

## DC GENERATION

### 1. DESCRIPTION

This section covers the systems to generate, regulate, control, and indicate DC electrical power. The DC generation portion of the system includes the batteries, alternators (with internal rectifiers), and regulator.

Two batteries (battery 1 and battery 2) and two alternators (alternator 1 and alternator 2) are used in the power generation system on this airplane. Both batteries are used for power storage. The two alternators are very similar in design to each other.

The alternators and the batteries are designed to function in parallel or independently. Both alternators are self-exciting which means the alternators become energized as soon as either battery switch is moved to the "on" position. If an alternator becomes disconnected, the remaining alternator will still function properly, as long as the opposing alternator received initial excitation. If the alternators were initially excited from the batteries, they will continue to generate electrical power if either battery should fail. Because the alternators are self-exciting (not self-starting), the battery switches should never be turned off during flight.

**CAUTION:** Never turn the battery switches off during normal flight.

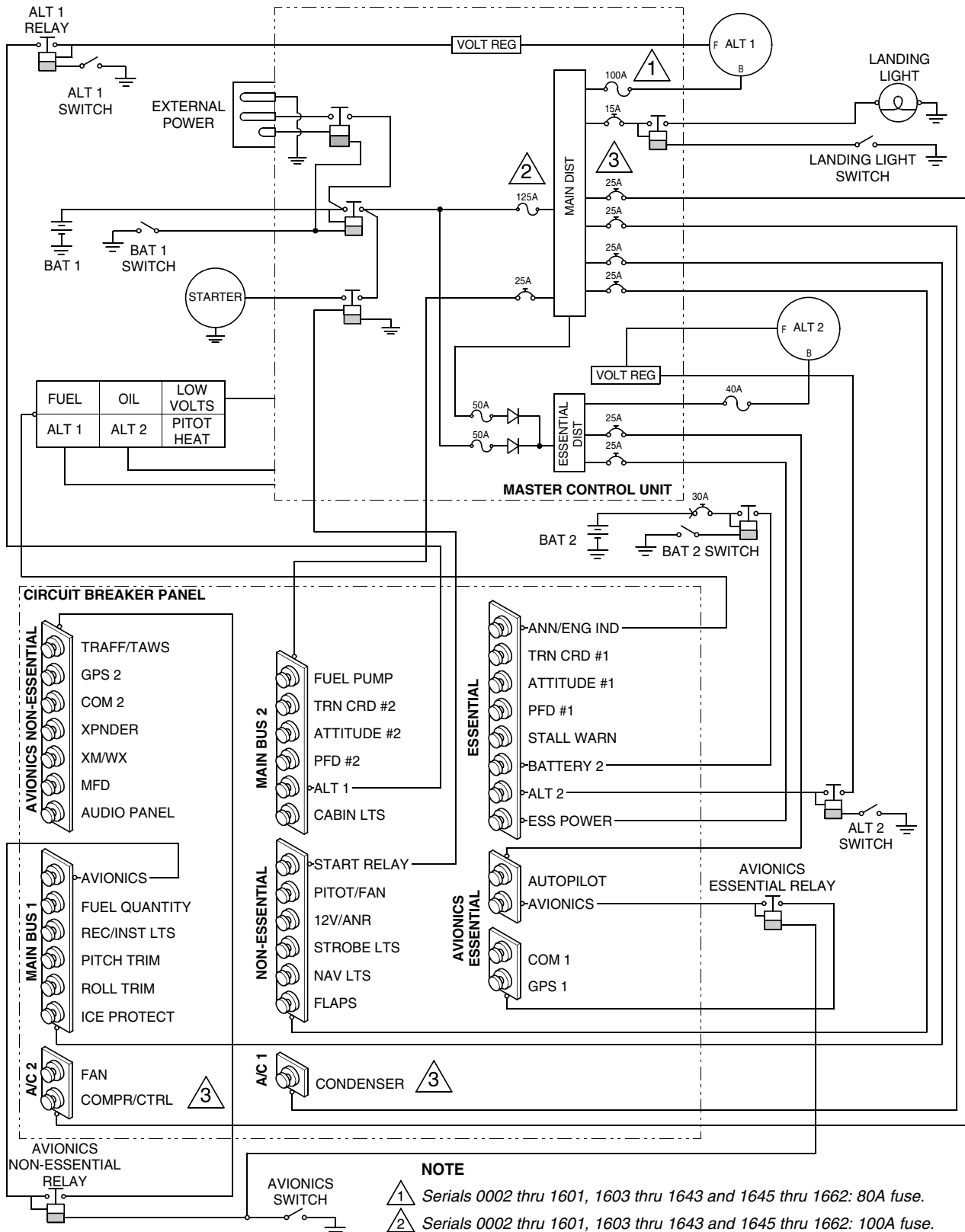
During normal operation, the alternators feed their respective distribution bus independently (ALT 1 feeds the main distribution bus and ALT 2 feeds the essential distribution bus). The distribution buses are interconnected by two 50-amp fuses and diodes. The diodes prevent ALT 2 from feeding the main distribution bus. Additionally, since ALT 2 / essential bus voltage is slightly higher than ALT 1 / main distribution bus voltage, ALT 1 will not feed the essential distribution bus unless ALT 2 fails.

The alternators are three-phase AC generator type; each alternator has an internal rectifier, which limits current output to 28 VDC. Each alternator uses two diodes for each phase to rectify the output. In addition, these diodes will block reverse current. If a single output diode were to fail, the winding junction will be held to the output potential, reducing the quantity of current the alternator can produce.

The alternators are regulated by the MCU and power the MCU via 6 AWG tin plated copper wires. Alternator 1 is protected by an 80-amp fuse within the MCU while alternator 2 is protected by a 40-amp fuse within the MCU. ALT 1 is connected to the main distribution bus and ALT 2 is connected to the essential distribution bus. Each alternator system has its own 5-amp alternator circuit breaker located in the circuit breaker panel. Each alternator is individually protected against overvoltage generation by the field control module, located within the MCU. ALT 1 is regulated to 28 volts and ALT 2 is regulated to 28.75 volts.

Voltage output of each alternator is a function of engine RPM, alternator design, and load on the alternator. During low RPM operation, the alternator will require higher engine RPM to provide the same voltage to increased electrical loads. With nominal loads on the electrical system, alternator 2 will drop off at approximately 1700 - 2200 RPM and alternator 1 will drop off at approximately 600 - 900 RPM. Alternator 2 drops off before alternator 1 because alternator 2 spins half as fast as alternator 1.

The drop off RPM for each alternator will change whenever the electrical system loads are altered from nominal. Any time an alternator drops off line, it will be indicated by illumination of the corresponding ALT 1 or ALT 2 annunciators. If an alternator drops off line due to low engine RPM, the alternator(s) can be restarted by simply increasing engine RPM. When alternator 2 drops off line, the ALT 2 annunciator will illuminate and alternator 1 will provide electrical power to the entire electrical system, including charging both batteries. When alternator 1 drops off line, the ALT 1 annunciator will illuminate and alternator 2 will provide electrical power to only the essential bus and BAT 1 will provide power to the main bus. Alternator 2 will then allow continued operation of only the flight critical instruments and charging of battery 2.



- NOTE**
- ① Serials 0002 thru 1601, 1603 thru 1643 and 1645 thru 1662: 80A fuse.
  - ② Serials 0002 thru 1601, 1603 thru 1643 and 1645 thru 1662: 100A fuse.
  - ③ Serials 1602, 1821, 1840, 1863 & subs.

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**Figure 24-301**  
**Electrical System Schematic**

**A. Alternator 1 (See Figure 24-302)**

The front alternator (alternator 1) is mounted directly to the front of the engine on the co-pilots' side.

Serials 0002 thru 1820, 1822 thru 1839, 1841 thru 1862, 1863 & subs w/o Fan, 1863 & subs w/o Air Conditioning: Alternator 1 is a 60-amp (rated at 58-amps) engine-driven alternator.

*Serials 1821, 1840, 1863 & subs w/ Fan, 1863 & subs w/ Air Conditioning:* Alternator 1 is a 100-amp engine-driven alternator.

Alternator 1 is controlled by the ALT 1 master switch located in the bolster panel. Battery 1 and alternator 1 are independently controlled and can be alternately connected to main bus 2. Failure or malfunction of alternator 1 will not impair the capability of the main battery to provide power to main bus 2.

Failure or malfunction of either or both alternators will not impair the capability of either battery to power the essential load circuits, because each of these power sources feed into the essential bus. If either alternator is lost, the other alternator and both batteries are still capable of feeding the essential bus. In addition, each alternator or battery can be manually disconnected by switching the appropriate master bolster switch located on the pilot's bolster switch panel.

**B. Alternator 2 (See Figure 24-303)**

The rear alternator (alternator 2) is mounted directly to the aft engine accessory pad which is located at the rear of the engine. Alternator 2 supplies electrical power to the essential bus through a 5-amp circuit breaker located in the circuit breaker panel.

Alternator 2 is controlled by the ALT 2 switch located in the bolster panel. If alternator 2 fails while in operation, the essential bus will then get electrical power from alternator 1, battery 1, and/or battery 2. Alternator 2 is a 20-amp engine-driven alternator.

**C. Master Control Unit (MCU) (See Figure 24-304)**

*Serials 0002 thru 1601, 1603 thru 1643, 1645 thru 1662:* The MCU is an integrated component which ensures proper electrical output over the entire temperature and RPM range of the alternator system by regulating and distributing alternator output. The MCU is mounted to the forward side of the firewall, on the pilot's side. The MCU controls alternator 1, alternator 2, starter, landing light, external power, and the power generation system annunciation. The MCU provides protection for external power reverse polarity and alternator 1 and alternator 2 overvoltage situations. The MCU also provides low voltage annunciation and an overload annunciation for ALT 1 and ALT 2 fail annunciators in the instrument panel.

The bus structure of the MCU and the circuit breaker panel allows all power devices to feed into the Essential Bus during emergencies. This action is automatic and does not require pilot intervention. The Main and Essential Buses are separated via diodes which allow the main bus to feed into the Essential Bus during failures of Alternator 2 or Battery 2. The MCU regulates Alternator 1 to 28 VDC, while Alternator 2 is regulated to 28.75 VDC which ensures the diode separates the buses during normal operation.

The MCU used on this airplane contains a landing light relay, battery relay, ground power relay, starter relay, ammeter transducer, 15-amp landing light circuit breaker, two buses (one essential and one non-essential), two field control modules, three current sensors, and five 25-amp distribution feeder circuit breakers.

The pilot has access to the alternator circuit breakers, which are located in the circuit breaker panel, during flight. If the system is generating more than  $31.75 \pm 0.25$  V, the corresponding alternator circuit breaker will open, preventing further power generation by that alternator.

The MCU contains a current sensor in the battery bus, this current sensor sends a signal to the ammeter (battery charge or discharge). The ammeter will only indicate a discharge when the ammeter select switch is in the BATT position and the electrical draw on the system exceeds the quantity of power generated by the system. Diodes in the alternators block reverse current making negative current indication unnecessary. The current value displayed by the ammeter corresponds directly to the quantity of

power generated by the alternator system. When the ammeter select switch is in the ALT 1 or ALT 2 position, the ammeter drives will only allow the ammeter to display a positive current value because of the diodes within the alternator block.

The master switch arrangement, located in the pilot's bolster contains battery 1, battery 2, alternator 1, and alternator 2 control switches. Each switch disconnects the associated device from the corresponding bus. The switches are located in a side-by-side arrangement and are labeled as to their function. The BAT 2 switch, when closed, connects battery 2 to the essential bus. This switch activates a relay located next to BAT 2, providing the ability to connect and disconnect battery 2 from the aircraft.

Seven power distribution buses with associated protection devices are located in the MCU. These buses are designed to ensure essential flight and avionics systems remain powered during a malfunction of any one of the buses. Five bus wires run from the MCU, through the firewall, and to the circuit breaker panel for overload protection by fuses or circuit breakers. The five buses are used to power the majority of aircraft loads and supply power to the circuit breaker panel. Three buses are used as distribution feeders from the Main Distribution Bus. Two buses are used as distribution feeders from the Essential Distribution Bus. One bus is used to power the landing light directly from the Main Distribution Bus through a 15 amp circuit breaker. One bus is used to power the clock which is fused at 5 amperes and is the only bus powered directly from battery 1 and is not controlled by master switch arrangement. The clock bus fuse is externally removable for long term storage situations to prevent battery drain. On PFD equipped airplanes, the clock bus is not used.

Alternator power flows from alternators into the MCU. Inside the MCU is where the field control module regulates alternators output. Each field control module provides transient suppression and constant voltage regulation of unfiltered alternator power. To protect sensitive instruments, the over-voltage protection system monitors the primary power bus and automatically limits peak voltage to approximately 31.75 volts. During sustained over-voltage periods, the over-voltage system provides a warning to the pilot. Each field control module will cause the corresponding alternator circuit breaker to open in cases of field output overloads, and overvoltage. In the event an over-voltage condition occurs, the corresponding field control module automatically removes alternator field current to shut down the corresponding alternator. Each field control module has been integrated into the MCU case, for durability and reliability.

*Serials 1602, 1644, 1663 & subs:* The MCU is an integrated component which ensures proper electrical output over the entire temperature and RPM range of the alternator system by regulating and distributing alternator output. The MCU is mounted to the forward side of the firewall, on the pilot's side. The MCU controls alternator 1, alternator 2, starter, landing light, and external power. The MCU provides protection for external power reverse polarity and alternator 1 and alternator 2 overvoltage situations.

The bus structure of the MCU and the circuit breaker panel allows all power devices to feed into the Essential Bus during emergencies. This action is automatic and does not require pilot intervention. The Main and Essential Buses are separated via diodes which allow the main bus to feed into the Essential Bus during failures of Alternator 2 or Battery 2. The MCU regulates Alternator 1 to 28 VDC, while Alternator 2 is regulated to 28.75 VDC which ensures the diode separates the buses during normal operation.

The MCU used on this airplane contains a landing light relay, battery relay, ground power relay, starter relay, 15-amp landing light circuit breaker, two buses (one essential and one non-essential), two field control modules, three current shunts, and seven 25-amp distribution feeder circuit breakers.

The pilot has access to the alternator circuit breakers, which are located in the circuit breaker panel, during flight. If the system is generating more than  $31.75 \pm 0.25$  V, the corresponding alternator circuit breaker will open, preventing further power generation by that alternator.

The MCU contains a current shunt in the battery bus, this current shunt sends a signal to the data acquisition unit. Diodes in the alternators block reverse current making negative current indication unnecessary. The current value displayed by the ammeter corresponds directly to the quantity of power generated by the alternator system.

The master switch arrangement, located in the pilot's bolster contains battery 1, battery 2, alternator 1, and alternator 2 control switches. Each switch disconnects the associated device from the corresponding bus. The switches are located in a side-by-side arrangement and are labeled as to their function. The BAT 2 switch, when closed, connects battery 2 to the essential bus. This switch activates a relay located next to BAT 2, providing the ability to connect and disconnect battery 2 from the aircraft.

Nine power distribution buses with associated protection devices are located in the MCU. The buses are designed to ensure essential flight and avionics systems remain powered during a malfunction of any one of the buses. Seven bus wires run from the MCU, through the firewall, and to the circuit breaker panel for overload protection by fuses or circuit breakers. The seven buses are used to power the majority of aircraft loads and supply power to the circuit breaker panel. Five buses are used as distribution feeders from the Main Distribution Bus. Two buses are used as distribution feeders from the Essential Distribution Bus. One bus is used to power the landing light directly from the Main Distribution Bus through a 15 amp circuit breaker. One bus was used to power the clock which was fused at 5 amperes. On PFD equipped airplanes, the clock bus is not used.

Alternator power flows from alternators into the MCU. Inside the MCU is where the field control module regulates alternators output. Each field control module provides transient suppression and constant voltage regulation of unfiltered alternator power. To protect sensitive instruments, the over-voltage protection system monitors the primary power bus and automatically limits peak voltage to approximately 31.75 volts. Each field control module will cause the corresponding alternator circuit breaker to open in cases of field output overloads, and overvoltage. In the event an over-voltage condition occurs, the corresponding field control module automatically removes alternator field current to shut down the corresponding alternator. Each field control module has been integrated into the MCU case, for durability and reliability.

#### D. Low Volts Warning Light

The airplane is equipped with a red LOW VOLTS warning light in the annunciator panel, located on the left side of the instrument panel.

*Serials 0002 thru 1601, 1603 thru 1643, 1645 thru 1662:* If Essential Bus voltage drops to approximately 24.5 volts, the field control module within the MCU will cause the LOW VOLTS annunciator to illuminate red.

