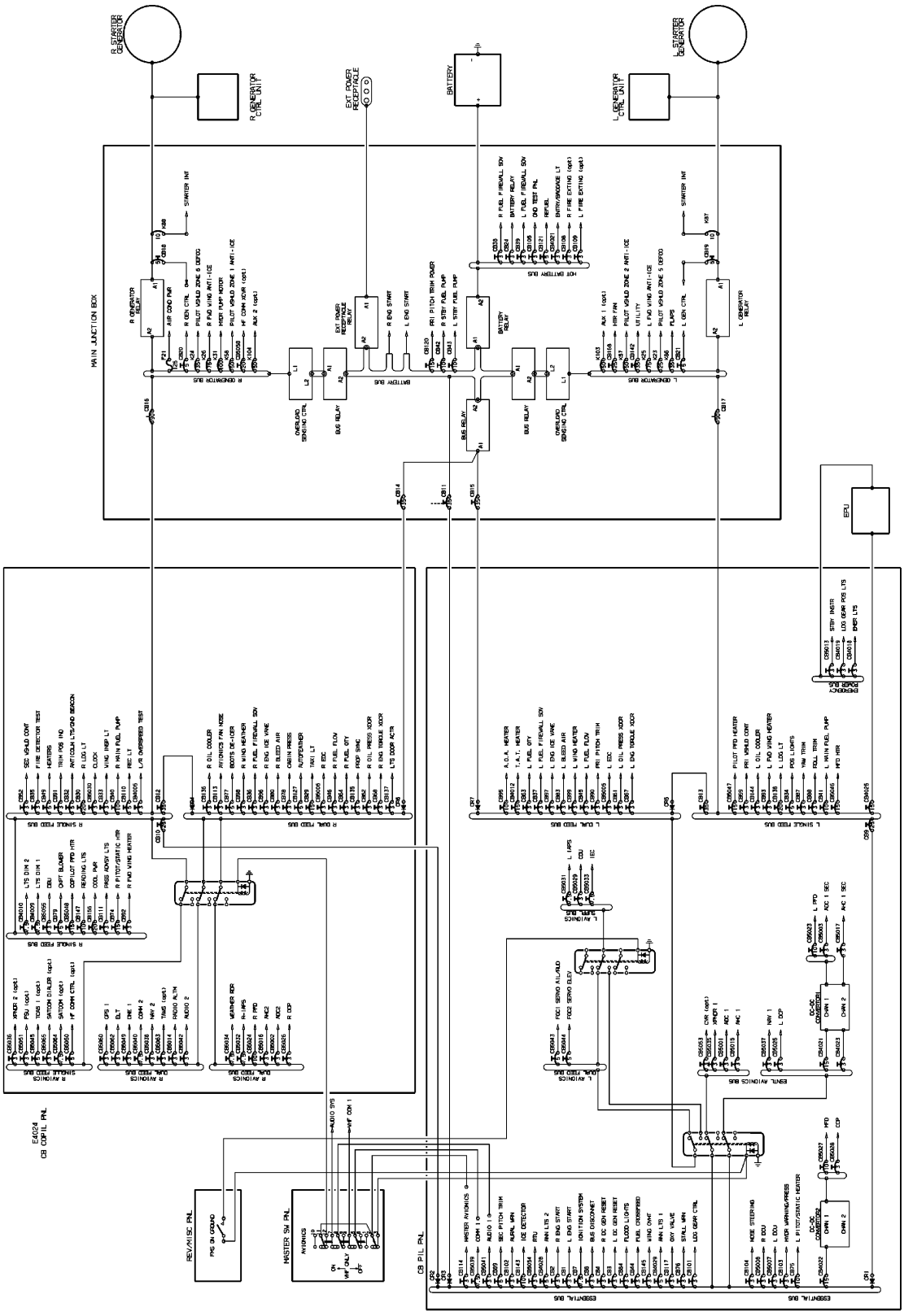

Fig. 1 - DC Electrical Load Distribution - Schematic

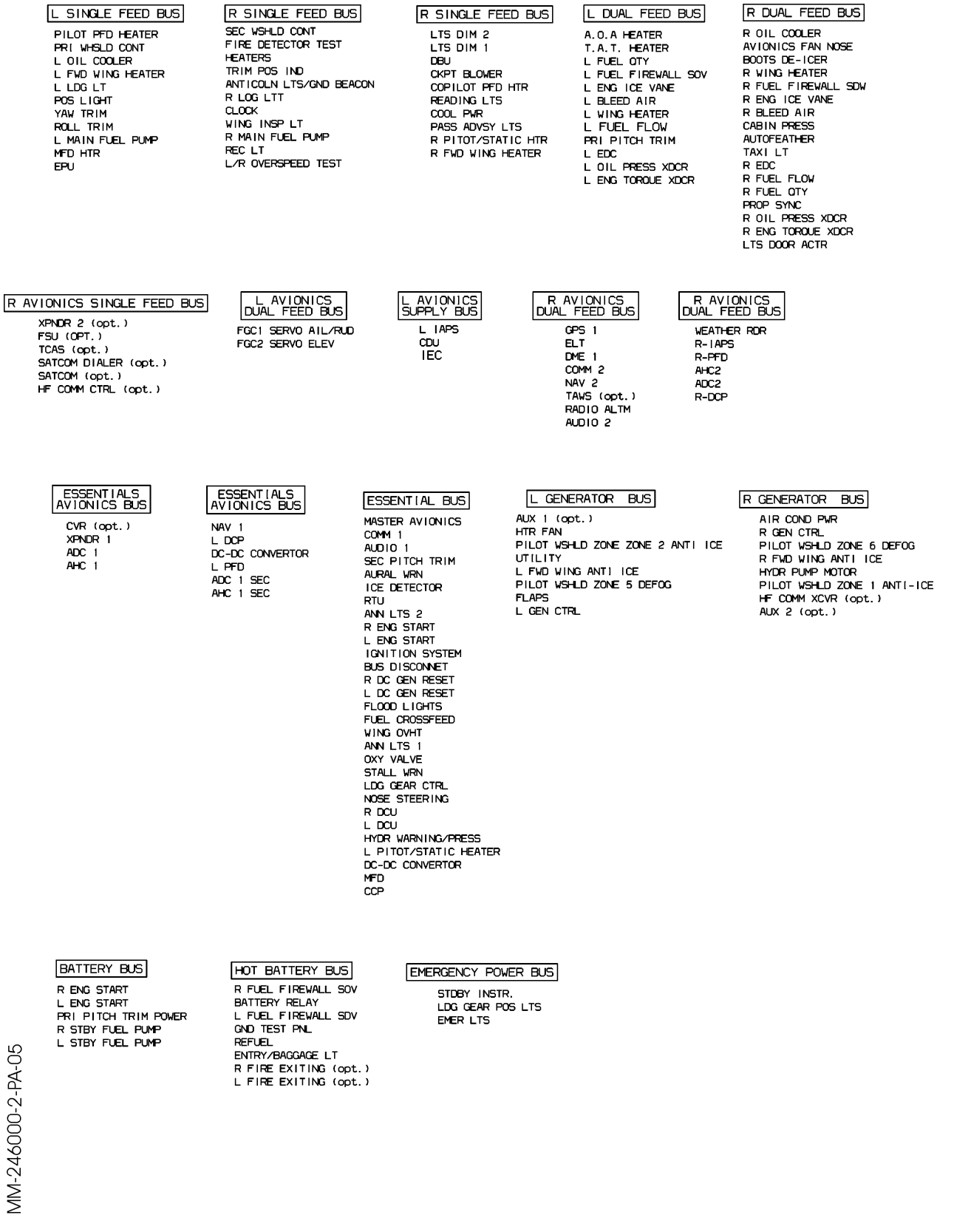


Fig. 2 - DC Electrical Load Distribution

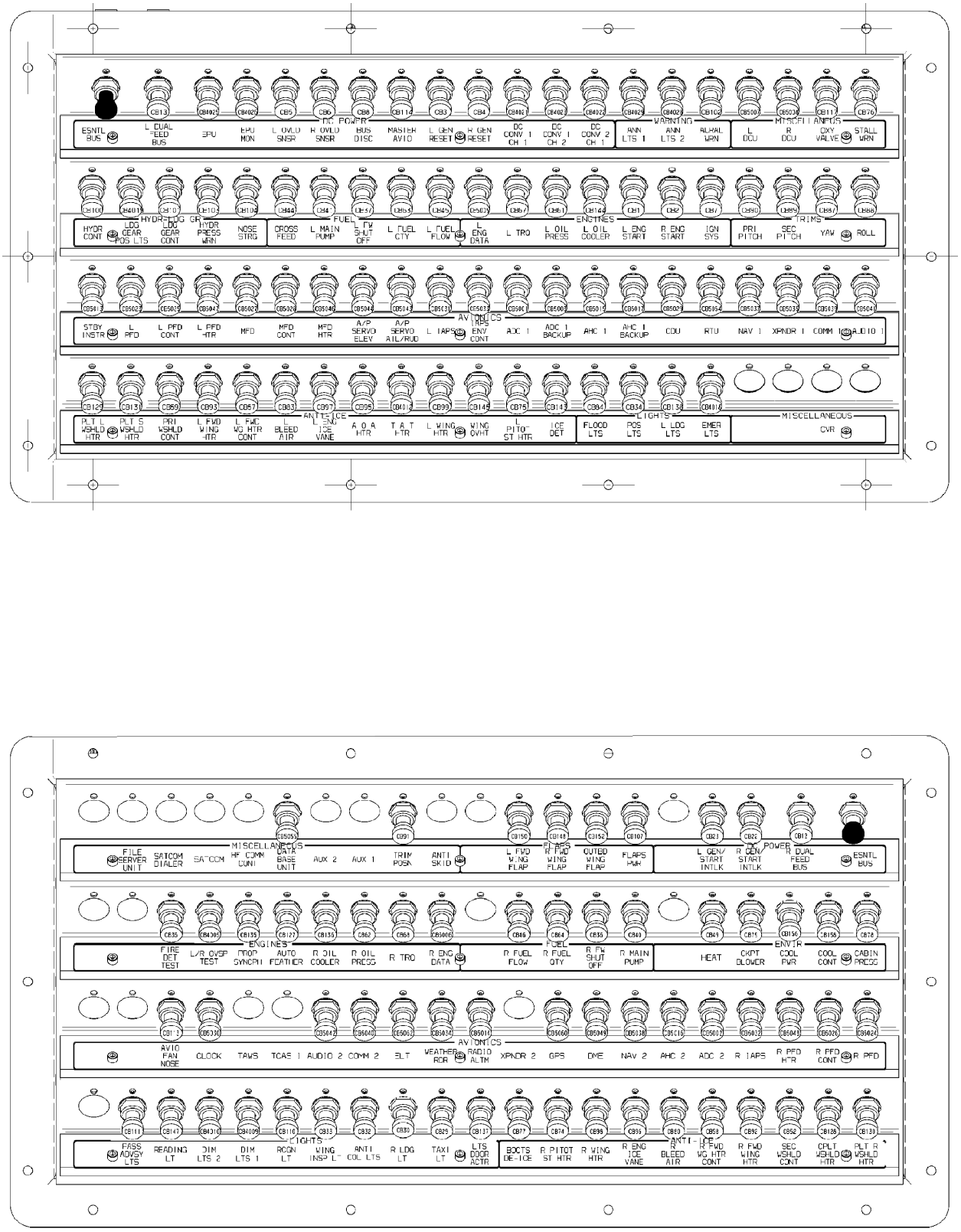





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Fig. 3 - Pilot and Copilot Circuit Breaker Panels

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DC ELECTRICAL LOAD DISTRIBUTION - MAINTENANCE PRACTICES

1. Main Junction Box - Removal (Ref. Fig. 201)

A. Fixtures,Test and Support Equipment

| | |
|---|---|
| Access platform, 3 feet (1 meter) | Not specified |
| Protective caps, electrical connectors | |

B. Referenced Information

Maintenance Manual Chapter 24-31-00
Maintenance Manual Chapter 52-30-00

C. Procedure

