

SECTION 6

TROUBLE SHOOTING

INTRODUCTION

Trouble shooting the charging system may involve any one or more of the components in the system; the alternator, the regulator (or ACU), the battery, the ammeter, or any portion of wiring between the above components.

The trouble shooting charts are furnished as a guide for categorizing troubles, and suggestion for their probable causes and remedies. Before studying the charts, however, one should consider the text which precedes the charts. Note that they cover testing procedures without the use of the Alternator/Regulator Field Tester or ACU Field Tester.

GENERAL TROUBLE SHOOTING COMMENTS APPLICABLE TO THE TRANSISTORIZED AND SOLID-STATE VOLTAGE REGULATORS

Battery discharge is not always due to charging system defects. Excessive use of lights and accessories while the engine is running at low speed; is not running at all; corroded battery cable and connectors; low battery electrolyte level; or prolonged inactivity and misuse of battery, which would allow self-discharge, are all possible reasons to be considered when you encounter low battery output.

Charging system troubles such as low output, no output (indicated by ammeter showing zero or discharge while engine is running), or high output voltage, all require testing of both the alternator and the regulator.

Regulator failures; usually are not recognized except by the direct effect on the alternator output, and, of course, eventual battery deterioration in discharge or overcharge. Because the regulator is a control valve for the alternator, it acts to protect the battery by preventing excessive voltage output. Discharge of the battery to ground through the alternator is prevented by the diodes in the alternator. Diodes permit current in one direction only, in this case to the battery.

TROUBLE SHOOTING CHART FOR TRANSISTORIZED REGULATORS

TROUBLE	PROBABLE CAUSE	REMEDY
Ammeter Reads Constant Discharge.	Alternator Belt Broken, Loose, or Slipping.	Adjust or Replace as Outlined in Section 7.
Lights Dim at Low Engine R. P. M.	Resistive Connection in Charging System.	Clean, Tighten, Repair, or Replace Defective Wiring and Connectors.
Battery Low in Charge.	No or Low Alternator Output.	Perform Voltage Output Tests to Determine Exact Malfunction.
Lights and Fuses Fail Prematurely.	Alternator Output Low.	Tighten Loose Connection. Repair or Replace Wiring as Required.
Short Battery Life. Battery Uses Excessive Water. Ammeter Reads High Charging Rate.	Charging System Wiring, Including Regulator Ground Wire.	Perform the Voltage Output Tests to Verify the Condition of the Regulator.
Alternator Noisy.	Alternator Drive Belt (Squealing Noise).	Adjust or Replace Belt as Required.
	Alternator Diode (Whining Noise).	Test Alternator Output as Outlined in Section 7.

TROUBLE	PROBABLE CAUSE	REMEDY
Ammeter Fluctuates.	Loose Connection in Charging System or Intermittent Shorted (Bare Wire). Brushes Worn or Loose.	Tighten Loose Connections, Repair or Replace Wiring, as Required. Check for security and wear. Replace Entire Assembly if Necessary.

NOTE

Anytime the battery is found in a state of low charge, a complete check of the charging system should be completed. Always refer to applicable Aircraft Service Manual for specific trouble shooting procedures.

TROUBLE SHOOTING CHART FOR SOLID-STATE REGULATORS

The following table provides a pin-by-pin trouble shooting chart for circuit checking.

SYMPTOM	PROBABLE CAUSE
POWER INPUT LEAD (RED)	
a. Alternator will not put out. b. Alternator will not put out. c. Normal.	Open circuit. Short to ground. Short to bus.
FIELD OUTPUT LEAD (BLUE)	
a. Alternator will not be excited. b. Alternator will not be excited and regulator will be damaged. c. Alternator will be overexcited.	Open circuit. Short to ground. Short to bus.
GROUND LEAD (BLACK)	
a. Alternator will receive limited excitation, may cause overvoltage at light load. b. Normal. c. Alternator will overexcite.	Open circuit. Short to ground. Short to bus.

Footnote: a. and c. will result in normal operation if the case is grounded.

CESSNA 28-VOLT ALTERNATOR/REGULATOR TESTER

A Cessna Alternator Charging System Test Box Assembly (9870000-1) is available through the Cessna Service/Parts Center for use in isolating failures in the 28-Volt Transistorized Voltage Regulators (C611002-0105) and/or 28-Volt Solid-State Voltage Regulators (C611004-0101 and C611004-0102), and 28-Volt, 95 Amp, Alternators used on 1978 210 Series aircraft and 1978 & on 188 Series aircraft. The Test Box Assembly is designed to provide field personnel with the capability of performing on-aircraft checks of malfunctioning alternator/regulator systems without engines running. Refer to the "CESSNA ALTERNATOR CHARGING SYSTEM TEST BOX ASSEMBLY" (9870000-1) Parts List in "Section 10", of this manual for spare parts of the Tester Assembly.

NOTE

The 9870000-1 Cessna Alternator Charging System Test Box Assembly is available for use on all 1978 210 and 1978 & on 188, 24-Volt Series Models.