*Serials 1602, 1644, 1663 & subs:* If Essential Bus voltage drops to approximately 24.5 volts, the data acquisition unit will cause the LOW VOLTS warning light to illuminate red.

Resetting the ALT 1 and ALT 2 switches (from off and back on again) may reset the field control module within the MCU. If the warning light does not illuminate again, normal alternator charging has resumed. If the light illuminates again, a malfunction has occurred. The LOW VOLTS annunciator will illuminate regardless of how many or what types of power sources are connected.

Illumination of the LOW VOLTS warning light along with ammeter discharge indications may occur during low RPM conditions with an electrical load on the system, such as during a low RPM taxi. Under these conditions, the light will go out at higher RPM. The battery switches will not need to be recycled since an over-voltage condition has not occurred to de-activate the alternator system.

#### E. ALT 1 and ALT 2 Fail Lights

Two amber colored alternator fail lights are located in the annunciator panel. The lights provide warning of a overloaded or inoperative alternator.

*Serials 0002 thru 1601, 1603 thru 1643, 1645 thru 1662:* The ALT 1 and ALT 2 fail lights are operated by circuits in the MCU and current sensors on the ALT 1 and ALT 2 output lines.

*Serials 1602, 1644, 1663 & subs:* The ALT 1 and ALT 2 fail lights are operated by the data acquisition unit. The DAU monitors a voltage drop across the current shunts in the MCU on the ALT 1 and ALT 2 output lines.

If either alternator generates less than 2 amps (approximately), the corresponding annunciator light will illuminate steady. If either alternator becomes overloaded, the corresponding annunciator light will flash approximately 40 times per minute.

**F. Volt and Ampere Meter (See Figure 24-306)**

*Serials 0002 thru 1601, 1603 thru 1643, 1645 thru 1662:* A combination Volt and Ampere meter is mounted on the right instrument panel immediately outboard of the oil temperature and pressure gage. The indicator is internally lighted. 28 VDC for instrument lighting is supplied through the 2-amp INST LIGHTS circuit breaker on Main Bus 1.

*Serials 0002 thru 0782:* The AMP pointer sweeps a scale from -60 to +60 amps with zero at the 9 o'clock position.

*Serials 0783 thru 1601, 1603 thru 1643, 1645 thru 1662:* The AMP pointer sweeps a scale from -100 to +100 amps with zero at the 9 o'clock position.

The ammeter will indicate the current generation provided by Alternator 1, Alternator 2, and the charge or discharge status of battery 1.

The VOLT pointer sweeps a scale from 16 to 32 volts. The voltage indication for the Volt / Ampere Meter is measured off the annunciator circuit breaker which is on the Essential Bus. Main Bus voltage (measured at the engine instrument circuit breaker) is displayed on the clock voltmeter for reference.

*Serials 1602, 1644, 1663 & subs:* Main and Essential Bus voltages are shown as text in the electrical data field located in the mid-right section of the MFD and are also continuously displayed in the voltage parameters field located in the upper left corner of the PFD. The MFD and PFD receive the voltage signals via the DAU as measured directly off the Main and Essential Buses.

In the event Main Bus voltage is less than 24.5v or exceeds 32.0v the MFD will display "Check Main Bus" in a yellow advisory box in the lower right corner of the MFD.

In the event Essential Bus voltage is less than 24.5v or exceeds 32.0v the MFD will display "Check Essential Bus" in a red advisory box in the lower right corner of the MFD.

Alternator 1 and Alternator 2 ampere output are shown as text in the electrical data field located in the mid-right section of the MFD. The MFD and PFD receive the amp signals via the DAU as derived from current shunts located in the MCU.

In the event Alternator 1 or Alternator 2 ampere output is less than 2 amps for 20 seconds or more, the MFD will display "Check ALT 1" or "Check ALT 2" respectively, in a yellow advisory box in the lower right corner of the MFD.

28 VDC for the digital instrument operation is supplied through the 2-amp ANNUN / ENGINE INST circuit breaker on the Avionics Essential Bus.

**G. Ammeter Select Switch (See Figure 24-306)**

*Serials 0002 thru 1601, 1603 thru 1643, 1645 thru 1662:* An ammeter select switch is located on the right instrument panel and is labeled distinctly. The ammeter select switch controls which output reading the ammeter will display the voltage from ALT 1, ALT 2 or the BAT 1 or BAT 2. The ammeter will also display the state of charge or discharge either battery is in. The amps indication is derived from a current transducer located in the electrical system MCU. When the engine is operating and the BAT 1 switch is turned on, the ammeter indicates the charging rate applied to battery 1. Due to the inability of the alternators to dissipate current, the alternator ammeter indications are positive only.

*Serials 1602, 1644, 1663 & subs:* Main and Essential Bus voltages are displayed on the MFD and PFD, therefore, no ammeter select switch is necessary.

**H. Battery 1 (See Figure 24-307)**

Battery 1 is a 24-volt, 12-cell, 10-ampere hour, lead-acid aviation-grade type battery with non-spill vent caps. The battery is mounted in the engine compartment and has a top vent with an acid-resistant tube. The tube discharges out the bottom of the engine cowling, preventing the build up of dangerous or explosive gasses within the engine cowl.

The battery is used for engine starting and can also be used as an emergency power source in the event Battery 2 or either alternator fails. Battery 1 provides all the electrical power for starting the aircraft. Battery 1 also supplies the electrical power to the landing light in the event Alternator 1 fails. Battery 1 is independently controlled by the BAT 1 switch, located in the pilot's bolster panel. The BAT 1 switch energizes a relay in the MCU which will connect BAT 1 to the Main Distribution Bus.

**I. Battery 2 (See Figure 24-308)**

Battery 2 is a maintenance free rechargeable sealed lead acid battery. The battery consists of two 12-volt, 6-cell, 7-amp-hour batteries connected in series to provide 24-VDC to the Essential Bus. There is no need to check the specific gravity of the electrolyte or add water to these batteries during their service life.

Battery 2 is independently controlled by using the BAT 2 switch, located in the pilot's bolster panel. The BAT 2 switch energizes a relay located just aft of bulkhead 222 in the MCU which will connect BAT 2 to the Essential Bus. The electrical power from BAT 2 reaches the Essential Bus through the circuit breaker panel. Battery 2 is mounted directly behind bulkhead 222 in an acid resistant battery container.

Battery 2 is primarily used to power the Essential Bus. The Essential Bus delivers electrical power to the annunciator lights, turn coordinator, attitude indicator, horizontal situation indicator (HSI), stall warning system, and alternator 2.

Failure of the BAT 1 will not affect the ability of BAT 2 to provide necessary power to the Essential Bus. Because of diode protection, a failure or malfunction of the BAT 1 will not affect BAT 2 or either alternator output.

**Note:** Prior to engine start-up, the pilot must activate only the BAT 2 switch to verify that BAT 2 properly energizes the electrical loads powered by the Essential Bus and that BAT 2 has proper voltage.

*Serials 0002 thru 1601, 1603 thru 1643, 1645 thru 1662:* The voltage is displayed by the combination Volt / Amp meter mounted on the RH instrument panel.

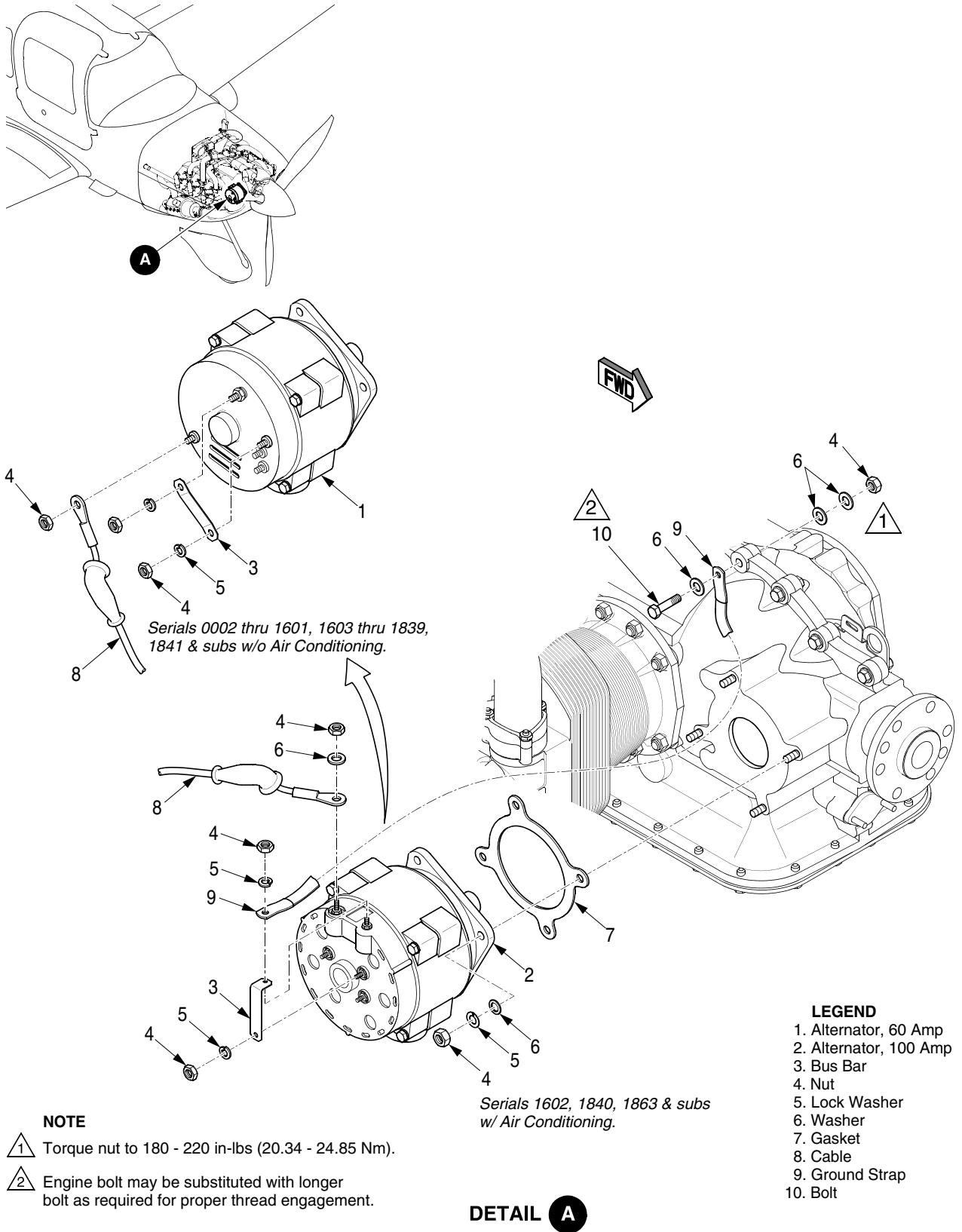
*Serials 1602, 1644, 1663 & subs:* The voltage is displayed by the MFD and PFD.

## 2. MAINTENANCE PRACTICES

### A. Alternator 1 (Forward Alternator) (See Figure 24-302)

- (1) Removal - Alternator 1
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Disconnect cables and wires from alternator terminals.
  - (e) Remove nuts and washers securing alternator to engine. Remove alternator from airplane.
  - (f) Discard old gasket and remove residual gasket material from alternator and engine.
- (2) Installation - Alternator 1
  - (a) Position alternator and new gasket to engine. Hand tighten washers and nuts in an alternating pattern securing alternator to engine.
  - (b) Torque nuts to 180 - 220 in-lb (20.3 - 24.8 Nm) in an alternating pattern.
  - (c) Connect cables and wires to alternator terminals.
  - (d) Connect battery 1. (Refer to 24-30)
  - (e) Install engine cowling. (Refer to 71-10)





**Figure 24-302**  
**Alternator 1 (Forward Alternator)**

**EFFECTIVITY:**  
All

**B. Alternator 2 (Aft Alternator) (See Figure 24-303)**

- (1) Removal - Alternator 2
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Identify and disconnect wires from alternator terminals.
  - (e) *Serials 1602, 1821, 1840, 1863 & subs:* Remove bolts and washers securing blast tube bracket to alternator.
  - (f) Remove nuts and washers securing alternator to engine. Remove alternator from airplane.
  - (g) Discard old gasket and remove residual gasket material from alternator and engine.
- (2) Disassembly - Alternator 2

**Note:** To facilitate removal of shear coupling assembly from coupling pins on alternator, tightly grip and rock spline of shear coupling assembly back and forth until loosened.

- (a) Pull shear coupling assembly from alternator.
- (3) Assembly - Alternator 2
  - (a) Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Mallet	-	Any Source	Tap shear coupling onto shaft coupling pins.

- (b) Position and align shear coupling assembly to alternator pins. Gently tap shear coupling assembly with mallet until coupling is seated onto pins.
- (4) Installation - Alternator 2
  - (a) Place alternator and new gasket into position. Hand tighten washers and nuts in an alternating pattern securing alternator to engine.
  - (b) Torque nuts to 50 - 70 in-lb (5.6 - 7.9 Nm) in an alternating pattern.
  - (c) *Serials 1602, 1821, 1840, 1863 & subs:* Position and secure blast tube bracket onto RH side of alternator with bolts and washers.
  - (d) Connect alternator wires to appropriate terminals.
  - (e) Connect battery 1. (Refer to 24-30)
  - (f) Install engine cowling. (Refer to 71-10)
- (5) Inspection/Check - Alternator 2
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Visually inspect rear housing cooling slots for gray dust residue which may indicate bearing failure.
  - (e) Verify alternator is securely mounted to engine and no oil leakage is visible around alternator base.
  - (f) Visually inspect alternator wiring and electrical connectors for security and condition.
  - (g) Visually inspect output terminal and nut for dark discoloration. If discolored or corroded, replace terminal ring on output wire.
    - 1 Remove nut and washer securing output wire to alternator terminal.
    - 2 Clean output terminal and nut with brass wire brush.

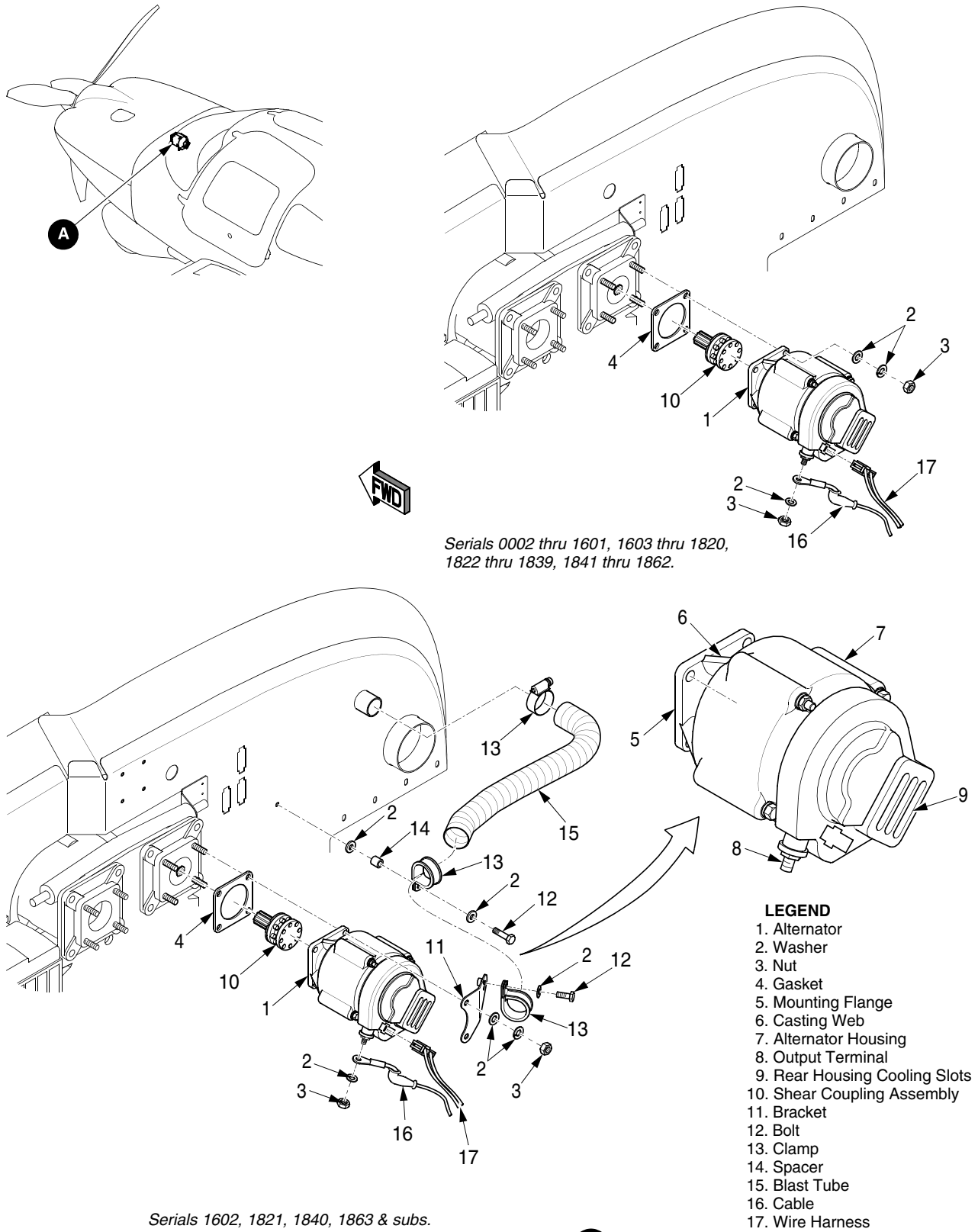
- 3 Cut old end of wire off and strip new end to obtain a clean and bright conductor.
- 4 Insert end of wire into terminal ring and crimp.
- 5 Position terminal ring on output terminal and secure with washer and nut.

