CHAPTER

24

ELECTRICAL POWER

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* Asterisk indicates pages revised, added, or deleted by the current revision.
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RECORD OF TEMPORARY REVISIONS

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24-25	24-00-00:201	10/28/94	12/15/94		4/27/00	68	ATP/JB

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ELECTRICAL POWER - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. Primary aircraft DC electrical power is provided by two independent DC generator systems. During normal operation, both generator systems operate in parallel. Secondary aircraft electrical power is provided by either two nickel-cadmium batteries or two optional lead-acid batteries. For ground operation, an external power source provides electrical power requirements. AC power requirements are provided by two static inverters installed in the tailcone. In addition, the aircraft is equipped with an emergency battery system. Refer to Chapter 33 for emergency exit light system power supplies.

B. Two engine-driven DC generators, one on each engine, provide the normal source of 28 vdc to the aircraft. Each generator is an air-cooled type, rated at 30 volts, 400 amperes, at 6,000 to 12,000 rpm.

C. Two nickel-cadmium or two optional lead-acid batteries, located in the tailcone, provide the secondary source of 28 vdc. Battery power is utilized for engine starting whenever external power is not used. The nickel-cadmium batteries are equipped with an overheat warning system and an optional temperature indicating system.

D. AC electrical power is provided by two solid-state inverters installed in the tailcone. Each inverter is rated at 115 volts, 400 Hz, at 1000 va. During normal operation, the inverters operate in parallel.

E. External DC power can be connected to the aircraft through an external power receptacle located on the left side of the aircraft adjacent to the tailcone access door. With either or both Battery Switches set to ON, external power is applied to the power distribution buses.

F. Emergency power is provided by either single or dual emergency batteries installed in the tailcone or in the nose compartment. The battery provides both AC and DC power. AC power is 115 volts, 400 Hz, at 100 va. DC power is 28 vdc at either 1.9 amp hours or 3.9 amp hours, depending upon the model installed.

G. Indicators

(1) A DC ammeter is installed for each generator. The ammeter indicates the load current supplied by its respective generator.

(2) A single DC voltmeter indicates DC voltage present on the battery charging bus.

H. Switches

(1) Two battery switches, one RH and one LH, provide the aircraft with battery isolation capabilities. Each switch is a two-position (on-off) switch and completes a ground circuit to its respective battery relay. The switches are labeled BAT 1-OFF and BAT 2-OFF.

(2) Two Starter-Generator Switches, one RH and one LH, are installed. Each switch is a three-position switch marked GEN-OFF-START. When in the START position, power is applied to close respective fuel motive flow valve and to energize the standby fuel pump. After the motive flow valve closes, power is applied, energizing the start relay. When in the GEN position, power is removed from the start relay, the motive flow valve is opened, and the standby pump is deenergized. Automatic setup of generator regulation, paralleling, and protection takes place within the generator control box.

(3) Two Generator Reset Switches, one RH and one LH, are installed. Each switch is a two-position, double-throw, momentary-type switch. When in the RESET position, one set of contacts completes a ground circuit to energize and reset the generator overvoltage cutout relay. The remaining contacts complete a power circuit to the voltage regulator.

(4) Two inverter switches, one for the primary inverter and one for the secondary inverter, are installed. Each switch is a two-position, double-throw switch. When in the ON position, one set of contacts completes a power circuit to energize the inverter control relay. The remaining set of contacts connects inverter remote switch and inverter switch return lines. This completes the inverter operation circuit and inverter paralleling circuits.

(5) A single AC Bus Switch (PRI-SEC) is installed. The switch, a two-position type, is used to monitor either AC bus voltage depending upon switch setting.

I. Indicator Lights

(1) On aircraft with nickel-cadmium batteries, two warning lights (red) labeled BAT 140 and BAT 160 are installed in the glareshield. The warning lights are controlled by thermal switches within each battery.

(2) Two generator caution lights (amber) labeled L GEN and R GEN are installed in the glareshield. The lights will be illuminated if a generator is not functioning or has failed.

(3) Two inverter warning lights (red) labeled PRI INV and SEC INV are installed in the glareshield. If an inverter fails, its respective warning light will illuminate.

1. INSPECTION/CHECK

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

A. Check Electrical System
   (1) Check electrical wiring for damage such as chafing, fraying, and cuts.
   (2) Check wire clamps and supports for security.
   (3) Check that all wiring is supported clear of sharp metal edges.
   (4) Check wiring for liquid impregnation.
   (5) Check that terminal connections are secure and that lugs are not cracked or touching adjacent terminal or structure.
   (6) Check electrical bonding jumpers for security and for frayed or broken condition.
   (7) Check electrical equipment for proper installation, security of mounting, physical damage, and evidence of overheating.
   (8) Check security of safety wire on electrical equipment and electrical connectors where applicable.

B. Inspection of No. 4 Gauge Electrical Cables *(Aircraft 35-002 thru 35-462 and 36-002 thru 36-050 not modified per AMK 82-3, "Replacement of Number 4 Gauge Electrical Cables.")*
   (1) Inspect No. 4 Gauge Electrical Cables (See Figure 201.)
      (a) Lower tailcone access door.
      (b) Remove engine nacelle cowls.
      (c) Inspect for cracks in electrical cables from starter-generator to batteries. Inspect particularly the outside circumference at each of the cable bends.

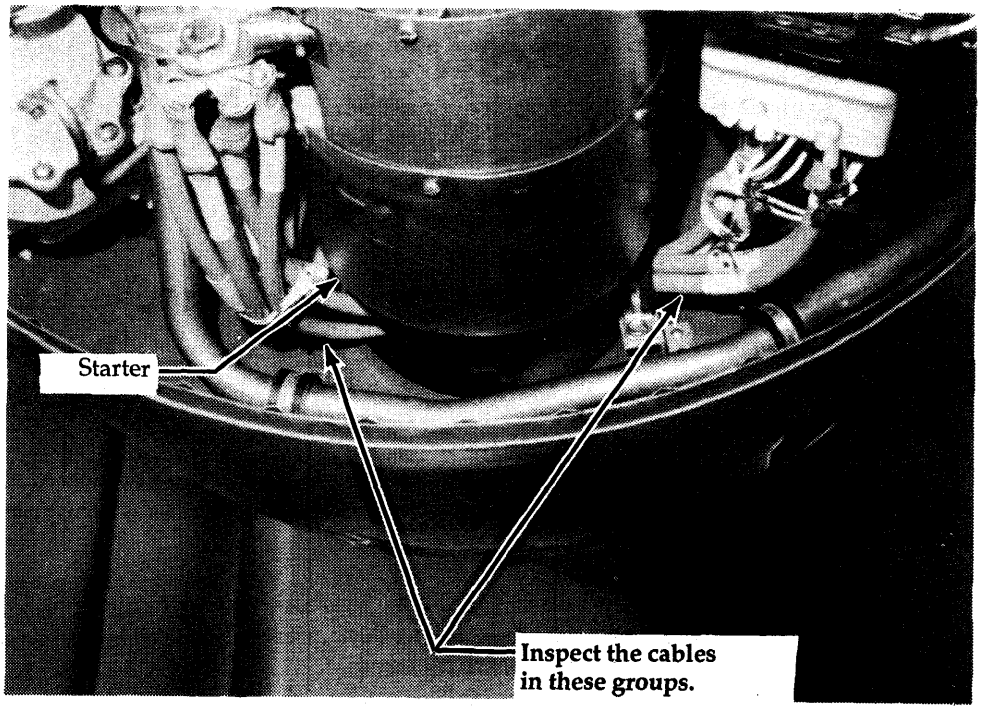
         NOTE: Only the Number 4 electrical cables with extruded Teflon insulated wire need be inspected.

         Cracks are most likely to occur in the outside circumference of the cable bend where cables are routed under engine. Insulation cracks will appear as black hairlines running parallel with the cable.

      (d) If cracks are found, comply with AMK 82-3, "Replacement of Number 4 Gauge Electrical Cables" not later than the next 300 hour inspection. If cracks are not found, comply with this inspection until such time that cables are replaced.
      (e) Install engine nacelle cowls and secure tailcone access door.

C. Inspection of No. 4 Gauge Electrical Cables *(Aircraft 35-463 and Subsequent and 36-051 and Subsequent and prior aircraft modified per AMK 82-3, "Replacement of Number 4 Gauge Electrical Cables")*
   (1) Inspect No. 4 Gauge Electrical Cables (See Figure 201.)
      (a) Remove engine nacelle cowls.
      (b) Inspect electrical cable(s) as required.
      (c) Replace electrical cable(s) as required.

         NOTE: Further compliance with AMK 82-3, "Replacement of Number 4 Gauge Electrical Cables," is NOT required.



(VIEW UNDER ENGINE LOOKING UP AND FORWARD)

ORIGINAL
As Received By
ATP

Inspection of No. 4 Gauge Electrical Cables
Figure 201

AC GENERATION - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. An AC generation system is installed to provide 115-vac 400-Hz to various using systems.

B. Two autotransformers provide 26 vac for various using systems.

C. The system consists of two static inverters, a paralleling control box, two overload sensors, two power relays, an AC voltmeter and switch, two control switches, and two red warning lights.

D. On aircraft equipped with an optional auxiliary inverter, an inverter, overload sensor, a power relay, a system switch, and an amber caution light are installed in addition to the standard components.

E. Component Description

(1) The autotransformers reduce 115 vac to 26 vac to power various electrical and electronic equipment. The transformers are installed on the RH and LH sides of the cockpit, aft of frame 8.

(2) The paralleling control box is installed on the RH side of the tailcone between frames 28 and 29 and serves as the central control unit for the AC generation system. The inverter output, load equalizer, and frequency synchronizer circuits are connected to the paralleling control box. The control box senses the inputs and, through its load equalizer and frequency synchronizer circuits, maintains the load and frequency balance between inverters.

(3) The overload sensors are located on a panel on the LH side of the tailcone aft of frame 26. The sensor consists basically of a 60-ampere thermal circuit breaker mechanically connected to a set of switch contacts. During normal operation, the primary inverter power relay is energized through the closed contacts of the overload control sensor and the PRI INV circuit breaker. Operation of the secondary and auxiliary inverters are the same as the primary. If an overload condition exists, the thermal breaker contained within the sensor positions the switch contacts to remove power from the power relay and grounds the applicable AC bus circuit breaker. The overload sensor will reset when the thermal breaker has cooled and the switch contacts have been positioned to their original position. However, the 28 vdc required to energize the power relay will not be present due to the open AC bus circuit breaker. After the malfunction has been corrected and the applicable AC bus circuit breaker reset, the power relay will energize. When the power relay is energized, generator output voltage is connected to the main power buses.

(4) The power relays are located on a panel in the LH side of the tailcone aft of frame 26 and are standard AN relays used to supply power to the inverters.

(5) The voltmeter is installed on the instrument panel. The voltmeter indicates the output voltage supplied to the AC distribution buses. The range of the voltmeter is 0 to 150 volts. (Refer to Chapter 31 for instrument markings and refer to 24-31-06 for removal and installation procedures.)

(6) The inverters are installed on the LH and RH sides of the tailcone between frames 29 and 30.

(7) An optional auxiliary inverter is installed in the tailcone equipment section between frames 29 and 30 adjacent to the emergency batteries.

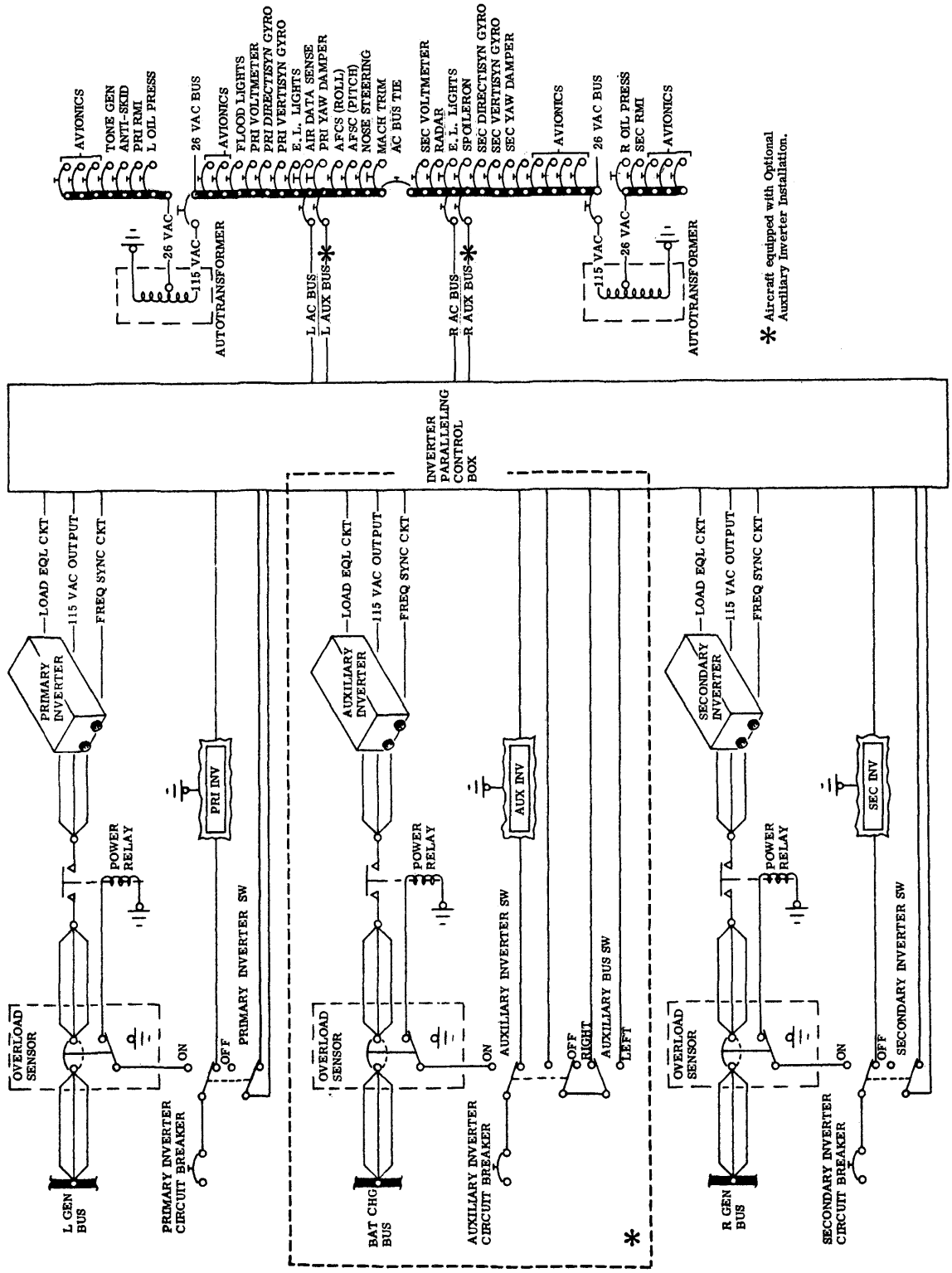
(8) Each inverter is capable of delivering 115-vac 400-Hz at 1000 va. The inverters are powered directly from their respective generator bus through an overload sensor and a power relay. Each inverter incorporates a load equalizer and a frequency synchronizer sensing circuit which connect to the paralleling control box for inverter paralleling purposes.

(9) The auxiliary inverter is rated at 115-vac 400-Hz at 1000 va. The auxiliary inverter is powered directly from the Battery Charging Bus through an overload sensor and power relay. The auxiliary inverter output is applied to the R AC BUS or the L AC BUS by using the AUX INVERTER L BUS-R BUS Switch.

2. OPERATION

A. When the Primary Inverter Switch is set to PRI, a power circuit is completed through a closed switch within the overload sensor to energize the inverter power relay. With the inverter power relay energized, 28 vdc is applied to the inverter from its applicable generator bus. Inverter output is applied to its respective bus through the paralleling control box. Operation of the secondary inverter is the same.

B. Operation of the optional auxiliary inverter is the same as the primary and secondary inverter operation, except that the auxiliary inverter output is applied to either the R or L AC bus through the Auxiliary Inverter Bus Switch. In case of primary or secondary inverter failure, the Auxiliary Inverter ON-OFF Switch must be set to ON and the Auxiliary Inverter Bus Switch must be set to either R BUS or L BUS, depending on which inverter has failed.



AC Power System Electrical Schematic
Figure 1

AC GENERATION - TROUBLE SHOOTING

1. TROUBLE SHOOTING

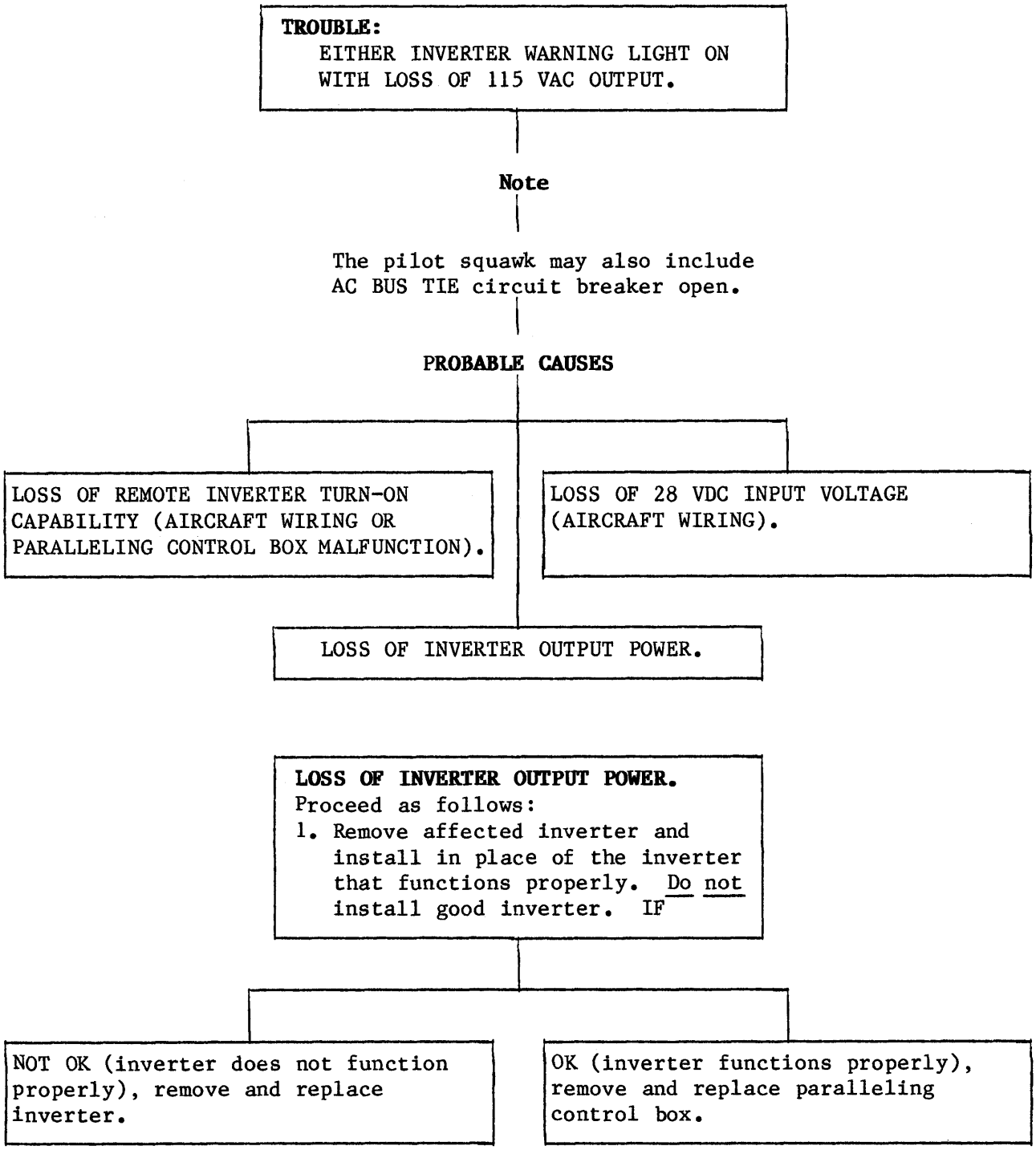
A. Trouble shooting procedure consists basically of isolating the trouble to aircraft wiring, inverter, or paralleling control box.

B. Tools and Equipment

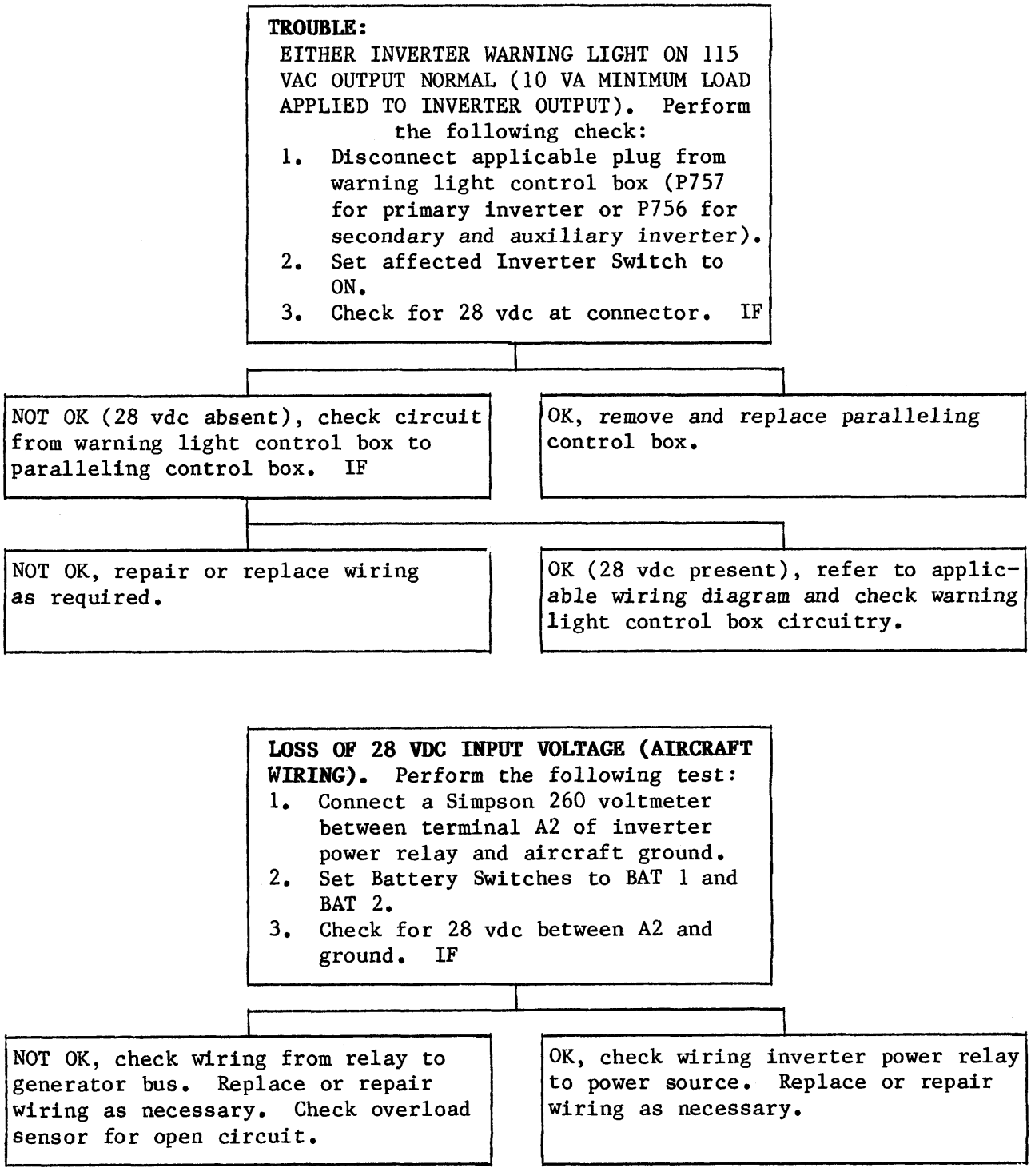
NOTE: Equivalent substitutes may be used in lieu of the following items.

NAME	PART NUMBER	MANUFACTURER	USE
Voltmeter	3430A	Hewlett Packard	To check voltages and continuity of circuits
or			
Voltmeter	260	Simpson	To check voltages and continuity of circuits

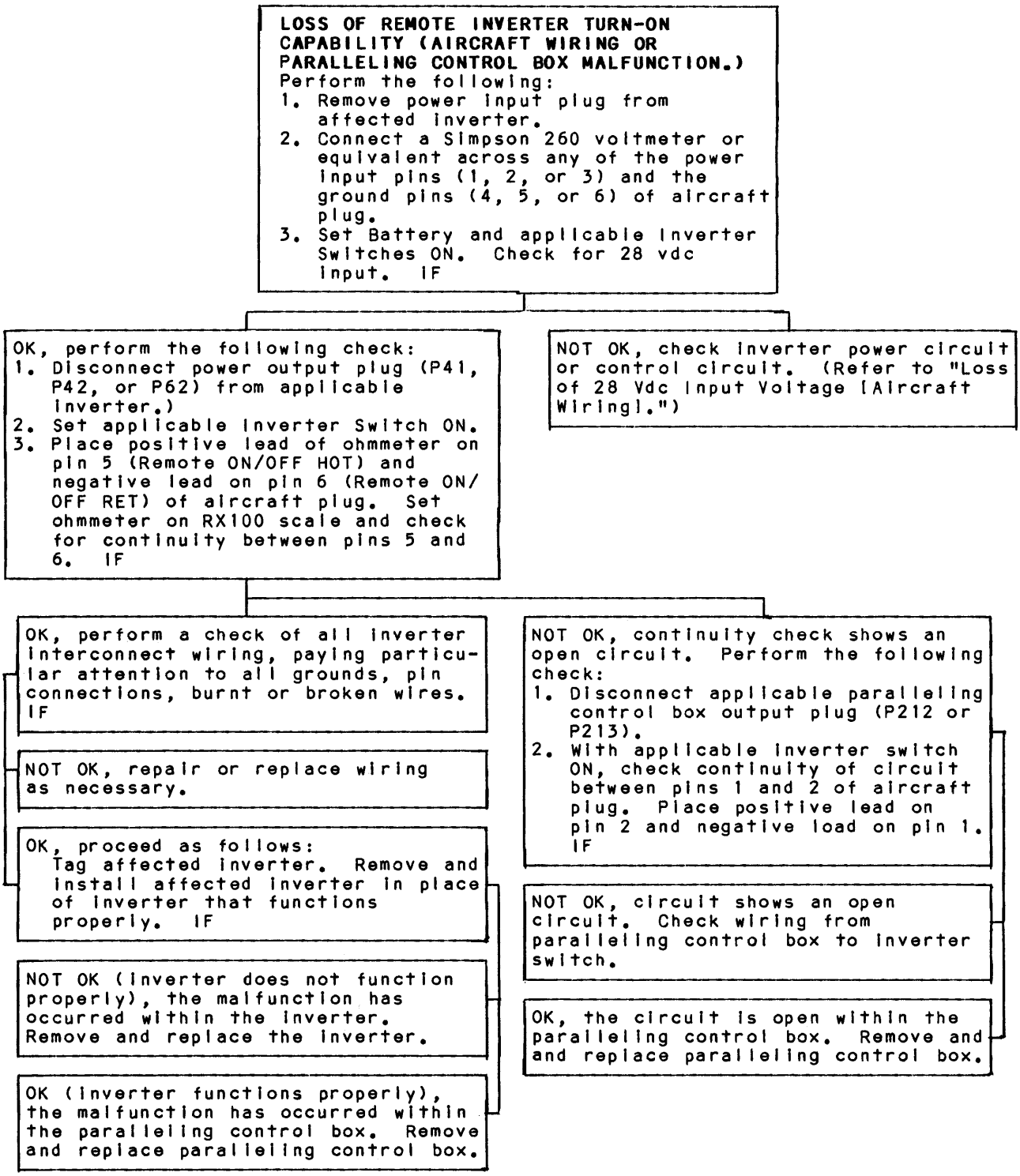
C. See figure 101 for trouble shooting procedure.



AC Generation System Trouble Shooting
Figure 101 (Sheet 1 of 3)



AC Generation System Trouble Shooting
Figure 101 (Sheet 2 of 3)



AC Generation System Trouble Shooting
Figure 101 (Sheet 3 of 3)

AC GENERATION - MAINTENANCE PRACTICES

1. INSPECTION/CHECK

NOTE: It is recommended that the AC power system be operationally checked after maintenance of any type is performed in the tailcone area of the aircraft and in accordance with current inspection requirements in Chapter 5.

A. Operational Check (Two-Inverter System)

(1) Set Battery Switches to BAT 1 and BAT 2 and pull AC BUS TIE circuit breaker.

(2) Set Primary Inverter Switch to PRI and AC Bus Switch to PRI. Check voltage reading within green arc.

(3) Reset AC BUS TIE circuit breaker and set AC Bus Switch to SEC. Check voltage reading within green arc.

(4) Set Primary Inverter Switch to OFF and pull AC BUS TIE circuit breaker.

(5) Set Secondary Inverter Switch to SEC and check voltage reading within green arc.

(6) Reset AC BUS TIE circuit breaker and set AC Bus Switch to PRI. Check voltage reading within green arc.

(7) In the following steps, check the inverters for proper paralleling. If an inverter will not parallel, its applicable caution light will illuminate.

(a) Set Primary Inverter Switch to ON.

(b) Set AC Bus Switch to PRI, then to SEC; voltage reading within green arc.

(8) Set Primary, Secondary, and Battery Switch to OFF.

B. Operational Check (Three-Inverter System)

(1) Set Battery Switches to BAT 1 and BAT 2 and pull AC BUS TIE circuit breaker.

(2) Set Primary Inverter Switch to PRI and AC Bus Switch to PRI. Check voltage reading within green arc.

(3) Reset AC BUS TIE circuit breaker and set AC Bus Switch to SEC. Check voltage reading within green arc.

(4) Set Primary Inverter Switch to OFF and pull AC BUS TIE circuit breaker.

(5) Set Secondary Inverter Switch to SEC and check voltage reading within green arc.

(6) Reset AC BUS TIE circuit breaker and set Bus Switch to PRI. Check voltage reading within green arc.

(7) Set Seconary Inverter Switch to OFF and Auxiliary Inverter Switch to ON.

(8) Pull AC BUS TIE circuit breaker and set Auxiliary Inverter Bus Switch to L BUS. Check voltage reading within green arc.

(9) Reset AC BUS TIE circuit breaker and set AC Bus Switch to SEC. Check voltage reading within green arc.

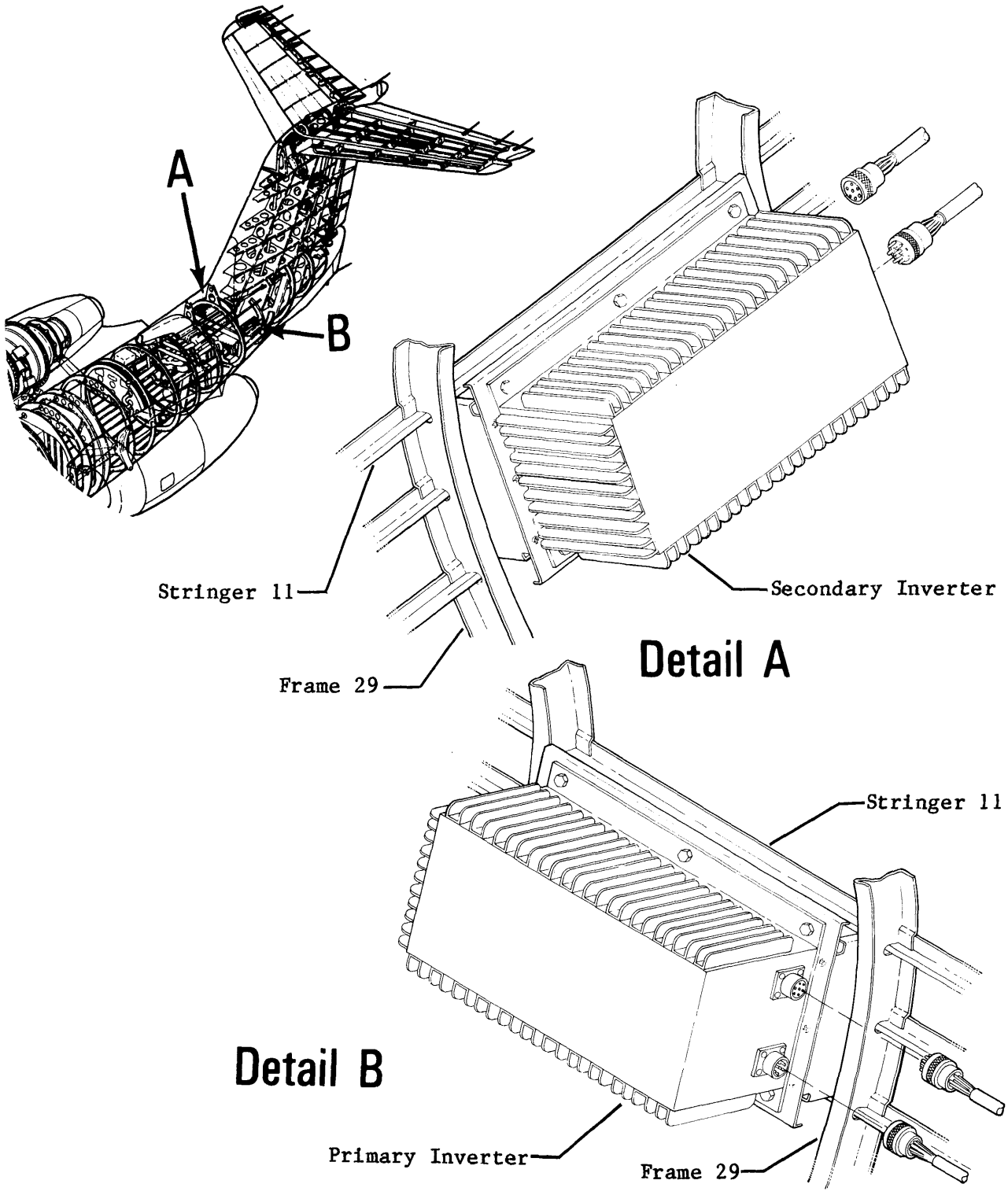
(10) Pull AC BUS TIE circuit breaker. Set Auxiliary Inverter Bus Switch to R BUS. Check voltage reading within green arc.
(11) Reset AC BUS TIE circuit breaker and set AC Bus Switch to PRI. Check voltage reading within green arc.
(12) In the following steps, check the inverters for proper paralleling. If an inverter will not parallel, its applicable caution light will illuminate.
  (a) Set Primary and Secondary Inverter Switches ON. Check voltage reading within green arc and assure that inverter caution lights are not illuminated.
  (b) Pull AC BUS TIE circuit breaker and set Auxiliary Inverter Bus Switch to L BUS.
  (c) Set Auxiliary Inverter Switch to ON. Check voltage reading within green arc and assure that inverter caution lights are not illuminated.
  (d) Set Auxiliary Inverter bus Switch to R BUS and AC Bus Switch to SEC. Check voltage reading within green arc.
  (e) Reset AC BUS TIE circuit breaker and set Auxiliary Inverter Bus Switch to L BUS and R BUS. In each position, check voltage reading within green arc and assure that caution lights are not illuminated.
(13) Set Primary, Seconary, Auxiliary, and Battery Switches to OFF.

1. Removal/Installation

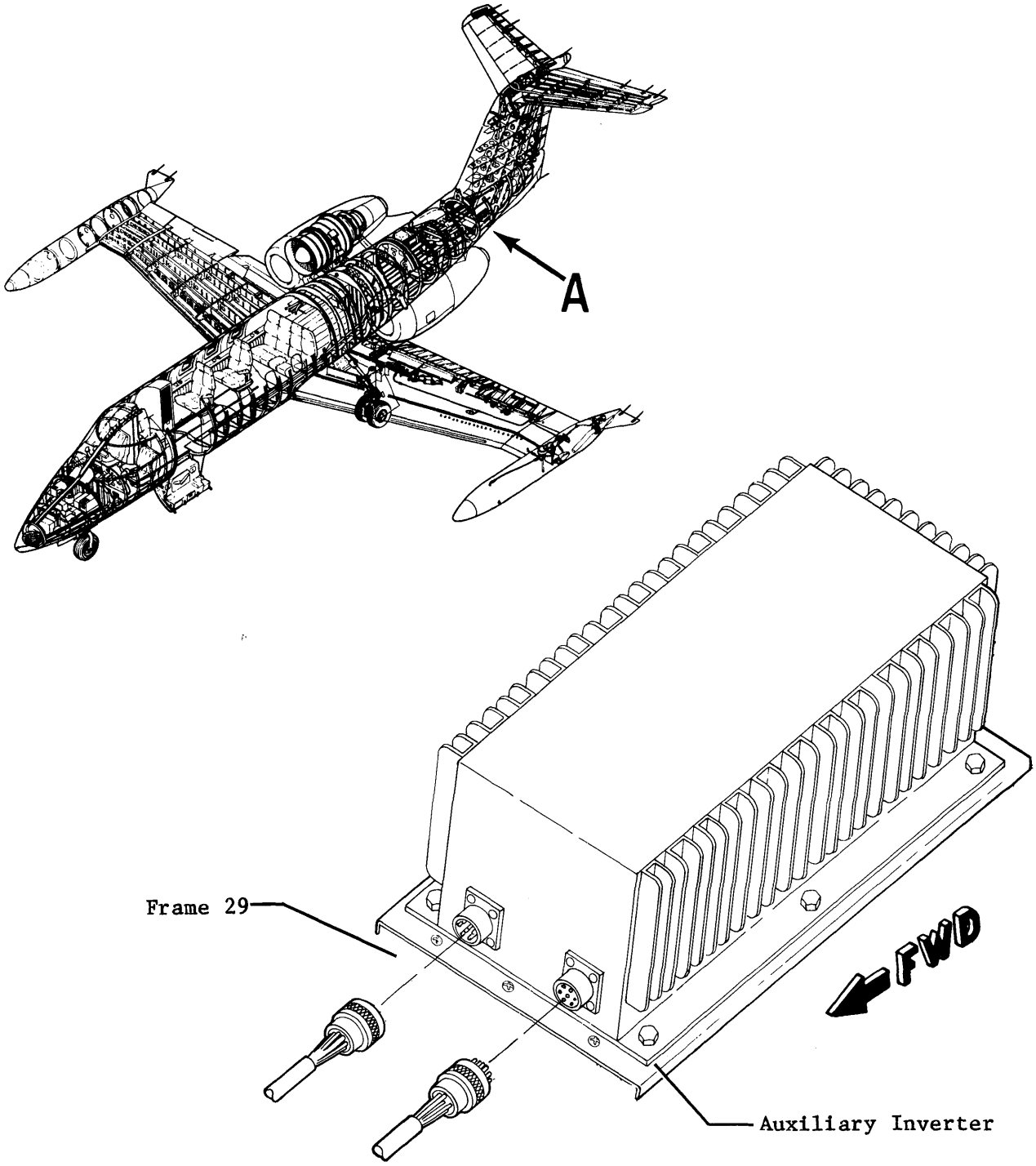
NOTE: Removal and installation procedures for all inverters are identical.

A. Remove Inverter (See Figures 201, 202 and 203.)
   (1) Lower tailcone access door.
   (2) Disconnect both aircraft batteries.
   (3) Disconnect electrical connectors from inverter.
   (4) Remove attaching parts and inverter from aircraft.

B. Install Inverter (See Figures 201, 202 and 203.)
   (1) Install inverter and secure with attaching parts.
   (2) Check electrical bonding per Chapter 20 of the Wiring Manual.
   (3) Connect electrical connectors to inverter.
   (4) Connect aircraft batteries.
   (5) Perform operational check of AC power system. (Refer to Adjustment/Test, 24-20-00.)
   (6) Secure tailcone access door.

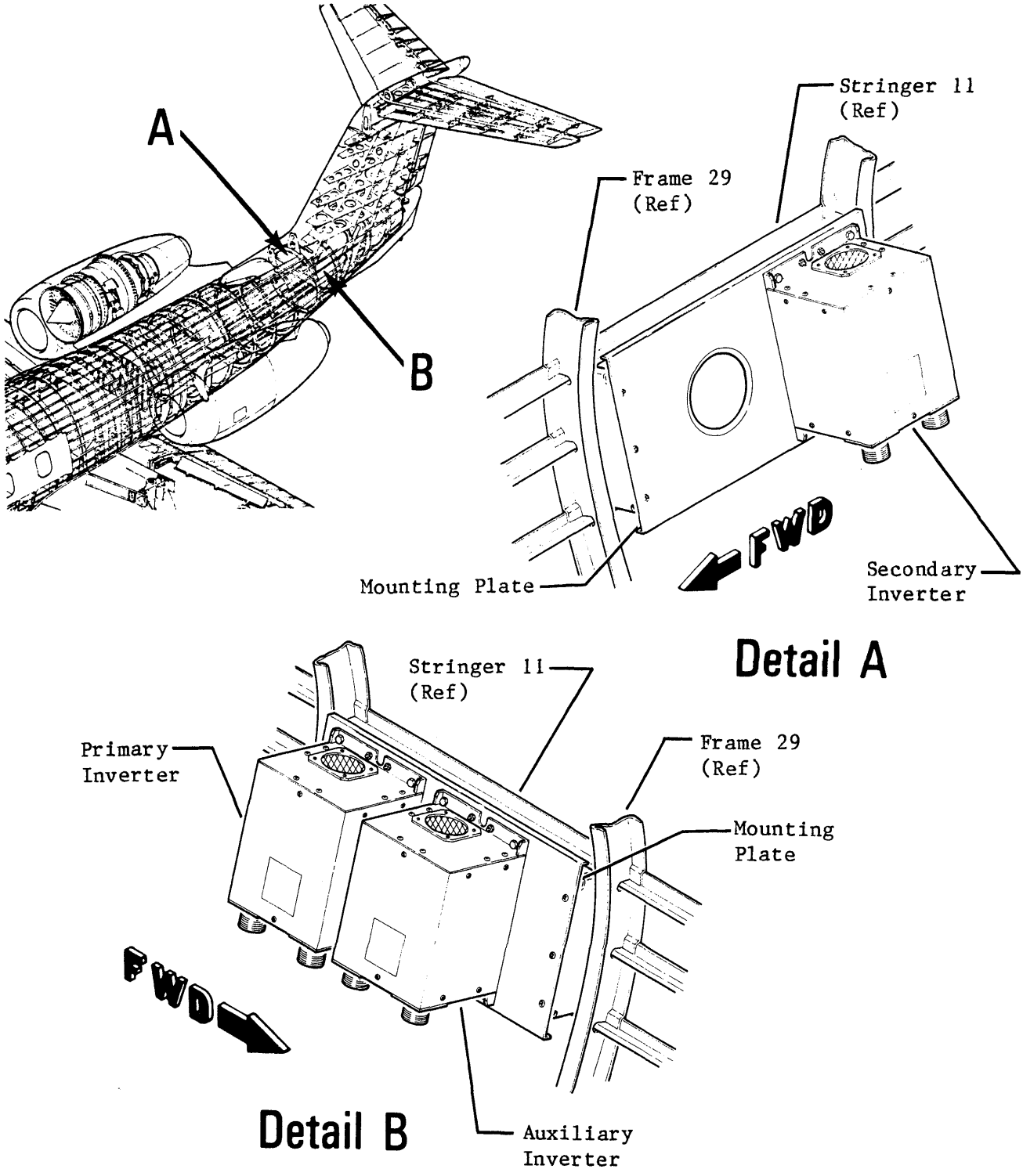


Primary and Secondary Inverter Installation
Figure 201



Detail A

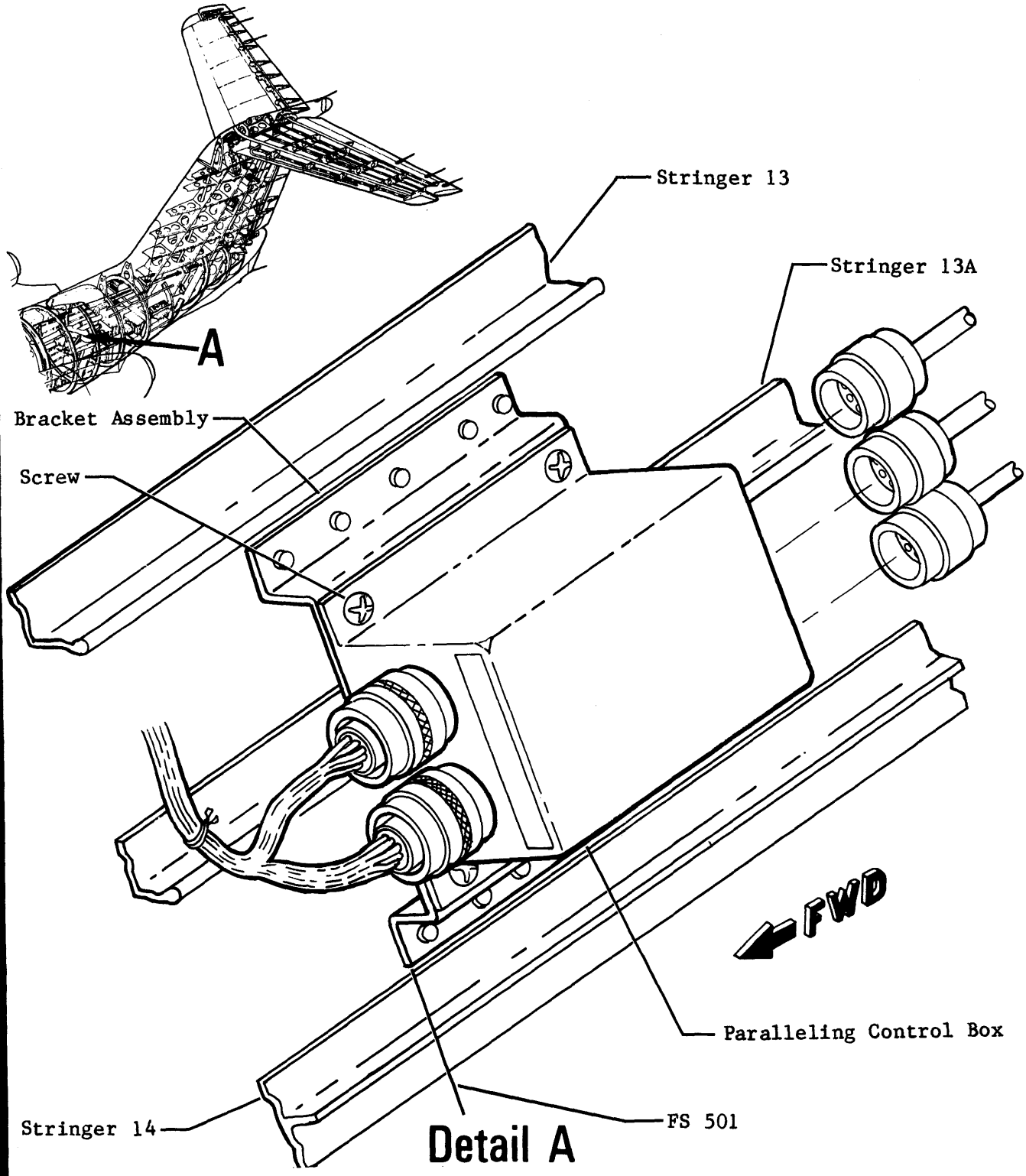
Auxiliary Inverter Installation
Figure 202



Primary, Secondary, and Auxiliary Inverter Installation
Figure 203

PARALLELING CONTROL BOX - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   - A. **Remove Paralleling Control Box** (See figure 201.)
     - (1) Lower tailcone access door.
     - (2) Disconnect aircraft batteries.
     - (3) Disconnect electrical connectors from control box.
     - (4) Remove attaching parts and control box from aircraft.
   - B. **Install Paralleling Control Box** (See figure 201.)
     - (1) Install control box and secure with attaching parts.
     - (2) Check electrical bonding per Chapter 20 of the Wiring Manual.
     - (3) Connect electrical connectors to control box.
     - (4) Connect aircraft batteries.
     - (5) Perform operational check of AC power system if any system component was replaced.
     - (6) Secure tailcone access door.

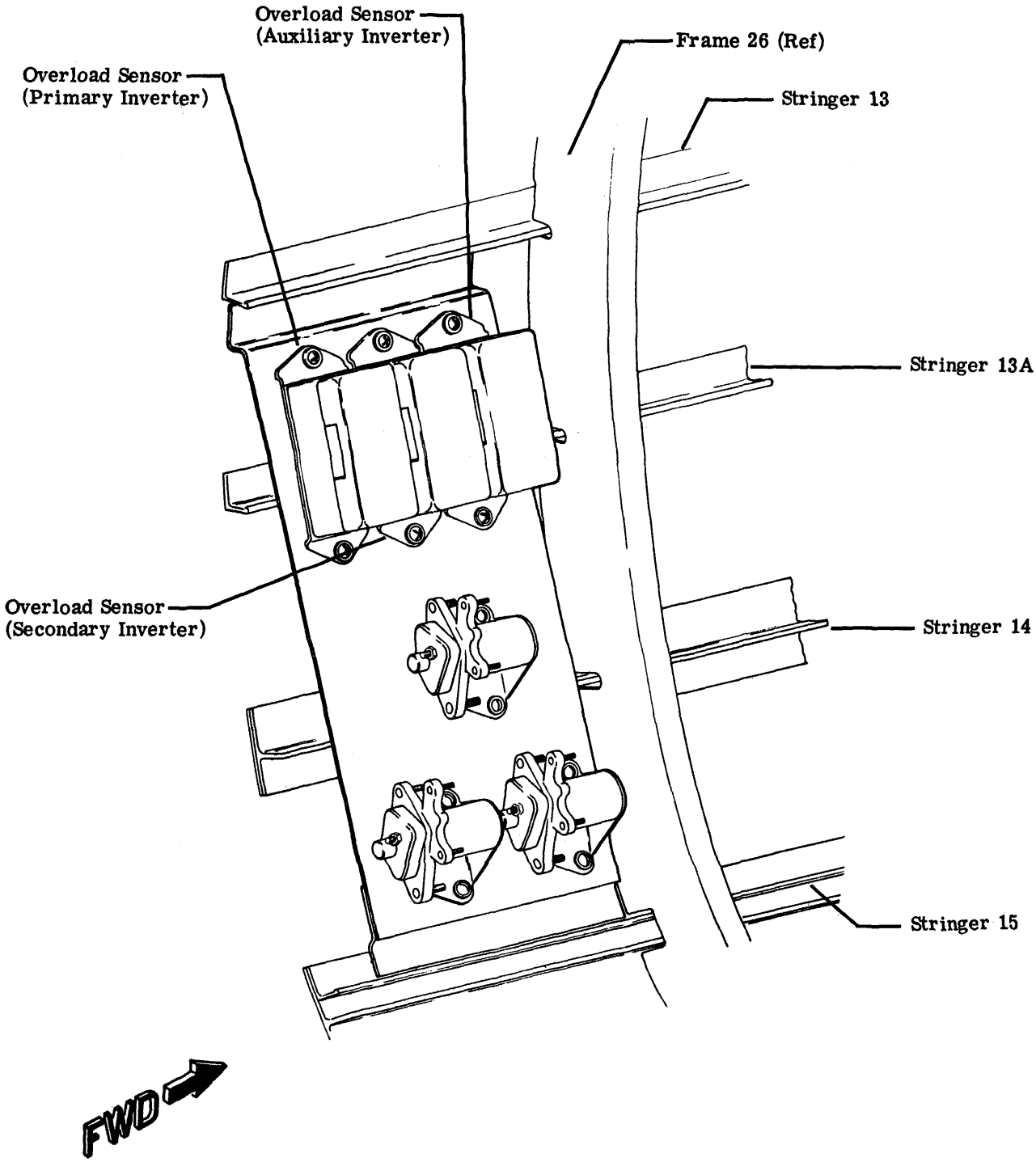


Paralleling Control Box Installation
Figure 201

9-222A

OVERLOAD SENSOR - MAINTENANCE PRACTICES

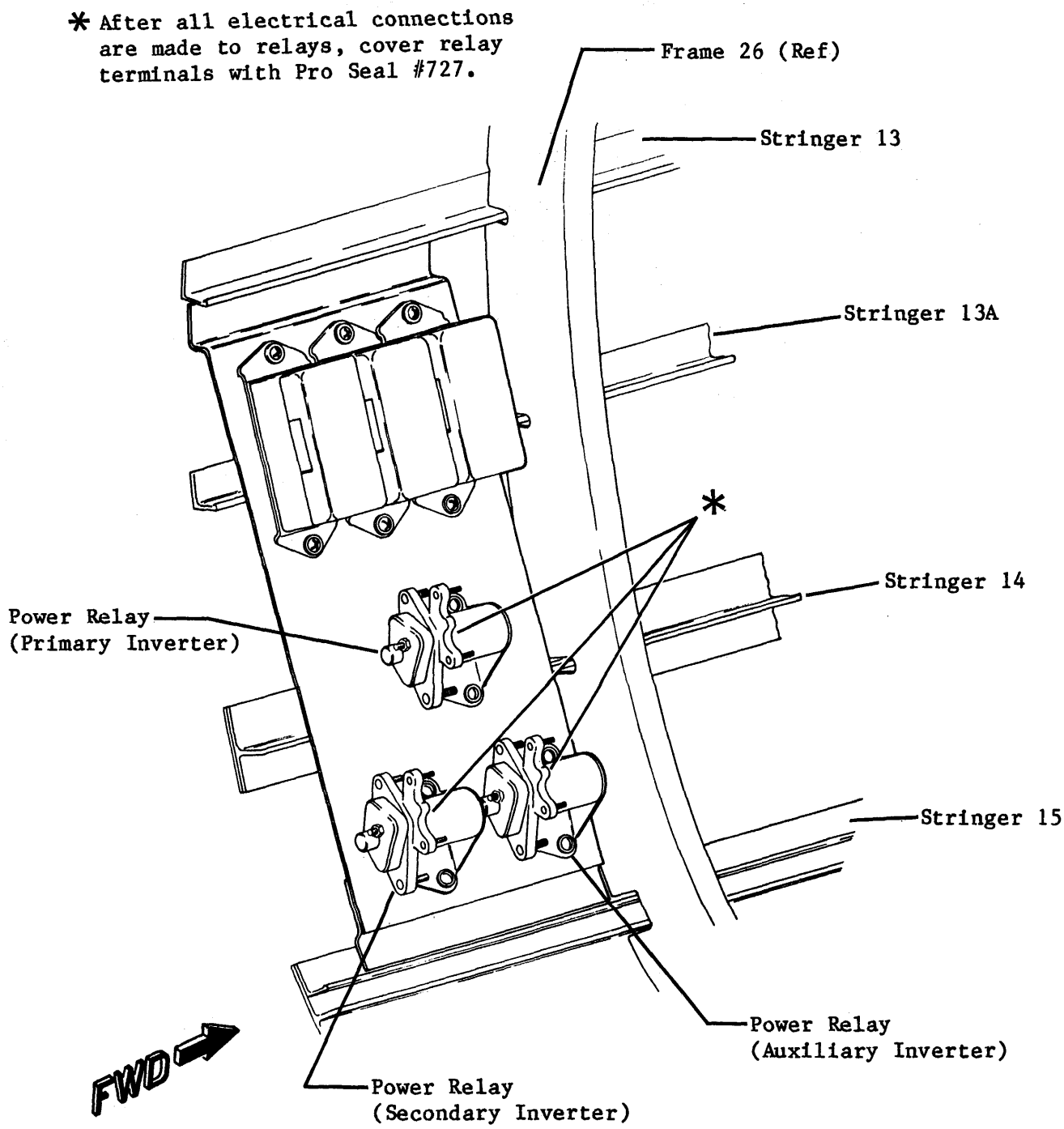
1. **REMOVAL/INSTALLATION**
   - **A. Remove Overload Sensor** (See figure 201.)
     - (1) Lower tailcone access door.
     - (2) Disconnect aircraft batteries.
     - (3) Remove attaching parts and cover from sensor.
     - (4) Disconnect electrical wiring.
     - (5) Remove attaching parts and sensor from aircraft.
   - **B. Install Overload Sensor** (See figure 201.)
     - (1) Install sensor and secure with attaching parts.
     - (2) Check electrical bonding per Chapter 20 of the Wiring Manual.
     - (3) Connect electrical wiring to sensor.
     - (4) Install cover and secure with attaching parts.
     - (5) Connect aircraft batteries.
     - (6) Perform operational check of AC power system. (Refer to 24-20-00.)
     - (7) Secure tailcone access door.



Overload Sensor Installation
Figure 201

POWER RELAY - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   - **A. Remove Power Relays** (See figure 201.)
     - (1) Lower tailcone access door.
     - (2) Disconnect aircraft batteries.
     - (3) Remove sealant from relay terminals.
     - (4) Disconnect and tag electrical wiring.
     - (5) Remove attaching parts and relay from aircraft.
   - **B. Install Power Relays** (See figure 201.)
     - (1) Install relay and secure with attaching parts.
     - (2) Check electrical bonding per Chapter 20 of the Wiring Manual.
     - (3) Remove tags and connect electrical wiring to relay.
     - (4) Apply Pro Seal #727 to completely cover relay terminals.
     - (5) Connect aircraft batteries.
     - (6) Perform operational check of AC power system.
     - (7) Secure tailcone access door.



Power Relay Installation
Figure 201

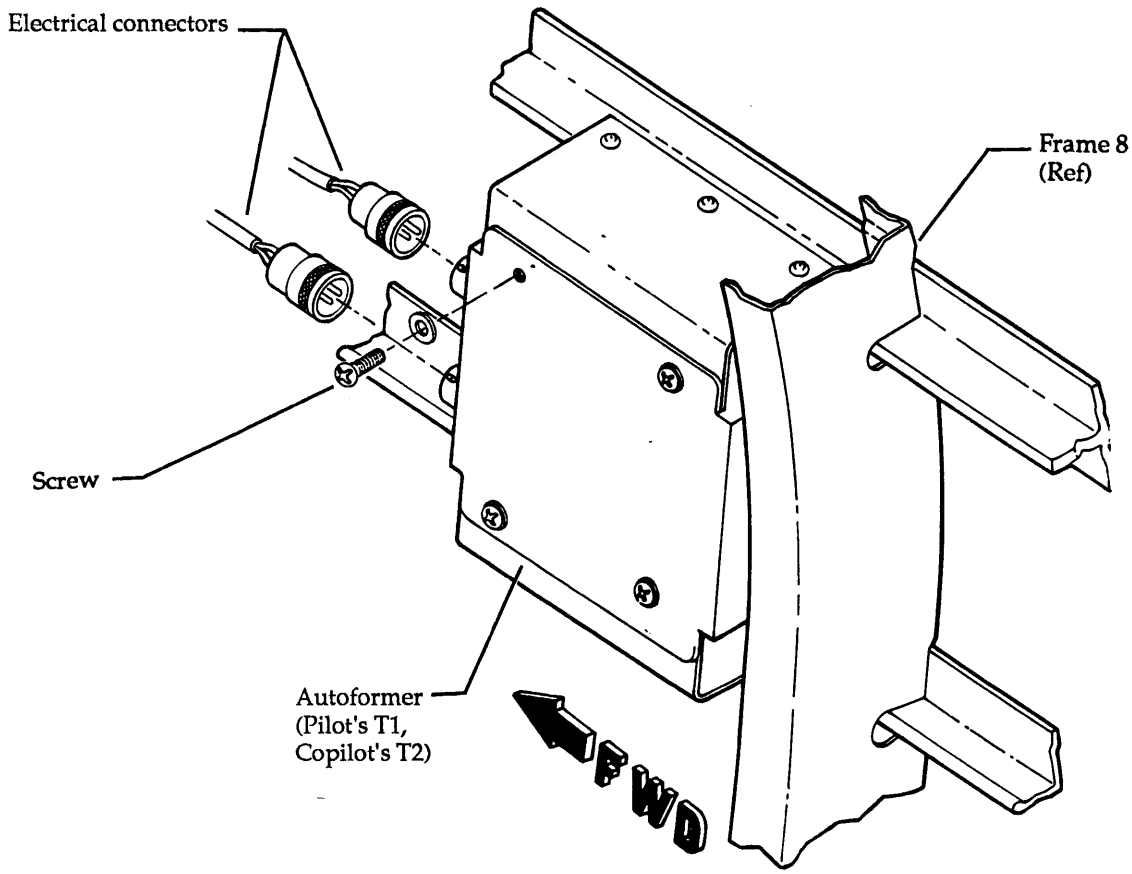
AUTOFORMER - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE: The following procedures are applicable to both the pilot and copilot autoformers.

A. Remove Autoformer (See figure 201.)
   (1) Open tailcone access door and disconnect battery quick-disconnects.
   (2) Remove cockpit sidewall above either the pilot's or copilot's circuit breaker panel to expose stringer 11 and 12.
   (3) Disconnect electrical connectors from autoformer.
   (4) Remove attaching parts and autoformer from aircraft.

B. Install Autoformer (See figure 201.)
   (1) Position autoformer on mounting bracket and secure with attaching parts.
   (2) Connect electrical connectors to autoformer.
   (3) Perform operational check of Autoformer as follows:
      (a) Connect battery quick-disconnects and set Battery Switches to ON.
      (b) Engage Automatic Directional Finder (ADF) system.
      (c) Verify that ADF indicators (ADF 1 or ADF 2) are functional.
      (d) Disengage ADF system.
      (e) Set Battery Switches to OFF.
   (4) Install sidewall panel.
   (5) Close tailcone access door.
   (6) Restore aircraft to normal.



9-233C

(Copilot's Autoformer shown)

Autoformer Installation
Figure 201

DC GENERATION - DESCRIPTION AND OPERATION

1. Description

A. The aircraft primary 28 vdc requirements are supplied by two independent DC generator systems. Secondary sources of 28 vdc power are supplied by a DC battery system, an external power source, and an optional emergency DC battery system.

B. For further information on the external power system, refer to 24-40-00.

C. The DC generator system consists of a 30-volt 400-ampere generator installed on each engine. Additional components are a generator control box, two voltage regulators, two voltage regulator control relays, a paralleling protection assembly, two 10-ampere current limiters, two DC ammeters, a DC voltmeter, two system switches, two generator reset switches, and two generator caution lights. The paralleling protection assembly is installed in the tailcone. The 10-ampere current limiters are installed on each generator. The DC generator system switches and two generator reset switches are located on the instrument panel. The two amber generator caution lights are located on the glareshield.

D. Battery System

(1) On aircraft equipped with nickel-cadmium batteries, the DC battery system consists of two 24-volt 19-cell nickel-cadmium batteries or two 25.2 volt 20-cell nickel-cadmium batteries, a battery temperature indicating system, a battery overheat warning system, and two system switches.

(2) On aircraft equipped with lead-acid batteries, the DC battery system consists of two 25.2 volt lead-acid batteries and two system switches. *On Aircraft 35-431 and Subsequent and 36-050 and Subsequent and prior aircraft modified per AMK81-5, "Modification of Lead-Acid Battery Vent System"*, a battery sump jar assembly has been added to the system.

E. Emergency Battery System

(1) The optional emergency battery system consists of a single battery or dual batteries rated at 25 vdc, system switches, and indicator light(s). The emergency battery may be either a dry cell or wet cell, lead-acid or nickel-cadmium type.

(2) Some models include an integrated static inverter providing 115 vac (+7%, -10%) at 400 Hz, for emergency attitude indicator power.

(3) An optional static inverter, available with some emergency batteries, provides 115 vac (+5%, -10%) at 400 Hz, for emergency attitude indicator power.

(4) Later versions provide for an optional DC to DC converter, to provide 5 vdc power to the emergency attitude indicator.

DC GENERATION SYSTEM - DESCRIPTION AND OPERATION

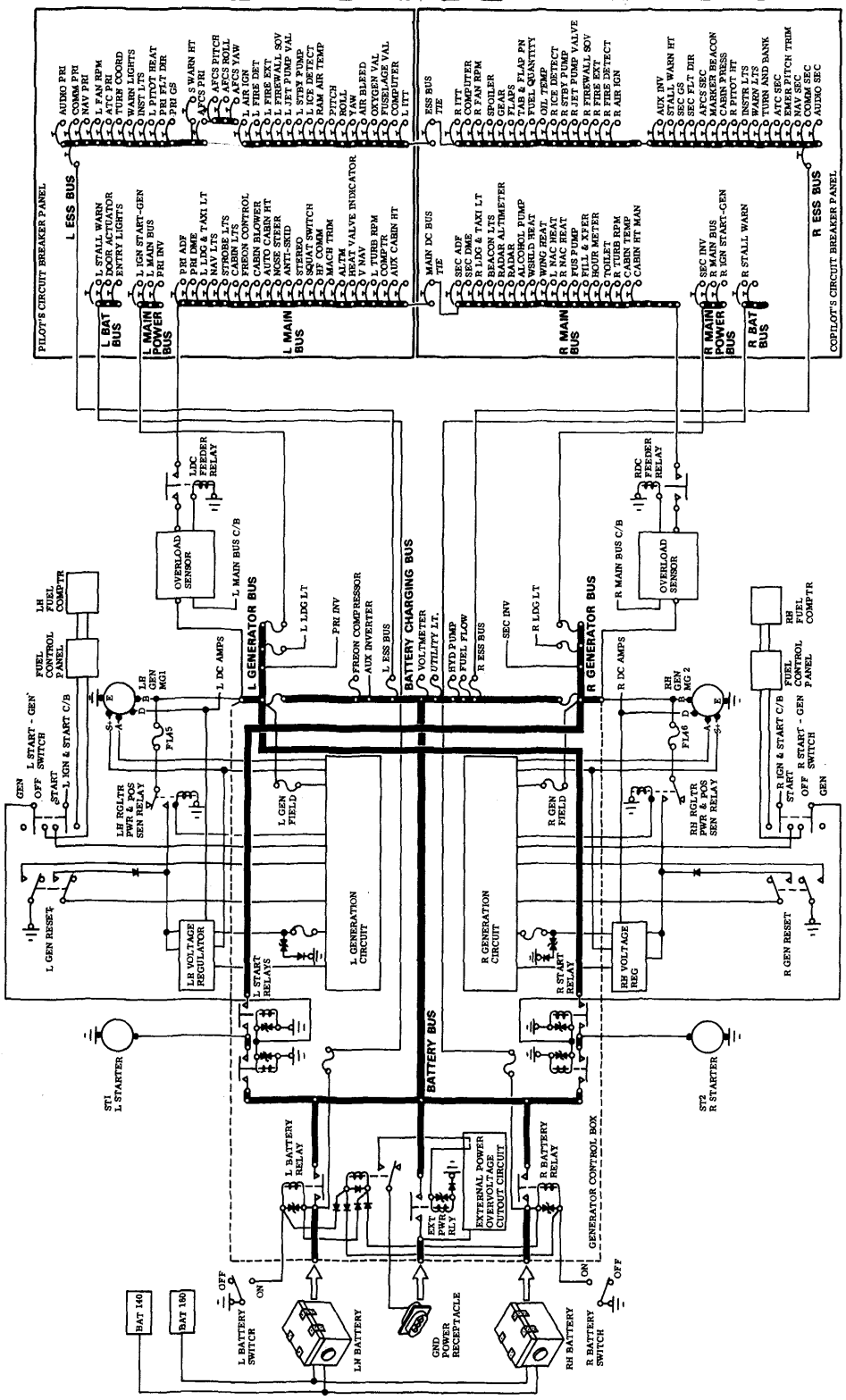
1. DESCRIPTION

A. The DC generator system consists of a 30-volt 400-ampere, air-cooled, brushless-type generator installed on each engine. Additional components are a generator control box, two voltage regulators, two voltage regulator control relays, a paralleling protection assembly, two 10-ampere current limiters, two DC ammeters, a DC voltmeter, two system swiches, two generator reset switches, two generator caution lights and a generator warning control box. The paralleling protection assembly is installed in the tailcone. The 10-ampere current limiters are installed on each generator. The DC generator system also consists of two system switches and two generator reset switches located on the instrument panel. Two amber generator caution lights are located on the glareshield.