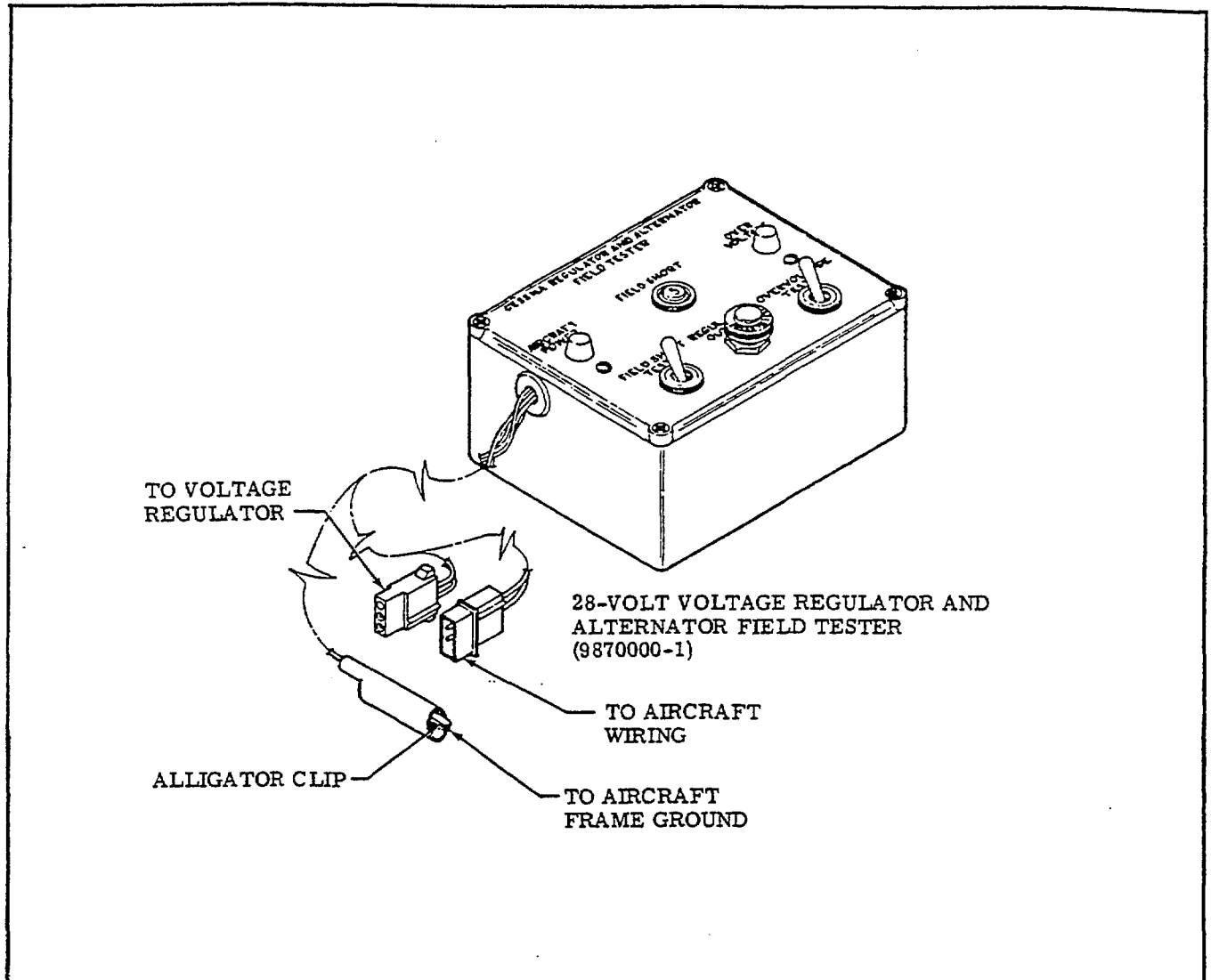


Figure 6-1. Voltage Regulator and Alternator Field Tester

Isolation Tests Using The Alternator/Regulator Tester

The Voltage Regulator and Alternator Field Tester will detect the following faults:

1. No aircraft battery power to the regulator.
2. A shorted regulator (overvoltage condition).
3. An open regulator (no alternator output).
4. A shorted alternator field winding or wiring.
5. An open alternator field winding or wiring.

Test Set-Up Procedures Using The Alternator/Regulator Tester

1. Open the connection between the voltage regulator and aircraft wiring as shown in Figure 6-1. Hook-up Voltage Regulator/ Alternator Field Tester to voltage regulator and aircraft connector, connect ground lead (alligator clip) to aircraft frame.

2. Place ALT and BAT (Master Switch) to ON (AVIONICS POWER SWITCH should be OFF):

ACTION	RESULTS
a. AIRCRAFT POWER and REGULATOR OUTPUT lights come ON.	Regulator OK - Not Open. Alternator Field OK - Not Open. Power Check OK - Go to Step 4.
b. AIRCRAFT POWER light comes ON REGULATOR OUTPUT light stays OFF.	Regulator Field - Open or Alternator Winding - Open or Aircraft Wiring - Open. Go to Step 3.
c. AIRCRAFT POWER and REGULATOR OUTPUT lights stay OFF.	No power to Regulator - Check Master ALT, BAT Switch, ALT Reg. Breaker, Overvoltage Sensor and Aircraft Wiring. Correct and go back to Step 2.

3. If REGULATOR OUTPUT Light is OFF in 2b above depress REGULATOR OUTPUT Light:

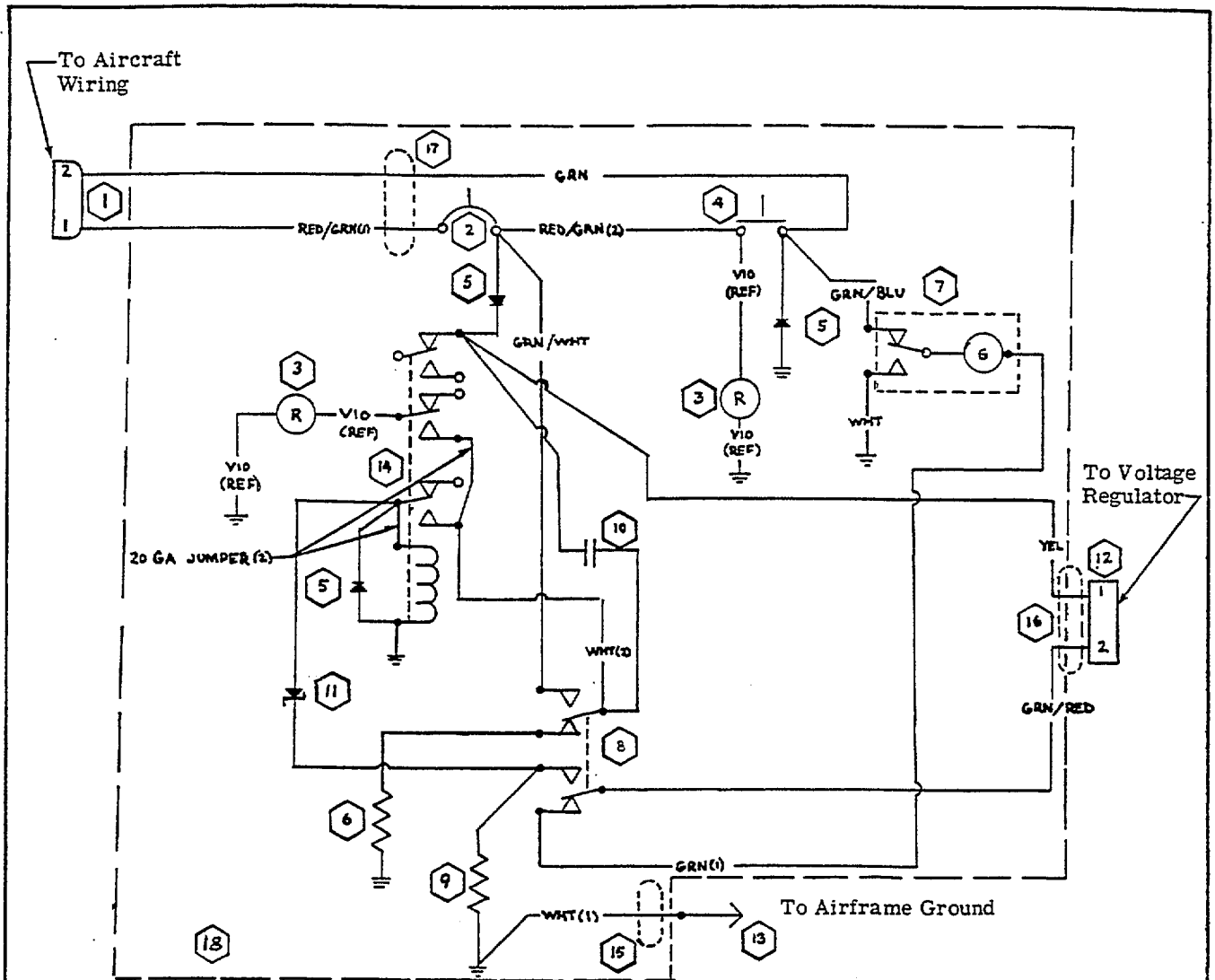
ACTION	RESULTS
a. REGULATOR OUTPUT lamp LIGHTS.	Alternator Field Wiring or Aircraft Wiring - Open Check and Correct. Go back to Step 2.
b. REGULATOR OUTPUT light stays OFF.	Regulator is Open - Replace. Go back to Step 2.