**Note:** If it is difficult to distinguish casting features from cracks, refer to Advisory Circular 43.13-1B Acceptable Methods, Techniques, and Practices - Aircraft Inspection And Repair for additional non-destructive testing.

- (h) Clean casting webs between mounting flanges and alternator housing and visually inspect casting webs for cracks. If a crack exists in any of the four casting webs, replace alternator.
- (i) Connect battery 1. ([Refer to 24-30](#))
- (j) Perform the Before Takeoff checklist as described in the Normal Procedures section of the Pilot's Operating Handbook.
  - 1 Verify both ALT 1 and ALT 2 caution lights are out.
  - 2 Verify positive amps indication for each alternator.
  - 3 Listen for excessive noise or vibration which may indicate bearing failure.
- (k) Install engine cowling. ([Refer to 71-10](#))

**C. Blast Tube - *Serials 1602, 1821, 1840, 1863 & subs* (See Figure 24-303)**

- (1) Removal - Blast Tube
  - (a) Remove bolt, washer, and clamp securing blast tube to alternator 2 bracket.
  - (b) Remove bolt, washers, spacer, and clamp securing blast tube to aft baffle.
  - (c) Remove hose clamp securing blast tube to aft baffle.
- (2) Installation - Blast Tube
  - (a) Install hose clamp securing blast tube to aft baffle.
  - (b) Install bolt, washers, spacer, and clamp securing blast tube to aft baffle.
  - (c) Install bolt, washer, and clamp securing blast tube to alternator 2 bracket.



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**Figure 24-303**  
**Alternator 2 (Aft Alternator)**

<p><b>EFFECTIVITY:</b> All</p>
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**D. Master Control Unit (See Figure 24-304)**

MCU part number 14600-001, 14600-002, 16600-001, and 19900-001 are field repairable to the extent provided for in Chapter 24-00, Electrical Power Troubleshooting. (Refer to 24-00) Field repair is limited to replacing the following components: current sensors, logic module, fuses, and field control modules. The MCU part number may be determined from a placard located on the MCU chassis.

**Note:** Airplane serial effectivities may vary from shown if originally installed MCU has been replaced.

MCU part number 14600-001 is installed on SR22 airplanes serial numbers 0098 thru 0447.

MCU part number 14600-002 is installed on SR22 airplanes serial numbers 0448 thru 1469.

MCU part number 16600-001 is installed on SR22 airplanes serial numbers 1470 thru 1601, 1603 thru 1643, 1645 thru 1662.

MCU part number 19900-001 is installed on SR22 airplanes serial numbers 1602, 1644, 1663 and subsequent.

(1) Removal - Master Control Unit

- (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
- (b) Remove engine cowling. (Refer to 71-10)
- (c) Disconnect battery 1. (Refer to 24-30)
- (d) Remove nuts and washers securing grounding strap to MCU chassis.
- (e) *MCU 14600-001, 14600-002, & 16600-001:* Disconnect P108, P109, P111, and P115 connectors.
- (f) *MCU 16600-001:* Disconnect P757 connector, if installed.
- (g) *MCU 19900-001:* Disconnect P135, P136, P137, and P138 connectors.
- (h) *MCU 19900-001:* Remove nuts, washers, and clamps securing wire loom to chassis.
- (i) *MCU 14600-001, 14600-002 & 16600-001:* Remove MCU cover. (Refer to 24-30)

**Note:** *MCU 14600-001 & 14600-002:* Label cable guide routing holes with cable component name to facilitate re-installation.

- (j) *MCU 14600-001 & 14600-002:* Remove screws and washers securing cable guide to MCU chassis.
- (k) Remove nuts and washers securing alternator 1 cable assembly to bus bar stud.
- (l) Remove nuts and washers securing alternator 2 cable assembly to bus bar stud.
- (m) Remove nuts and washers securing battery 1 cable assembly to bus bar stud.
- (n) Remove nuts and washers securing starter cable assembly to bus bar stud.
- (o) Remove bolts and washers securing MCU to firewall. Remove MCU from airplane.

(2) Installation - Master Control Unit

- (a) Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
High Temperature Silicone Sealant	RTV 736	Dow Corning	Sealant.

- (b) Position MCU to firewall and secure with bolts and washers. Apply sealant over bolt heads.
- (c) Install washers and nuts securing alternator 1 cable assembly to bus bar stud.
- (d) Install washers and nuts securing alternator 2 cable assembly to bus bar stud.

EFFECTIVITY:  
All

- (e) Install washers and nuts securing battery 1 cable assembly to bus bar stud.
  - (f) Install washers and nuts securing starter cable assembly to bus bar stud.
  - (g) *MCU 14600-001 & 14600-002*: Install screws and washers securing cable guide to MCU chassis.
  - (h) *MCU 14600-001, 14600-002, & 16600-001*: Connect P108, P109, P111, and P115 connectors.
  - (i) *MCU 16600-001*: Connect P757 connector, if installed.
  - (j) *MCU 19900-001*: Connect P135, P136, P137, and P138 connectors.
  - (k) *MCU 19900-001*: Position wire loom to chassis and secure with clamps, washers, and nuts.
  - (l) Install washers and nuts securing grounding strap to MCU chassis.
  - (m) *MCU 14600-001, 14600-002 & 16600-001*: Install MCU cover. (Refer to 24-30)
  - (n) *MCU 14600-001 & 14600-002*: Apply sealant around cable guide holes where cable assemblies and connector wires exit MCU.
  - (o) Connect battery 1. (Refer to 24-30)
  - (p) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
  - (q) Install engine cowling. (Refer to 71-10)
- (3) Operational Inspection - Master Control Unit

**WARNING:** In order to perform the following check the engine must be operating. Do not stand or let anyone else stand close to the arc of the airplane's propeller while conducting this check.

- (a) Verify all circuit breakers are set.
- (b) Toggle battery 2 master switch to the ON position and verify the following occurs:
  - 1 Volt / Amp meter indicates at least 24 volts on battery 2.
  - 2 *Serials 0002 thru 1601, 1603 thru 1643, 1645 thru 1662*: ALT 1 and ALT 2 caution lights illuminate.
  - 3 *Serials 1602, 1644, 1663 & subs*: ALT 2 caution light illuminates.
  - 4 Flap position light off.
  - 5 Attitude gyro low voltage flag hidden.
  - 6 *Serials 0002 thru 0434, 0435 thru 0820 w/o PFD*: HSI HDG flag hidden within five minutes.
  - 7 *Serials 0435 thru 0820 w/ PFD, 0821 & subs*: PFD powers up.
  - 8 *Serials 0002 thru 0434, 0435 thru 0820 w/o PFD*: Turn Coordinator low voltage flag hidden.
  - 9 Autopilot ready indication after gyro spool up.
- (c) Toggle battery 1 master switch to the ON position and verify the following occurs:
  - 1 ALT 1 and ALT 2 caution lights illuminate.
  - 2 Flap position light illuminates.
  - 3 Engine instruments are operational and manifold pressure gage indicates approximately the altimeter setting.
  - 4 Ammeter select switch shows slight discharge in BAT position.
- (d) Start Engine and set engine speed at 1000 RPM.
- (e) Verify landing light, pitot heat, avionics, strobe lights, and navigation lights are on.
- (f) Switch ALT 1 ON and ALT 2 ON.
- (g) Increase RPM to 1700.
- (h) Check that LOW VOLT light is off and ammeter shows no current discharge in BAT position.

EFFECTIVITY:  
All

- (i) Increase RPM to 2200.
- (j) Check that LOW VOLT light is off and ammeter shows no current discharge in BAT position.
- (k) Switch ALT 1 ON and ALT 2 OFF. Verify and record operating values.

Voltage Indication		Ammeter Indication			Annunciator Illumination		
Clock/Volts	Voltmeter	ALT 1	BAT	ALT 2	LOW VOLTS	ALT 1 Steady	ALT 2 Steady
27V - 28.3V	27V - 28V	Pos < 40A	0 - Pos	0A	OFF	OFF	ON

- (l) Switch ALT 1 OFF and ALT 2 ON. Verify and record operating values.

Voltage Indication		Ammeter Indication			Annunciator Illumination		
Clock/Volts	Voltmeter	ALT 1	BAT	ALT 2	LOW VOLTS	ALT 1 Steady	ALT 2 Steady
20V - 24V	28V - 29V	0A	0A - Neg	2A - 20A	OFF	ON	OFF

- (m) Switch ALT 1 ON and ALT 2 ON. Verify and record operating values.

Voltage Indication		Ammeter Indication			Annunciator Illumination		
Clock/Volts	Voltmeter	ALT 1	BAT	ALT 2	LOW VOLTS	ALT 1 Steady	ALT 2 Steady
27V - 28.3V	28V - 29V	Pos < 40A	0A - Pos	2A - 20A	OFF	OFF	OFF

- (n) Switch ALT 1 OFF and ALT 2 OFF. Verify and record operating values.

Voltage Indication		Ammeter Indication			Annunciator Illumination		
Clock/Volts	Voltmeter	ALT 1	BAT	ALT 2	LOW VOLTS	ALT 1 Steady	ALT 2 Steady
20V - 24V	20V - 24V	0A	Neg < 40A	0A	ON	ON	ON

- (o) Shut down engine.
- (4) Inspection/Check - Master Control Unit



- (a) Acquire necessary tools, equipment, and supplies.

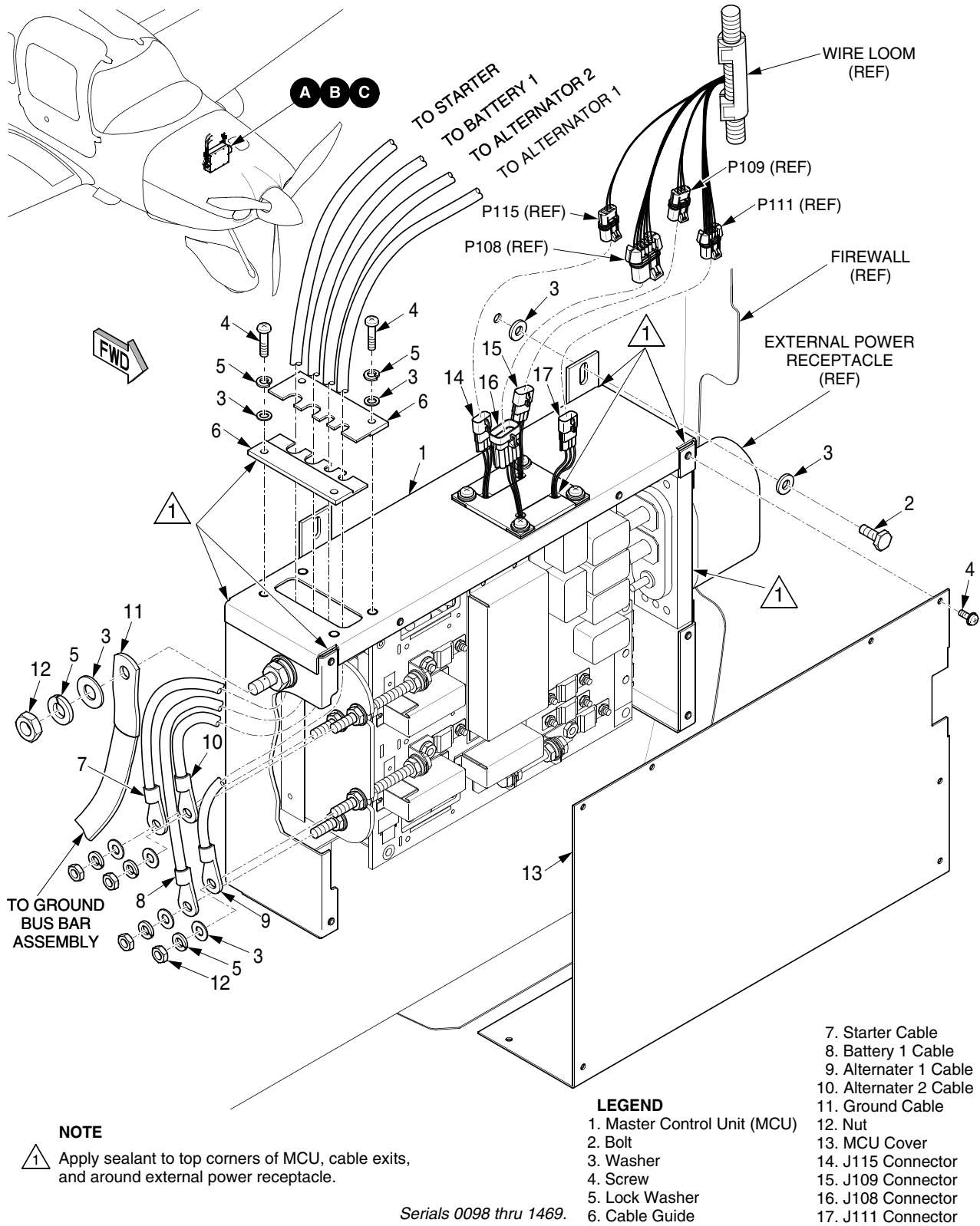
Description	P/N or Spec.	Supplier	Purpose
High Temperature Silicone Sealant	RTV 736	Dow Corning	Sealant.
Cotton Cloth (clean and lint free)	-	Any Source	General Cleaning.
Isopropyl Alcohol	TT-I-735 Grade A or B	Any Source	Solvent clean.
Corrosion Inhibitor (aerosol)	MIL-C-81309 Type III	Any Source	Prevent corrosion.

- (b) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
- (c) Remove engine cowling. (Refer to 71-10)
- (d) Disconnect battery 1. (Refer to 24-30)
- (e) Remove MCU cover. (Refer to 24-30)
- (f) Visually inspect inside MCU for evidence of water. If water is found, dry MCU and components with a clean cotton cloth.

**Note:** Evidence of surface corrosion does not require replacement of MCU components. If corrosion is found, verify MCU operation by performing Operational Inspection - Master Control Unit.