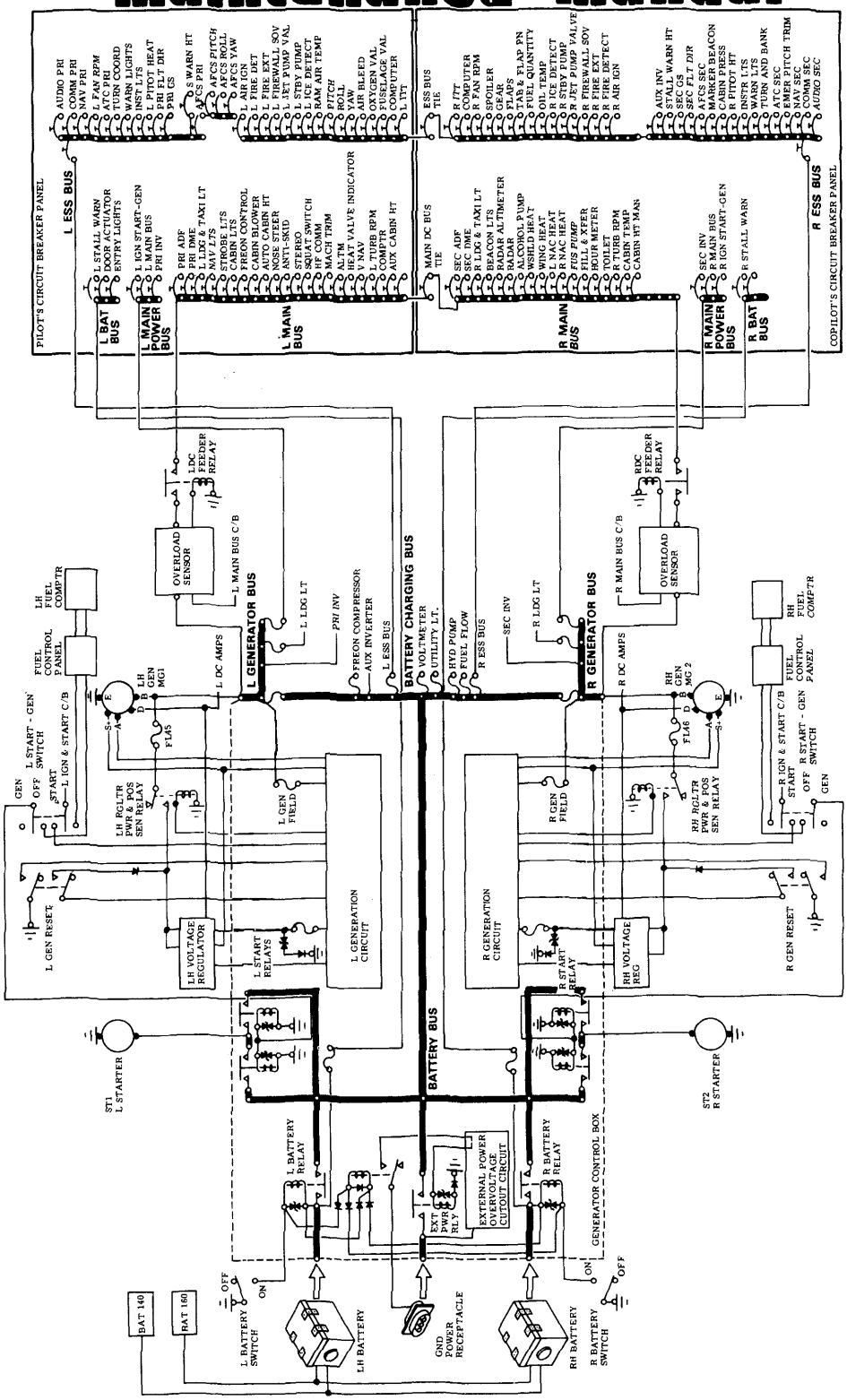
B. On Aircraft 35-028 and 35-031 and Subequent and 36-014 and 36-017 and Subsequent, a low voltage sensing circuit is incorporated in each generator caution (amber) light control system circuitry. The circuit assures proper caution light operation when its applicable generator voltage is low. The generator warning control box is located on the LH aft side of frame 26 adjacent to the AC power system power relays. (Refer to Chapter 24.)

C. The generator control box, installed in the tailcone, serves as the central control unit for the DC electrical system. The generator control box incorporates the battery, external power, right and left starter and generator control, overvoltage control, warning light, and paralleling control relays. Battery, external power, starter, and generator outputs are connected to the generator control box from which DC power is distributed through current limiters and circuit breakers to the various electrical systems.

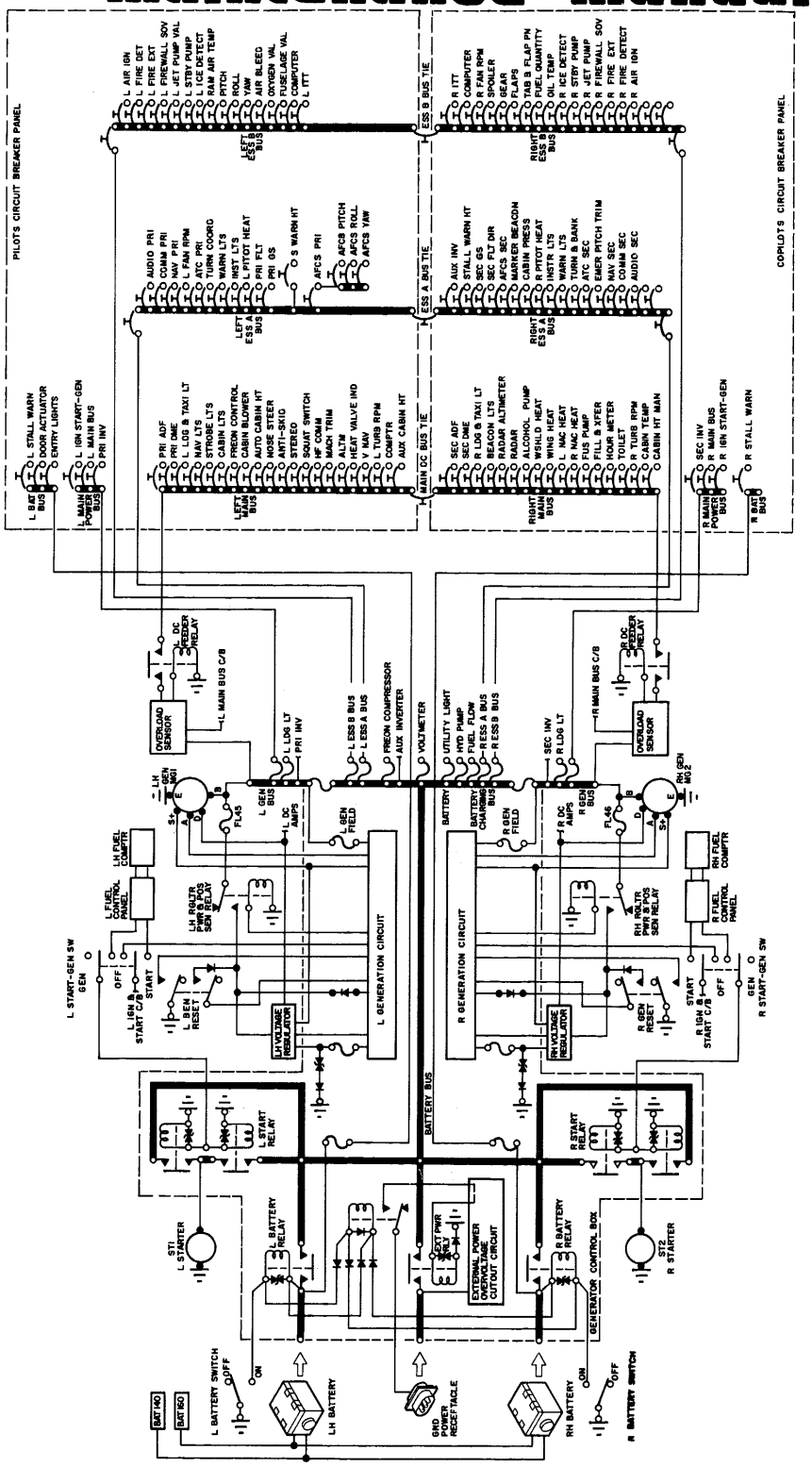
D. Two solid state voltage regulators are installed in the tailcone. The regulators maintain a constant output voltage under varying engine speeds and load conditions by automatically adjusting the generator field current. Generator output is sensed by the voltage regulator positive sense line. On Aircraft 35-002 thru 35-508 and 36-002 thru 36-053, the sense line is protected by a 10 ampere fuse. The sense point and fuse location are on the generator. (See 24-31-01 for voltage indicator fuses, FL45 and FL46.) On Aircraft 35-509 and Subsequent and 36-054 and Subsequent, the sense line is protected by a 2 ampere circuit breaker. The sense point is the generator bus bar, and the circuit breaker location is in the current limiter failure sensor bracket on the current limiter panel. (See 24-50-02 for voltage indicator circuit breakers, CB203 and CB204.) The voltage regulators are preset at the factory following a complete functional test. The design of the regulators precludes voltage drift with time. A paralleling protection circuit is electrically connected in the equalizer bus line of each voltage regulator. The circuit consists of 0.5-ampere fuse and a diode network installed as an assembly on the LH electrical equipment tray.



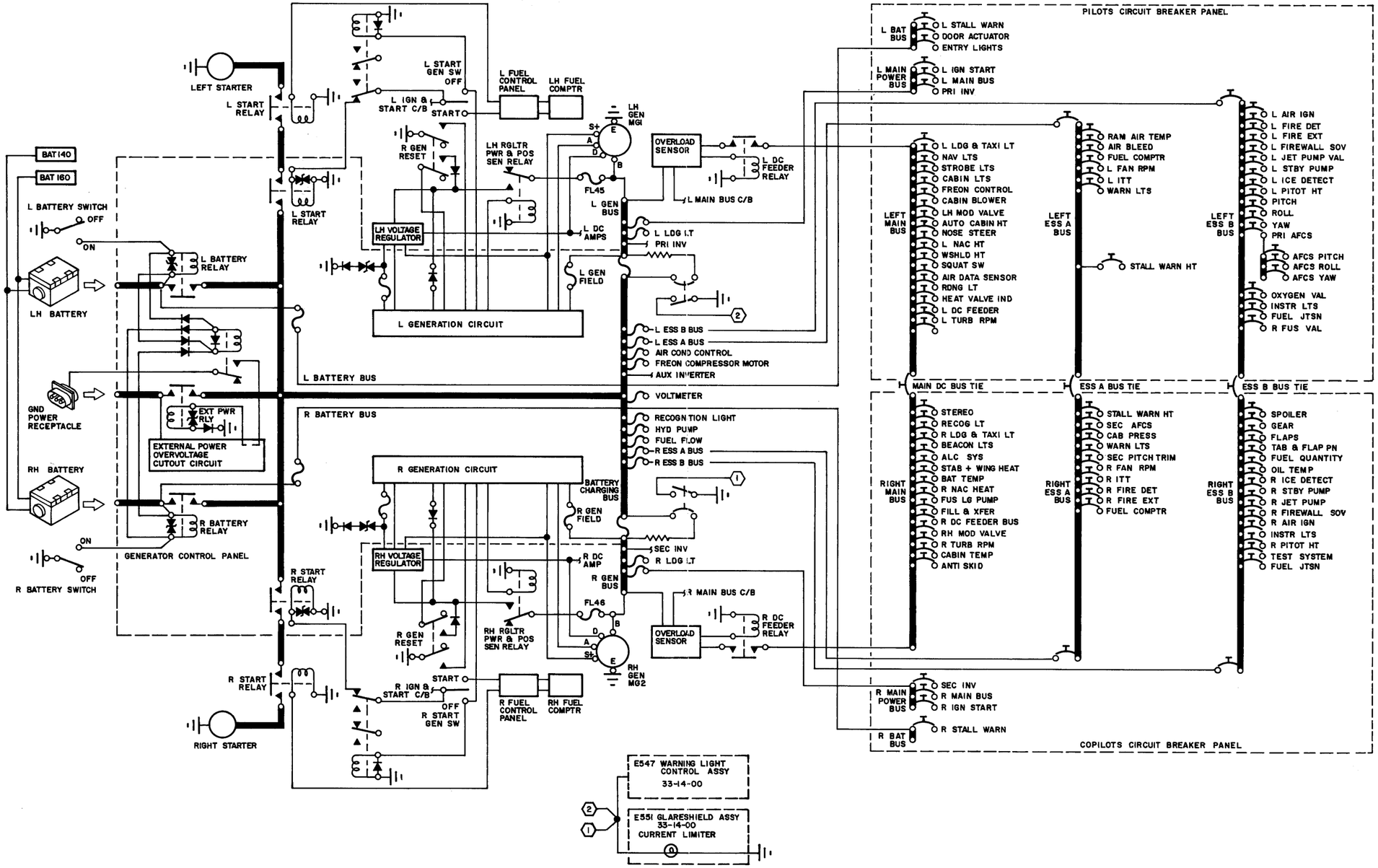
DC Generation Electrical Control Schematic
Figure 1 (Sheet 1 of 5)



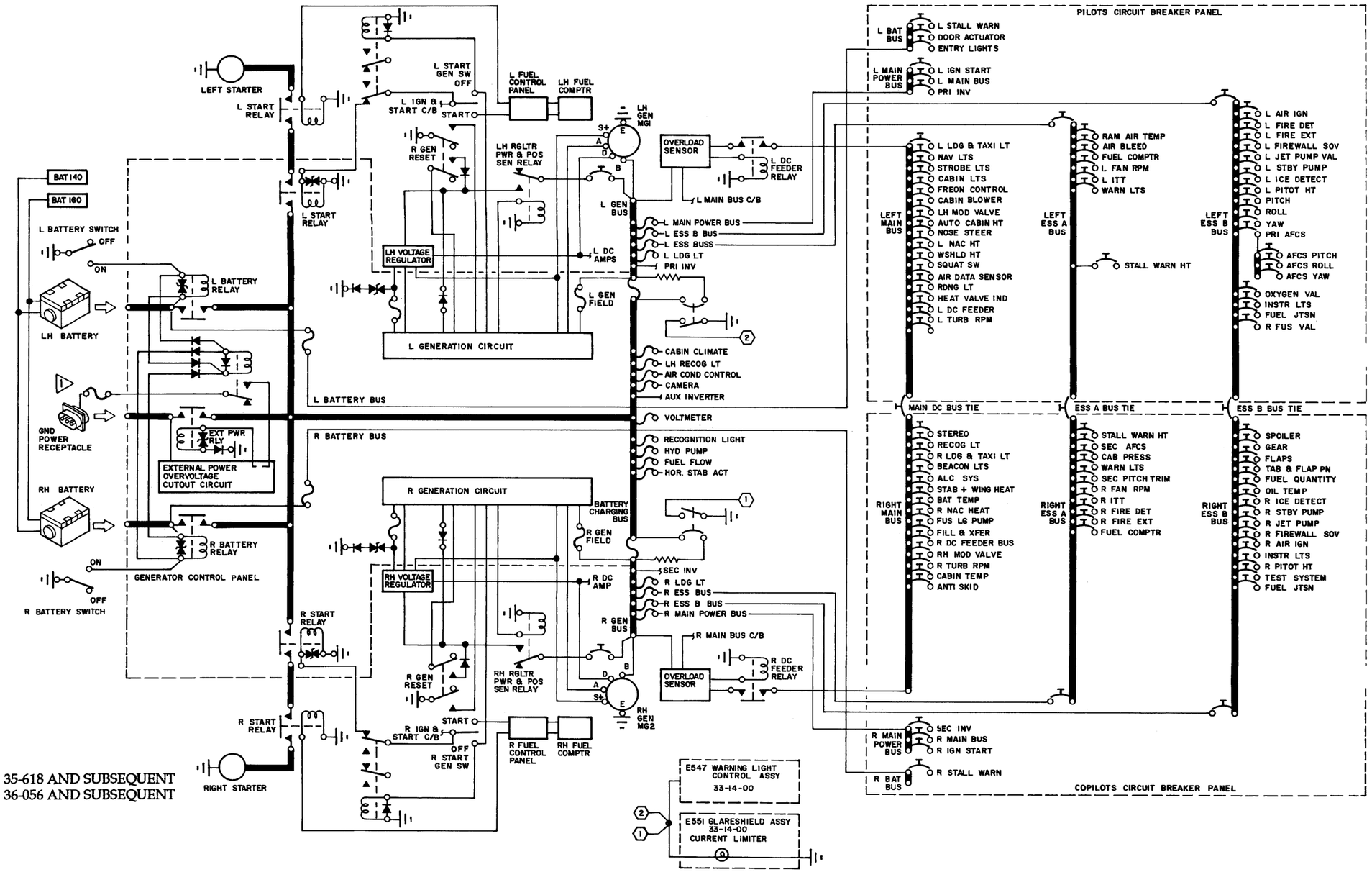
DC Generation Electrical Control Schematic
Figure 1 (Sheet 2 of 5)



DC Generation Electrical Control Schematic
Figure 1 (Sheet 3 of 5)



DC Generation Electrical Control Schematic
Figure 1 (Sheet 4 of 5)



1 35-618 AND SUBSEQUENT
36-056 AND SUBSEQUENT

DC Generation Electrical Control Schematic
Figure 1 (Sheet 5 of 5)

E. The overload control sensors are located in the tailcone. The overload control sensor consists basically of a 70-ampere thermal circuit breaker mechanically connected to a set of switch contacts. The overload sensors are electrically connected between the battery charging bus and the main bus of each circuit breaker.

F. The feeder bus relays are installed in the tailcone. The relay is energized through the closed contacts of the overload sensor.

G. The ammeters are installed on the instrument panel. The ammeters indicate the amperage output of their respective generator. The range of the ammeters is 0 to 400 amperes. The voltmeter is installed on the instrument panel. The voltmeter indicates generator output voltage supplied to the distribution buses. The range of the voltmeter is 0 to 30 volts.

H. The generator warning control box is installed in the tailcone on frame 26, LH stringer 15.

2. OPERATION

A. When the Starter-Generator Switch is set to GEN, the motive flow valve is open (Aircraft 35-002 thru 35-057 and 36-002 thru 36-017), the standby boost pumps are deenergized, the generation circuit relays are energized, and the generator caution (amber) lights are extinguished. When the generation circuit relays are energized, three circuits are completed: (1) a circuit for 28 vdc to energize the voltage regulator (K628 and K629) control relay, (2) a circuit for power to the refrigeration compressor motor relay, and (3) a circuit for the voltage regulator equalizer bus. On Aircraft 35-083 and Subsequent and 36-021 and Subsequent and earlier aircraft modified per AMK 76-6, "Separation of Voltage Regulator and Generator Excitation Circuit," five circuits are completed: (1) a circuit is completed to energize the voltage regulator control relay (K628 and K629), (2) a parallel 28-vdc circuit is completed to the voltage regulator POS SEN through the contacts of the generator control relay within the generator control box, (3) a circuit for REGLTR PWR is also completed through the generator control relay, (4) a circuit for power to the refrigeration compressor motor, and (5) a circuit for the voltage regulator equalizer bus. Engine rpm acceleration raises generator voltage output to voltage regulator setting. Output of the operating generator is used to assist in starting the opposite engine. (Refer to Chapter 80.)

With both generation circuits energized, the voltage regulator equalizer bus is connected. The voltage regulator equalizer circuit senses any change in the applicable generator load. The voltage regulator will then automatically adjust its respective generator field until a balanced condition exists. If a generator should exceed 31 (±0.5) volts (an overvoltage condition), a circuit within the voltage regulator completes a ground circuit and energizes the generator overvoltage relay. With the overvoltage relay energized, the applicable generator field is grounded, power is removed from the coil of the voltage regulator control relay (K628 and K629), the paralleling relay is deenergized, and the generator caution

(amber) light will illuminate. The generator may be reactivated by holding the applicable generator RESET Switch on momentarily, then release. Monitor DC ammeters for generator operation. If ammeters are within 25 amperes of each other, paralleling is functioning properly. If not, set Starter-Generator Switch to OFF.

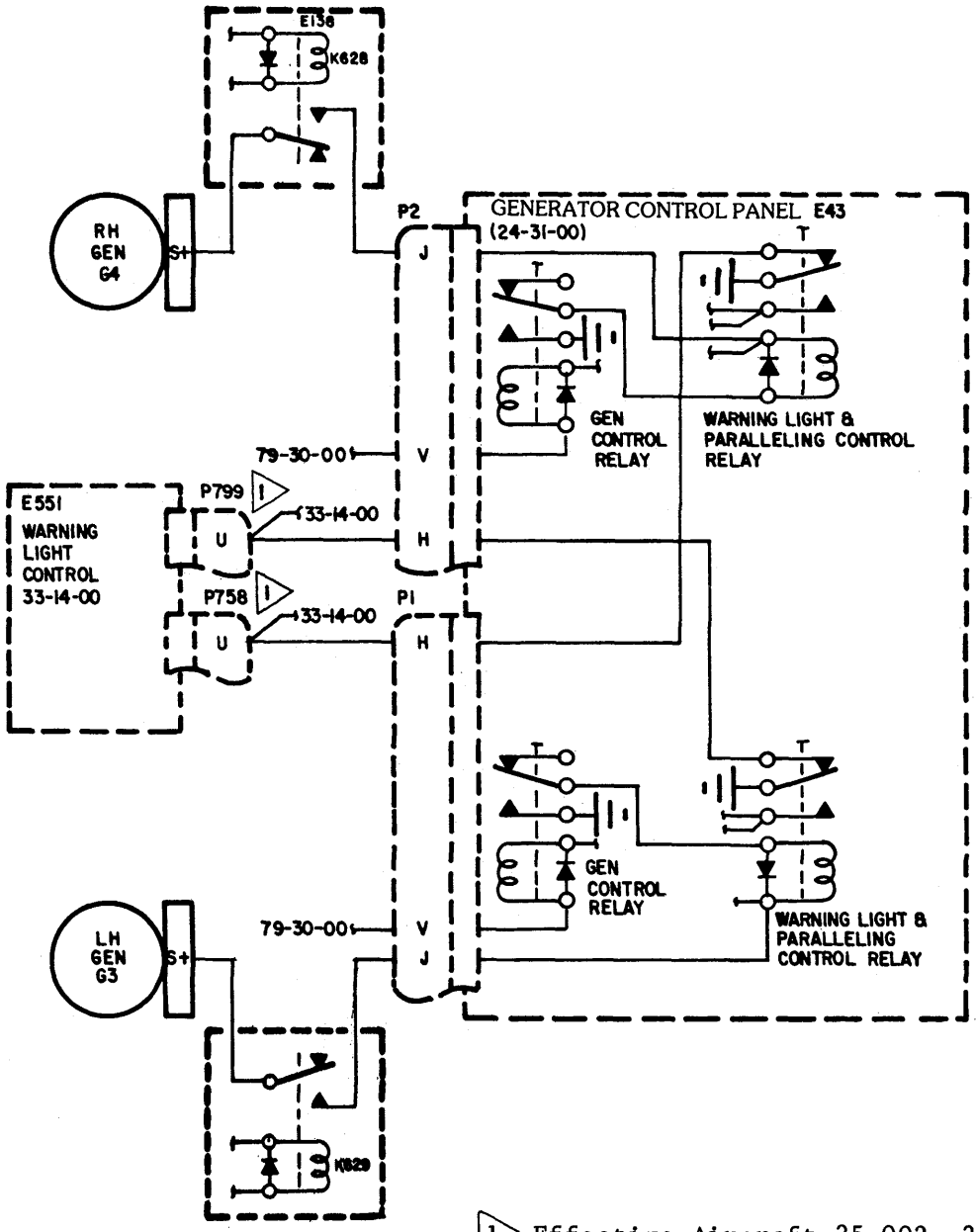
B. Generator Caution Light Operation (See figure 2.)

(1) On Aircraft 35-002 thru 35-027, 35-029, and 35-030 and 36-002 thru 36-013, 36-015, and 36-016, the generator voltage is applied directly to its applicable warning light and paralleling control relay within the generator control box. When the relays are energized, a ground circuit to the applicable generator caution light is opened. If a low voltage condition should occur or the generator is shut down or an overvoltage condition should occur, the relay will deenergize and complete the ground circuit to the applicable L GEN or R GEN caution light.

(2) On Aircraft 35-028, 35-031 and Subsequent and 36-014, 36-017 and Subsequent, each low voltage sensing circuit senses the voltage present at its applicable generator. This voltage is applied to a resistor network which provides the turn-on voltage for the transistor. With the transistor conducting, a current path is completed to the warning light and paralleling control relay within the generator control box. The relay energizes and opens the ground circuit to the caution light. When generator voltage is low (approximately 10 vdc), the transistor is turned off and the relay deenergizes. This completes a ground circuit to the applicable L GEN or R GEN caution light.

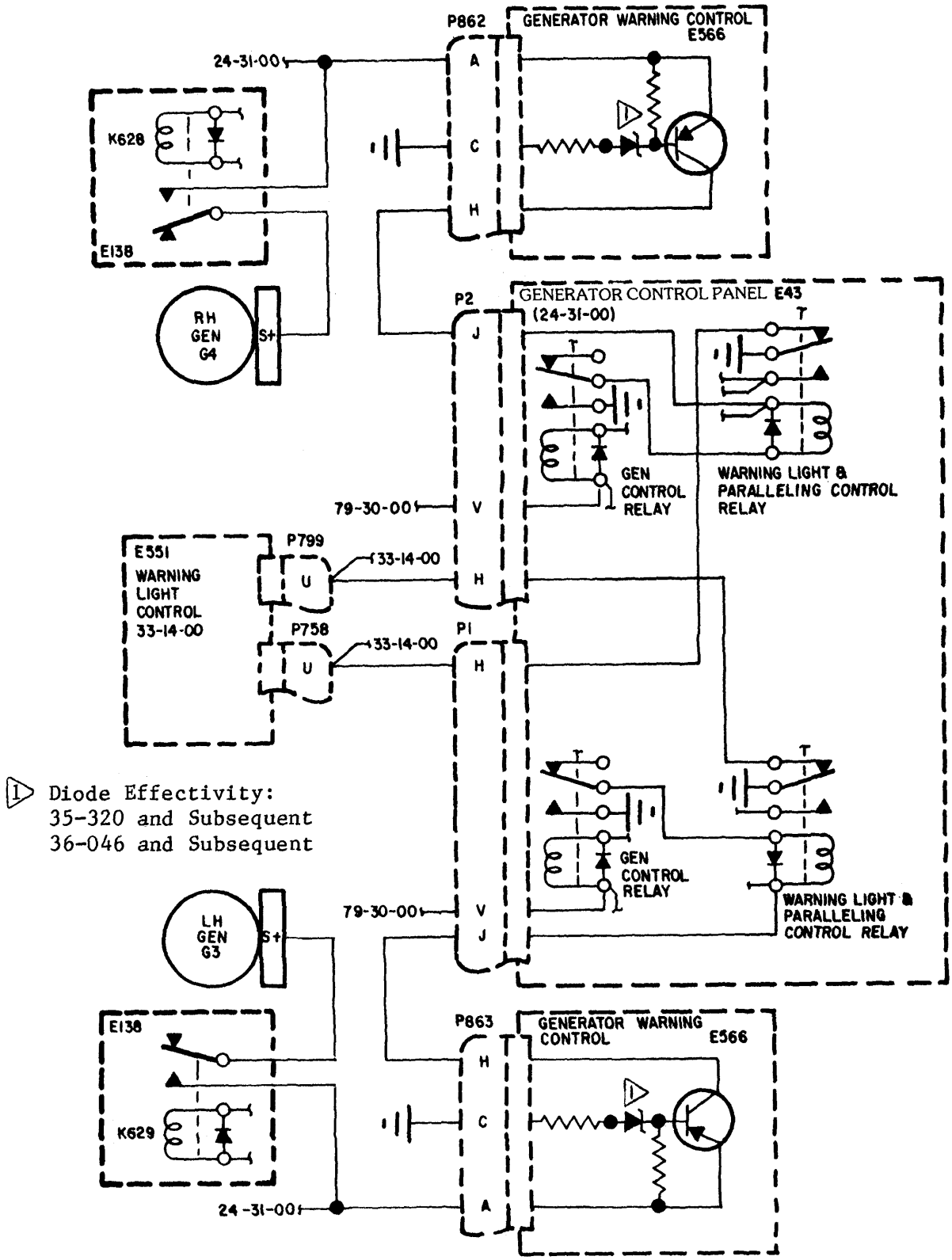
C. Component Operation

(1) During normal operation, the left main bus power relay is energized through the closed contacts of the overload control sensor and the L MAIN BUS circuit breaker. Operation for the right main bus power relay is the same as the left main bus power relay. If an overload condition exists, the thermal breaker contained within the sensor will position the switch contacts to remove power from the power relay and ground the applicable bus circuit breaker. The overload sensor will reset when the thermal breaker has cooled and the switch contacts have been returned to their original position. However, the 28 vdc required to energize the power relay will not be present due to the open bus circuit breaker. After the malfunction has been corrected and the applicable bus circuit breaker reset, the power relay will energize. When the power relay is energized, the generator output voltage is connected to the main power bus.



1 Effective Aircraft 35-002, 35-003, 35-004 and 36-002 only change P799-U to P757-10 and P758-U to P756-11

Generator Caution Light Control Schematic
Figure 2 (Sheet 1 of 2)



Generator Caution Light Control Schematic
Figure 2 (Sheet 2 of 2)

DC GENERATION SYSTEM - TROUBLE SHOOTING

1. TROUBLE SHOOTING

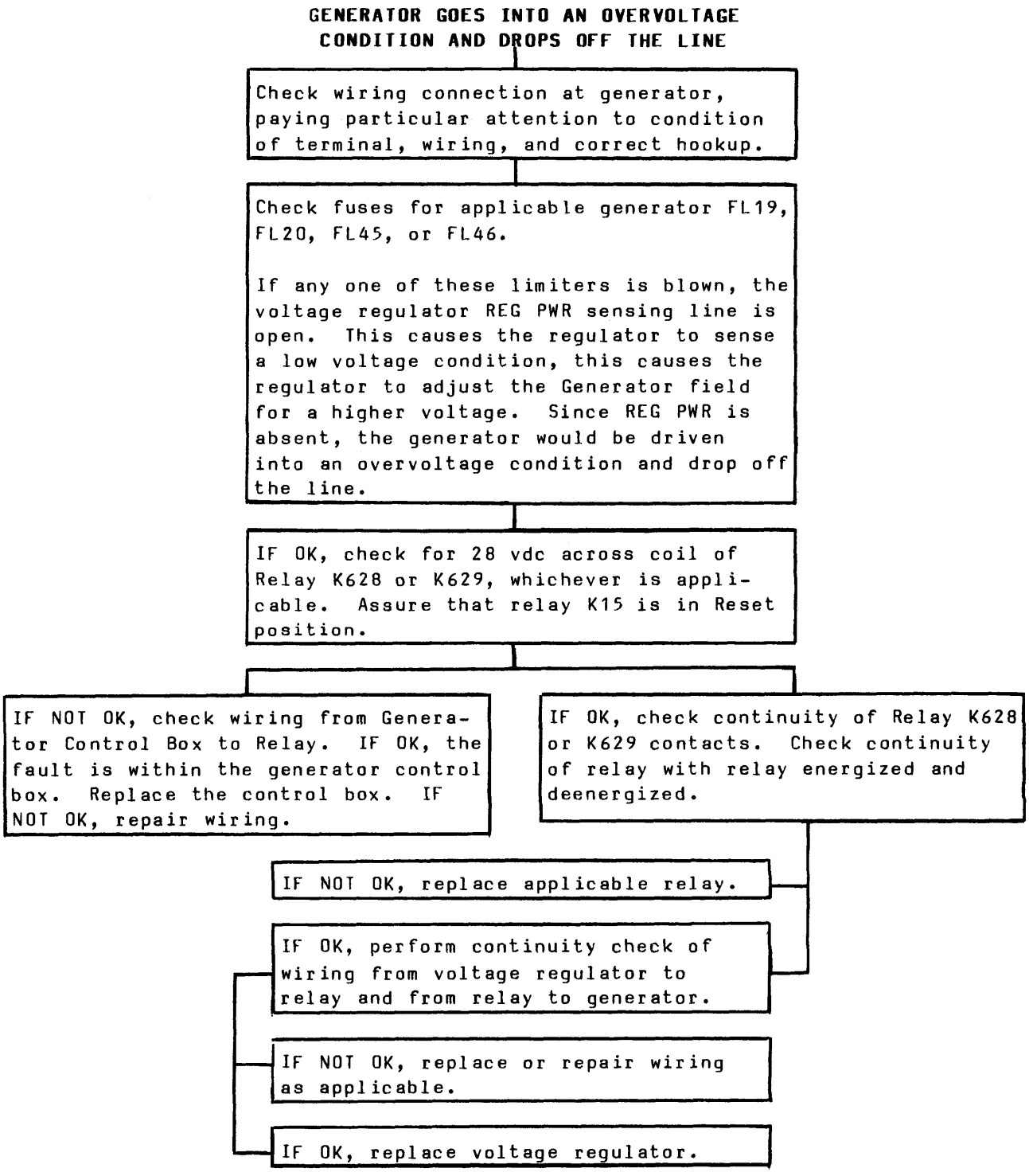
A. Trouble shooting procedures consist of complete electrical circuit check of system components and replacement or repair of component or circuit.

B. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following items:

NAME	PART NUMBER	MANUFACTURER	USE
Voltmeter	3430A	Hewlett Packard	To check electrical circuits
or			
Voltmeter	260	Simpson	To check electrical circuits

C. See figure 101 for trouble shooting procedure.



DC Generator System Trouble Shooting
Figure 101

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
1. GENERATOR RUMBLE		
a. Loose 4-gauge wires	Check all 4-gauge wiring from generator to generator control box.	Disconnect loose connection, clean terminals and studs and re-install wiring.
b. Loose or improperly installed QAD.	Check generator for any movement.	Check QAD clamp bolt torque. (Ref 24-31-01.) Remove and reinstall generator. (Ref. 24-31-01.)
c. Loose Engine Frame Support Struts	Check for loose support struts (located in either side of generator from gear box to forward engine frame).	Adjust support struts. (Ref. Engine Manual, 72-60-01.)
d. Internal Generator Resistance	Perform Generator Resistance Check. (Refer to 24-31-01.)	Replace generator.
e. Generator Rotor out of balance	Remove generator and send to Repair Facility for Rotor check.	Replace generator.

DC System Trouble Shooting
Figure 102

DC GENERATION SYSTEM - MAINTENANCE PRACTICES

1. Inspection/Check

NOTE: It is recommended that the power distribution system be functionally tested for proper operation after maintenance of any type is performed in the tailcone area of the aircraft.

A. Operational Check of DC Power Distribution System

NOTE: Perform Operational Check of DC Power Distribution system in accordance with the current inspection interval specified in Chapter 5.

(1) Right and Left Essential Buses Operational Check *(Aircraft 35-002 thru 35-201, 35-205; 36-002 thru 36-040 not modified per AMK 78-13, "Installation of Split Essential Bus Electrical System.")*
   (a) Set BAT 1 Switch on and pull ESS BUS TIE circuit breaker. This will isolate the L ESS BUS and R ESS BUS.
   (b) Both ice detect lights on forward glareshield shall illuminate.
   (c) Pull L ESS BUS circuit breaker. Left ice detect light shall extinguish. Reset L ESS BUS circuit breaker. Left ice detect light shall illuminate.
   (d) Pull R ESS BUS circuit breaker. Right ice detect light shall extinguish. Reset R ESS BUS circuit breaker. Right ice detect light shall illuminate.

(2) Right and Left Essential B Buses Operational Check *(Aircraft 35-202 thru 35-204, 35-206 and Subsequent; 36-041 and Subsequent and prior aircraft modified per AMK 78-13, "Installation of Split Essential Bus Electrical System.")*
   (a) Set BAT 1 Switch on and pull ESS B BUS TIE circuit breaker. This will isolate the L ESS B BUS and R ESS B BUS.
   (b) Both ice detect lights on forward glareshield shall illuminate.
   (c) Pull L ESS B BUS circuit breaker. Left ice detect light shall extinguish. Reset L ESS B BUS circuit breaker. Left ice detect light shall illuminate.
   (d) Pull R ESS B BUS circuit breaker. Right ice detect light shall extinguish. Reset R ESS B BUS circuit breaker. Right ice detect light shall illuminate.
   (e) Depress ESS B BUS TIE circuit breaker.

(3) Right and Left Essential A Buses Operational Check *(Aircraft 35-202 thru 35-204, 35-206 and Subsequent; 36-041 and Subsequent and prior Aircraft modified per AMK 78-13, "Installation of Split Essential Bus Electrical System.")*
   (a) Set BAT 1 Switch on and pull ESS A BUS TIE circuit breaker. This will isolate the L ESS A BUS and R ESS A BUS.
   (b) Verify that SEC Pitch Trim system is operational. Pull the R ESS A BUS circuit breaker and verify that SEC Pitch Trim system is inoperative. Reset R ESS A BUS circuit breaker.
   (c) Verify that left fan indicator flag (off or red) is out of view. Pull the L ESS A BUS circuit breaker. Left fan indicator flag (off or red) shall come into view. Reset the L ESS A BUS circuit breaker.
   (d) Reset the ESS A BUS TIE circuit breaker.

(4) Right and Left Main Buses Operational Check
   (a) Pull MAIN BUS TIE circuit breaker. This will isolate the L MAIN BUS and R MAIN BUS.
   (b) Verify operation of navigation lights. Pull L MAIN BUS circuit breaker. Navigation lights shall extinguish. Reset L MAIN BUS circuit breaker. Navigation lights shall illuminate.
   (c) Verify operation of beacon lights. Pull R MAIN BUS circuit breaker. Beacon lights shall extinguish. Reset R MAIN BUS circuit breaker. Beacon light shall illuminate.
   (d) Depress the MAIN BUS TIE circuit breaker.

(5) Right and Left Main Power Buses Operational Check
   (a) If the above test (step 4) is satisfactory, the right and left main power buses are functioning correctly.

(6) Right and Left Battery Buses Operational Check
  (a) Set Entry Light Switch on. If lights illuminate, the left battery bus is functioning correctly.
  (b) Set R Stall Warning Switch on and move right stall vane; the right angle-of-attack indicator shall move with changes in vane position. This indicates the right battery bus is functioning properly.
(7) Repeat steps A.(1) thru A.(6) substituting BAT 2 Switch for BAT 1 Switch.
(8) Battery Charging Bus Current Limiter Test *(Aircraft 35-509 and Subsequent, 36-054 and Subsequent and prior Aircraft when modified per AMK 85-1, "Electrical Power Distribution Improvement".)*
  (a) Lower tailcone access door.
  (b) Remove current limiter panel cover. (Refer to 24-50-02.)
  (c) Depress WARN LTS circuit breakers CB203 and CB204, located in current limiter panel.
  (d) Set Battery Switches on.
  (e) Pull circuit breaker CB199 and depress CB198, located in current limiter panel, to test left current limiter. (Refer to 24-50-02.)
  (f) The master warning lights shall flash and CUR LIM light in glareshield shall illuminate.
  (g) Depress circuit breaker CB199 on current limiter panel. Both master warning lights and CUR LIM light shall extinguish.
  (h) Pull circuit breaker CB198 and depress CB199, located in current limiter panel, to test right current limiter. (Refer to 24-50-02.)
  (i) The master warning lights shall flash and CUR LIM light in glareshield shall illuminate.
  (j) Depress circuit breaker CB198 on current limiter panel. Both master warning lights and CUR LIM light shall extinguish.

    NOTE: Failure of CUR LIM light to illuminate indicates a malfunction. Replace 275A current limiter on side which would not illuminate.

  (k) Set Battery Switches off, depress both circuit breakers on main current limiter panel (CB199 and CB198).
  (l) Install current limiter panel cover. (Refer to 24-50-02.)
  (m) Close and secure tailcone access door.

B. Overvoltage Monitor Circuits Functional Test

NOTE: Perform Functional Test of Overvoltage Monitor Circuits in accordance with the current inspection interval specified in Chapter 5.

Fabricate an overvoltage monitor test adapter. (See Figure 201.)

(1) Lower tailcone access door to gain access to voltage regulators.
(2) Disconnect LH voltage regulator connector (P381) and connect test adapter as shown.
(3) Set Battery Switches on. Set variable DC power supply on and slowly increase voltage.

NOTE: As the voltage from the DC power supply is increased, the test lamp will illuminate.

(4) When the overvoltage monitor threshold voltage (32.0 [±1.0] volts as measured between J3 and J4) is reached, the test lamp will extinguish. This indicates that the overvoltage relay in the generator control box is energized. Depress L GEN RESET pushbutton.
(5) Set variable DC power supply and Battery Switches off, and perform steps E.(2) through E.(4) using the RH voltage regulator and R GEN RESET pushbutton.
(6) If functional test fails, connect a voltmeter between J1 and J2 of test adapter and check the following:
  (a) No voltage at J1 when power supply is set below threshold voltage indicates no power is available to overvoltage control relay in the generator control box.

(b) Failure of the voltage at J1 to drop off when threshold is reached indicates a failed voltage regulator.
(c) Failure of the test lamp to turn off when the voltage at J1 drops off indicates a failed overvoltage relay.

(7) Set variable DC power supply and Battery Switches off.
(8) Remove test adapter and connect electrical connector to voltage regulator.
(9) Close and secure tailcone access door.

C. Battery Switching Circuit Functional Test

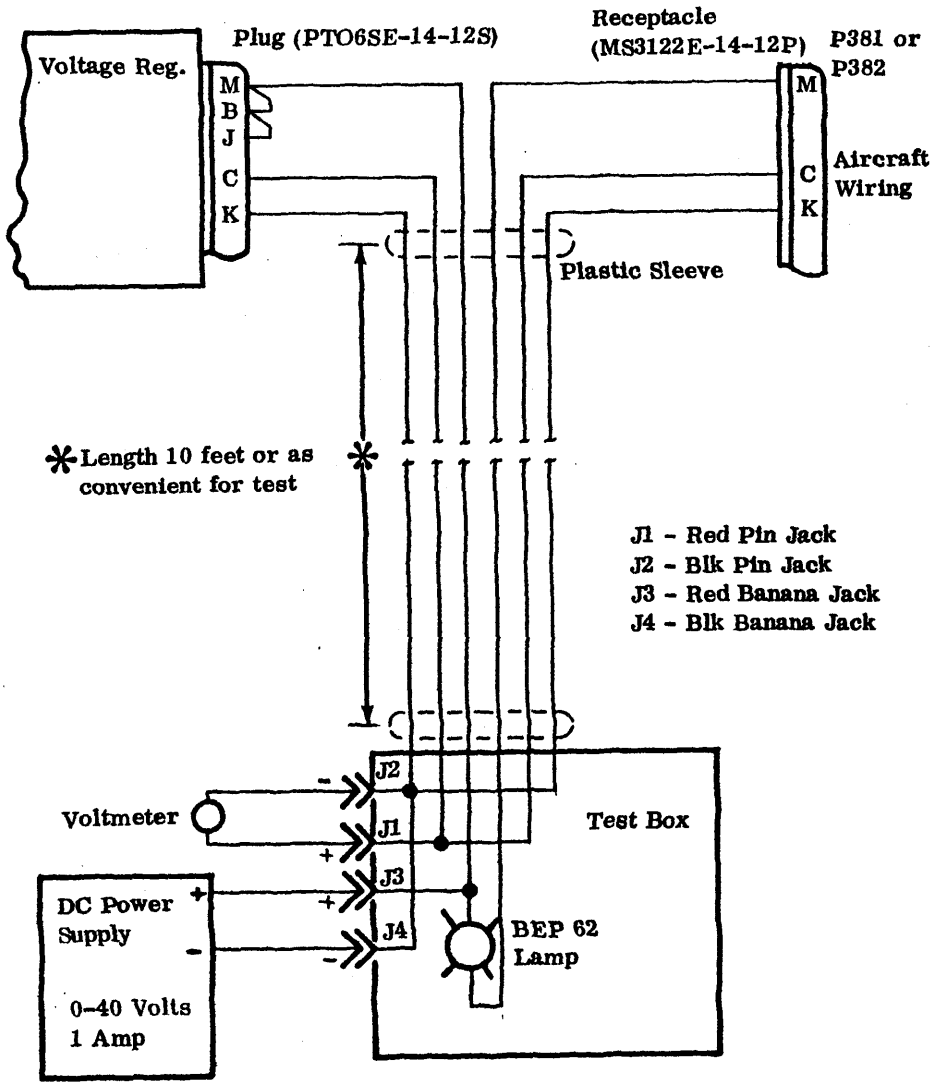
CAUTION: DISCONNECTED BATTERY QUICK-DISCONNECTS MUST BE SECURED AND PROTECTED FROM SHORTING. BATTERY VOLTAGE WILL FEED BACK FROM CONNECTED BATTERY AND ARCING WILL OCCUR IF THE QUICK DISCONNECT IS ADVERTENTLY SHORTED TO AIRCRAFT STRUCTURE.

NOTE: It is recommended that the battery switching circuit be functionally tested for proper operation after maintenance is performed on the current limiter panel and/or generator control panel.

(1) Set BAT 1 and BAT 2 Battery Switches off. Disconnect external power if connected.
(2) Disconnect LH battery quick-disconnect. Do not disconnect RH battery quick-disconnect.
(3) Set BAT 1 Switch on. The glareshield warning lights shall not illuminate.
(4) Set BAT 1 Switch off and BAT 2 Switch on. The glareshield warning lights shall illuminate.

CAUTION: DISCONNECTED BATTERY QUICK-DISCONNECTS MUST BE SECURED AND PROTECTED FROM SHORTING. BATTERY VOLTAGE WILL FEED BACK FROM CONNECTED BATTERY AND ARCING WILL OCCUR IF THE QUICK-DISCONNECT IS ADVERTENLY SHORTED TO AIRCRAFT STRUCTURE.

(5) Set BAT 2 Switch off.
(6) Disconnect RH battery quick-disconnect and connect LH battery quick-disconnect.
(7) Set BAT 2 Switch on. The glareshield warning lights shall not illuminate.
(8) Set BAT 2 Switch off and BAT 1 Switch on. The glareshield warning lights shall illuminate.
(9) Set BAT 1 Switch off and connect RH battery quick-disconnect.
(10) If the above conditions are not met, check wiring. (Refer to Wiring Manual, 24-31-00.)



Overvoltage Monitor Test Adapter
Figure 201

DC GENERATOR - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE: The following procedure is applicable to either generator.

A. Removal of Generator (See Figure 201.)
   (1) Lower tailcone access door and disconnect aircraft batteries.
   (2) Remove lower engine nacelle.
   (3) Disconnect and tag electrical wiring.
   (4) Loosen clamps and remove air duct from forward nacelle and generator.
   (5) Remove safety wire from Q.A.D. clamp bolt.
   (6) Loosen Q.A.D. clamp bolt sufficiently to allow removal of generator.
   (7) Remove generator from aircraft.

B. Installation of Generator *(Aircraft 35-002 thru 35-234 and 36-002 thru 36-044 NOT modified per AMK 78-8, "Installation of Generator Spline Drive Coupler," or AMK 79-7, "Installation of Generator Spline Drive Coupler Spacer," or SSK 956, "Replacement of Generator Spline Drive Coupler Adapter.")* (See Figure 201.)

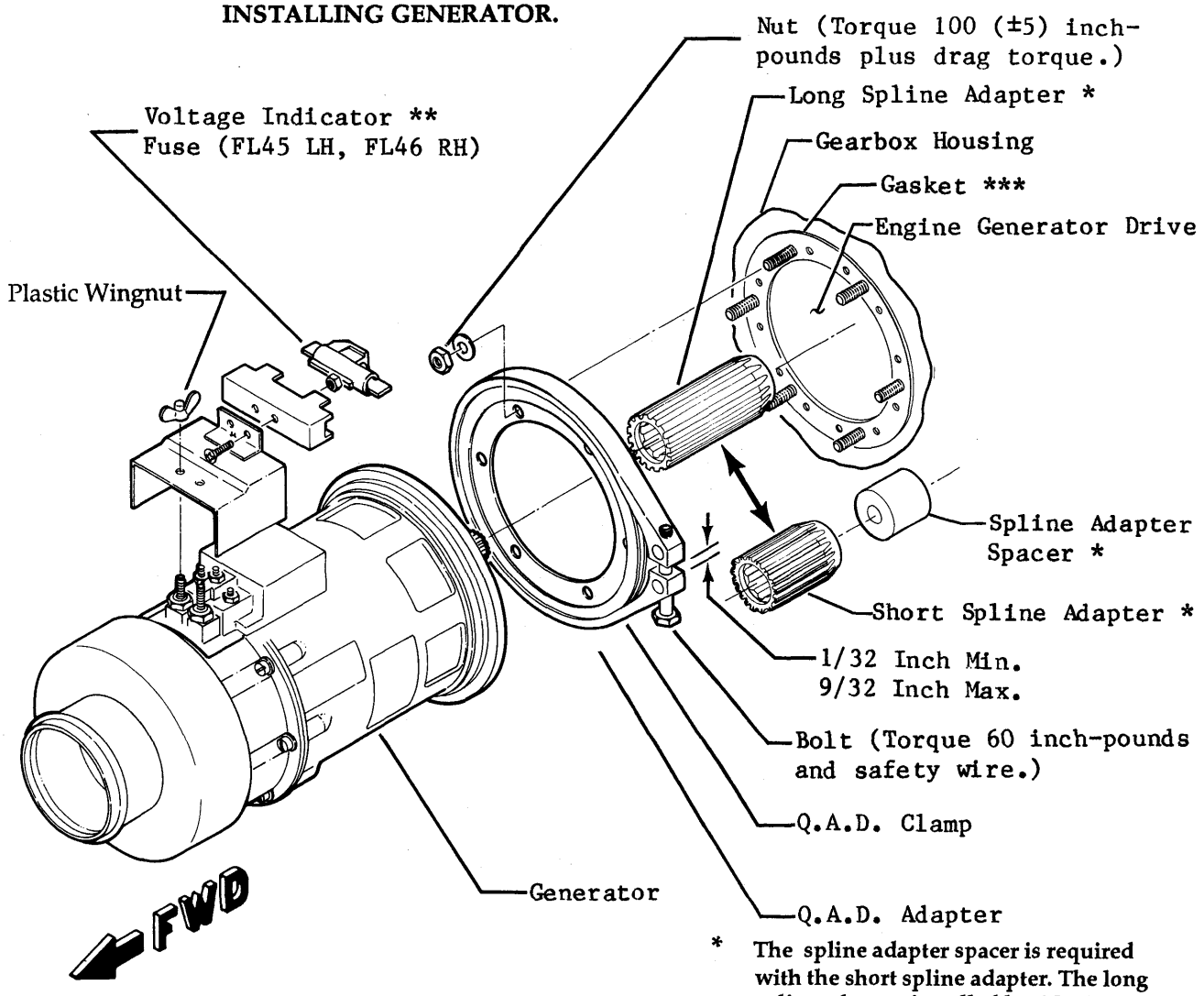
CAUTION: ENSURE THAT LIMITERS (FL45 OR FL46), LIMITER HOLDER, COVER ASSEMBLY, WIRING, AND ATTACHING HARDWARE (ESPECIALLY PLASTIC WING-NUTS) ARE SECURE WHEN INSTALLING GENERATOR.

   (1) Pack the spline cavity on the engine one-fourth full (approximately 1 inch) with Mobil grease No. 29 (mfd. by Mobil Oil Co.) or Braycote No. 664S (mfd. by Bray Oil Co.) and apply to screw threads and V-groove of Q.A.D. clamp.
   (2) Install generator in Q.A.D. clamp on engine. Torque Q.A.D. clamp to 60 inch-pounds while moving end of generator back and forth. This will assure that no binding occurs. After torquing clamp to 60 inch-pounds, check space between ends of clamp; distance should be between 1/32 inch minimum to 9/32 inch maximum. The QAD clamp must be replaced if it does not meet end gap clearance requirements. Ensure steps B.(3) thru B.(7) are completed if a new Q.A.D. clamp assembly is installed. Safety wire bolt.
   (3) Before installing new Q.A.D. adapter assembly on engine, check that the three (3) screws attaching adapter plate to the adapter ring do not protrude above the mounting surface. Inspect Q.A.D. clamp for possible damage.
   (4) Check that Q.A.D. assembly slides freely over the gearbox studs and fits flat against gearbox.
   (5) Assure that gearbox housing, generator housing, adapter plate mounting surface, Q.A.D. clamp, and both splines are clean and free from foreign matter.
   (6) On *Aircraft 35-002 thru 35-150 and 36-002 thru 36-036,* install gasket on gearbox housing studs.
   (7) Install adapter assembly on gearbox housing and secure with attaching parts. Torque nuts 100 (±5) inch-pounds plus drag torque.

CAUTION: ENSURE THAT BOTH SPLINES ARE CLEAN BEFORE APPLYING NEW GREASE. THIS WILL PREVENT CONTAMINATION OF NEW GREASE.

   (8) Remove tags and connect electrical wiring to generator.
   (9) Install generator cooling duct and secure with clamp.
   (10) Install and secure engine lower nacelle.
   (11) Connect aircraft batteries and secure tailcone access door.
   (12) Perform operational check of generator.

CAUTION: **ENSURE THAT LIMITERS (FL 45 AND FL 46), LIMITER HOLDER, COVER ASSEMBLY, WIRING, AND ATTACHING HARDWARE (ESPECIALLY PLASTIC WINGNUTS) ARE SECURE WHEN INSTALLING GENERATOR.**



* The spline adapter spacer is required with the short spline adapter. The long spline adapter, installed by AMK 78-8A or SSK 956, eliminates the need for a spacer.

** 35-002 thru 35-508 and 36-002 thru 36-053 not modified by AMK 85-1 "Electrical Power Distribution Improvement".

*** Aircraft 35-002 thru 35-150, 35-671 and Subsequent; 36-002 thru 36-036, 36-064 and Subsequent.

Generator Installation
Figure 201

C. Install Generator *(Aircraft 35-235 and Subsequent and 36-045 and Subsequent and prior aircraft modified per AMK 78-8, "Installation of Generator Spline Drive Coupler.")* (See figure 201.)

CAUTION:
- **ENTIRE OUTSIDE SURFACE ONLY OF SPLINE ADAPTER MUST BE LUBRICATED WITH MOBIL 29 (MFD. BY MOBIL OIL CO.) OR BRAYCOTE NO. 664S (MFD. BY BRAY OIL CO.) GREASE PRIOR TO INSTALLATION.**
- **ENSURE THAT LIMITERS (FL 45 AND FL 46), LIMITER HOLDER, COVER ASSEMBLY, WIRING, AND ATTACHING HARDWARE (ESPECIALLY PLASTIC WINGNUTS) ARE SECURE WHEN INSTALLING GENERATOR.**

(1) On *Aircraft 35-002 thru 35-382 and 36-002 thru 36-044 equipped with generator spline drive short adapter and spacer*, insert spline adapter spacer with nut end first into engine generator drive. Insert spline adapter, chamfered end first, into engine generator drive using Bendix insertion tool P/N 1106841-1. Maximum insertion force shall not exceed 22 pounds of force. Minimum insertion force shall not be less than 15 pounds of force. Do not apply force against engine generator drive.

NOTE: If force exceeds 22 pounds, check spline adapter and cavity for damage or obstructions. If force is less than 15 pounds, replace spline adapter.

(2) *On Aircraft 35-383 and Subsequent, 36-045 and Subsequent and prior aircraft equipped with generator spline drive long adapter*, insert spline adapter with chamfered end first into engine drive pad using Bendix insertion tool P/N 1106841-1 without exceeding 22 inch-pounds of force. Do not apply force against engine generator drive.

NOTE: Use Bendix tool P/N 1106769-1 when the spline adapter must be removed.

(3) Before installing new Q.A.D. adapter assembly on engine, check that the three (3) screws attaching adapter plate to the adapter ring do not protrude above the mounting surface. Inspect Q.A.D. clamp for possible damage.
(4) Check that Q.A.D. assembly slides freely over the gearbox studs and fits flat against gearbox.
(5) Assure that gearbox housing, generator housing, adapter plate mounting surface, Q.A.D. clamp, and both splines are clean and free from foreign matter.
(6) Apply Mobil grease No. 29 (mfd. by Mobil Oil Co.) or Braycote No. 664S (mfd. by Bray Oil Co.) to screw threads and V-groove of Q.A.D. clamp. Install Q.A.D. adapter assembly on gearbox housing and secure with attaching parts. Torque nuts 100 (±5) inch-pounds plus drag torque.
(7) Install generator and Q.A.D. clamp on engine. Torque Q.A.D. clamp to 60 inch-pounds while moving end of generator back and forth. This will assure that no binding occurs. After torquing clamp to 60 inch-pounds, check space between ends of clamp; distance should be between 1/32 inch minimum to 9/32 inch maximum. Safety wire bolt using MS20995C32 safety wire.
(8) Remove tags and connect electrical wiring to generator.
(9) Install generator cooling duct and secure with clamp.
(10) Install and secure lower engine nacelle.
(11) Connect aircraft batteries and secure tailcone access door.
(12) Perform operational check of generator.

2. Inspection/Check

A. Generator Load and Paralleling Check *(Aircraft 35-002 thru 35-147 and 36-002 thru 36-035.)*
(1) Start both engines. (Refer to Airplane Flight Manual for Starting Procedures.)
(2) Set Cabin Air Switch to OFF.
(3) Set engines at 70% turbine rpm.
(4) Check ammeters for 50 to 100 amperes. If necessary, turn on equipment to obtain proper load.

NOTE: Both ammeters should read approximately the same.

(5) Pull Main DC Bus Tie breaker and set R Starter-Generator Switch to OFF.
(6) Amperage load of left generator should be approximately double.

NOTE: This indicates that L Generator Current Limiter (FL1, 275A) is not blown.

(7) Set R Starter-Generator Switch to GEN. Ammeters should return to the load determined in step A.(4) and be approximately equal.
(8) Set L Starter-Generator Switch to OFF.
(9) Amperage load of right generator should be approximately double.

NOTE: This indicates the R Generator Current Limiter (FL2, 275A) is not blown.

(10) Shut down engines. (Refer to Airplane Flight Manual for engine shut down procedures.)

B. Generator Load and Paralleling Check *(Aircraft 35-148 and Subsequent and 36-036 and Subsequent.)*
(1) Start both engines. (Refer to Airplane Flight Manual for Starting Procedures.)
(2) Set Cabin Air Switch to OFF.
(3) Set engines at 70% turbine rpm.
(4) Check ammeters for 50 to 100 amperes. If necessary, turn on equipment to obtain proper load.

NOTE: Both ammeters should read approximately the same.

(5) Pull Main DC Bus Tie breaker and set R Starter-Generator Switch to OFF.
(6) Pull Squat Switch Circuit Breaker.
(7) Amperage load of left generator should be approximately double.

NOTE: This indicates that L Generator current limiter (FL1, 275A) is not blown.

(8) Reset Squat Switch Circuit Breaker. The generator voltage may be reduced by approximately 2 vdc. Ammeter reading may change.
(9) Set R Starter-Generator Switch to GEN. Ammeters should return to the load determined in step B.(4) and be approximately equal.
(10) Set L Starter-Generator Switch to OFF.
(11) Pull Squat Switch Circuit Breaker.
(12) Amperage of R Generator should be approximately double.

NOTE: This indicates the R Generator Current Limiter (FL2, 275A) is not blown.

(13) Reset Squat Switch Circuit Breaker. The generator voltage may be reduced by approximately 2 vdc. Ammeter reading may change.

NOTE: Reduced voltage and ammeter readings are due to the generator limiting circuit. With the Squat Switch Circuit Breaker engaged, airframe ground from the Squat Switch Relay Panel is applied through R7, located in the Generator Control Panel, to the generator paralleling bus. Ammeter readings are not accurate as a result of the generator limiting circuit.

(14) Set L Starter-Generator Switch to GEN. Ammeters should return to the load determined in step B.(4) and be approximately equal.
(15) Reset Main Bus Tie breaker.
(16) Battery Charging Bus Current Limiter Check
(a) Test Switch - L CUR LIM

(b) Test Button - Press. Green current limiter light will illuminate and remain on while button is held. The light indicates continuity through the left current limiter. Also the L GEN light will come on.

NOTE: The R Generator voltage may be reduced by approximately 2 vdc.

(c) Test Switch - R CUR LIM

(d) Test Button - Press. Green current limiter light will illuminate and remain on while button is held. The light indicates continuity through the right current limiter. Also the R GEN light will come on.

NOTE:
- The L Generator voltage may be reduced by approximately 2 vdc.
- Failure of light to remain illuminated indicates a malfunction. Replace 275A Current Limiter.

(17) Shut down engines. (Refer to Airplane Flight Manual for engine shut- down procedures.)

C. Generator Resistance Check (See figure 202.)

NOTE: The symbols (+) and (-), in the following resistance check, signify which meter lead is used on the generator terminal. This resistance check is performed with all wiring disconnected from the generator.

CAUTION: PERFORM RESISTANCE CHECK USING A SIMPSON 260 OR EQUIVALENT. DO NOT USE DIGITAL VOLT-OHMMETER.

(1) Disconnect all wiring from generator.

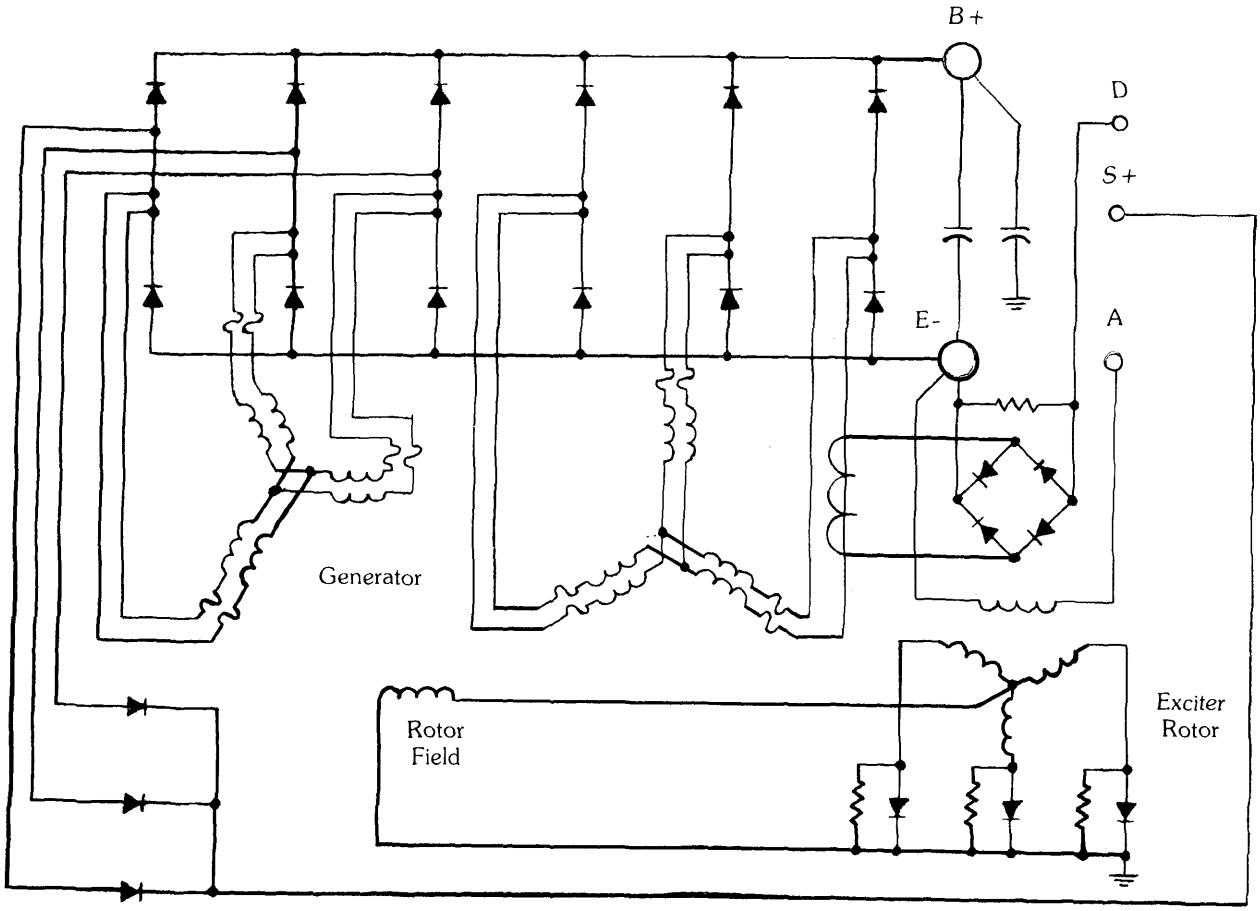
(2) Check generator resistance as shown.

From Terminal	To Terminal	Resistance Values
A	E	2.2 (±10%) ohms
B (+)	E (-)	Infinity
E (+)	B (-)	22.0 (±30%) ohms
E (+)	S (-)	40.0 (±30%) ohms
S (+)	E (-)	Infinity
E (-)	D (+)	10.5 (±30%) ohms
D (-)	E (+)	10.5 (±30%) ohms

(3) If generator fails any of these resistance checks, replace the generator.

3. APPROVED REPAIRS

A. Replacement of generator bearings is allowed provided the repair facility obtains the applicable repair manuals and test equipment specified by the vendor. These repair procedures apply only to the 30-B107 series generators.



Generator Electrical Schematic
Figure 202

GENERATOR CONTROL PANEL - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE:
- Maintenance information on the generator control panel is described in Generator Control Repair Manuals RM-113, RM-115, RM-116, and RM-117. Refer to Supplementary Publications in the Introduction to this manual. Installation of the generator control panel into the aircraft is defined in this section.
- Removal/installation of the generator control panel is described with the current limiter panel attached. Maintenance information on the current limiter panel is described in 24-50-02.

A. Remove Generator Control Panel (See Figure 201.)
   (1) Remove electrical power from aircraft. Disconnect aircraft batteries.
   (2) Disconnect electrical connectors from generator control panel and current limiter panel. *On Aircraft 35-643 and Subsequent*, remove screws holding defog fuse box (E622) to side of control panel. (Refer to Chapter 21.)
   (3) Remove current limiter panel cover assembly. (Refer to applicable figure and paragraph in 24-50-02.)
   (4) Remove cabin climate (AIR COND) wire from stud COM. (Refer to removal of current limiter FL3 in 24-50-02.)
   (5) Disconnect wires from battery charging bus, left and right generator busses that route into the current limiter panel without routing through an electrical connector (primary and secondary inverter wires). (Refer to applicable Figure in 24-50-02.)

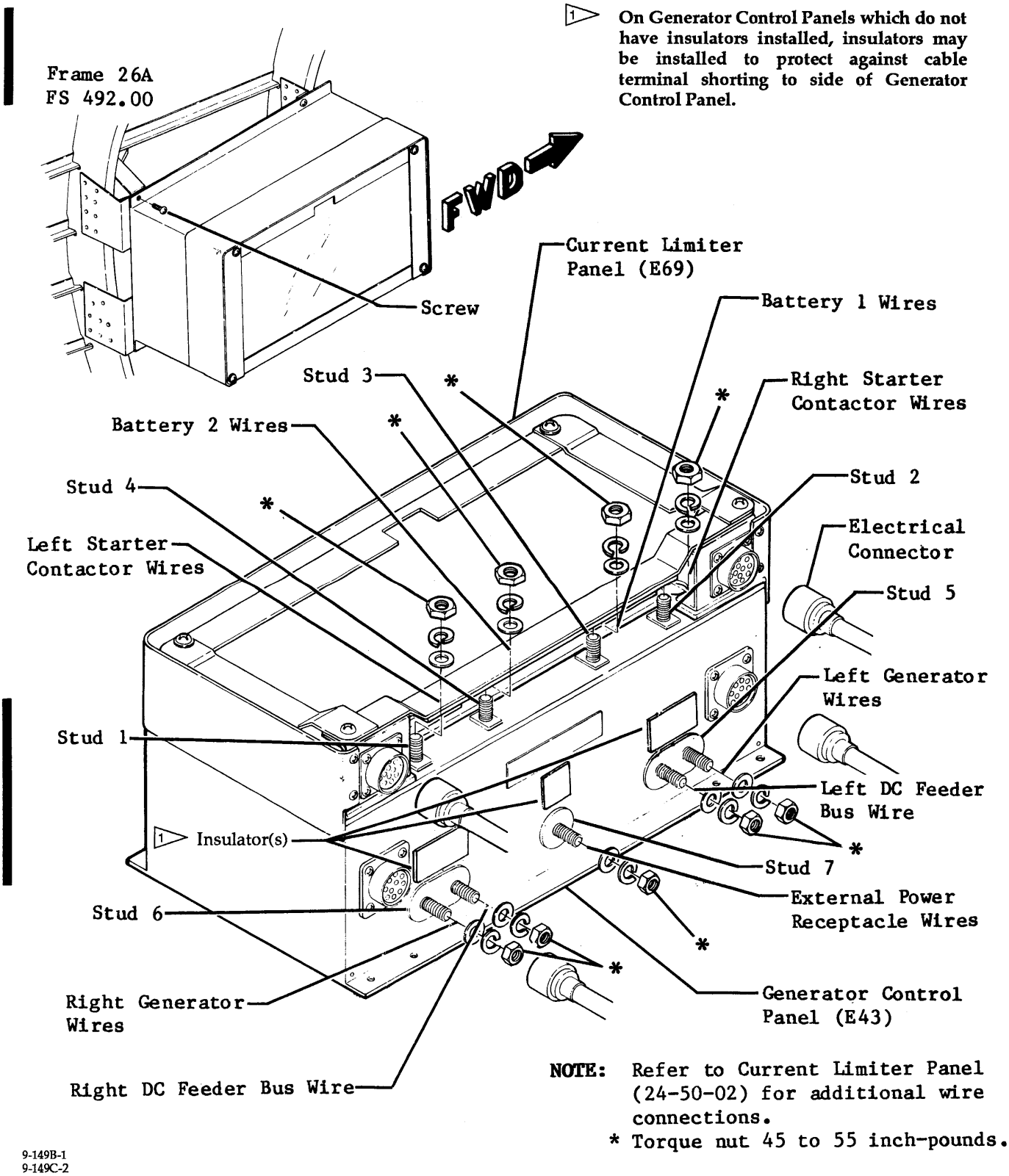
       NOTE: *On Aircraft equipped with current limiter failure sensor assemblies*, the current limiter failure sensor assemblies shall be removed before wires can be disconnected from bus bars. (Refer to applicable figure in 24-50-02.)

   (6) Disconnect wire terminals from generator control panel.
       (a) Stud 1 - Left starter contactor wires.
       (b) Stud 2 - Right starter contactor wires.
       (c) Stud 3 - Battery 1 wires.
       (d) Stud 4 - Battery 2 wires.
       (e) Stud 5 - Left generator wires and left DC feeder bus wire.
       (f) Stud 6 - Right generator wires and right DC feeder bus wire.
       (g) Stud 7 - External power receptacle wires.
   (7) Remove screws attaching generator control panel to frame 26 and frame 26A. Remove generator control panel from aircraft.

B. Install Generator Control Panel (See Figure 201.)

   NOTE:
   - The following generator control panel installation procedure is described with the current limiter panel attached.
   - The generator control panel may be installed without current limiter panel attached. If this procedure is used, perform only the applicable procedural steps.