(1) Make sure that the battery switch is set to OFF. Put a warning notice in the flight compartment to tell persons not to apply electrical power.
(2) Make sure that a ground power supply is not connected.
(3) Open and support the baggage compartment door (Refer to 52-30-00). Put the access platform in position.
(4) Make sure that no other work is being carried out which would be upset by the removal of aircraft electrical power.
(5) Disconnect the battery (Refer 24-31-00).
(6) Disconnect electrical connectors P10, P26, P7, P37 from receptacles J10, J26, J7, J37.
(7) Remove the front cover of the main junction box. Remove the four screws. Open the circuit breaker panel door.
(8) Disconnect wire numbers P10A4,P10B4, P10C4 from terminal A1 of the RH generator relay K6 and withdraw cable 80-208516-405 from the main junction box.
(9) Disconnect wire numbers P9A4, P9B4, P9C4 from terminal A2 on the LH generator relay K7 and withdraw cable 80-208516-407 from the main junction box.
(10) Disconnect wire numbers P4A4, P4B4 from terminal A1 on the external power relay K1 and withdraw cable 80-208516-411 from the main junction box.
(11) Disconnect wire numbers P1A4, P1B4 from terminal A2 on the battery relay K2 and withdraw cable 80-208516-413 from the main junction box.
(12) Disconnect the two ground wires from the case to the shelf.
(13) Remove the four screws holding the case to the rear bracket.
(14) Remove the two screws and two washers holding the upper sides of the case to the vertical brackets.
(15) Carefully remove the main junction box.
(16) Put protective caps on the connectors if further work is to be carried out, delaying re-installation of the unit.