- (g) Apply corrosion inhibitor as follows:
  - 1 Cover surrounding components and structures to prevent inadvertent application of corrosion inhibitor to these areas.
  - 2 Apply a thin coat of corrosion inhibitor to MCU circuit board, internal components, and connectors per the manufacturer's instructions.
- (h) Verify security of MCU chassis to firewall.
- (i) Visually inspect cable assemblies and connector wires for chafing and security.
- (j) Visually inspect sealant for a tight seal around cable guide holes where cable assemblies and connector wires exit MCU.
- (k) If necessary, reapply sealant to MCU as follows:
  - 1 Solvent clean areas of MCU to be sealed. (Refer to 20-30)
  - 2 Apply sealant around cable guide holes where cable assemblies and connector wires exit MCU.
- (l) Install MCU cover. (Refer to 24-30)
- (m) Connect battery 1. (Refer to 24-30)
- (n) Install engine cowling. (Refer to 71-10)

EFFECTIVITY:  
All

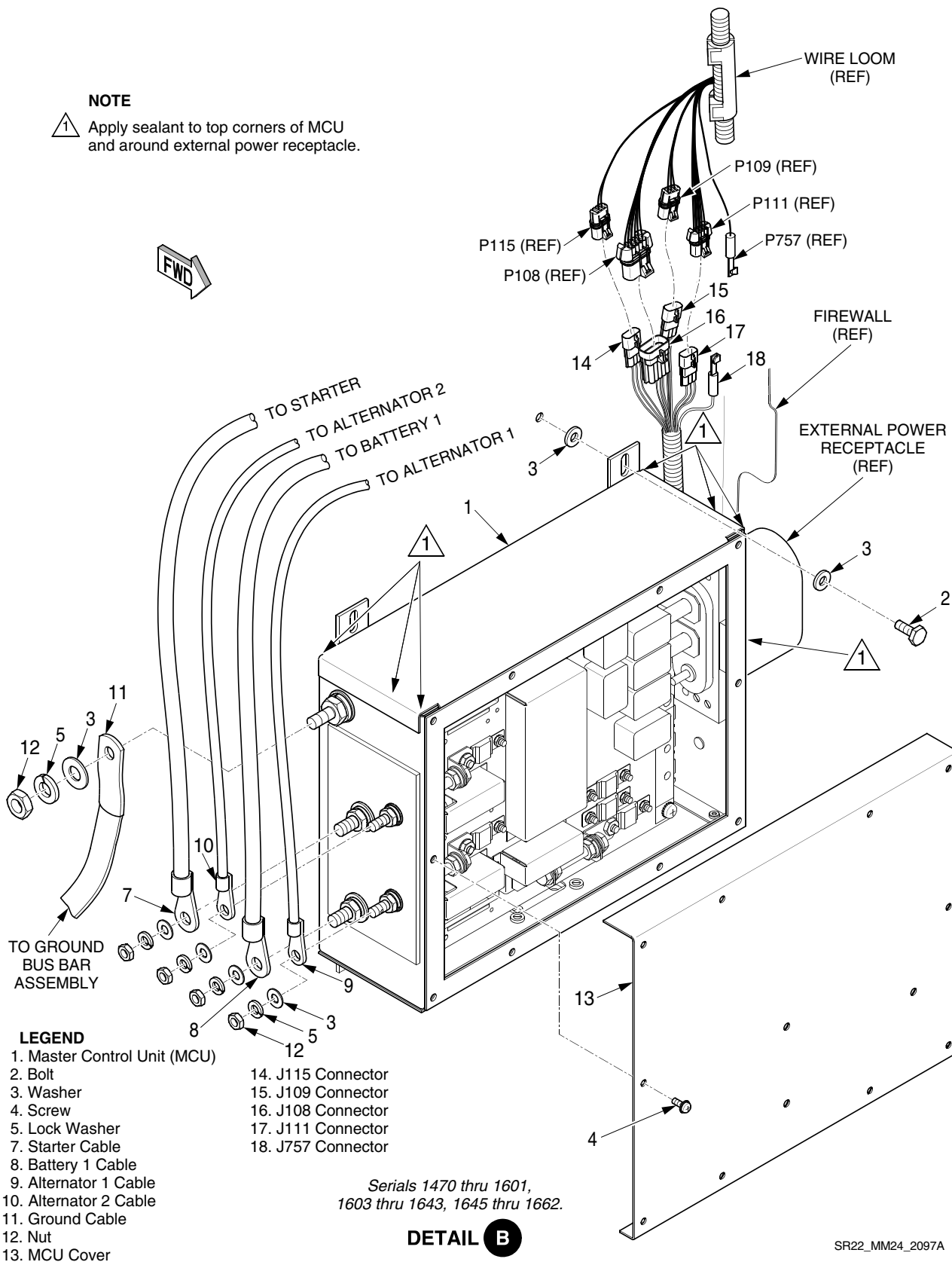


DETAIL A

SR22\_MM24\_2060C

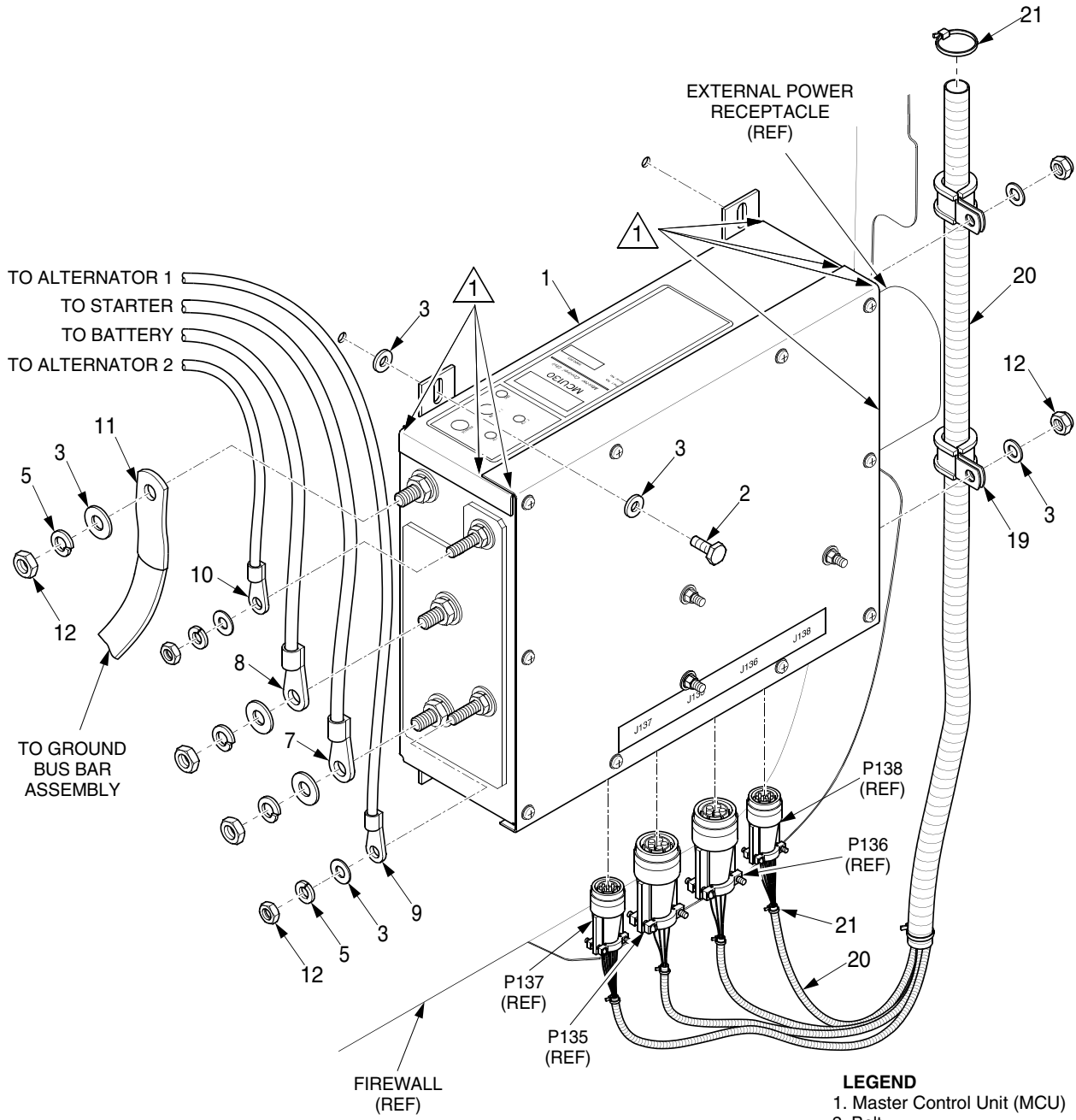
Figure 24-304  
 MCU Installation - Serials 0098 thru 1469 (Sheet 1 of 3)

**NOTE**  
 1 Apply sealant to top corners of MCU and around external power receptacle.



**Figure 24-304**  
**MCU Installation - Serials 1470 thru 1601, 1603 thru 1643, 1645 thru 1662 (Sheet 2 of 3)**

**EFFECTIVITY:**  
 Serials 1470 thru 1601, 1603 thru 1643, 1645 thru 1662



- LEGEND**
- 1. Master Control Unit (MCU)
  - 2. Bolt
  - 3. Washer
  - 5. Lock Washer
  - 7. Starter Cable
  - 8. Battery 1 Cable
  - 9. Alternator 1 Cable
  - 10. Alternator 2 Cable
  - 11. Ground Cable
  - 12. Nut
  - 19. Adel Clamp
  - 20. Wire Loom
  - 21. Cable Tie

**NOTE**  
 △ Apply sealant to top corners of MCU and around external power receptacle.

**DETAIL C**

SR22\_MM24\_2192A

**Figure 24-304**  
**MCU Installation - Serials 1602, 1644, 1663 & subs (Sheet 3 of 3)**

**EFFECTIVITY:**  
 Serials 1602, 1644, 1663 & subs

**E. MCU Cover (See Figure 24-305)**

- (1) Removal - MCU Cover
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Using a plastic scraper, remove sealant from corners of MCU and from around external power receptacle.
  - (e) Remove screws securing MCU cover to chassis. Remove MCU cover.
- (2) Installation - MCU Cover
  - (a) Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Corrosion Inhibitor (aerosol)	MIL-C-81309 Type III	Any Source	Prevent corrosion.
High Temperature Silicone Sealant	RTV 736	Dow Corning	Sealant.
Cotton Cloth (clean and lint free)	-	Any Source	General Cleaning.
Isopropyl Alcohol	TT-I-735 Grade A or B	Any Source	Solvent clean.

- (b) Apply corrosion inhibitor as follows:
  - 1 Cover surrounding components and structures to prevent inadvertent application of corrosion inhibitor to these areas.
  - 2 Apply a thin coat of corrosion inhibitor to MCU circuit board, internal components, and connectors per the manufacturer's instructions.
- (c) Position MCU cover to chassis and secure with screws.
- (d) Solvent clean upper corners of MCU chassis, and along edge of external power receptacle. (Refer to 20-30)
- (e) Apply sealant to openings at upper corners of MCU chassis, and along edge of external power receptacle.
- (f) Connect battery 1. (Refer to 24-30)
- (g) Install engine cowling. (Refer to 71-10)

EFFECTIVITY:  
All

**F. MCU Bottom Cover - *Serials w/ MCU 16600-001* (See Figure 24-305)**

## (1) Removal - MCU Bottom Cover

- (a) Remove MCU cover.
- (b) Remove nuts, washers, and clamps securing wire harness loom to chassis.

**Note:** Label cable guide routing holes with wire harness name to facilitate re-installation.

- (c) Remove screws and washers securing cable guide to chassis.
- (d) Remove screws securing MCU bottom cover to chassis. Remove MCU bottom cover from chassis.

## (2) Installation - MCU Bottom Cover

- (a) Position MCU bottom cover to chassis and secure with screws.
- (b) Position cable guide around wire harness J108, J109, J111, J115, and J757, if installed.
- (c) Install screws and washers securing cable guide to chassis.
- (d) Position wire harness loom to chassis and secure with clamps, washers, and nuts.
- (e) Install MCU cover.

**G. MCU Bottom Cover - *Serials w/ MCU 19900-001* (See Figure 24-305)**

- (1) Removal - MCU Bottom Cover
  - (a) Remove MCU cover.
  - (b) Identify and disconnect P135, P136, P137, and P138 connectors.
  - (c) Remove screws securing cable plate to bottom cover.
  - (d) Remove screws securing MCU bottom cover to chassis. Remove MCU bottom cover from chassis.
- (2) Installation - MCU Bottom Cover
  - (a) Position MCU bottom cover to chassis and secure with screws.
  - (b) Position cable plate to bottom cover and secure with screws.
  - (c) Install MCU cover.
  - (d) Connect P135, P136, P137, and P138 connectors.

**H. ALT 1 Current Sensor - Serials w/ MCU 14600-001, 14600-002, & 16600-001 (See Figure 24-305)**

The ALT 1 current sensor, integral to the MCU, is located on the LH side of the power board assembly.

(1) Removal - ALT 1 Current Sensor

- (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
- (b) Remove engine cowling. (Refer to 71-10)
- (c) Disconnect battery 1. (Refer to 24-30)
- (d) Remove MCU cover. (Refer to 24-30)
- (e) Disconnect ALT 1 cable assembly from ALT 1 bus bar stud.
- (f) *MCU 14600-001 & 14600-002:* Loosen nuts securing ALT 1 bus bar to terminal ring support bracket.
- (g) *MCU 16600-001:* Loosen nuts securing ALT 1 bus bar to the MCU chassis.

**Note:** Inboard fuse stud securing ALT 1 current sensor to power board assembly is not soldered to board and may fall lose if not held in place.

- (h) *MCU 14600-001 & 14600-002:* Remove kep-nuts securing 80A fuse to power board assembly.
- (i) *MCU 16600-001:* Remove kep-nuts securing 100A fuse to power board assembly.
- (j) Remove screws and washers securing ALT 1 current sensor to power board assembly.
- (k) Remove ALT 1 current sensor from power board assembly.
- (l) Disassemble ALT 1 bus bar stud, washers, bus bar IX<sub>a</sub>, and nuts from ALT 1 current sensor standoff.

(2) Installation - ALT 1 Current Sensor

- (a) Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Loctite®	222	Any Source	Fuse installation.

- (b) Assemble ALT 1 bus bar stud, washers, bus bar IX<sub>a</sub>, and nuts to ALT 1 current sensor standoff.

**CAUTION:** Before installing, examine current sensor module for bent pins. If bent pins are found, gently straighten them.

Do not force current sensor assembly into power board jack. Current sensor should install into jack with gentle pressure.

- (c) *MCU 14600-011 & 14600-002:* Align ALT 1 current sensor module pins to power board jack while simultaneously aligning bus bar IX<sub>a</sub> on fuse stud and ALT 1 bus bar stud over terminal ring support bracket.
- (d) *MCU 16600-001:* Align Alt 1 current sensor module pins to power board jack while simultaneously aligning bus bar IX<sub>a</sub> on fuse stud and ALT 1 bus bar stud through hole in MCU chassis.
- (e) Gently press ALT 1 current sensor assembly onto power board.
- (f) Install screws and washers securing ALT 1 current sensor to power board assembly.
- (g) Apply Loctite® to power board fuse studs.
- (h) *MCU 14600-011 & 14600-002:* Position 80A fuse to power board assembly and secure with kep-nuts



- (i) *MCU 16600-001*: Position 100A fuse to power board assembly and secure with kep-nuts.
- (j) *MCU 14600-011 & 14600-002*: Tighten nuts securing ALT 1 bus bar to terminal ring support bracket.
- (k) *MCU 16600-001*: Tighten nuts securing ALT 1 bus bar to MCU chassis.
- (l) Connect ALT 1 cable assembly to ALT 1 bus bar stud.
- (m) Install MCU cover. ([Refer to 24-30](#))
- (n) Connect battery 1. ([Refer to 24-30](#))
- (o) Perform Operational Inspection - Master Control Unit. ([Refer to 24-30](#))
- (p) Install engine cowling. ([Refer to 71-10](#))

**I. ALT 2 Current Sensor - Serials w/ MCU 14600-001, 14600-002, & 16600-001 (See Figure 24-305)**

The ALT 2 current sensor, integral to the MCU, is located on the LH side of the power board assembly.

(1) Removal - ALT 2 Current Sensor

- (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
- (b) Remove engine cowling. (Refer to 71-10)
- (c) Disconnect battery 1. (Refer to 24-30)
- (d) Remove MCU cover. (Refer to 24-30)
- (e) Disconnect ALT 2 cable assembly from ALT 2 bus bar stud.
- (f) *MCU 14600-011 & 14600-002:* Loosen nuts securing ALT 2 bus bar to terminal ring support bracket.
- (g) *MCU 16600-001:* Loosen nuts securing ALT 2 bus bar to MCU chassis.
- (h) Remove kep-nuts securing 40A fuse to power board assembly.
- (i) Remove screws and washers securing ALT 2 current sensor to power board assembly.
- (j) Remove ALT 2 current sensor from power board assembly.
- (k) Disassemble ALT 2 bus bar stud, washers, bus bar IX<sub>b</sub>, and nuts from ALT 2 current sensor standoff.

(2) Installation - ALT 2 Current Sensor

- (a) Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Loctite®	222	Any Source	Fuse installation.

- (b) Assemble ALT 2 bus bar stud, washers, bus bar IX<sub>b</sub>, and nuts to ALT 2 current sensor standoff.

**CAUTION:** Before installing, examine current sensor module for bent pins. If bent pins are found, gently straighten them.

Do not force current sensor assembly into power board jack. Current sensor should install into jack with gentle pressure.