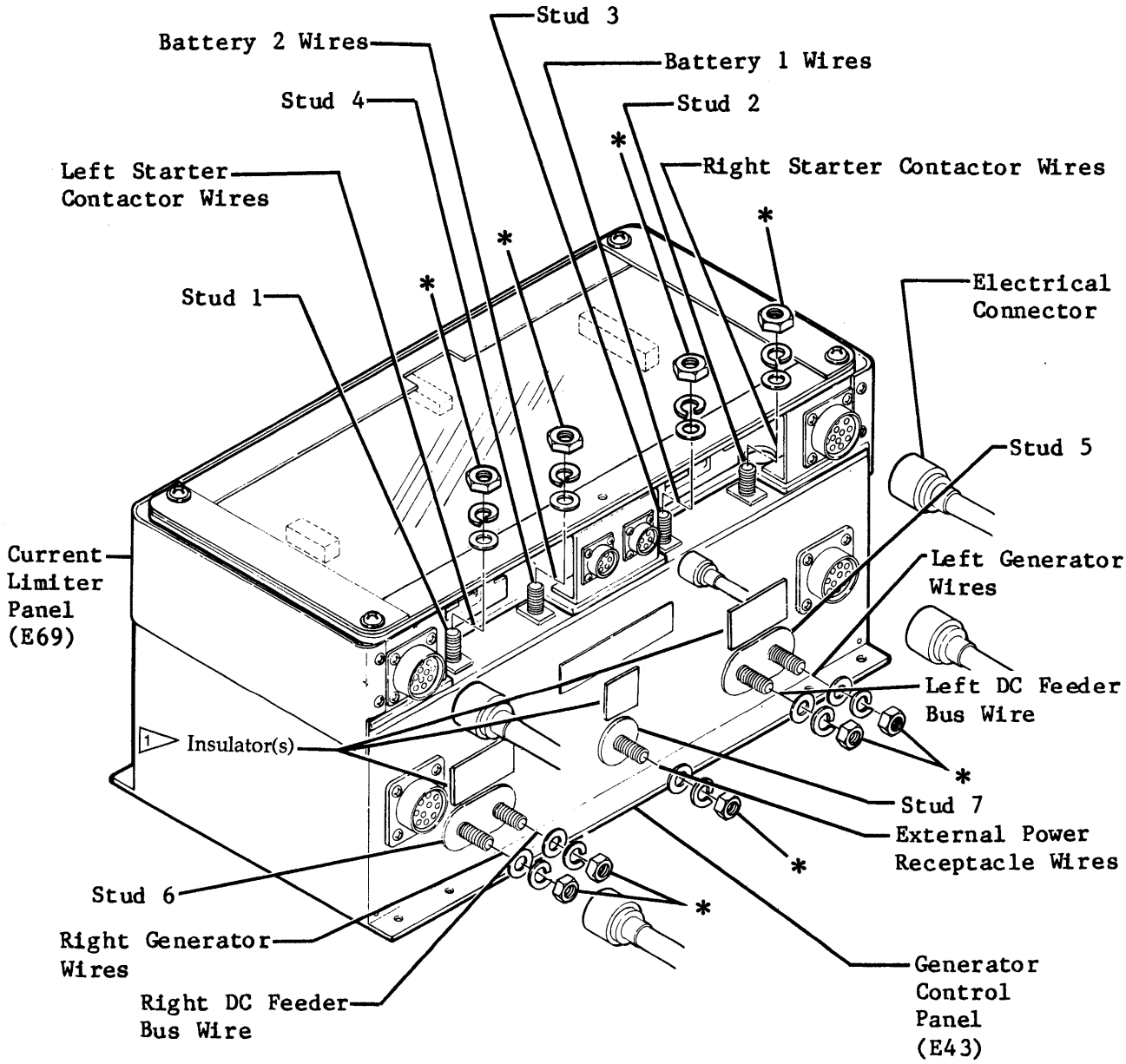
   (1) Verify that the aircraft batteries are disconnected.
   (2) Position and attach generator control panel to frame 26 and frame 26A with screws. On *Aircraft 35-643 and Subsequent*, secure defog fuse box (E622) to side of generator control panel. (Refer to Chapter 21.)



9-149B-1
9-149C-2

Generator Control Panel Installation
Figure 201 (Sheet 1 of 2)

1 On Generator Control Panels which do not have insulators installed, insulators may be installed to protect against cable terminal shorting to side of Generator Control Panel.



NOTE: Refer to Current Limiter Panel (24-50-02) for additional wire connections.

*Torque nut 45 to 55 inch-pounds.

9-149B-1
9-149C-2

Generator Control Panel Installation
Figure 201 (Sheet 2 of 2)

(3) Remove cover assembly from current limiter panel. (Refer to 24-50-02.)
(4) *On Aircraft equipped with current limiter failure sensor assemblies*, remove current limiter failure sensor bracket from bus bars. (Refer to 24-50-03.)
(5) Install wire terminals on battery charging bus, left and right generator busses. (Refer to applicable figure in 24-50-02.)

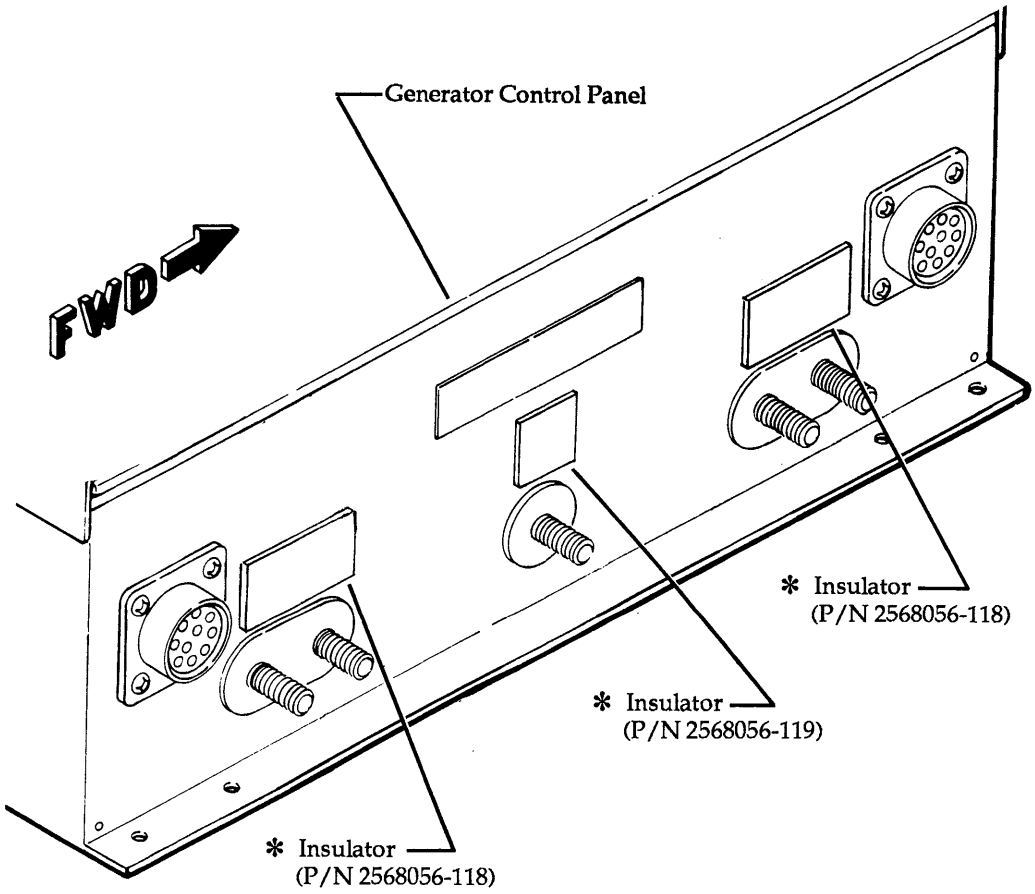
NOTE: The wires to be attached in the preceding step are wires routed to the current limiter panel but do route through a connector (primary and secondary inverter wires).

(6) On *Aircraft equipped with current limiter failure sensor assemblies*, install current limiter failure sensor bracket on bus bars. (Refer to 24-50-03.)
(7) Install cabin climate (AIR COND) wire on Stud COM. (Refer to installation of current limiter FL3 in 24-50-02.)

CAUTION: ENSURE THAT CABLE TERMINALS ARE NOT CONTACTING SIDE OF GENERATOR CONTROL PANEL WHEN CABLES ARE INSTALLED. PHENOLIC INSULATORS MAY BE INSTALLED TO PREVENT SHORTING. (SEE FIGURE 202.)

(8) Connect wire terminals to generator control panel.
  (a) Stud 1 - Left starter contactor wires.
  (b) Stud 2 - Right starter contactor wires.
  (c) Stud 3 - Aircraft battery 1 wires.
  (d) Stud 4 - Aircraft battery 2 wires.
  (e) Stud 5 - Left generator wires and left DC feeder bus wire.
  (f) Stud 6 - Right generator wires and right DC feeder bus wire.
  (g) Stud 7 - External power receptacle wires.
(9) Install washer, lockwasher, and nut on Studs 1 thru 7. Torque nut 45 to 55 inch-pounds.
(10) Install cover assembly on current limiter panel. (Refer to 24-50-02.)
(11) Connect electrical connectors to generator control panel and current limiter panel.
(12) Perform Operational Check of Voltage Regulating System. (Refer to 24-31-03.)

✻ **Position approximately as shown.**



NOTE: **Bond Insulator to Generator Control Panel with Class II Adhesive. (Refer to Chapter 20.)**

(TYPICAL INSTALLATION)

Generator Control Panel Insulator Installation
Figure 202

VOLTAGE REGULATOR - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

A. Remove Voltage Regulator (See figure 201.)
   (1) Lower tailcone access door.
   (2) Disconnect aircraft batteries.
   (3) Disconnect electrical connector from regulator.
   (4) Remove attaching parts and regulator from aircraft.

B. Install Voltage Regulator (See figure 201.)
   (1) Install regulator and secure with attaching parts.
   (2) Check electrical bond per Chapter 20 of the Wiring Manual.
   (3) Connect electrical connector to regulator.
   (4) Connect aircraft batteries.

CAUTION: OPERATIONAL CHECK OF THE VOLTAGE REGULATING SYSTEM MUST BE PERFORMED PRIOR TO GENERATOR RESET OR TURN-ON OR POSSIBLE DAMAGE TO EQUIPMENT COULD RESULT.

   (5) Perform operational check of voltage regulators.
   (6) Secure tailcone access door.

2. ADJUSTMENT/TEST

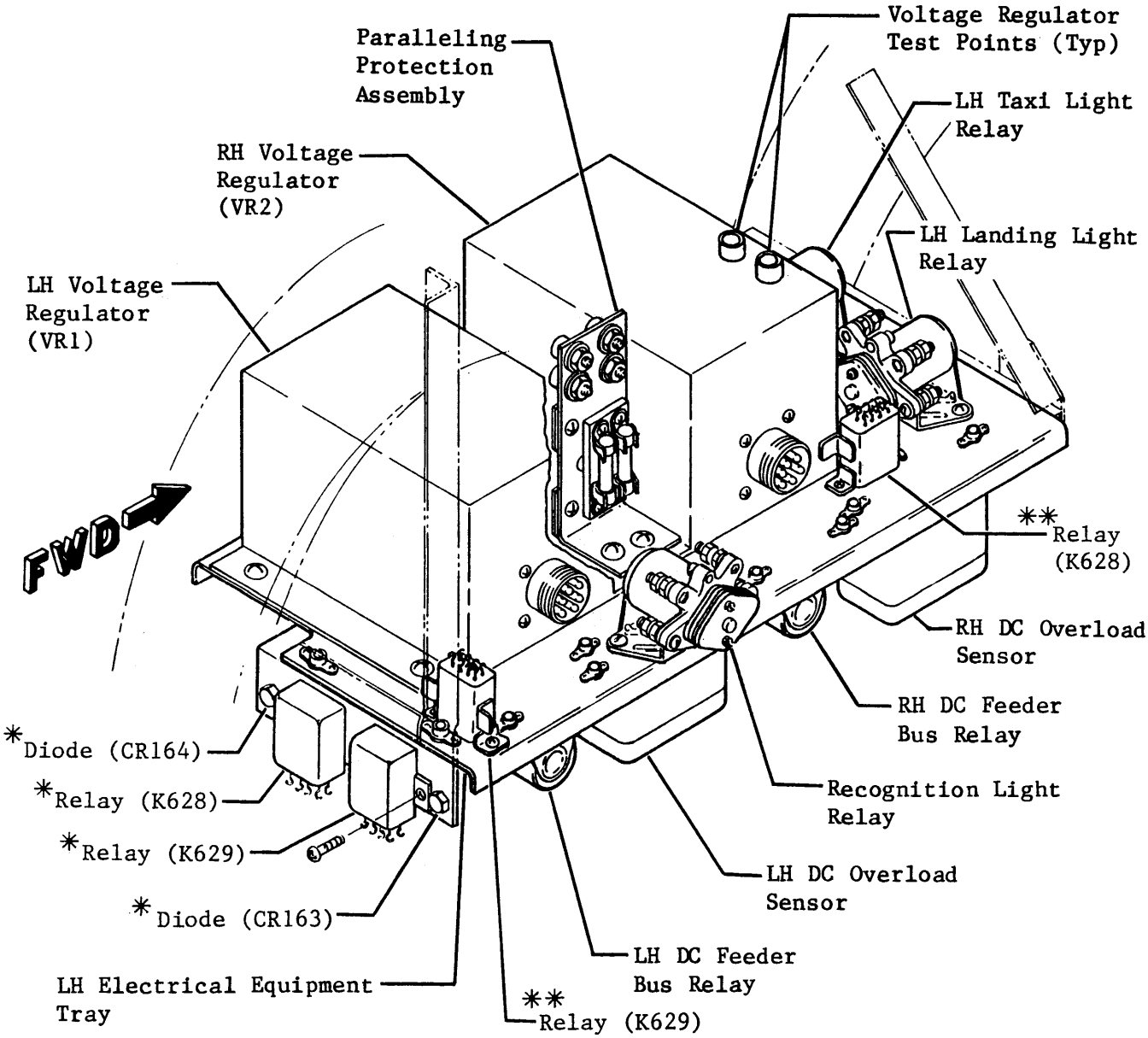
NOTE: Adjustment of the voltage regulators can be accomplished by the following procedures when it is determined that one or more of the following conditions exist:
   (a) LH and RH ammeters indicate differences in loads greater than 25 amperes during dual generator operation.
   (b) Bus voltages are not 28.5 (±0.3) volts measured at the battery charging bus during single or dual generator operation with a load of 25 amperes or less.
   (c) Operational check of voltage regulating system has been performed with negative results.

NOTE: Before making any adjustment to the voltage regulators, it must be determined that the source of the problem is not elsewhere in the DC power system. A faulty generator or ammeter may cause the conditions listed.

A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Digital Voltmeter	Model 8000 or 8800	Fluke Inc.	Voltage checks.
Insulated Screwdriver		Fabricate Locally	Adjustments.
Patch Cable (2 reqd.)		Fabricate Locally (Refer to figure 202.)	



* 35-083 and Subsequent and 36-021 and Subsequent and prior Aircraft modified per AMK 76-6, "Separation of Voltage Regulator and Generator Excitation Circuit"

** 35-002 thru 35-082 and 36-002 thru 36-020 not modified per AMK 76-6, "Separation of Voltage Regulator and Generator Excitation Circuits"

Voltage Regulator Installation
Figure 201

B. Adjustment of Voltage Regulators (See Figure 202.)
(1) Remove lower engine nacelle covers.
(2) Open tailcone access door.
(3) Disconnect aircraft batteries. (Refer to Chapter 24.)
(4) Remove voltage regulators from aircraft. Connect voltage regulators to aircraft wiring using patch cables and jumper each voltage regulator box to aircraft ground.
(5) Connect aircraft batteries. (Refer to Chapter 24.)

NOTE: Ensure that both paralleling adjustment (ADJ PAR) potentiometers are turned to mid-range before adjusting voltage.

(6) Press Glareshield Lights Test Switch and ensure both starter lights, CUR LIM light, and the master warning lights illuminate.
(7) Start both engines and set to idle speed.
(8) Set Starter-Generator Switches to GEN and run paralleled for 15 minutes to allow loads to stabilize and warm the voltage regulators.

NOTE: The following procedure details how to adjust the voltage regulators in the field. It is important to make all readings with a high degree of accuracy when making adjustments and reading data. Setting the voltages too low could cause incomplete charging of the batteries, while setting voltage too high could cause premature battery failure due to overcharging. Failure to set the two generator output voltages as close to each other as possible will make the load sharing adjustment procedure more difficult.

When making adjustments on voltage regulators, use a screwdriver with an insulated shaft. Potentiometers in the voltage regulators are not insulated from circuit voltages, therefore, the voltage regulator could be damaged if the screwdriver shorted the potentiometer to the voltage regulator case.

When loading generator(s), utilize only aircraft loads that are non-cyclic in nature. Do not use heater loads on the ground. This could overheat the elements and airframe due to lack of cooling air flowing. Be sure that no external power is connected to the aircraft. Depending upon aircraft equipment, the loads indicated in the tables may not be possible. In other cases, use the maximum attainable loads.

(9) After both generators have run in parallel for at least 15 minutes, set R Starter-Generator Switch to OFF. *On Aircraft 35-148 and Subsequent and 36-036 and Subsequent*, pull Squat Switch circuit breaker.
(10) Increase the LH engine rpm to 67% N2 and turn on enough steady state loads to read 100 amps on the LH generator ammeter. Connect meter leads to LH voltage regulator test points. Voltage should read 28.5 (± 0.3) vdc.
(11) Adjust LH voltage regulator as close as possible to the nominal voltage using the "voltage adjustment" potentiometer (ADJ VOLT). DO NOT adjust "paralleling adjustment" potentiometer (ADJ PAR).
(12) Record readings required in Table One for the LH generator measuring the potentials at the listed currents and engine rpm's. Record indicated load from the LH ammeter and the equalizer voltage output measured at the LH generator terminal D to ground.
(13) Accuracy of the LH ammeter can be verified by multiplying by 200, the value of equalizer voltage recorded in Table One. Record these values beside the indicated value of load. If the indicated and actual calculated values differ by more than 15 amps, the system is out of tolerance and the generator or the ammeter system should be investigated.

(14) Set R Starter-Generator Switch to GEN and set L Starter-Generator Switch to OFF. Allow RH generator system 5 minutes to warm up at ground idle.

(15) Increase RH engine rpm to 67% N2 and turn on enough steady state loads to read 100 amps on the RH generator ammeter. Connect meter leads to RH voltage regulator test points. Voltage should read 28.5 (± 0.3) vdc. Adjust the voltage to be as close to the nominal voltage as possible using the "voltage adjustment" potentiometer (ADJ VOLT) on the voltage regulator. DO NOT adjust the "paralleling adjustment" (ADJ PAR) potentiometer.

(16) Record readings required in Table Two for the RH generator measuring the potentials at the listed currents and engine rpm's. Record the indicated load from the RH ammeter and the equalizer voltage output measured at the RH generator terminal D to ground.

(17) If voltage measured is not within the tolerance listed in Table Two, switch voltage regulators and try to adjust the RH generator with the LH voltage regulator. If the LH voltage regulator is able to stay within the tolerances of Table Two, the RH voltage regulator should be replaced. Should the LH voltage regulator fail to hold the RH generator output within the tolerances of Table One, investigate the generator as the source of the problem.

NOTE: Electrical Power must be OFF prior to connecting or disconnecting the voltage regulator.

(18) Accuracy of the RH ammeter can be verified by multiplying the value of equalizer voltage recorded in Table Two by 200. Enter this calculated value in Table Two beside the indicated value of load. If the indicated and actual calculated values differ by more than 15 amps, the system is out of tolerance and the ammeter system or generator should be investigated.

(19) Set LH Starter-Generator Switch to GEN to parallel the two systems. Set both engines to 67% N2. Apply as much steady state load as can be turned on. Allow 15 minutes for the voltage regulators to warm up and the load to stabilize.

(20) Record LH and RH ampere indication and the calculated difference in Table Three. If the difference in the ammeter readings is within 25 amperes, the load sharing is satisfactory and the procedure complete.

(21) If the difference in the ammeter reading is greater than 25 amperes, then the "paralleling adjustment" potentiometer (ADJ PAR) should be adjusted. *On Aircraft 35-148 and Subsequent and 36-036 and Subsequent*, depress Squat Switch circuit breaker.

CAUTION: DO NOT ATTEMPT TO ADJUST LOAD SHARING WITH THE "VOLTAGE ADJUSTMENT" POTENTIOMETER (ADJ VOLT).

NOTE: Adjusting the "paralleling adjustment" potentiometer (ADJ PAR) clockwise will cause the respective generator to increase its output current while causing a decrease in the opposite generator output current.

Adjust the low voltage regulator paralleling potentiometer clockwise to match cockpit ammeter indications.

C. Final Check

(1) As a final check, repeat steps B.(10) thru B.(16) to confirm that generator outputs are within proper tolerances.

(2) If outputs are not within tolerances, readjust the voltage regulator that is out of tolerance and repeat steps B.(19), B.(20), and B.(21).

(3) Disconnect aircraft batteries and return aircraft to normal configuration.

3. INSPECTION/CHECK

A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the listed items:

NAME	PART NUMBER	MANUFACTURER	USE
Multimeter	Model 8020A	Fluke Inc.	Voltage Checks
Variable DC Power Supply	Model NFB	EPSCO Inc. Addison, IL 60707	
Test Adapter Assembly	(Refer to Figure 203)	Fabricate Locally	

B. Operational Check of Voltage Regulating System - Engine Not Running

NOTE:
- Operational check of voltage regulating system must be made prior to initial engine start (engine overhaul or replacement) and after any maintenance has been performed on the generator control circuits (includes generator, generator regulator, generator control panel, and current limiter panel).
- It is recommended the operational check of voltage regulating system be performed in sequence.

(1) L.H. Voltage Regulator Overvoltage Monitor Check
(a) Assure that Battery Switches are OFF and disconnect electrical connector (P381) from left voltage regulator.
(b) Connect test adapter between left voltage regulator and aircraft wiring. (See figure 203.)
(c) Set Battery Switches ON and set variable DC power supply ON.
(d) Slowly increase voltage output from variable DC power supply.

NOTE: As the voltage from the variable DC power supply is increased, the test lamp will illuminate.

(e) When overvoltage monitor threshold voltage 32 (±1) volts measured between J3 and J4 (reference test adapter) is reached, the lamp will extinguish. This indicates that overvoltage relay in generator control panel is energized.
(f) Decrease the variable DC power supply output to 28 (±2) volts.
(g) Depress L GEN RESET Switch; test lamp shall illuminate.
(h) Set variable DC power supply OFF, set Battery Switches to OFF, remove test adapter from left voltage regulator, and do not connect electrical connector (P381) to left voltage regulator.

(2) R.H. Voltage Regulator Overvoltage Monitor Check
(a) Assure that Battery Switches are OFF and disconnect electrical connector (P382) from right voltage regulator.
(b) Connect test adapter between right voltage regulator and aircraft wiring. (See figure 203.)
(c) Set Battery Switches ON and set variable DC power supply ON.
(d) Slowly increase voltage output from variable DC power supply.

NOTE: As the voltage from the variable DC power supply is increased, the test lamp will illuminate.

(e) When overvoltage monitor threshold voltage (32 ±1 volts measured between J3 and J4, reference test adapter) is reached, the lamp shall extinguish. This indicates that overvoltage relay in generator control panel is energized.
(f) Decrease the variable DC power supply output to 28 (±2) volts.
(g) Depress R GEN RESET Switch; test lamp shall illuminate.
(h) Set variable DC power supply OFF, set Battery Switches to OFF, remove test adapter from right voltage regulator, and do not connect electrical connector (P382) to right voltage regulator.

(3) Disable left voltage regulator positive sensing circuit.
(a) *On Aircraft 35-002 thru 35-508, 36-002 thru 36-053*, remove current limiter (FL45) from its holder (located below LH generator).
(b) *On Aircraft 35-509 and Subsequent, 36-054 and Subsequent*, pull circuit breaker (CB203) located in the current limiter panel.

(4) Set Battery Switches ON and set left Start/Generator Switch to GEN.

(5) Depress and hold left Generator Reset Switch. Use a multimeter and check for DC power (battery voltage) at the following:
(a) P381 pin B to ground.
(b) P381 pin J to ground.
(c) *Aircraft 35-002 thru 35-508, 36-002 thru 36-053*, wire P112A16T, at FL45 holder, to ground.
(d) *Aircraft 35-509 and Subsequent, 36-054 and Subsequent*, on current limiter panel connector P701 pin C to ground.

(6) Correct any defective circuits and repeat steps 3.B.(4) and 3.B.(5).

(7) Set left Start/Generator Switch to OFF. Set Battery Switches to OFF.

(8) *On Aircraft 35-002 thru 35-508, 36-002 thru 36-053*, reinstall current limiter (FL45). *On Aircraft 35-509 and Subsequent, 36-054 and Subsequent*, reset (close) circuit breaker CB203.

(9) Pull (open) squat switch circuit breaker.

(10) Set Battery Switches ON and momentarily turn left Start/Generator Switch to START. While in start mode, measure battery voltage at right voltage regulator connector P382 pin A to ground.

(11) Reset (close) squat switch circuit breaker and set Start/Generator Switch to GEN. Measure zero voltage at voltage regulator P382 pin A to ground.

(12) Set Battery Switches to OFF. Connect electrical connector (P381) to left voltage regulator.

(13) Disable right voltage regulator positive sensing circuit.
(a) *On Aircraft 35-002 thru 35-508, 36-002 thru 36-053*, remove current limiter (FL46) from its holder (located below RH generator).
(b) *On Aircraft 35-509 and Subsequent, 36-054 and Subsequent*, pull (open) circuit breaker (CB204) located in the current limiter panel.

(14) Set Battery Switches ON and set right Start/Generator Switch to GEN.

(15) Depress and hold right Generator Reset Switch. Use a multimeter and check for DC power (battery voltage) at the following:
(a) P382 pin B to ground.
(b) P382 pin J to ground.
(c) *Aircraft 35-002 thru 35-508, 36-002 thru 36-053*, wire P113A16T, at FL46 to ground.
(d) *Aircraft 35-509 and Subsequent, 36-054 and Subsequent*, on current limiter panel connector P702 pin C to ground.

(16) Correct any defective circuits and repeat steps 3.B.(14) and 3.B.(15).

(17) Set right Start/Generator Switch to OFF. Set Battery Switches to OFF.

(18) *On Aircraft 35-002 thru 35-508, 36-002 thru 36-053*, reinstall current limiter (FL46). *On Aircraft 35-509 and Subsequent, 36-054 and Subsequent*, reset (close) circuit breaker CB204.

(19) Pull (open) squat switch circuit breaker.

(20) Set Battery Switches to ON and momentarily turn right Start/Generator Switch to START. While in the start mode, measure battery voltage at left voltage regulator connector P381 pin A to ground.
(21) Reset (close) squat switch circuit breaker. Set right Start/Generator Switch to GEN. Measure zero voltage at left voltage regulator connector P381 pin A to ground.
(22) Set left Start/Generator Switch to OFF. Set Battery Switches to OFF. Connect electrical connector (P382) to left and right voltage regulators.

C. Operational Check of Voltage Regulating System - Engine Running

NOTE:
- Start both engines. (Refer to Airplane Flight Manual for starting procedures.)
- Fifteen minutes minimum warm-up time after generators are loaded is required for voltage regulators and any aircraft electrical loading between 100 and 320 amperes is permissible.
- If voltage does not fall within specified tolerances, or if the generator load-sharing difference is greater than 25 amperes and it has been determined that the source of the problem is not elsewhere, the voltage regulators can be adjusted per step 3, this section.

(1) Set bleed air switches to OFF. *On Aircraft 35-148 and Subsequent and 36-036 and Subsequent*, pull (open) squat switch circuit breaker.
(2) Set L Start/Generator Switch to GEN and R Start/Generator Switch to OFF.
(3) Set RH engine rpm to idle.
(4) Check voltage *(Aircraft 35-002 thru 35-508 and 36-002 thru 36-053)*.
(a) Connect multimeter (Fluke Model 8020A) to LH voltage regulator test point TP1 (red). Set LH engine to 70% N2 rpm. Read and record voltage. The voltage at regulator test point TP1 shall be 28.5 (± 0.3) volts.
(b) *On Aircraft 35-148 thru 35-508 and 36-036 thru 36-053*, reset squat switch circuit breaker. Voltage at LH regulator test point shall be 26 to 28 volts. Pull (open) squat switch circuit breaker.
(c) Reduce LH engine rpm to idle. Remove multimeter from LH voltage regulator and connect to generator control panel electrical Stud 5 or Stud B. Set LH engine to 70% N2 rpm. Adjust electrical load for cockpit ammeter reading between 100 and 150 amperes. Read and record voltage.

WARNING: THE AIRCRAFT AIR CONDITIONING SYSTEM, AUXILIARY CABIN HEATERS (IF INSTALLED), CABIN LIGHTS OR INVERTERS MAY BE UTILIZED TO OBTAIN THE 100 TO 150 AMPERE LOAD. EXTREME CAUTION SHOULD BE USED IF AIR CONDITIONER UNIT IS USED WHILE WORKING IN THE TAILCONE AREA.

1) The voltage at Stud 5 shall be 28.3 (±0.4) vdc. The difference between this reading and reading in step 3.C.(4)(a) shall not exceed 0.3 vdc.

(d) Reduce LH engine rpm to idle. Set R Start/Generator Switch to GEN and set L Start/Generator Switch to OFF.
(e) Connect multimeter (Fluke Model 8020A) to RH voltage regulator test point TP1 (red). Set RH engine to 70% N2 rpm. Read and record the voltage. The voltage at regulator test point TP1 shall be 28.5 (± 0.3) vdc.
(f) *On Aircraft 35-148 thru 35-508 and 36-036 thru 36-053*, reset squat switch circuit breaker. Voltage at RH regulator shall be 26 to 28 volts. Pull (open) squat switch circuit breaker.
(g) Reduce RH engine rpm to idle. Remove multimeter from RH voltage regulator and connect to generator control panel electrical Stud 6 or Stud A. Set RH engine 70% N2 rpm. Electrical load between 100 and 150 amperes, read and record voltage.

1) The voltage at Stud 6 shall be 28.5 (±0.3) vdc. The difference between this reading and reading in step 3.C.(4)(e) shall not exceed 0.3 vdc.

(h) Reduce RH engine rpm to idle. Remove multimeter.

(5) Check Voltage *(Aircraft 35-509 and Subsequent and 36-054 and Subsequent)*.

(a) Connect multimeter (Fluke Model 8020A) to LH voltage regulator test point TP1 (red). Set LH engine to 70% N2 rpm. Read and record voltage.

1) The voltage at regulator test point shall be 28.5 (± 0.3) vdc.

(b) Reduce LH engine rpm to idle. Remove multimeter from LH voltage regulator and connect to LH generator Terminal B(+) and Terminal E(-). Set LH engine to 70% N2 rpm. Adjust electrical load for cockpit ammeter reading between 100 and 150 amperes. Read and record voltage.

WARNING: THE AIRCRAFT AIR CONDITIONING SYSTEM, AUXILIARY CABIN HEATERS (IF INSTALLED), CABIN LIGHTS OR INVERTERS MAY BE UTILIZED TO OBTAIN THE 100 TO 150 AMPERE LOAD. EXTREME CAUTION SHOULD BE USED IF AIR CONDITIONER UNIT IS USED WHILE WORKING IN THE TAILCONE AREA.

1) The voltage reading at generator Terminals B and E shall be higher than voltage reading at voltage regulator in step 3.C.(5)(a) and 3.C.(5)(d) by the following amount:

LOAD AMPERES	VOLTAGE READING DIFFERENCE
100 to 110 Amps	0.380 to 0.627
110 to 120 Amps	0.427 to 0.675
120 to 130 Amps	0.475 to 0.723
130 to 140 Amps	0.523 to 0.771
140 to 150 Amps	0.571 to 0.819

NOTE: If the voltage difference is greater than defined, check the condition of the electrical terminal (swaging, distortion, and cleanliness) on the four gauge wires.

(c) Reduce LH engine rpm to idle. Set R Start/Generator Switch to GEN and set L Start/Generator Switch to OFF.

(d) Connect multimeter (Fluke Model 8020A) to RH voltage regulator test point TP1 (red). Set RH engine to 70% N2 rpm. Read and record voltage. The voltage at regulator test point shall be 28.5 (± 0.3) volts.

(e) Reduce RH engine rpm to idle. Remove multimeter from RH voltage regulator and connect to RH generator terminal B(+) and E(-). Set RH engine to 70% N2 rpm. Adjust electrical load for cockpit ammeter reading between 100 and 150 amperes. Read and record voltage.

1) The difference between the voltage reading at generator Terminals B and E and voltage reading in step 3.C.(5)(d) shall be an amount listed in step 3.C.(5)(b)1).

(f) Reduce RH engine rpm to idle. Remove multimeter.

(6) Set L Start/Generator Switch to GEN. Increase RH engine to 80% N2 rpm, and increase LH engine to 80% N2 rpm while observing load sharing on cockpit ammeters. Load on one generator shall be within 25 amperes of the other.

(7) Reduce both LH and RH engines N2 rpm to 65% N2 rpm and observe load sharing on cockpit ammeters. Load on one generator shall be within 25 amperes of the other.

D. Operational Check of Voltage Regulating System - Generator Reset Check
   (1) Both engines at idle.
      (a) Turn off all electrical and avionic systems.
      (b) Pull (open) the pilot and copilot essential bus circuit breakers.
      (c) Pull (open) the pilot and copilot AC bus circuit breakers.
   (2) Set Battery Switches to OFF.
      (a) Observe that both generators have current output at 28 vdc.
   (3) Set L Start/Generator Switch and R Start/Generator Switch to OFF.
      (a) Observe that both generators have zero current output and voltage is less than 5.0 vdc.
   (4) Set R Start/Generator Switch to GEN.
      (a) Observe that right generator output is approximately zero and voltage is less than 5.0 vdc.
   (5) Momentarily depress the R Generator Reset Switch.
      (a) Observe that the right generator ammeter indicates load current and the voltmeter indicates 28 vdc.
      (b) Set R Start/Generator Switch to OFF.
   (6) Set L Start/Generator Switch to GEN.
      (a) Observe that left generator current is approximately zero and voltage is less than 5 vdc.
   (7) Momentarily depress the L Generator Reset Switch.
      (a) Observe that the left generator ammeter indicates load current and the voltmeter indicates 28 vdc.
   (8) Set Battery Switches ON. Set R Start/Generator Switch to GEN.
   (9) Reset circuit breakers opened in steps 3.D.(1)(b) and 3.D.(1)(c).
   (10) Operational check of voltage regulating system complete.

LOAD CURRENT (Amps)			Engine RPM % N_2	VOLTAGE REGULATOR TEST POINTS		EQUALIZER Volts D to GND	
Req'd	Actual Ind	Actual Calc		Required	Actual	Required	Actual
50			52	28.5 (± 0.3)			
100			52				
200			52				
50			67			0.25 ± .02	
100			67			0.25 ± .02	
150			67			0.75 ± .025	
200			67			1.0 ± .03	
250			67	28.5 (± 0.3)		1.25 ± .03	

TABLE ONE
Left-hand Voltage Regulator Adjust

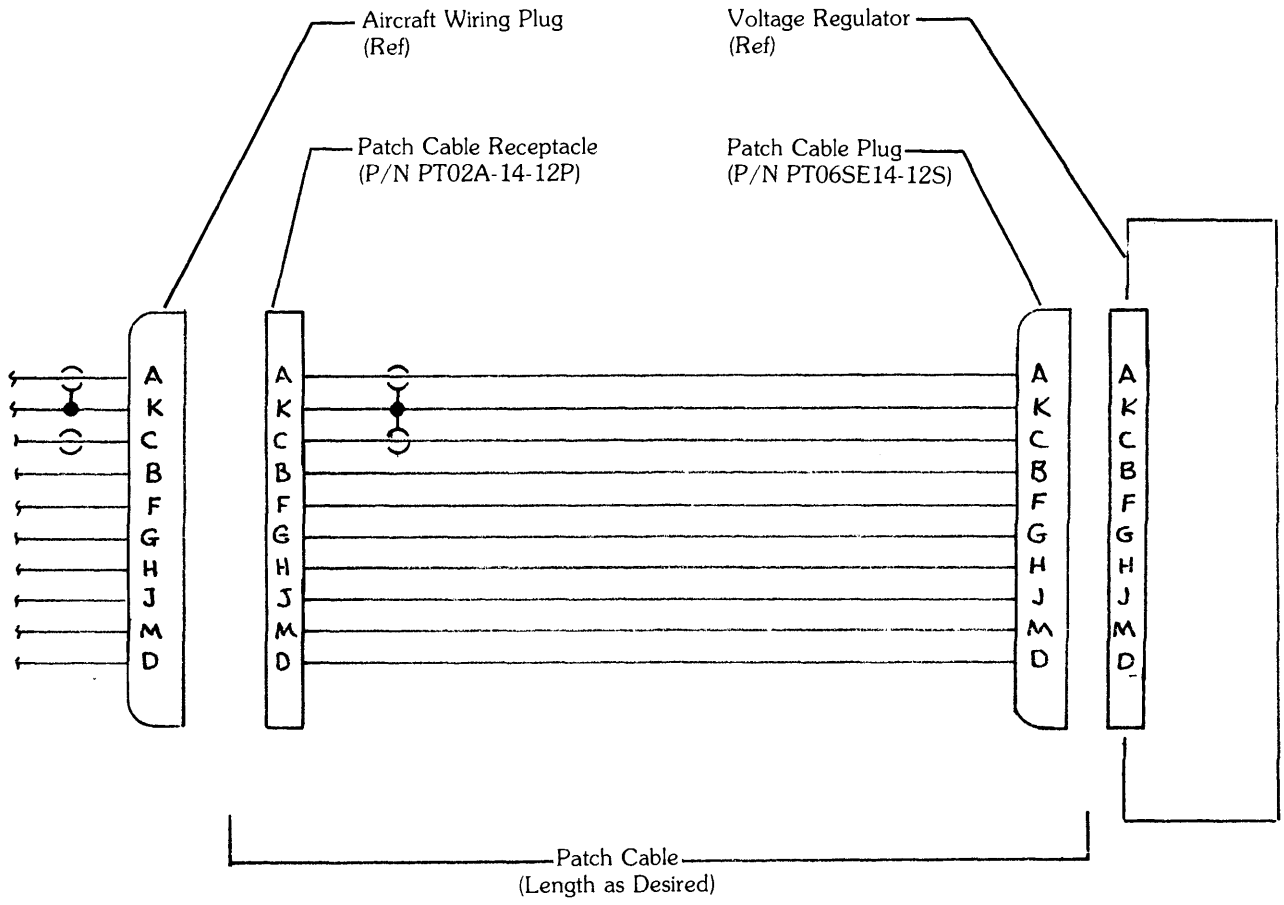
LOAD CURRENT (Amps)			Engine RPM % N_2	VOLTAGE REGULATOR TEST POINTS		EQUALIZER Volts D to GND	
Req'd	Actual Ind	Actual Calc		Required	Actual	Required	Actual
50			52	28.5 (± 0.3)			
100			52				
200			52				
50			67			0.25 ± .02	
100			67			0.25 ± .02	
150			67			0.75 ± .025	
200			67			1.0 ± .03	
250			67	28.5 (± 0.3)		1.25 ± .03	

TABLE TWO
Right-hand Voltage Regulator Adjust

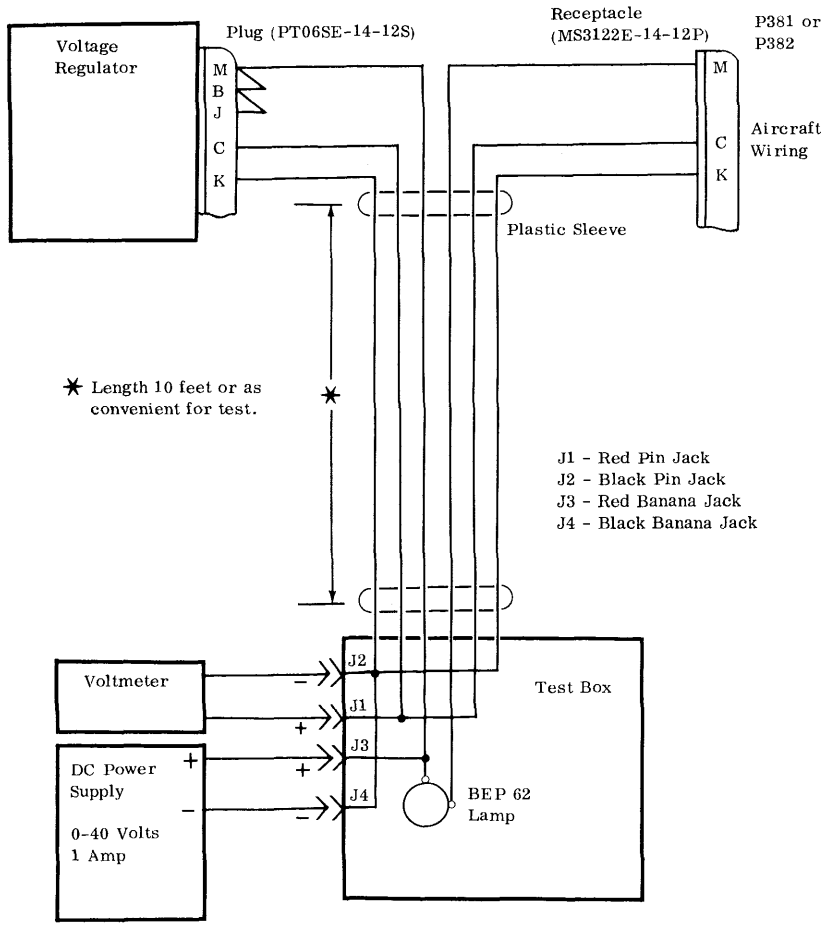
MAXIMUM LOAD CURRENT READINGS		**DIFF. IN RIGHT TO LEFT READINGS**
R Ammeter	**L Ammeter**	**Ammeters**

TABLE THREE
Load Division - Both Generators On Line

Voltage Regulator Adjustment
Figure 202 (Sheet 1 of 2)



Voltage Regulator Adjustment
Figure 202 (Sheet 2 of 2)



Overvoltage Monitor Test Adapter
Figure 203

DC OVERLOAD SENSORS - MAINTENANCE PRACTICES

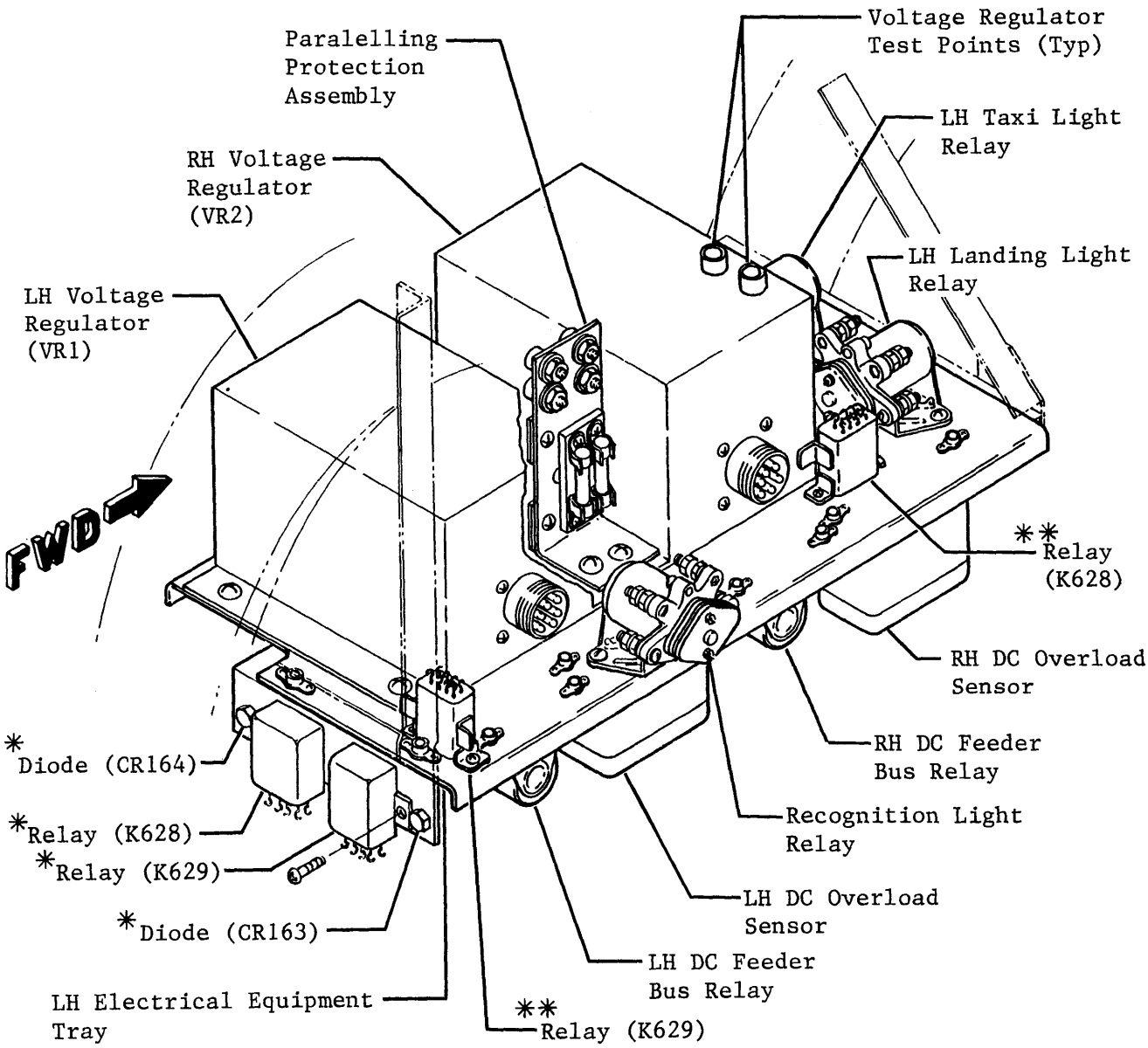
1. REMOVAL/INSTALLATION

A. Remove Overload Sensors (See figure 201.)

(1) Lower tailcone access door and remove electrical power from aircraft.
(2) Remove attaching parts and overload control sensor cover.
(3) Disconnect electrical wiring from overload control sensor. Tag electrical wiring.
(4) Remove attaching parts and overload control sensor from aircraft.

B. Install Overload Sensors (See figure 201.)

(1) Install overload control sensor and secure with attaching parts.
(2) Remove tags and connect electrical wiring to overload control sensor and install cover.
(3) Restore electrical power to aircraft.
(4) Perform functional check of DC generation. (Refer to 24-31-00.)
(5) Secure tailcone access door.



* 35-083 and Subsequent and 36-021 and Subsequent and prior Aircraft modified per AMK 76-6, "Separation of Voltage Regulator and Generator Excitation Circuit"

** 35-002 thru 35-082 and 36-002 thru 36-020 not modified per AMK 76-6, "Separation of Voltage Regulator and Generator Excitation Circuits"

9-93A
9-192B

Overload Sensor Installation
Figure 201

FEEDER BUS RELAYS - MAINTENANCE PRACTICES

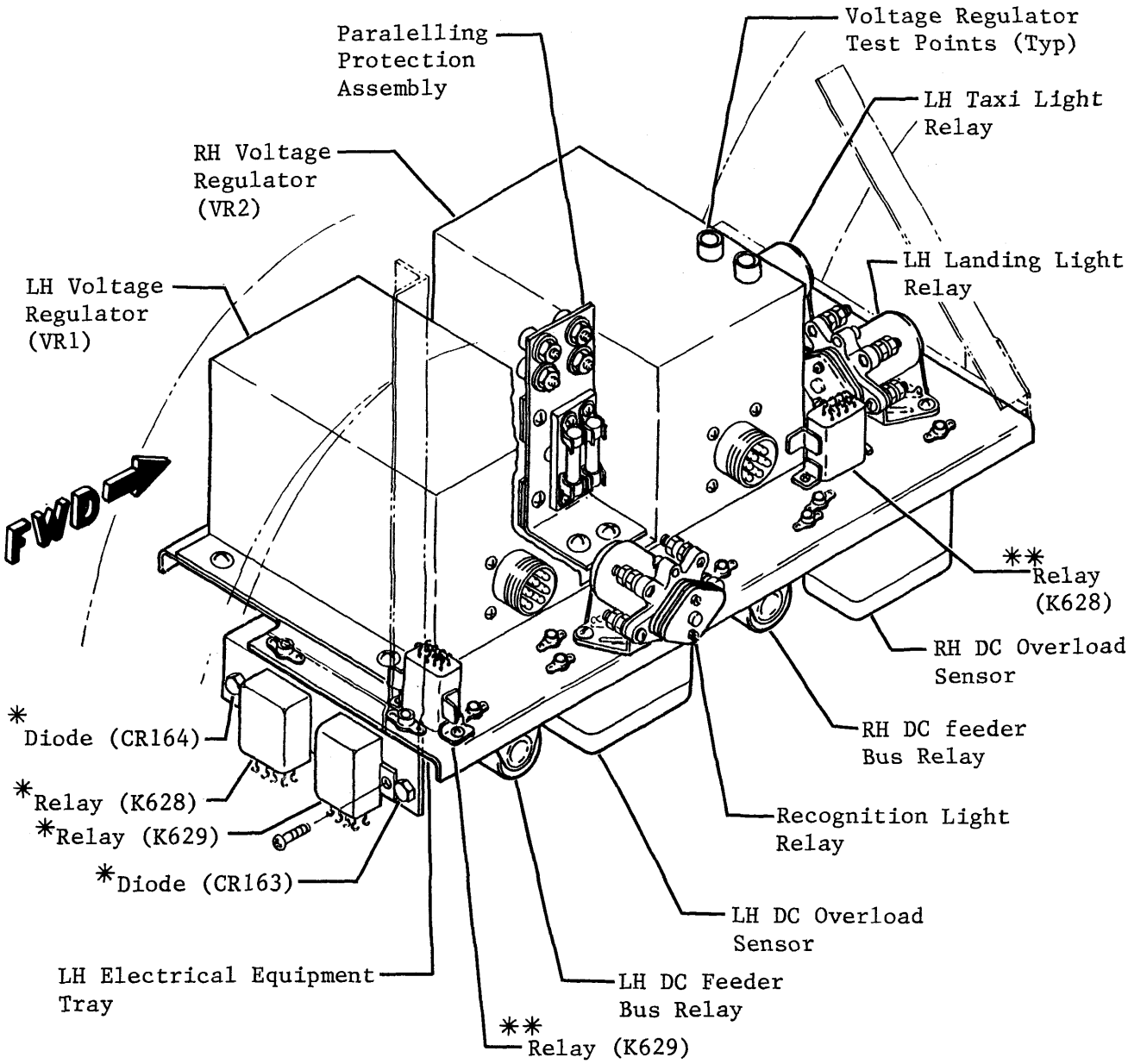
1. REMOVAL/INSTALLATION

A. Remove Feeder Bus Relay (See figure 201.)

(1) Lower tailcone access door.
(2) Remove electrical power from aircraft.
(3) Disconnect electrical wiring from relay. Tag wiring.
(4) Remove attaching parts and relay from aircraft.

B. Install Feeder Bus Relay (See figure 201.)

(1) Install relay and secure with attaching parts.
(2) Remove tags and connect electrical wiring.
(3) Restore electrical power to aircraft.
(4) Perform operational check of DC generation system. (Refer to 24-31-00.)
(5) Secure tailcone access door.



* 35-083 and Subsequent and 36-021 and Subsequent and prior Aircraft modified per AMK 76-6, "Separation of Voltage Regulator and Generator Excitation Circuit"

** 35-002 thru 35-082 and 36-002 thru 36-020 not modified per AMK 76-6, "Separation of Voltage Regulator and Generator Excitation Circuits"

9-93A
9-192B

Feeder Bus Relay Installation
Figure 201

INDICATOR - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   A. **Remove Indicators**

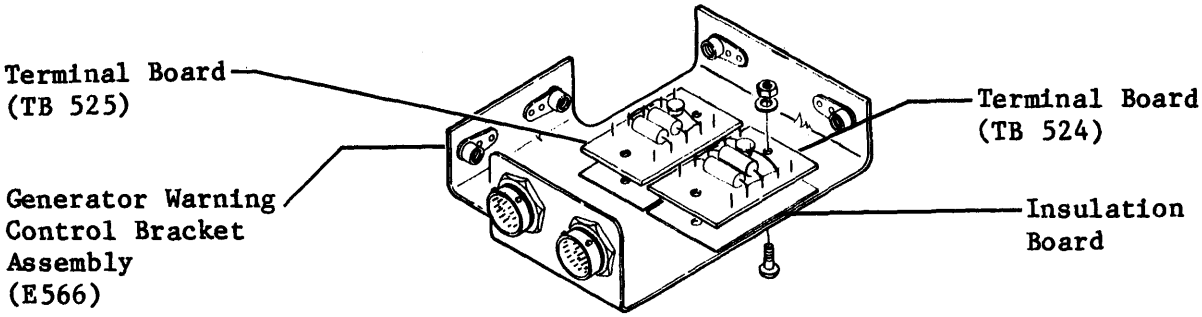
      NOTE: The voltmeter and ammeters are installed in the same instrument cluster on the instrument panel. Removal and installation procedures are identical, except for removal of applicable attaching screw of each indicator.

      (1) Loosen screw in upper RH corner of applicable instrument.
      (2) Remove instrument from cluster sufficiently to disconnect electrical connector.

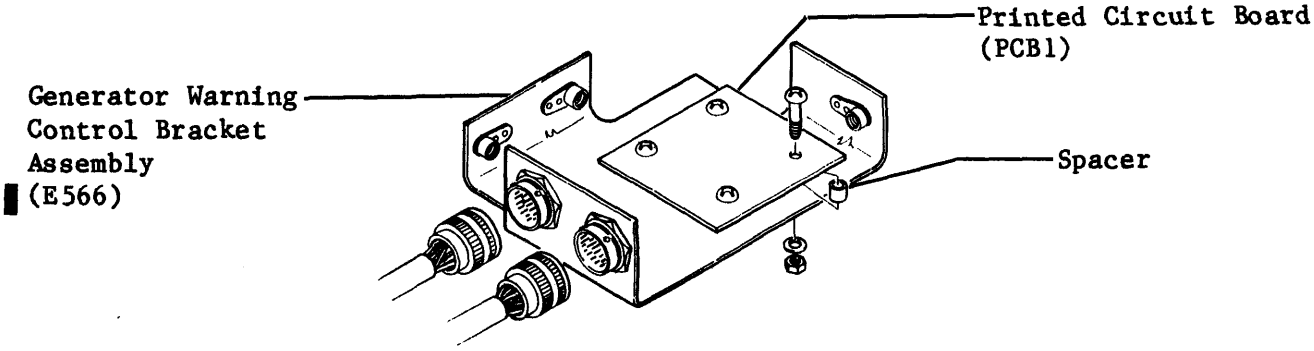
   B. **Install Indicator**
      (1) Connect electrical connector to instrument.
      (2) Install indicator in cluster and secure with screw.

GENERATOR WARNING CONTROL BOX - MAINTENANCE PRACTICES

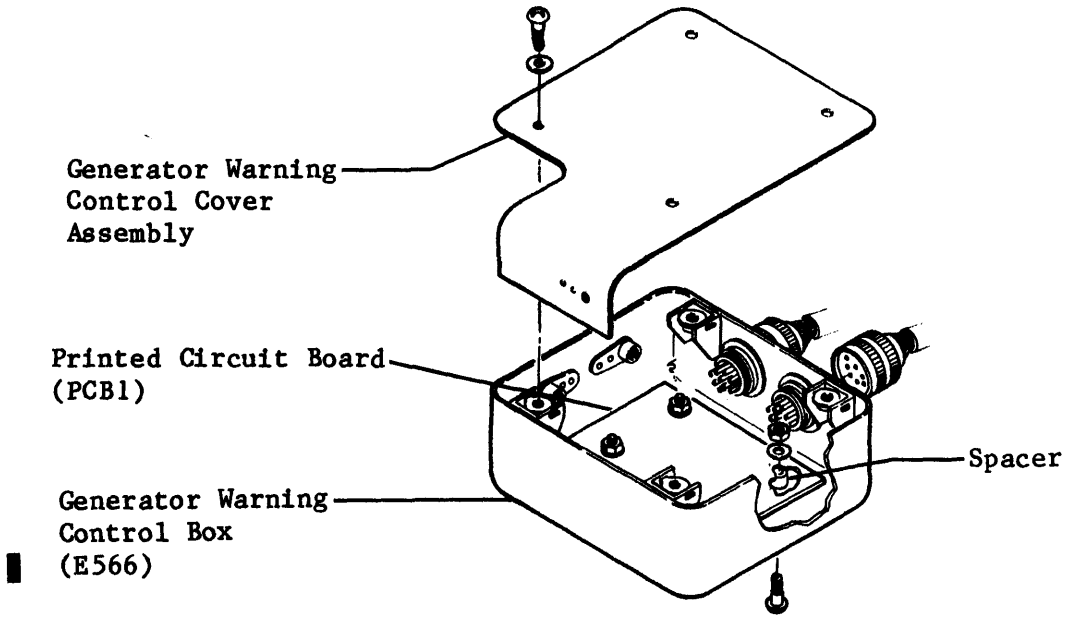
1. **REMOVAL/INSTALLATION**
   - **A. Remove Generator Warning Control Box** (See figure 201.)
     - (1) Lower tailcone access door.
     - (2) Remove electrical power from aircraft.
     - (3) Disconnect electrical connectors from generator warning control box.
     - (4) Remove attaching parts and generator warning control box from aircraft.
   - **B. Install Generator Warning Control Box** (See figure 201.)
     - (1) Install generator warning control box and secure with attaching parts.
     - (2) Connect electrical connectors to generator warning control box.
     - (3) Restore electrical power to aircraft.
     - (4) Close and secure tailcone access door.



Effective on Aircraft 35-028, 35-031 thru 35-082 and 36-014, 36-017 thru 36-020 when Modified per AMK 76-6, "Separation of Voltage Regulator and Generator Excitation Circuit," and 35-083 thru 35-249, 36-021 thru 36-044.



Effective on Aircraft 35-250 thru 35-318, and 36-045.



Effective on Aircraft 35-320 and Subsequent and 36-046 and Subsequent. (Shown inverted for detail.)

Generator Warning Control Box Installation
Figure 201

GENERATOR NOISE FILTER - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Generator Noise Filter. (See figure 201.)
   (1) Remove electrical power from aircraft.
   (2) Remove applicable lower nacelle cover. (Refer to Chapter 71.)
   (3) Remove starter. (Refer to Chapter 80.)
   (4) Remove wing-nuts and caps from generator noise filter terminals.

CAUTION: TO PREVENT POSSIBLE NOISE FILTER FAILURE, ALWAYS RESTRAIN THE OUTER STUD RETAINING NUT FROM ROTATING WHEN REMOVING OR INSTALLING THE TERMINAL RETAINING NUT.

   (5) Loosen and remove nut, lockwasher, and wiring from generator noise filter terminals. Tag and insulate wiring.
   (6) Disconnect filter cable from generator.
   (7) Loosen and remove attaching screws and generator noise filter from bracket assemblies.

B. Install Generator Noise Filter (See figure 201.)
   (1) Position generator noise filter on bracket assemblies and secure with attaching screws. Check electrical resistance between noise filter and aircraft structure. Resistance shall not exceed 0.0015 ohm maximum.
   (2) Connect filter cable to terminal B on generator.

CAUTION: TO PREVENT POSSIBLE NOISE FILTER FAILURE, ALWAYS RESTRAIN THE OUTER STUD RETAINING NUT FROM ROTATING WHEN REMOVING OR INSTALLING THE TERMINAL RETAINING NUT.

   (3) Remove tags and insulation and connect wiring to filter terminals and secure with washers, lockwashers, and nuts.

NOTE: Torque positive terminal nut to 150 inch-pounds. Torque negative terminal nut to 7 to 9 inch-pounds.

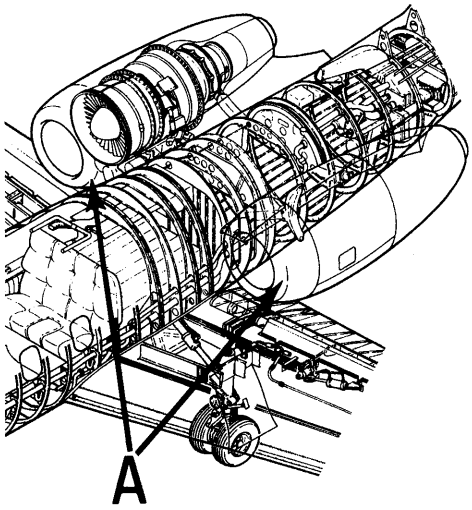
   (4) Position caps on filter terminals and secure with wing nuts.
   (5) Install starter. (Refer to Chapter 80.)
   (6) Perform operational check of generator noise filter. (Refer to paragraph 2., Inspection/Check.)
   (7) Install applicable lower nacelle cover. (Refer to Chapter 71.)

2. Inspection/Check

A. Operational Check of Generator Noise Filter
   (1) Restore electrical power to aircraft and activate GNS 500/1000 system.
   (2) Observe the quality and quantity of Omega stations received prior to engine run.

NOTE: Perform reception check on aircraft battery power in a location away from electrical noise interference.

   (3) Start engines. (Refer to Airplane Flight Manual.)
   (4) Operate engines with single and parallel generators at idle N2 RPM and 92.2 percent N2 RPM. There shall not be any decrease in quality or quantity of received Omega stations.
   (5) Turn off GNS 500/1000 system.
   (6) Shut down engines. (Refer to Airplane Flight Manual.)
   (7) Remove electrical power from aircraft.

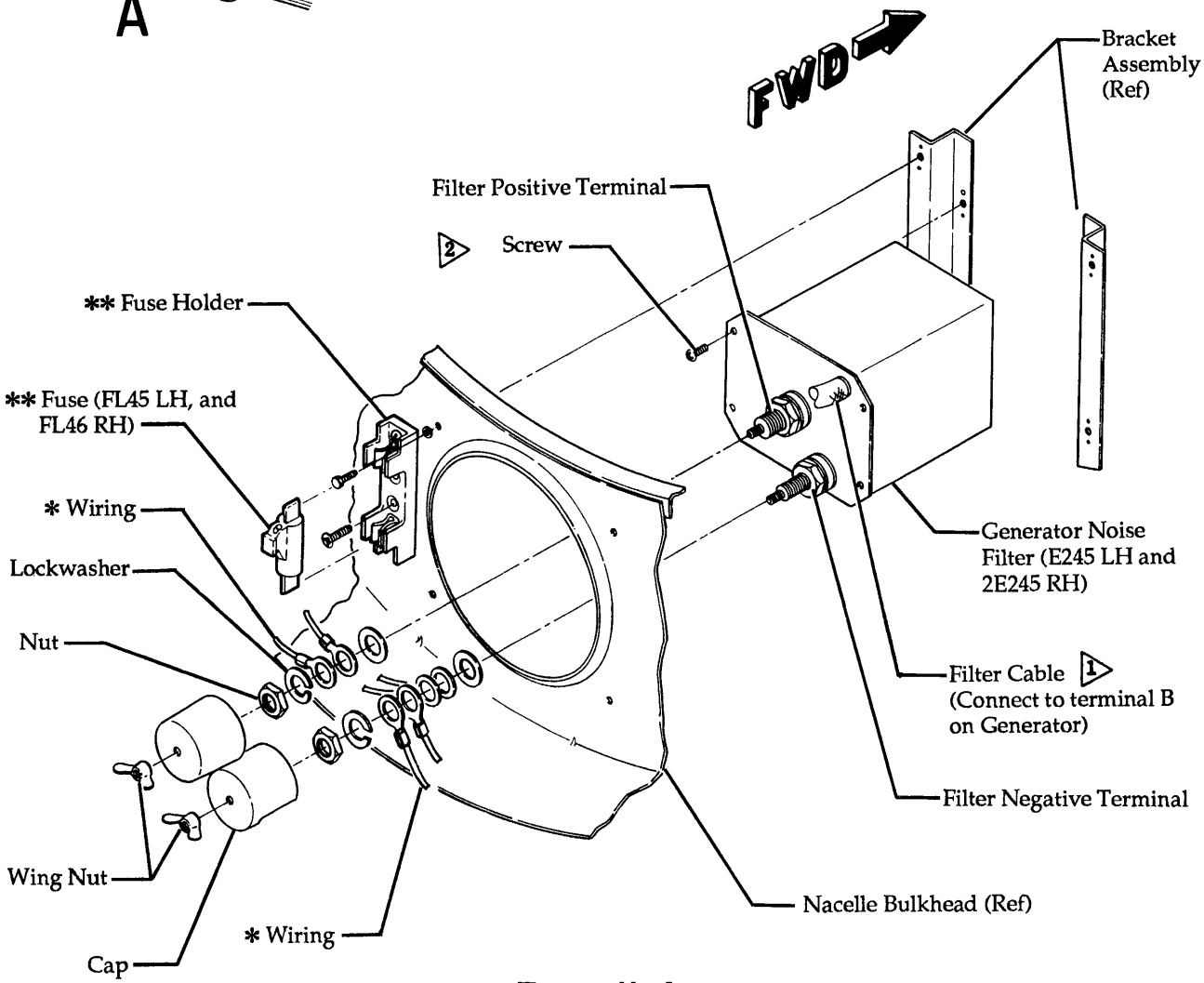


* Refer to Wiring Manual for wiring connections.

** On Aircraft 35-002 thru 35-508 and 36-002 thru 36-053, not modified per AMK85-1, "Electrical Power Distribution Improvement," FL45 and FL46 are relocated from generator to nacelle bulkhead when generator noise filter is installed.

1 A minimum clearance of 0.12 inch shall exist between filter cable and starter. Adjust clamps for clearance.

2 Maximum allowable resistance between filter and aircraft structure is 0.0015 ohm. Refer to Wiring Manual, Chapter 20 for electrical bonding procedure.



Detail A

Generator Noise Filter Installation
Figure 201

BATTERY SYSTEM - DESCRIPTION AND OPERATION

1. Description

A. Nickel-Cadmium Batteries

(1) Battery power is supplied by two 19- or 20-cell nickel cadmium batteries. The batteries are installed in the tailcone.

(2) Batteries are normally shipped in a discharged state, complete with proper electrolyte level. It is necessary to charge a battery to prepare it for service. No adjustment of liquid level will be necessary even though occasionally no liquid level is visible. The initial charge will cause the liquid to rise to proper level.

CAUTION: **SOME BATTERIES ARE SHIPPED WITH SHIPPING PLUGS IN THE FILL VENTS. IN THIS CASE, THE PROPER VENT VALVES ARE WITH THE BATTERY. BE SURE TO REMOVE SHIPPING PLUGS AND INSTALL VENT VALVES AFTER UNPACKING. SHIPPING PLUGS MUST BE REMOVED PRIOR TO CHARGING OR DISCHARGING.**

(3) The batteries can be stored indefinitely in the discharged state. Storage in any state of charge does not damage the cells, but the battery will slowly become discharged. The higher the existing temperature, the faster the self-discharge. At normal temperature, the battery will deliver at least 85% of its rated capacity after 2 weeks of storage. It is recommended that a charged battery stored in excess of 2 months be charged prior to use. (Refer to Chapter 12 for servicing instructions.)

(4) Each battery consists of a stainless steel case containing 19 or 20 cells and a removable cover.

NOTE: Marathon batteries marked Type TCA-5 have 19-cells. Type TCA-5-20 and TCA-5-20-1 have 20 cells.

(5) The batteries are vented overboard through hoses connected to the battery case vent ports and overboard vents. The overboard vents are scarfed to produce an airflow through the batteries to aid battery venting. The right drain is scarfed aft while the left drain is scarfed forward.

(6) The battery system also incorporates a battery overheat warning system. The system consists of two thermoswitches (Lo-Limit and Hi-Limit) installed in each battery and two battery temperature warning annunciators. The annunciators are installed in the glareshield.

(7) The optional temperature indicating system consists of a dual indicator mounted on the copilot's switch panel or in the center pedestal, a circuit breaker located on the copilot's circuit breaker panel, and a temperature thermistor located in each battery.

(8) The gas vent holes in the vent valves must be kept clear during battery operation or serious damage can be caused to the battery and other equipment in the aircraft.

(9) The battery life in the aircraft is greatly controlled by the voltage regulator in the following manner:

(a) Should the voltage regulator overcharge the battery, the electrolyte will boil out through the vent valves and excessive sluffing of active material from the plates will occur, resulting in a premature failure.

(b) Should the voltage regulator undercharge the battery, the capacity of the battery will be lower and the plates will become sulphated, reducing the capacity of the battery.

(10) To extend the service life of the nickel-cadmium battery, proper servicing should be maintained. (Refer to Chapter 12 for servicing instructions.) The batteries should be removed from the aircraft and put through a complete discharge and recharge cycle in accordance with Chapter 12 and current inspection intervals in Chapter 5.

B. Lead-Acid Batteries

(1) Aircraft battery power is supplied by two lead-acid batteries. The batteries are installed in the tailcone equipment section of the aircraft.

(2) The case of the lead-acid battery is constructed of plastic to conserve weight and must be handled with care to prevent damage to the case.

(3) The battery contains twelve cells which are interconnected to provide the required voltage output.

(4) The cells are filled with an electrolyte (diluted sulphuric acid) to provide a path for electron flow during charging and discharging of the battery.

(5) The battery case contains two vents, one on each side of the case. The vents are used to expel the hydrogen gas from the battery during charging and discharging of the battery. The vents also provide a drain for electrolyte spillage or overflow.

(6) *On Aircraft 35-431 and Subsequent, 36-050 and Subsequent and prior Aircraft modified per AMK 81-5, "Modification of Lead Acid Battery Vent System,"* a battery sump jar assembly has been added to the battery vent system. Located on the aft side of the battery installation at approximately WL 38 and RBL 5, the battery sump jar assembly contains bicarbonate of soda, and is utilized in the neutralization of any electrolyte spillage, overflow or hydrogen gas, expelled from the batteries through the vent system.

(7) The battery is shipped in a dry charged state and will deliver a minimum of 75% of its rated capacity after the initial filling of electrolyte without further charging. Batteries should be given a booster charge prior to use.