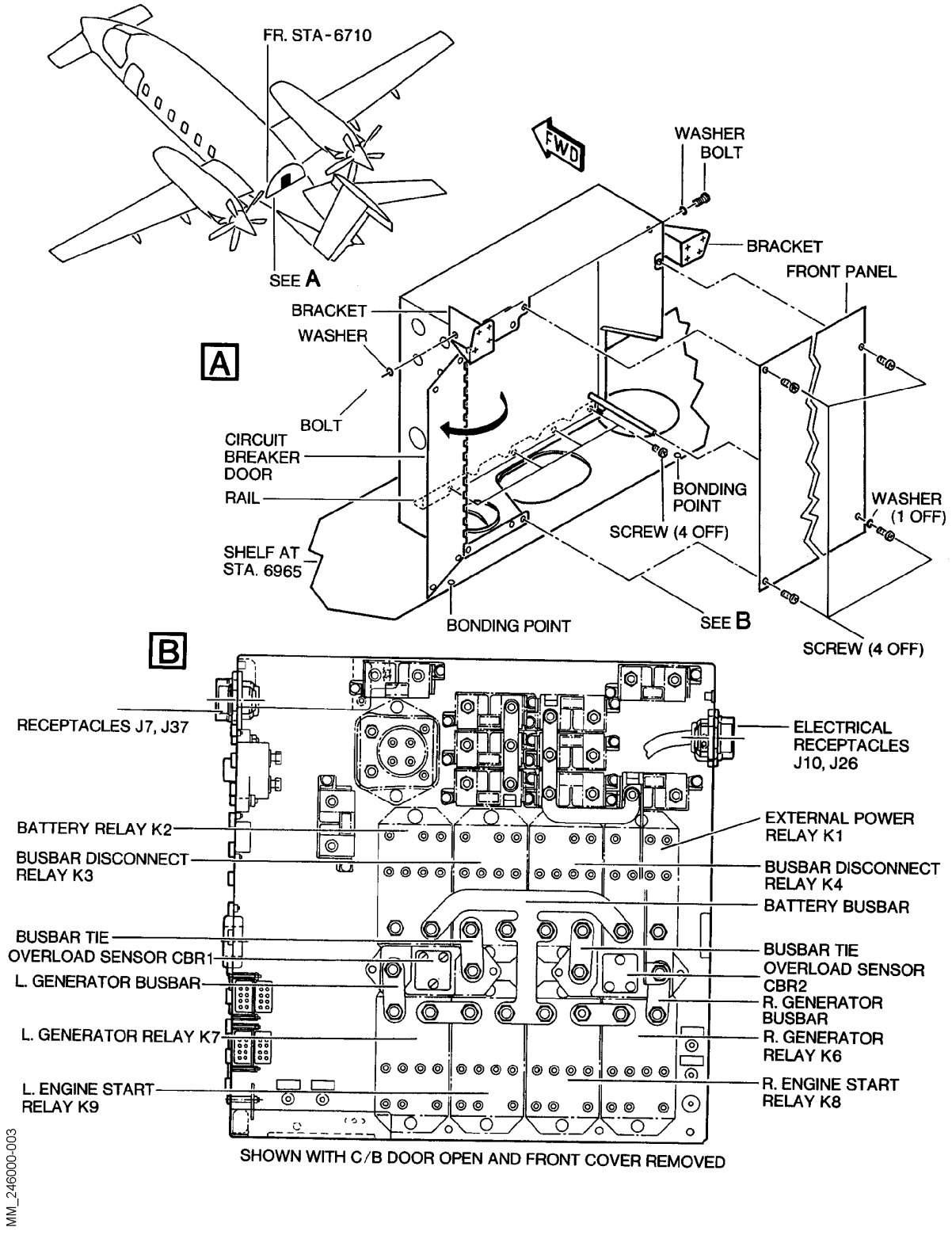


Fig. 201 - Main Junction Box

2. Main Junction Box - Installation (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

| | |
|---|---|
| Access platform, 3 feet (1 meter) | Not specified |

B. Referenced Information

Maintenance Manual Chapter 24-31-00
Maintenance Manual Chapter 52-30-00

C. Procedure

(1) Position the main junction box on the shelf and locate to the vertical brackets using the two washers and screws. Do not tighten.
(2) Secure the case to the rear bracket using the four screws.
(3) Tighten the four lower screws and then the two upper screws.
(4) Connect the two ground wires between the case and the shelf.
(5) Insert cable 80-208516-405 into the case and connect wires P10A4, P10B4, P10C4 to terminal A1 of the RH generator relay K6.
(6) Insert cable 80-208516-407 into the case and connect wires P9A4, P9B4, P9C4 to terminal A2 of the LH generator relay K7.
(7) Insert cable 80-208516-411 into the case and connect wires P4A4, P4B4 to terminal A1 of the external power relay K1.
(8) Insert cable 80-208516-413 into the case and connect wires P1A4, P1B4 to terminal A2 of the battery relay K2.
(9) Remove any protective caps fitted to the electrical connectors.
(10) Connect electrical connectors P37, P7, P26, P10 to receptacle J37, J7, J26, J10.
(11) Connect the battery (Refer 24-31-00).
(12) Remove the warning notice in the flight compartment which tells persons not to apply electrical power.
(13) Do a functional test of the electrical load distribution system.
(14) Install the main junction box front cover using the four screws.
(15) Remove the access platform.
(16) Close the baggage compartment door (Refer to 52-30-00).

3. Main Junction Box - Inspection / Check (Ref. Fig. 201)

A. Fixtures,Test and Support Equipment

| | |
|---|---|
| Access platform, 3 feet (1 meter) | Not specified |

B. Referenced Information

Maintenance Manual Chapter 52-30-00

C. Procedure

**NOTE:** Inspection and/or checking of the Main Junction Box components should be conducted in accordance with current inspection intervals as outlined in Chapter 5 or whenever is requested.

(1) Make sure that the battery switch is set to OFF. Put a warning notice in the flight compartment to tell persons not to apply electrical power.
(2) Make sure that a ground power supply is not connected.
(3) Open and support the baggage compartment door (Refer to 52-30-00). Put the access platform in position.