- (c) *MCU 14600-011 & 14600-002:* Align ALT 2 current sensor pins to power board jack while simultaneously aligning bus bar IX<sub>b</sub> on fuse stud and ALT 2 bus bar stud over terminal ring support bracket.
- (d) *MCU 16600-001:* Align Alt 2 current sensor module pins to power board jack while simultaneously aligning bus bar IX<sub>a</sub> on fuse stud and ALT 2 bus bar stud through hole in MCU chassis.
- (e) Gently press ALT 2 current sensor assembly onto power board.
- (f) Install screws and washers securing ALT 2 current sensor to power board assembly.
- (g) Apply Loctite® to power board fuse studs.
- (h) Position 40A fuse to power board assembly and secure with kep-nuts.
- (i) *MCU 14600-011 & 14600-002:* Tighten nuts securing ALT 2 bus bar to terminal ring support bracket.
- (j) *MCU 16600-001:* Tighten nuts securing ALT 2 bus bar to MCU chassis.
- (k) Connect ALT 2 cable assembly to ALT 2 bus bar stud.
- (l) Install MCU cover. (Refer to 24-30) and Connect battery 1. (Refer to 24-30)
- (m) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
- (n) Install engine cowling. (Refer to 71-10)

**EFFECTIVITY:**  
Serials w/ MCU 14600-001, 14600-002, & 16600-001

**J. BAT Current Sensor - Serials w/ MCU 14600-001, 14600-002, & 16600-001 (See Figure 24-305)**

The BAT current sensor, integral to the MCU, is located on the lower mid portion of the power board assembly.

- (1) Removal - BAT Current Sensor
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Remove MCU cover. (Refer to 24-30)
  - (e) *MCU 14600-011 & 14600-002:* Remove kep-nuts securing 100A fuse to power board assembly.
  - (f) *MCU 16600-001:* Remove kep-nuts securing 125A fuse to power board assembly.
  - (g) Remove screw, washers, and nut securing bus bar IX<sub>c</sub> to power board assembly.
  - (h) Remove screws and washers securing BAT current sensor to power board assembly.
  - (i) Remove BAT current sensor from power board assembly.
  - (j) Disassemble BAT bus bar stud, nuts, washers, bus bar IX<sub>c</sub>, and bus bar X, from BAT current sensor standoff.

(2) Installation - BAT Current Sensor

- (a) Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Loctite®	222	Any Source	Fuse installation.

- (b) Assemble BAT bus bar stud, nuts, washers, bus bar IX<sub>c</sub>, and bus bar X, to BAT current sensor standoff.

**CAUTION:** Before installing, examine current sensor module for bent pins. If bent pins are found, gently straighten them.

Do not force current sensor assembly into power board jack. Current sensor should install into jack with gentle pressure.

- (c) Align BAT current sensor pins to power board jack while simultaneously aligning bus bar X on fuse stud.
- (d) Gently press BAT current sensor assembly onto power board.
- (e) Install screws and washers securing BAT current sensor to power board assembly.
- (f) Apply Loctite® to power board fuse studs.
- (g) *MCU 14600-011 & 14600-002:* Position 100A fuse to power board assembly and secure with kep-nuts.
- (h) *MCU 16600-001:* Position 125A fuse to power board assembly and secure with kep-nuts.
- (i) Install screw, washers, and nut securing bus bar IX<sub>c</sub> to power board assembly.
- (j) Install MCU cover. (Refer to 24-30)
- (k) Connect battery 1. (Refer to 24-30)
- (l) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
- (m) Install engine cowling. (Refer to 71-10)

**K. Logic Module - *Serials w/ MCU 14600-001, 14600-002, & 16600-001* (See Figure 24-305)**

The logic module, integral to the MCU, is centrally located on the power board assembly.

- (1) Removal - Logic Module
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Remove MCU cover. (Refer to 24-30)
  - (e) Remove screws and washers securing logic module to power board assembly.
  - (f) Remove logic module from power board assembly.
- (2) Installation - Logic Module

**CAUTION:** Before installing, examine logic module for bent pins. If bent pins are found, gently straighten them.

Do not force logic module into power board jack. Logic module should install into jack with gentle pressure.

- (a) Align logic module pins to power board jack and gently press logic module onto power board.
- (b) Install screws and washers securing logic module to power board assembly.
- (c) Install MCU cover. (Refer to 24-30)
- (d) Connect battery 1. (Refer to 24-30)
- (e) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
- (f) Install engine cowling. (Refer to 71-10)

**L. Midi Fuse - Serials w/ MCU 14600-001, 14600-002, & 16600-001 (See Figure 24-305)**

The midi fuses, integral to the MCU, are installed in five locations on the power board assembly.

- (1) Removal - Midi Fuse
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Remove MCU cover. (Refer to 24-30)
  - (e) Remove kep-nuts securing midi fuse to power board assembly.
  - (f) Remove midi fuse from power board assembly.
- (2) Installation - Midi Fuse
  - (a) Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Loctite®	222	Any Source	Fuse installation.

- (b) Apply Loctite® to power board studs.
- (c) Position midi fuse on power board studs.
- (d) Install kep-nuts securing midi fuse to power board assembly.
- (e) Install MCU cover. (Refer to 24-30)
- (f) Connect battery 1. (Refer to 24-30)
- (g) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
- (h) Install engine cowling. (Refer to 71-10)

**M. Midi Fuse - *Serials w/ MCU 19900-001* (See Figure 24-305)**

The midi fuses, integral to the MCU, are installed in five locations behind the circuit board assembly. Midi fuses are named in accordance with the attaching bus bar.

- (1) Removal - Midi Fuse 28
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Remove MCU cover. (Refer to 24-30)
  - (e) Remove circuit board assembly.
  - (f) Remove screw and washers securing bus bar 28 to power diode.
  - (g) Remove nut, washer, and spacers securing bus bar 28 to chassis.
  - (h) Remove nuts, washers, and spacers securing bus bar 27 to chassis.
  - (i) Remove nut, washers, and screw securing fuse to current shunt.
  - (j) Remove nut, washers, and screw securing fuse to bus bar 28.
  - (k) Remove fuse from MCU.
- (2) Installation - Midi Fuse 28
  - (a) Position fuse to bus bar 28 and secure with screw, washers, and nuts.
  - (b) Position fuse to current shunt and secure with screw, washers, and nut.
  - (c) Position bus bar 27 to chassis and secure with spacers, washers, and nuts.
  - (d) Position bus bar 28 to chassis and secure with spacers, washer, and nut.
  - (e) Position bus bar 28 to power diode and secure with screws and washers.
  - (f) Install circuit board assembly.
  - (g) Install MCU cover. (Refer to 24-30)
  - (h) Connect battery 1. (Refer to 24-30)
  - (i) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
  - (j) Install engine cowling. (Refer to 71-10)
- (3) Removal - Midi Fuse 18
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Remove MCU cover. (Refer to 24-30)
  - (e) Remove circuit board assembly.
  - (f) Remove screw, washers, and nut securing fuse to bus bar 18.
  - (g) Remove screw securing fuse to power diode.
  - (h) Remove fuse from MCU.
- (4) Installation - Midi Fuse 18
  - (a) Position fuse to power diode and secure with screw.
  - (b) Position fuse to bus bar 18 and secure with screw, washers, and nut.
  - (c) Install circuit board assembly.
  - (d) Install MCU cover. (Refer to 24-30)
  - (e) Connect battery 1. (Refer to 24-30)
  - (f) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
  - (g) Install engine cowling. (Refer to 71-10)
- (5) Removal - Midi Fuse 10
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)

- (d) Remove MCU cover. (Refer to 24-30)
- (e) Remove circuit board assembly.
- (f) Remove screw, washers, and nut securing fuse to bus bar 10.
- (g) Remove screw, washers, and nut securing fuse to current shunt.
- (h) Remove fuse from MCU.
- (6) Installation - Midi Fuse 10
  - (a) Position fuse to current shunt and secure with screw, washers, and nut.
  - (b) Position fuse to bus bar 10 and secure with screw, washers, and nut.
  - (c) Install circuit board assembly.
  - (d) Install MCU cover. (Refer to 24-30)
  - (e) Connect battery 1. (Refer to 24-30)
  - (f) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
  - (g) Install engine cowling. (Refer to 71-10)
- (7) Removal - Midi Fuse 19
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Remove MCU cover. (Refer to 24-30)
  - (e) Remove circuit board assembly.
  - (f) Remove screw, washers, and nut securing fuse to current shunt.
  - (g) Remove screw securing fuse to power diode.
  - (h) Remove fuse from MCU.
- (8) Installation - Midi Fuse 19
  - (a) Position fuse to power diode and secure with screw.
  - (b) Position fuse to current shunt and secure with screw, washers, and nut.
  - (c) Install circuit board assembly.
  - (d) Install MCU cover. (Refer to 24-30)
  - (e) Connect battery 1. (Refer to 24-30)
  - (f) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
  - (g) Install engine cowling. (Refer to 71-10)
- (9) Removal - Midi Fuse 17
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Remove MCU cover. (Refer to 24-30)
  - (e) Remove circuit board assembly.
  - (f) Remove nuts securing 3 bus bar 11s to breakers.
  - (g) Remove screw securing midi fuse 7 to power diode.
  - (h) Remove screw securing midi fuse 19 to power diode.
  - (i) Remove nut and washers securing bus bar 19 to bus bar 16.
  - (j) Remove nuts and washers securing RH clamp to bus bar 14.
  - (k) Remove screw, washers, and nut securing fuse to busbar 14.
  - (l) Remove screw, washers, and nut securing fuse to busbar 17.
- (10) Installation - Midi Fuse 17
  - (a) Position fuse to busbar 17 and secure with screw, washers, and nut.
  - (b) Position fuse to busbar 14 and secure with screw, washers, and nut.
  - (c) Position bus bar 14 into clamp and secure with washers and nuts.

- (d) Position bus bar 19 to bus bar 16 and secure with washers and nuts.
- (e) Position midi fuse 19 to power diode and secure with screw.
- (f) Position midi fuse 7 to power diode and secure with screw.
- (g) Position 3 bus bar 11s to breakers and secure with nuts.
- (h) Install circuit board assembly.
- (i) Install MCU cover. ([Refer to 24-30](#))
- (j) Connect battery 1. ([Refer to 24-30](#))
- (k) Perform Operational Inspection - Master Control Unit. ([Refer to 24-30](#))
- (l) Install engine cowling. ([Refer to 71-10](#))



**N. Blade Fuse (See Figure 24-305)**

*MCU 14600-001, 14600-002, & 16600-001:* The blade fuse, integral to the MCU, is located on the lower LH side of the power board assembly. *MCU 19900-001:* The blade fuses, integral to the MCU, are installed in seven locations on the power board assembly.

- (1) Removal - Blade Fuse
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Remove MCU cover. (Refer to 24-30)
  - (e) Remove blade fuse from fuse holder.
- (2) Installation - Blade Fuse
  - (a) Insert blade fuse into fuse holder.
  - (b) Install MCU cover. (Refer to 24-30)
  - (c) Connect battery 1. (Refer to 24-30)
  - (d) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
  - (e) Install engine cowling. (Refer to 71-10)

**O. External Fuse (See Figure 24-305)**

The external fuse, integral to the MCU, is located on the RH side of the MCU chassis.

- (1) Removal - External Fuse
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Remove external fuse from fuse holder assembly.
- (2) Installation - External Fuse
  - (a) Insert external fuse into fuse holder assembly.
  - (b) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
  - (c) Install engine cowling. (Refer to 71-10)

**P. Field Control Module - Serials w/ MCU 14600-001, 14600-002, & 16600-001 (See Figure 24-305)**

The ALT 1 and ALT 2 field control modules, integral to the MCU, are located on the RH side of the MCU chassis floor.

**(1) Removal - Field Control Module**

- (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
- (b) Remove engine cowling. (Refer to 71-10)
- (c) Disconnect battery 1. (Refer to 24-30)
- (d) Remove MCU cover. (Refer to 24-30)
- (e) *MCU 16600-001*: Remove MCU bottom cover.
- (f) Identify and disconnect wire harness from field control module.
- (g) Remove screw and washer securing field control module to chassis.
- (h) Ensure flange on field control module is clear of retainer bar and remove from airplane.

**(2) Installation - Field Control Module**

**Note:** Do not interchange ALT 1 and ALT 2 field control modules. Verify ALT 1 and ALT 2 field control modules are installed in correct location on chassis.

- (a) Position field control module with flange under retaining bar, align over installation holes on chassis, and secure with screw and washer.
- (b) Connect wire harness to field control module.
- (c) *MCU 16600-001*: Install MCU bottom cover.
- (d) Install MCU cover. (Refer to 24-30)
- (e) Connect battery 1. (Refer to 24-30)
- (f) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
- (g) Install engine cowling. (Refer to 71-10)

**Q. Field Control Module - Serials w/ MCU 19900-001 (See Figure 24-305)**

The ALT 1 and ALT 2 field control modules are integral to the MCU. The ALT 1 field control module is located on the lower, RH side of chassis. The ALT 2 field control module is located on the upper, RH side of chassis floor.

- (1) Removal - ALT 1 Field Control Module
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Remove MCU cover. (Refer to 24-30)
  - (e) Remove MCU bottom cover. (Refer to 24-30)
  - (f) Remove circuit board assembly. (Refer to 24-30)
  - (g) Disconnect wire harness from field control module.
  - (h) Remove screw and washer securing field control module to chassis.
  - (i) Slide field control module from under retainer lip. Remove field control module from airplane.
- (2) Installation - ALT 1 Field Control Module
  - (a) Position field control module under retainer lip on chassis and secure with screws and washers.
  - (b) Connect wire harness to field control module.
  - (c) Install circuit board assembly. (Refer to 24-30)
  - (d) Install MCU bottom cover. (Refer to 24-30)
  - (e) Install MCU cover. (Refer to 24-30)
  - (f) Connect battery 1. (Refer to 24-30)
  - (g) Perform Operational Inspection - Master Control Unit. (Refer to 24-30)
  - (h) Install engine cowling. (Refer to 71-10)
- (3) Removal - ALT 2 Field Control Module
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. (Refer to 71-10)
  - (c) Disconnect battery 1. (Refer to 24-30)
  - (d) Remove MCU cover. (Refer to 24-30)
  - (e) Remove circuit board assembly. (Refer to 24-30)
  - (f) Remove screw securing upper RH standoff to chassis.
  - (g) Disconnect wire harness from field control module.
  - (h) Remove screw securing bus bar 8 and terminal ring 736 to power diode.
  - (i) Remove nut and spacers securing bus bar 8 to chassis.
  - (j) Remove nuts and spacers securing bus bar 9 to chassis.
  - (k) Remove bolt, washers, and nuts securing ALT 2 cable and bus bar 9 to chassis.
  - (l) Remove or relocate bus bar 8 and bus bar 9 assembly to allow removal of field control module.
  - (m) Remove screw and washers securing field control module to chassis.
  - (n) Slide field control module from under retainer lip. Remove field control module from airplane.

- (4) Installation - ALT 2 Field Control Module
  - (a) Acquire necessary tools, equipment, and supplies.

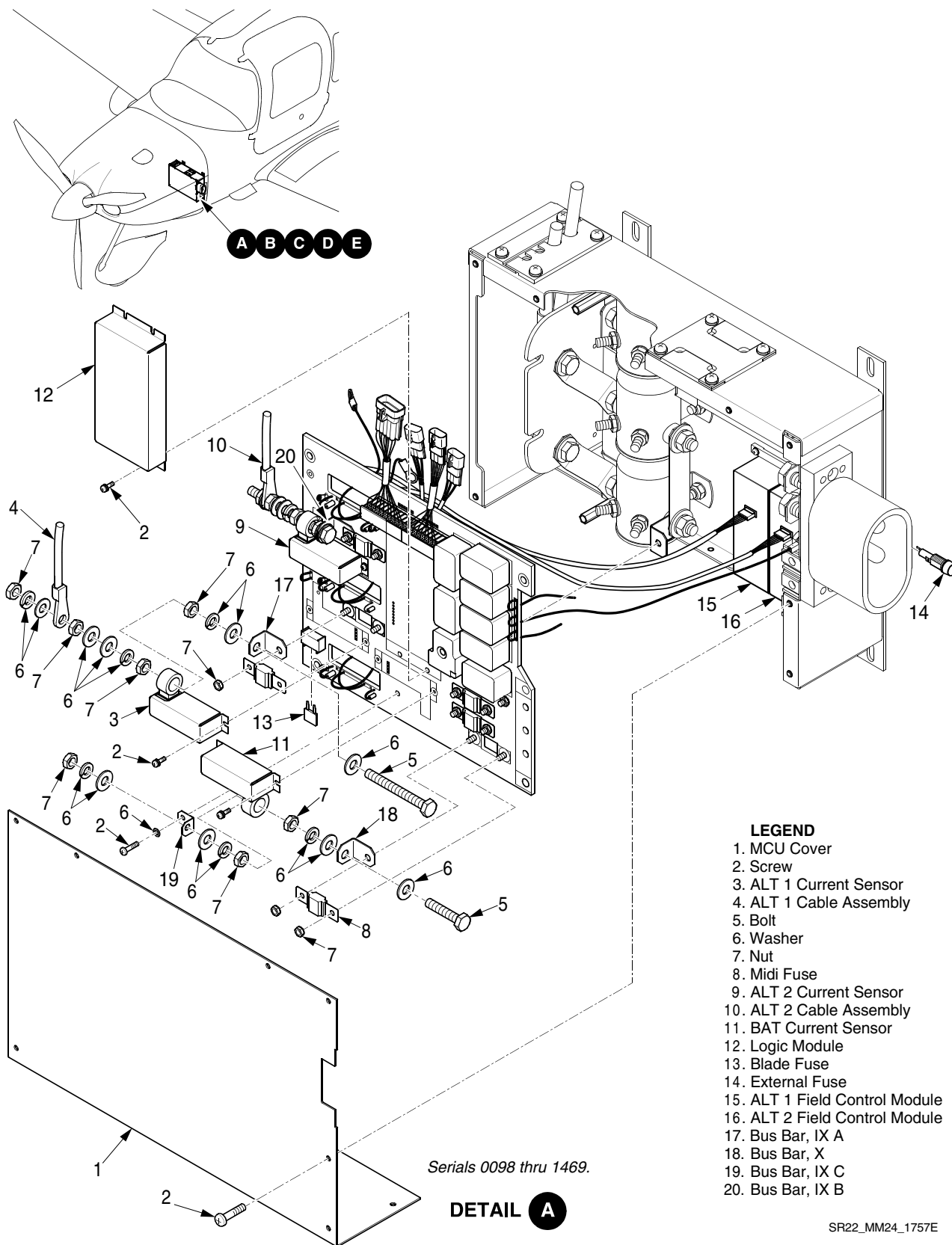
Description	P/N or Spec.	Supplier	Purpose
Loctite®	222	Any Source	Fuse installation.