4. Operate and hold FIELD SHORT TEST Switch:

ACTION	RESULTS
a. REGULATOR OUTPUT light goes OUT. AIRCRAFT POWER light stays ON.	Alternator Field OK. (Not Shorted) Go to Step 5.
b. REGULATOR OUTPUT light and AIRCRAFT POWER lights go OUT and FIELD SHORT Breaker OPENS.	Alternator Field/Wiring Shorted - Check (Also reset aircraft ALT Breaker if necessary). Correct and Go back to Step 4. WARNING Do not replace regulator until this short is cleared.

5. Operate and hold OVERVOLTAGE TEST Switch:

ACTION	RESULTS
a. REGULATOR OUTPUT light goes OUT OVER- VOLTAGE light stays OFF.	Regulator OK (Not Shorted) End of test.
b. REGULATOR OUTPUT light goes OUT OVERVOLTAGE light comes ON (Light stays on until test switch is released).	Regulator Shorted - Replace and go back to Step 2. WARNING Do not replace Regulator if Alternator Field Short is present.



-28- VOLT VOLTAGE REGULATOR AND ALTERNATOR FIELD TESTER
(9870000-1)

- | | |
|-----------------------------|------------------------|
| 1. S1648-2 Connector | 10. TVA 1315 Capacitor |
| 2. S1360-5L Circuit Breaker | 11. IN4110 Diode |
| 3. S2135-2 Lamp | 12. S1638-1 Connector |
| 4. ST-42F Switch | 13. 300 Alligator Clip |
| 5. IN4004 Diode | 14. S1813-1 Relay |
| 6. S2000A27EJ Resistor | 15. Cable Assy. |
| 7. MS25041-7 Lamp | 16. Cable Assy. |
| 8. ST-52R Switch | 17. Cable Assy. |
| 9. S2000A1KJ Resistor | 18. CU-234 Bud Box |

NOTE

All wiring is made from 20-GA wire.

Figure 6-2. Wiring Diagram, 28-Volt Voltage Regulator & Alternator Field Tester

CESSNA 28-VOLT ACU/ALTERNATOR FIELD TESTER (9870005-1)

A Cessna Alternator Charging System Test Box Assembly (9870005-1) is available through the Cessna Service/Parts Center for use in isolating failures in Alternator Control Units (C611505-0101, C611005-0102 and C611005-0103) and 28-Volt Alternators used on 1979 & on 210 and P210 Series aircraft and 1981 & on T182, R182, TR182, U206 and 207 Series aircraft. The Test Box Assembly is designed to provide field personnel with the capability of performing on-aircraft checks of malfunctioning alternator/regulator systems without engines running. Refer to the "ALTERNATOR CONTROL UNIT TEST BOX ASSEMBLY" (9870005-1) Parts List in "Section 10", of this manual for spare parts of the ACU tester.

NOTE

The 9870005-1 Cessna Alternator Control Unit Test Box Assembly is available for use on 1979 & on 210 and P210 Series aircraft and 1981 & on T182, R182, TR182, U206 and 207 Series aircraft.

Alternator Control Unit Isolation Tests

The ACU Tester Assembly will detect the following faults:

1. No aircraft battery power to the ACU.
2. A shorted regulator (overvoltage condition) in the ACU.
3. An open regulator (no alternator output) in the ACU.
4. A shorted alternator field winding or wiring.
5. An open alternator field winding or wiring.
6. An inoperative (failed) low-voltage circuit in the ACU.

Alternator Control Unit Test Set-Up Procedures

1. Hook-up the ACU Tester Assembly between the ACU and aircraft connector, connect ground lead (alligator lip) to aircraft frame as shown on the wiring diagram in Figure 6-3.