(8) Batteries in the dry state can be stored indefinitely if the batteries are kept clean and in a dry area at temperatures not exceeding 80° F (26.7° C).

(9) The specific gravity of the electrolyte shall read between 1.285 and 1.295 on a hydrometer when the battery is fully charged.

(10) To obtain maximum efficiency and extend the service life of the lead-acid battery, the battery must be kept clean and at or near full charge, and the electrolyte must be kept at the proper level.

(11) As the battery charges or discharges, the electrolyte will tend to heat and cause the water within the electrolyte to evaporate. It is very important to keep the electrolyte at the proper level.

(12) Should the battery be allowed to stay in an uncharged condition, or without the proper electrolyte level, the plates in the battery will become sulphated. The lead sulphate is a crystaline formation and limits the capacity of the battery. A battery in this condition never fully recovers.

(13) An idle battery will lose some of its charge and for that reason should be thoroughly charged at regular intervals.

(14) Low electrolyte temperatures temporarily reduce the battery capacity, causing the battery to perform as if it were a lower-rated battery.

2. Operation

A. Nickel-Cadmium Batteries (See Figures 1 and 2)

(1) When a Battery Switch is set to BAT 1 or BAT 2, a ground circuit is completed to energize the battery relay. With the relay energized, battery power is applied to the battery charging bus.

(2) The battery overheat warning system alerts maintenance crews or the pilot of an impending battery overheat, allowing corrective action to be taken. If battery temperature reaches 140° F, the Lo-Limit temperature switch energizes the BAT 140 (red) warning light. If battery temperature reaches 160° F, the Hi-Limit temperature switch energizes the BAT 160 (red) warning light. If at any time during flight or ground operation, including engine start, either overheat warning light comes on, the batteries must be removed from the aircraft and the discharge-recharge reconditioning cycle must be performed. (Refer to Chapter 12.) *On Aircraft equipped with the optional battery temperature indicator system*, the overheated battery may be isolated from the system by setting its respective Battery Switch to OFF.

(3) The battery temperature indicator face is divided into thirds by two white lines. The lower third indicates a battery temperature of 100° F to 140° F, the center third indicates 140° F. and the upper third indicates 160° F to 200° F. If the temperature of either battery goes above 140° F (into center third on the indicator face), the BAT 140 light on the glareshield will illuminate. If battery temperature continues to rise and goes above 160° F (into upper third on indicator face), the BAT 160 light will also illuminate. By reading the indicator to determine which battery has malfunctioned, that battery may be isolated by setting its applicable Battery Switch to OFF.

(4) The BAT 140 and BAT 160 annunciators will not illuminate when the glareshield press-to-test button is depressed if:

(a) The wiring circuit to both battery 1 and 2 Lo-Limit and Hi-Limit switches is not complete.

(b) Either electrical connector (P449) or (P450) is not connected to the batteries.

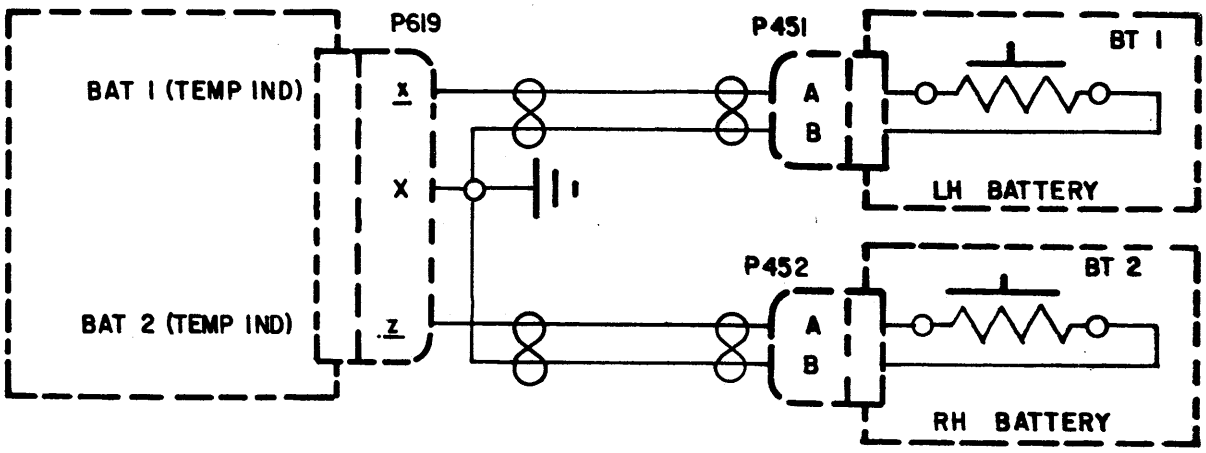
B. Lead-Acid Batteries

(1) Battery power is produced by the flow of electrons between the positive and negative plates in the battery by means of the aircraft DC electrical circuits.

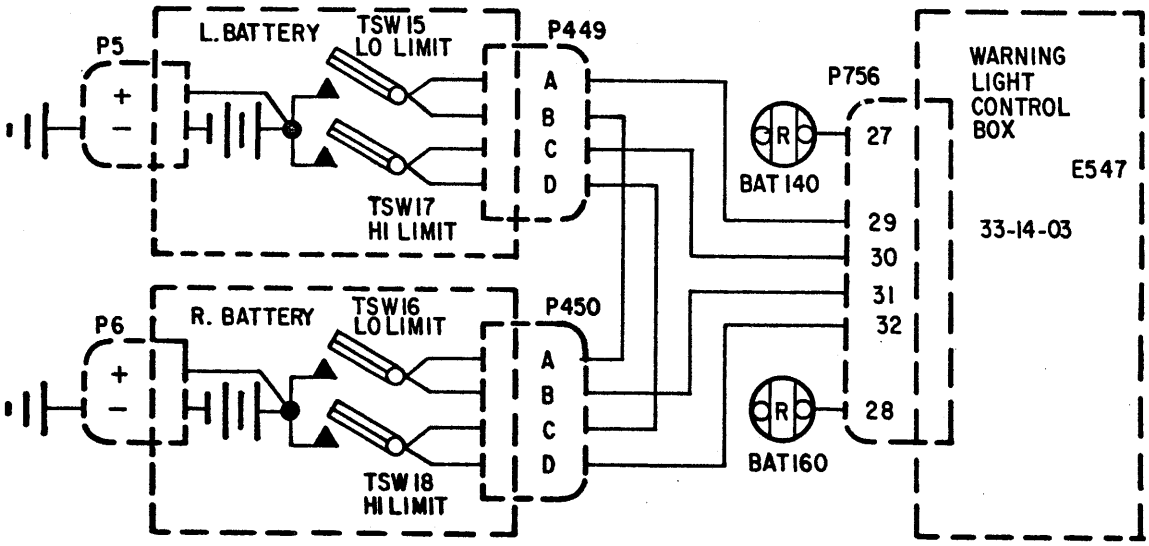
(2) The state of charge or battery capacity is a point of concern with lead-acid batteries. The state of charge is the physical as well as the chemical condition of the battery.

(3) Always charge the battery after water has been added to the electrolyte. This will prevent freezing of the water in cold temperatures and damage to the battery.

NOTE: A fully charged battery will not freeze.



Battery Temperature System Electrical Control Schematic
Figure 1



Battery Overheat Warning Electrical Control Schematic
Figure 2

BATTERY SYSTEM - TROUBLE SHOOTING

1. Trouble Shooting

A. Trouble shooting procedures consist basically of isolating trouble to either the batteries or to aircraft wiring.

B. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following items:

NAME	PART NUMBER	MANUFACTURER	USE
Voltmeter	3430A	Hewlett Packard	To check voltage and continuity of circuits.
Voltmeter	260	Simpson	To check voltage and continuity of circuits.

1. **Battery Maintenance Precautions (Nickel-Cadmium Batteries)**
   A. The following must be strictly adhered to for the safety of personnel, batteries, aircraft and equipment.

WARNING:

- PROTECTIVE CLOTHING SUCH AS: RUBBER GLOVES, APRON AND FACE SHIELD SHALL BE WORN WHEN SERVICING OR CLEANING BATTERIES.
- REMOVE RINGS, WATCHES, BRACELETS AND OTHER METAL OBJECTS BEFORE PERFORMING BATTERY MAINTENANCE. METAL OBJECTS MAY FUSE TO CONNECTORS AND CAUSE SEVERE SKIN BURNS.
- ALKALINE ELECTROLYTE IS HARMFUL TO SKIN. NEUTRALIZE THE AFFECTED AREA IMMEDIATELY AND RINSE WITH CLEAN WATER.
- ELECTROLYTE SPLASHED INTO EYES IS EXTREMELY DANGEROUS. IF THIS OCCURS, FORCE EYE OPEN AND NEUTRALIZE THE ELECTROLYTE. CALL A DOCTOR IMMEDIATELY. DO NOT ADD EYE DROPS OR OTHER MEDICATION UNLESS ADVISED TO DO SO BY THE DOCTOR. BE SURE TO ADVISE PHYSICIAN THAT ELECTROLYTE WAS ALKALI, NOT ACID.
- AVOID THE USE OF UNINSULATED TOOLS. SEVERE ARCING MAY RESULT WITH POSSIBLE PERSONNEL INJURY AND DAMAGE TO TOOLS AND THE BATTERY CELL OR CELLS.
- HYDROGEN AND OXYGEN GASES, PRODUCED DURING AND AFTER CHARGING, MAY FORM A HIGHLY EXPLOSIVE ATMOSPHERE. TURN BATTERY CHARGER OFF BEFORE CONNECTING OR DISCONNECTING BATTERY TO PREVENT SPARKS. AVOID OPEN FLAMES AND SPARKS IN THE BATTERY AREA.
- BATTERY CHARGING AREA MUST BE WELL VENTILATED.
- DO NOT USE A WIRE BRUSH TO CLEAN BATTERY CELLS. USE A BRISTLE BRUSH AND WATER. USE EXTREME CARE TO PREVENT MATERIAL FROM COMING INTO CONTACT WITH SKIN AND EYES. PROTECTIVE CLOTHING SHALL BE WORN. REMOVE BATTERIES FROM AIRCRAFT WHEN USING WATER.
- DO NOT USE ANY TOOLS, JARS, OR INSTRUMENTS IN COMMON WITH ACID BATTERIES. ACID AND ALKALINE REACT VIOLENTLY WITH EACH OTHER AND SPLATTERING MAY OCCUR.
- REMOVE QUICK-DISCONNECTS FROM BOTH BATTERIES. IF ALL QUICK-DISCONNECTS ARE NOT REMOVED, BATTERY VOLTAGE WILL FEED BACK FROM REMAINING CONNECTED BATTERY AND ARCING MAY OCCUR.

CAUTION:

- AVOID CONTAMINATION. NICKEL-CADMIUM BATTERIES ARE OF THE ALKALINE TYPE AND REQUIRE ABSOLUTE INTERNAL CLEANLINESS.

CAUTION:
- ALKALINE ELECTROLYTE HAS A STRONG CORROSIVE EFFECT ON MOST METALS. IN CASE OF A SPILL, IMMEDIATELY NEUTRALIZE THE AREA. DO NOT FLUSH WITH WATER PRIOR TO NEUTRALIZING AS THIS WILL ONLY ENLARGE THE AREA OF CONTAMINATION. DO NOT NEUTRALIZE THE BATTERY.

- IF EVIDENCE OF ELECTROLYTE SPILL IS FOUND IN THE TAILCONE, THE AREA SHALL BE IMMEDIATELY NEUTRALIZED. THE CAUSE OF THE SPILL SHALL BE FOUND AND CORRECTED.

(1) A suitable electrolyte neutralizing solution for personnel and equipment may be made by mixing 6 ounces (177.4 ml) of boric acid to one gallon (3.785 liters) water or a solution of one part vinegar to 3 parts water.
(2) An alternate neutralizing solution suitable for the skin is one part vinegar to three parts water followed by washing with soap and water.

2. Battery Maintenance Precautions (Lead-Acid Batteries)
A. The following must be strictly adhered to for the safety of personnel, batteries, aircraft and equipment.

WARNING:
- PROTECTIVE CLOTHING SUCH AS: RUBBER GLOVES, APRON, AND FACE SHIELD SHALL BE WORN WHEN SERVICING OR CLEANING BATTERIES.

- REMOVE RINGS, WATCHES, BRACELETS AND OTHER METAL OBJECTS BEFORE PERFORMING BATTERY MAINTENANCE. METAL OBJECTS MAY FUSE TO CONNECTORS AND CAUSE SEVERE SKIN BURNS.

- SULPHURIC ACID IN BATTERY ELECTROLYTE WILL BURN SKIN. NEUTRALIZE ANY SPILLED ACID IMMEDIATELY AND THEN RINSE WITH CLEAR WATER.

- ELECTROLYTE SPLASHED INTO EYES IS EXTREMELY DANGEROUS. IF THIS OCCURS, FORCE EYE OPEN AND FLOOD WITH COOL, CLEAN WATER FOR APPROXIMATELY FIVE MINUTES. CALL A DOCTOR IMMEDIATELY. DO NOT ADD EYE DROPS OR OTHER MEDICATION UNLESS ADVISED TO DO SO BY THE DOCTOR.

- HYDROGEN AND OXYGEN GASES, PRODUCED DURING AND AFTER CHARGING, MAY FORM A HIGHLY EXPLOSIVE ATMOSPHERE. TURN BATTERY CHARGER OFF BEFORE CONNECTING OR DISCONNECTING BATTERY TO PREVENT SPARKS. AVOID OPEN FLAMES AND SPARKS IN THE BATTERY AREA.

- AVOID THE USE OF UNINSULATED TOOLS. SEVERE ARCING MAY RESULT WITH POSSIBLE PERSONNEL INJURY AND DAMAGE TO TOOLS AND THE BATTERY CELL OR CELLS.

- BATTERY CHARGING AREA MUST BE WELL VENTILATED.

- DO NOT USE ANY TOOLS, JARS, OR INSTRUMENTS IN COMMON WITH NICKEL-CADMIUM BATTERIES. ACID AND ALKALINE REACT VIOLENTLY WITH EACH OTHER AND SPLATTERING MAY OCCUR.

WARNING:
- WHEN MIXING ELECTROLYTE, ALWAYS POUR THE ACID INTO THE WATER WHILE SLOWLY AND CONTINUOUSLY STIRRING. DO NOT POUR WATER INTO ACID. USE ONLY GLASS, HARD RUBBER, OR GLAZED EARTHENWARE CONTAINERS FOR MIXING ELECTROLYTE.
- DO NOT USE A WIRE BRUSH TO CLEAN BATTERIES. USE A BRISTLE BRUSH. USE EXTREME CARE TO PREVENT MATERIAL FROM COMING INTO CONTACT WITH SKIN AND EYES. PROTECTIVE CLOTHING SHALL BE WORN.

CAUTION:
- REMOVE QUICK-DISCONNECTS FROM BOTH BATTERIES. IF ALL QUICK-DISCONNECTS ARE NOT REMOVED, BATTERY VOLTAGE WILL FEED BACK FROM REMAINING CONNECTED BATTERY AND ARCING MAY OCCUR.
- DO NOT USE FRESHLY PREPARED ELECTROLYTE UNTIL IT HAS COOLED TO AT LEAST 90° F (32° C). CONSIDERABLE HEAT IS GENERATED WHICH CAN DAMAGE THE BATTERY.
- TO NEUTRALIZE ANY SPILLED ELECTROLYTE, WIPE WITH A CLOTH DAMPENED WITH NEUTRALIZING SOLUTION.
- IF EVIDENCE OF ELECTROLYTE SPILL IS FOUND IN THE TAILCONE, THE AREA SHALL BE IMMEDIATELY NEUTRALIZED, FOLLOWED BY A CLEAR WATER RINSE. THE CAUSE OF THE SPILL SHALL BE FOUND AND CORRECTED.

(1) A suitable electrolyte neutralizing solution for personnel and equipment may be made by mixing a 5% bicarbonate of soda solution. (1 part bicarbonate of soda (baking soda) to 20 parts water).

3. **Removal/Installation**

A. Remove Batteries. (See Figure 201.)

WARNING: REMOVE THE QUICK-DISCONNECTS FROM BOTH BATTERIES EVEN THOUGH ONLY ONE BATTERY IS BEING REMOVED. BATTERY VOLTAGE WILL FEED BACK FROM THE CONNECTED BATTERY AND ARCING WILL OCCUR IF THE QUICK-DISCONNECT IS INADVERTENTLY SHORTED TO THE AIRCRAFT STRUCTURE.

CAUTION: INSTALL TERMINAL PROTECTOR OR PLACE ELECTRICAL TAPE OVER EXPOSED TERMINALS BEFORE REMOVING BATTERY FROM AIRCRAFT.

(1) Lower tailcone access door.
(2) Disconnect both battery quick-disconnects. Install terminal protector or tape over exposed terminals.
(3) Disconnect battery overheat warning system plug (nickel-cadmium batteries) located directly below battery quick-disconnect.
(4) Disconnect battery temperature indicator plug from nickel-cadmium batteries.
(5) Loosen clamps and remove vent hoses.
(6) Remove safety wire from bolts and keepers. Loosen and remove bolts and keepers from lid retainer.

CAUTION: DO NOT USE BATTERY RECEPTACLE AS HAND HOLD WHEN REMOVING BATTERY FROM AIRCRAFT. BATTERY DAMAGE COULD RESULT.

(7) Remove battery from aircraft.
(8) Clean battery compartment if required.

B. Install Batteries. (See Figure 201.)
(1) Inspect battery to assure that no damage has occurred during shipment. If new batteries are being put into service, refer to Chapter 12 for servicing procedures.
(2) Check all battery electrical connections for tightness (nickel-cadmium batteries).

CAUTION:
- POOR ELECTRICAL CONTACT COULD RESULT IN DAMAGE TO THE BATTERY.
- DO NOT USE BATTERY RECEPTACLE AS HAND HOLD WHEN INSTALLING BATTERY. BATTERY DAMAGE COULD RESULT.

(3) Position battery on battery support or tray.

CAUTION: DO NOT OVERTORQUE BOLTS. BOLTS SHALL BE TORQUED TO 10 INCH-POUNDS. IF OVERTORQUED, BOLTS WILL CAUSE BATTERY LID TO BOW SLIGHTLY, CAUSING IMPROPER VENTING.

(4) Install keepers and bolts on lid retainer. Torque bolts to 10 inch-pounds and secure with safety wire (MS20995-C20) to keepers.
(5) Connect vent hoses and secure with clamps.
(6) Connect battery overheat warning system and battery temperature indicator plugs (nickel-cadmium batteries).
(7) Remove terminal protector or tape, connect battery quick-disconnects and safety using 0.20 inch soft copper wire.
(8) Perform functional check of battery switching. (Refer to Inspection/Check, 24-31-00.)
(9) Perform press-to-test of glareshield annunciator panel and verify that BAT 140 and BAT 160 annunciators illuminate (nickel-cadmium batteries).
(10) Close and secure tailcone access door.

4. Cleaning/Painting
A. Clean Nickel-Cadmium Batteries.

NOTE: For aircraft equipped with SAFT batteries, refer to SAFT Operating and Maintenance Manual listed under Supplementary Publications in the Introduction to this manual.

(1) Remove batteries from aircraft. (Refer to Removal/Installation, this section.)

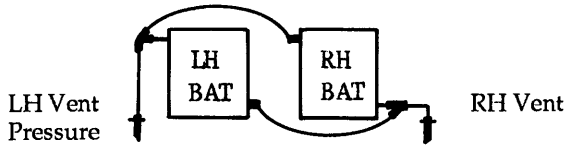
CAUTION: IN ORDER TO AVOID SHORTING, RESULTING IN POSSIBLE CELL DAMAGE, IT IS RECOMMENDED THAT THE BATTERIES BE DISCHARGED PRIOR TO DISASSEMBLY FOR CLEANING.

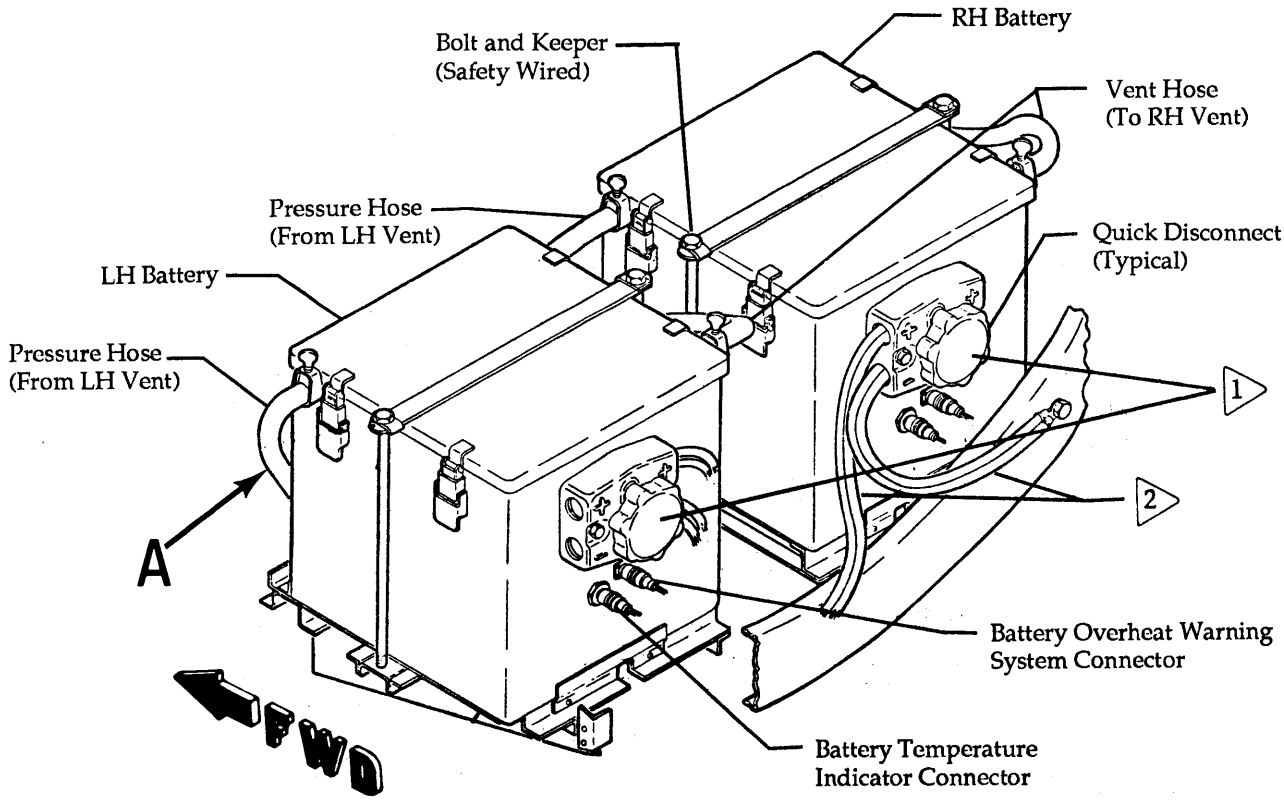
(2) Discharge batteries through a resistance high enough to permit a current flow of 20 or less amperes for 22 ampere-hour Marathon batteries (10 or less amperes for Gulton batteries), and 40 or less amperes for 40 ampere-hour Marathon batteries (17 or less amperes for Gulton batteries). When voltage is approximately 9.5 volts, place a shorting clip (8-gauge stranded wire, 6 inches long with insulated alligator clips) across each cell's terminals with the load applied. When 15 cells are shorted out, place a 1.0-ohm, 2-watt resistor across each of the remaining cells and allow the battery to remain shorted for 3 hours before removing the shorting straps and resistors.

1 CAUTION: DO NOT USE BATTERY RECEPTACLES AS HANDHOLDS WHEN REMOVING OR INSTALLING BATTERIES. BATTERY DAMAGE COULD RESULT.

2 MINIMUM BEND RADIUS OF BATTERY WIRES (4 AWG) IS 3 INCHES.

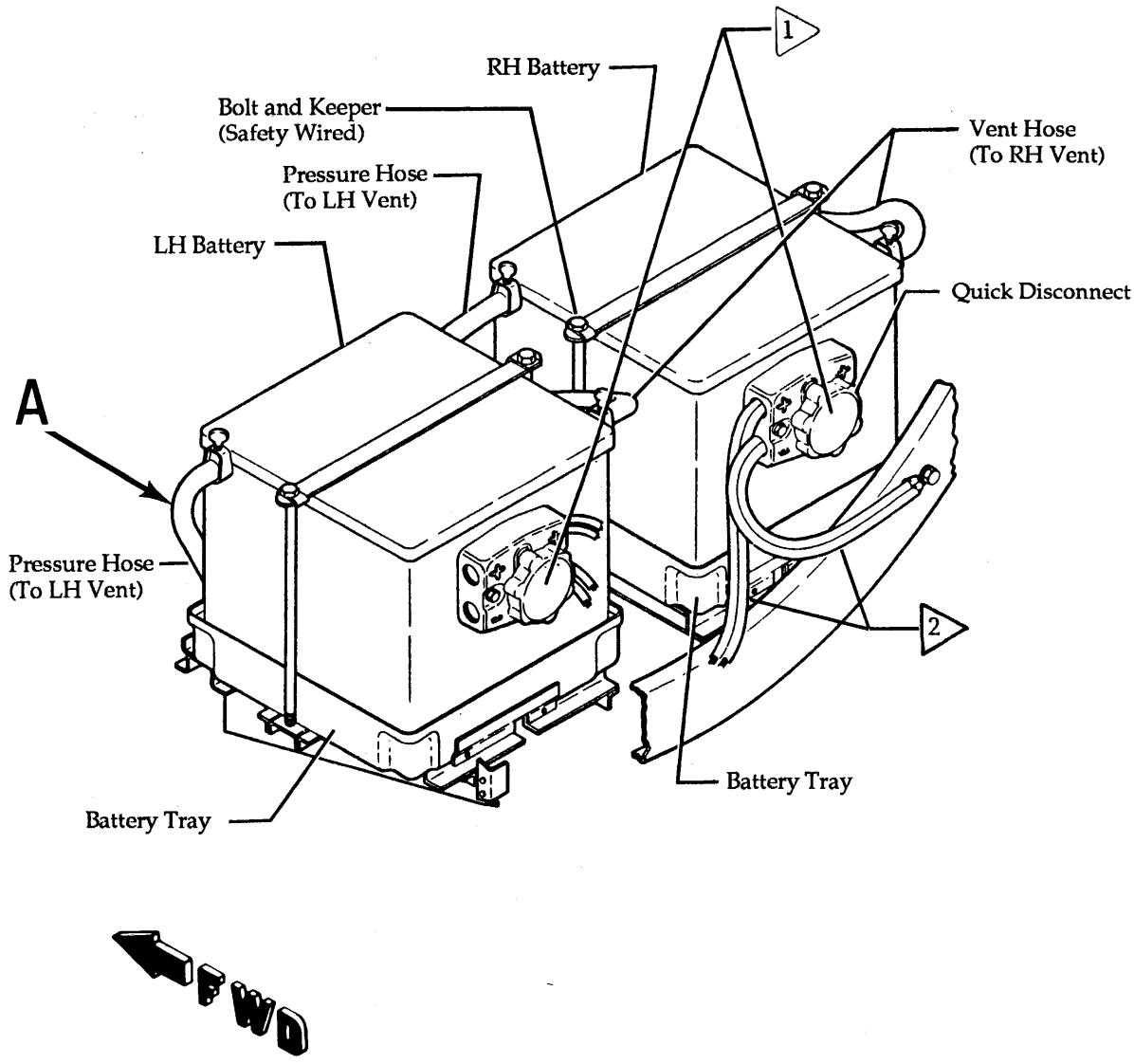
3 THE OVERBOARD VENTS HAVE SCARFED ENDS WHICH PROVIDE POSITIVE BATTERY VENTILATION.



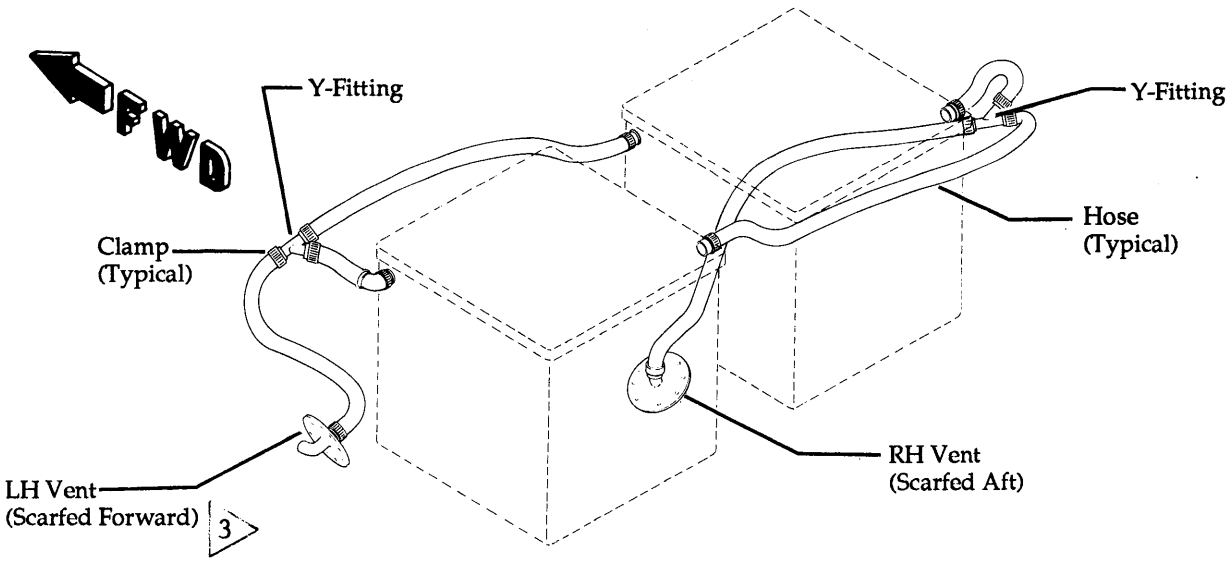


Battery Installation
Figure 201 (Sheet 1 of 3)

EFFECTIVITY: AIRCRAFT EQUIPPED WITH NICKEL-CADMIUM BATTERIES

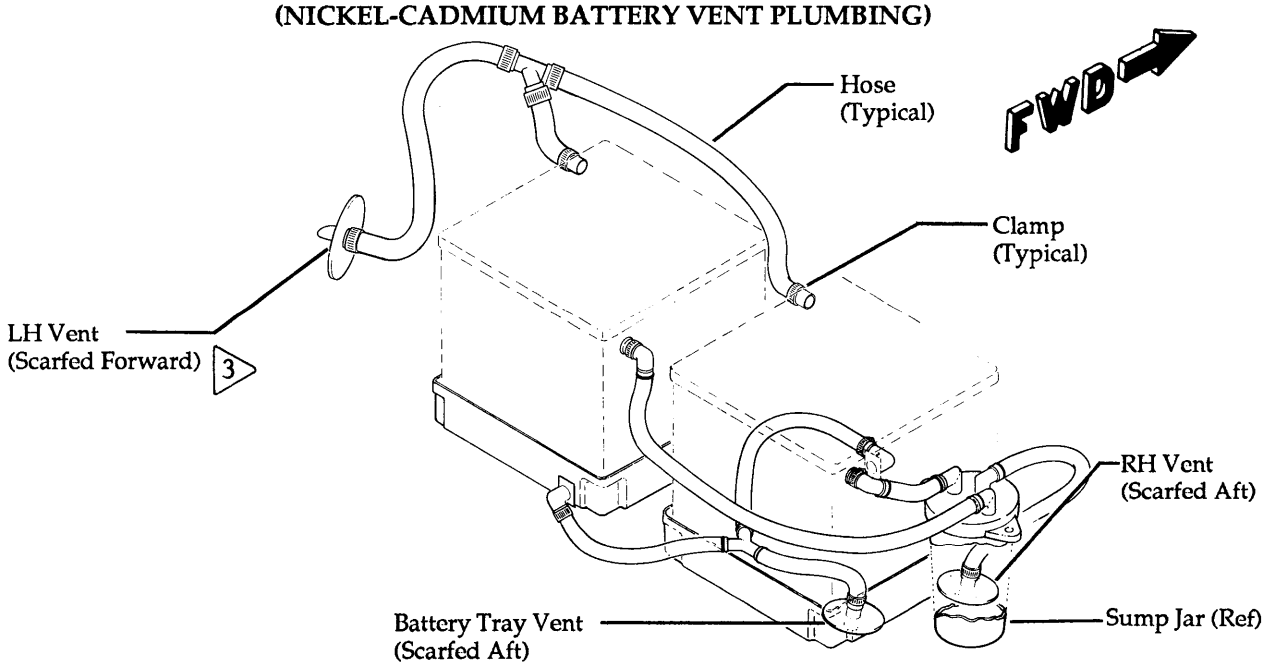


Battery Installation
Figure 201 (Sheet 2 of 3)



(35-571 thru 35-588, 35-601 and Subsequent; 36-054, 36-056 and Subsequent and prior Aircraft Modified per SB 35/36-24-10, "Relocation of Battery Vent Fitting")

(NICKEL-CADMIUM BATTERY VENT PLUMBING)



(35-571 thru 35-588, 35-601 and Subsequent; 36-054, 36-056 and Subsequent and prior Aircraft Modified per SB 35/36-24-10, "Relocation of Battery Vent Fitting")

(LEAD-ACID BATTERY VENT PLUMBING)

Detail A

9-1C-8
9-1C-9

Battery Installation
Figure 201 (Sheet 3 of 3)

WARNING: DO NOT USE A WIRE BRUSH FOR CLEANING. USE A STIFF BRISTLE BRUSH. WHEN CLEANING BATTERIES, USE EXTREME CARE TO PREVENT THIS MATERIAL FROM COMING INTO CONTACT WITH THE EYES. PROTECTIVE CLOTHING SUCH AS RUBBER GLOVES, AN APRON, AND FACE SHIELD SHALL BE WORN.

(3) After the battery has been discharged, remove the shorting clips and all intercell connecting links. During removal, connecting hardware should be marked to ensure proper reinstallation. Remove any white deposits (potassium carbonate) from top of cells and case with a bristle brush.
(4) Loosen the vent plugs using a vent wrench.
(5) Remove cells from case. After removing cells, retighten the vents.
(6) After washing cells with tap water and drying, inspect for cracks and leaks. Store cells in a dry, clean area.
(7) Wash battery case with tap water and dry with compressed air.
(8) Wash intercell hardware with tap water and wipe dry. Remove any corrosion preventive with a solvent such as trichloroethane or acetone. Relace all parts that are damaged or have defective nickel plating. Replace burnt, cracked, bent, or pitted terminals on battery power receptacles. Repair or replace bent battery cases and covers, loose or damaged cover gaskets, and cell hold-down bars.
(9) Inspect rubber case liners for deterioration or edges pulled away from the case. Liners may be recemented using a good metal-to-rubber cement (EC 1300, manufactured by 3M Co., or equivalent). Liners may be replaced using neoprene rubber of a 40 to 60 durometer which is the same thickness as the old liners.
(10) Replace cells in case, making certain to insert with the polarity symbols in the right direction. Cells are connected plus to minus.

NOTE: To aid in installation of battery cells, install cells inward from the end of each row until the center cell in each row remains. Apply a light coating of petroleum jelly on the sides of the last cells and adjacent cells and slide in last cells. Silicone reacts with electrolyte and is not recommended.

CAUTION: DO NOT USE "HOMEMADE" HARDWARE. VENDOR-SUPPLIED PARTS ARE SPECIFICALLY DESIGNED TO PRODUCE ADEQUATE ELECTRICAL CONNECTIONS.

(11) Install intercell connectors and tighten attaching hardware finger-tight. Apply a thin coat of Shell Darina No. 2 or equivalent on all exposed hardware including contact surfaces and screw threads.
(12) Torque intercell connecting hardware 34 to 38 inch-pounds for Gulton batteries, 50 to 60 inch-pounds for Marathon 22 ampere-hour batteries, and 35 to 50 inch-pounds for Marathon 40 ampere-hour batteries.
(13) Charge battery. (Refer to Chapter 12.)
(14) Install batteries in aircraft. (Refer to Removal/Installation, this section.)

B. Clean Lead-Acid Batteries.
(1) Remove batteries from aircraft. (Refer to Removal/Installation, this section.)

WARNING: DO NOT USE A WIRE BRUSH TO CLEAN BATTERIES. USE A BRISTLE BRUSH. USE EXTREME CARE TO PREVENT MATERIAL FROM COMING INTO CONTACT WITH SKIN AND EYES. PROTECTIVE CLOTHING SHALL BE WORN.

(2) Clean battery with stiff bristle brush (not metal) or with cloth dampened with 5% bicarbonate of soda solution. (1 part bicarbonate of soda (baking soda) to 20 parts water.)

(3) Ensure that vent plugs are tightly in place and wash battery with water.
(4) Examine vent plugs to ensure that gas escape holes are open.
(5) Install batteries in aircraft. (Refer to Removal/Installation, this section.)

5. **Battery Storage (Nickel-Cadmium Batteries)**

NOTE: For aircraft equipped with SAFT batteries, refer to SAFT Operating and Maintenance Manual listed under Supplementary Publications in the Introduction to this manual.

A. Batteries can be stored indefinitely in the discharge state. Storage in any state of charge does not damage the cells, but the battery will slowly become discharged. The higher the temperature, the faster the self-discharge. At normal temperature, the battery will deliver at least 85% of its rated capacity after 2 weeks of storage. It is recommended that a charged battery stored in excess of 2 months be charged prior to use. (Refer to Chapter 12 for servicing instructions.)

6. **Battery Storage (Lead-Acid Batteries)**
A. The batteries shipped in a dry-charged condition may be stored indefinitely, providing the batteries are kept clean in a clean, dry place at temperatures not exceeding 80° F (26.7° C). The length of charging time for a stored battery will vary with the length of storage and temperature during storage.
B. When storing batteries which have an electrolyte added, it is important that the battery be thoroughly cleaned, serviced, and charged prior to storage. During storage, a lead-acid battery will lose some of its charge and must be thoroughly charged at regular intervals. When returning a "wet" battery to service, it must be charged until specific gravity does not rise over a 3-hour period.

NOTE: During shelf storage, lead-acid batteries must be fully charged every 30 days. Battery failure may occur after 45 to 60 days without charging. (Includes new batteries.)

7. **Inspection/Check**
A. Battery Connector Check

NOTE: Perform Battery Connector Check in accordance with current inspection intervals specified in Chapter 5.

(1) Acquire necessary tools and equipment.

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Battery Connector Gage	No. 029	Icore Intl. (Elcon) Sunny Dale, CA	Check connector tolerances.
	or	Locally Manufactured (See Figure 202.)	
Tension Gage		Commercially Available	Check removal force of battery connector gage.

NAME	PART NUMBER	MANUFACTURER	USE
Dial Calipers (Capable of reading to 0.001 Inch [0.0002 mm)		Commercially Available	Check connector tolerances.
Safety Wire	MS20995CY20	Commercially Available	Secure connector knob.

(2) Open tailcone access door.

WARNING: REMOVE QUICK-DISCONNECTS FROM BOTH BATTERIES. BATTERY VOLTAGE WILL FEED BACK FROM CONNECTED BATTERY AND ARCING WILL OCCUR IF QUICK-DISCONNECT IS INADVERTENTLY SHORTED TO AIRCRAFT STRUCTURE.

(3) Disconnect both battery electrical quick-disconnects.
(4) Inspect battery electrical quick-disconnects for excessive free-play in the handwheel (worm assembly).
(5) Inspect battery electrical quick-disconnects for evidence of corrosion or pitting of the helix.
(6) Inspect battery electrical quick-disconnects for evidence of arcing or burn marks of the helix.

NOTE: This is caused when disconnect is removed under electrical load.

(7) Test the helix (socket) resiliency of the battery electrical quick-disconnect to hold an oversized pin as follows:
(a) Insert large diameter end of gage into battery connector helix up to gage shoulder. The fit shall be snug.

NOTE: If necessary, manufacture battery connector gage. (See Figure 202.)

(b) The force to remove gage from battery connector helix shall be greater than one (1) pound [0.45 kg].
(8) Test the helix (socket) resiliency of the battery electrical quick-disconnect to hold a worn or undersized pin as follows:
(a) Insert small diameter end of battery connector gage into each battery connector helix up to gage shoulder. The fit shall be snug.

NOTE: If necessary, manufacture battery connector gage. (See Figure 202.)

(b) The nominal force to remove gage from battery connector helix shall be one (1) pound [0.45 kg]

(9) Inspect battery electrical contact pins for evidence of battery electrolyte leakage through receptacle body and/or contact pins.

NOTE: Electrolyte leakage can be noticed by a discoloration of receptacle body and/or the glass fibers exposed.

WARNING: AVOID THE USE OF UNINSULATED TOOLS. SEVERE ARCING MAY RESULT WITH POSSIBLE PERSONNEL INJURY AND DAMAGE TO TOOLS AND THE BATTERY.

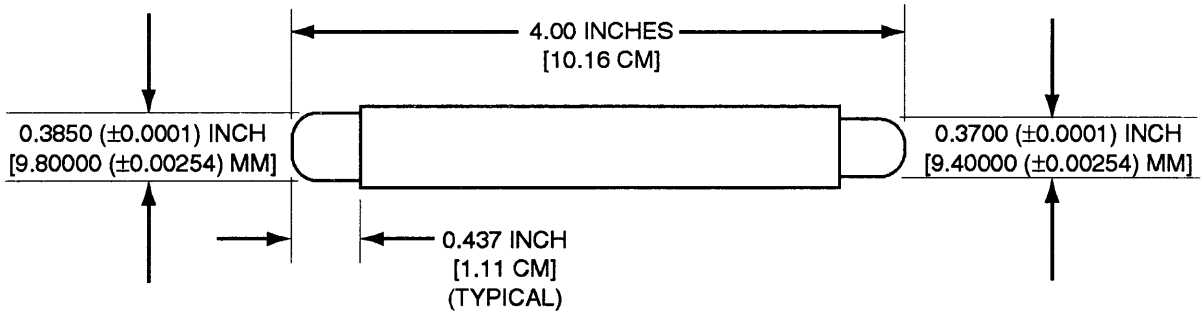
INSULATING OPPOSITE POLARITY PIN IS RECOMMENDED DURING GAGING OF PINS TO AVOID SEVERE ARCING RESULTING IN POSSIBLE PERSONNEL INJURY AND DAMAGE TO TOOLS AND THE BATTERY.

(10) Using dial calipers, gage each contact pin diameter. The diameter shall be 0.375 (±0.005) inch [0.095 (±0.001) mm].

(11) Replace any defective parts.

CAUTION: ENSURE QUICK-DISCONNECT IS PROPERLY CONNECTED TO BATTERY. POOR ELECTRICAL CONTACT CAN RESULT IN DAMAGE TO BATTERIES.

(12) Connect battery electrical quick-disconnects. If securing is desired, use MS20995CY20 (copper) safety wire.
(13) Close tailcone access door.



Battery Connector Gage
Figure 202

BATTERY TEMPERATURE INDICATOR - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Battery Temperature Indicator. (See Figure 201.)
   (1) Disconnect electrical connector from copilot's switch panel assembly.
   (2) Remove screws and copilot's switch panel assembly from instrument panel.
   (3) Remove cabin temperature selector knob.

CAUTION: THE ELECTROLUMINESCENT (EL) PANEL HAS ELECTRICAL WIRING ATTACHED. USE CAUTION WHEN REMOVING THE PANEL NOT TO BREAK THE WIRING CONNECTIONS.

   (4) Remove attaching parts securing EL panel.
   (5) Remove electrical connector retainer and disconnect electrical connectors from indicator.
   (6) Remove EL panel sufficiently to gain access to attaching screws.
   (7) Loosen upper RH screw and slide indicator forward from panel.

B. Install Battery Temperature Indicator. (See Figure 201.)
   (1) Position indicator in panel and instrument clamp. Tighten upper RH screw.
   (2) Connect electrical connector to indicator and install electrical connector retainer.
   (3) Position EL panel on switch panel and secure with attaching parts.
   (4) Install cabin temperature selector knob.
   (5) Install switch panel and secure with attaching parts.
   (6) Connect electrical connector to switch panel.

2. Inspection/Check

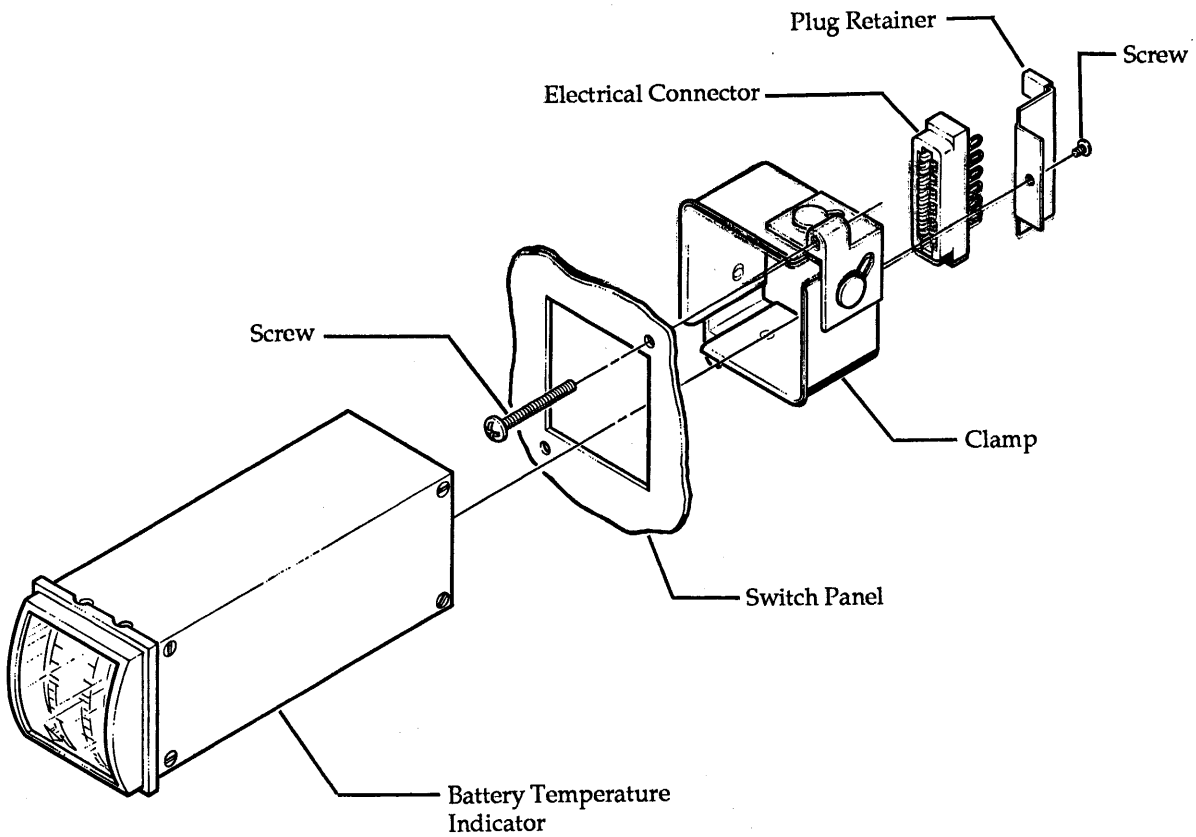
NOTE:
- Perform Functional Test of Battery Temperature Indicating System in accordance with the current inspection interval specified in Chapter 5.
- It is recommended that the battery temperature system be functionally checked for proper operation after battery maintenance is performed.

A. Functional Test of Battery Temperature Indicator
   (1) Ensure that Battery Switches are set off.
   (2) Disconnect both battery temperature connectors (P451 for LH battery and P452 for RH battery).
   (3) Connect a variable resistor with a capacity of 0 thru 3000 (±1) ohms between pins A and B of temperature indicator connector (P451).
   (4) Set LH Battery Switch on.
   (5) Adjust variable resistor to 1830 ohms.
   (6) Indicator needle shall indicate 50 (±3)° F.
   (7) Adjust variable resistor to 630 ohms.
   (8) Indicator needle shall indicate 100 (±3)° F.
   (9) Adjust variable resistor to 294 ohms.
   (10) Indicator needle shall indicate 140 (±3)° F.
   (11) Adjust variable resistor to 250 ohms.
   (12) Indicator needle shall indicate 150 (±3)° F.
   (13) Adjust variable resistor to 110 ohms.
   (14) Indicator needle shall indicate 200 (±3)° F.
   (15) Adjust variable resistor to 90 ohms, increase to 3000 ohms and then decrease to 1000 ohms. Indicator shall not stick.

(16) Set LH Battery Switch off.
(17) Remove variable resistor from temperature indicator (P451) pins A and B and connect to pins A and B of temperature indicator connector (P452).
(18) Set RH Battery Switch on.
(19) Repeat steps 2A.(5) thru 2A.(15) for the RH battery temperature indicator.

NOTE: Indicators that fail to meet any one or more of these tests shall be replaced. After replacement, repeat steps 2A.(5) thru 2A.(15).

(20) Set RH Battery Switch off.
(21) Connect both battery temperature connectors (P451 LH battery and P452 RH battery).
(22) Restore aircraft to normal.



9-97A-2

Battery Temperature Indicator Installation
Figure 201

THERMISTOR - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Thermistor. (See Figure 201.)
   (1) Remove battery from aircraft. (Refer to 24-32-01.)
   (2) Remove cover from battery.
   (3) Discharge battery. (Refer to Chapter 12.)
   (4) Remove connecting link with thermistor attached. (Refer to 24-32-01.)
   (6) Remove sealant covering thermistor and unscrew thermistor from link.
   (5) Disconnect thermistor leads from electric plugs.

B. Install Thermistor. (See Figure 201.)
   (1) Clean surface of link with MEK or other suitable solvent.
   (2) Install new thermistor in connecting link and tighten finger-tight.
   (3) Spread Pro Seal 890 over thermistor, completely covering thermistor. Ensure that thermistor wires are clean, not shorted together, or grounded to connector link.
   (4) Install link and secure with attaching parts. (Refer to 24-32-01.)
   (5) Connect thermistor leads to electrical connector.
   (6) Recharge battery. (Refer to Chapter 12.)
   (7) Install battery cover.
   (8) Install battery in aircraft. (Refer to 24-32-01.)

2. Adjustment/Test

NOTE: Perform Functional Test of Battery Thermistor in accordance with the current inspection interval specified in Chapter 5.

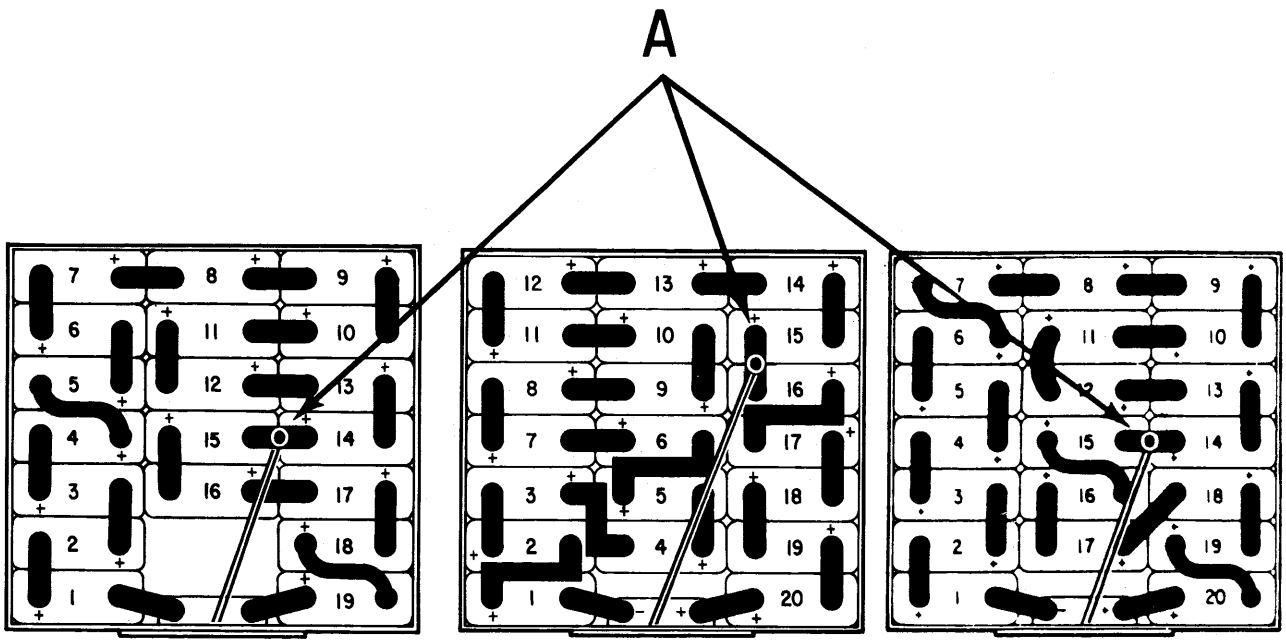
A. Perform Functional Test of Thermistor.
   (1) Remove connecting link with thermistor attached from battery. (Refer to Removal/Installation.)
   (2) Place link and thermistor in an oil bath adjusted to 140 (±1)°F and connect wires to an ohmmeter.

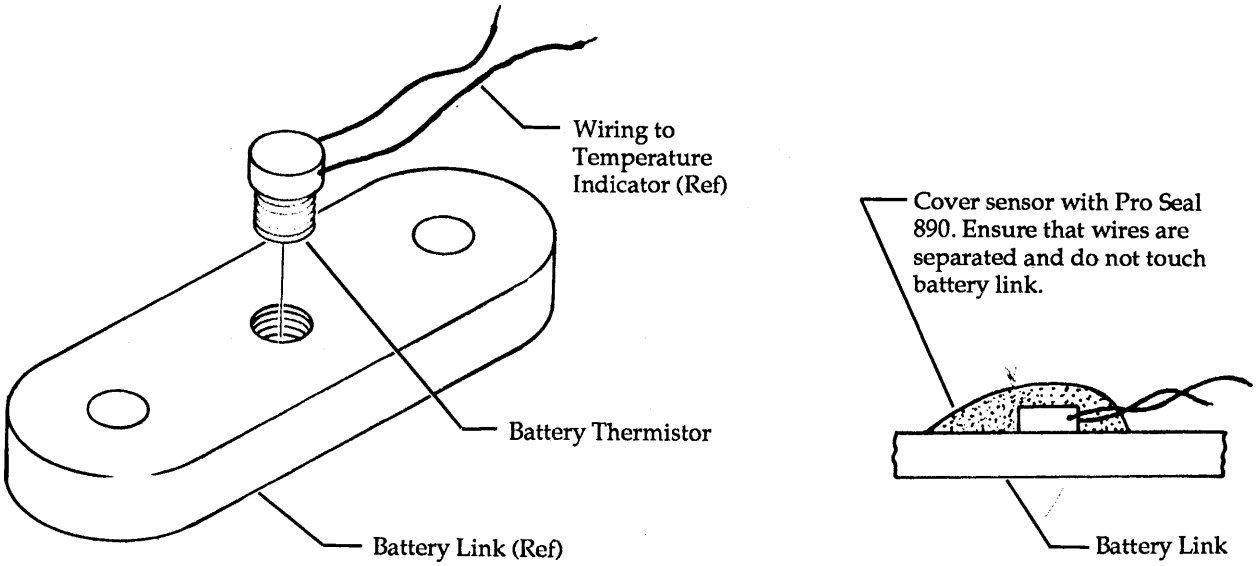
   NOTE: A minimum of four (4) inches of thermistor leads must be submerged in the oil bath to achieve an accurate ohmmeter reading.

   (3) Allow reading to stabilize. Check that ohmmeter reading is 295 (±11) ohms.
   (4) Adjust the oil bath temperature to 160 (±1)°F and allow temperature to stabilize. Check that ohmmeter reading is 213 (±10) ohms.

   NOTE: Thermistors that fail to meet any one or more of these checks shall be replaced.

   (5) Install link and thermistor in battery. (Refer to Removal/Installation.)
   (6) Perform battery temperature indicator operational check. (Refer to 24-32-02.)





Detail A

Thermistor Installation
Figure 201

B. Functional Test of Thermistor (Alternate Method) (See Figure 202.)
(1) Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Omega Thermister Thermometer	Model 700°		Read temperature.
Temperature Probe	OL-709-PP		

(2) Remove connecting link with thermistor attached from battery. (Refer to Removal/Installation.)
(3) Attach temperature probe to thermistor.
(4) Connect wires to an ohmmeter. Ensure ohmmeter reading is within limits shown in Figure 202.

NOTE: Thermistors that fail to meet any one or more of these checks shall be replaced.

(5) Install link and thermistor in battery. (Refer to Removal/Installation.)
(6) Perform battery temperature indicator operational check.

Degrees F	Ohms (±5%)	Degrees F	Ohms (±5%)	Degrees F	Ohms (±5%)
50.0	1810.8	80.0	962.4	110.0	511.5
51.0	1773.0	81.0	942.3	111.0	500.8
52.0	1736.0	82.0	922.7	112.0	490.4
53.0	1699.8	83.0	903.4	113.0	480.1
54.0	1664.4	84.0	884.6	114.0	470.1
55.0	1629.7	85.0	866.1	115.0	460.3
56.0	1595.7	86.0	848.1	116.0	450.7
57.0	1562.4	87.0	830.4	117.0	441.3
58.0	1529.8	88.0	813.1	118.0	432.1
59.0	1498.0	89.0	796.1	119.0	423.1
60.0	1466.7	90.0	779.5	120.0	414.3
61.0	1436.2	91.0	763.3	121.0	405.7
62.0	1406.2	92.0	747.4	122.0	397.2
63.0	1376.9	93.0	731.8	123.0	388.9
64.0	1348.2	94.0	716.5	124.0	380.3
65.0	1320.1	95.0	701.6	125.0	372.9
66.0	1292.6	96.0	687.0	140.0	295.0
67.0	1265.6	97.0	672.6	160.0	213.0
68.0	1239.2	98.0	658.6		
69.0	1213.4	99.0	644.9		
70.0	1188.1	100.0	631.4		
71.0	1163.3	101.0	618.3		
72.0	1139.1	102.0	605.4		
73.0	1115.3	103.0	592.8		
74.0	1092.1	104.0	580.4		
75.0	1069.3	105.0	568.3		
76.0	1047.0	106.0	556.5		
77.0	1025.2	107.0	544.8		
78.0	1003.8	108.0	533.5		
79.0	982.9	109.0	522.4		

Temperature Probe Curve
Figure 202

BATTERY TEMPERATURE LIMIT SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE: *On batteries modified per SSK 948, "Replacement of Battery Temperature Overheat Switches"*, the Hi-Limit Switch is orange or black and Lo-Limit Switch is yellow or green. Orange Hi-Limit Switch (152° - 160° F) must be paired with yellow Lo-Limit Switch (132° - 140° F). Black Hi-Limit Switch (160° - 168° F) must be paired with green Lo-Limit Switch (140° - 148° F).

A. Remove Battery Temperature Limit Switch (See Figure 201.)
   (1) Lower tailcone access door and disconnect aircraft batteries.
   (2) Remove batteries from aircraft. (Refer to 24-32-01.)
   (3) Remove cover from battery.
   (4) Remove battery link containing temperature limit switches from battery.

   NOTE: The switches are installed adjacent to each other on the same battery link.

   (5) Remove limit switches from link.
   (6) Identify and tag wires and cut approximately halfway between switch and receptacle.

B. Install Battery Temperature Limit Switch (See Figure 201.)
   (1) Clean sealant from battery link.
   (2) Install new temperature limit switches in battery link. Torque switches to 3 (±1) inch-pounds.
   (3) Identify and splice switch wires to electrical receptacle wiring.
   (4) Apply Pro-Seal 890B around base of temperature limit switches and in holes in bottom of link and allow to cure.
   (5) Install battery link on battery and secure with attaching hardware. (Refer to 24-32-01.)
   (6) Install battery in aircraft. (Refer to 24-32-01.)
   (7) Raise and secure tailcone access door.

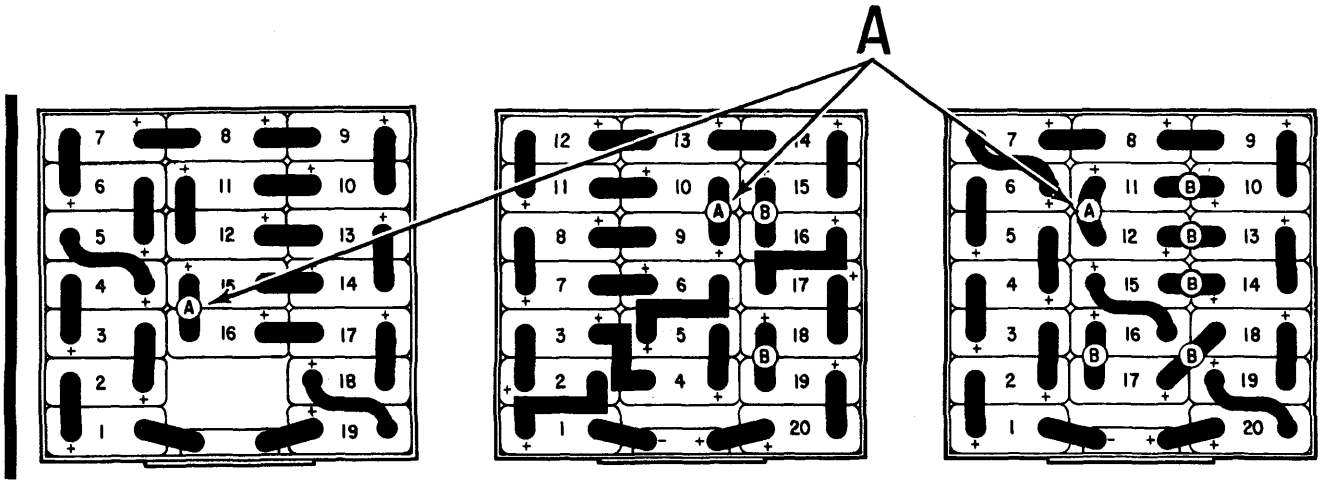
2. Inspection/Check

NOTE: Perform Functional Test of Battery Temperature Limit Switches in accordance with the current inspection interval specified in Chapter 5.

A. Perform Functional Test of Battery Temperature Limit Switches
   (1) Remove cover from battery.
   (2) Remove connecting link with limit switches from battery. (Refer to Removal/Installation, this section.)
   (3) Attach ohmmeter positive lead to link and negative lead to both lo-limit switch leads and place link and switches in an oil bath that is set to 130° (±1°)F.
   (4) Increase temperature of oil bath and note temperature at which lo-limit switch closes. Lo-limit switch shall close between 132°F and 148°F.
   (5) Remove ohmmeter negative lead from lo-limit switch leads and attach to both hi-limit switch leads.
   (6) Increase temperature of oil bath and note temperature at which hi-limit switch closes. Hi-limit switch shall close between 152°F and 168°F.
   (7) Any switch that fails this check shall be replaced.

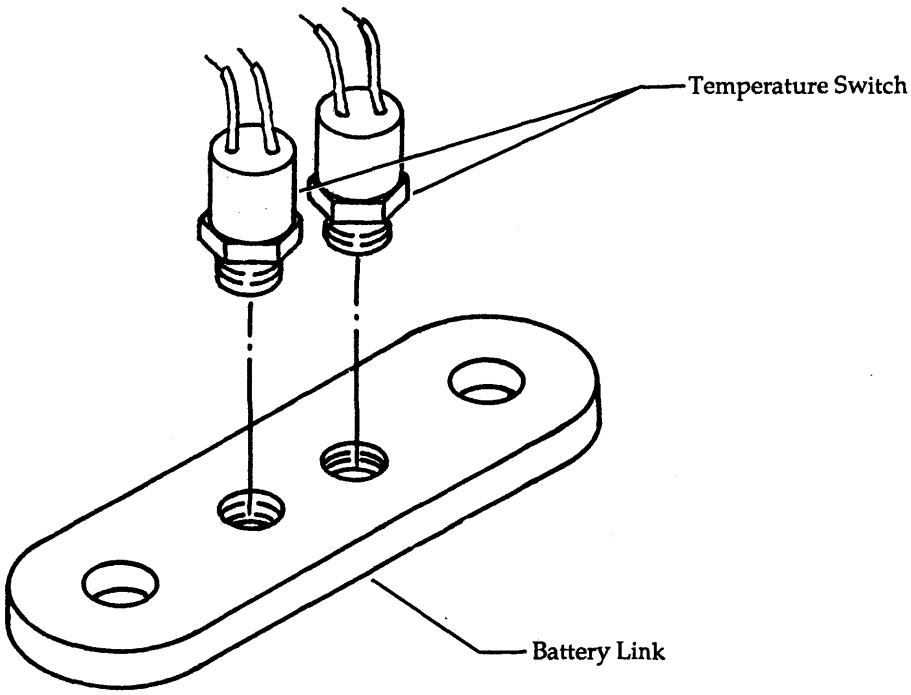
   NOTE: Temperature limit switches shall be replaced as a set.

   (8) Install connecting link on battery.
   (9) Replace battery cover and secure.
   (10) Install battery in aircraft. (Refer to 24-32-01.)



(19-CELL BATTERY) (MARATHON 20-CELL BATTERY) (SAFT 20-CELL BATTERY)

NOTE: ***Recommended temperature switch placement is shown by the letter A in a circle. Alternate placement is shown by the letter B in a circle.***



Detail A

Battery Temperature Switch Installation
Figure 201

BATTERY SUMP JAR - MAINTENANCE PRACTICES

NOTE: Inspect battery sump jar assembly in accordance with the current inspection interval specified in Chapter 5.

1. REMOVAL/INSTALLATION

A. Remove Battery Sump Jar Assembly (See figure 201.)

(1) Open tailcone access door allowing access to battery sump jar assembly installation.

(2) Loosen attaching parts that secure vent hoses to sump jar cover assembly; identify and disconnect vent hoses from cover assembly.

(3) Remove attaching parts that secure battery sump jar assembly to battery hold-down post; remove sump jar assembly from aircraft.

B. Disassemble Battery Sump Jar Assembly (See figure 201.)

(1) Rotate jar assembly counterclockwise sufficient to dislodge jar assembly from cover assembly.

(2) Remove and discard battery sump jar assembly felt pad and bicarbonate of soda.

(3) Clean inside of battery sump jar assembly with a solution of bicarbonate of soda and water (1 part soda to 20 parts water).

C. Assemble Battery Sump Jar Assembly (See figure 201.)

(1) Fill battery sump jar assembly with bicarbonate of soda, to a level approximately 3/8-inch (9.5 mm) deep. (See Detail B.)

(2) Prior to installing new felt pad, saturate felt pad in a solution of bicarbonate of soda and water (1 part soda to 20 parts water).

(3) Place felt pad in battery sump jar assembly.

NOTE: Maintain battery sump jar assembly in a vertical position to avoid disturbing bicarbonate of soda and felt pad inside.

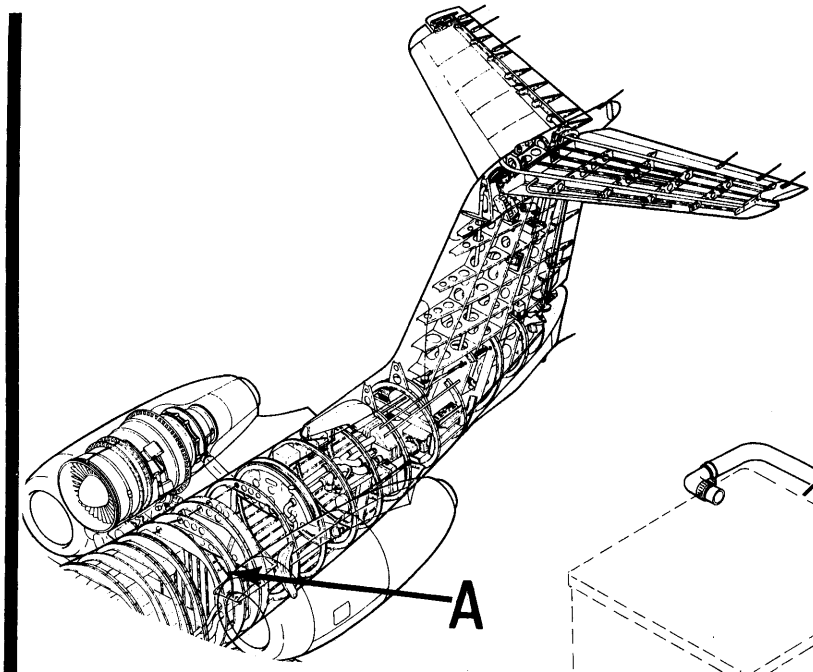
D. Install Battery Sump Jar Assembly (See figure 201.)

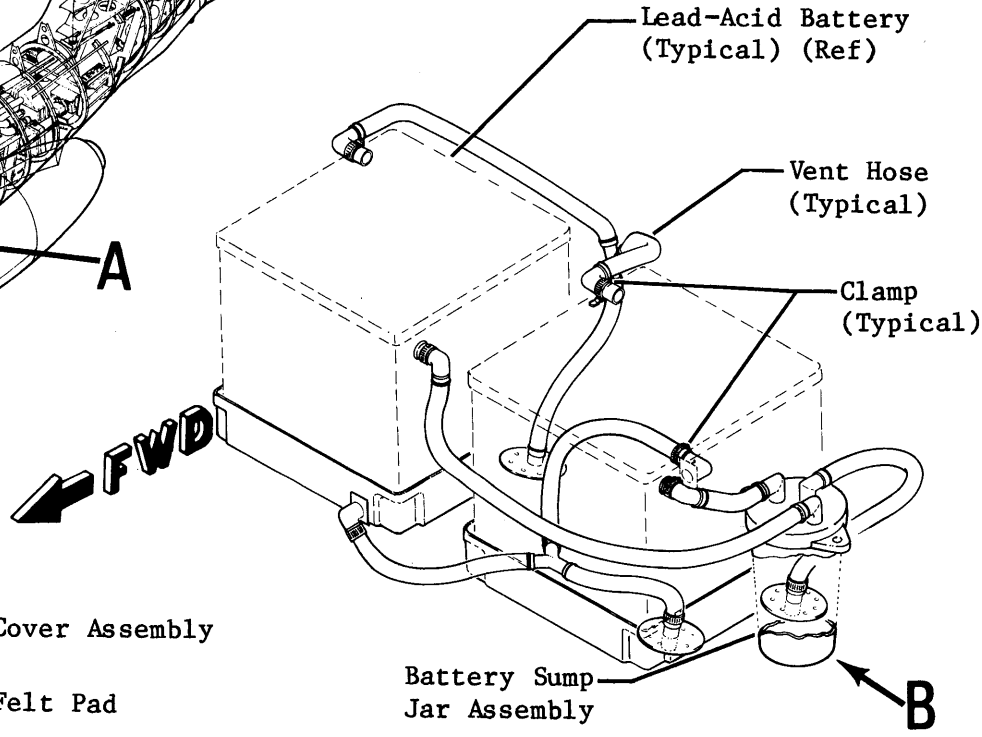
(1) Secure battery sump jar assembly to battery hold-down post with attaching parts.