- (b) Position field control module under retainer lip and secure with screws and washers.
- (c) Position bus bar 9 to chassis and secure with spacers, washers, and nuts.
- (d) Install bolt, washers, and nuts securing ALT 2 cable and bus bar 9 to chassis.
- (e) Apply Loctite to upper RH standoff and secure to chassis floor with screw. Position sleeve over standoff.
- (f) Position bus bar 8 to chassis and secure with spacers, washers, and nut.
- (g) Position bus bar and terminal ring 736 to power diode.
- (h) Connect wire harness to field control module.
- (i) Install circuit board assembly. [\(Refer to 24-30\)](#)
- (j) Install MCU cover. [\(Refer to 24-30\)](#)
- (k) Connect battery 1. [\(Refer to 24-30\)](#)
- (l) Perform Operational Inspection - Master Control Unit. [\(Refer to 24-30\)](#)
- (m) Install engine cowling. [\(Refer to 71-10\)](#)

EFFECTIVITY:  
Serials w/ MCU 19900-001

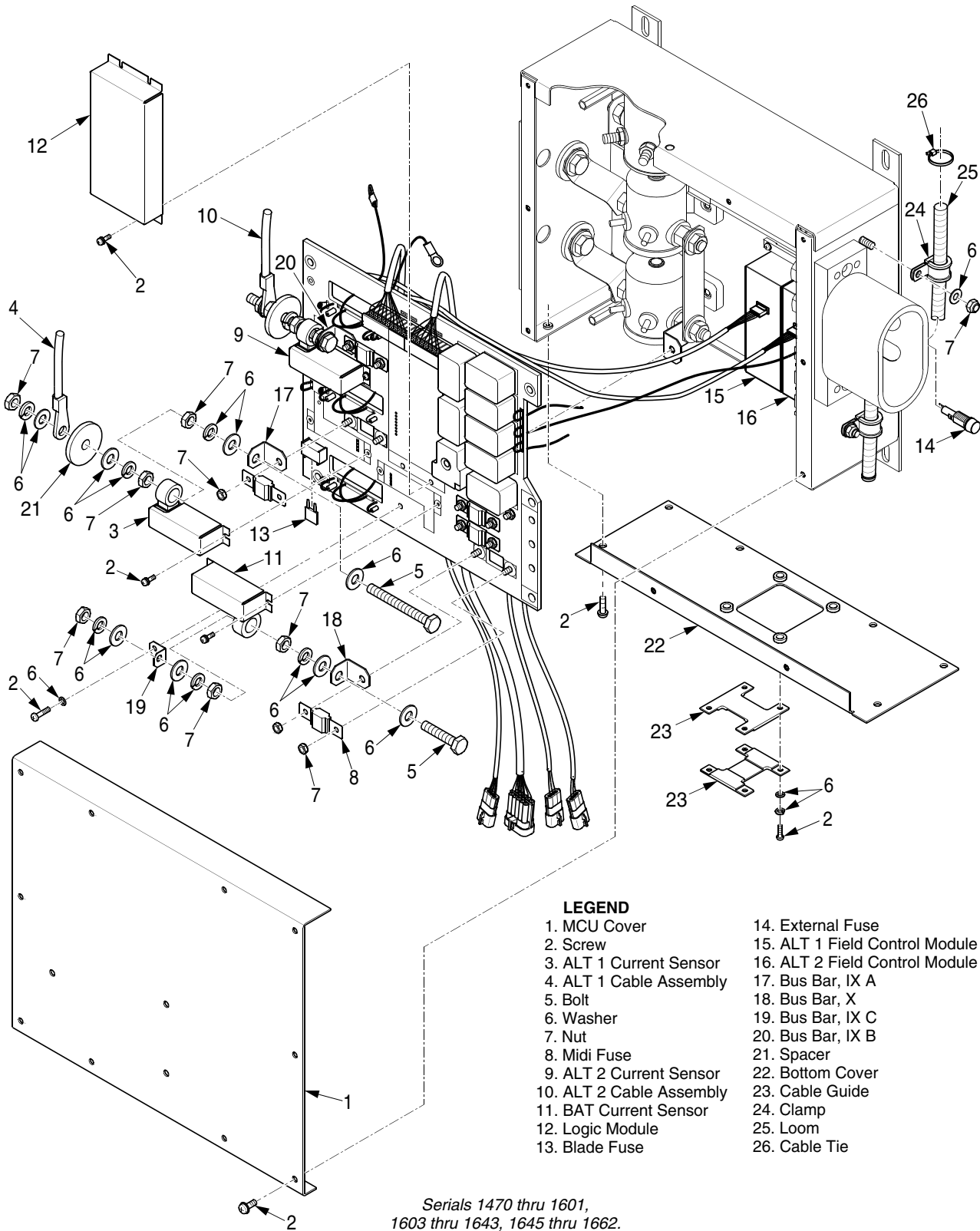
**R. Circuit Board Assembly - *Serials w/ MCU 19900-001* (See Figure 24-305)**

- (1) Removal - Circuit Board Assembly
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Remove engine cowling. ([Refer to 71-10](#))
  - (c) Disconnect battery 1. ([Refer to 24-30](#))
  - (d) Remove MCU cover. ([Refer to 24-30](#))
  - (e) Disconnect P134 and P126 connectors from circuit board.
  - (f) Remove screws securing circuit board to mount.
  - (g) Remove nuts and clamps securing wire harness to mount.
  - (h) Remove screws securing mount to chassis standoffs.
- (2) Installation - Circuit Board Assembly
  - (a) Position mount to chassis standoffs and secure with screws.
  - (b) Position circuit board assembly to mount and secure with screws.
  - (c) Position wire harness clamps to mount and secure with nuts.
  - (d) Connect P134 and P126 connectors to circuit board.
  - (e) Install MCU cover. ([Refer to 24-30](#))
  - (f) Connect battery 1. ([Refer to 24-30](#))
  - (g) Perform Operational Inspection - Master Control Unit. ([Refer to 24-30](#))
  - (h) Install engine cowling. ([Refer to 71-10](#))



**Figure 24-305**  
**MCU Components - Serials 0098 thru 1469 (Sheet 1 of 4)**

**EFFECTIVITY:**  
 Serials 0098 thru 1469



- LEGEND**
- |                          |                                |
|--------------------------|--------------------------------|
| 1. MCU Cover             | 14. External Fuse              |
| 2. Screw                 | 15. ALT 1 Field Control Module |
| 3. ALT 1 Current Sensor  | 16. ALT 2 Field Control Module |
| 4. ALT 1 Cable Assembly  | 17. Bus Bar, IX A              |
| 5. Bolt                  | 18. Bus Bar, X                 |
| 6. Washer                | 19. Bus Bar, IX C              |
| 7. Nut                   | 20. Bus Bar, IX B              |
| 8. Midi Fuse             | 21. Spacer                     |
| 9. ALT 2 Current Sensor  | 22. Bottom Cover               |
| 10. ALT 2 Cable Assembly | 23. Cable Guide                |
| 11. BAT Current Sensor   | 24. Clamp                      |
| 12. Logic Module         | 25. Loom                       |
| 13. Blade Fuse           | 26. Cable Tie                  |

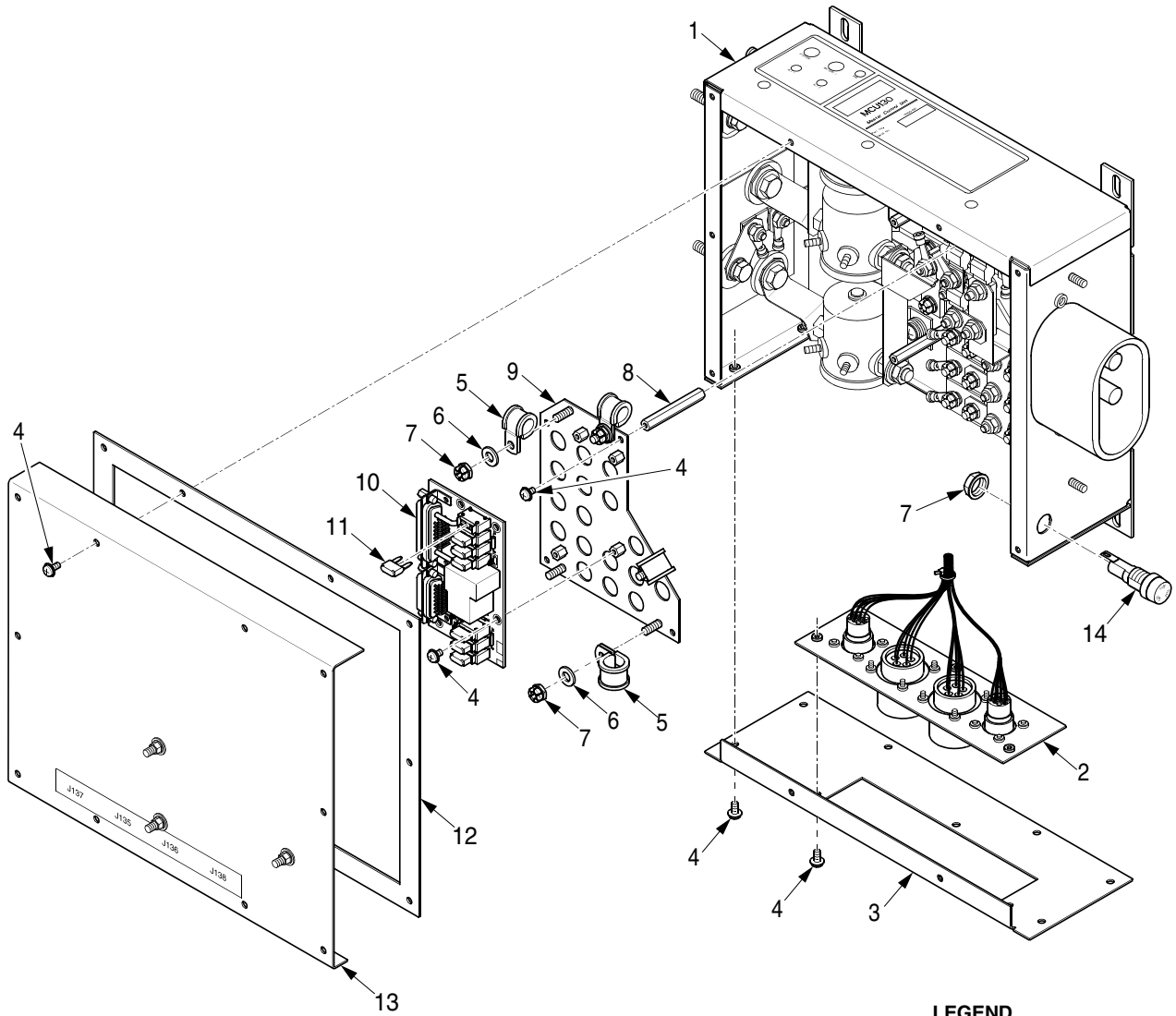
Serials 1470 thru 1601,  
1603 thru 1643, 1645 thru 1662.

**DETAIL B**

SR22\_MM24\_2101A

**Figure 24-305**  
**MCU Components - Serials 1470 thru 1601, 1603 thru 1643, 1645 thru 1662 (Sheet 2 of 4)**





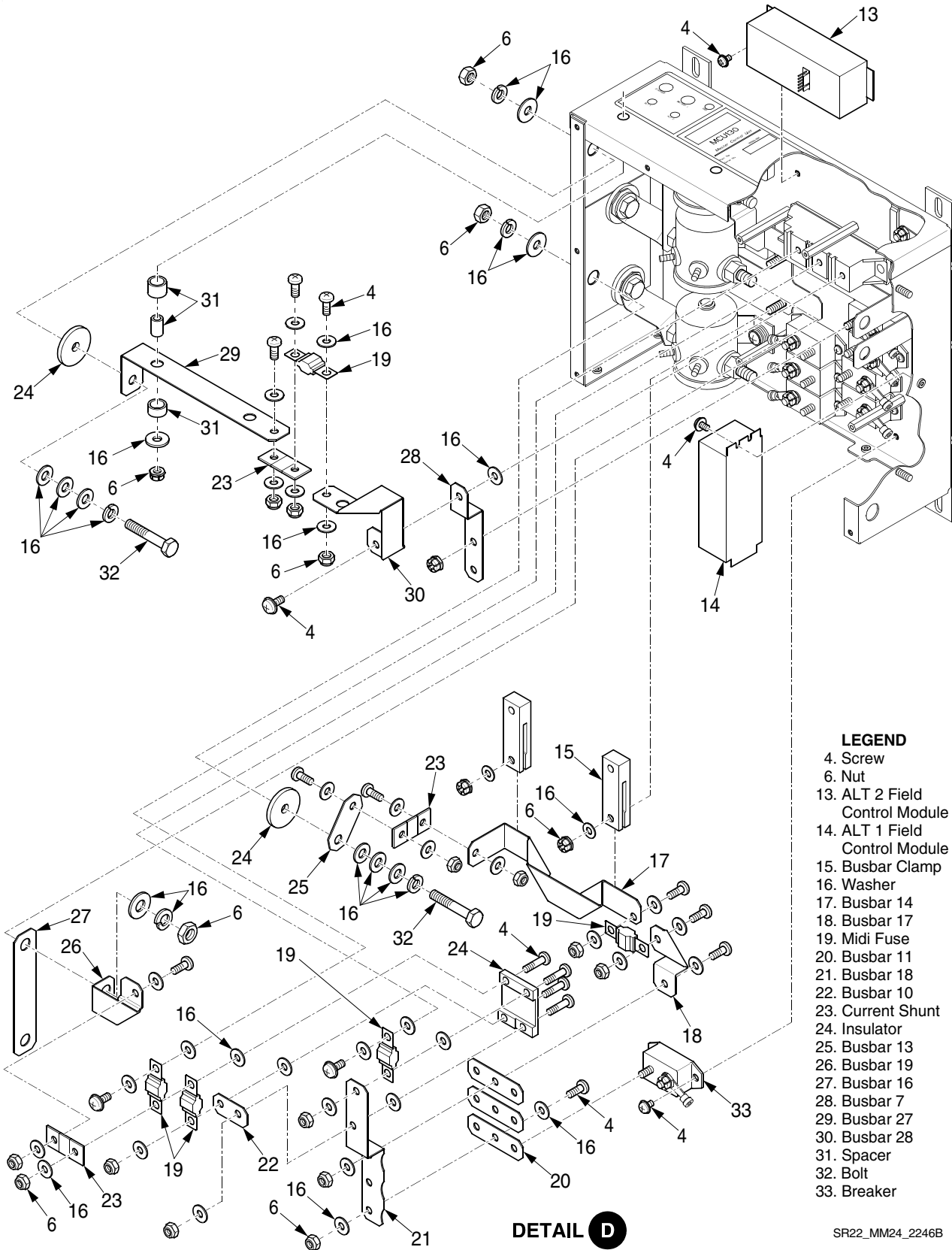
- LEGEND**
1. Master Control Unit (MCU)
  2. Bottom Cable Plate
  3. Bottom Cover
  4. Screw
  5. Clamp
  6. Washer
  7. Nut
  8. Standoff
  9. Power Board Mount
  10. Power Board
  11. Blade Fuse
  12. Gasket
  13. MCU Cover
  14. External Fuse

**DETAIL C**

SR22\_MM24\_2244

**Figure 24-305**  
**MCU Components - Serials 1602, 1644, 1663 & subs (Sheet 3 of 4)**

**EFFECTIVITY:**  
 Serials 1602, 1644, 1663 & subs



SR22\_MM24\_2246B

**Figure 24-305**  
**MCU Components - Serials 1602, 1644, 1663 & subs (Sheet 4 of 4)**

- S. Low-Volts Warning Light (Annunciator Panel) (Refer to 31-50)
- T. ALT 1 and ALT 2 Fail Lights (Annunciator Panel) (Refer to 31-50)
- U. Volt / Amp Meter - *Serials 0002 thru 1601, 1603 thru 1643, 1645 thru 1662* (See Figure 24-306)

- (1) Removal - Volt / Amp Meter
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Pull BAT 2 circuit breaker to the OFF position.
  - (c) Remove engine cowling. (Refer to 71-10)
  - (d) Disconnect battery 1. (Refer to 24-30)
  - (e) Remove MFD.
  - (f) Remove screws and washers securing volt / amp meter to instrument panel.
  - (g) *Serials 0002 thru 1396 w/ 100A amp meter after SB 2X-24-04*: Disconnect amp meter adaptor from wire harness connector.
  - (h) Identify and disconnect all wires from volt / amp meter.
  - (i) Remove volt / amp meter from airplane.
- (2) Installation - Volt / Amp Meter

**Note:** Volt/amp meter P/N 11240-001 requires adaptor installation between amp meter and wire harness connector.

- (a) Identify and connect wire harness connector to volt / amp meter.
  - (b) Position volt/amp meter to instrument panel and secure with screws and washers.
  - (c) Install MFD.
  - (d) Connect battery 1.
  - (e) Install engine cowling.
  - (f) Perform Operational Test - Volt / Amp Meter. (Refer to 24-30)
- (3) Operational Test - Volt / Amp Meter
    - (a) Set BAT 1 switch to ON position.
    - (b) Verify needle indicates  $26 \pm 2$  VDC.
    - (c) Set BAT 1 switch to OFF position.