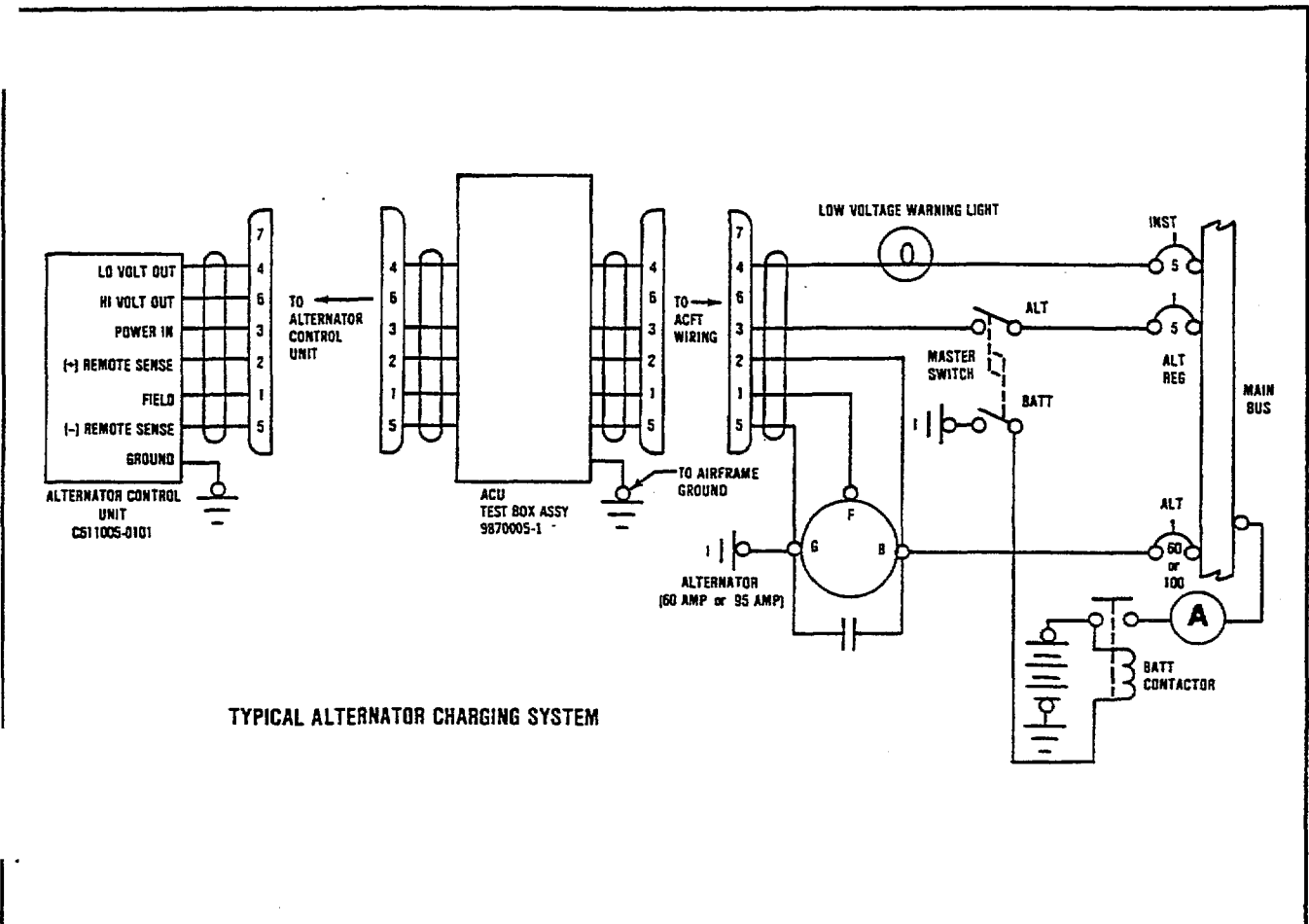


Figure 6-3. Wiring Diagram, ACU Tester & Alternator Charging System

2. Place ALT and BAT (Master Switch) to ON (AVIONICS POWER SWITCH should be OFF):

ACTION	RESULTS
a. AIRCRAFT POWER, REGULATOR and SENSE VOLTAGE OUTPUT lights come ON.	Alt, Bat & Gnd Wiring OK - Not Open. Regulator OK - Not Open. Alternator Field OK - Not Open. Power Check OK - Go to Step 4.
b. AIRCRAFT POWER and SENSE VOLTAGE lights come ON, REGULATOR OUTPUT light stays OFF.	Regulator Field - Open or Alternator Winding - Open or Airplane WIRING - OPEN. Go to Step 3.
c. AIRCRAFT POWER and REGULATOR OUTPUT lights stay OFF.	No power to ACU - Check Master ALT, BAT Switch, ALT Reg. Breaker, and Aircraft Wiring. Correct and go back to Step 2.
d. AIRCRAFT POWER light comes ON, SENSE VOLTAGE light and REGULATOR OUTPUT light stays OFF.	Alt Wiring - Open. Check circuit breaker, Alt Bat Wiring, and Alt ground wiring. Go back to Step 2.

3. If REGULATOR OUTPUT Light is OFF in 2. b., depress REGULATOR OUTPUT Switch:

ACTION	RESULTS
a. REGULATOR OUTPUT lamp LIGHTS.	Alternator Field Wiring or Aircraft Wiring - Open. Check and Correct. Go back to Step 2.
b. REGULATOR OUTPUT light stays OFF.	Regulator is Open - Replace ACU. Go back to Step 2.

4. Operate and hold ALTERNATOR FIELD TEST Switch:

ACTION	RESULTS
a. REGULATOR OUTPUT light goes OUT, AIRCRAFT POWER light stays ON.	Alternator Field OK. (Not Shorted) Go to Step 5.
b. REGULATOR OUTPUT light and AIRCRAFT POWER lights go OUT and FIELD SHORT Breaker OPENS.	Alternator Field/Wiring Shorted - Check (Also reset airplane ALT breaker if necessary). Correct and go back to Step 4.

WARNING

Do not replace ACU until short is cleared.

5. Operate and hold OVERVOLTAGE TEST Switch:

ACTION	RESULTS
a. REGULATOR OUTPUT light goes OUT, OVER-VOLTAGE lights stays OFF (when Switch is released only when testing the VR515G Regulator).	Regulator OK (Not Shorted) - Go to Step 6.
b. REGULATOR OUTPUT light goes OUT, OVER-VOLTAGE light comes ON (Light stays on until test switch is released).	Regulator Shorted - Replace ACU and go back to Step 2.

WARNING

Do not replace ACU if Alternator Field Short is present.

Activate Taxi and Landing Lights, Nav Lights, Beacon and Strobes. Observe LOW-VOLTAGE light on Instrument Panel.