(2) Safety wire jar assembly to aircraft structure.

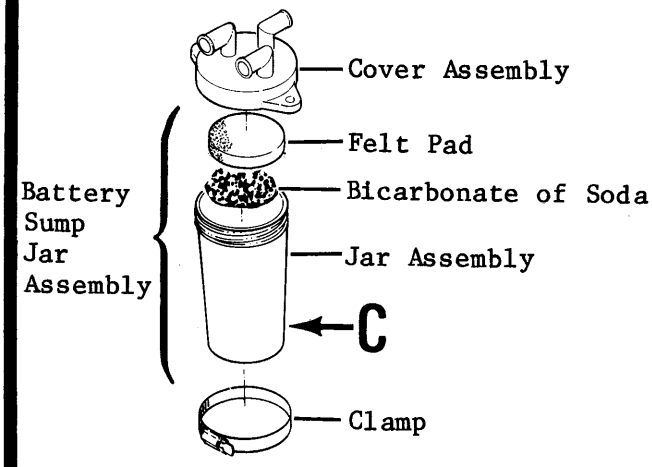
(3) Identify and connect battery vent hoses to cover assembly; secure with attaching parts.

(4) Restore aircraft to normal.

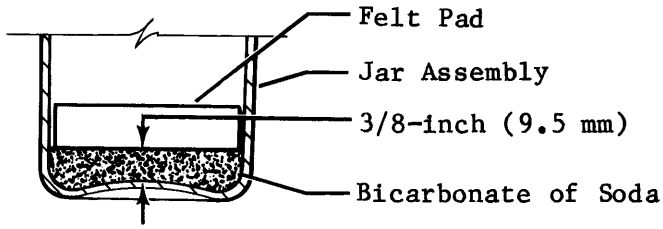




Detail A



Detail B



Detail C

9-1C-8
A9-1C-8
B9-1B-11

Battery Sump Jar Assembly and Installation
Figure 201

EFFECTIVITY: **35-431 and Subsequent, 36-054 and Subsequent equipped with Lead Acid Batteries and prior aircraft modified per AMK81-5, "Modification of Lead Acid Battery Vent System"**

EMERGENCY BATTERY SYSTEM - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The aircraft is equipped with either a single or dual emergency battery system. The battery(s) is installed in the nose compartment or the tailcone.

B. Two types of emergency batteries are utilized in aircraft installation. One type contains 40 nickel-cadmium cells and is rated at 3.8 ampere-hours. The other type contains 12 lead-acid cells and is rated at 5.0 ampere-hours.

C. Each battery pack contains the battery and an optional module. The battery combined with an optional module (DC to AC inverter option or DC to DC converter option) will supply 24 vdc, 115 vac single phase or three phase at 400 Hz and 5 vac at 400 Hz or 24 vdc and 5 vdc. The optional module utilized depends on electrical power requirements of emergency equipment (emergency attitude indicator and/or transceiver, lighting, etc.) installed in the aircraft.

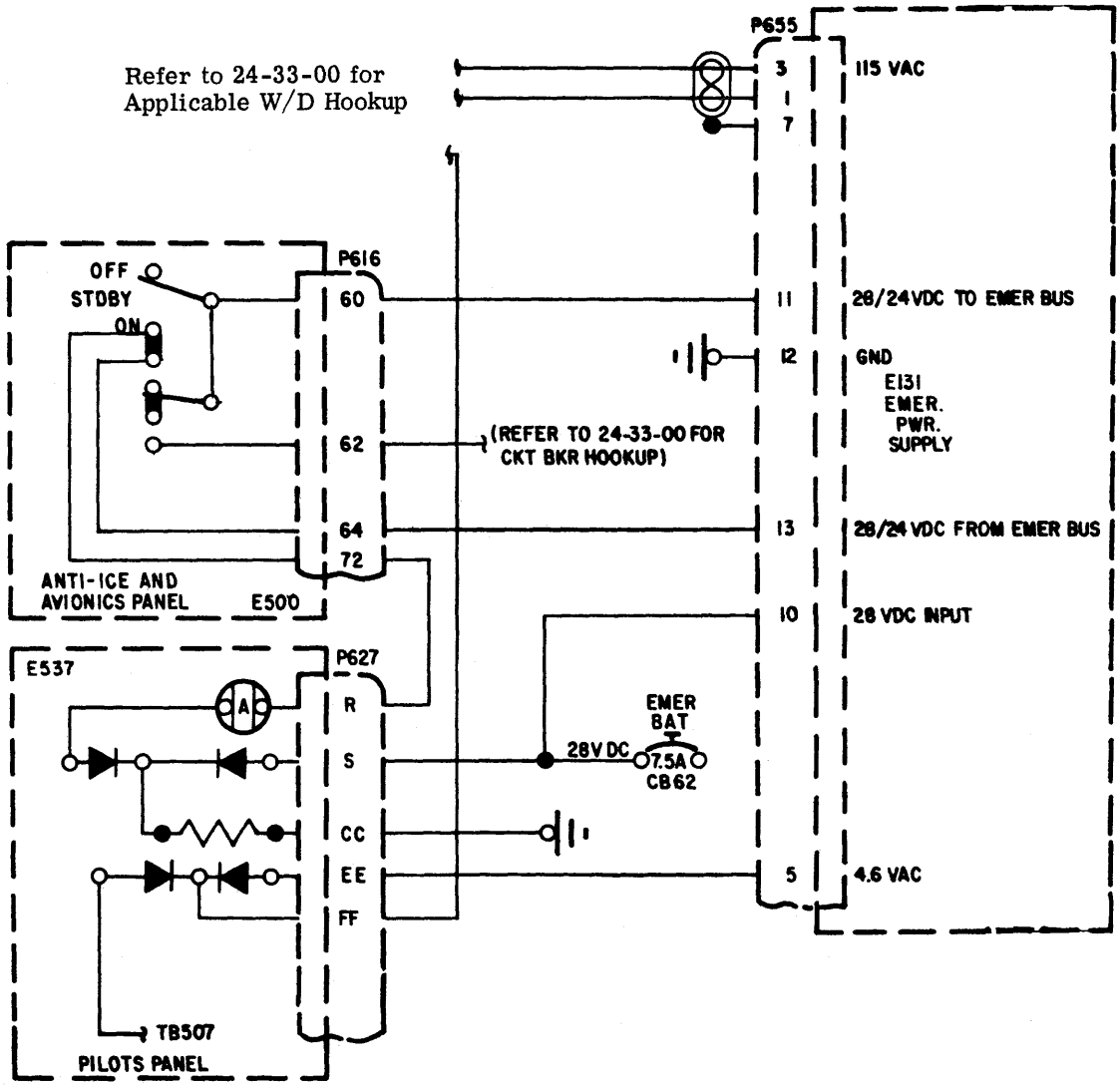
D. Refer to 24-33-00 in the Wiring Manual or Avionics and Optional Electrical Customization Wiring Manual for applicable circuit breaker configurations.

E. Refer to Manufacturer's Instruction Manual (listed in the Supplemental Publications Section at the front of this manual) for maintenance and overhaul instructions.

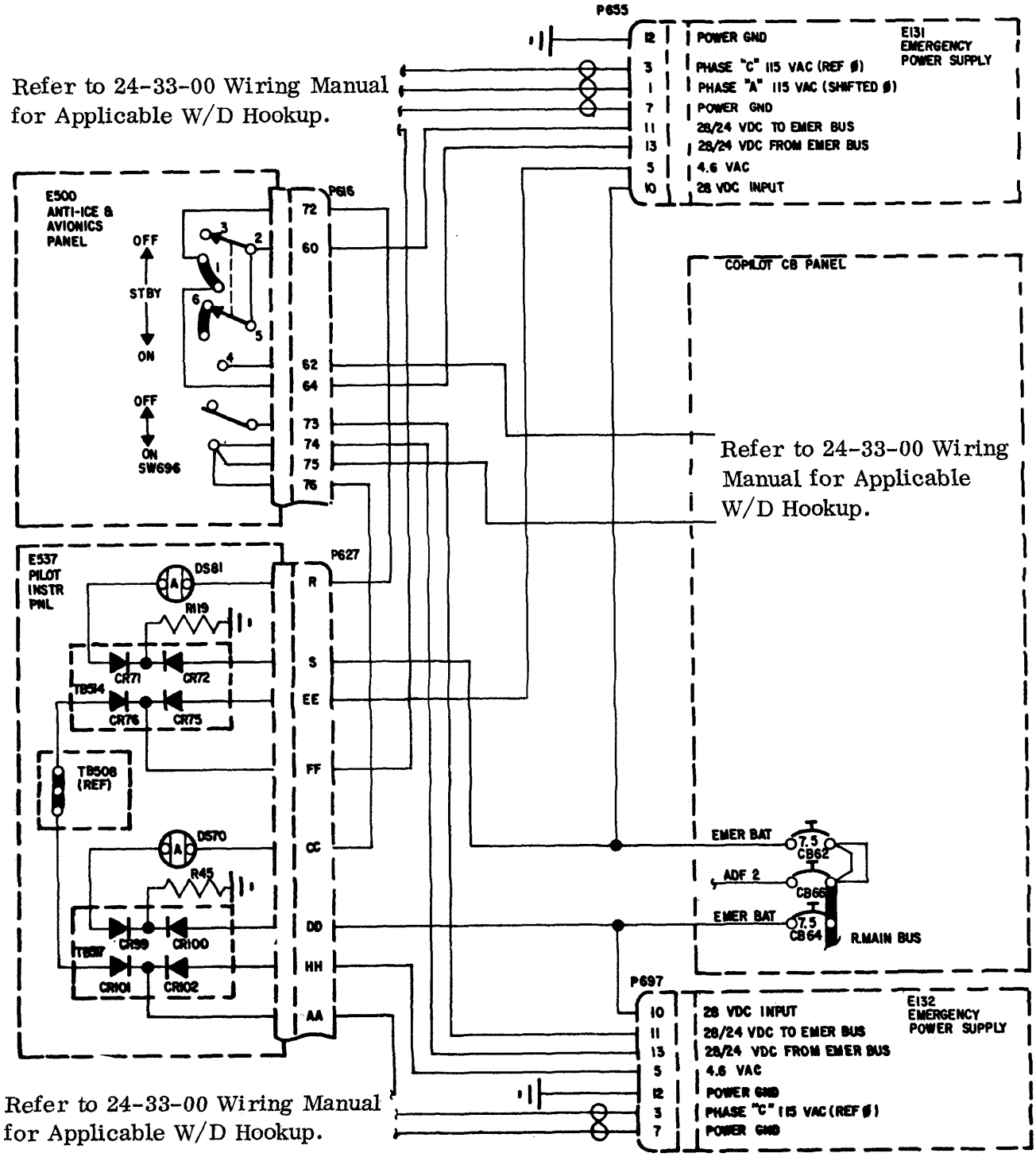
2. OPERATION (See figures 1, 2, and 3.)

A. On aircraft equipped with single emergency battery utilizing DC to AC inverter optional module, the system is controlled by ON-STBY-OFF Emergency Power Switch on the anti-ice and avionics panel (pilot's switch panel on 35-506 and subsequent, 36-054 and subsequent.) In the STBY position, the emergency battery is providing 115 vac, 4.6 vac, and 28 vdc. Also, in the STBY position, the 28 vdc is provided to illuminate the emergency battery indicator (amber) light. However, the indicator light will not illuminate so long as normal power is available to the main buses. If normal power is lost, the indicator will illuminate. The Emergency Power Switch is then set to ON and supplies power to the applicable circuit breaker configuration. The battery is rated at 25 vdc and 115 vac (+7%/-10%) at 400 Hz. Emergency battery charge is maintained through normal power 28 vdc input.

B. On aircraft equipped with dual emergency batteries utilizing DC to AC inverter optional module, the system is controlled by the (BAT 1) ON-STBY-OFF and (BAT 2) ON-OFF Emergency Power Switches on the anti-ice and avionics panel (pilot's switch panel on 35-506 and subsequent, 36-054 and subsequent). During normal operation, the ON-OFF Switch is set to ON and the ON-STBY-OFF Switch is set to STBY. With the (BAT 2) Switches set to ON, the emergency battery (BAT 2) is furnishing 115 vac, 4.6 vac for various avionics systems and 28 vdc power. The 28 vdc power is applied to the indicator (amber) light. However, the indicator light will not illuminate so long as normal power is available to the main buses. The avionics equipment will be receiving power from their normal sources. With the (BAT 1) Switch set to STBY, the emergency battery (BAT 1) is furnishing 115 vac, 4.6 vac, and 28 vdc power.

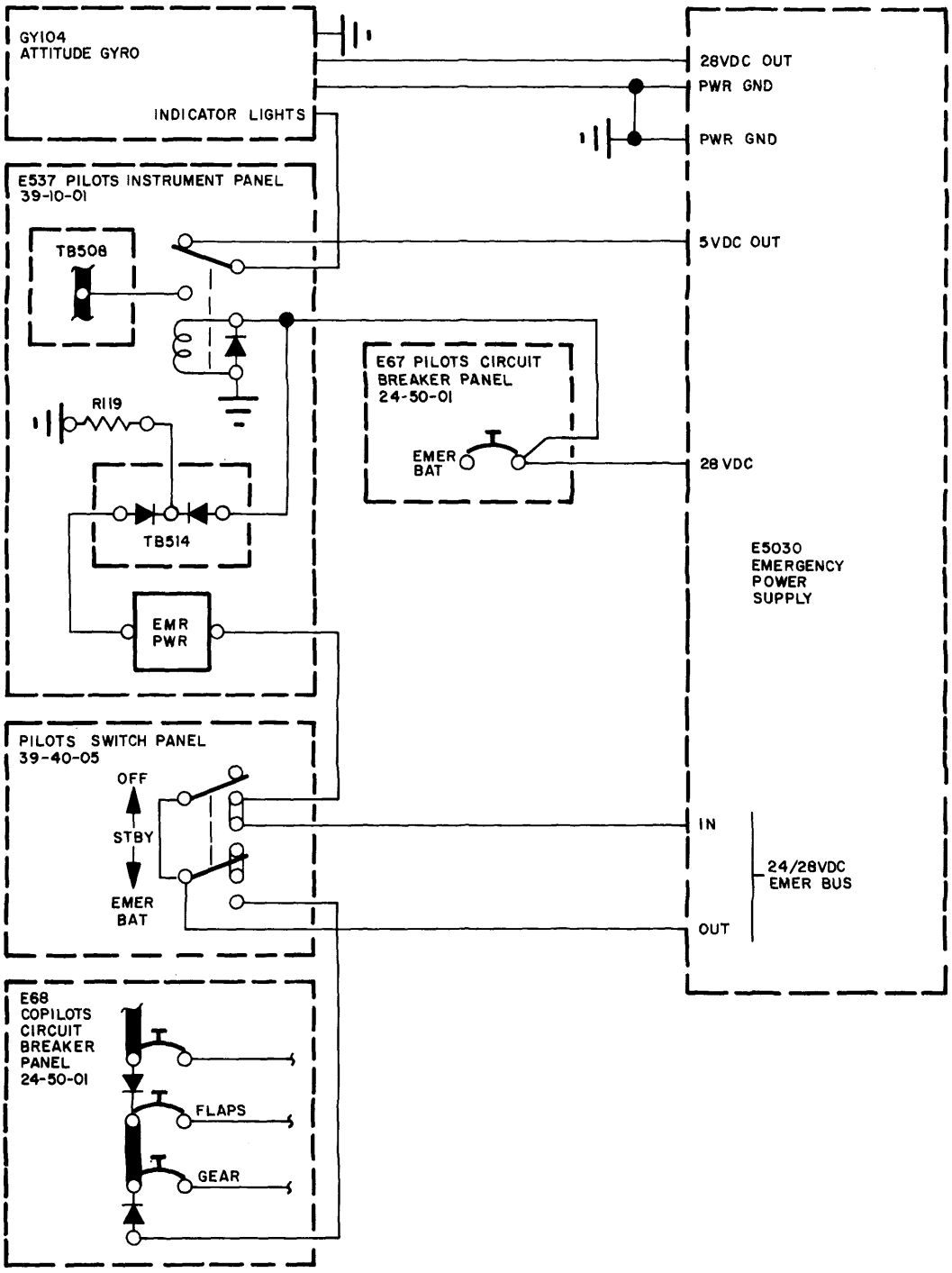


Emergency Battery System Electrical Control Schematic
Figure 1



Emergency Battery System Electrical Control Schematic
Figure 2

EFFECTIVITY: **Aircraft Equipped with Dual Emergency Battery**
MM-99
Disk 599



Emergency Power Electrical Control Schematic
Figure 3

EFFECTIVITY: **Aircraft Equipped with**
MM-99 **Single Emergency Battery**
Disk 599

The 115 vac and 4.6 vac are provided to various avionics systems and the 28 vdc is applied to the indicator (amber) light. However, the indicator (amber) light will not illuminate so long as normal power is available to the main buses. If normal power is lost, both indicator (amber) lights will illuminate. The (BAT 1) Switch is then set from STBY to ON, supplying emergency power to the applicable circuit breaker configuration. Each battery is rated at 25 vdc and 115 vac (+7%/-10%) at 400 Hz. Emergency battery charge is maintained through normal power 28 vdc input.

C. On aircraft equipped with single emergency battery utilizing DC to DC converter, the system is controlled by EMER BAT-STBY-OFF Emergency Power Switch. During normal operation, the aircraft's electrical system supplies power to the using systems. If normal aircraft power is lost with EMER BAT-STBY-OFF Switch set to EMER BAT, the emergency battery will supply 24 vdc and 5 vdc electrical power to the selected circuits (emergency circuits) without interruption. It is important that the EMER BAT-STBY-OFF Switch be set to OFF when aircraft electrical system is shut down to avoid discharging the emergency battery to a low voltage condition that results in battery cell damage.

EMERGENCY BATTERY SYSTEM - TROUBLE SHOOTING

1. **TROUBLE SHOOTING**
   A. Trouble shooting the emergency battery system consists basically of isolating the trouble to aircraft wiring or the emergency battery.
   B. **Tools and Equipment**

      NOTE: Equivalent substitutes may be used in lieu of the following items.

NAME	PART NUMBER	MANUFACTURER	USE
Voltmeter	3430A	Hewlett Packard	To check continuity.
or			
Voltmeter	260	Simpson	To check continuity.

1. Inspection/Check

NOTE: Perform Operational Check of Emergency Power Supply system in accordance with the current inspection interval specified in Chapter 5.

A. Operational Check of Emergency Power Supply System *(Aircraft Equipped with Single Emergency Power Supply System)*

CAUTION: ON AIRCRAFT NOT MODIFIED PER SB 35/36-32-4, SUPPORT NOSE OF AIRCRAFT WITH JACK PRIOR TO PERFORMING OPERATIONAL CHECK.

(1) Set EMER BAT/STBY/OFF switch, located on anti-ice/avionics panel *(Pilot's switch panel on 35-506 and Subsequent, 36-054 and Subsequent)* to OFF.
(2) Ensure that EMER BAT 1 circuit breaker is depressed.
(3) Set EMER BAT/STBY/OFF Switch to STBY.

NOTE:
- With EMER BAT/STBY/OFF Switch set to STBY, emergency power is applied to Emergency (Standby) Attitude Direction Indicator (EADI) and is available to illuminate the EMER PWR annunciator in the event of a failure of the normal electrical system.
- One minute after the initial application of power, pull the EADI caging knob and rotate the knob clockwise to momentarily cage the gyro and then uncage by pulling and rotating the knob counterclockwise.

(a) EADI shall illuminate and power flag shall pull from view.
(b) EMER PWR annunciator, located on pilot's instrument panel, shall illuminate.
(4) Set Battery Switches on. EADI shall remain powered on. EMER PWR annunciator shall extinguish.
(5) Pull EMER BAT 1 circuit breaker. EADI shall remain powered on. EMER PWR annunciator shall illuminate.
(6) Pull R ESS A BUS and ESS A BUS TIE circuit breakers. EADI shall remain powered on. EMER PWR annunciator shall remain illuminated.
(7) Pull L ESS A BUS circuit breaker. EADI shall continue to receive power. EMER PWR annunciator shall remain illuminated.
(8) Set EMER BAT/STBY/OFF Switch to OFF. EADI power flag shall come into view and illumination shall extinguish. EMER PWR annunciator shall extinguish
(9) Depress EMER BAT 1, R ESS A BUS, ESS A BUS TIE, and L ESS A BUS circuit breakers.
(10) Set Hydraulic Pump Switch on and allow hydraulic pressure to build up, then set off.
(11) Set EMER BAT/STBY/OFF Switch to EMER BAT. EADI shall illuminate and power flag shall pull from view.

NOTE: With the EMER BAT/STBY/OFF Switch set to EMER BAT, emergency power is applied to the Emergency (Standby) Attitude Direction Indicator and is available to illuminate the EMER PWR annunciator and landing gear position lights, and to operate flaps and landing gear in the event of a failure of the normal electrical system.

(12) Set Battery Switches off. Landing gear position lights shall remain illuminated and dimming can be achieved. EMER PWR annunciator shall illuminate.

(13) Lower flaps a short distance. Verify that flaps respond accordingly. No flap indicator movement shall be indicated.
(14) Set EMER BAT/STBY/OFF Switch to OFF. *On Aircraft not modified per SB 35/36-32-4*, depressurize hydraulic system by pumping brake pedals; then set EMER BAT/STBY/OFF Switch to OFF.
(15) Restore aircraft to normal.

B. Operational Check of Emergency Power Supply System. *(Aircraft Equipped with Dual Emergency Power Supply System)*

CAUTION: ON AIRCRAFT NOT MODIFIED PER SB 35/36-32-4, SUPPORT NOSE OF AIRCRAFT WITH JACK PRIOR TO PERFORMING OPERATIONAL CHECK.

(1) Set EMER BAT 1/STBY/OFF and EMER BAT 2/OFF switches, located on anti-ice/avionics panel *(Pilot's switch panel on 35-506 and Subsequent, 36-054 and Subsequent)* to OFF.
(2) Ensure that EMER BAT 1 and EMER BAT 2 circuit breakers are depressed.
(3) Set EMER BAT 1/STBY/OFF Switch to STBY.

NOTE:
- With EMER BAT 1/STBY/OFF Switch set to STBY, emergency power is applied to Emergency (Standby) Attitude Direction Indicator and is available to illuminate the EMER PWR 1 annunciator in the event of a failure of the normal electrical system.
- One minute after the initial application of power, pull the EADI caging knob and rotate the knob clockwise to momentarily cage the gyro and then uncage by pulling and rotating the knob counterclockwise.

(a) EADI shall illuminate and power flag shall pull from view.
(b) EMER PWR 1 annunciator, located on pilot's instrument panel, shall illuminate.
(4) Set EMER BAT 2/OFF Switch to EMER BAT 2. EMER PWR 2 annunciator, located on pilot's instrument panel, shall illuminate.
(5) Check equipment powered by second emergency power supply for operation. (Refer to Avionics and Optional Electrical Customization Wiring Manual.)
(6) Set Battery Switches on. EADI shall remain powered on. Both EMER PWR 1 and EMER PWR 2 annunciators shall extinguish.
(7) Pull EMER BAT 1 and EMER BAT 2 circuit breakers. EADI shall remain powered on. EMER PWR 1 and EMER PWR 2 annunciators shall illuminate.
(8) Pull R ESS A BUS and ESS A BUS TIE circuit breakers. EADI shall remain powered on. EMER PWR 1 and EMER PWR 2 annunciators shall remain illuminated.
(9) Pull L ESS A BUS circuit breaker. EADI shall continue to receive power. EMER PWR 1 and EMER PWR 2 annunciators shall remain illuminated.
(10) Set EMER BAT 1/STBY/OFF Switch to OFF. EADI power flag shall come into view and illumination shall extinguish. EMER PWR 1 annunciator shall extinguish.
(11) Set EMER BAT 2/OFF Switch to OFF. EMER PWR 2 annunciator shall extinguish.
(12) Depress EMER BAT 1, EMER BAT 2, R ESS A BUS, ESS A BUS TIE, and L ESS A BUS circuit breakers.
(13) Set Hydraulic Pump Switch on and allow hydraulic pressure to build up, then set off.
(14) Set EMER BAT 1/STBY/OFF Switch to EMER BAT 1. EADI shall illuminate and power flag shall pull from view.

NOTE: With the EMER BAT 1/STBY/OFF Switch set to EMER BAT 1, emergency power is applied to the Emergency (Standby) Attitude Direction Indicator and is available to illuminate the EMER PWR 1 annunciator and landing gear position lights, and to operate flaps and landing gear in the event of a failure of the normal electrical system.

(15) Set Battery Switches off. Landing gear position lights shall remain illuminated and dimming can be achieved. EMER PWR 1 annunciator shall illuminate.
(16) Lower flaps a short distance. Verify that flaps respond accordingly. No flap indicator movement shall be indicated.
(17) Set EMER BAT 1/STBY OFF Switch to OFF. *On Aircraft not modified per SB 35/36-32-4*, depressurize hydraulic system by pumping brake pedals; then set EMER BAT/STBY/OFF Switch to OFF.
(18) Restore aircraft to normal.

1. **Removal/Installation**
   A. Remove Emergency Battery. (Tailcone) (See Figure 201.)
      (1) Lower tailcone access door.
      (2) Disconnect aircraft batteries.
      (3) Loosen hold-down nut and remove emergency battery from battery rack and aircraft.
   B. Install Emergency Battery. (Tailcone) (See Figure 201.)
      (1) Install emergency battery in battery rack and secure with hold-down nut.
      (2) Connect aircraft batteries.
      (3) Secure tailcone access door.
   C. Remove Emergency Battery. (Nose Compartment) (See Figure 202.)
      (1) Lower tailcone access door and disconnect aircraft batteries.
      (2) Remove nose compartment access doors.
      (3) Loosen hold-down nut and remove emergency battery from battery rack and aircraft.
   D. Install Emergency Battery. (Nose Compartment) (See Figure 202.)
      (1) Install emergency battery in battery rack and secure with hold-down nut.
      (2) Connect aircraft batteries and secure tailcone access door.
      (3) Install and secure nose compartment access door.

2. **Inspection/Check**
   A. Inspect Emergency Power Supply (Model PS-823 Nickel Cadmium).

      NOTE: Perform Inspection of Emergency Power Supply system in accordance with the current inspection interval specified in Chapter 5.

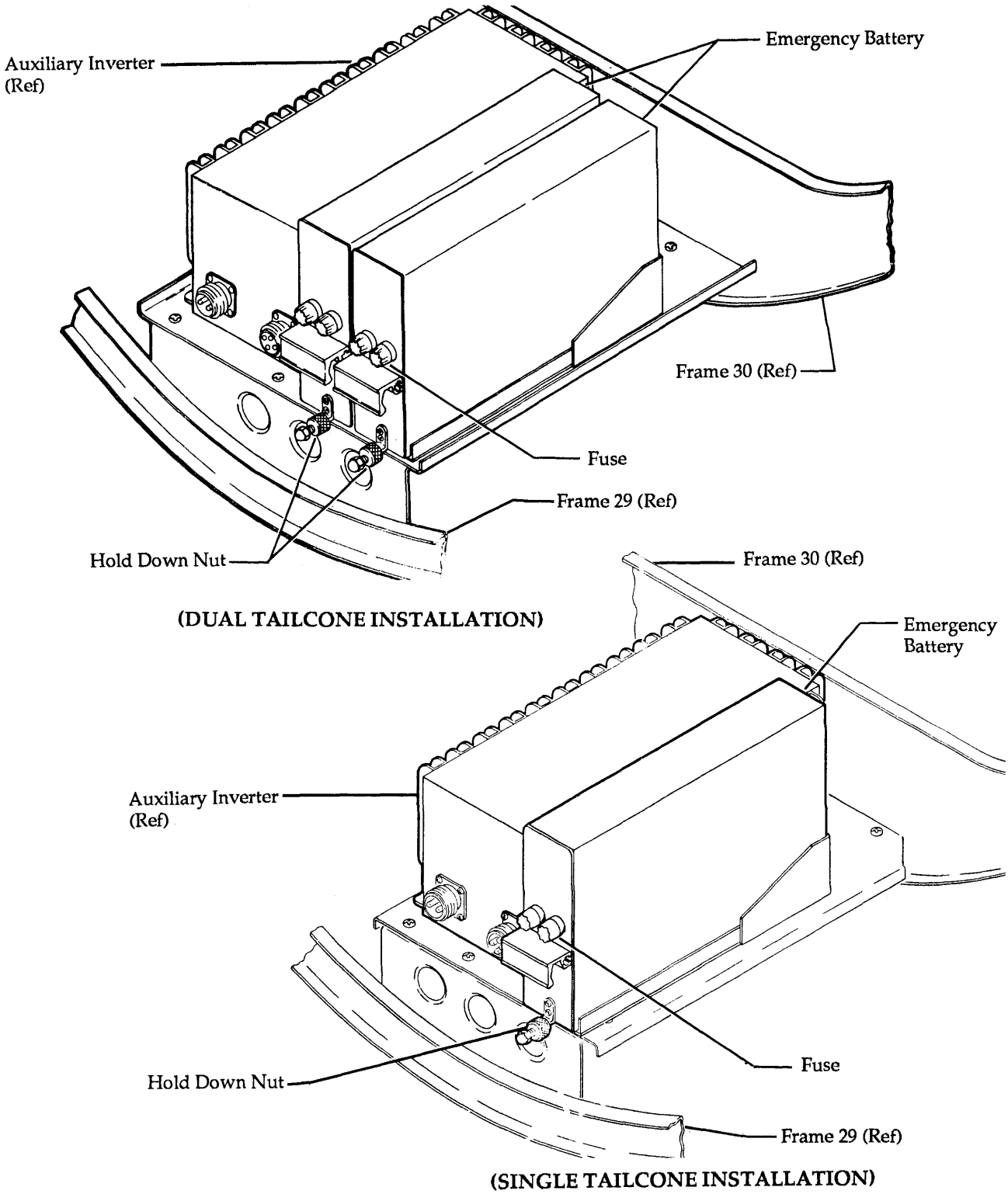
      (1) Remove emergency power supply. (Refer to Removal/Installation, this section.)

      CAUTION: WHEN REMOVING OR INSTALLING EMERGENCY POWER SUPPLY MODEL PS-823 COVER, REMOVE 10 AMP FUSE (F2) TO PREVENT CIRCUIT DAMAGE TO POWER SUPPLY.

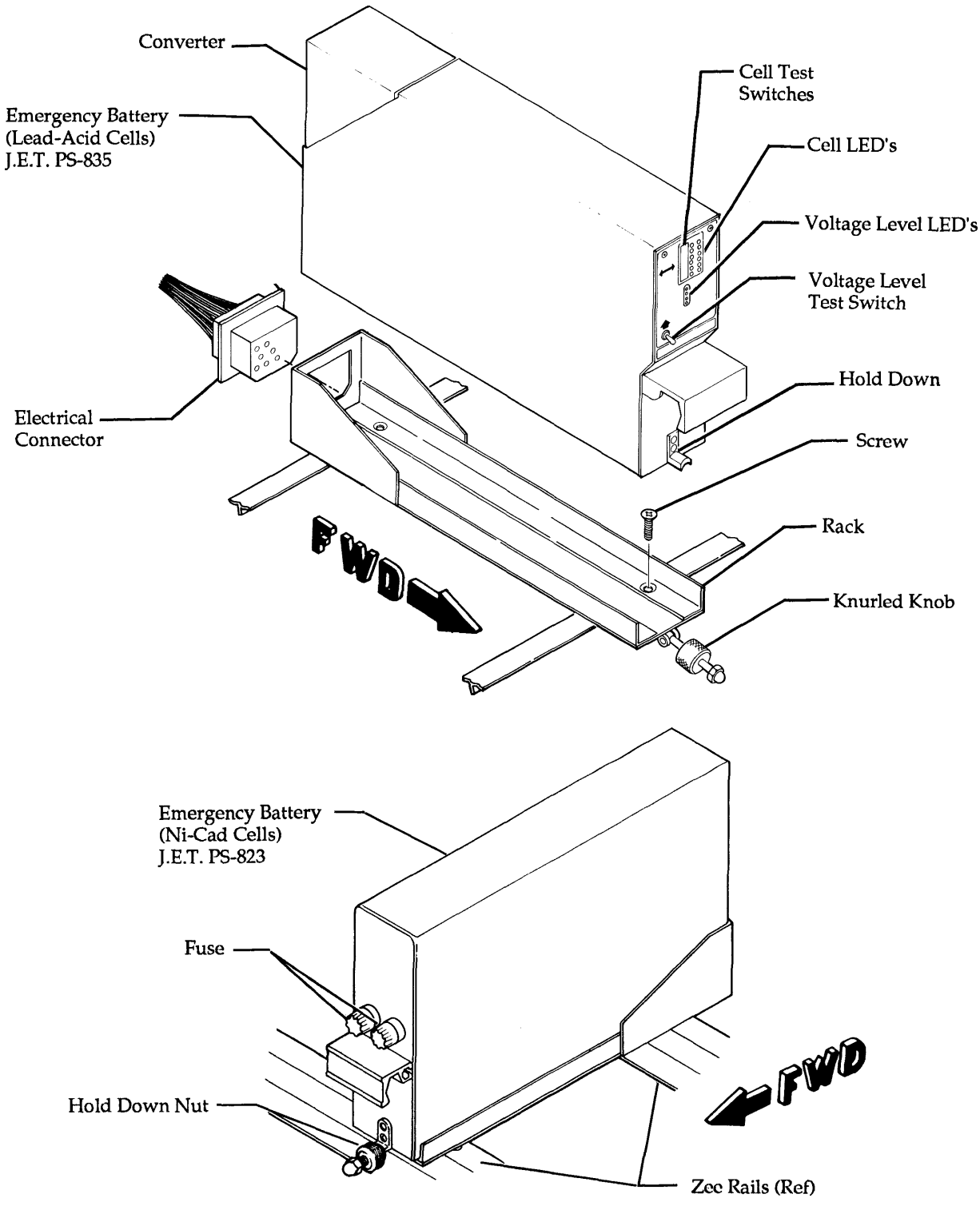
      (2) Remove 10 amp fuse (F2) from power supply.
      (3) Remove attaching parts and cover from power supply.
      (4) With internal battery pack exposed, inspect battery cells for obvious signs of excessive venting or corrosion.

      NOTE:
      - As a battery cell is repeatedly charged and discharged, a white powdery deposit may appear around the inner perimeter of battery cap seal area. This is potassium carbonate formation and is harmless to battery or components.
      - Venting is a normal process in which the battery cell releases excessive internal pressure resulting from overheating. Excessive venting is indicated by either a visible rupture near the top center of the battery cell or through the appearance of corrosion in the same area.
      - Battery cells can normally be inspected without physically removing individual cells from battery pack.

      (5) If venting or corrosion is evident, refer to current J.E.T. Operation, Installation and Maintenance Manual, Publication No. TP-202, for Battery Pack Repair procedures.
      (6) Position cover on power supply and secure with attaching parts.
      (7) Replace 10 amp fuse (F2) in power supply and secure.



Emergency Battery Installation
Figure 201



(SINGLE NOSE COMPARTMENT INSTALLATION)

9-1B-5

Emergency Battery Installation
Figure 202

(8) Install emergency power supply in aircraft. (Refer to Removal/Installation, this section.)
(9) Perform operational check of emergency power supply system. (Refer to Inspection/Check, 24-33-00.)

B. Inspect Emergency Power Supply (Model PS-835 Lead Acid).

NOTE: Perform Inspection of Emergency Power Supply system in accordance with the current inspection interval specified in Chapter 5.

(1) Remove emergency power supply. (Refer to Removal/Installation, this section.)
(2) Remove attaching parts and cover from power supply.

NOTE:
- Venting is a normal process in which the battery cell releases excessive internal pressure resulting from overheating. Excessive venting is indicated by either a visible rupture near the top center of the battery cell or through the appearance of corrosion in the same area.
- Battery cells can normally be inspected without physically removing individual cells from battery pack.

(3) With internal battery pack exposed, inspect battery cells for obvious indications of venting or corrosion.
(4) If venting or corrosion is evident, refer to current J.E.T. Operation, Installation and Maintenance Manual, Publication No. TB-329, for Battery Pack Repair procedures.
(5) Position cover over power supply and secure with attaching parts.
(6) Install power supply in aircraft. (Refer to Removal/Installation, this section.)
(7) Perform operational check of emergency power supply battery. (Refer to steps 2.C.(1) thru (4) .)
(8) Perform operational check of emergency power supply system. (Refer to Inspection/Check, 24-33-00.)

C. Operational Check of Emergency Power Supply Battery (Model PS-835 Lead Acid)

NOTE: Perform Operational Check of Emergency Power Supply Battery (Model PS-835 Lead Acid) in accordance with the current inspection interval specified in Chapter 5.

(1) Set the 12 CELL TEST Switches, located on the front panel of the emergency power supply, to ON position. Each CELL TEST LED shall illuminate if cell voltage is 1.9 volts dc or greater.

NOTE: CELL TEST LED's function as go/no go indicators during testing of the lead-acid cells. The brightness of the LED's may vary and does not indicate cell condition.

(2) Actuate and hold TEST toggle switch, located on the front panel of the emergency power supply, for 10 seconds.
(a) HEATER ON LED shall illuminate if battery ambient temperature is below 55° C (131° F).
(b) BATTERY VOLTAGE LED's shall illuminate according to the amount of voltage in the 12-cell pack. Twenty-four (24) volts dc is minimum requirement. If less than 24 volts dc, charge emergency power supply battery. (Refer to Chapter 12.)

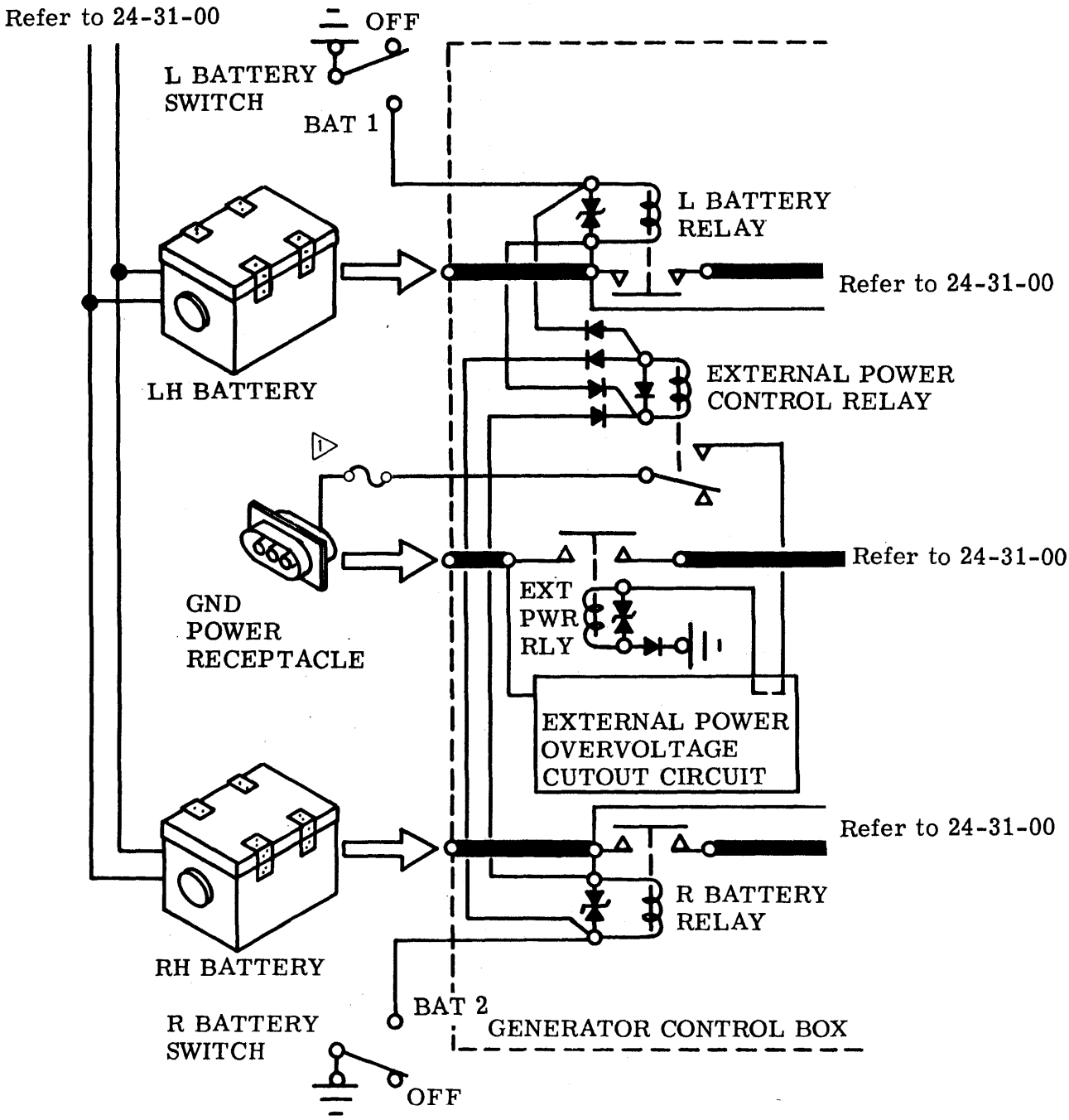
NOTE: If battery ambient temperature is above 55° C (131° F), OVER 55° C LED is illuminated. When OVER 55° C LED is illuminated, the internal heater will not turn on to provide a test load for performing step 2.C.(2), however the test is still considered valid.

(3) Set CELL TEST Switches off.

EXTERNAL POWER - DESCRIPTION AND OPERATION

1. **Description**
   A. External power is connected to the aircraft through a standard external power receptacle installed on the left side of the aft fuselage adjacent to the tailcone access door.

2. **Operation** (See figure 1.)
   A. With external power connected to the aircraft, a power circuit is completed to the de-energized contacts of the external power control relay. Setting either Battery Switch to ON completes a ground circuit to energize the external power control relay. The control relay energizes and power is applied through the external power overvoltage cutout circuit to energize the external power relay and apply external power to the battery bus. If external power input exceeds 33 (±2) volts, the zener diode breaks down and applies power to the gated diode. The gated diode will in turn break down and complete the ground circuit to the overvoltage cutout relay, which will energize and remove power from the external power relay, disconnecting external power from the aircraft. *On Aircraft 35-618 and Subsequent, 36-056 and Subsequent, and previous aircraft modified per AMK 86-5,* a fuse provides additional protection between the external power receptacle and the contacts of the external power control relay. At currents above 5A, the fuse will open and remove power from the contacts of the external power control relay, causing the external power relay to de-energize, disconnecting external power from the aircraft.



1 *35-618 and Subsequent; 36-056 and Subsequent, and previous aircraft modified per AMK 86-5.*

External Power Electrical Control Schematic
Figure 1

EXTERNAL POWER - TROUBLE SHOOTING

1. **TROUBLE SHOOTING**
   A. Trouble shooting procedures consist basically of electrical continuity checks to isolate the trouble.
   B. **Tools and Equipment**

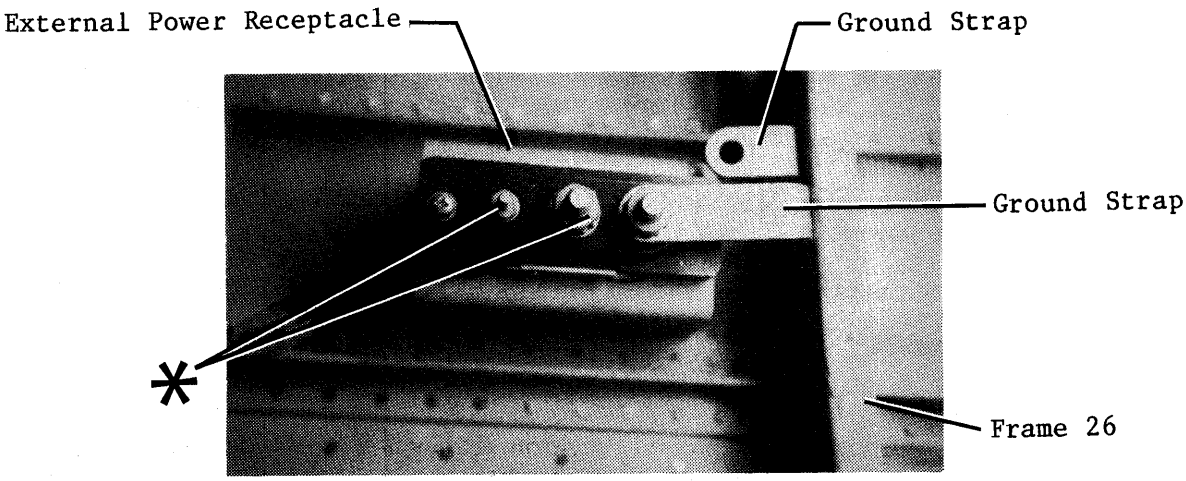
      NOTE: Equivalent substitutes may be used in lieu of the following items.

NAME	PART NUMBER	MANUFACTURER	USE
Voltmeter	3430A	Hewlett Packard	To check continuity of circuits.
or			
Voltmeter	260	Simpson	To check continuity of circuits.

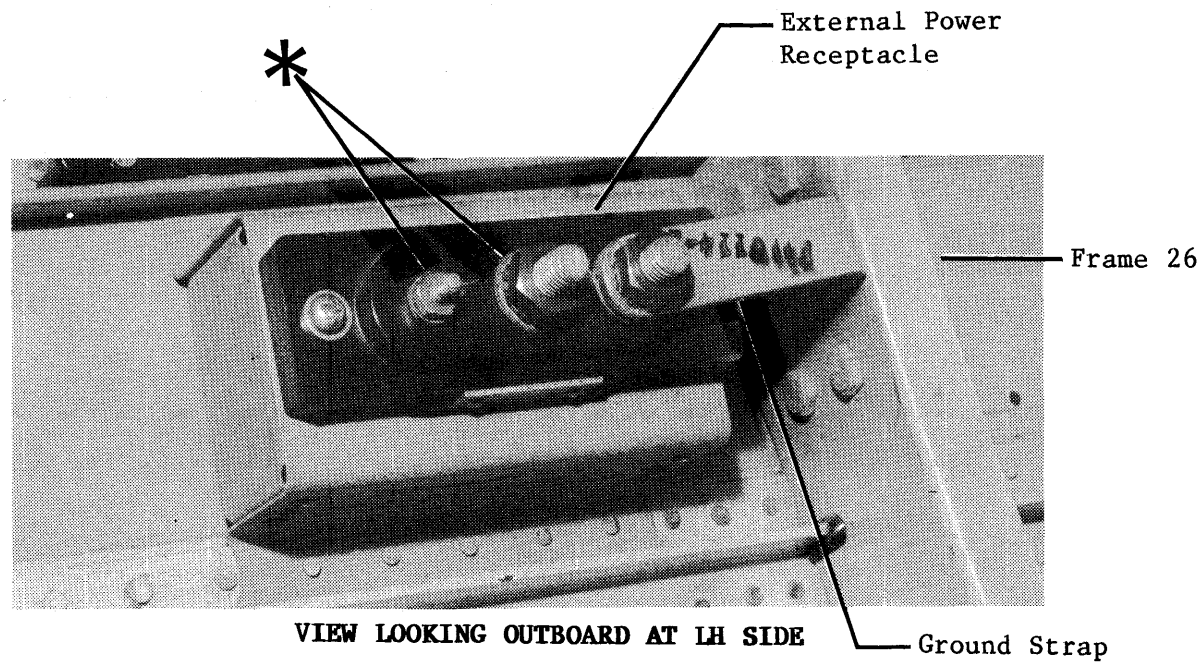
1. Removal/Installation

NOTE:
- All controls of the external power system are incorporated within the generator control box with the exception of the battery switches. Maintenance practices are limited to a visual check of wiring and replacement of the generator control box or the power receptacle.
- *Aircraft 35-618 and Subsequent and 36-056 and Subsequent* have a fuse installed between the external power receptacle and E43, Pin K. (See figure 202.)

A. Refer to 24-31-02 for removal and installation procedures of the generator control box.
B. Remove External Power Receptacle (See figure 201.)
   (1) Lower tailcone access door and disconnect aircraft batteries.
   (2) Remove sealant from exterior surface of support structure opening and from positive (+) terminals on receptacle.
   (3) Disconnect wiring and remove ground strap from terminals of receptacle. Tag wiring.
   (4) Remove attaching parts and receptacle from aircraft.
C. Install External Power Receptacle (See figure 201.)
   (1) Remove old sealant from exterior surface of support structure. Clean surface of support structure and outside of receptacle with methyl ethyl ketone.
   (2) Install receptacle and secure with attaching parts.
   (3) Seal around exterior surface of support structure and edge of receptacle using Pro-Seal 890, Class B. (Refer to Chapter 20.)
   (4) Connect electrical wiring and ground strap to receptacle.
   (5) Torque large terminals on receptacle 85 to 140 inch-pounds and small terminal 10 to 12 inch-pounds.
   (6) Clean positive (+) terminals with O-A-51 acetone and allow to air dry for 15 minutes.
   (7) Apply Pro-Seal (727B) liberally over terminals as shown. Assure that all bare metal is covered.



Aircraft 35-002, -003, -005, -007, -008 and -010 and Subsequent
36-002, -005 and Subsequent

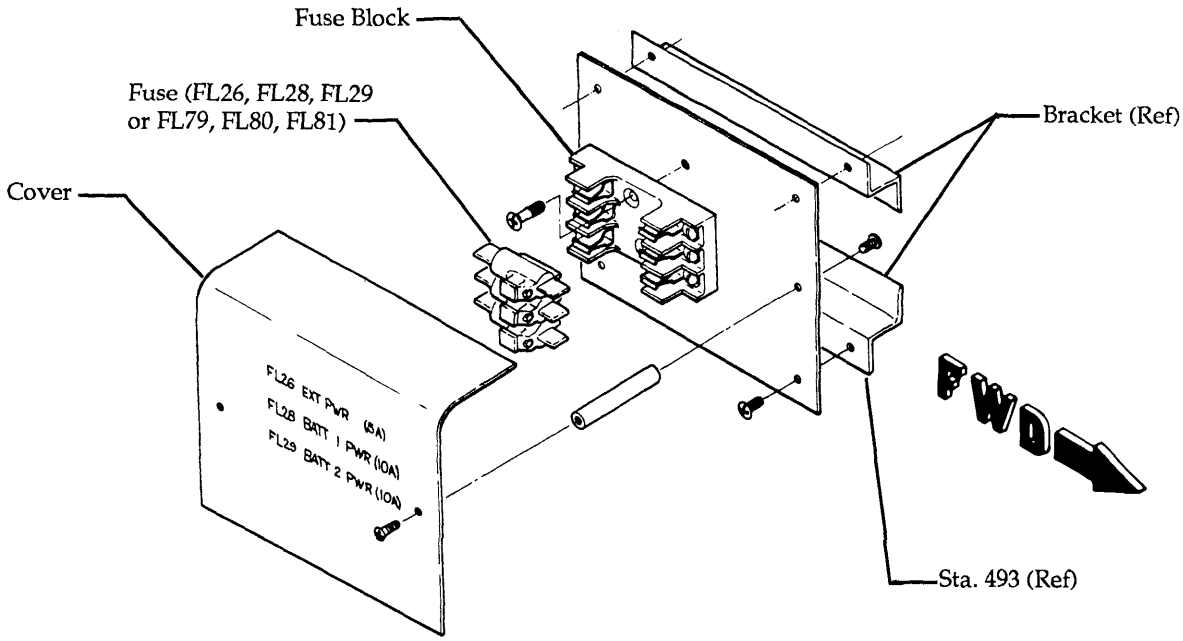


VIEW LOOKING OUTBOARD AT LH SIDE

Aircraft 35-004, -006, and -009
36-003 and -004

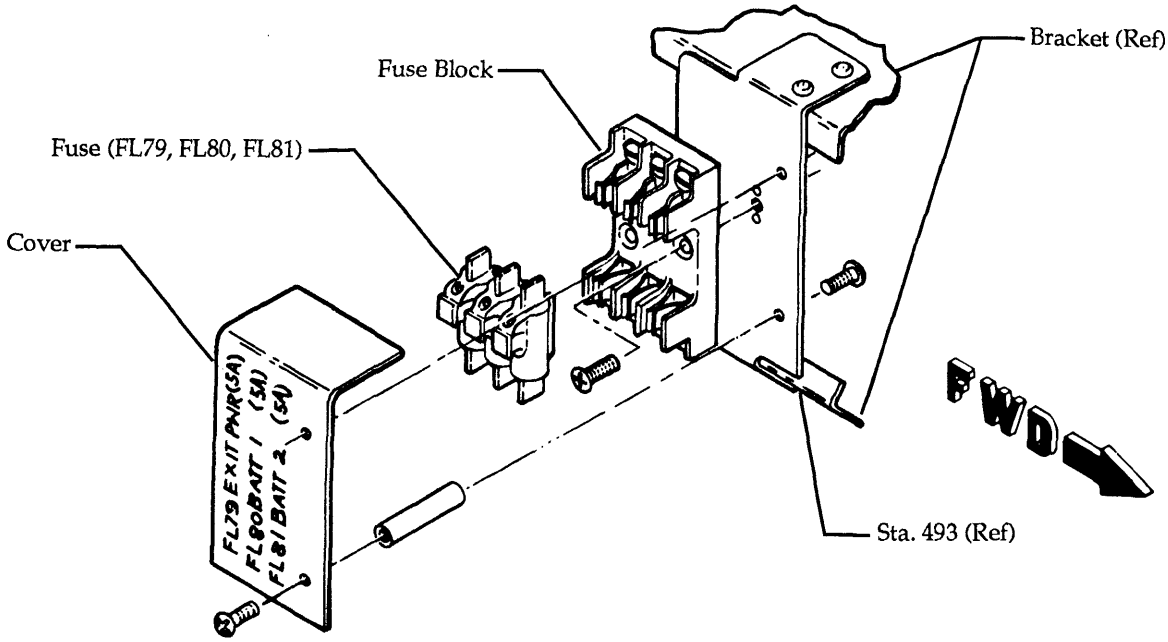
*Apply Pro-Seal (P/N 727B) liberally over positive post.

External Power Receptacle Installation
Figure 201



9-405C

(Aircraft 35-618 Thru 35-642; 36-056 Thru 36-058)



9-434A

(Aircraft 35-643 And Subsequent; 36-059 And Subsequent)

External Power Receptacle Fuse Installation
Figure 202

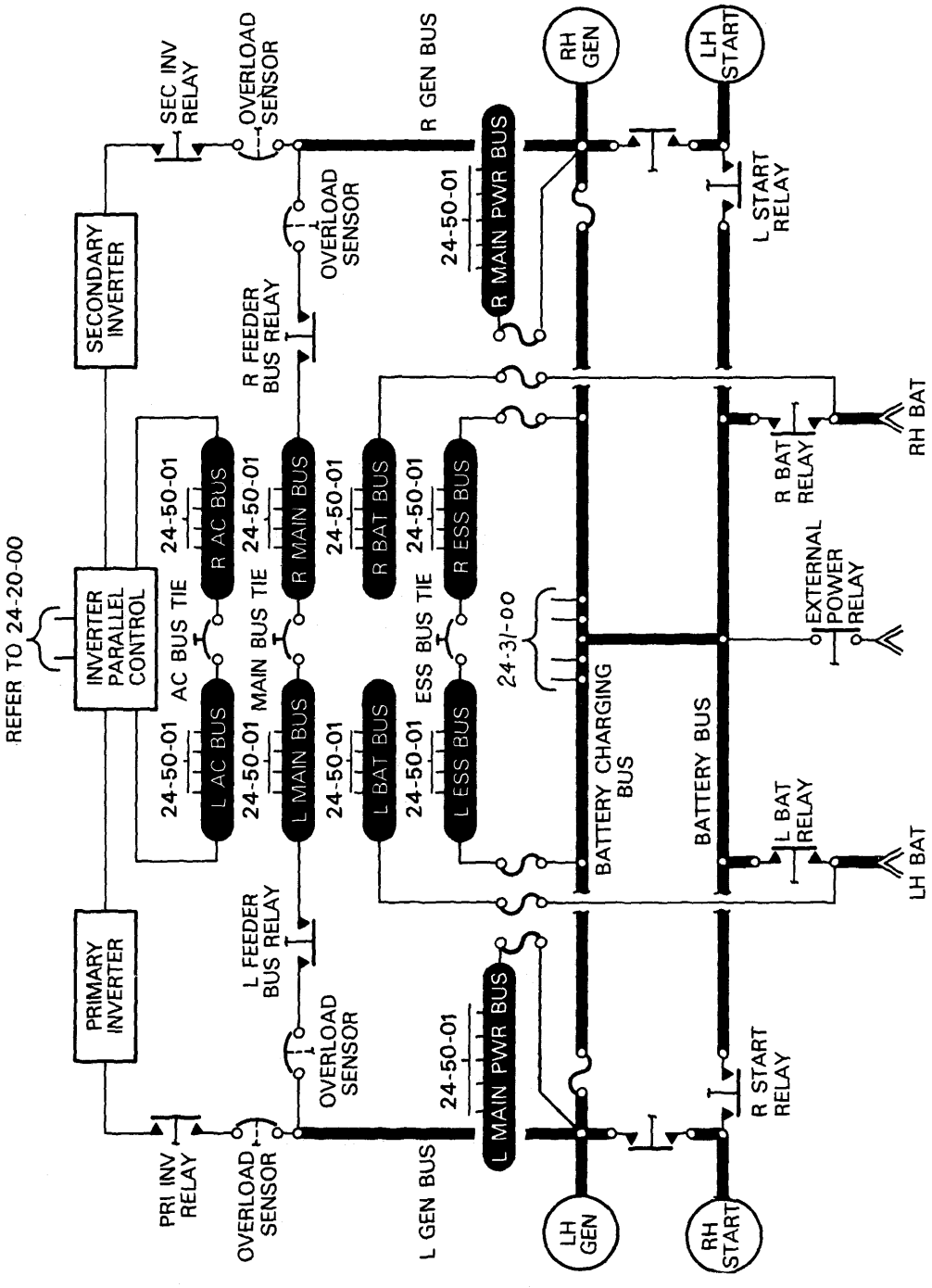
ELECTRICAL LOAD DISTRIBUTION - DESCRIPTION AND OPERATION

1. **Description**
   A. Electrical load distribution from the power sources to the various using systems is accomplished by wiring, current limiters, and circuit breakers.
   B. On *Aircraft 35-002 thru 35-201, 35-205; 36-002 thru 36-040, not modified per AMK 78-13, "Installation of Split Essential Bus Electrical System,"* each circuit breaker panel is divided into five major buses; ESS, BUS, MAIN BUS, AC BUS, BAT BUS, and MAIN PWR BUS. On *Aircraft 35-202, 35-203, 35-204, 35-206 and Subsequent; 36-041 and Subsequent and prior aircraft modified per AMK 78-13, "Installation of Split Essential Bus Electrical System,"* each circuit breaker panel is divided into six major buses; ESS A BUS, ESS B BUS, MAIN BUS, AC BUS, BAT BUS, and MAIN PWR BUS. On *Aircraft 35-002 thru 35-201, 35-205; 36-002 thru 36-040 modified per AMK 78-13, "Installation of Split Essential Bus Electrical System,"* the L and R essential B buses are installed in a current limiter box forward of frame 26 on stringers 13AL and 14L.
   C. The current limiter panel distributes electrical power from the batteries, generators, and external ground power to systems throughout the aircraft. Current limiters and current limiting fuses are protective devices utilized to protect against excessive current loads. The current limiter panel is installed on the generator control panel located in the tailcone on the left side at frame 26 (FS 476) and frame 26A (FS 492).
   D. On *Aircraft 35-657 and Subsequent and 36-064 and Subsequent,* a remote control circuit breaker (CBR9) and current limiting fuse (FL4), located on the shroud of the current limiting panel, provide power and protection for the remote interior circuit breaker panel. (See figure 2.)
   E. The generator control panel is divided into four major buses: R GEN BUS, L GEN BUS, BAT BUS, and BAT CHARGING BUS.
   F. The maximum allowable bus loading shall not exceed the following limits. The values are the maximum allowable current with the "Bus-Tie" circuit breaker open.

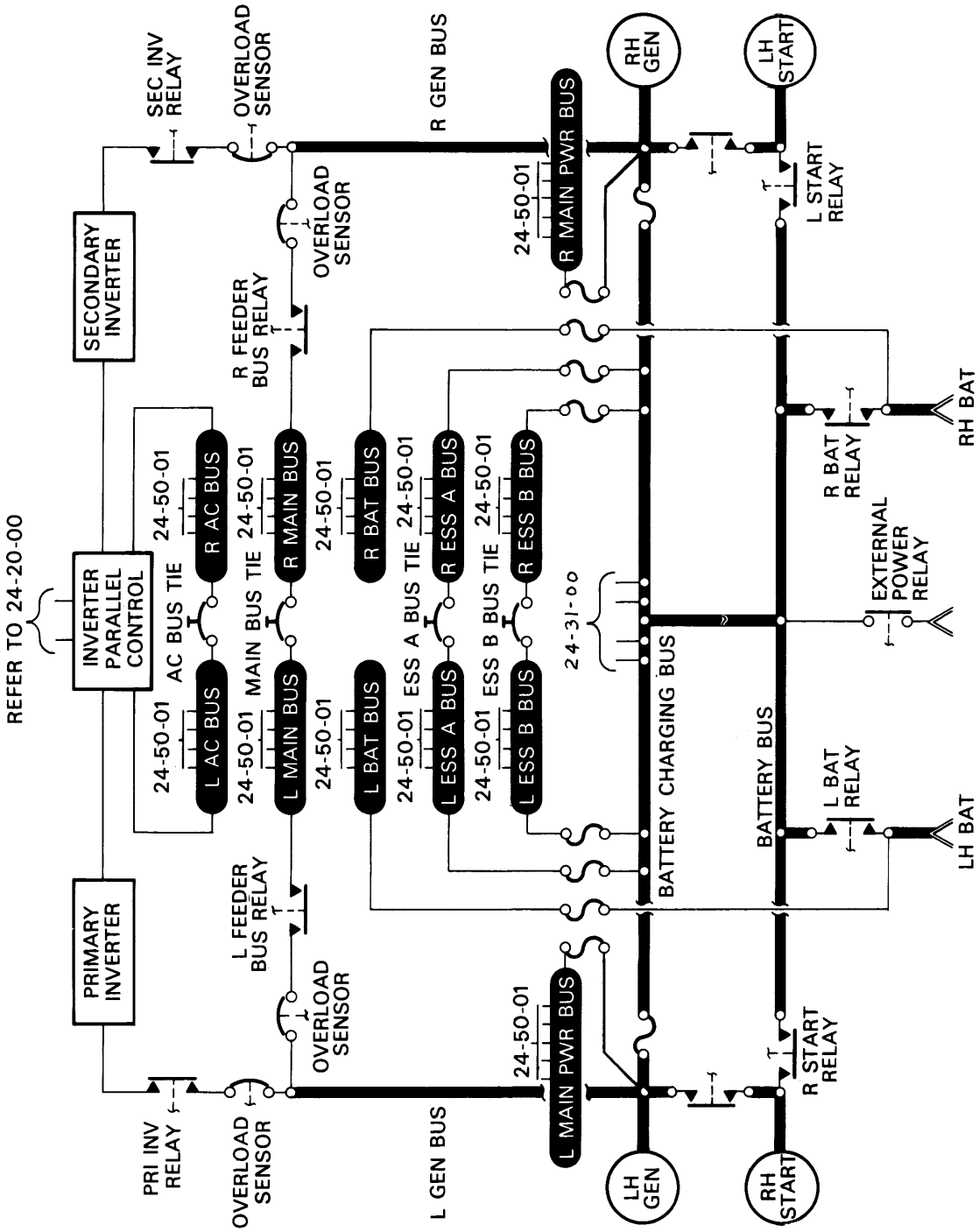
	EACH ESS BUS	EACH MAIN BUS
Continuous	28 Amperes	49 Amperes
Intermittent (5-Min.)	31 Amperes	55 Amperes
Transient (5-Sec.)	51 Amperes	90 Amperes

NOTE: If the last measured bus current load plus the added load is less than 90% of the maximum allowable load, testing is not required.

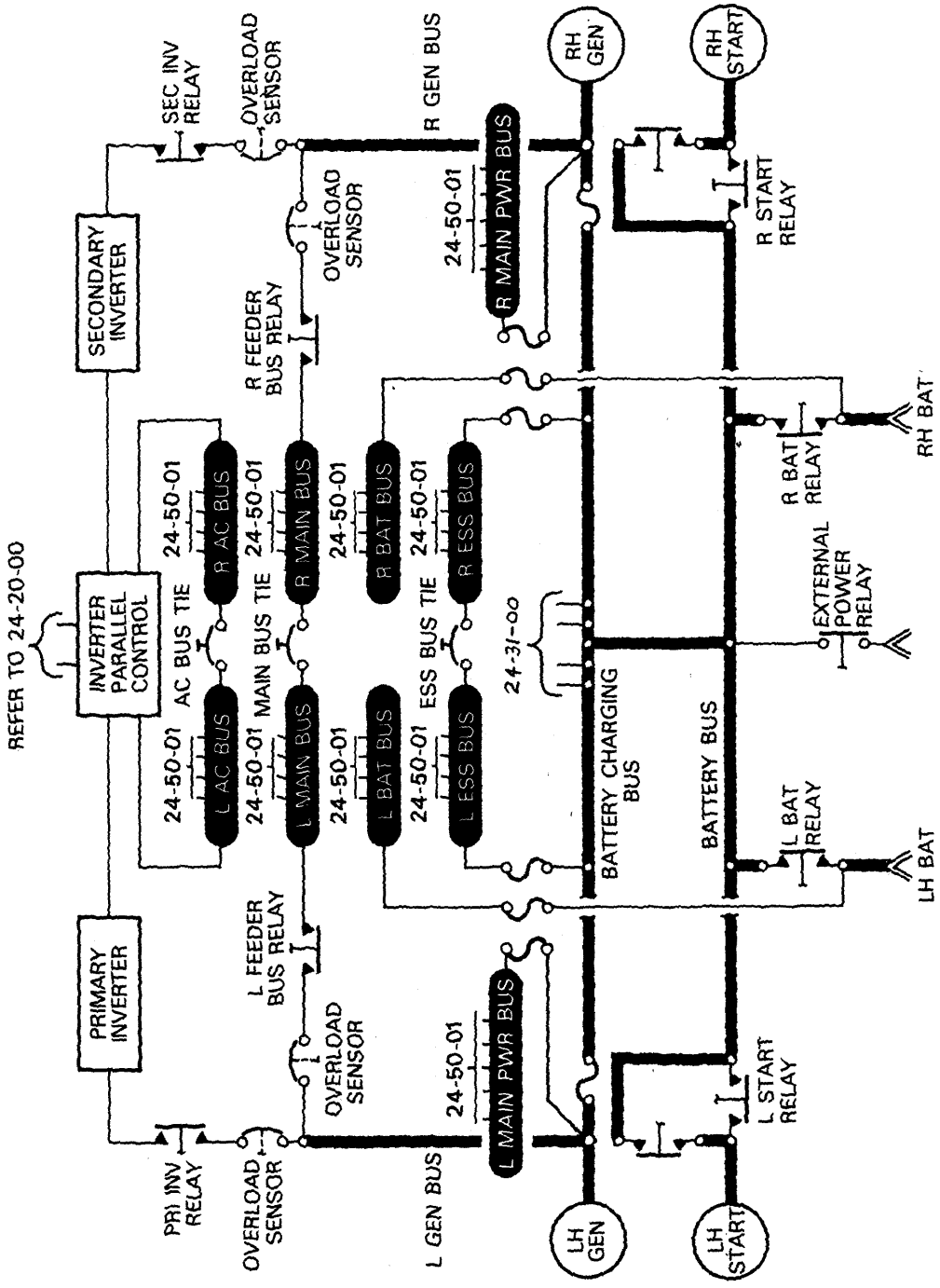
   G. If electrical equipment is added and the bus load current is unknown, an electrical load check must be performed. The load check may be performed with the additional equipment temporarily connected to the applicable bus.
   H. AC power supplied by the inverters is applied through the paralleling control to the pilot's and copilot's circuit breaker panel AC load buses. The individual buses are protected by circuit breakers. Each bus (pilot's and copilot's) is connected by a bus tie circuit breaker.
   I. The battery charging bus and battery bus are connected to the L and R Generator buses by 275 ampere current limiters. From the battery charging bus and battery bus power is distributed to the major buses in the circuit breaker panels through current limiters. The ESS buses and MAIN buses in each circuit breaker panel are connected by individual bus tie circuit breakers.
   J. The circuit breaker panels are installed in the cockpit on the RH and LH sides. Push-pull type circuit breakers are installed to protect all electrical systems in the aircraft. All primary circuit breakers are located on the left panel and all secondary breakers on the right panel. The DC circuit breakers are thermal type and the AC are magnetic type. Amperage ratings are shown on top of each circuit breaker. All odd-numbered circuit breakers are on the pilot's side and even numbers on the copilot's side. Refer to Chapter 24 in the Wiring Manual for circuit breaker number, nomenclature, and amperage rating.