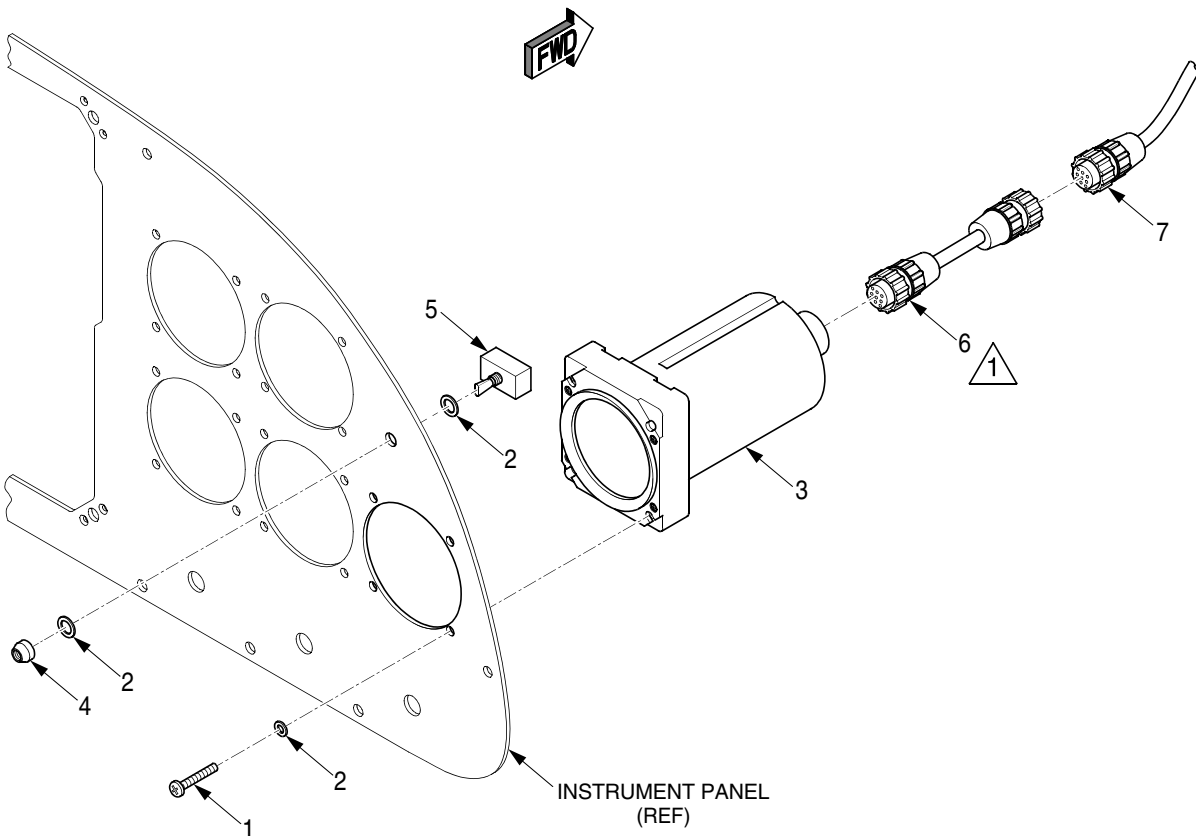
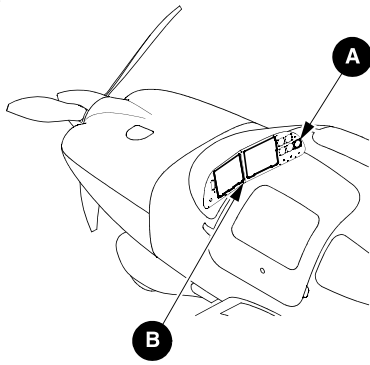
**V. Volt / Amp Meter - Serials 1602, 1644, 1663 & subs (See Figure 24-306)**

**Note:** Voltage and amperage are displayed on the screens of the MFD and PFD.

- (1) Operational Test - Volt / Amp Meter
  - (a) Set BAT1 and AVIONICS switches to ON positions.
  - (b) On MFD, when PRESS ANY BEZEL KEY TO CONTINUE is displayed, press any key.
  - (c) If Engine Monitoring is selected, press [Fuel Done] to enter Map page.
  - (d) Rotate left knob to select Engine page.
  - (e) Verify main bus voltage indicates  $26 \pm 2$  VDC.
  - (f) Verify essential bus voltage indicates no more than 1 vdc less than the main bus voltage.
  - (g) Verify ALT1 indicates zero amps.
  - (h) Verify ALT2 indicates zero amps.
  - (i) Verify BATT indicates Dschg 0 - 10 amps.
  - (j) Turn on large electrical loads (landing light, nav lights, pitot heat, etc.) to ensure more amps are drawn when larger electrical loads are introduced.
  - (k) Verify ammeter indicates an increase in amperage.
  - (l) Set BAT1 and AVIONICS switches to OFF positions.

**W. Ammeter Select Switch - Serials 0002 thru 1601, 1603 thru 1643, 1645 thru 1662 (See Figure 24-306)**

- (1) Removal - Ammeter Select Switch
  - (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (b) Pull BAT 2 circuit breaker to the off position.
  - (c) Remove engine cowling. (Refer to 71-10)
  - (d) Disconnect battery 1. (Refer to 24-30)
  - (e) Remove MFD.
  - (f) Remove screws and washers securing low-volts annunciator to instrument panel.
  - (g) Identify and disconnect all wires from low-volts annunciator and select switch.
  - (h) Remove nut and washer securing ammeter select switch to instrument panel. Remove low-volts annunciator and ammeter select switch from instrument panel.
  - (i) To disconnect switch, use a solder gun and remove solder from each terminal.
- (2) Installation - Ammeter Select Switch
  - (a) Identify corresponding wires and place heat shrink tubing into position. Solder all wires to corresponding terminal on select switch.
  - (b) Install screws and washers securing low-volts annunciator to instrument panel.
  - (c) Place ammeter select switch into position and secure with washer and nut.
  - (d) Install MFD.
  - (e) Connect battery 1.
  - (f) Install engine cowling.
  - (g) Perform Operational Test - Ammeter Select Switch. (Refer to 24-30)
- (3) Operational Test - Ammeter Select Switch
  - (a) Set ammeter switch to "BATT".
  - (b) Ammeter should read 0 to -10 amps.
  - (c) Turn on large electrical loads (landing light, nav lights, pitot heat, etc.) to ensure more amps are drawn when larger electrical loads are introduced.
  - (d) Verify ammeter indicates an increased discharge.
  - (e) Set ammeter switch to "ALT1" and "ALT2".
  - (f) Ammeter should read "0" in both positions.



Serials 0002 thru 1601, 1603 thru 1643, 1645 thru 1662.

**LEGEND**

- 1. Screw
- 2. Washer
- 3. Amp Meter
- 4. Nut
- 5. Ammeter Select Switch
- 6. Adaptor
- 7. Connector

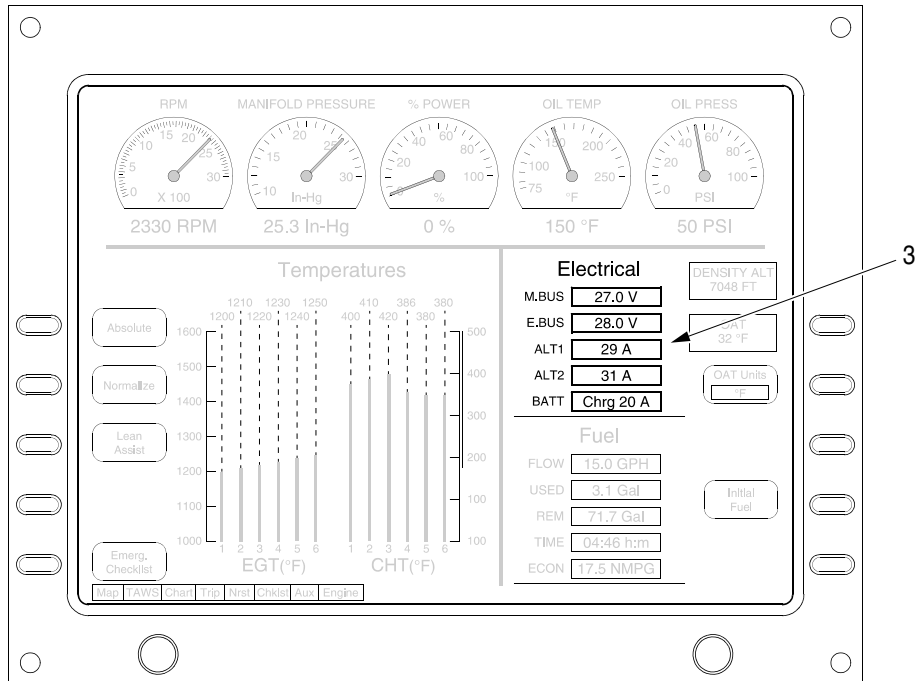
**NOTE**

1 Serials 0002 thru 1396 w/ 100A amp meter after SB 2X-24-04.

**DETAIL A**

SR22\_MM24\_1777B

**Figure 24-306**  
**Amp Meter Indication - Serials 0002 thru 1601, 1603 thru 1643, 1645 thru 1662 (Sheet 1 of 2)**



Serials 1602, 1644, 1663 & subs.

**DETAIL B**

**Figure 24-306**  
**Amp Meter Indication - Serials 1602, 1644, 1663 & subs (Sheet 2 of 2)**

**EFFECTIVITY:**  
 Serials 1602, 1644, 1663 & subs

**LEGEND**  
 3. Amp Meter

SR22\_MM24\_2214

**X. Battery 1 (See Figure 24-307)**

(1) Removal - Battery 1

**WARNING:** All electrical circuits must be off, prior to disconnecting battery cables. Always remove the negative battery cable first, then the positive cable. Insulate cable ends and battery terminals to prevent accidental re-connection.

Remove all jewelry before servicing the battery. Metal objects may fuse to electrical connections and cause severe burns. Wear face shield and protective clothing when servicing battery and/or handling electrolyte. Neutralize electrolyte spills with a solution of baking soda and water, then rinse with clean water.

**Note:** The battery box should be washed out thoroughly and dried each time the battery is removed. Use a non-metallic bristle brush to clean the battery. The battery vent hose should be inspected periodically for obstructions.

- (a) Verify ignition switch is in OFF position and remove the key.
- (b) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
- (c) Pull BAT 2 circuit breaker.
- (d) Remove upper engine cowling. (Refer to 71-10).

**CAUTION:** After battery disconnection, insulate cable ends and battery terminals to prevent accidental connection.

- (e) Remove negative battery cable from battery terminal
- (f) Remove positive battery cable from battery terminal.
- (g) Insulate cable ends and battery terminals.
- (h) Remove clamp securing vent hose to battery.
- (i) *Serials 0002 thru 0497:* Remove bolts, washers, and cotter pins securing hold-down bracket to battery mounting tray.
- (j) *Serials 0498 & subs:* Remove bolts and washers securing hold-down bracket to battery mounting tray.
- (k) Remove battery hold-down bracket and battery from airplane.

(2) Installation - Battery 1

- (a) Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Bicarbonate of Soda (baking soda)	-	Any Source	Neutralize electrolyte.
Contact Cleaner	-	Any Source	Clean terminals.
Acid Resistant Bristle Brush (non-metallic)	-	Any Source	Clean terminals.
Petroleum Jelly	W-P-236	Any Source	Prevent corrosion.

- (b) Rinse battery with fresh water and wipe clean with a dry cloth.
- (c) Visually inspect battery box for corrosion and spilled electrolyte.



**CAUTION:** Do not allow bicarbonate of soda to enter battery cells or permanent battery damage will result.

- (d) If necessary, clean battery with a solution of bicarbonate of soda and clean water.
- (e) Using contact cleaner and bristle brush, remove dirt and corrosion from battery terminals.
- (f) Install battery into battery mounting tray, and position battery hold-down bracket to top of battery.
- (g) *Serials 0002 thru 0497:* Install bolts, washers, and cotter pins securing battery hold-down bracket to battery mounting tray.
- (h) *Serials 0498 & subs:* Install bolts and washers securing battery hold-down bracket to battery mounting tray. Torque bolts to 10 in-lb (1.1 Nm) greater than accepted nut drag. Maximum torque not to exceed 45 in-lb (5.1 Nm).
- (i) Inspect battery vent hose for damage, kinks, or obstructions.
- (j) Position battery vent hose to battery and secure with clamp.

**CAUTION:** Connecting cables in reverse (positive to negative and negative to positive) can cause serious damage to the electrical system. Connect the negative cable last.

- (k) Connect positive battery cable to positive terminal.
  - (l) Connect negative battery cable to negative terminal.
  - (m) To prevent corrosion, apply petroleum jelly to battery terminals.
  - (n) Install engine cowling. (Refer to 71-10)
  - (o) Verify operation of electrical system.
- (3) Inspection/Check - Battery 1 Capacity

**Note:** A fully charged battery is considered serviceable if it meets 80% of the 30 minute emergency capacity rating.

- (a) Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
24-Volt Battery/Alternator Load Tester	-	Any Source	Test battery condition.

- (b) Perform load test as instructed by the manufacturer of the load tester.
  - (c) If battery fails load test, replace battery.
- (4) Inspection/Check - Battery 1 Charging
- If the airplane is parked for long periods of time, the battery may become discharged. The battery may be recharged using a constant-voltage charger.

**WARNING:** Do not charge battery in airplane or within 10 feet of a fuel servicing area. The battery cell caps must be installed during charging.

- (a) Acquire necessary tools, equipment, and supplies.