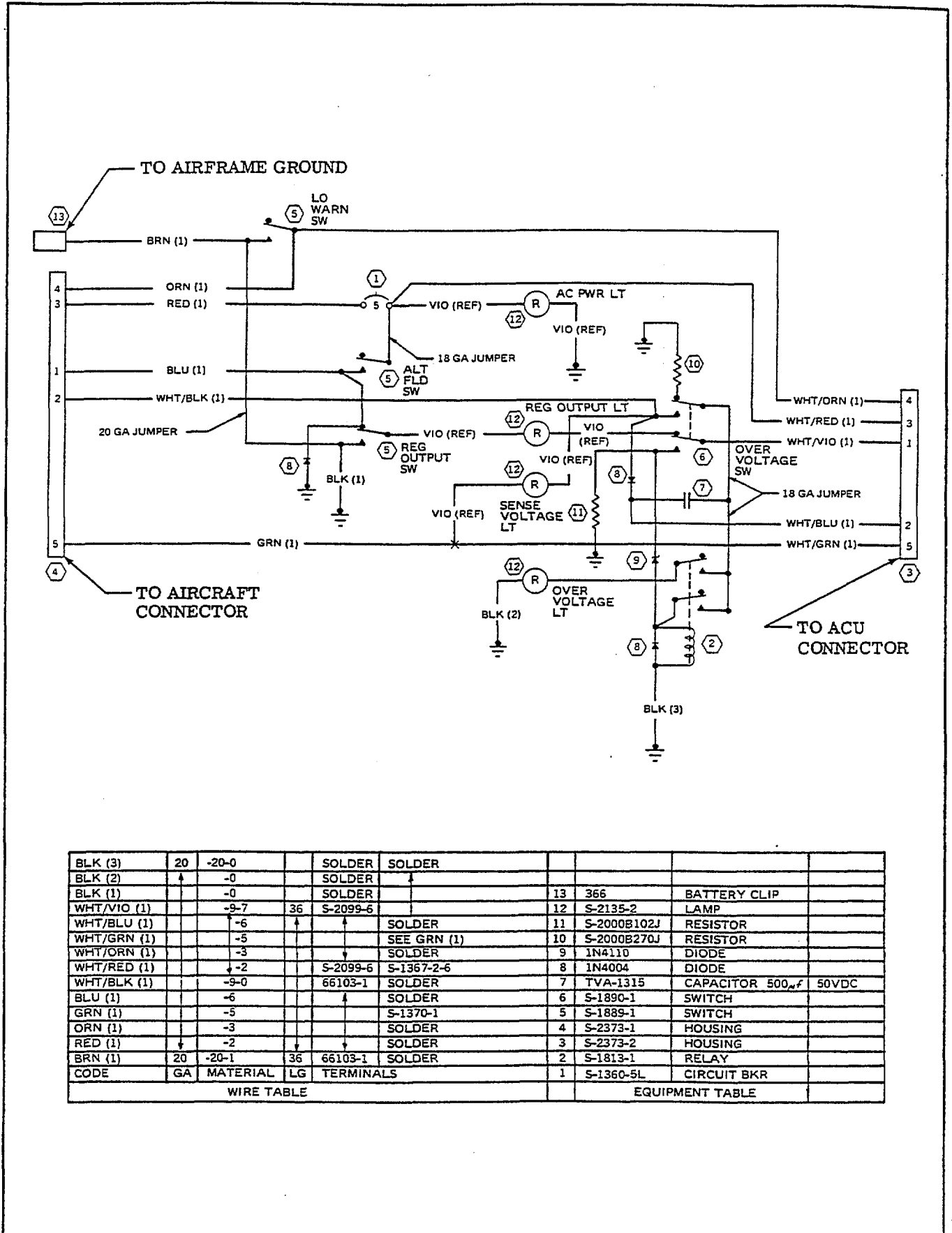
ACTION	RESULTS
<p>a. Light is ON</p> <p style="text-align: center;">NOTE</p> <p>If low-voltage light on Instrument panel is on, the ACU is supposed to be operating correctly. However, the failure could be a shorted transistor in the low voltage circuit and the light would also be on. The tester could assume the system is operating correctly. Yet, in flight, low voltage light, would always be on, therefore, causing pilot to check charging system. To ensure the low voltage circuit in the ACU is working properly, perform the following test:</p>	<p>ACU OK - End of test.</p> <p>Remove test box. Reconnect plug of ACU to aircraft. Start engine, switch alternator ON and observe. If ammeter shows + charge and low voltage light is still on, then ACU low voltage circuit is defective and the ACU should be replaced.</p>
<p>b. Light is OFF</p>	<p>Go to Step 7.</p>

Press LOW-VOLTAGE button on ACU Tester and observe LOW-VOLTAGE light on Instrument Panel.

ACTION	RESULTS
<p>a. Light is ON.</p>	<p>Wiring - Open or ACU low-voltage circuit no good. Check wiring from ACU Tester to ACU. Go to Step 8.</p>
<p>b. Light is OFF.</p>	<p>Wiring - Open or Low-Voltage bulb no good. Check that ACU tester is grounded. Check wiring from bus through bulb to ACU Tester. Check bulb. Go back to Step 6.</p>

8. Activate Taxi and Landing Lights, Nav Lights, Beacon and Strobes. Observe LOW-VOLTAGE Light on Instrument Panel.

ACTION	RESULTS
<p>a. Light is ON.</p>	<p>ACU OK - End of Test.</p>
<p>b. Light is OFF.</p>	<p>ACU Faulty - Replace.</p>



BLK (3)	20	-20-0		SOLDER	SOLDER			
BLK (2)		-0		SOLDER				
BLK (1)		-0		SOLDER				
WHT/VIO (1)		-9-7	36	S-2099-6		13	366	BATTERY CLIP
WHT/BLU (1)		-6			SOLDER	11	S-2000B102J	LAMP
WHT/GRN (1)		-5			SEE GRN (1)	10	S-2000B270J	RESISTOR
WHT/ORN (1)		-3			SOLDER	9	1N4110	DIODE
WHT/RED (1)		-2		S-2099-6	S-1367-2-6	8	1N4004	DIODE
WHT/BLK (1)		-9-0		66103-1	SOLDER	7	TVA-1315	CAPACITOR 500 μ F 50VDC
BLU (1)		-6			SOLDER	6	S-1890-1	SWITCH
GRN (1)		-5			S-1370-1	5	S-1889-1	SWITCH
ORN (1)		-3			SOLDER	4	S-2373-1	HOUSING
RED (1)		-2			SOLDER	3	S-2373-2	HOUSING
BRN (1)	20	-20-1	36	66103-1	SOLDER	2	S-1813-1	RELAY
CODE	GA	MATERIAL	LG	TERMINALS		1	S-1360-5L	CIRCUIT BKR

Figure 6-4. Wiring Diagram, Alternator Control Unit Tester Assembly

TROUBLE SHOOTING THE MODEL T303 DUAL ALTERNATOR SYSTEM

The dual alternator system can be monitored by the aircraft's annunciator lights and volt-ammeter. The malfunctioning system can be isolated by observation of the annunciator lights and volt-ammeter during engine run-up.

Table 6-1 shows the indications for normal operation and seven situations caused by open circuit breakers or Master switches (L ALT, BAT, R ALT).

NOTE

The circuit breakers and switches associated with an inoperative alternator or battery system should be checked. If possible, the circuit breakers and switches should be set to restore normal operation.

TABLE 6-1. ALTERNATOR MONITORING SYSTEM INDICATIONS
(Indications During Engine Run-up at 1700 RPM With
30 Amps or More Load)

ANNUNCIATOR LIGHTS			VOLT-AMMETER				REMARKS
L. ALT OFF	LOW V.	R. ALT OFF	L. CHG	R. CHG	BAT	VOLTS	
OFF	OFF	OFF	+	+	+	28.8	Normal Operation
ON	OFF	OFF	0	+	+	28.8	Left Alt. Shut OFF
OFF	OFF	ON	+	0	+	28.8	Right Alt. Shut OFF
OFF	ON	OFF	+	+	(0 or -)	24.5 or less	Both Alt's ON Battery Not Charging.
ON	ON	ON	0	0	(-)	24.5 or less	Battery Supplying Power Both Alt's OFF.
ON	ON	OFF	0	+	(0 or -)	24.5 or less	Right Alt. ON Bat. Not Charging.
OFF	ON	ON	+	0	(0 or -)	24.5 or less	Left Alt. ON. Bat. Not Charging.
ON	OFF	ON	0	0	(0 or -)	Above 24	Neither Alt. Charging. Bat. Supplying Power

Abnormal Indications For The Situations In Table 6-1, Include the Following

1. "ALT OFF" lights, ON when the charge rate is +.
2. "ALT OFF" lights OFF when the charge rate is 0.
3. "LOW V" light ON when the voltage is greater than 25.0-volts.
4. "LOW V" light OFF when the voltage is less than 24.0-volts.