(4) Make sure that no other work is being carried out which would be upset by the removal of aircraft electrical power.
(5) Remove the front cover of the main junction box. Remove the four screws. Open the circuit breaker panel door.
(6) Check electrical wiring for damage such as overheating, chafing, fraying, and cuts.
(7) Check wire clamps and supports for security.
(8) Check that all wiring is supported clear of sharp metal edges.
(9) Check wiring for liquid impregnation.
(10) Check the terminal connections are secure and that lugs are not cracked or touching adjacent terminal structure.
(11) Check the electrical equipment (Ref. to Fig. 201) for proper installation, security of mounting, phisical damage and evidence of overheating.
(12) Ckeck security of safety wire on electrical equipment and electrical connectors (Ref. to Fig. 201) where applicable.
(13) Install the main junction box front cover using the four screws.
(14) Remove the access platform.
(15) Close the baggage compartment door (Refer to 52-30-00).
(16) Remove the warning notice in the flight compartment

4. Pilot and Copilot Power Distribution Panel - Removal (Ref. Fig. 202)

A. Fixtures, Test and Support Equipment

Protective caps, electrical connectors

B. Referenced Procedures

Maintenance Manual Chapter 24-31-00
Maintenance Manual Chapter 25-00-00

C. Procedure

**NOTE:** The removal procedure for the pilot and copilot power distribution panel is identical except for electrical connector identification and handing, right and left.

(1) Make sure that no other work is being carried out which would be upset by the removal of aircraft electrical power.

(2) Set the battery switch to OFF. Put a warning notice in the flight compartment to tell persons not to apply electrical power.
(3) Make sure that a ground power supply is not connected.
(4) Disconnect the battery (Refer to 24-31-00).
(5) Remove the pilot or copilot seat as applicable (Refer to 25-00-00).
(6) Disconnect the electrical connectors:
- P128, P130, P612 from receptacles J128, J130, J612 (pilot)
- P131, P133, P611 from receptacles J131, J133, J611(copilot)

(7) Put protective caps on the electrical connectors if further work is to be carried out delaying the installation of the power distribution panel.
(8) Remove the twelve screws fastening the power distribution panel to the structure.
(9) Remove the panel.