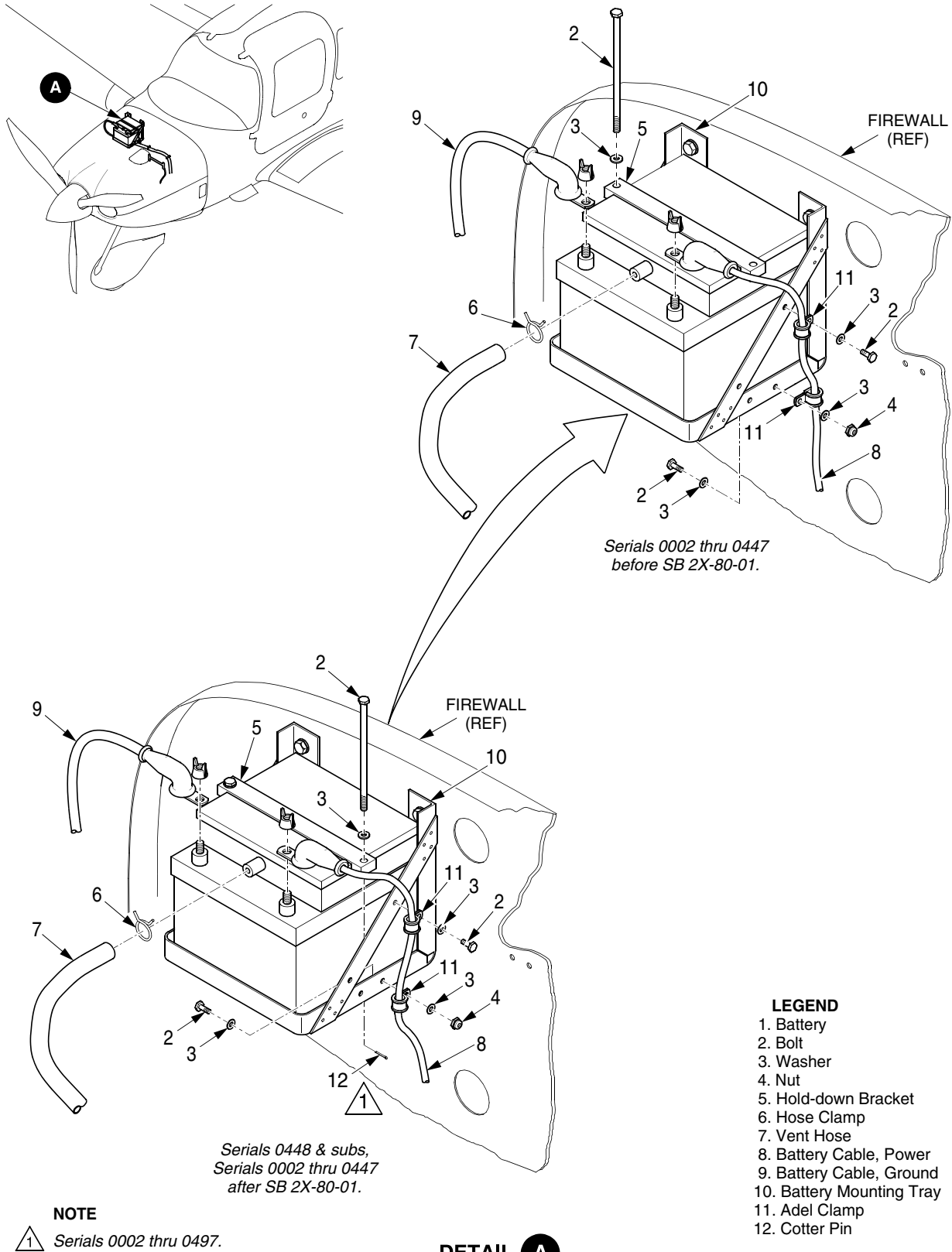
Description	P/N or Spec.	Supplier	Purpose
Battery Charger (constant-voltage)	24 Volt	Any Source	Charge Battery 1.

EFFECTIVITY:  
All

- (b) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
- (c) Remove battery 1. ([Refer to 24-30](#))
- (d) Perform Battery 1 Electrolyte Specific Gravity Check. ([Refer to 12-10](#))
- (e) Ensure battery cell caps are installed and battery charger is turned off.
- (f) Connect battery charger positive lead to positive terminal.
- (g) Connect battery charger negative lead to negative terminal.
- (h) Set battery charger switch to ON position.
- (i) Charge battery at 3-amp rate until cells are gassing. Once cells start gassing, reduce rate of charge to 1.5 amps.

**Note:** Allow 18 to 24 hours to fully charge battery. During charging, maintain electrolyte temperature between 60 - 110°F.

- (j) Charge battery until voltage and specific gravity readings are constant over three readings taken at 1/2-hour intervals.
- (k) Set battery charger switch to OFF position. Unplug battery charger.
- (l) Disconnect battery charger negative lead.
- (m) Disconnect battery charger positive lead.
- (n) Install battery 1. ([Refer to 24-30](#))



SR22\_MM24\_1438G

**Figure 24-307  
Battery 1 Installation**

**EFFECTIVITY:**  
All

**Y. Battery 2 (See Figure 24-308)**

## (1) Removal - Battery 2

**WARNING:** All electrical circuits must be off, prior to disconnecting battery cables. If battery 2 becomes damaged and electrolyte is spilled, neutralize the spill immediately with a solution of baking soda and water, then rinse with clean water.

- (a) Verify ignition switch is in OFF position and remove the key.
- (b) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
- (c) Remove access panel CB6. (Refer to 06-00)
- (d) Disconnect electrical connector from battery enclosure.
- (e) Disconnect vent hose from battery enclosure.
- (f) *Serials 0002 thru 0820:* Remove screws and washers securing battery enclosure to mounting tray standoffs. Remove battery enclosure from airplane.
- (g) *Serials 0821 & subs:* Remove screws, washers, and spacers securing battery enclosure to mounting tray. Remove battery enclosure from airplane.
- (h) Remove screws, washers, and nuts securing upper battery enclosure to lower battery enclosure.
- (i) Disconnect negative battery cables from battery terminals.
- (j) Disconnect positive battery cables from battery terminals.
- (k) Remove batteries from lower enclosure.

**CAUTION:** Do not use abrasive cleaners or materials to clean battery terminals.

- (l) Visually inspect battery terminals for dirt or corrosion. Clean or replace terminals as necessary.

## (2) Installation - Battery 2

- (a) Position batteries to lower battery enclosure.
- (b) Connect negative battery cables to battery terminals.
- (c) Connect positive battery cables to battery terminals.
- (d) Position upper battery enclosure to lower battery enclosure and secure with screws, washers, and nuts.
- (e) *Serials 0002 thru 0820:* Position battery enclosure to mounting tray standoffs and secure with screws and washers.
- (f) *Serials 0821 & subs:* Position battery enclosure to mounting tray and secure with screws, washers, and spacers.
- (g) Connect vent hose to battery enclosure.
- (h) Connect electrical connector to battery enclosure.
- (i) Install access panel CB6. (Refer to 06-00)

## (3) Inspection/Check - Battery 2 Top-Charging

The battery will discharge at approximately 3% per month when storage temperature is maintained at 68° F (20° C). Self-discharge rate will vary with storage temperature and the remaining capacity. If the battery is going to be stored for extended periods of time, the battery should be top-charged periodically with a constant-voltage charger.

**WARNING:** Do not charge batteries in airplane or within 10 feet of a fuel servicing area.

- (a) Acquire necessary tools, equipment, and supplies.

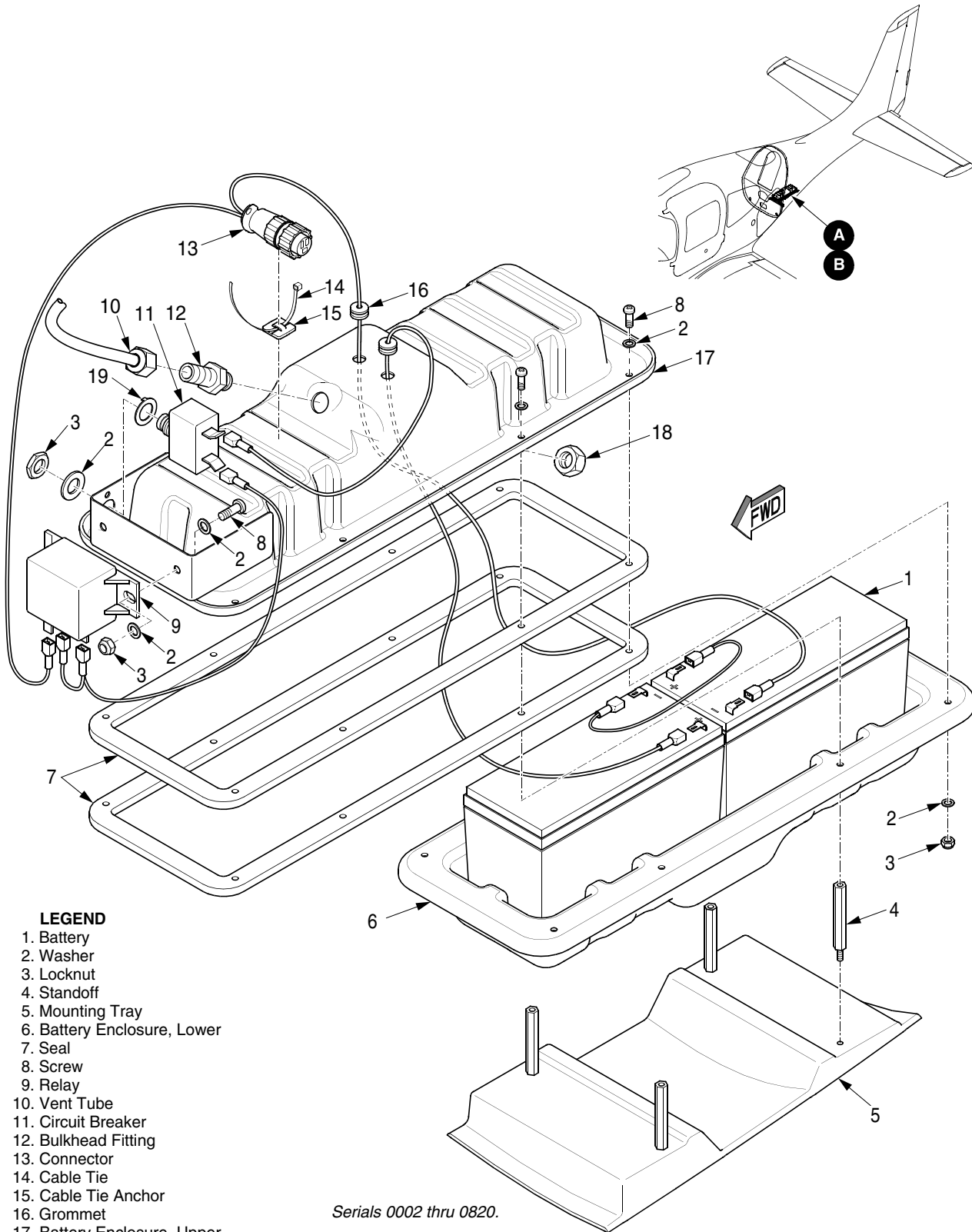
Description	P/N or Spec.	Supplier	Purpose
Battery Charger (constant-voltage)	24 Volt	Any Source	Charge Battery 2.

- (b) Verify ignition switch is in OFF position and remove key.
- (c) Set BAT 1, BAT 2, and master switches to OFF positions.
- (d) Remove battery 2. ([Refer to 24-30](#))
- (e) Ensure battery charger is turned off.
- (f) Connect battery charger positive lead to positive terminal.
- (g) Connect battery charger negative lead to negative terminal.
- (h) Set battery charger switch to ON position.

**CAUTION:** In higher temperature areas, the battery should be charged at the lower voltage of 2.35 volts per cell.

- (i) Charge battery at a rate of 2.35 to 2.47 volts per cell (each battery has 6-cells).
- (j) Set battery charger switch to OFF position. Unplug battery charger.
- (k) Disconnect battery charger negative lead.
- (l) Disconnect battery charger positive lead.
- (m) Install battery 2. ([Refer to 24-30](#))

EFFECTIVITY:  
All



**LEGEND**

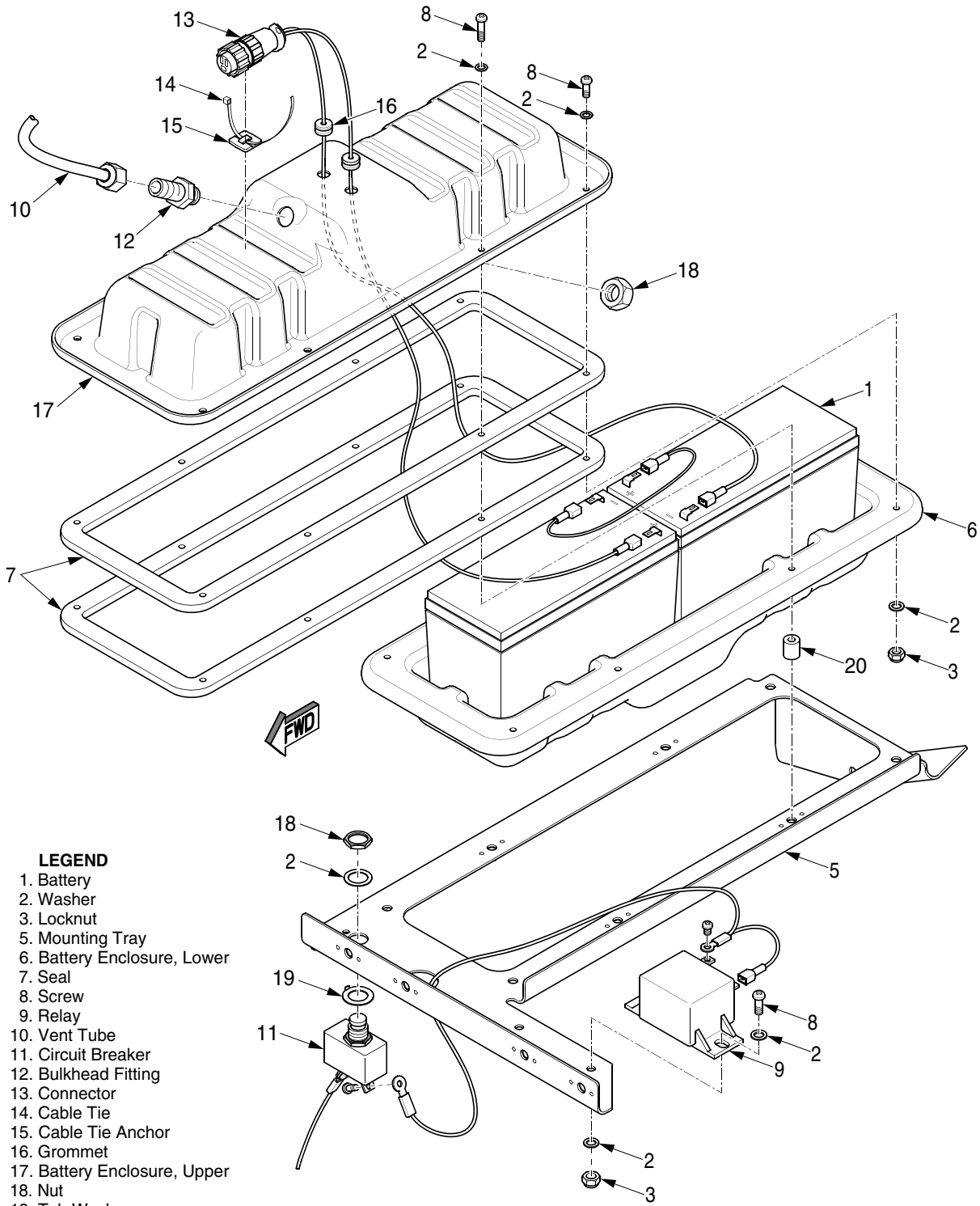
- 1. Battery
- 2. Washer
- 3. Locknut
- 4. Standoff
- 5. Mounting Tray
- 6. Battery Enclosure, Lower
- 7. Seal
- 8. Screw
- 9. Relay
- 10. Vent Tube
- 11. Circuit Breaker
- 12. Bulkhead Fitting
- 13. Connector
- 14. Cable Tie
- 15. Cable Tie Anchor
- 16. Grommet
- 17. Battery Enclosure, Upper
- 18. Nut
- 19. Tab Washer

Serials 0002 thru 0820.

**DETAIL A**

SR22\_MM24\_1436A

**Figure 24-308**  
**Battery 2 - Serials 0002 thru 0820 (Sheet 1 of 2)**



- LEGEND**
- 1. Battery
  - 2. Washer
  - 3. Locknut
  - 5. Mounting Tray
  - 6. Battery Enclosure, Lower
  - 7. Seal
  - 8. Screw
  - 9. Relay
  - 10. Vent Tube
  - 11. Circuit Breaker
  - 12. Bulkhead Fitting
  - 13. Connector
  - 14. Cable Tie
  - 15. Cable Tie Anchor
  - 16. Grommet
  - 17. Battery Enclosure, Upper
  - 18. Nut
  - 19. Tab Washer
  - 20. Spacer

**DETAIL B**

SR22\_MM24\_1771

**Figure 24-308**  
**Battery 2 - Serials 0821 & subs (Sheet 2 of 2)**

**EFFECTIVITY:**  
 Serials 0821 & subs

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