If the abnormal indications appear, a malfunction of the associated system has occurred. Also, if normal operation cannot be restored by circuit breakers and switches, a malfunction of the inoperative alternator system should be checked by the following procedures.

Equalization Circuit

Each alternator control unit has an equalization (paralleling) circuit which senses alternator output and field excitation to provide alternator paralleling. Failure of the equalization circuit in one alternator control unit (ACU) can result in the other "ALT OFF" light illuminating, unless the total load exceeds the output of one alternator. Each alternator system should be tested independently.

If both alternators function correctly independently, but one "ALT OFF" light illuminates when both alternator are turned on, the equalization circuit is suspect. Operation of both alternators may be restored by adding electrical load. If both alternators operate correctly with a load exceeding the capacity of one alternator, the equalization unbalance is too large, but the alternator systems are basically functional. Due to low signal levels from the shunts, it may be normal for one "ALT OFF" light to be illuminated under light load (less than 30 amps total) conditions.

Test of Aircraft Wiring

1. With engines stopped, disconnect both alternator control unit (ACU) connectors.
2. Shut OFF alternator switches and master switch.
3. Check for abnormal continuity in aircraft wiring harness for both left and right connectors. (Refer to Figure 6-1, Item 6.)

PIN	ABNORMAL CONTINUITY	CAUSES	REMEDY
2 to 10	Greater than 1 OHM.	Open Circuit or Fuse Blown.	Repair Wire From Plug to Shunt. Replace Fuses.
5	Resistance to GND	Open or Poor Connection in Circuit.	Repair Wire.
7	Other than 100±20 OHMS Between Pin and Alt. Stator	Short, Open Wire or Defective Resistor.	Repair Wire or Replace Resistor.
9	Other than 72±15 OHMS to Ground.	Short, Open Wire or Defective Line Contactor Coil.	Repair Wire or Replace Replace Contactor.
12	Resistance to Ground.	Open or Poor Connection in Circuit.	Repair Wire.

4. Turn ON master and alternator switches for the side being tested.

NOTE

If external power is used, set no higher than 24.0-volts.

5. Check for abnormal voltages on aircraft wiring harnesses.

PIN	ABNORMAL CONDITION	CAUSES	REMEDY
1 Field	More than 0 Volts	Field wire shorted to Voltage Source.	Repair Wire.
2 Sense	More than 0 Volts	Wiring Shorted to Voltage Source. Line Contactor Failed Closed	Repair Wiring or Replace Line Contactor.
2 Power	Zero (0) Volts	Open Circuit to Bus Defective Switch or Circuit Breaker	Repair Wire or Replace Switch or Circuit Breaker
4 LV Out	Zero (0) Volts	Open Circuit Through LV Bulb.	Repair Wire or Replace LV Bulb.

Continued On Next Page

PIN	ABNORMAL CONDITION	CAUSES	REMEDY
5 Remote Sense (-)	More than 0 Volts	A+ Short to Wire & Open Circuit to Ground	Repair Wire
6 Alt. Out	Zero (0) Volts	Open Circuit Through HV Bulb	Repair Wire or Replace HV Bulb
7 Aux Sense	More than 3 Volts	Wire Shorted to Voltage Source.	Repair Wiring.
8 LV Sense	Zero (0) Volts	Open Circuit to Battery Bus	Repair Wiring.
9 Line Cont	More than 0 Volts	Wiring Shorted to Voltage Source A+ Short to Line Contactor Wiring	Remove Short.
10 Neg Current Sense	More than 0 Volts	Short to Voltage Source	Remove Short.
11 EQ. Bus	More than 0 Volts	Wiring Shorted to Voltage Source	Remove Short
12 Pwr Gnd	More than 0 Volts	Short to Voltage Source	Repair Wiring

6. The aircraft's wiring should be correct now. If wiring defects have been located and repaired, reconnect the alternator control units and retest.

Test of Alternator Control Units

1. If abnormal operations persist, note the systems and identify the malfunctioning system.
2. With engines stopped, master switch off and alternator switches off, connect the ACU from the abnormal system to the alternator system operating correctly.
3. Run the engine for the abnormal ACU and correct alternator system. Observe the lights and volt-ammeter.
4. If the system under test has an abnormal behavior, the ACU should be replaced with a new unit.
5. Re-test the system to verify correct operation. If the test system functions correctly, the ACU is good. However, a component of the malfunction alternator system may be bad.

Tests of Alternator System Components

NOTE

The other components of an alternator system include; the field and alternator circuit breakers, the line contactor, the fuses, the shunt, the annunciator lamps or the alternator itself.

1. Connect a good ACU to the malfunctioning circuit.
2. Turn on the master switch and alternator switches, but do not start the engine.

ABNORMAL SYSTEM	CAUSE AND REMEDY
Field Circuit Breaker	If Field Circuit Breaker (5-amps) Continues to Open (After Testing the Wiring and the ACU), Replace the Alternator Field Circuit Breaker
Alternator Circuit Breaker	<p>If the Circuit Breaker Opens at this Time, Check for Short to Ground Between the Bus and the Alternator Output Terminal.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">The Alternator Circuit Breaker is Best Tested Later When the Engine is Running.</p>
The Line Contactor	The Line Contactor Should Close Putting Battery Voltage on the Shunt Terminals. Check for Battery Voltage on the Shunt Terminals. If None, Check for Battery Voltage on the Bus Side of the Line Contactor and on the Line Contactor Field. If These Conditions Exist, Replace the Contactor. If Battery Voltage is not Evident Check the Wiring to the Bus and to Pin #9 of the ACU.
The Fuses (From Shunt)	The Fuses Were Checked Along With the Wiring.
The Shunt	The Shunt Connections to the Fuses Were Checked Along With the Wiring. The Power Connection Will be Checked With the Engine Running.
The Annunciator Lamps	The Annunciator Lamps can be Tested by the Test Switch on the Annunciator Panel. Replace Burned Out Lamps Before Continuing.
The Alternator	<p>The Alternator May Have Defective Field or Stator Windings. Check the Voltage at the Field Terminal. If the Voltage is Battery Voltage, the Wiring to the Terminal is Good. If the Voltage is Nearly Zero, Separate the Wiring From the Terminal. If the Voltage on the Wiring Returns to Battery Voltage, the Alternator is Defective. If not, Check the Wiring to the ACU.</p> <p>If the Annunciator Light for the "Alt Out" Remains Off, Check the Voltage at the Stator Terminals. A Voltage Greater Than 3.0 Volts Indicates the Alternator is Defective.</p>