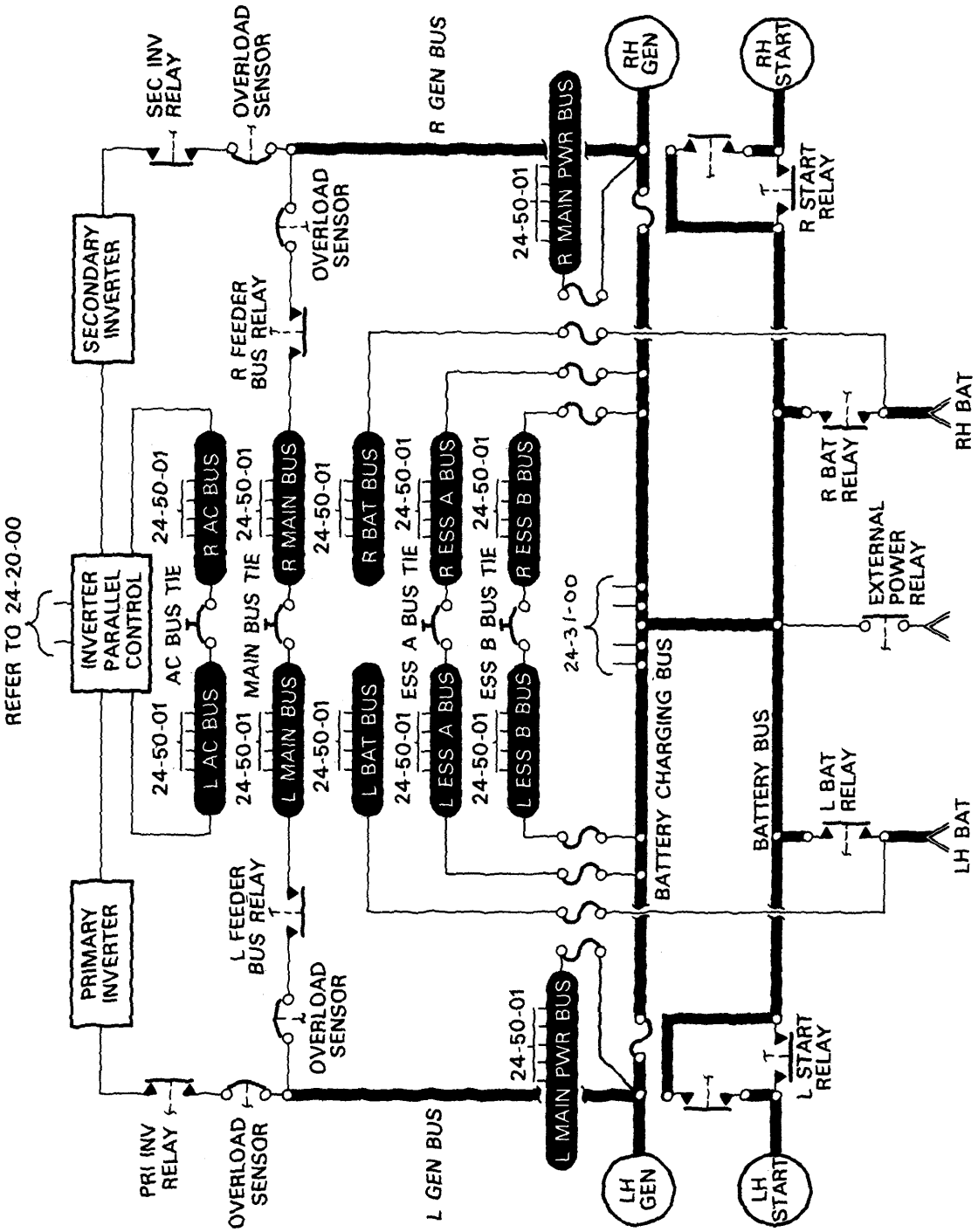
Electrical Power Distribution System Schematic
Figure 1 (Sheet 1 of 7)



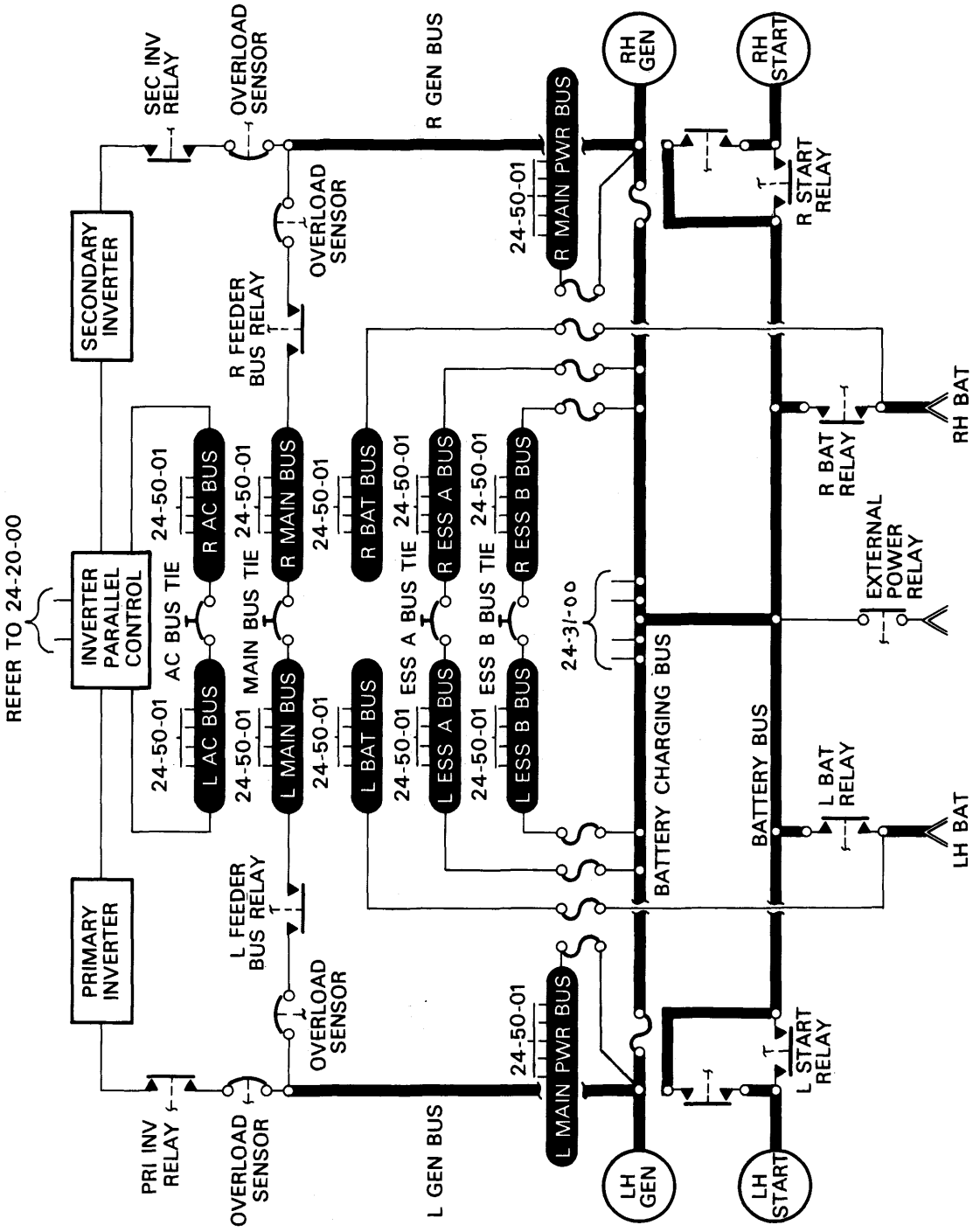
Electrical Power Distribution System Schematic
Figure 1 (Sheet 2 of 7)



Electrical Power Distribution System Schematic
Figure 1 (Sheet 3 of 7)

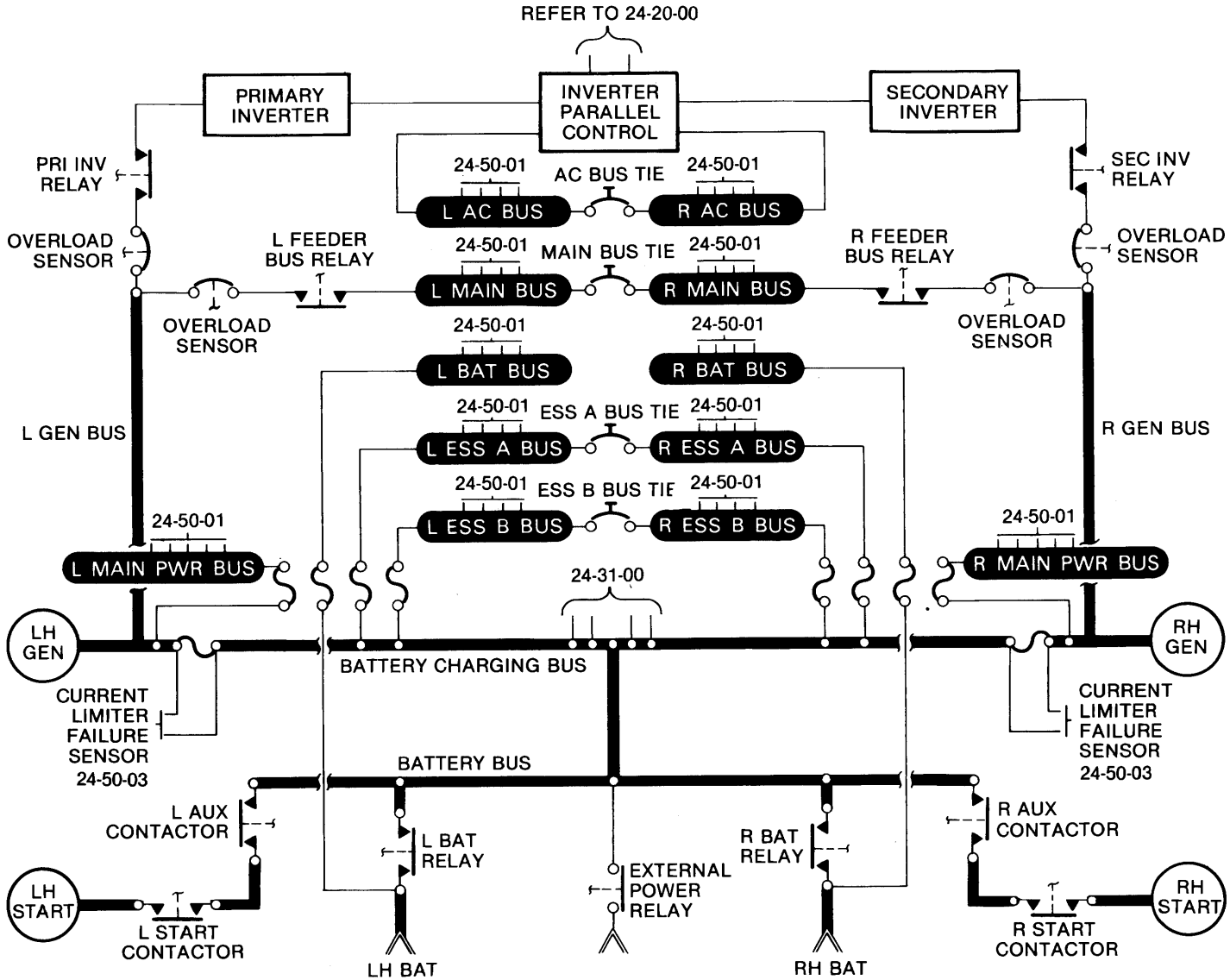


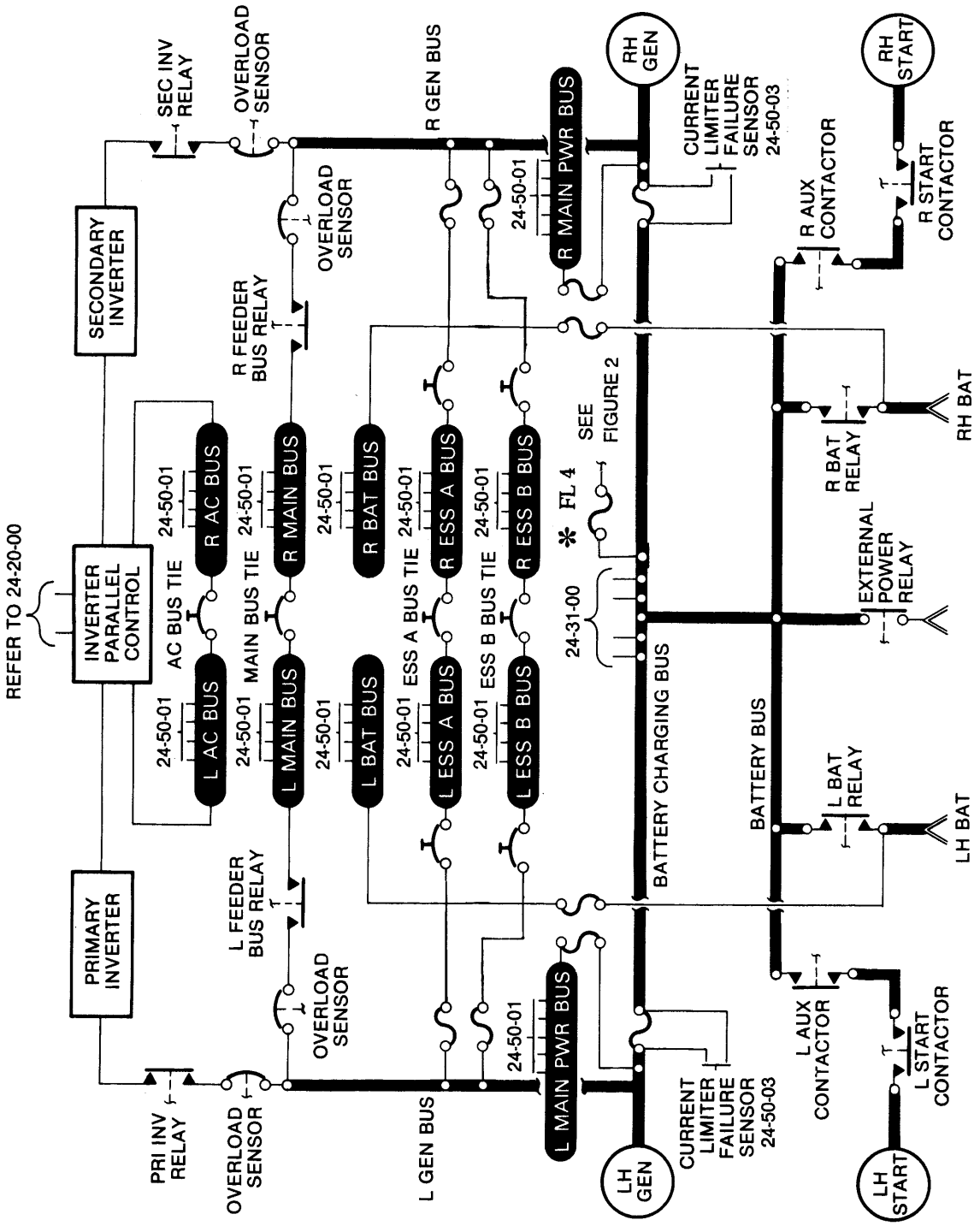
Electrical Power Distribution System Schematic
Figure 1 (Sheet 4 of 7)



Electrical Power Distribution System Schematic
Figure 1 (Sheet 5 of 7)

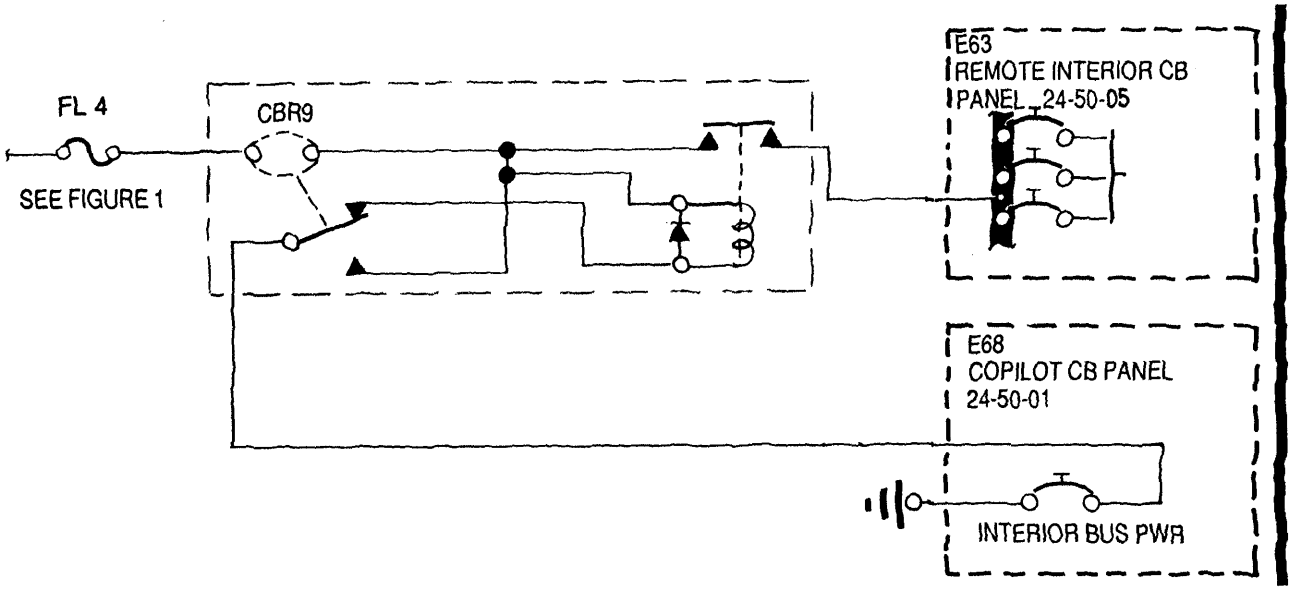
Electrical Power Distribution System Schematic
Figure 1 (Sheet 6 of 7)





* *Effective 35-657 and Subsequent, 36-064 and Subsequent*

Electrical Power Distribution System Schematic
Figure 1 (Sheet 7 of 7)



20-33A

Electrical Power Distribution System Schematic
Figure 2

K. *On Aircraft 35-657 and Subsequent, and 36-064 and Subsequent*, an interior circuit breaker panel (E63) located in the forward center headliner is provided to add an interior power circuit. Push-pull DC thermal circuit breakers are installed to protect interior electrical systems. Amperage ratings are shown on top of each circuit breaker. Refer to Wiring Manual, Chapter 24 for circuit breaker number, nomenclature and amperage rating.

L. *On Aircraft 35-002 thru 35-389, except 35-370; 36-002 thru 36-047 modified per AMK 80-17, "Installation of Current Limiter Warning and Starter Indicator Lights,"* operation of the 275-ampere current limiters is monitored by two current limiter failure sensors. (Refer to 24-50-03.) If either current limiter fails, power will flow from the generator bus to the battery charging bus through a resistor and circuit breaker (current limiter failure sensor). The circuit breaker is mechanically linked to a switch in the ground circuit for the L CUR LIMITER or R CUR LIMITER annunciator on the aft glareshield. If either annunciator illuminates, either the left or right 275-ampere current limiter has failed. *On Aircraft 35-370, 35-390 and Subsequent; 36-048 and Subsequent*, operation of the 275-ampere current limiters is monitored by two current limiter failure sensors. (Refer to 24-50-03.) If either current limiter fails, power will flow from the generator bus to the battery charging bus through a resistor and circuit breaker (current limiter failure sensor). The circuit breaker is mechanically linked to a switch in a ground circuit for the CUR LIM annunciator on the aft glareshield. If the CUR LIM annunciator illuminated, one of the 275-ampere current limiters has failed. Check aircraft electrical system.

M. Component Description

(1) The current limiter panel consists of a non-conductive plate assembly, bracket assemblies, bus bars, current limiter failure sensors, guard assembly, and cover assembly.

(a) Plate Assembly

1) The non-conductive phenolic material has tee nuts cemented flush with the plate in countersunk holes. The tee nuts provide mounting for fuse holders.

2) An enclosed link limiter type fuse (MS28937) is installed in the fuse holder. The ampere rating is marked on the top surface of the limiter.

(b) Bracket Assemblies

1) The bracket assemblies contain electrical connector(s). Electrical connectors provide quick electrical connect/disconnect during removal and installation.

(c) Bus Bars

1) Three silver-plated copper bus bars are utilized in the current limiter panel. The bus bars are identified by nomenclature as: left generator bus, right generator bus, and battery charging bus.

2) NAS bolts are silver soldered to the silver-plated copper bars. These bolts provide the connecting points for current limiters, fuses, and other electrical circuits. *On Aircraft 35-370, 35-390 and Subsequent and 36-048 and Subsequent*, four of the bolts also provide attach points for current failure sensor brackets.

(d) Current Limiter Failure Sensors *(Aircraft 35-002 thru 35-389, except 35-370, and 36-002 thru 36-047 modified per AMK 80-17, "Installation of Current Limiter Warning and Starter Indicator Lights.")*

1) Two sensor assemblies are utilized along with the current limiter panel. They are installed in a box on a mounting panel below and forward of the current limiter panel. One sensor assembly monitors the left-hand generator system. (For maintenance practices, refer to 24-50-03.)

(e) Current Limiter Failure Sensors *(Aircraft 35-370, 35-390 and Subsequent, 36-048 and Subsequent.)*

1) Two sensor assemblies are utilized in the current limiter panel. One sensor assembly monitors the left-hand generator system and the other sensor assembly monitors the right-hand generator system. (For maintenance practices, refer to 24-50-03.)

2) Current limiter failure sensor components are assembled on a non-conductive bracket. The bracket is attached to electrical studs on the bus bars. (Refer to paragraph on bus bars.)

(f) Guard Assembly

1) A guard assembly wraps around three sides of the current limiter panel as a protection for current limiter components. The guard assembly attaches to a plate assembly and provides attach points for the cover assembly.

(g) Cover Assembly

1) The cover assembly consists of a frame and plexiglass that attaches to the guard assembly with screws. Current limiters and fuses are installed in the current limiter panel so maintenance personnel can visually determine their condition (blown indicator) with cover assembly installed.

2) The cover assembly has location, reference designator, and amperage of current limiters and fuses silkscreened on the plexiglass.

(2) Spare Current Limiters and Fuses

(a) *On Aircraft 35-023, 35-026, 35-028, 35-030 and Subsequent, 36-014 and Subsequent, and aircraft modified per AMK 75-6, "Installation of Spare Current Limiter Box Assembly,"* a spare current limiter box is located on the tailcone floorboard just inside and aft of the tailcone access door. To gain access to the spare current limiters and fuses, remove a screw at each end of the box and remove the box containing the spare current limiters and fuses.

ELECTRICAL LOAD DISTRIBUTION - TROUBLE SHOOTING

1. **TROUBLE SHOOTING**
   A. Trouble shooting the load distribution system consists basically of checking condition of the current limiters, curcuit breakers, wiring, and continuity checks of wire.
   B. Tools and Equipment

   NOTE: Equivalent substitutes may be used in lieu of the following items.

NAME	PART NUMBER	MANUFACTURER	USE
Voltmeter	3430A	Hewlett Packard	To check continuity of wiring.
or			
Voltmeter	260	Simpson	To check continuity of wiring.

ELECTRICAL LOAD DISTRIBUTION - MAINTENANCE PRACTICES

1. ELECTRICAL BUS LOAD CHECK

NOTE: ° This check is applicable to the Essential DC buses and the Main DC buses.

° All aircraft electrical and avionics must be installed and functional.

° All current measurements shall be made with one engine operating at 60% N_2 or above. An alternate power source having a regulated output of 28.5 (±0.3) vdc at 100 amperes for the Essential Bus or 200 amperes for the Main Buses may be used.

° If Essential Bus load is being measured, Main Bus loads need not be operating. If Main Bus load is being measured, Essential Bus loads need not be operating.

A. Perform Electrical Bus Load Check

(1) Turn on all electrical equipment for the applicable bus except as noted:
- (a) Instrument Lights - Fully Clockwise
- (b) Autopilot - Heading Mode
- (c) Yaw Damper - Secondary
- (d) Navigation Lights - OFF
- (e) Pitot Heaters - ON (during measurement only)
- (f) Stall Warning Heaters - ON (during measurement only)
- (g) Air Ignition - ON (during measurement only)
- (h) Communication Transceiver - ON (Transmit only as noted in procedure)
- (i) Standby Boost Pumps (both) - ON (Operate only as noted in procedure)
- (j) Manual Pitch Trim - Trim as noted in procedure

(2) Check current at R Essential Bus as follows: (35-002 thru 35-201 and 35-205 and 36-002 thru 36-040 not modified per AMK 78-13 "Installation of Split Essential Bus Electrical System").

(a) Clamp current gun (F.W. Bell CG-100A or equivalent), around wire P58B12T at plug 184 (Frame 17A, RH side) or at receptacle J262 on rear of copilot's circuit breaker panel.

NOTE: ° A DC ammeter (0 - 100 amperes) may be used in lieu of the current gun. If ammeter is used, connect ammeter in series with wire P58B12T at receptacle J262. Use extreme caution and protect ammeter terminals and leads from shorting to aircraft structure or equipment.

° Refer to applicable wiring diagram in Chapter 24 of the wiring manual for applicable pin designation.

(b) Set Battery Switches ON and assure that ESS BUS-TIE circuit breaker is closed (depressed).
(c) Turn on all electrical and avionics systems. Set up items as noted in paragraph A(1)(a) thru A(1)(g).

CAUTION: OPERATE HEATERS AND AIR IGNITION ONLY AS REQUIRED TO OBTAIN CURRENT READINGS. TAKE CURRENT READINGS AFTER APPROXIMATELY 10 SECONDS TO OBTAIN A MORE STABLE CURRENT.

(d) Measure and record Essential Bus current in table 1 (Continuous load configuration - Bus-Tie closed I_{RC}.)

NOTE: Allow 2-3 minutes between checks so that heater can cool down.

(e) Repeat steps A(2)(b) and A(2)(c) and, in addition, set both Standby Boost Pump Switches to ON.
(f) Measure and record Essential bus current in table 1 (intermittent load configuration - Bus-Tie closed I_{RC}.)
(g) Repeat steps A(2)(b), A(2)(c) and A(2)(e) and, in addition, transmit on Comm 2 while trimming in pitch from the copilot's control wheel.
(h) Measure and record Essential Bus current in table 1 (transient load configuration - Bus-Tie I_{RC}.)
(i) Repeat steps A(2)(b) thru A(2)(h) except open Essential Bus-tie circuit breaker. Loads on pilot's side need not be operated.
(j) Remove current gun or ammeter from copilot's essential bus.
(k) Compute current load for the LH Essential Bus and enter in table 1. Use the following formula to compute the current load.

$$I_{LO}=2\ I_{RC} - I_{RO}$$

Where I_{LO} = Left Bus Current (Bus-Tie open)
I_{RC} = Right Bus Current (Bus-Tie closed)
I_{RO} = Right Bus Current (Bus-Tie open)

(3) Check current at R Essential A and B as follows: (35-202 thru 35-204, 35-206 and Subsequent and 36-041 and Subsequent and prior Aircraft modified per AMK 78-13 "Installation of Split Essential Bus Electrical System.")
(a) Clamp current gun (F.W. Bell, CG-100A or equivalent) around wire P58B12T at plug P184 (Frame 17A, RH side) or at receptacle J262 on rear of copilot's circuit breaker panel.

NOTE: ° A DC ammeter (0-100 amperes) may be used in lieu of the current gun. If ammeter is used, connect ammeter in series with wire P58B12T at receptacle J262. Use extreme caution and protect ammeter terminals and leads from shorting to aircraft structure or equipment.

° Refer to applicable wiring diagrams in Chapter 24 of the Wiring Manual for applicable pin designation.

(b) Set Battery Switches ON and assure that ESS BUS-TIE circuit breaker is closed.

(c) Turn on all electrical and avionics equipment applicable to R Essential A Bus. Set up items as noted in paragraph A(1)(a) thru A(1)(g).

CAUTION: OPERATE HEATERS AND AIR IGNITION ONLY AS REQUIRED TO OBTAIN CURRENT READINGS. TAKE CURRENT READINGS AFTER APPROXIMATELY 10 SECONDS TO OBTAIN A MORE STABLE CURRENT.

(d) Measure and record RH Essential A Bus current in table 1 (continuous load configuration - Bus-Tie closed, I_{RC}.)

NOTE: Allow 2-3 minutes between checks so that heaters can cool down.

(e) Repeat steps (3)(b) and (3)(c) and, in addition, turn on any intermittently operated optional equipment.

NOTE: If no intermittently operated optional equipment is connected to R Essential A Bus, enter continuous load current reading.

(f) Measure and record R Essential A Bus current in table 1 (intermittent load configuration - Bus-Tie closed, I_{RC}.)

(g) Repeat steps (3)(b), (3)(e) and, in addition, transmit on Comm 2 while trimming in pitch from copilot's control wheel.

(h) Measure and record R Essential A Bus current in table 1 (transient load configuration - Bus-Tie closed I_{RC}.)

(i) Repeat steps (3)(b) thru (3)(h) except open R ESS A BUS-TIE circuit breaker. Loads on pilot's side need not be operated.

(j) Remove current gun or ammeter from copilot's Essential A Bus.

(k) Clamp current gun around wire P169B12T at plug P184 (Frame 17A, RH side) or at receptacle J262 on rear of copilot's circuit breaker panel.

(l) Repeat steps (3)(b) thru (3)(h) and record readings for Essential B Bus in table 1. Operate loads applicable to Essential B Bus with the exception of the gear, flaps, and spoilers.

NOTE: Utilize the Standby boost pumps as the intermittently operated equipment during this check.

(4) Check current at L Essential A and B Buses as follows: (35-202 thru 35-204, 35-206 and Subsequent and 36-041 and Subsequent and prior Aircraft modified per AMK 78-13 "Installation of Split Essential Bus Electrical System").

(a) Compute current loads for the L Essential A and B Buses using the following formula. Record loads in table 1.

$$I_{LO} = 2I_{RC} - I_{RO}$$

Where I_{LO} = Left Bus Current (Bus-Tie Open)
I_{RC} = Right Bus Current (Bus-Tie Closed)
I_{RO} = Right Bus Current (Bus-Tie Open)

(5) Check Current of R Main Bus as follows: (35-002 and Subsequent and 36-002 and Subsequent)

(a) Clamp current gun (F.W. Bell, CG-100A or equivalent) around wires P54A12T and P54D12T at plug P184 (Frame 17A, RH side) or at receptacle J262 on the rear of the copilot's circuit breaker panel.

NOTE: ° A DC ammeter (0-100 amperes) may be used in lieu of the current gun. If ammeter is used, connect ammeter in series with wires P54A12T and P54D12T at receptacle J262. Use extreme caution and protect ammeters terminals and leads from shorting to aircraft structure or equipment.

° Refer to applicable wiring diagram in Chapter 24 of the wiring manual for applicable pin designation.

(b) Set Battery Switches ON and assure that Main Bus-Tie circuit breaker is closed (depressed).

(c) Turn on all electrical and avionics equipment that is used continuously during night flight. Measure and record current readings in table 1 (continuous load configuration - Bus-Tie closed, I_{RC}).

(d) Repeat step (5)(c) and, in addition, turn on all electrical and avionics equipment that is used only for short periods of time during flight.

NOTE: Examples of short-period equipment are the landing lights, windshield heat, fuselage pump, recognition light, etc.

(e) Measure and record current reading in table 1 (intermittent load configuration - Bus-Tie closed, I_{RC}.)

(f) Repeat steps (5)(c) and (5)(d) and, in addition, operate all equipment that has a duty cycle of approximately 5 seconds.

NOTE: Examples of equipment are DME search, radio transmissions, etc.

(g) Measure and record current readings in table 1 (transient load configuration - Bus-Tie closed, I_{RC}.)
(h) Repeat steps (5)(c), (5)(d), and (5)(f) except open MAIN BUS-TIE circuit breaker. Record current readings in table 1 (Bus-Tie open, I_{RO}). Remove current gun or ammeter from copilot's circuit breaker panel.
(j) Turn off all electrical and avionics equipment and set Battery Switches to OFF.

(6) Check current at L Main Bus as follows. (35-002 and Subsequent and 36-002 and Subsequent.)
(a) Compute current load for L Main Bus using the following formula. Record loads in table 1.

$$I_{LO} = 2I_{RC} - I_{RO}$$

Where I_{LO} = Left Bus Current (Bus-Tie Open)
I_{RC} = Right Bus Current (Bus-Tie Closed)
I_{RO} = Right Bus Current (Bus-Tie Open)

B. Perform operational check of current limiter failure sensors as follows: (Aircraft 35-370, 35-390 and Subsequent, 36-048 and Subsequent.)
(1) Connect auxiliary power unit to aircraft.
(2) Set Battery Switches to BAT 1 and BAT 2.
(3) Depress circuit breakers for master warning system.
(4) Lower tailcone access door and remove cover from current limiter panel. Current limiter panel is located on the LH side of the tailcone above the tailcone access opening.
(5) Pull circuit breaker 198 on current limiter panel and observe that master warning light flashes and the CUR LIM light in the glareshield illuminates steady.
(6) Depress circuit breaker 198 and observe that CUR LIM light extinguishes. Press and release master warning light and observe that it extinguishes.
(7) Pull circuit breaker 199 on current limiter panel and observe that the master warning light flashes and the CUR LIM light in the glareshield illuminates steady.
(8) Depress circuit breaker 199 and observe that CUR LIM light extinguishes. Press and release master warning light and observe that it extinguishes.
(9) Install and secure cover on current limiter panel, and close and secure tailcone access door.
(10) Disconnect auxiliary power unit from aircraft and set Battery Switches to OFF.
(11) If any of the lights failed to illuminate, check condition of bulb.
(12) If bulbs are acceptable, perform continuity check of circuit. Refer to applicable wiring diagrams in Chapter 24 of the Wiring Manual.

LOAD CONFIGURATION	ESSENTIAL MAX.	ESSENTIAL ACTUAL LEFT (I_{LO})	ESSENTIAL ACTUAL RIGHT Bus-Tie Open (I_{RO})	ESSENTIAL ACTUAL RIGHT Bus-Tie Closed (I_{RC})	LOAD CONFIGURATION	MAIN MAX.	MAIN ACTUAL LEFT (I_{LO})	MAIN ACTUAL RIGHT Bus-Tie Open (I_{RO})	MAIN ACTUAL RIGHT Bus-Tie Closed (I_{RC})
Continuous	28A				Continuous	49			
Intermittent (5-Minute)	31				Intermittent (5-Minute)	55			
Transient (5-Second)	51				Transient (5-Second)	90			

35-002 thru 35-201, 35-205 and 36-002 thru 36-040 Not Modified Per AMK 78-13

LOAD CONFIGURATION	ESSENTIAL MAX.	ESSENTIAL ACTUAL LEFT (I_{LO}) A	ESSENTIAL ACTUAL LEFT (I_{LO}) B	ESSENTIAL ACTUAL RIGHT Bus-Tie Open (I_{RO}) A	ESSENTIAL ACTUAL RIGHT Bus-Tie Open (I_{RO}) B	ESSENTIAL ACTUAL RIGHT Bus-Tie Closed (I_{RC}) A	ESSENTIAL ACTUAL RIGHT Bus-Tie Closed (I_{RC}) B	LOAD CONFIGURATION	MAIN MAX.	MAIN ACTUAL LEFT (I_{LO})	MAIN ACTUAL RIGHT Bus-Tie Open (I_{RO})	MAIN ACTUAL RIGHT Bus-Tie Closed (I_{RC})
Continuous	28A							Continuous	49			
Intermittent (5-Minute)	31							Intermittent (5-Minute)	55			
Transient (5-Second)	51							Transient (5-Second)	90			

35-202 thru 35-204, 35-206 and Subsequent and 36-041 and Subsequent and Prior Aircraft Modified Per AMK 78-13

Electrical Load Distribution System Check Table 1

CIRCUIT BREAKER PANEL - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Circuit Breaker Panel. (See Figure 201.)
   (1) Disconnect aircraft batteries.
   (2) Remove screws securing circuit breaker panel to aircraft structure.
   (3) Tilt panel sufficiently to allow disconnection of electrical connectors.
   (4) Disconnect electrical connectors and remove circuit breaker panel from aircraft.

B. Remove Circuit Breaker.
   (1) Remove attaching parts and bus bar from circuit breakers.

   NOTE: To allow removal of defective circuit breaker, the bus bar which is attached to the defective circuit breaker must be completely removed.

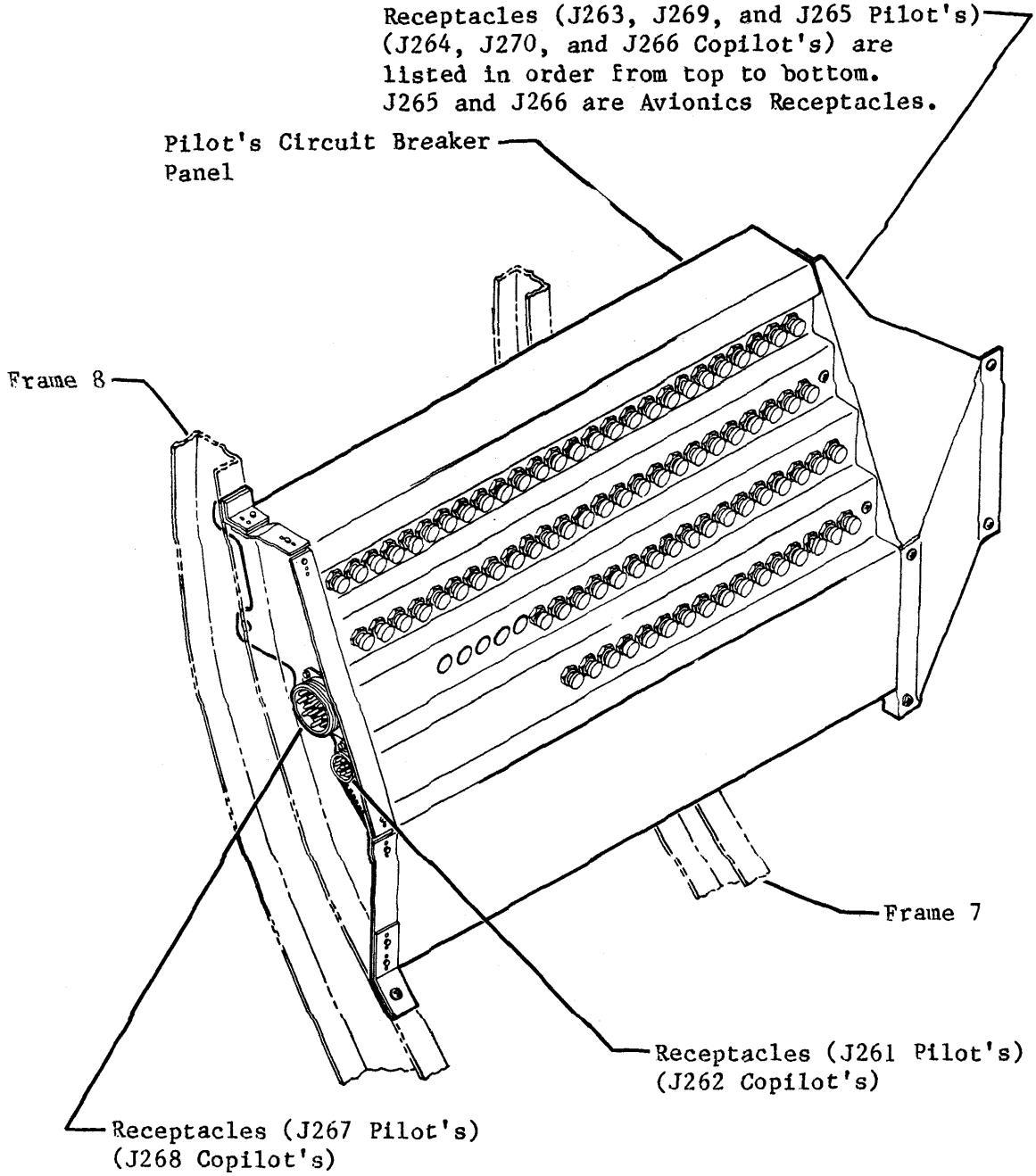
   (2) Disconnect electrical wiring from remaining terminal of circuit breaker.
   (3) Remove jamnut, lockwasher, keyway, and circuit breaker from panel.

C. Install Circuit Breaker.
   (1) Place keyway on replacement circuit breaker and install circuit breaker in panel. Assure that keyway is positioned in hole of panel doubler.
   (2) Secure circuit breaker to panel with lockwasher and jamnut.
   (3) Install previously removed bus bar on circuit breakers.

   CAUTION: ENSURE THAT TERMINAL LUGS AND CIRCUIT BREAKER SCREWS ARE COMPATIBLE IN LENGTH AND DIAMETER. EQUIPMENT DAMAGE OR WIRE DAMAGE COULD RESULT FROM INCOMPATIBLE SIZING.

   (4) Connect electrical wiring to replacement circuit breaker.

D. Install Circuit Breaker Panel. (See Figure 201.)
   (1) Install circuit breaker panel and connect electrical connectors.
   (2) Secure circuit breaker panel to aircraft structure.
   (3) Connect aircraft batteries.
   (4) Perform operational check of replacement circuit breaker system.



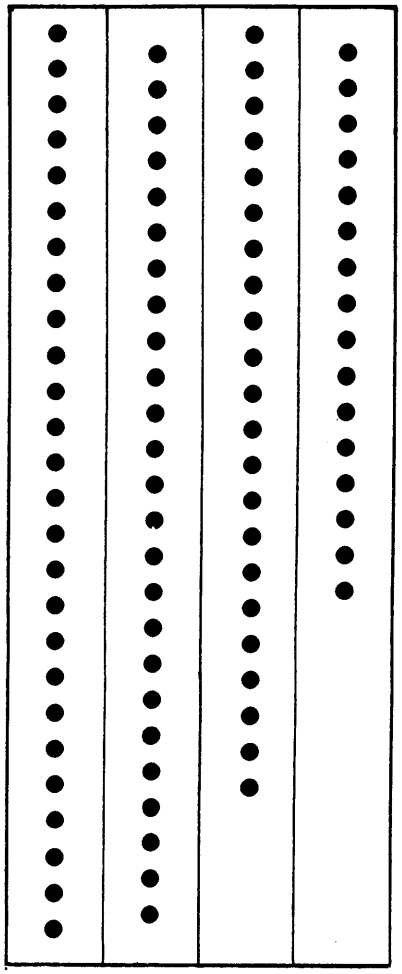
NOTE: All plugs and receptacle wire bundles have yellow identification tags secured to them.

Circuit Breaker and Circuit Breaker Panel Installation
Figure 201 (Sheet 1 of 2)

FORWARD END OF PANEL

TOP ROW

BOTTOM ROW



AFT END OF PANEL

Circuit Breaker Panel Numbering Diagram

NOTE:

- The circuit breakers and plug buttons in the pilot's panel are numbered 1, 3, 5, etc., starting with the top row and counting from the forward end to the aft end. The numbering continues with the forward end of row 2 and so on.
- The numbering of the copilot's circuit breaker panel is identical to the pilot's panel, except the circuit breakers are numbered 2, 4, 6, etc.

Circuit Breaker and Circuit Breaker Panel Installation
Figure 201 (Sheet 2 of 2)

CURRENT LIMITER PANEL - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Current Limiter Panel (See Figures 201 thru 207.)

NOTE:
- Removal of the current limiter panel requires partial disassembly of the panel. Retain attaching hardware for installation.
- Stud COM on Current Limiter Panel Installation (figure 201 thru figure 207) does not designate an electrical common.

(1) Remove electrical power from aircraft and disconnect batteries.
(2) Disconnect electrical connectors from current limiter panel.
(3) Remove cover assembly from current limiter panel.
(4) Remove nut, lockwasher, and washer from Stud A and Stud B on the generator control panel.

NOTE: Nut, lockwasher, and washer are furnished with the generator control panel. The nut is silver plated copper and shall be reinstalled on Stud A and Stud B.

(5) Remove left and right current limiter failure sensor assemblies, when applicable, from the bus bars.

NOTE: Wires connected to the sensor assemblies prevent removing the sensor assemblies from the current limiter panel. Place sensor assemblies aside as sensor assemblies will be removed with current limiter panel.

(6) Remove nut, lockwasher, washer, and cabin climate wire terminal (AIR COND) from Stud COM (also attaches one end of FL3) on generator control panel.

NOTE: Nut, lockwasher, and washer are furnished with the generator control panel. The nut is silver plated copper and shall be reinstalled on Stud COM.

(7) Remove fuse buses and wire terminals from battery charging bus, left generator bus, and right generator bus. Refer to paragraph 1.D.
(8) Remove wire terminal from Stud 11 and Stud 12 on generator control panel.
(9) Remove nut, lockwasher, washer, and fuse bus wire from Stud 3 and Stud 4 on the generator control panel.

NOTE: Nut, lockwasher, and washer are furnished with the generator control panel. The nut is silver plated copper and shall be reinstalled on Stud 3 and Stud 4.

(10) On applicable aircraft (British Certification) remove fuse bus wire from Stud 1 and Stud 2.
(11) Remove screws attaching guard assembly and plate assembly to generator control panel. Remove current limiter panel.
(12) On *Aircraft 35-657 and Subsequent and 36-064 and Subsequent*, remove, identify, and tag wiring from remote control circuit breaker CBR9. (Refer to 24-50-06.)
(13) On *Aircraft 35-657 and Subsequent and 36-064 and Subsequent*, remove, identify, and tag wires to current limiting fuse FL4.

B. Remove Current Limiter (FL1, FL2) (See Figures 201 thru 207.)
(1) Remove electrical power from aircraft and disconnect batteries.
(2) Remove cover assembly from current limiter panel.

(3) Remove nut, lockwasher, and washer from battery charging bus and left generator bus or right generator bus. Retain attaching hardware for installation.
(4) Lift current limiter FL1 or FL2 from bus bar studs.

C. Remove Current Limiter (FL3). (See Figures 201 thru 207.)
(1) Remove electrical power from aircraft and disconnect batteries.
(2) Remove cover assembly from current limiter panel.
(3) Remove nut, lockwasher, and washer from Stud C and Stud COM on generator control panel. Retain attaching hardware for installation.
(4) Remove cabin climate wire (AIR COND) from Stud COM.
(5) Lift current limiter FL3 from Stud C and Stud COM.

D. Remove Bus Bars. (Battery Charging Bus, Left Generator Bus, Right Generator Bus) (See Figures 201 thru 207.)
(1) Remove electrical power from aircraft and disconnect batteries.
(2) Remove cover assembly from current limiter panel.
(3) Remove Battery Charging Bus.
(a) Remove current limiters FL1, FL2, and FL3. (Refer to removal procedures 1.B. and 1.C.)
(b) Remove nut, lockwasher, washer, fuse busses, and wire terminals from studs on battery charging bus.
(c) Remove two screws, one at each end of battery charging bus.
(d) Remove battery charging bus and two spacers.
(4) Remove Generator Bus, Left or Right.
(a) Remove current limiter FL1 and/or FL2. (Refer to removal procedure 1.B.)
(b) Remove nut, lockwasher, washer, and wire terminals from Stud A and/or Stud B on generator control panel.

NOTE: Nut, lockwasher, and washer are furnished with the generator control panel. The nut is silver plated copper and shall be reinstalled on Stud A and/or Stud B.

(c) Remove nut, lockwasher, washer, fuse buses, and wire terminals from studs on left generator bus and/or right generator bus.
(d) Remove one screw, near the center of the bus bar.
(e) Remove left generator bus and/or right generator bus and a spacer for each generator bus.

E. Remove Fuse Holder. (See Figures 201 thru 207.)
(1) Remove electrical power from aircraft and disconnect batteries.
(2) Remove cover assembly from current limiter panel.
(3) Pull fuse from fuse holder (the fuse has knife blade type contacts).
(4) Disconnect electrical wires from fuse holder.
(5) Remove screws securing fuse holder to plate assembly.

F. Install Current Limiter Panel. (See Figures 201 thru 207.)

NOTE: Current limiter panel may be installed with generator control panel removed or installed in aircraft. Use silk screen cover assembly to locate current limiters and fuse holders. Perform the following applicable steps.

(1) Install fuse holders on current limiter panel plate assembly. (Refer to Fuse Holder installation paragraph.)
(2) Install bus bars (battery charging bus, left generator bus, and right generator bus) on generator control panel. Refer to installation paragraph.
(3) Position current limiter panel plate assembly on generator control panel.

NOTE: Use care to prevent wires being trapped between current limiter panel plate assembly and generator control panel.

(4) Position current limiter panel guard assembly on plate assembly and attach guard assembly and plate assembly to generator control panel assembly with screws.
(5) On *Aircraft 35-657 and Subsequent and 36-064 and Subsequent*, identify and connect wires to current limiting fuse FL4.
(6) On *Aircraft 35-657 and Subsequent and 36-064 and Subsequent*, identify and connect wiring to remote control circuit breaker CBR9. (Refer to 24-50-06.)
(7) Attach FL5 fuse bus wire to Stud 3 on generator control panel and FL18 fuse bus wire to Stud 4 on generator control panel. On applicable aircraft, install bus wire on Stud 1 and Stud 2.

NOTE: Remove nut, lockwasher, and washer from Stud 3 and Stud 4. Attach the fuse bus wire terminals and refer to Generator Control Panel Installation 24-31-02 for nut torque value.

(8) Remove nut, lockwasher, and washer from Stud 11 and Stud 12 on generator control panel. Attach FL19 fuse wire to Stud 11 and FL20 fuse wire to Stud 12. Install washer, lockwasher, and nut on Stud 11 and Stud 12. Torque nuts 7 to 9 inch-pounds.
(9) Install FL3 current limiter. (Refer to Current Limiter FL3 installation paragraph.)
(10) Install FL1 and FL2 current limiter. (Refer to Current Limiter FL1 and FL2 installation paragraph.)
(11) Attach solid copper buses, wire buses, and wire terminals to fuse holders and studs on battery charging bus, left generator bus, and right generator bus. On applicable current limiter panels; position left and right current limiter failure sensor enough to include sensor wire terminals. Refer to step (13).

NOTE:
- Do not attach buses or wire terminals to studs attaching current limiter FL1, FL2, and FL3, except cabin climate wire (AIR COND).
- Use applicable current limiter panel installation panel figure and applicable Wiring Diagram.

(12) Install washer, lockwasher, and nut on studs (four steel studs) that attached the fuse buses and wire terminals in the preceding step. Torque nuts to 75 (±3) inch-pounds.
(13) Install left and right current limiter failure sensors. (Refer to Current Limiter Failure Sensors 24-50-03 for installation.)
(14) Install current limiter panel cover assembly.
(15) Perform operational check of Voltage Regulating System. (Refer to 24-31-03.)

G. Install Current Limiter (FL1, FL2). (See Figures 201 thru 207.)

WARNING: IF CURRENT LIMITER IS BEING INSTALLED WITH GENERATOR CONTROL PANEL INSTALLED IN AIRCRAFT, VERIFY THAT ELECTRICAL POWER IS REMOVED FROM THE AIRCRAFT DURING INSTALLATION OF CURRENT LIMITER.

(1) Remove nut, lockwasher, and washer from battery charging bus and left generator bus for FL1 and right generator bus for FL2.
(2) Position fuse limiter so that condition of fuse limiter can be viewed when cover assembly is installed.
(3) Install FL1 across battery charging bus and left generator bus and FL2 across battery charging bus and right generator bus.
(4) Install washer, lockwasher, and nut on studs securing current limiter to battery charging bus and (left or right) generator bus. Torque nut 75 (±3) inch-pounds.
(5) If current limiter is being installed with generator control panel installed in aircraft, install cover assembly on current limiter panel.

H. Install Current Limiter (FL3). (See Figures 201 thru 207.)

WARNING: IF CURRENT LIMITER IS BEING INSTALLED WITH GENERATOR CONTROL PANEL INSTALLED IN AIRCRAFT, VERIFY THAT ELECTRICAL POWER IS REMOVED FROM THE AIRCRAFT DURING INSTALLATION OF CURRENT LIMITER.

(1) Remove nut, lockwasher, and washer from Stud C and Stud COM on generator control panel. Remove cabin climate wire (AIR COND) from Stud COM.
(2) Position fuse limiter so that condition of fuse limiter can be viewed when cover assembly is installed.
(3) Install washers on Stud COM and install FL3 across Stud C and Stud COM.
(4) Install cabin climate wire (AIR COND) terminal on Stud COM.
(5) Install washer, lockwasher, and nut (silver plated copper) on Stud C and Stud COM. Torque nut 30 to 42 inch-pounds.
(6) If current limiter is being installed with generator control panel installed in aircraft, install cover assembly on current limiter panel.

I. Install Fuse Holder. (See Figures 201 thru 207.)

WARNING: IF FUSE HOLDER IS TO BE INSTALLED WITH CURRENT LIMITER PANEL INSTALLED IN AIRCRAFT, VERIFY ELECTRICAL POWER IS REMOVED FROM THE AIRCRAFT DURING INSTALLATION OF THE FUSE HOLDER.

(1) Utilize cover assembly from current limiter panel to locate fuse holder.
(2) With fuse(s) removed from fuse holder, attach fuse holder to panel with screw(s).
(3) Attach fuse bus and/or fuse wire to fuse holder. Insert fuse in fuse holder. Install fuse so that blow indicator is visible when cover assembly is installed.
(4) If fuse holder is being installed with current limiter panel installed in aircraft, install cover assembly on current limiter panel.

J. Install Bus Bars. (Battery Charging Bus, Left Generator Bus, Right Generator Bus) (See Figures 201 thru 207.)

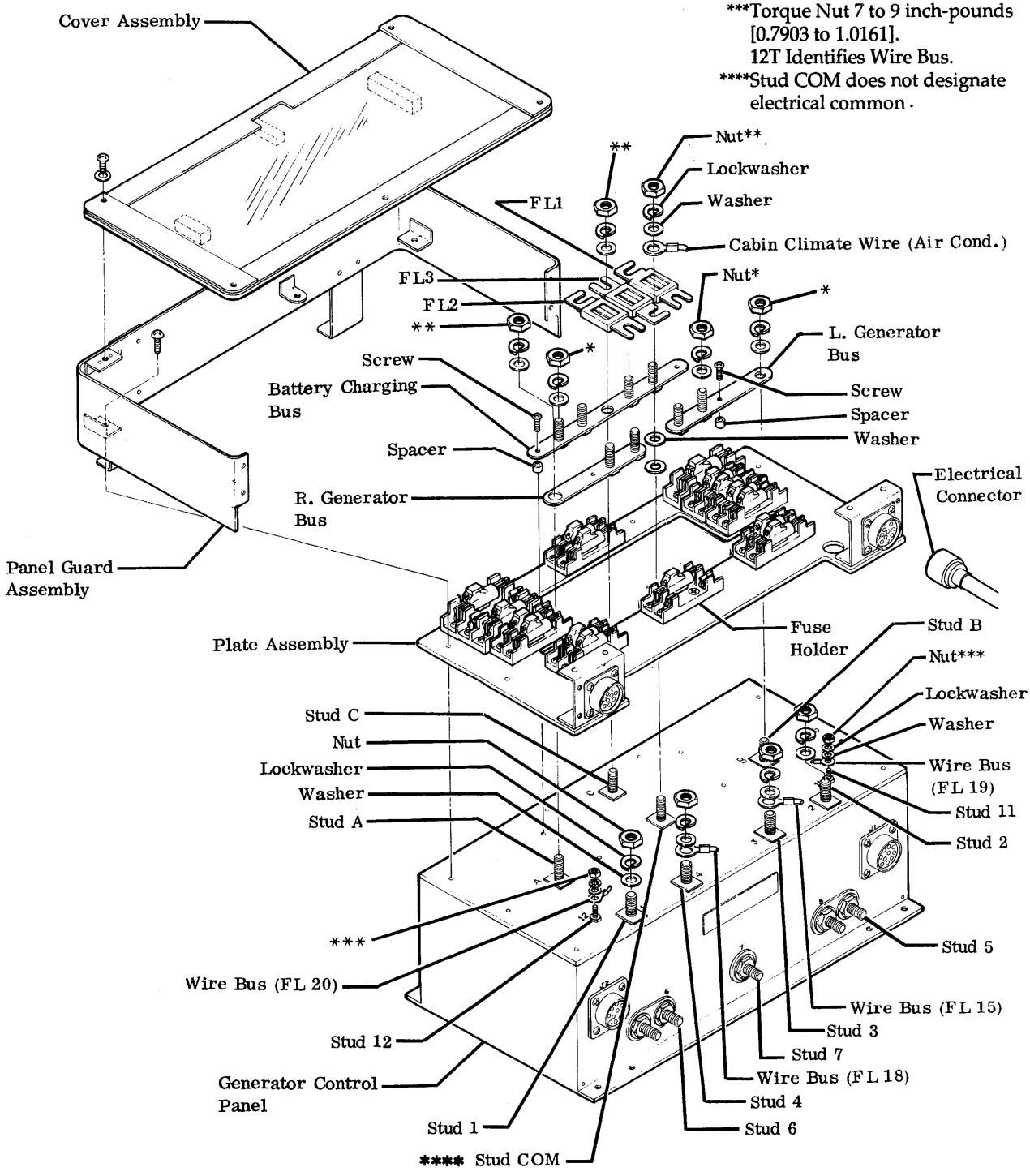
WARNING: IF BUS BARS ARE TO BE INSTALLED WITH GENERATOR CONTROL PANEL INSTALLED IN AIRCRAFT, VERIFY ELECTRICAL POWER IS REMOVED FROM THE AIRCRAFT DURING INSTALLATION OF BUS BARS.

(1) Remove nut, lockwasher, and washer from generator control panel Stud A, B, and C.
(2) Position battery charging bus on Stud C on the generator control panel.
(3) Position and align spacer between battery charging bus and top panel on generator control panel on each side of Stud C. Secure battery charging bus to top panel on generator control panel with screws.
(4) Position left generator bus on Stud B on the generator control panel.
(5) Position and align a spacer between the left generator bus and top panel on generator control panel. Attach left generator bus to top panel on generator control panel with screw.
(6) Install right generator bus on Stud A on the generator control panel.
(7) Position and align a spacer between the right generator bus and top panel on generator control panel. Attach right generator bus to top panel on generator control panel with screw.
(8) Install washer, lockwasher, and nut on Stud A and/or Stud B. Torque nut on Stud A and/or Stud B 30 to 42 inch-pounds.
(9) Install current limiters FL1, FL2, and FL3. (Refer to paragraph 1.G. and 1.H.)
(10) Attach copper busses, wire busses, and wire terminals to studs on battery charging bus, left generator bus, and right generator bus.

NOTE:
- On applicable current limiter panels; position left and right current limiter failure sensor close enough to include sensor wire terminals on busses. (Refer to Current Limiter Failure Sensor, 24-50-03 for installation.)
- Do not attach busses or wire terminals to studs attaching current limiters FL1, FL2, and FL3, except for cabin climate (AIR COND) wire.

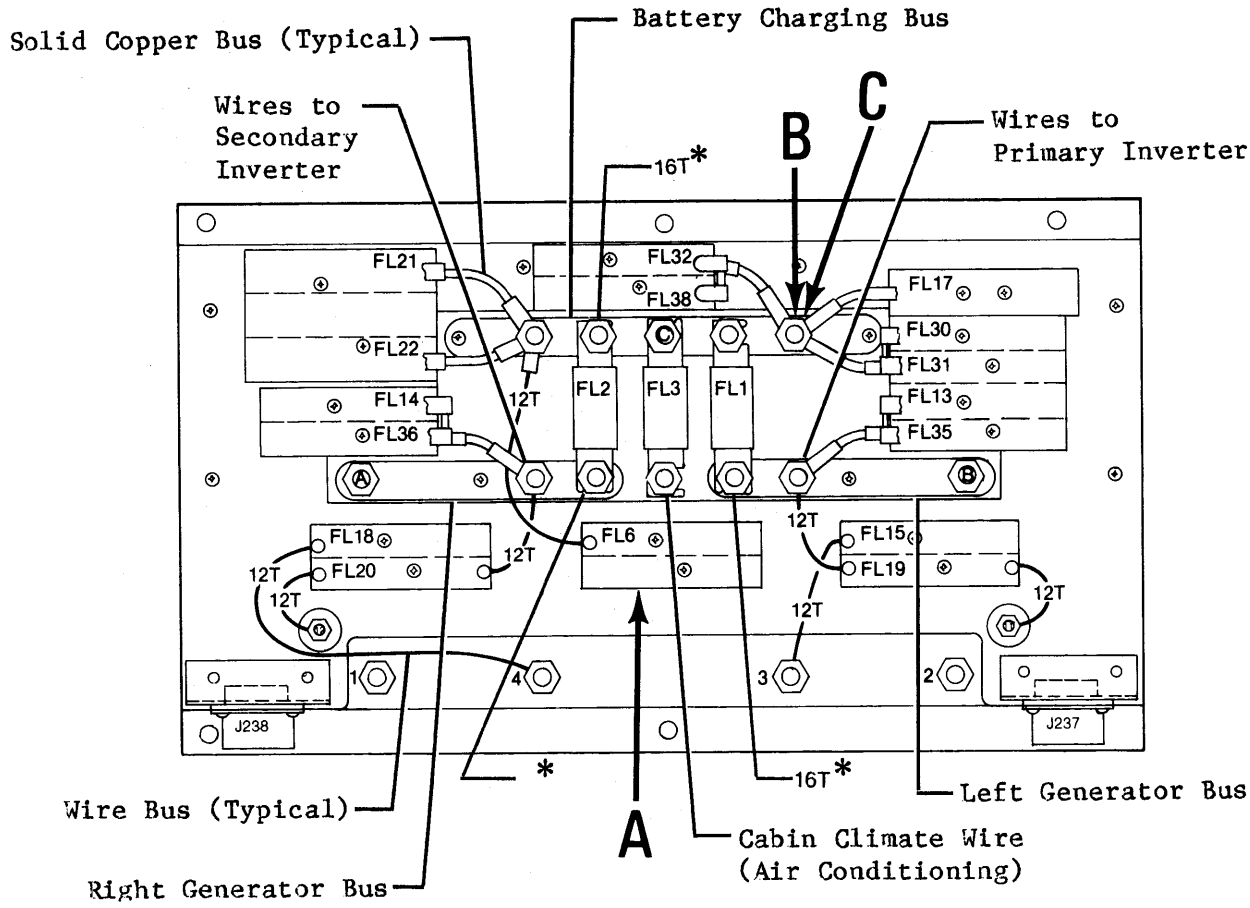
(11) Install washer, lockwasher, and nut on studs (four steel studs). Torque nuts to 75 (±3) inch-pounds.

*Torque Nut 75 (±3) inch-pounds [8.47 (±0.34) Nm].
**Torque Nut 38 (±2) inch-pounds [4.29 (±0.23) Nm].
***Torque Nut 7 to 9 inch-pounds [0.7903 to 1.0161].
12T Identifies Wire Bus.
****Stud COM does not designate electrical common.

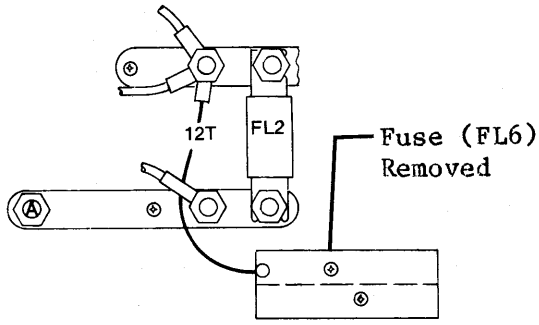


9-149A
9-149C-5

Current Limiter Panel Installation
Figure 201 (Sheet 1 of 4)

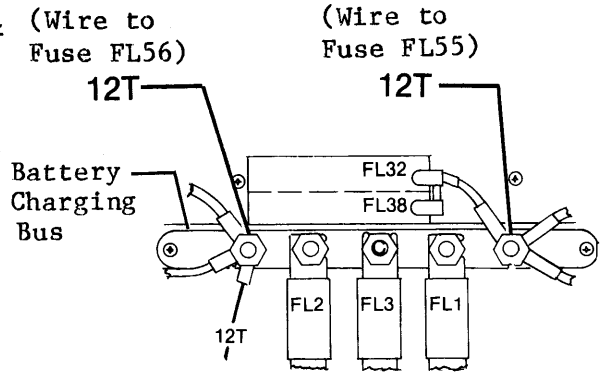


* *(When Modified per AMK 80-17, "Installation of Current Limiter Warning and Starter Indicator Lights".*



(Current Limiter Panel - Recognition Light Removed.)

Detail A

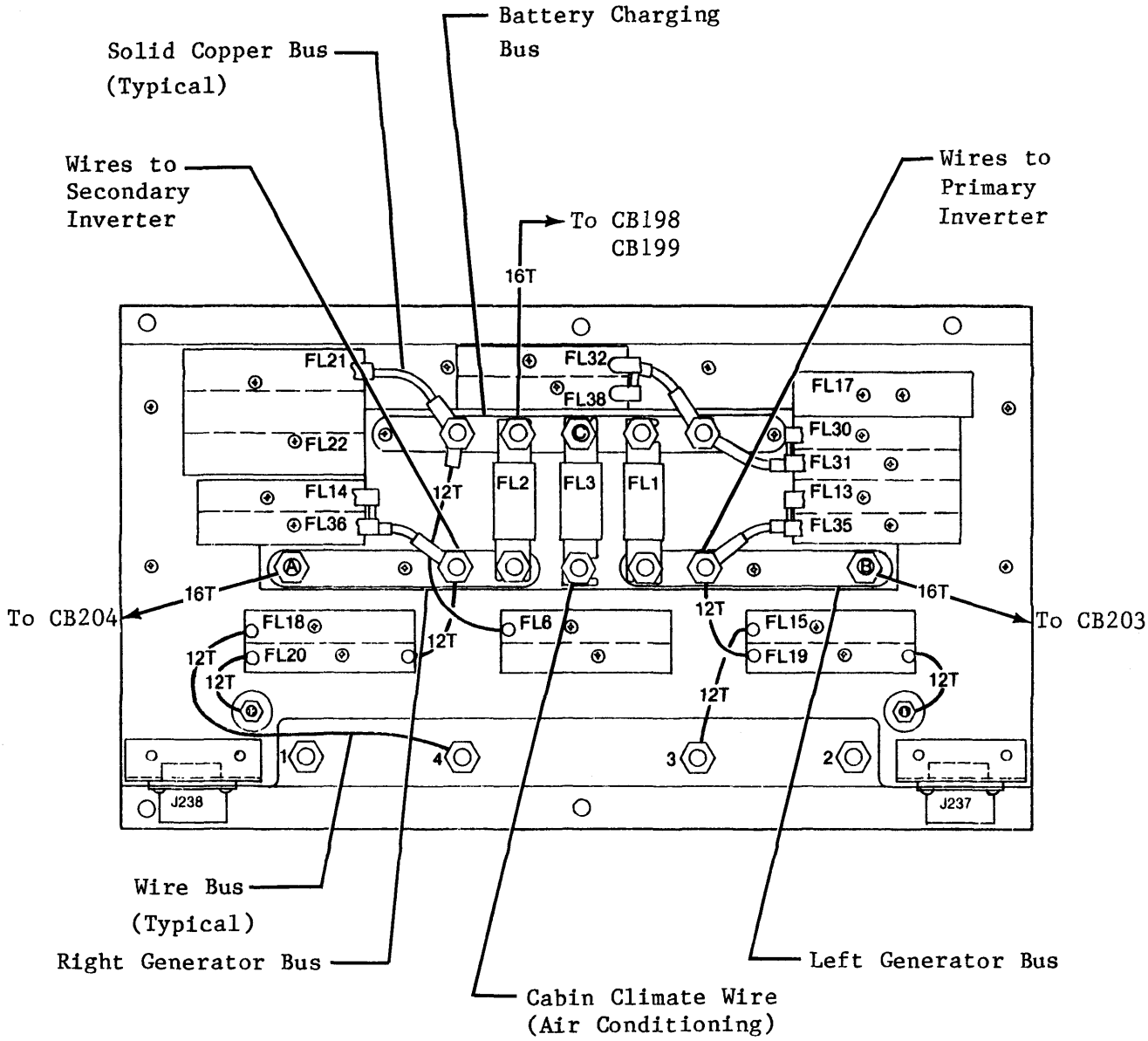


(Aircraft Modified per AMK 78-13, "Installation of Split Essential Bus Electrical System" but not Modified by AMK 85-1, "Electrical Power Distribution Improvement.")