5. Pilot and Coplilot Power Distribution Panel - Installation (Ref. Fig. 202)

A. Referenced Procedures

Maintenance Manual Chapter 24-31-00
Maintenance Manual Chapter 25-00-00

B. Procedure

(1) Locate the panel and fasten using the twelve screws.
(2) Remove any protective caps fitted to the electrical connectors.
(3) Connect the electrical connectors:
- P4005, P4003, P5009 to receptacles J4005,J4003, J5009 (pilot)
- P4006, P4004 ,P5010 to receptacles J4006, J4004 ,J5010 (copilot)

(4) Install the pilot or copilot seat as applicable (Refer to 25-00-00).
(5) Connect the battery (Refer to 24-31-00).
(6) Remove the warning notice in the flight compartment which tells persons not to apply electrical power.
(7) Do a functional test of the electrical load distribution system.

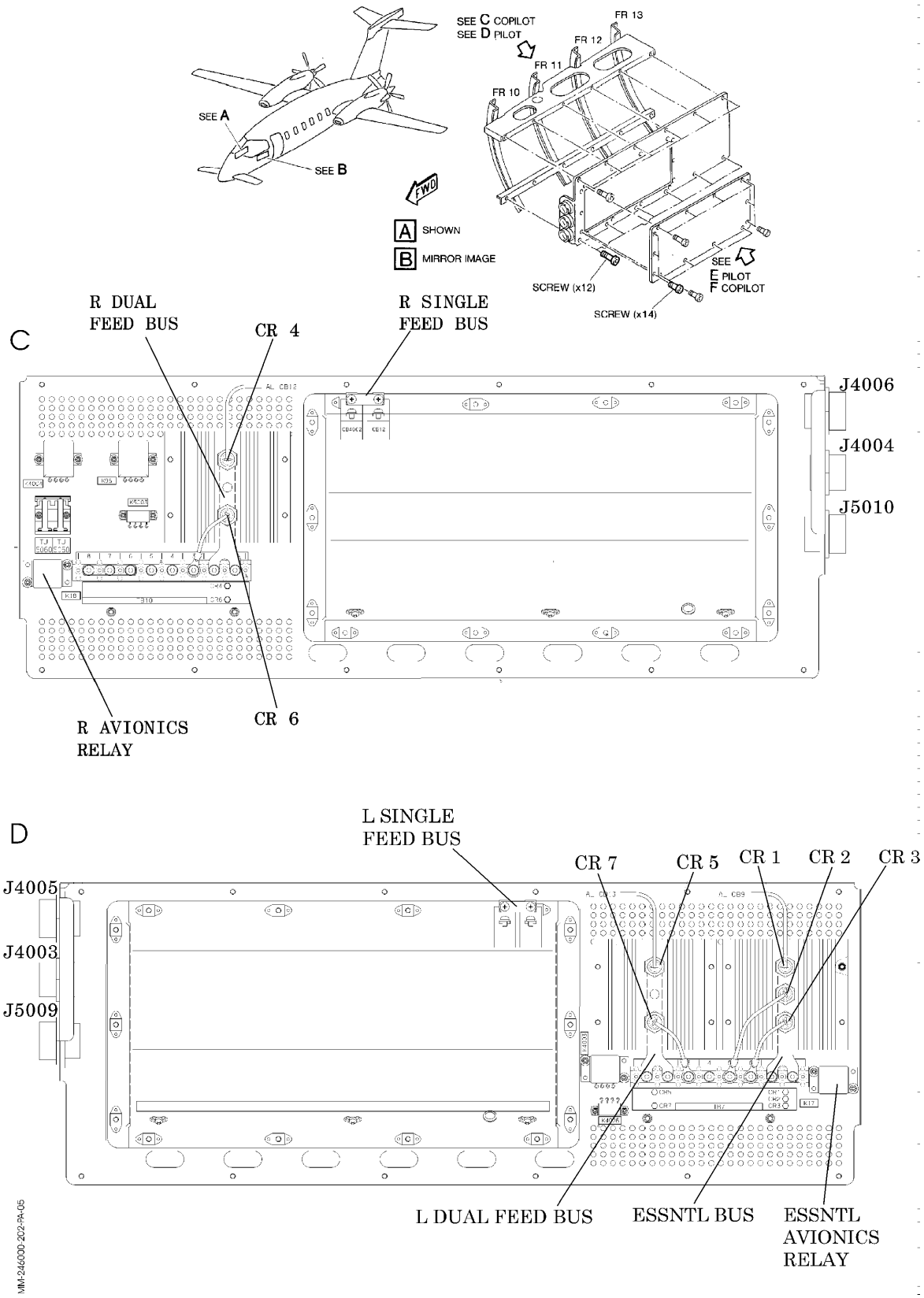


Fig. 202 - Pilot and Copilot Power Distribution Panels

6. Electrical Generation and Distribution - Functional Test

A. To perform the electrical distribution test, proceed as follows:

**NOTE:** The test must be initiated with the airplane on wheels. Lift the airplane on jacks when specified in the procedure.

**NOTE:** Considering that some steps of the following procedure are to be performed with engines running, park the airplane in a suitable area.

**NOTE:** The following abbreviations are used in this procedure:

| | | | | | |
|---|---|---|---|---|---|
| BB | – | Battery busbar | Circuit breakers: | | |
| EB | – | Essential busbar | CB5 | – L OVLD SENSOR | (Pilot) |
| LDFB | – | L dual feed busbar | CB6 | – R OVLD SENSOR | (Pilot) |
| RDFB | – | R dual feed busbar | CB9 | – ESNTL BUS | (Pilot) |
| LSFB | – | L single feed busbar | CB10 | – ESNTL BUS | (Copilot) |
| RSFB | – | R single feed busbar | CB11 | – ESNTL BUS FEEDER | (MJB) |
| LGB | – | L generator busbar | CB14 | – RH BUS FEEDER | (MJB) |
| RGB | – | R generator busbar | CB15 | – LH BUS FEEDER | (MJB) |

**NOTE:** The following procedure requires that power on a busbar is identified. This is achieved as follows:

| | |
|---|---|
| – ESSENTIAL BUS (EB) | Voltage on MFD |
| – L DUAL FEED BUS (LDFB) | LT Fuel QTY on MFD |