Test of Total System

1. Connect the ACU's.
2. Start one engine, turn the battery switch ON, idle engine at 1000 RPM's.
3. Adjust the aircraft electrical load to less than 20-amps. Monitor alternator output on volt-ammeter.
4. If the alternator indicates no output, check the alternator circuit breaker. If still no output, check the wiring between the alternator and bus and if wiring is good, replace the alternator.
5. The "Alt Out" light should go out if the alternator indicates output. If not replace or repair the alternator.
6. Monitor the voltage as the engine is run up to 1700 RPM. The voltage should hold steady at about 28.0 volts.
7. Turn on equipment to provide electrical load of approximately 40 amps for 60 amp alternators or 80 amps for 95 amp alternators and the, increase engine speed to 2000 RPM. The alternator should continue to carry the load with the voltage steady at 28.0-volts. If not, repair or replace alternator.
8. Repeat the procedures in items 2 through 7 with the other engine.
9. Start both engines, set battery and both alternators ON, run engines at 2000 RPM with an electrical load between 40 to 80-amps.

10. Check left and right alternator output. If they are within 10-amps, the system is operating correctly. If not, determine the engine putting out the most current. Slowly recycle the alternator switch. The other alternator should carry all the load when the first alternator is off and remain the high output engine when both are on again. If it does not, the equalization wiring (from pin #11 on either ACU to pin #11 on the other ACU) may be open. Stop the engines and check for continuity.
11. If equalization is not working, the equalizer bus problems may not be simply and accurately traced to the faulty ACU. Replace the ACU on the consistently high alternator. If the equalizer problem still occurs, reinstall the original ACU on the opposite side.