Detail B

9-367C-1

Current Limiter Panel Installation
Figure 201 (Sheet 2 of 4)



Aircraft Modified per AMK85-1, "Electrical Power Distribution Improvement"

Detail C

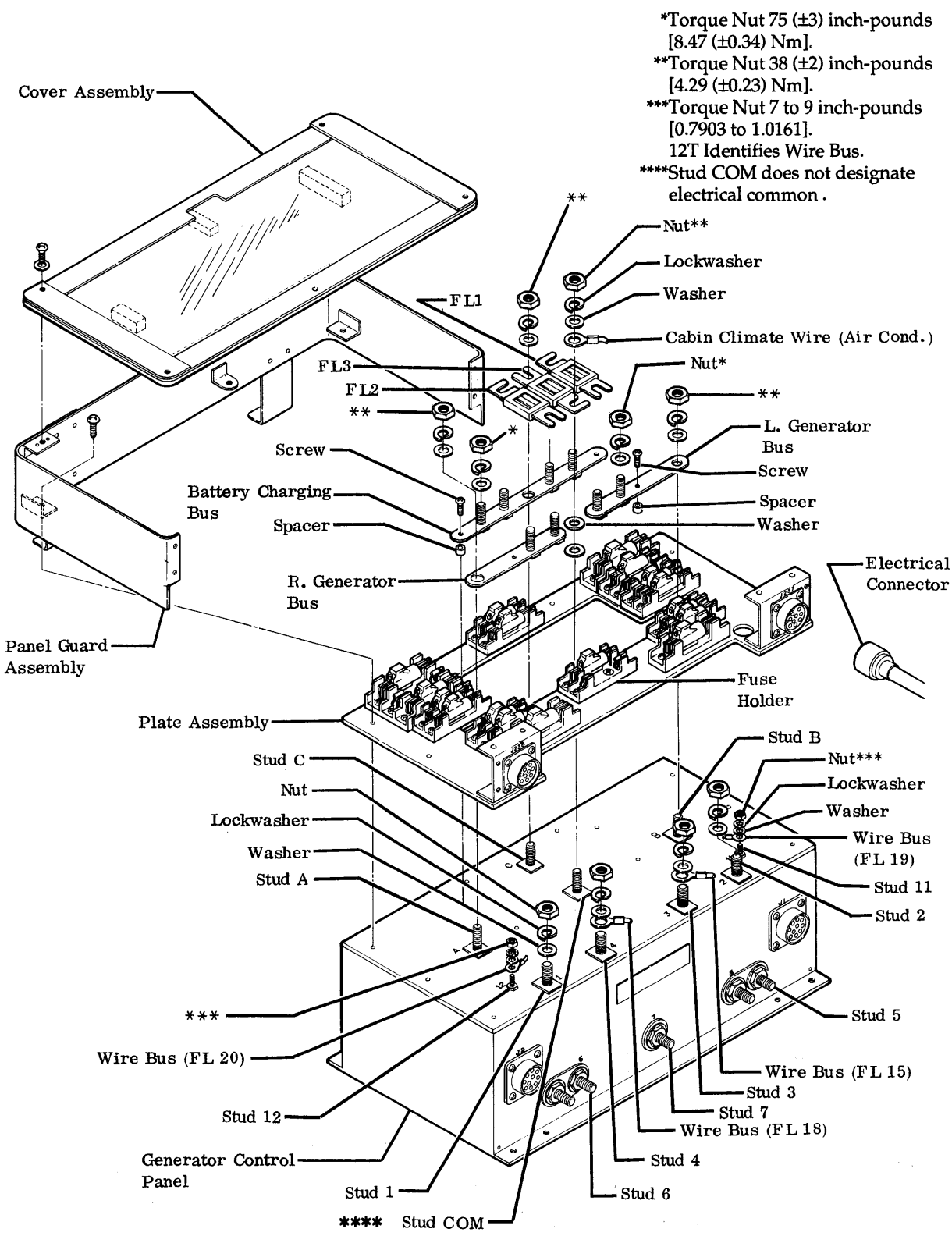
Current Limiter Panel Installation
Figure 201 (Sheet 3 of 4)

Cur. Lim. & Fuse Ref. Designators	Amperage	Circuit	Power Source	Current Limiter Panel 2618044 -2	-5	-7	-8
FL1	275	L. Gen Bus to Bat Charging Bus		X	X	X	X
FL2	275	R. Gen Bus to Bat Charging Bus		X	X	X	X
FL3	150	Cabin Climate	Battery Charging Bus	X	X	X	X
FL6	30	Recognition Light	Battery Charging Bus	X	X	X	
FL13	20	L. Landing Light	L. Generator Bus	X	X	X	X
FL14	20	R. Landing Light	R. Generator Bus	X	X	X	X
FL15	20	L. Battery Bus	Stud 3 (Bat 1)	X	X	X	X
FL17	50	L. Essential Bus	Battery Charging Bus	X	X	X	X
*FL17	50	L. Essential Bus	L. Generator Bus				
FL18	20	R. Battery Bus	Stud 4 (Bat 2)	X	X	X	X
FL19	10	L. Generator Bus	L. Gen Bus to Stud 11	X	X	X	X
FL20	10	R. Generator Bus	R. Gen Bus to Stud 12	X	X	X	X
FL21	50	Hydraulic Pump	Battery Charging Bus	X	X	X	X
*FL22	50	R. Essential Bus	R. Generator Bus				
FL22	50	R. Essential Bus	Battery Charging Bus	X	X	X	X
FL30	10	Fuel Flow	Battery Charging Bus	X	X	X	X
FL31	5	Utility Light	Battery Charging Bus	X	X	X	X
FL32	5	Voltmeter	Battery Charging Bus	X	X	X	X
FL35	10	L. Main Power Bus	L. Generator Bus	X	X	X	X
FL36	10	R. Main Power Bus	R. Generator Bus	X	X	X	X
FL38	5	Air Condition	Battery Charging Bus	X	X	X	X
**FL55	50	L. Ess B Bus or L Ess B Bus	Battery Charging Bus				
**FL56	50	R. Ess B Bus	Battery Charging Bus				
***CB198	1	FL2 Failure Sensor					
***CB199	1	FL1 Failure Sensor					
				-20	-20	-20	-20
				2418093 Cover Assembly			

-2 Current Limiter Panel: Aircraft 35-002 thru 35-090; 36-002 thru 36-022.
-5 Current Limiter Panel: Aircraft 35-091 thru 35-147; 36-023 thru 36-035.
-7 Current Limiter Panel: Aircraft 35-148 thru 35-201, 35-205; 36-036 thru 36-043.
-8 Current Limiter Panel - Recognition Light Removed: Aircraft 35-159 thru 35-201, 35-205; 36-039 thru 36-043.

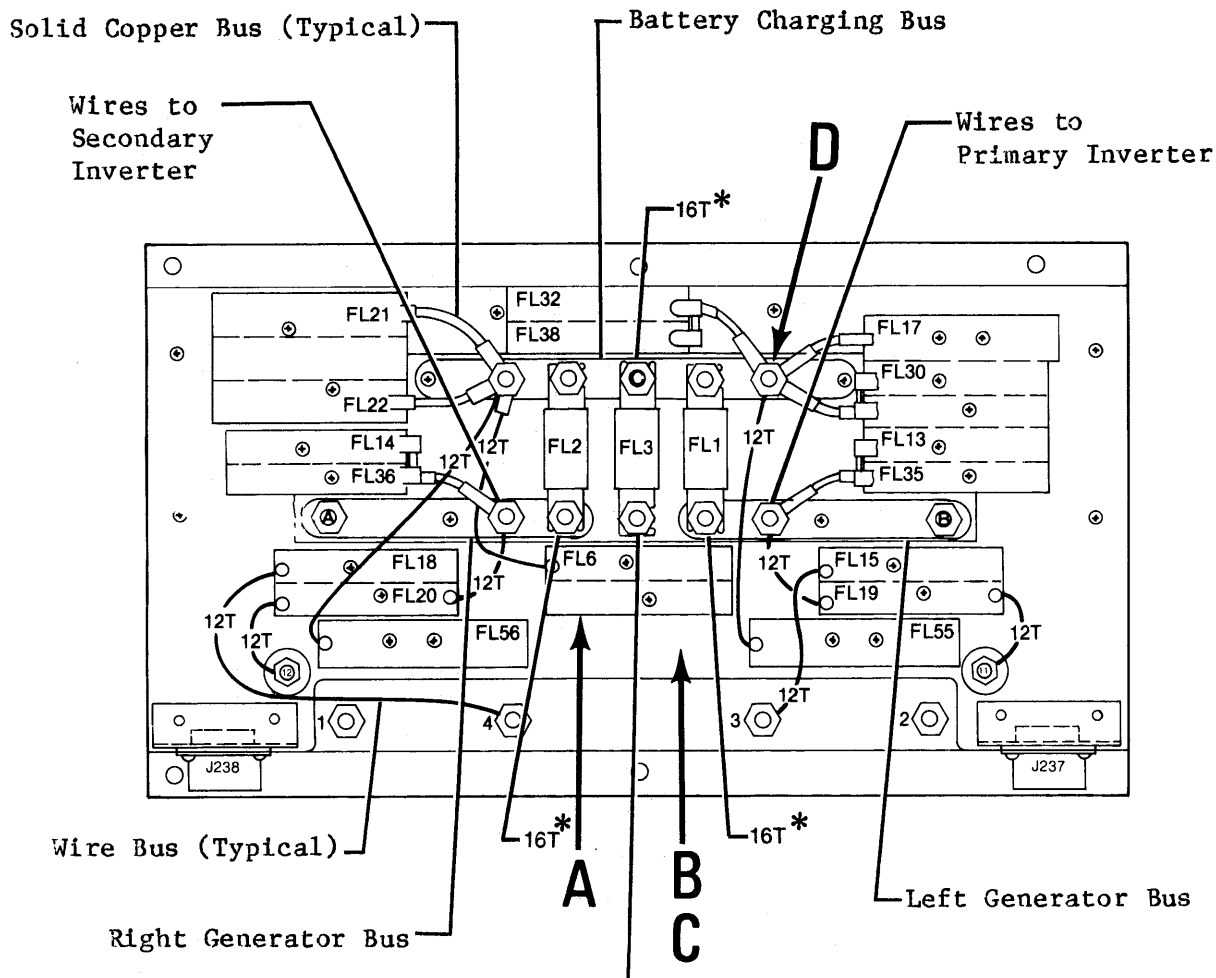
* Aircraft Modified per AMK85-1, "Electrical Power Distribution Improvement"
** Aircraft Modified per AMK78-13, "Installation of Split Essential Bus System"
*** Aircraft Modified per AMK80-17, "Installation of Current Limiter Warning and Starter Indicator Lights"

Current Limiter Panel Installation
Figure 201 (Sheet 4 of 4)

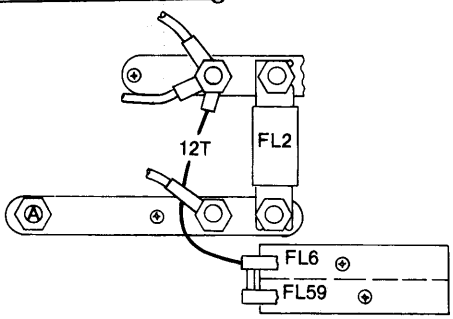


9-149C-5

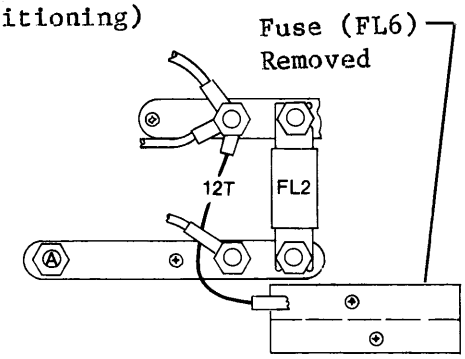
Current Limiter Panel Installation
Figure 202 (Sheet 1 of 5)



* *(When Modified per AMK 80-17, "Installation of Current Limiter Warning and Starter Indicator Lights")*



(Current Limiter Panel - LH Recognition Light)

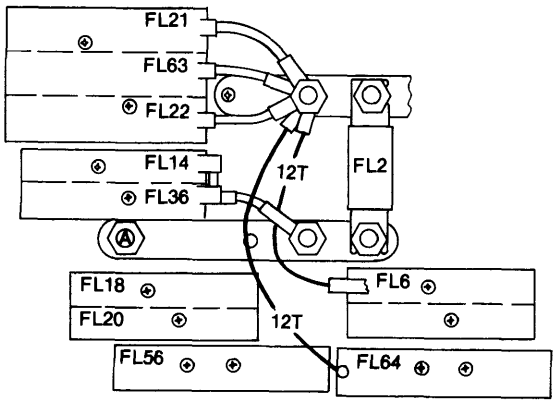


(Current Limiter Panel - RH Recognition Light Removed)

Detail A

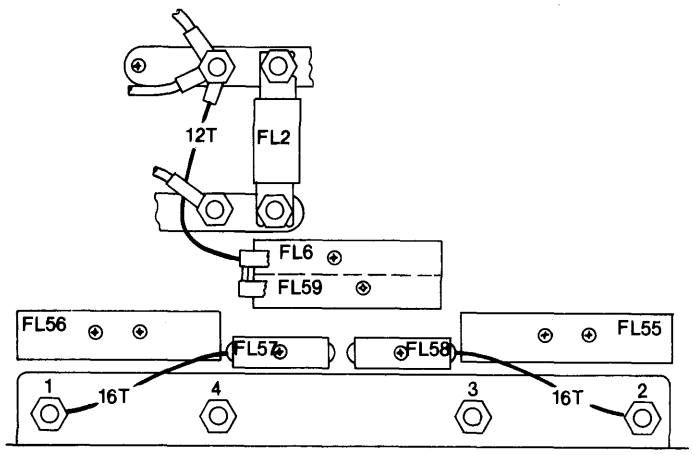
9-367C-2

Current Limiter Panel Installation
Figure 202 (Sheet 2 of 5)

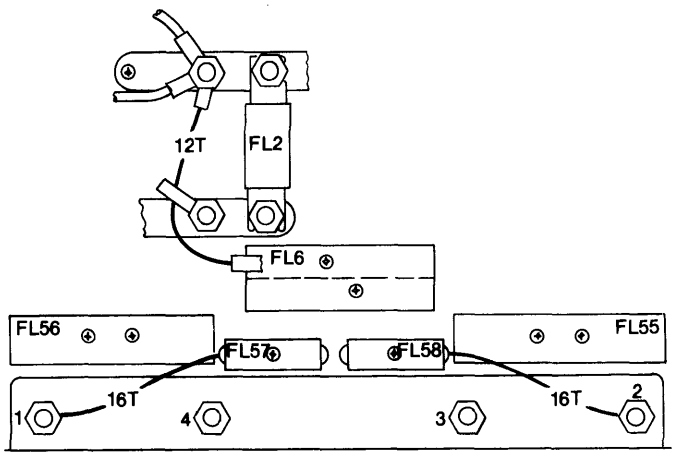


Current Limiter Panel - Camera

Detail B



Current Limiter Panel - British Certification
with LH Recognition Light

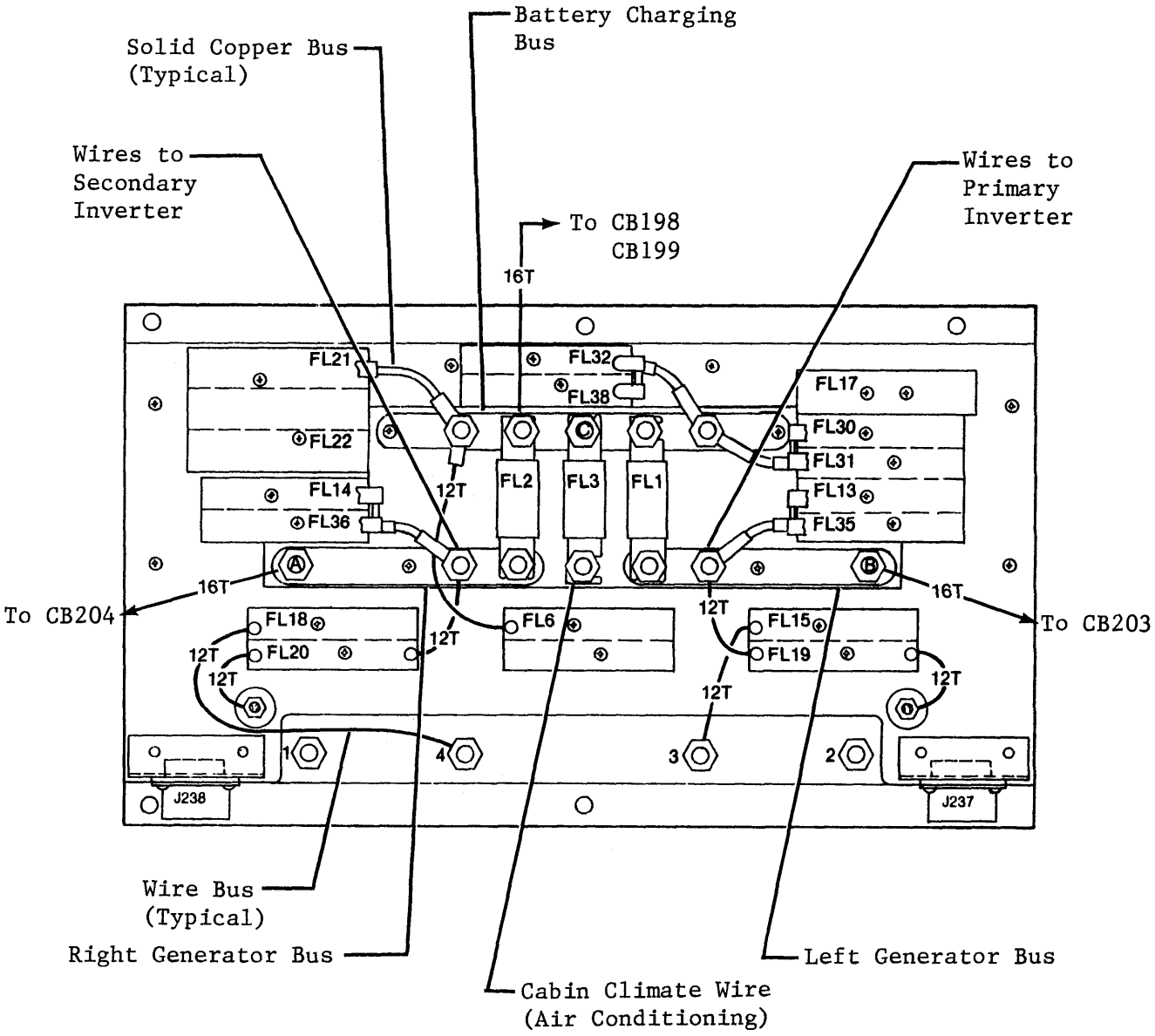


Current Limiter Panel - British Certification

Detail C

9-367C-2

Current Limiter Panel Installation
Figure 202 (Sheet 3 of 5)



Aircraft Modified per AMK85-1, "Electrical Power Distribution Improvement"

Detail D

Current Limiter Panel Installation
Figure 202 (Sheet 4 of 5)

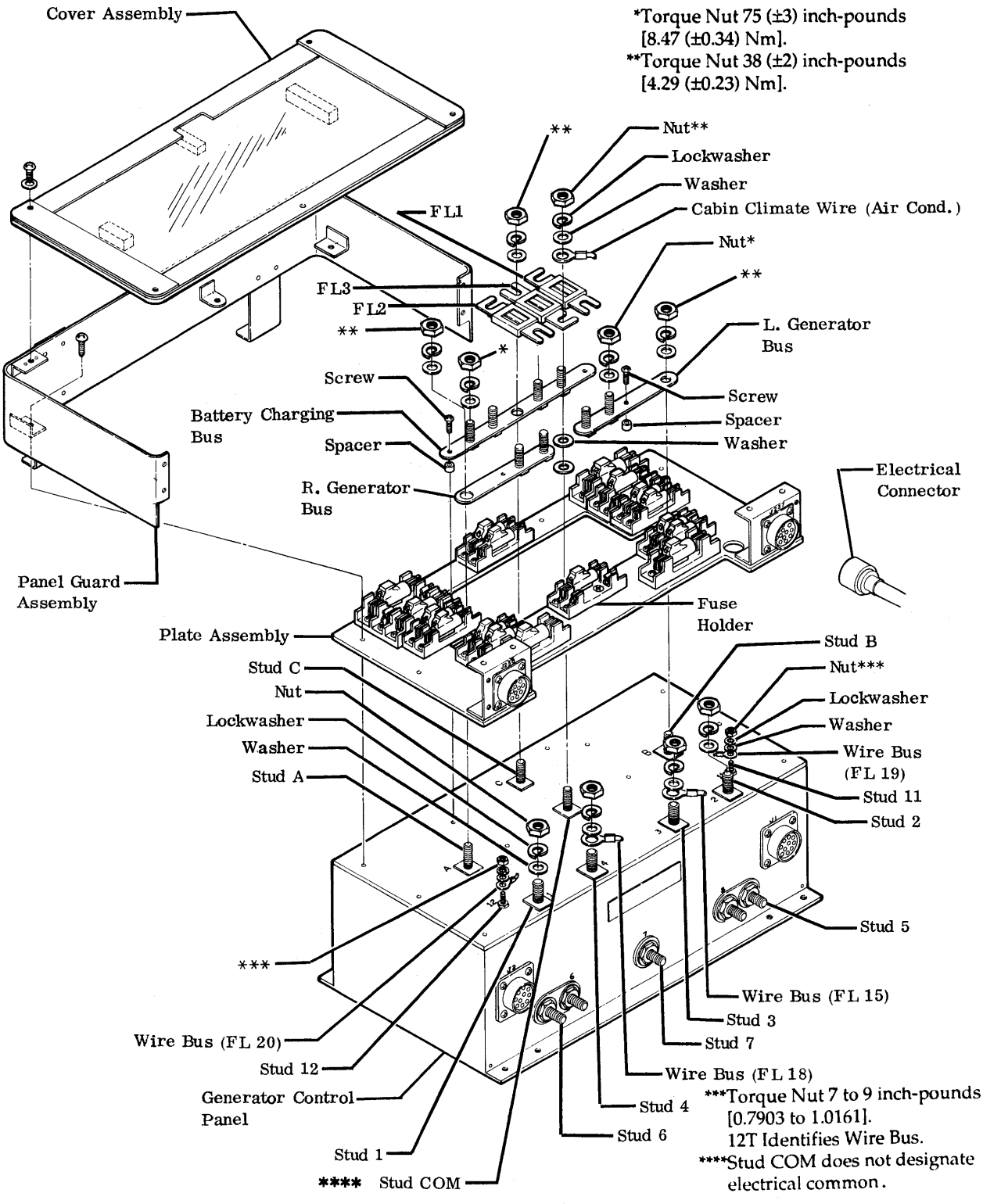
Cur. Lim. & Fuse Ref. Designators	Amperage	Circuit	Power Source	Current Limiter Panel 2618044 -11	-12	-14	-16	-19	-20
FL1	275	L. Gen Bus to Bat Charging Bus		X	X	X	X	X	X
FL2	275	R. Gen Bus to Bat Charging Bus		X	X	X	X	X	X
FL3	150	Cabin Climate	Battery Charging Bus	X	X	X	X	X	X
FL6	30	Recognition Light	Battery Charging Bus	X	X	X	X		X
FL13	20	L. Landing Light	L. Generator Bus	X	X	X	X	X	X
FL14	20	R. Landing Light	R. Generator Bus	X	X	X	X	X	X
FL15	20	L. Battery Bus	Stud 3 (Bat 1)	X	X	X	X	X	X
FL17	50	L. Essential Bus	Battery Charging Bus	X	X	X	X	X	X
*FL17	50	L. Essential Bus	L. Generator Bus						
FL18	20	R. Battery Bus	Stud 4 (Bat 2)	X	X	X	X	X	X
FL19	10	L. Generator Field	L. Gen Bus to Stud 11	X	X	X	X	X	X
FL20	10	R. Generator Field	R. Gen Bus to Stud 12	X	X	X	X	X	X
FL21	50	Hydraulic Pump	Battery Charging Bus	X	X	X	X	X	X
FL22	50	R. Essential A Bus	Battery Charging Bus	X	X	X	X	X	X
*FL22	50	R. Essential Bus	R. Generator Bus						
FL30	10	Fuel Flow	Battery Charging Bus	X	X	X	X	X	X
FL32	5	Voltmeter	Battery Charging Bus	X	X	X	X	X	X
FL35	10	L. Main Power Bus	L. Generator Bus	X	X	X	X	X	X
FL36	10	R. Main Power Bus	R. Generator Bus	X	X	X	X	X	X
FL38	5	Air Condition	Battery Charging Bus	X	X	X	X	X	X
FL55	50	L. Essential B Bus	Battery Charging Bus	X	X	X	X	X	X
*FL55	50	L. Essential B Bus	L. Generator Bus						
FL56	50	R. Essential B Bus	Battery Charging Bus	X	X	X	X	X	X
*FL56	50	R. Essential B Bus	R. Generator Bus						
FL57	5	Start Relay Lock	Stud 1 (Left Start)				X		X
FL58	5	Start Relay Lock	Stud 2 (Right Start)				X		X
FL59	30	LH Recognition Light	Battery Charging Bus					X	X
**CB198	1	FL2 Failure Sensor							
**CB199	1	FL1 Failure Sensor							
*CB203	10	L. Regulator Pos. Sense Voltage	L. Generator Bus						
*CB203	10	R. Regulator Pos. Sense Voltage	R. Generator Bus						

	-26	-26	-26	-35	-37	-20
	2418093 Cover Assembly					

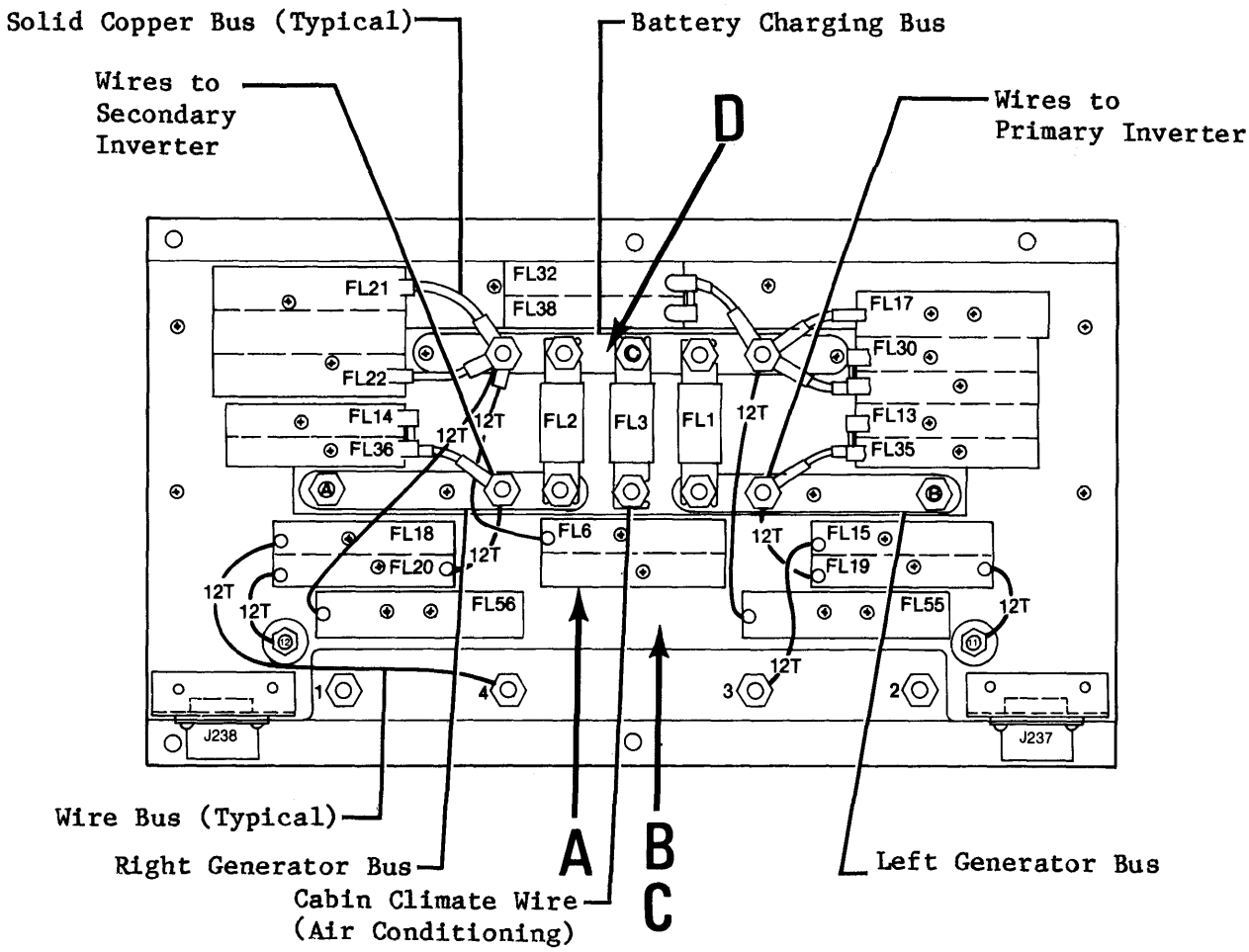
-11 Current Limiter Panel - Standard: Aircraft 35-202 thru 35-234 Except 25-205; 36-044.
-12 Current Limiter Panel - Standard: Aircraft 35-235 thru 35-253; 36-045.
-14 Current Limiter Panel - Standard: Aircraft 35-254 thru 35-295.
-16 Current Limiter Panel - British Certification: Aircraft 35-236 thru 35-295.
-19 Current Limiter Panel - LH Recognition Light: Aircraft 35-257 thru 35-295.
-20 Current Limiter Panel - British Certification with LH Recognition Light: Aircraft 35-265 thru 35-295.

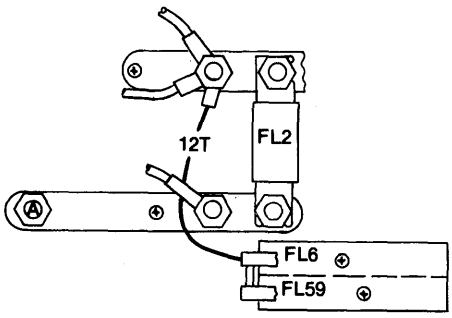
* Aircraft Modified per AMK85-1, "Electrical Power Distribution Improvement"
**Aircraft Modified per AMK80-17, "Installation of Current Limiter Warning and Starter Indicator Lights"

Current Limiter Panel Installation
Figure 202 (Sheet 5 of 5)

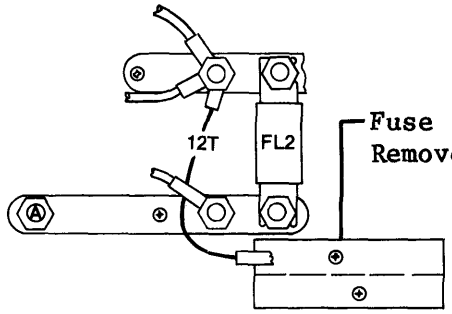


Current Limiter Panel Installation
Figure 203 (Sheet 1 of 5)





Current Limiter Panel - LH Recognition Light

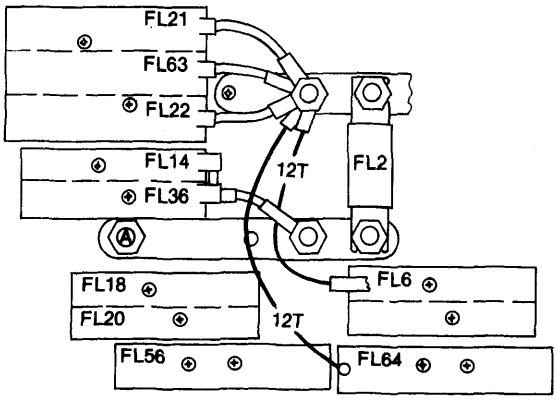


Current Limiter Panel - RH Recognition Light

Detail A

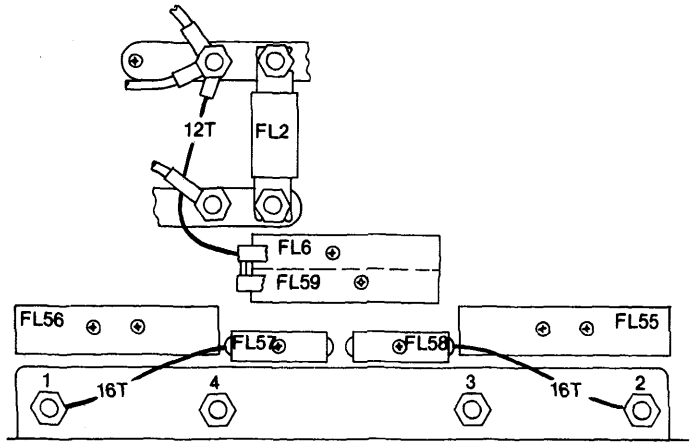
9-367C-2

Current Limiter Panel Installation
Figure 203 (Sheet 2 of 5)

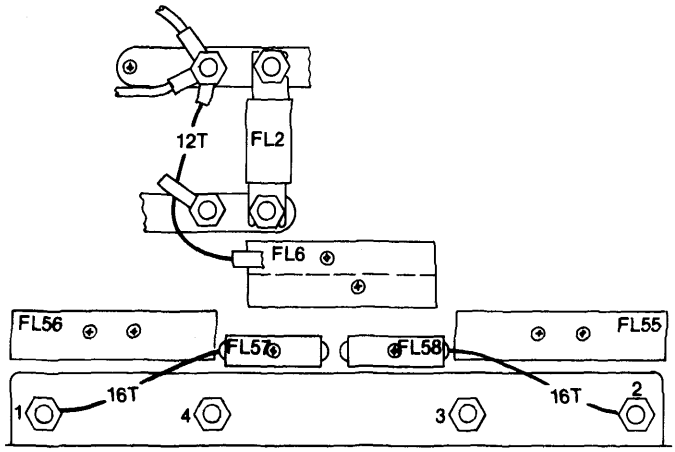


Current Limiter Panel - Camera

Detail B



Current Limiter Panel -
British Certification with
LH Recognition Light

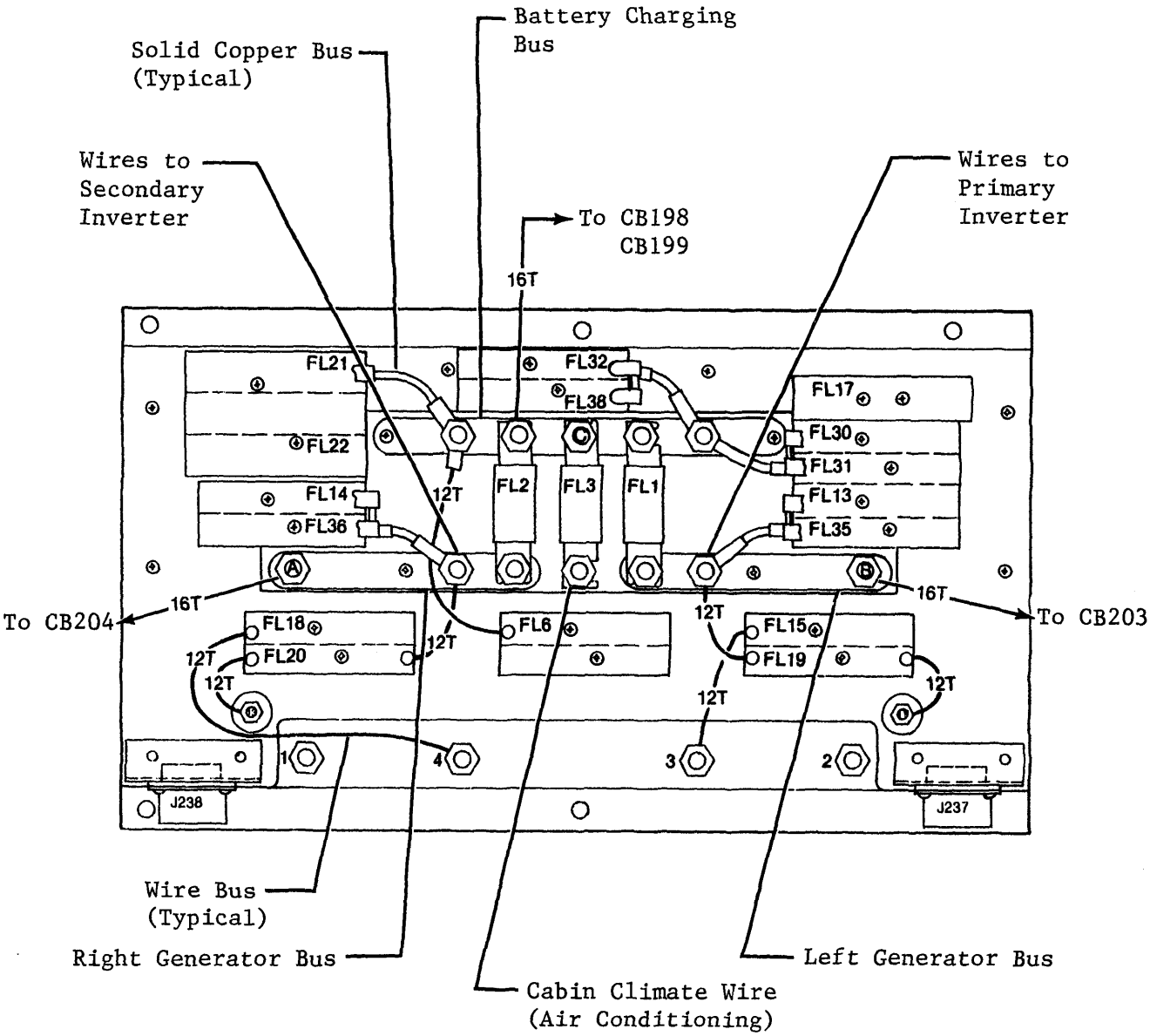


Current Limiter Panel -
British Certification

Detail C

9-367C-2

Current Limiter Panel Installation
Figure 203 (Sheet 3 of 5)



Aircraft Modified per AMK85-1, "Electrical Power Distribution Improvement"

Detail D

Current Limiter Panel Installation
Figure 203 (Sheet 4 of 5)

Cur. Lim. & Fuse Ref. Designators	Amperage	Circuit	Power Source	Current Limiter Panel 2618044 -22	-23	-24	-25	-26	-30
FL1	275	L. Gen Bus to Bat Charging Bus		X	X	X	X	X	X
FL2	275	R. Gen Bus to Bat Charging Bus		X	X	X	X	X	X
FL3	150	Cabin Climate	Battery Charging Bus	X	X	X	X	X	X
FL6	30	Recognition Light	Battery Charging Bus	X	X	X	X		X
FL13	20	L. Landing Light	L. Generator Bus	X	X	X	X	X	X
FL14	20	R. Landing Light	R. Generator Bus	X	X	X	X	X	X
FL15	20	L. Battery Bus	Stud 3 (Bat 1)	X	X	X	X	X	X
FL17	50	L. Essential Bus	Battery Charging Bus	X	X	X	X	X	X
*FL17	50	L. Essential Bus	L. Generator Bus						
FL18	20	R. Battery Bus	Stud 4 (Bat 2)	X	X	X	X	X	X
FL19	10	L. Generator Field	L. Gen Bus to Stud 11	X	X	X	X	X	X
FL20	10	R. Generator Field	R. Gen Bus to Stud 12	X	X	X	X	X	X
FL21	50	Hydraulic Pump	Battery Charging Bus	X	X	X	X	X	X
FL22	50	R. Essential A Bus	Battery Charging Bus	X	X	X	X	X	X
*FL22	50	R. Essential Bus	R. Generator Bus						
FL30	10	Fuel Flow	Battery Charging Bus	X	X	X	X	X	X
FL32	5	Voltmeter	Battery Charging Bus	X	X	X	X	X	X
FL35	10	L. Main Power Bus	L. Generator Bus	X	X	X	X	X	X
FL36	10	R. Main Power Bus	R. Generator Bus	X	X	X	X	X	X
FL38	5	Air Condition	Battery Charging Bus	X	X	X	X	X	X
FL55	50	L. Essential B Bus	Battery Charging Bus	X	X	X	X	X	X
*FL55	50	L. Essential B Bus	L. Generator Bus						
FL56	50	R. Essential B Bus	Battery Charging Bus	X	X	X	X	X	X
*FL56	50	R. Essential B Bus	R. Generator Bus						
FL57	5	Start Relay Lock	Stud 1 (Left Start)		X		X		
FL58	5	Start Relay Lock	Stud 2 (Right Start)		X		X		
FL59	30	LH Recognition Light	Battery Charging Bus	X			X		
FL63	50	Camera Scanner	Battery Charging Bus						X
FL64	50	Camera Scanner	Battery Charging Bus						X
**CB198	1	FL2 Failure Sensor							
**CB199	1	FL1 Failure Sensor							
*CB203	10	L. Regulator Pos. Sense Voltage	L. Generator Bus						
*CB204	10	R. Regulator Pos. Sense Voltage	R. Generator Bus						

	-37	-35	-26	-39	-42	-52
	2418093 Cover Assembly					

-22 Current Limiter Panel - LH Recognition Light: Aircraft 35-296 thru 35-369, 35-371 thru 35-389; 36-046 and 36-047.
-23 Current Limiter Panel - British Certification: Aircraft 35-296 thru 35-389, 35-371 thru 35-389; 36-046 and 36-047.
-24 Current Limiter Panel - Standard: Aircraft 35-296 thru 35-369, 35-371 thru 35-389; 36-046 and 36-047.
-25 Current Limiter Panel - British Certification with LH Recognition Light: Aircraft 35-296 thru 35-369, 35-371 thru 35-389; 36-046 and 36-047.
-26 Current Limiter Panel - RH Recognition Light Removal: Aircraft 35-296 thru 35-369, 35-371 thru 35-389; 36-046 and 36-047.
-30 Current Limiter Panel - Camera: Aircraft 35-296 thru 35-369, 35-371 thru 35-389; 36-046 and 36-047.

* Aircraft Modified per AMK85-1, "Electrical Power Distribution Improvement"
** Aircraft Modified per AMK80-17, "Installation of Current Limiter Warning and Starter Indicator Lights"

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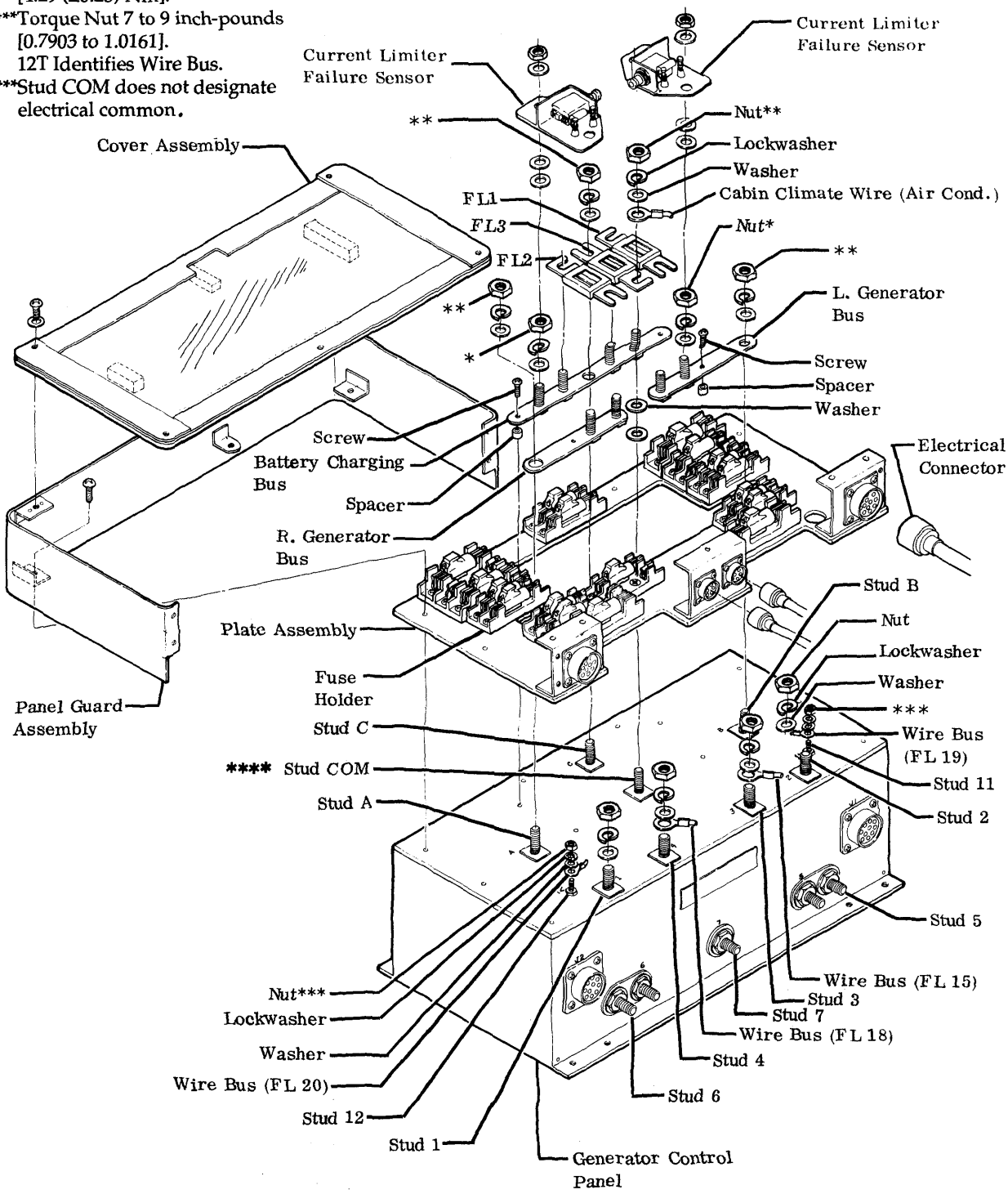
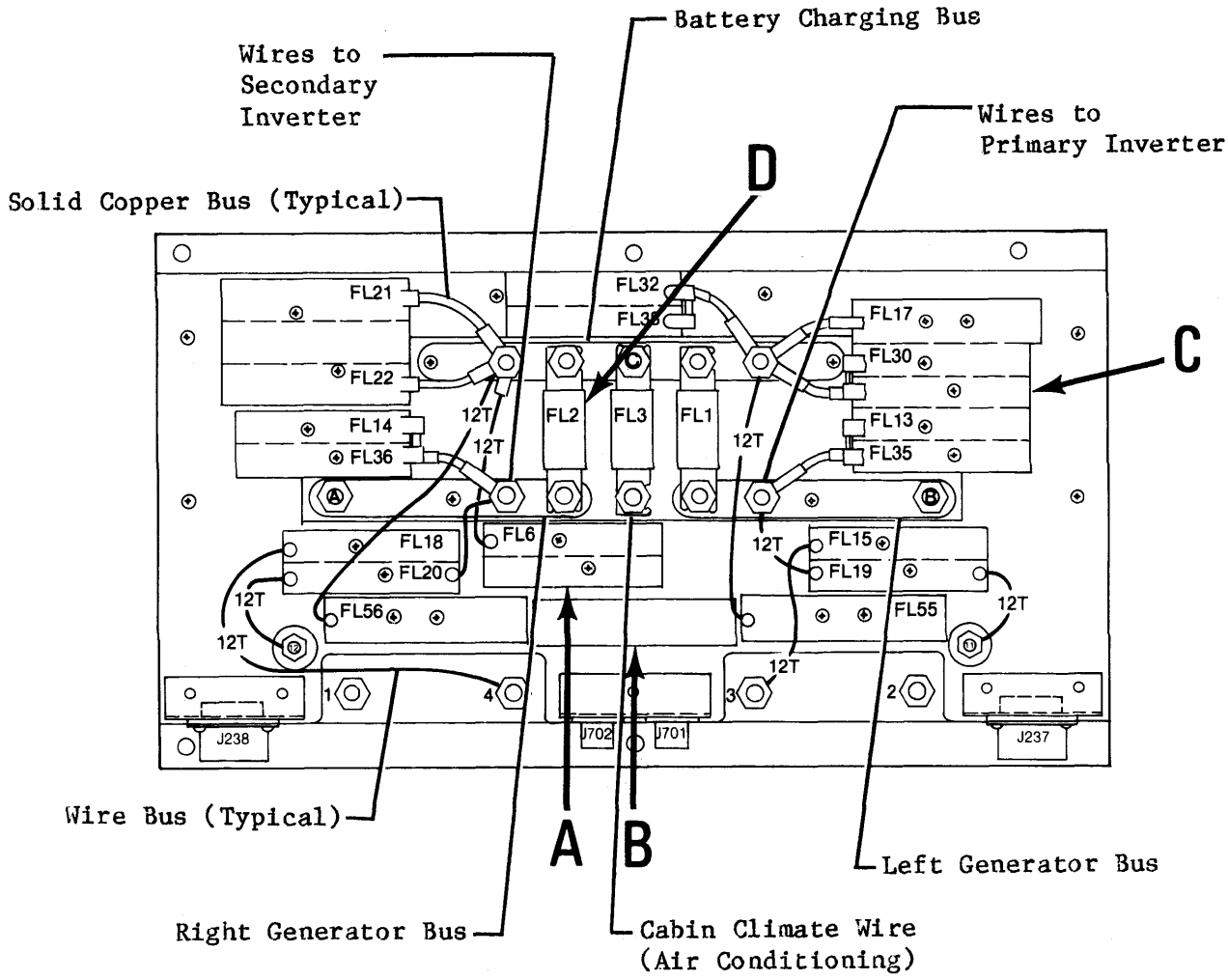
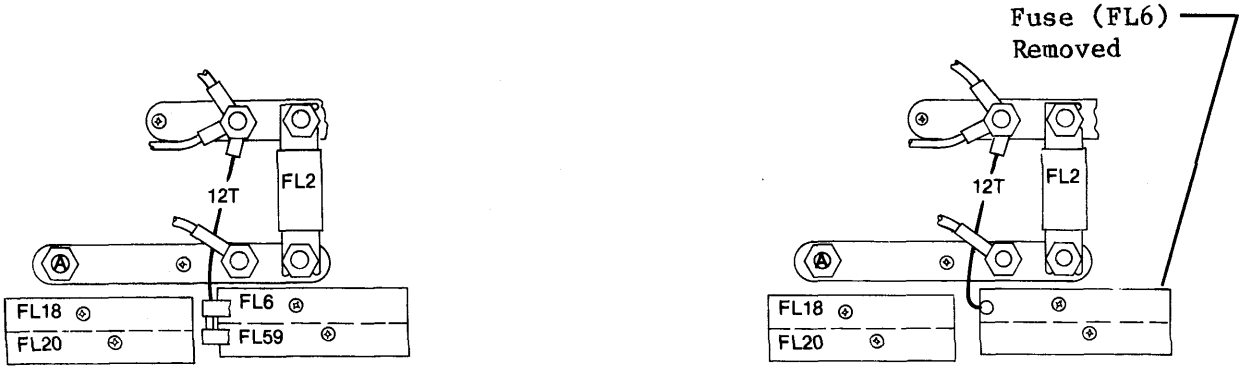
Current Limiter Panel Installation
Figure 203 (Sheet 5 of 5)

*Torque Nut 75 (±3) inch-pounds [8.47 (±0.34) Nm].
**Torque Nut 38 (±2) inch-pounds [4.29 (±0.23) Nm].
***Torque Nut 7 to 9 inch-pounds [0.7903 to 1.0161].
12T Identifies Wire Bus.
****Stud COM does not designate electrical common.



Current Limiter Panel Installation
Figure 204 (Sheet 1 of 5)



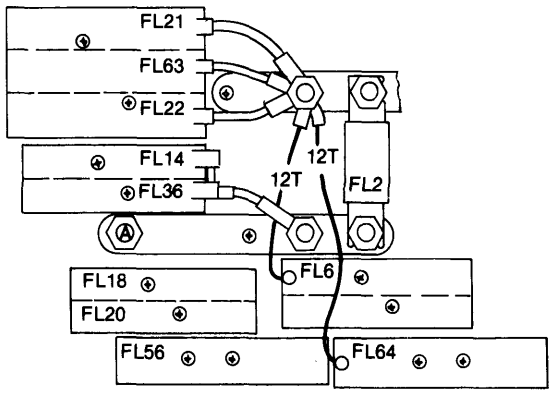


Current Limiter Panel - with Lh Recognition Light

Current Limiter Panel - Recognition Light Removed

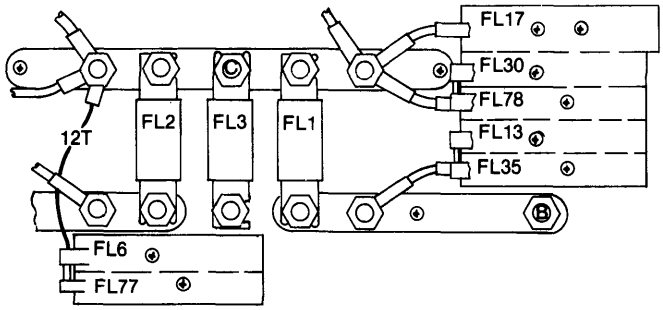
Detail A

Current Limiter Panel Installation
Figure 204 (Sheet 2 of 5)



Current Limiter Panel - Camera

Detail B



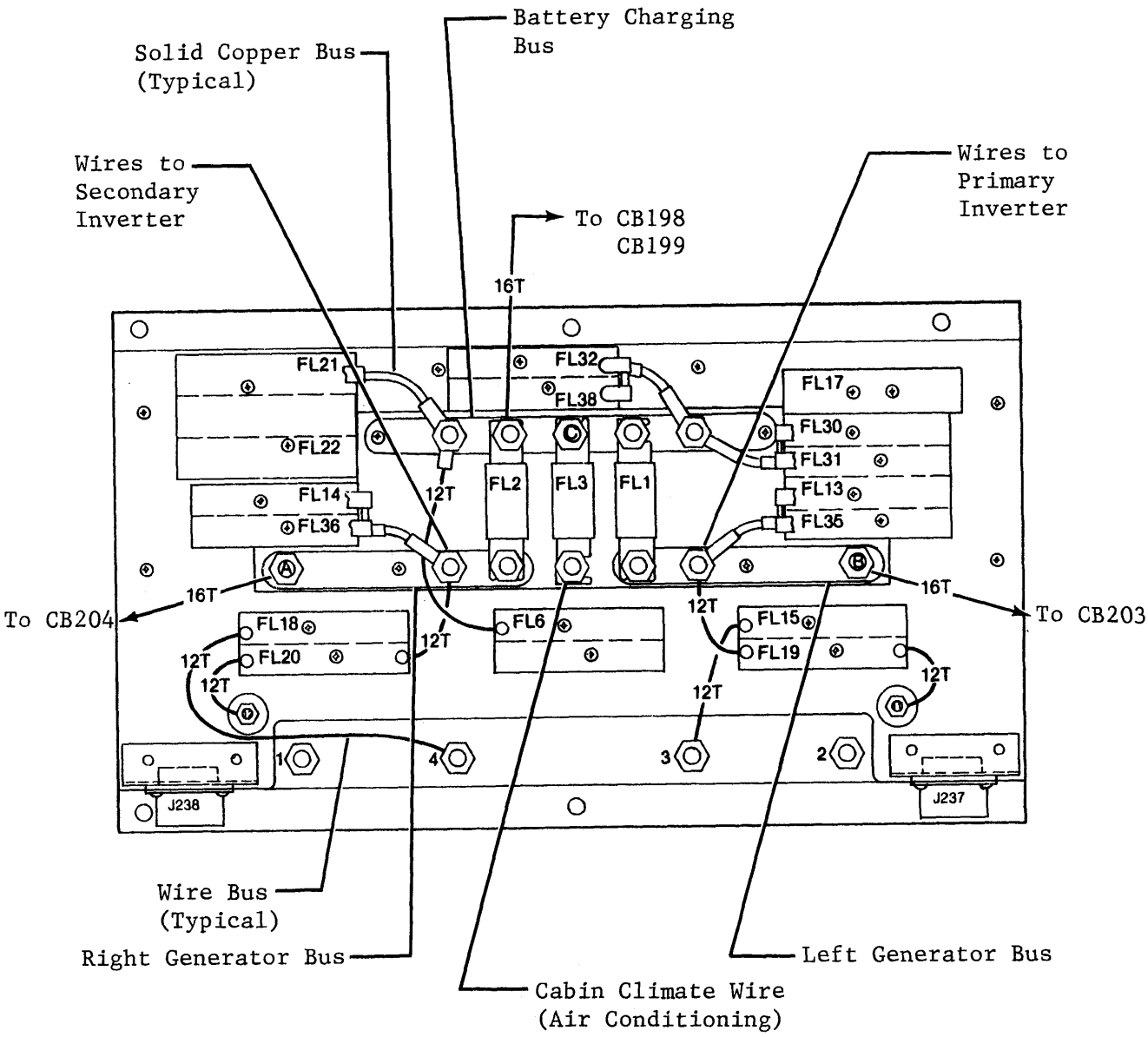
Current Limiter Panel -
Special Purpose Aircraft

Detail C

9-367C-2

Current Limiter Panel Installation
Figure 204 (Sheet 3 of 5)

EFFECTIVITY: **35-370, 35-390 thru 35-505;**
MM-99 **36-048 thru 36-053**
D921



Detail D

Aircraft Modified per AMK85-1, "Electrical Power Distribution Improvement"

Current Limiter Panel Installation
Figure 204 (Sheet 4 of 5)

Cur. Lim., Fuse & Circuit Brkr. Ref. Designators	Amperage	Circuit	Power Source	Current Limiter Panel 2618337 -13	-14	-15	-18	-25
FL1	275	L. Gen Bus to Bat Charging Bus		X	X	X	X	X
FL2	275	R. Gen Bus to Bat Charging Bus		X	X	X	X	X
FL3	150	Cabin Climate	Battery Charging Bus	X	X	X	X	X
FL6	30	Recognition Light	Battery Charging Bus	X	X		X	X
FL13	20	L. Landing Light	L. Generator Bus	X	X	X	X	X
FL14	20	R. Landing Light	R. Generator Bus	X	X	X	X	X
FL15	20	L. Battery Bus	Stud 3 (Bat 1)	X	X	X	X	X
FL17	50	L. Essential Bus	Battery Charging Bus	X	X	X	X	X
*FL17	50	L. Essential Bus	L. Generator Bus					
FL18	20	R. Battery Bus	Stud 4 (Bat 2)	X	X	X	X	X
FL19	10	L. Generator Field	L. Gen Bus to Stud 11	X	X	X	X	X
FL20	10	R. Generator Field	R. Gen Bus to Stud 12	X	X	X	X	X
FL21	50	Elec. Hyd. Pump	Battery Charging Bus	X	X	X	X	X
FL22	50	R. Essential Bus	Battery Charging Bus	X	X	X	X	X
*FL22	50	R. Essential Bus	R. Generator Bus					
FL30	10	Fuel Flow	Battery Charging Bus	X	X	X	X	X
FL32	5	Voltmeter	Battery Charging Bus	X	X	X	X	X
FL35	10	L. Main Power Bus	L. Generator Bus	X	X	X	X	X
FL36	10	R. Main Power Bus	R. Generator Bus	X	X	X	X	X
FL38	5	Air Condition Control	Battery Charging Bus	X	X	X	X	X
FL55	50	L. Essential B Bus	Battery Charging Bus	X	X	X	X	X
*FL55	50	L. Essential B Bus	L. Generator Bus					
FL56	50	R. Essential B Bus	Battery Charging Bus	X	X	X	X	X
*FL56	50	R. Essential B Bus	R. Generator Bus					
FL59	30	LH Recognition Light	Battery Charging Bus		X			
FL63	50	Scanner	Battery Charging Bus				X	
FL64	50	Scanner	Battery Charging Bus				X	
FL77	10		Battery Charging Bus					X
FL78	10		Battery Charging Bus					X
CB198	1	FL2 Failure Sensor		X	X	X	X	X
CB199	1	FL1 Failure Sensor		X	X	X	X	X
*CB203	10	L. Regulator Pos. Sense Voltage	L. Generator Bus					
*CB204	10	R. Regulator Pos. Sense Voltage	R. Generator Bus					

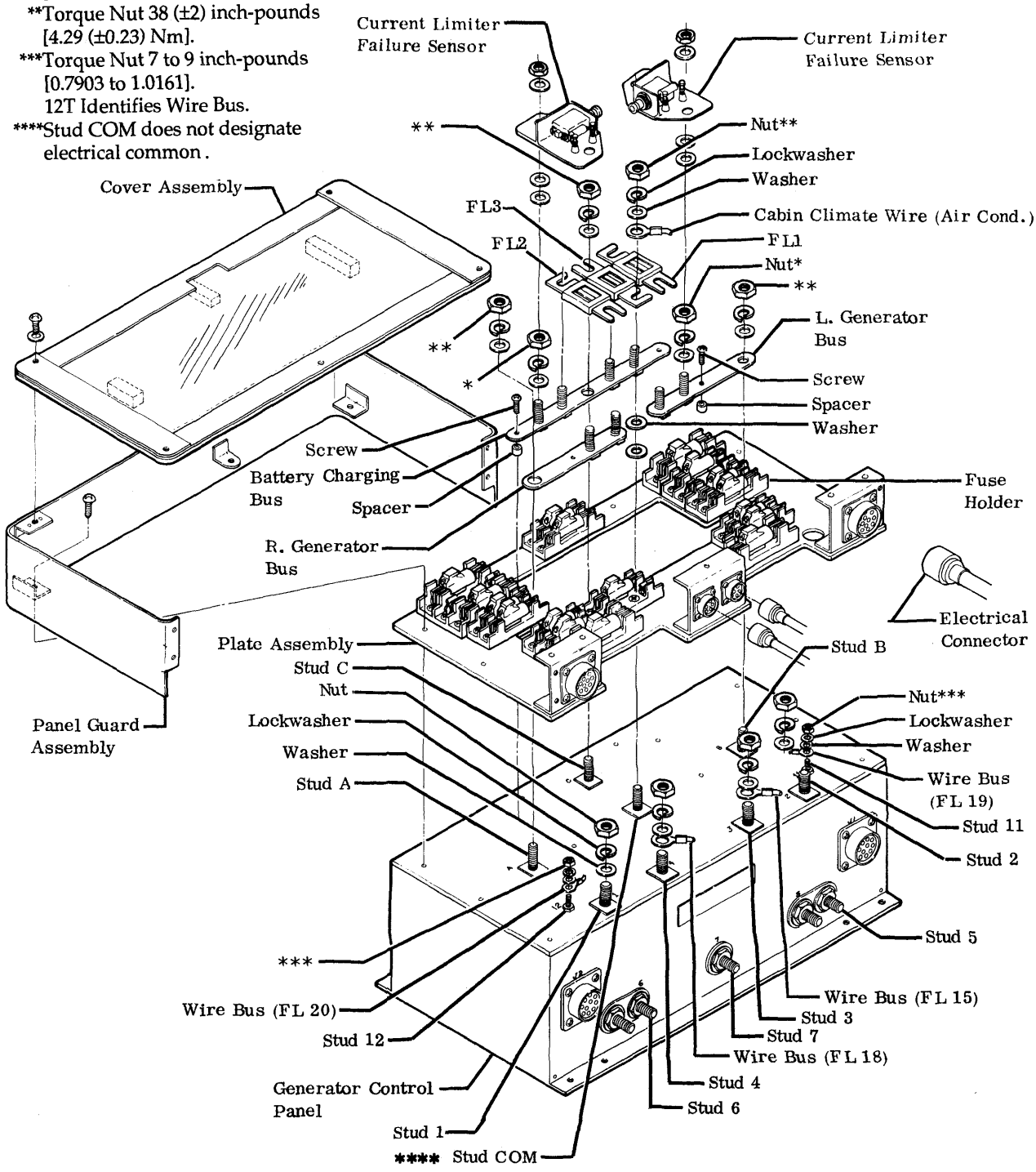
-83	-74	-75	-76	-84
2418093 Cover Assembly				

-13 Current Limiter Panel - Standard: Aircraft 35-370, 35-390 thru 35-505; 36-048 thru 36-053.
-14 Current Limiter Panel - LH Recognition Light: Aircraft 35-370, 35-390 thru 35-505; 36-048 thru 36-053.
-15 Current Limiter Panel - RH Recognition Light Removal: Aircraft 35-370, 35-390 thru 35-505; 36-048 thru 36-053.
-18 Current Limiter Panel - Camera: Aircraft 35-370, 35-390 thru 35-505; 36-048 thru 36-053.
-25 Current Limiter Panel - Special Purpose Aircrat: Aircraft 35-470.

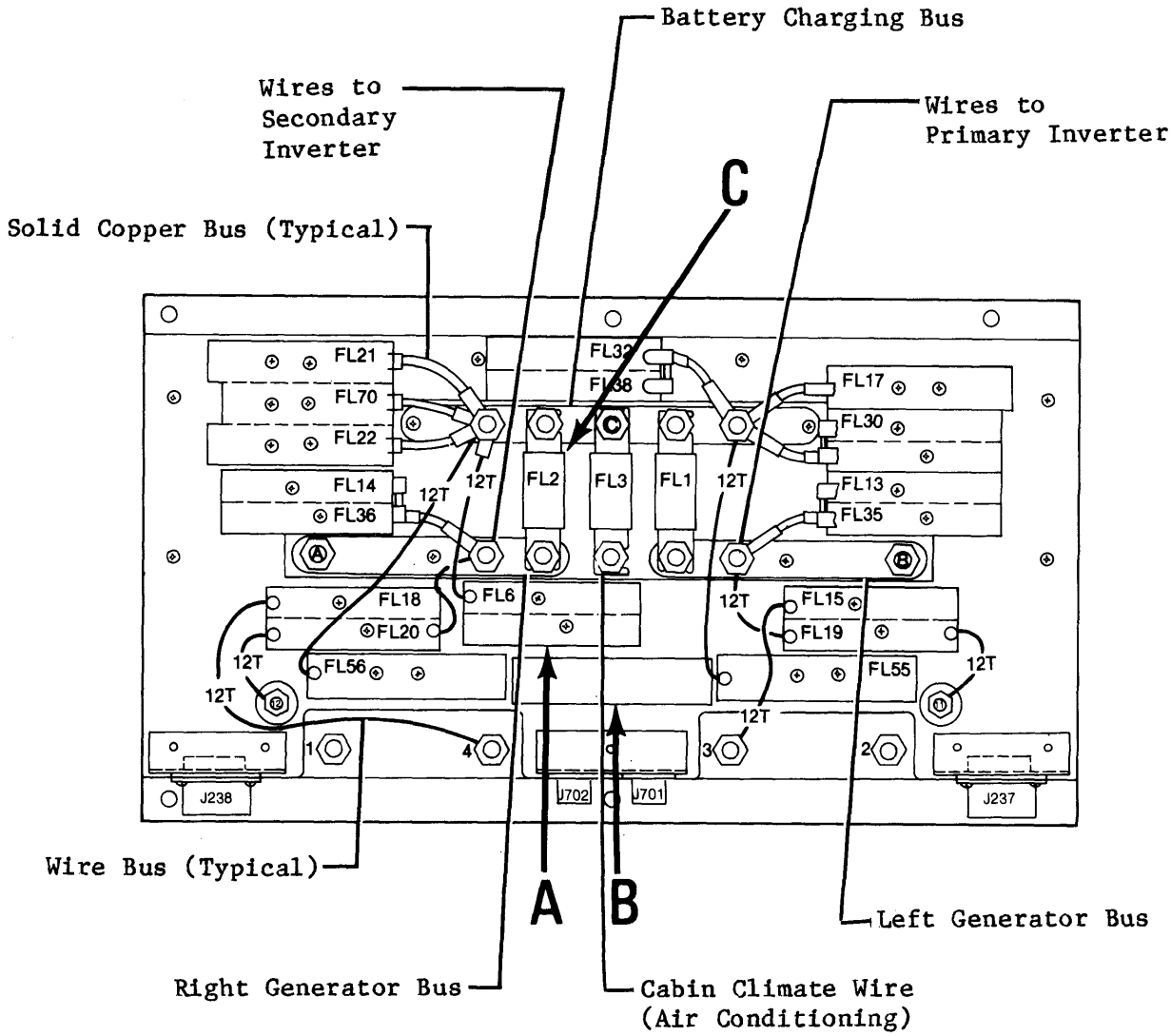
* Aircraft Modified per AMK85-1, "Electrical Power Distribution Improvement"

Current Limiter Panel Installation
Figure 204 (Sheet 5 of 5)

*Torque Nut 75 (±3) inch-pounds [8.47 (±0.34) Nm].
**Torque Nut 38 (±2) inch-pounds [4.29 (±0.23) Nm].
***Torque Nut 7 to 9 inch-pounds [0.7903 to 1.0161].
12T Identifies Wire Bus.
****Stud COM does not designate electrical common.