| – R DUAL FEED BUS (RDFB) | RT Fuel QTY on MFD |
| – L SINGLE FEED BUS (LSFB) | LT Landing Light |
| – R SINGLE FEED BUS (RSFB) | RT Landing Light |

(1) In the baggage compartment, make sure that the battery is connected and that all circuit breakers on the main junction box are set.
(2) Make sure that an external power supply is not connected.
(3) On the flight deck, make sure that all circuit breakers on the pilot and copilot circuit breaker panels are set.
(4) Set the all master switches to OFF.
(5) Select SYS on MFD.
(6) Connect an external power source regulated to 28 ± 0,5 VDC.
(7) Set the battery switch to BAT. Make certain that the MFD indicates a minimum of 23.5 volts. Relay K2 is serviceable.

**NOTE:** Do not proceed with this procedure if busbar voltage is 23 volts or less. Service or replace the battery.

(8) Set the EMER/NORM/BUS DISC switch to NORM. Make sure that:
- EB, LDFB, RDFB, LSFB, RSFB are powered
- the BUS DISC caption on the annunciator panel is off.

Conclusions:
- relays K3, K4, K5 operate to close
- right gear weight-on-wheels switch operates when closed
- connections from BB to LGB and RGB are serviceable
- connection from LGB to LSFB is serviceable
- connections from RGB to RSFB are serviceable.

(9) Set the EMER/NORM/BUS DISC switch to EMER. Make sure that:
- EB, LDFB, RDFB are powered
- LSFB, RSFB are not powered
- the BUS DISC caption is on.

Conclusions:
- CR6, CR7, CR3 are serviceable in the forward sense
- CR1, CR2, CR4, CR5 are serviceable in the reverse sense
- relays K3, K4 operate to open
- the EMER function is serviceable.

(10) Set the EMER/NORM/BUS DISC switch to BUS DISC. Make sure that:
- EB is powered
- LDFB, LSFB, RDFB, RSFB are not powered
- the BUS DISC caption is on.

Conclusions:
- relay K5 operate to open
- the BUS DISC function is serviceable.

(11) Open the baggage compartment door (Refer 52-00-00).

(12) On the main junction box, open circuit breakers CB11, CB14 and CB15.

(13) Set the EMER/NORM/BUS DISC switch to NORM. Make sure that:
- LDFB is powered
- RDFB is powered
- BUS DISC caption is off.