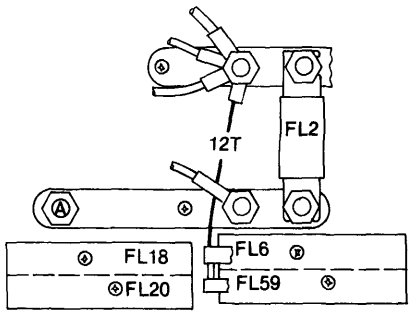


Current Limiter Panel Installation
Figure 205 (Sheet 1 of 5)

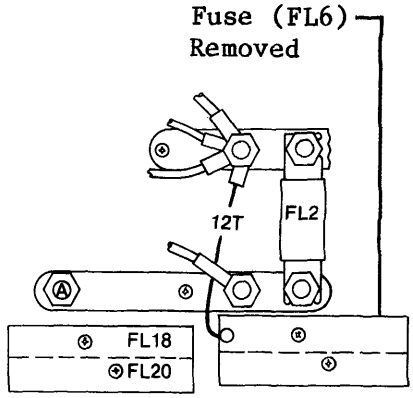


9-367C

Current Limiter Panel Installation
Figure 205 (Sheet 2 of 5)

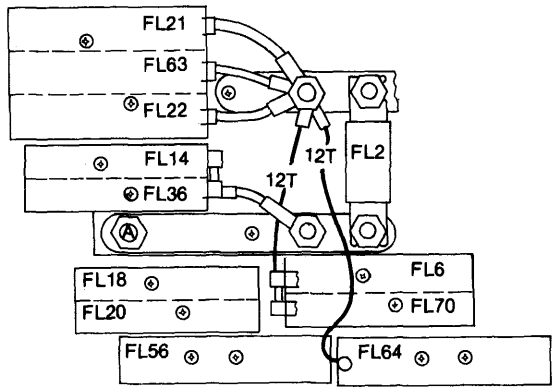


Current Limiter Panel -
LH Recognition Light



Current Limiter Panel -
RH Recognition Light Removed

Detail A

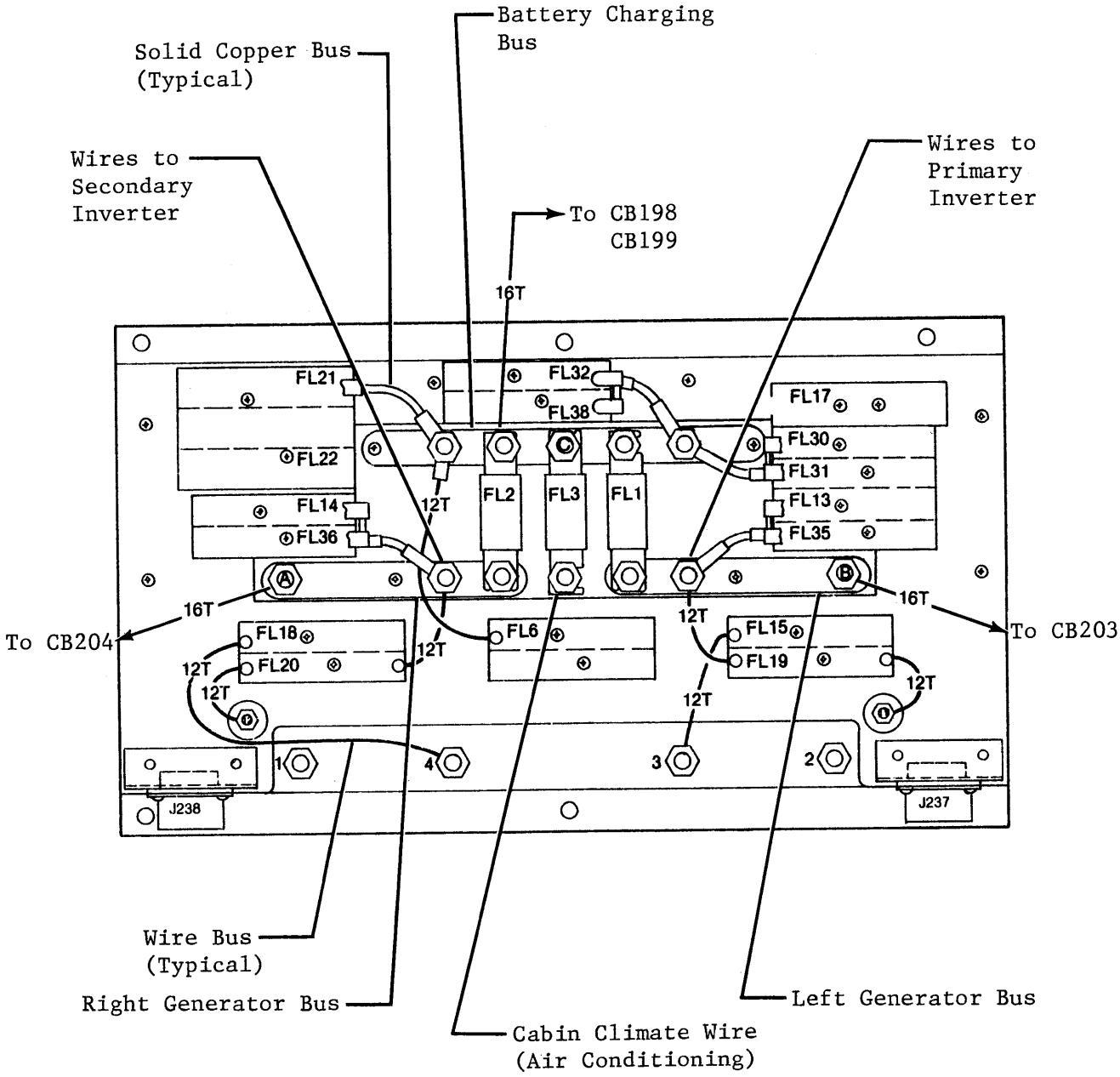


Current Limiter Panel - Camera

Detail B

9-367C

Current Limiter Panel Installation
Figure 205 (Sheet 3 of 5)



Detail C

Aircraft Modified per AMK85-1, "Electrical Power Distribution Improvement"

Current Limiter Panel Installation
Figure 205 (Sheet 4 of 5)

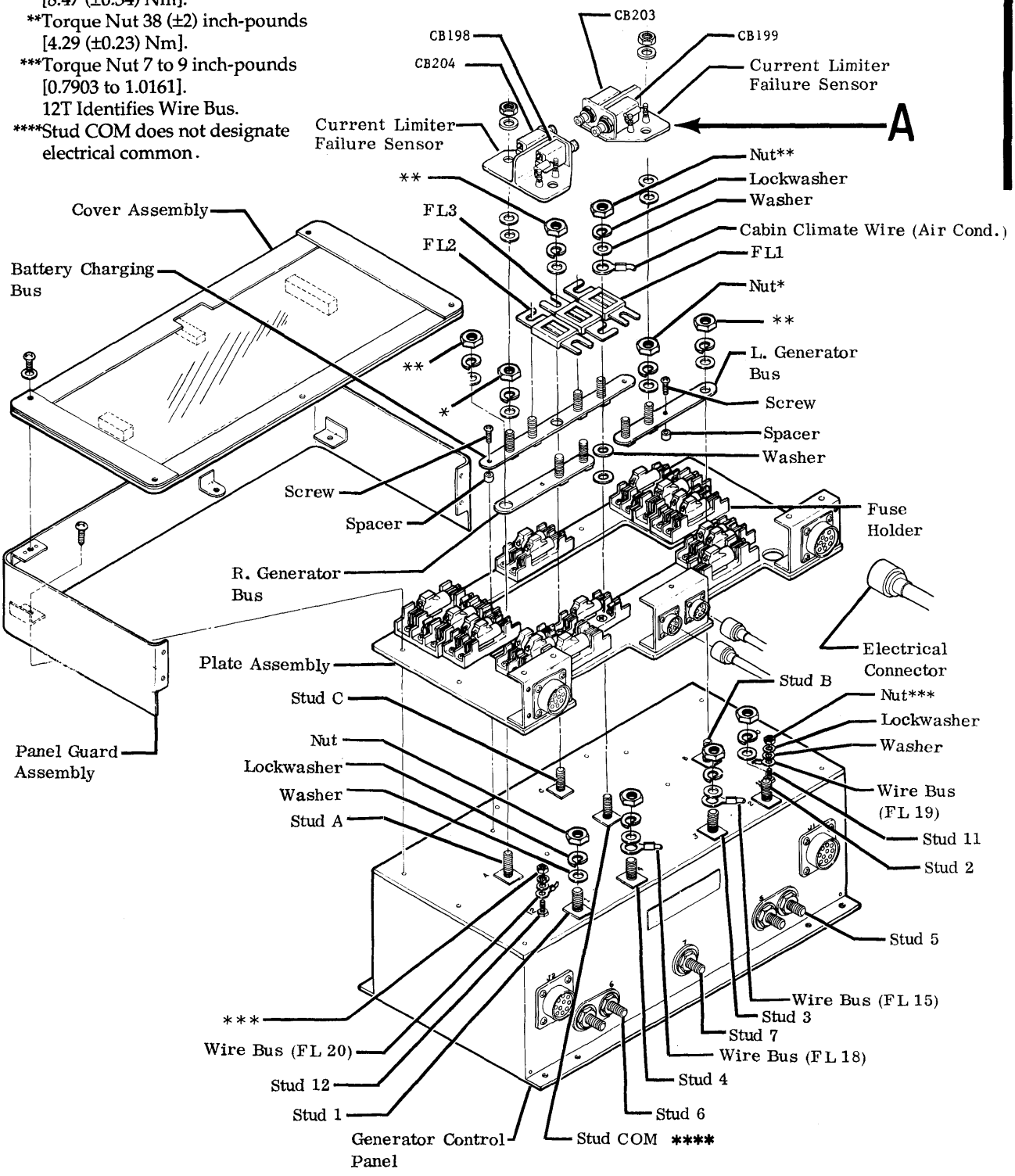
Cur. Lim., Fuse & Circuit Brkr. Ref. Designators	Amperage	Circuit	Power Source	Current Limiter Panel 2618337 -7	-8	-9	-10
FL1	275	L. Gen Bus to Bat Charging Bus		X	X	X	X
FL2	275	R. Gen Bus to Bat Charging Bus		X	X	X	X
FL3	150	Cabin Climate	Battery Charging Bus	X	X	X	X
FL6	30	Recognition Light	Battery Charging Bus	X	X	X	X
FL13	20	L. Landing Light	L. Generator Bus	X	X	X	X
FL14	20	R. Landing Light	R. Generator Bus	X	X	X	X
FL15	20	L. Battery Bus	Stud 3 (Bat 1)	X	X	X	X
FL17	50	L. Essential Bus	Battery Charging Bus	X	X	X	X
*FL17	50	L. Essential Bus	L. Generator Bus				
FL18	20	R. Battery Bus	Stud 4 (Bat 2)	X	X	X	X
FL19	10	L. Generator Field	L. Gen Bus to Stud 11	X	X	X	X
FL20	10	R. Generator Field	R. Gen Bus to Stud 12	X	X	X	X
FL21	50	Elec. Hyd. Pump	Battery Charging Bus	X	X	X	X
FL22	50	R. Essential Bus	Battery Charging Bus	X	X	X	X
*FL22	50	R. Essential Bus	R. Generator Bus				
FL30	10	Fuel Flow	Battery Charging Bus	X	X	X	X
FL32	5	Voltmeter	Battery Charging Bus	X	X	X	X
FL35	10	L. Main Power Bus	L. Generator Bus	X	X	X	X
FL36	10	R. Main Power Bus	R. Generator Bus	X	X	X	X
FL38	5	Air Condition Control	Battery Charging Bus	X	X	X	X
FL55	50	L. Essential B Bus	Battery Charging Bus	X	X	X	X
*FL55	50	L. Essential B Bus	L. Generator Bus				
FL56	50	R. Essential B Bus	Battery Charging Bus	X	X	X	X
*FL56	50	R. Essential B Bus	R. Generator Bus				
FL57	5	L. Start Relay Lock	Stud 1 (Bat 1)				
FL58	5	R. Start Relay Lock	Stud 2 (Bat 2)	X	X	X	X
FL63	50	Camera	Battery Charging Bus	X			
FL64	50	Camera	Battery Charging Bus	X			
FL70	20	Hor. Stab. Actuator	Battery Charging Bus	X	X	X	X
CB198	1	FL2 Failure Sensor		X	X	X	X
CB199	1	FL1 Failure Sensor		X	X	X	X
*CB203	10	L. Regulator Pos. Sense Voltage	L. Generator Bus				
*CB204	10	R. Regulator Pos. Sense Voltage	R. Generator Bus				

AIRCRAFT 35-506, 35-507, AND 35-508	-64 -65 -62 -63
	2418093 Cover Assembly

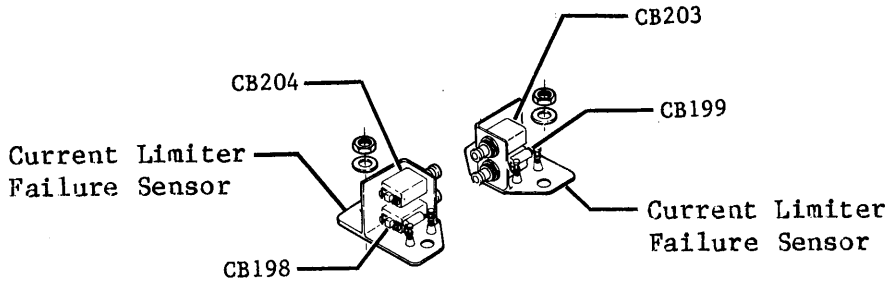
-7 Current Limiter Panel - Camera
-8 Current Limiter Panel - Standard
-9 Current Limiter Panel - Left Hand Recognition Light
-10 Current Limiter Panel - Right Hand Recognition Light Removal

Current Limiter Panel Installation
Figure 205 (Sheet 5 of 5)

*Torque Nut 75 (±3) inch-pounds [8.47 (±0.34) Nm].
**Torque Nut 38 (±2) inch-pounds [4.29 (±0.23) Nm].
***Torque Nut 7 to 9 inch-pounds [0.7903 to 1.0161]. 12T Identifies Wire Bus.
****Stud COM does not designate electrical common.

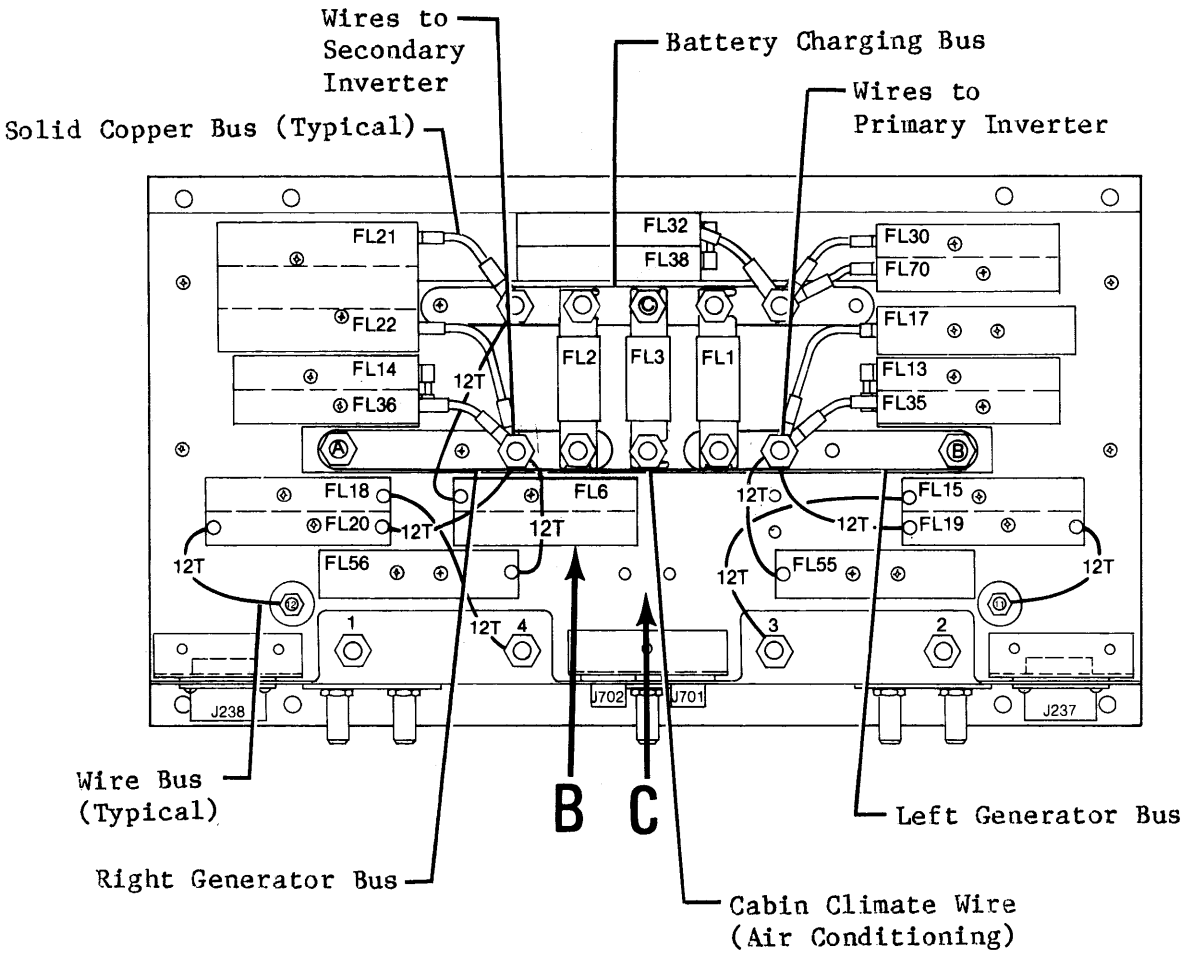


Current Limiter Panel Installation
Figure 206 (Sheet 1 of 4)

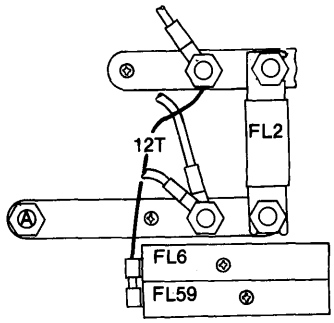


Aircraft 35-509 Only

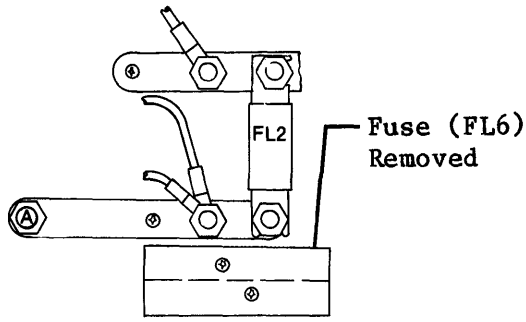
Detail A



Current Limiter Panel Installation
Figure 206 (Sheet 2 of 4)

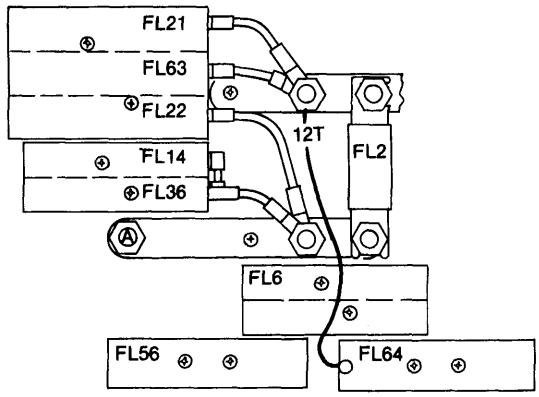


Current Limiter Panel -
LH Recognition Light



Current Limiter Panel -
RH Recognition Light Removed

Detail B



Current Limiter Panel - Camera

Detail C

9-367C-1

Current Limiter Panel Installation
Figure 206 (Sheet 3 of 4)

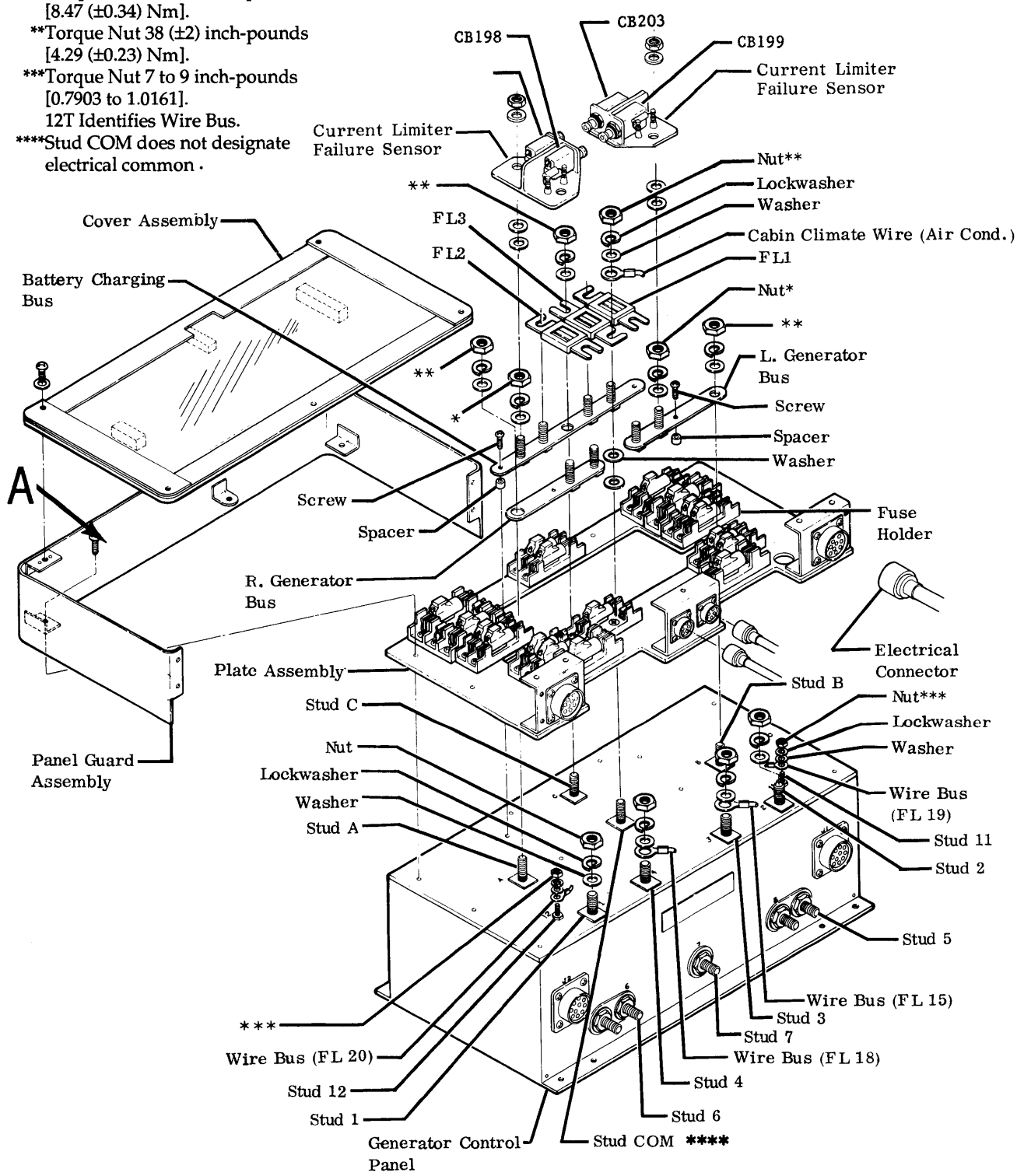
Cur. Lim., Fuse & Circuit Brkr. Ref. Designators	Amperage	Circuit	Power Source	Current Limiter Panel 2618447 -1	-2	-3	-4
FL1	275	L. Gen Bus to Bat Charging Bus		X	X	X	X
FL2	275	R. Gen Bus to Bat Charging Bus		X	X	X	X
FL3	150	Cabin Climate	Battery Charging Bus	X	X	X	X
FL6	30	Recognition Light	Battery Charging Bus	X	X	X	X
FL13	20	L. Landing Light	L. Generator Bus	X	X	X	X
FL14	20	R. Landing Light	R. Generator Bus	X	X	X	X
FL15	20	L. Battery Bus	Stud 3 (Bat 1)	X	X	X	X
FL17	50	L. Essential Bus	L. Generator Bus	X	X	X	X
FL18	20	R. Battery Bus	Stud 4 (Bat 2)	X	X	X	X
FL19	10	L. Generator Field	L. Gen Bus to Stud 11	X	X	X	X
FL20	10	R. Generator Field	R. Gen Bus to Stud 12	X	X	X	X
FL21	50	Elec. Hyd. Pump	Battery Charging Bus	X	X	X	X
FL22	50	R. Essential Bus	R. Generator Bus	X	X	X	X
FL30	10	Fuel Flow	Battery Charging Bus	X	X	X	X
FL32	5	Voltmeter	Battery Charging Bus	X	X	X	X
FL35	10	L. Main Power Bus	L. Generator Bus	X	X	X	X
FL36	10	R. Main Power Bus	R. Generator Bus	X	X	X	X
FL38	5	Air Condition Control	Battery Charging Bus	X	X	X	X
FL55	50	L. Essential B Bus	L. Generator Bus	X	X	X	X
FL56	50	R. Essential B Bus	R. Generator Bus	X	X	X	X
FL59	30	LH Recognition Light	Battery Charging Bus		X		
FL63	50	Scanner	Battery Charging Bus				X
FL64	50	Scanner	Battery Charging Bus				X
FL70	20	Hor. Stab. Actuator	Battery Charging Bus	X	X	X	X
CB198	1	FL2 Failure Sensor		X	X	X	X
CB199	1	FL1 Failure Sensor		X	X	X	X
CB203	10	L. Regulator Pos. Sense Voltage	L. Generator Bus	X	X	X	X
CB204	10	R. Regulator Pos. Sense Voltage	R. Generator Bus	X	X	X	X

AIRCRAFT 35-509 THRU 35-588	-1	-2	-3	-4
	2618449 Cover Assembly			

-1 Current Limiter Panel - Standard
-2 Current Limiter Panel - Left Hand Recognition Light
-3 Current Limiter Panel - Right Hand Recognition Light Removal
-4 Current Limiter Panel - Camera

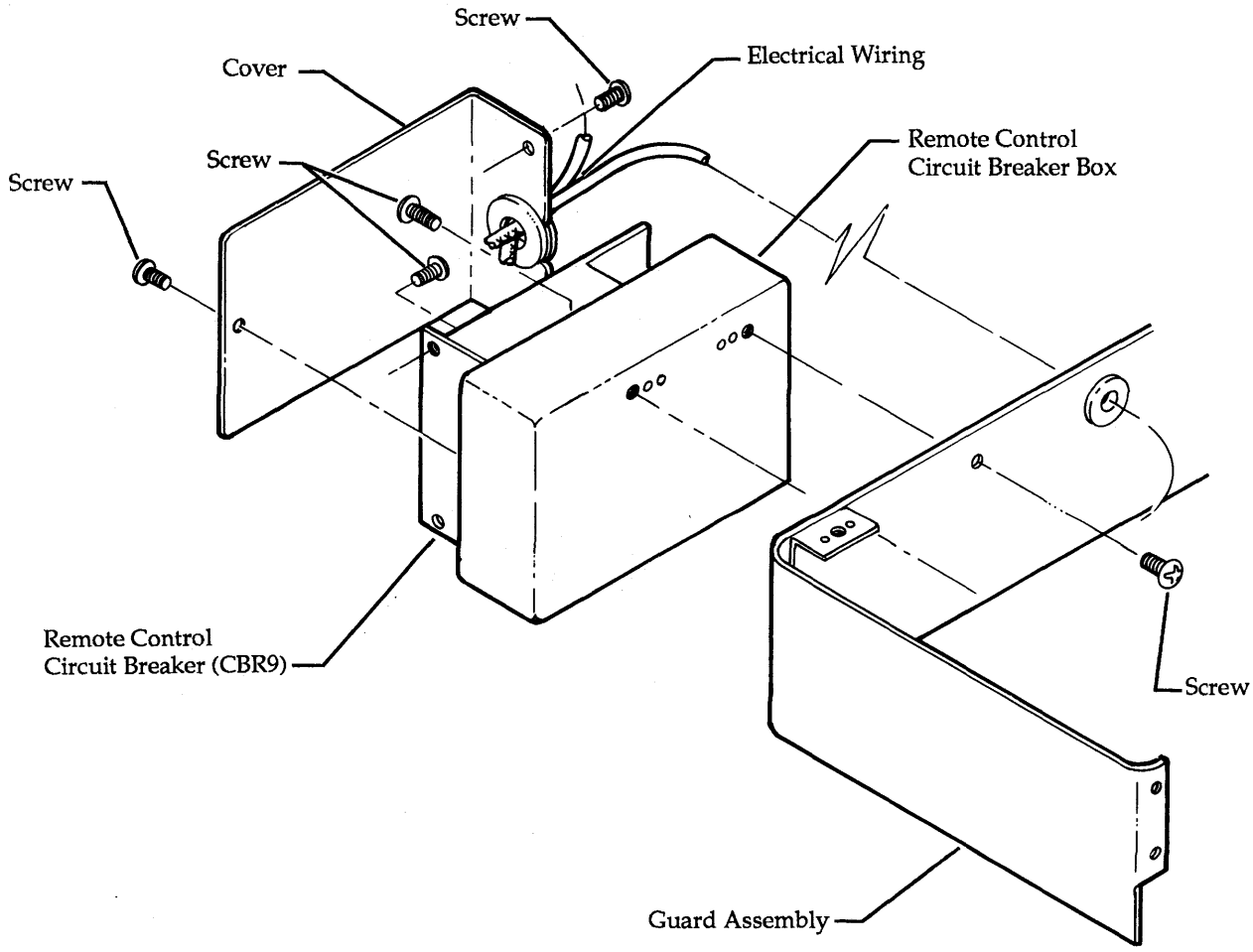
Current Limiter Panel Installation
Figure 206 (Sheet 4 of 4)

*Torque Nut 75 (±3) inch-pounds [8.47 (±0.34) Nm].
**Torque Nut 38 (±2) inch-pounds [4.29 (±0.23) Nm].
***Torque Nut 7 to 9 inch-pounds [0.7903 to 1.0161].
12T Identifies Wire Bus.
****Stud COM does not designate electrical common .



9-149A-2
9-149C-4

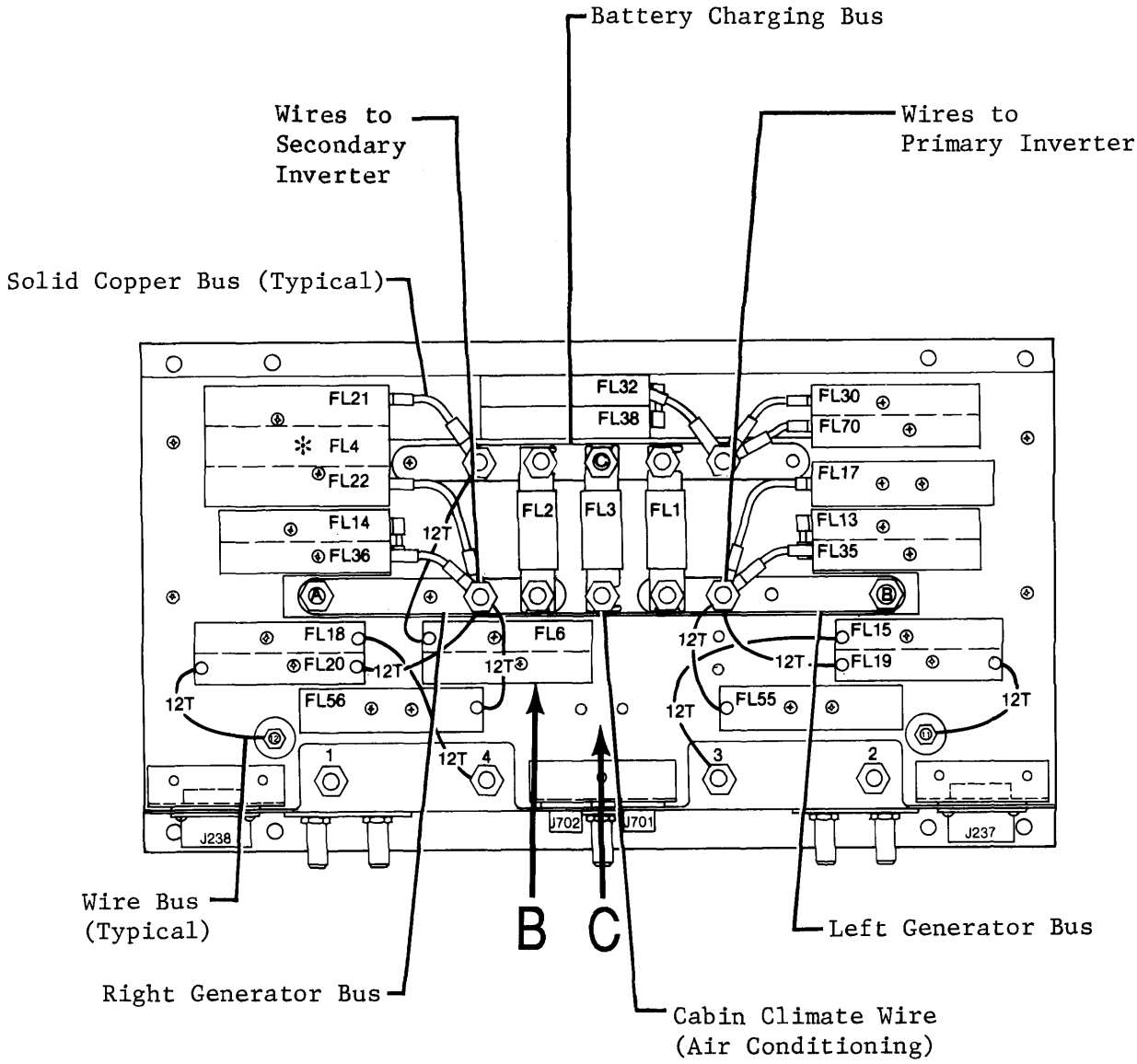
Current Limiter Panel Installation
Figure 207 (Sheet 1 of 5)



Detail A

9-149B-5

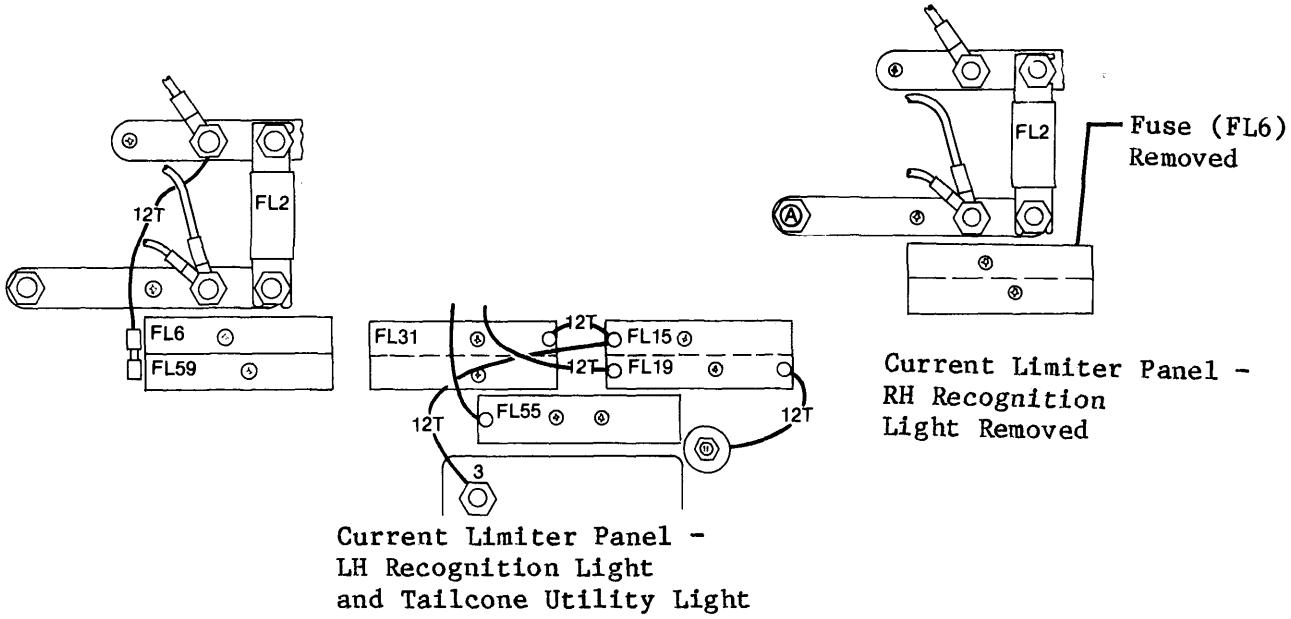
Current Limiter Panel Installation
Figure 207 (Sheet 2 of 5)



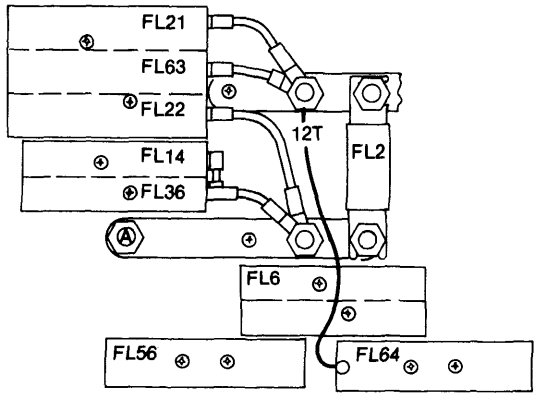
✻ *(Effective 35-657 and Subsequent, 36-064 and Subsequent)*

9-367C-1

Current Limiter Panel Installation
Figure 207 (Sheet 3 of 5)



Detail A



Detail B

Current Limiter Panel Installation
Figure 207 (Sheet 4 of 5)

	CUR LIMITER, FUSE, & CKT BRKR REF DESIGNATORS	AMPERE RATING	CIRCUIT	POWER SOURCE (NORMAL)
	FL1	275	L Gen Bus to Bat Charging Bus	
	FL2	275	R Gen Bus to Bat Charging Bus	
	FL3	150	Cabin Climate	Battery Charging Bus
*	FL4	50	Cabin Power	Battery Charging Bus
	FL6	30	Recog Light	Battery Charging Bus
	FL13	20	L Landing Light	L Generator Bus
	FL14	20	R Landing Light	R Generator Bus
	FL15	20	L Battery Bus	Stud 3 (Bat 1)
	FL17	50	L Essential A Bus	L Generator Bus
	FL18	20	R Battery Bus	Stud 4 (Bat 2)
	FL19	10	L Gen Field	L Gen Bus to Stud 11
	FL20	10	R Gen Field	R Gen Bus to Stud 12
	FL21	50	Elec Hyd Pump	Battery Charging Bus
	FL22	50	R Essential A Bus	R Generator Bus
	FL30	10	Fuel Flow	Battery Charging Bus
	FL31	5	Tailcone Utility Light	Stud 3 (Bat 1)
	FL32	5	Voltmeter	Battery Charging Bus
	FL35	10	L Main Power Bus	L Generator Bus
	FL36	10	R Main Power Bus	R Generator Bus
	FL38	5	Air Cond Cont	Battery Charging Bus
	FL55	50	L Essential B Bus	L Generator Bus
	FL56	50	R Essential B Bus	R Generator Bus
	FL59	30	LH Recognition Lt	Battery Charging Bus
	FL63	50	Scanner	Battery Charging Bus
	FL64	50	Scanner	Battery Charging Bus
	FL70	20	Horiz Stab Actuator	Battery Charging Bus
	CB198	1	FL2 Failure Sensor	
	CB199	1	FL1 Failure Sensor	
	CB203	10	L Regulator Pos Sense Voltage	L Generator Bus
	CB204	10	R Regulator Pos Sense Voltage	R Generator Bus

* *Effective 35-657 and Subsequent, 36-064 and Subsequent*

Current Limiter Panel Installation
Figure 207 (Sheet 5 of 5)

CURRENT LIMITER FAILURE SENSOR - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

NOTE:

- *On Aircraft 35-002 thru 35-389, except 35-370, modified per AMK 80-17, "Installation of Current Limiter Warning and Starter Indicator Lights,"* a current limiter failure sensor box (E55) containing two circuit breakers (CB198 and CB199) with resistors are installed on an electrical equipment tray in the tailcone forward of frame 26 (LH side) on stringers 13L and 14L.

- *On Aircraft 35-370, 35-390 thru 35-508 and 36-048 thru 36-053*, use two current limiter failure sensor assemblies on the current limiter panel with one circuit breaker in each assembly. *On Aircraft 35-509 and Subsequent and 36-054 and Subsequent, and Aircraft 35-370, 35-390 thru 35-508 and 36-048 thru 36-053 modified per AMK85-1, "Electrical Power Distribution Improvement,"* use two current limiter failure sensor assemblies with two circuit breakers in each assembly.

- For description of current limiter failure sensors, refer to Current Limiter Panel, 24-50-02. On some aircraft, a diode is installed on each current limiter failure sensor assembly. The diode is utilized to isolate specific circuitry from glareshield light test circuitry.

- Refer to applicable current limiter panel installation figure in 24-50-02 when performing current limiter failure sensor assembly removal and installation procedure.

A. Remove Current Limiter Failure Sensor *(Aircraft 35-002 thru 35-389, except 35-370, modified per AMK 80-17, "Installation of Current Limiter Warning and Starter Indicator Lights")* (See figure 201.)

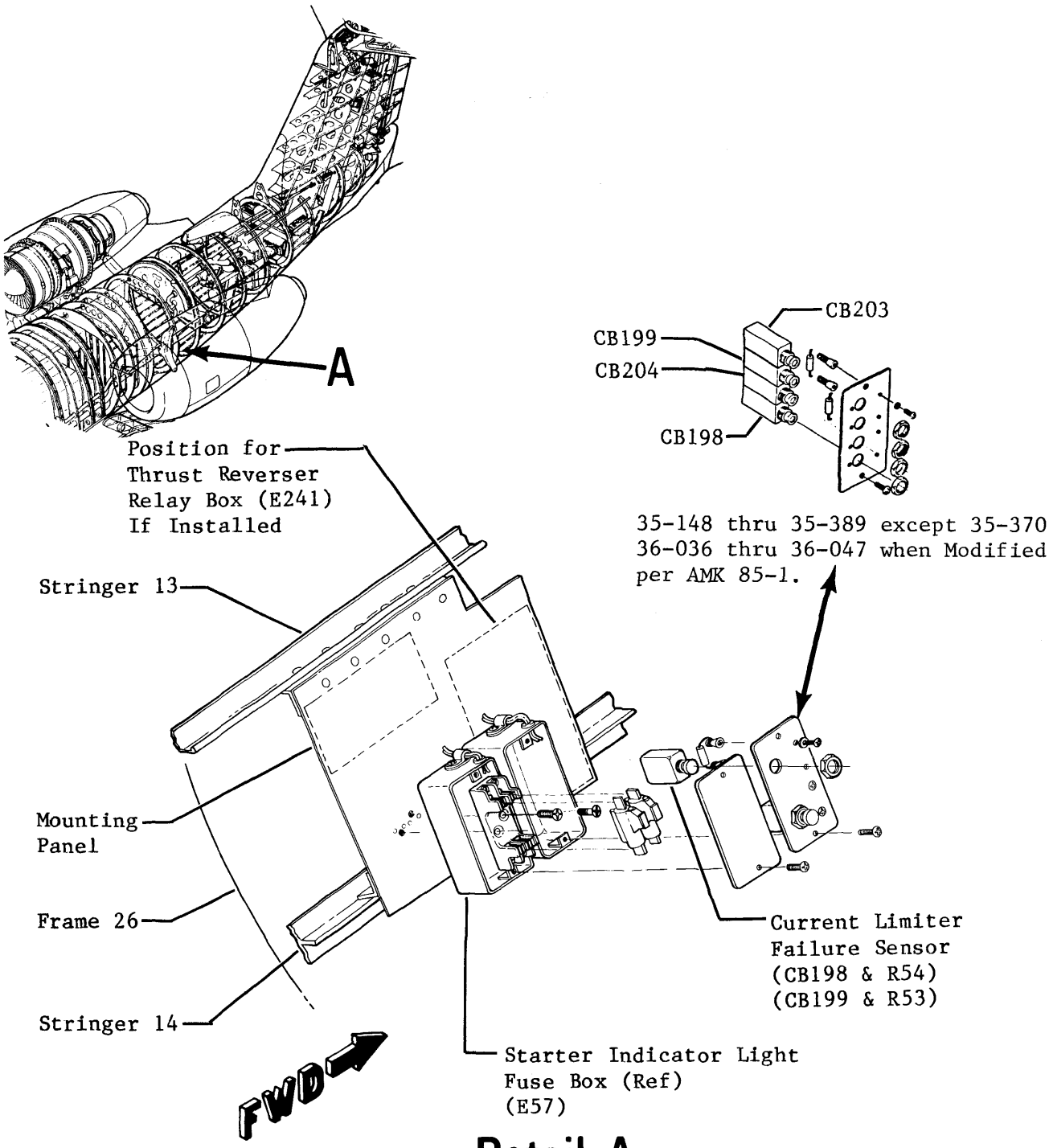
WARNING: IF INSTALLATION OF CURRENT LIMITER FAILURE SENSOR IS TO BE PERFORMED WITH CURRENT LIMITER PANEL INSTALLED IN THE AIRCRAFT, REMOVE POWER FROM THE AIRCRAFT DURING INSTALLATION OF SENSOR.

(1) Lower tailcone access door.
(2) Remove electrical power from aircraft.
(3) Remove attaching parts and cover from current limiter failure sensor box.
(4) Disconnect electrical wiring from appropriate circuit breaker.
(5) Remove attaching parts and circuit breaker from cover.

B. Install Current Limiter Failure Sensor *(Aircraft 35-002 thru 35-389, except 35-370, modified per AMK 80-17, "Installation of Current Limiter Warning and Starter Indicator Lights")* (See figure 201.)

WARNING: IF INSTALLATION OF CURRENT LIMITER FAILURE SENSOR IS TO BE PERFORMED WITH CURRENT LIMITER PANEL INSTALLED IN THE AIRCRAFT, REMOVE POWER FROM THE AIRCRAFT DURING INSTALLATION OF SENSOR.

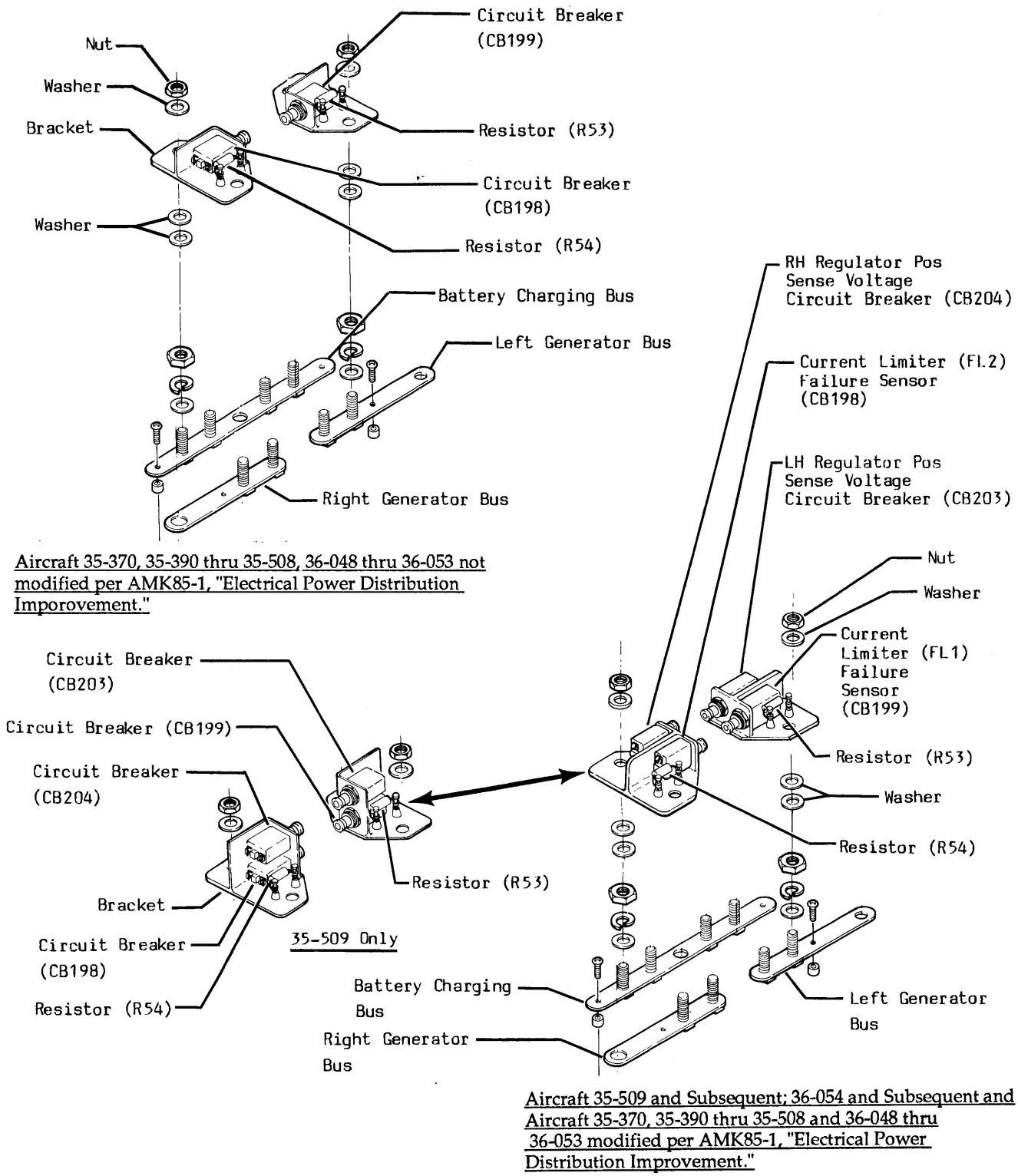
(1) Position circuit breaker on cover and secure with attaching parts.
(2) Connect electrical wiring to circuit breaker.
(3) Perform continuity check of circuit breaker as follows:
  (a) Pull circuit breakers CB198 and CB199.
  (b) Using an ohmmeter, check for continuity across each circuit breaker. Continuity shall not exist.
  (c) Depress circuit breakers CB198 and CB199.
  (d) Using an ohmmeter, check for continuity across each circuit breaker. Continuity shall exist.



Detail A

Current Limiter Failure Sensor Installation
Figure 201 (Sheet 1 of 2)

EFFECTIVITY: 35-002 thru 35-389, except 35-370; 36-002 thru 36-047 Modified per AMK 80-17,"Installation of Current Limiter Warning and Starter Indicator Lights"



Current Limiter Failure Sensor Installation
Figure 201 (Sheet 2 of 2)

(4) Position cover on current limiter failure sensor box and secure with attaching parts.
(5) Restore electrical power to aircraft.
(6) Perform Battery Charging Bus Current Limiter Check. (Refer to 24-31-00.)
(7) Perform Operational Check of Current Limiter Warning Light (step 2.A., this section).

C. Remove Current Limiter Failure Sensor *(Aircraft 35-370, 35-390 and Subsequent, 36-048 and Subsequent)* (See figure 201.)

WARNING: IF INSTALLATION OF CURRENT LIMITER FAILURE SENSOR IS TO BE PERFORMED WITH CURRENT LIMITER PANEL INSTALLED IN THE AIRCRAFT, REMOVE POWER FROM THE AIRCRAFT DURING INSTALLATION OF THE SENSOR.

(1) Remove electrical power from aircraft.
(2) Remove cover assembly from current limiter panel.
(3) Disconnect electrical wires from current limiter failure sensor.

NOTE: If current limiter failure sensor assemblies are being removed to perform additional disassembly of the current limiter panel, it is not necessary to unsolder wires from sensor assembly.

(4) Remove nut and washer attaching current limiter failure sensor bracket to battery charging bus and left generator bus or right generator bus. Retain hardware for installation.
(5) Remove current limiter failure sensor bracket from battery charging bus and left generator or right generator bus.
(6) If electrical wires were not unsoldered, refer to current limiter panel, 24-50-02, for removal of current limiter failure sensor assembly.

D. Install Current Limiter Failure Sensor *(Aircraft 35-370, 35-390 and Subsequent, 36-048 and Subsequent)* (See figure 201.)

WARNING: IF INSTALLATION OF CURRENT LIMITER FAILURE SENSOR IS TO BE PERFORMED WITH CURRENT LIMITER PANEL INSTALLED IN THE AIRCRAFT, REMOVE POWER FROM THE AIRCRAFT DURING INSTALLATION OF SENSOR.

(1) Verify that electrical power is removed from aircraft.
(2) Remove nut, lockwasher, and washer from applicable studs on battery charging bus and left generator bus or right generator bus. Install electrical wire terminals. Refer to Wiring Manual.
(3) Install washer, lockwasher, and nut on battery charging bus and left generator bus or right generator bus. Torque nut (refer to current limiter panel installation, 24-50-02).
(4) Position current limiter failure sensor bracket on battery charging bus and left generator bus or right generator bus.

NOTE: If interference exists between the current limiter failure sensor assembly and current limiter panel or cover assembly, perform step 1.D.(5).

(5) Lift current limiter failure sensor assembly from battery charging bus and left generator bus or right generator bus. Add washers on the studs (on top of the torqued nuts) to eliminate interference defined in the preceding note.
(6) Install washer and nut securing current limiter failure sensor assembly.

NOTE: If wires were unsoldered from current limiter failure sensor assembly during removal, solder wires to sensor assembly. (Refer to Wiring Diagram Manual.)

(7) Install circuit breakers on current limiter failure sensor assembly.
(8) Perform continuity check of circuit breakers as follows:
(a) Pull circuit breakers CB198 and CB199.

NOTE: *On Aircraft 35-509 and Subsequent, 36-054 and Subsequent and 35-370, 35-390 thru 35-508 and 36-048 thru 36-053 modified per AMK85-1, "Electrical Power Distribution Improvement,"* also check circuit breakers CB203 and CB204 to assure that excess solder has not contaminated circuit breaker contacts.

(b) Using an ohmmeter, check for continuity across each circuit breaker. Continuity shall not exist.
(c) Depress circuit breakers CB198 and CB199.
(d) Using an ohmmeter, check for continuity across each circuit breaker. Continuity shall exist.
(9) Install cover assembly on current limiter panel. (Refer to current limiter panel installation, 24-50-02.)
(10) Perform Operational Check of Current Limiter Warning Light (Refer to Inspection/Check, this section).

2. INSPECTION/CHECK
A. Current Limiter Warning Light Operational Check *(Aircraft 35-002 thru 35-389, except 35-370, and 36-002 thru 36-047 modified per AMK 80-17, "Installation of Current Limiter Warning and Starter Indicator Lights")*
(1) Start engines in accordance with FAA Approved Airplane Flight Manual.
(2) Lower tailcone access door and locate Current Limiter Failure Sensor Box (E55) on mounting panel forward of frame 26 at stringer 14.
(3) Pull circuit breaker CB199. The L CUR LIMITER annunciator on the glareshield shall illuminate.
(4) Depress circuit breaker CB199. The L CUR LIMITER annunciator shall extinguish.
(5) Pull circuit breaker CB198. The R CUR LIMITER annunciator on the glareshield shall illuminate.
(6) Depress circuit breaker CB198. The R CUR LIMITER annunciator shall extinguish.
(7) Close tailcone access door and shut down engines in accordance with FAA Approved Airplane Flight Manual.
B. Current Limiter Warning Light Operational Check *(Aircraft 35-370, 35-390 and Subsequent, 36-048 and Subsequent)*
(1) Start engines in accordance with FAA Approved Airplane Flight Manual.
(2) Lower tailcone access door.
(3) Remove cover from current limiter panel.
(4) Pull circuit breaker CB199. The CUR LIM annunciator on the glareshield shall illuminate.
(5) Depress circuit breaker CB199. The CUR LIM annunciator shall extinguish.
(6) Pull circuit breaker CB198. The CUR LIM annunciator on the glareshield shall illuminate.
(7) Depress circuit breaker CB198. The CUR LIM annunciator shall extinguish.
(8) Install cover on current limiter panel.
(9) Close tailcone access door and shut down engines in accordance with FAA Approved Airplane Flight Manual.

CURRENT LIMITER BOX - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

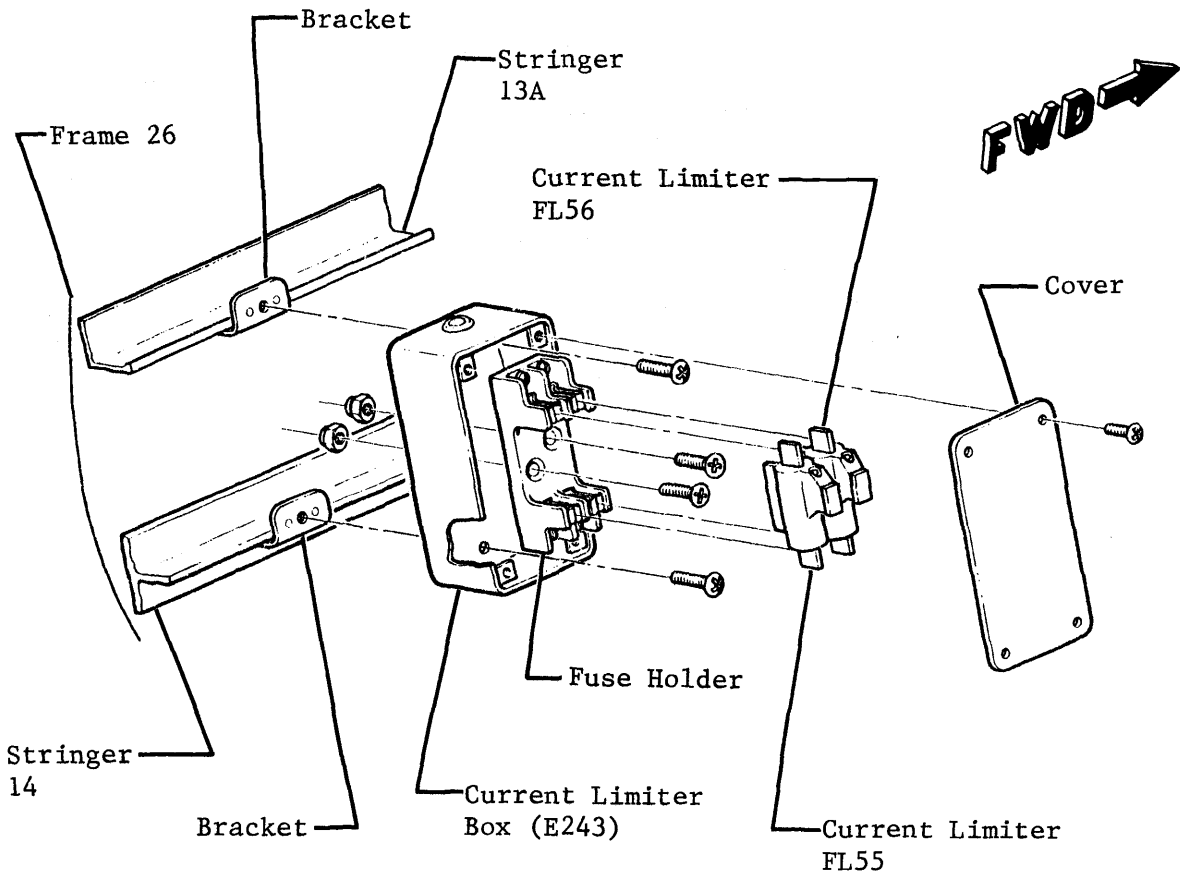
A. Remove Current Limiter Box (E243) (See figure 201.)

NOTE: The current limiter box is located on the LH side of the tailcone equipment section, forward of frame 26 at stringers 13 and 14.

(1) Open tailcone access door to gain access to current limiter box.
(2) Disconnect aircraft batteries.
(3) Remove cover from current limiter box.
(4) Disconnect electrical wiring from fuse holders. Tag wiring.
(5) Remove screws and current limiter box from aircraft.

B. Install Current Limiter Box (E243) (See figure 201.)

(1) Position current limiter box on bracket assemblies and secure with attaching screws.
(2) Connect electrical wiring to fuse holder.
(3) Install cover on current limiter box and secure.
(4) Connect aircraft batteries.
(5) Perform Operational Check of Essential B buses. (Refer to Inspection/Check, para. A.(4), 24-31-00.)
(6) Close and secure tailcone access door.



Current Limiter Box Installation
Figure 201

REMOTE INTERIOR CIRCUIT BREAKER PANEL - MAINTENANCE PRACTICES

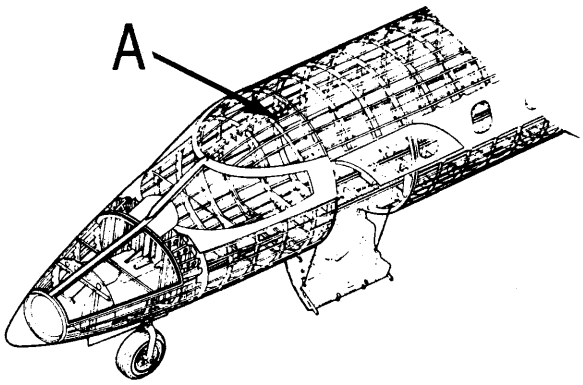
1. **Removal/Installation**
   A. Remove Remote Interior Circuit Breaker Panel (See Figure 201.)
      (1) Open tailcone access door and disconnect aircraft batteries quick-disconnects.
      (2) Lower access cover on remote interior circuit breaker panel.
      (3) Remove attaching parts securing remote interior circuit breaker access cover.
      (4) Remove No Smoking - Fasten Seat Belt light. (Refer to Chapter 33.)
      (5) Remove center overhead panel containing No Smoking - Fasten Seat Belt light.
      (6) Remove screws securing remote interior circuit breaker panel from aircraft structure.

      NOTE: On *Aircraft 35-676 and Subsequent; 36-064 and Subsequent,* remove aft screws from upholstery support.

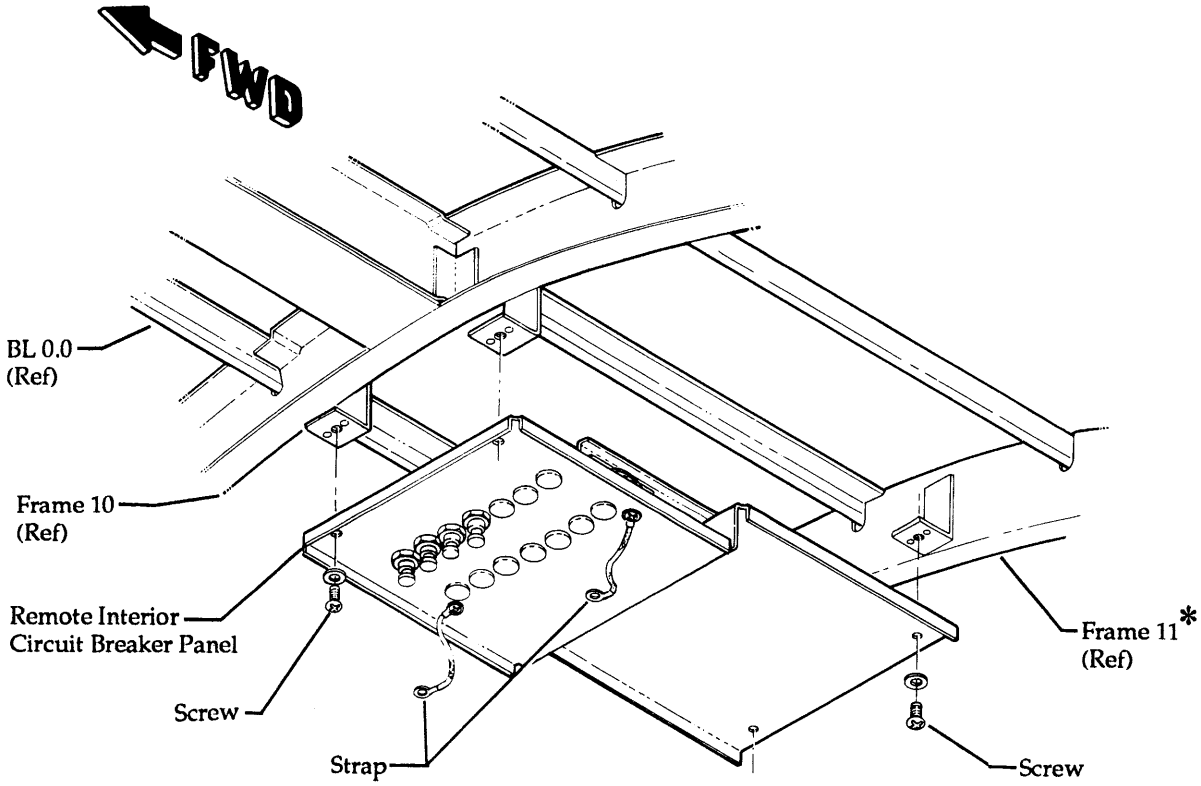
      (7) Lower panel sufficiently to allow disconnection of electrical connector.
      (8) Remove remote interior circuit breaker panel from aircraft.
   B. Install Remote Interior Circuit Breaker Panel (See Figure 201.)
      (1) Install circuit breaker panel and connect electrical connector.
      (2) Secure circuit breaker panel to aircraft structure.

      NOTE: On *Aircraft 35-676 and Subsequent; 36-064 and Subsequent*, secure aft screws to upholstery support.

      (3) Install center overhead panel containing No Smoking - Fasten Seat Belt light.
      (4) Install No Smoking - Fasten Seat Belt light. (Refer to Chapter 33.)
      (5) Install and close access cover on remote circuit breaker panel.
      (6) Connect aircraft batteries and close tailcone access door.
      (7) Perform operational check of replacement circuit breaker system.



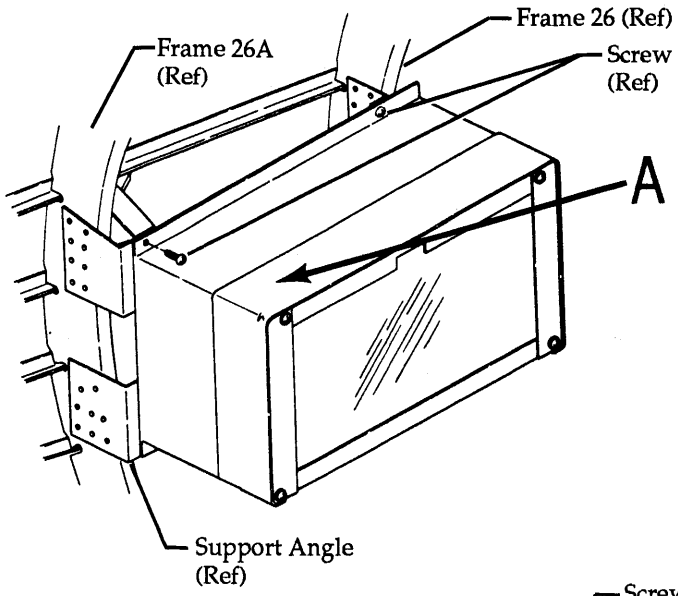
* On *Aircraft 35-676 and Subsequent; 36-064 and Subsequent*, upholstery support replaces Frame 11 for rear attach point.



Detail A

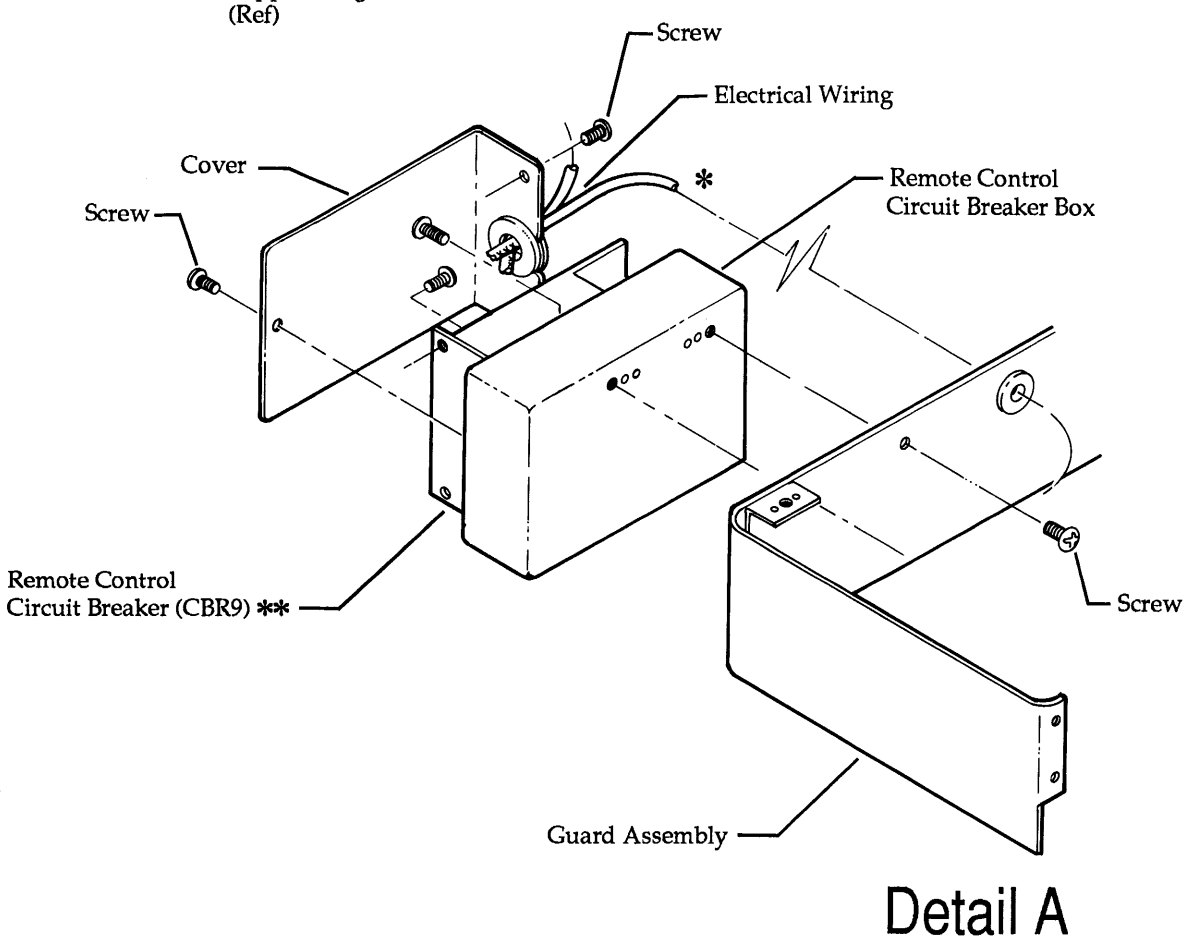
Remote Interior Circuit Breaker Installation
Figure 201

1. **Removal/Installation**
   A. Remove Remote Control Circuit Breaker. (See Figure 201.)
      (1) Disconnect aircraft batteries.
      (2) Remove cover from remote control circuit breaker box.
      (3) Disconnect, identify and tag electrical wiring on remote control circuit breaker.
      (4) Remove attaching parts securing remote control circuit breaker.
      (5) Remove remote control circuit breaker from aircraft.
   B. Install Remote Control Circuit Breaker. (See Figure 201.)
      (1) Identify and connect electrical wiring to remote control circuit breaker.
      (2) Position remote control circuit breaker in circuit breaker box and secure with attaching parts.
      (3) Install cover to circuit breaker box using attaching parts.
      (4) Connect aircraft batteries.
      (5) Perform operational check of replacement circuit breaker system.



* Connects to Fuse (FL4) (rated at 50 amps). Protects the remote interior circuit breaker panel. Power is supplied by the Battery Charging Bus.

** Remote control circuit breaker (CBR9) (rated at 50 amps). Protects the remote interior circuit breaker panel.



9-149B-1
A9-149B-5

Remote Control Circuit Breaker Installation
Figure 201

EFFECTIVITY: 35-657 AND SUBSEQUENT
36-064 AND SUBSEQUENT

MM-99