Conclusions:
- CR4 and CR5 are serviceable in the forward sense
- connection from LSFB to LDFB is serviceable
- connection from RSFB to RDFB is serviceable.

(14) Open CB9. Make sure that:
- EB is powered.

Conclusions:
- CR2 is serviceable in the forward sense
- Connection from EB to RSFB is serviceable.

(15) Set CB9 and open CB10. Make sure that:
- EB is powered.

Conclusions:
- CR1 is serviceable in the forward sense
- connection from EB to LSFB is serviceable.

(16) Set CB10 and open CB5. Make sure that:
- LSFB and LDFB are not powered
- EB, RDFB and RSFB are powered
- BUS DISC caption is on.

Conclusions:
- CB5 switching capability is serviceable.

(17) Set CB5 and open CB6. Make sure that:
- RSFB and RDFB are not powered
- EB, LSFB and LDFB are powered
- BUS DISC caption is on.

Conclusions:
- CB6 switching capability is serviceable.

(18) Set CB6.

**WARNING:** USE EXTREME CARE WHEN EXPOSED TO LIVE VOLTAGES.

(19) Open the main junction box circuit breaker door. Using a voltmeter (with impedance equal or minor of 100KOhm) or equivalent, make certain that on CB11, CB14 and CB15, one terminal is live, one terminal is dead. Conclusions:

Conclusions:
- CR3, CR6 and CR7 are serviceable in the reverse sense.

(20) Close the main junction box circuit breaker door.
(21) Set circuit breakers CB11, CB14 and CB15.
(22) Close the baggage compartment door (Refer 52-00-00).
(23) Set the battery switch to OFF.
(24) Lift airplane on jacks (airplane in flight condition).
(25) Set the battery switch to BAT.
(26) Set the EMER/NORM/BUS DISC switch to NORM. Make sure that:
- EB is powered
- LDFB, LSFB, RDFB, and LSFB are not powered
- the BUS DISC caption is on.

Conclusions:
- right gear weight-on-wheels switch operates to open.

(27) Set the battery switch to OFF.
(28) Connect an external power source regulated to 28 ± 0,5V DC.

(29) Set the battery switch to BAT. Make sure that:
- busbars BB, EB, LDFB, RDFB, LSFB, RSFB are powered
- the EXT PWR caption on the MFD is on
- the BUS DISC caption is off.

Conclusions:
- relay K1 is serviceable
- switch S1 is serviceable.

(30) Set the battery switch to OFF.
(31) Remove the external power source.
(32) Lower the airplane on ground.
(33) Make sure that all circuit breakers are closed.

**NOTE:** Park the airplane in a suitable area for engine running.

(34) Start the LH engine (Refer to 71-00-00). After starter cut-off, set the power to ground idle. Make sure that:
- the L GEN caption is on (with the L GENERATOR switch OFF).

Conclusions:
- L generator control unit is serviceable in the starting mode
- relay K9 operates to close (CBR1 will trip if not)
- relay K7 operates to open (line contactor open)
- switch S3 is serviceable.

(35) Set the GENERATOR switch to L. Make sure that:
- the L GEN caption is off
- Press SYS on MFD, voltage should be a minimum of 26.5 volts.

Conclusions:
- relay K7 operates to close
- relay K11 operates
- switch S5 is serviceable.

(36) On MFD. View LT GEN, make sure that:
- a load is indicated.

Conclusions:
- relay K9 has operated to open
- L generator control unit is serviceable in the generator mode.

(37) Increase power to flight idle. Cross start the RH engine (Refer to 70-00-00). After starter cut-off, set both power levers to ground idle. Make sure that:
- the R GEN caption is on (with the R GENERATOR switch OFF).

Conclusions:
- R generator control unit is serviceable in the starting mode
- K8 operates to close (CBR2 will trip if not)
- K6 operates to open (line contactor open)
- switch S2 is serviceable.

(38) Set the GENERATOR switch to R. Make sure that:
- the R GEN caption is off
- On the MFD, the RT GEN load is approximately the same as the LT GEN.

Conclusions:
- relay K6 operates to close
- relay K8 has operated to open
- relay K10 operates
- the R generator control unit is serviceable in all modes
- the L generator control unit is serviceable in all modes
- switch S6 is serviceable.

(39) Stop the engines (Refer to 71-00-00).
(40) Return all switches to OFF.
(41) Make sure that all circuit breakers are set.
(42) Set the BAT switch to OFF.

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