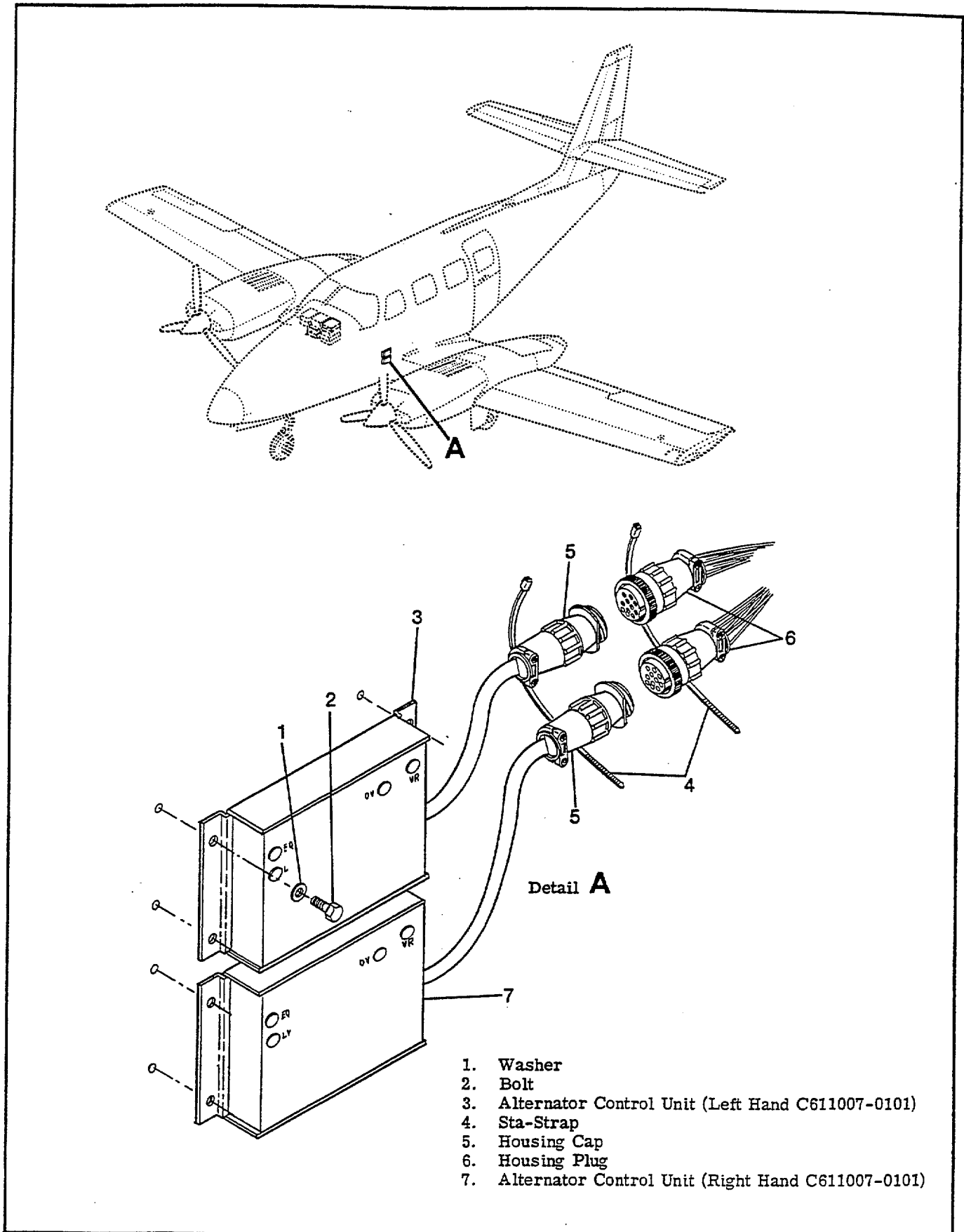


Figure 6-5. Alternator Control Unit - 1982 & On T303 Models Only

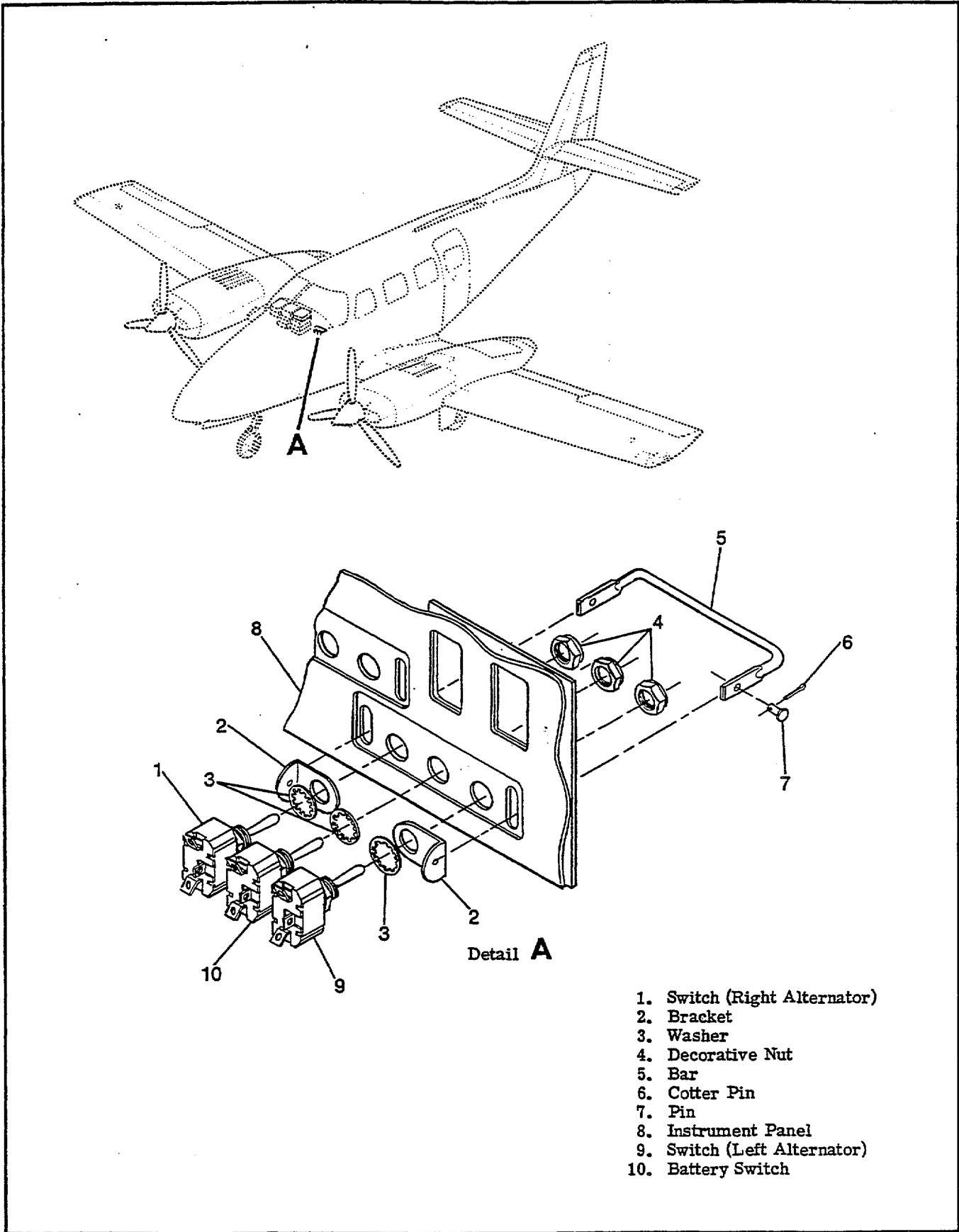


Figure 6-6. Alternator Field Switches Installation - 1982 & On T303 Models Only

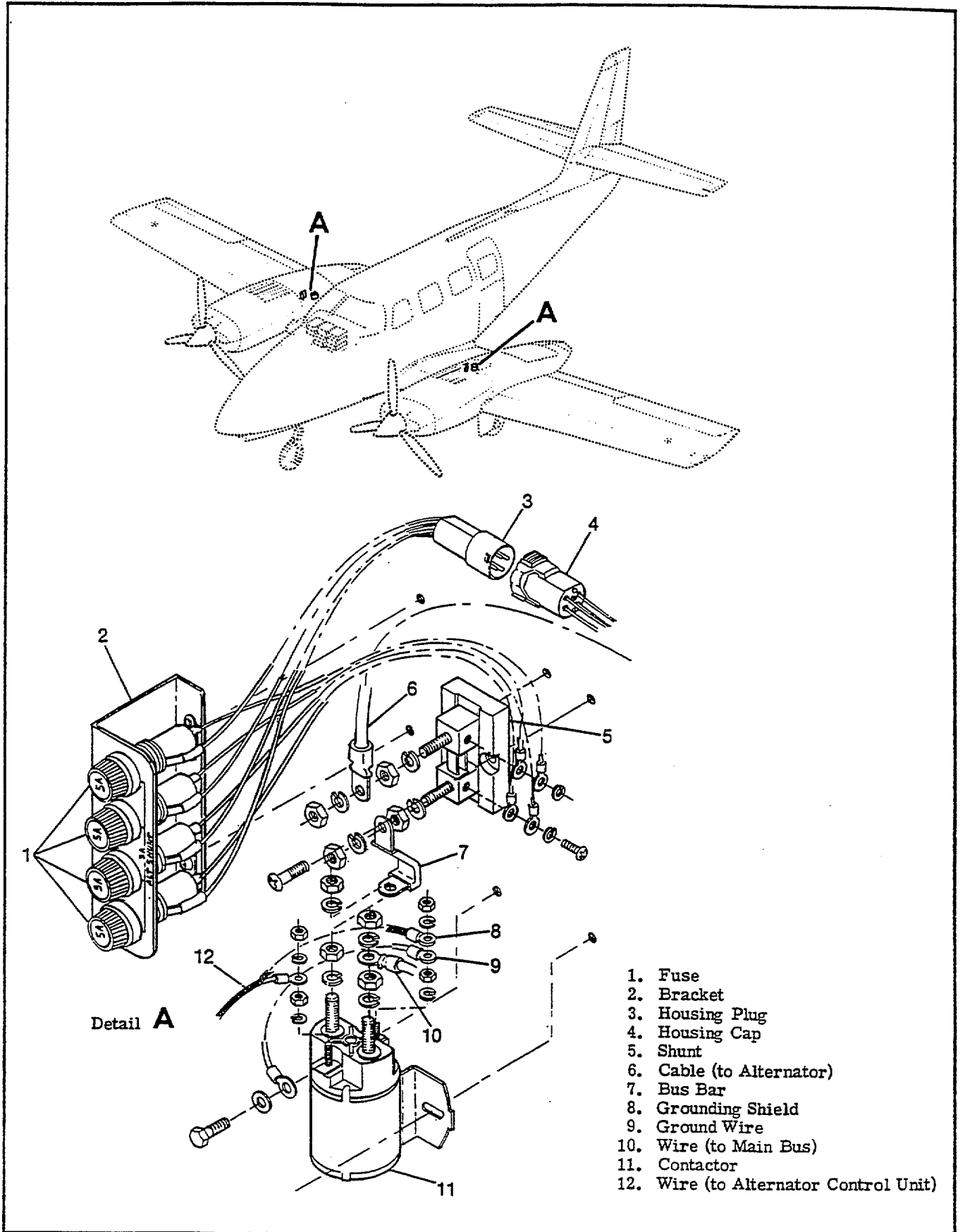
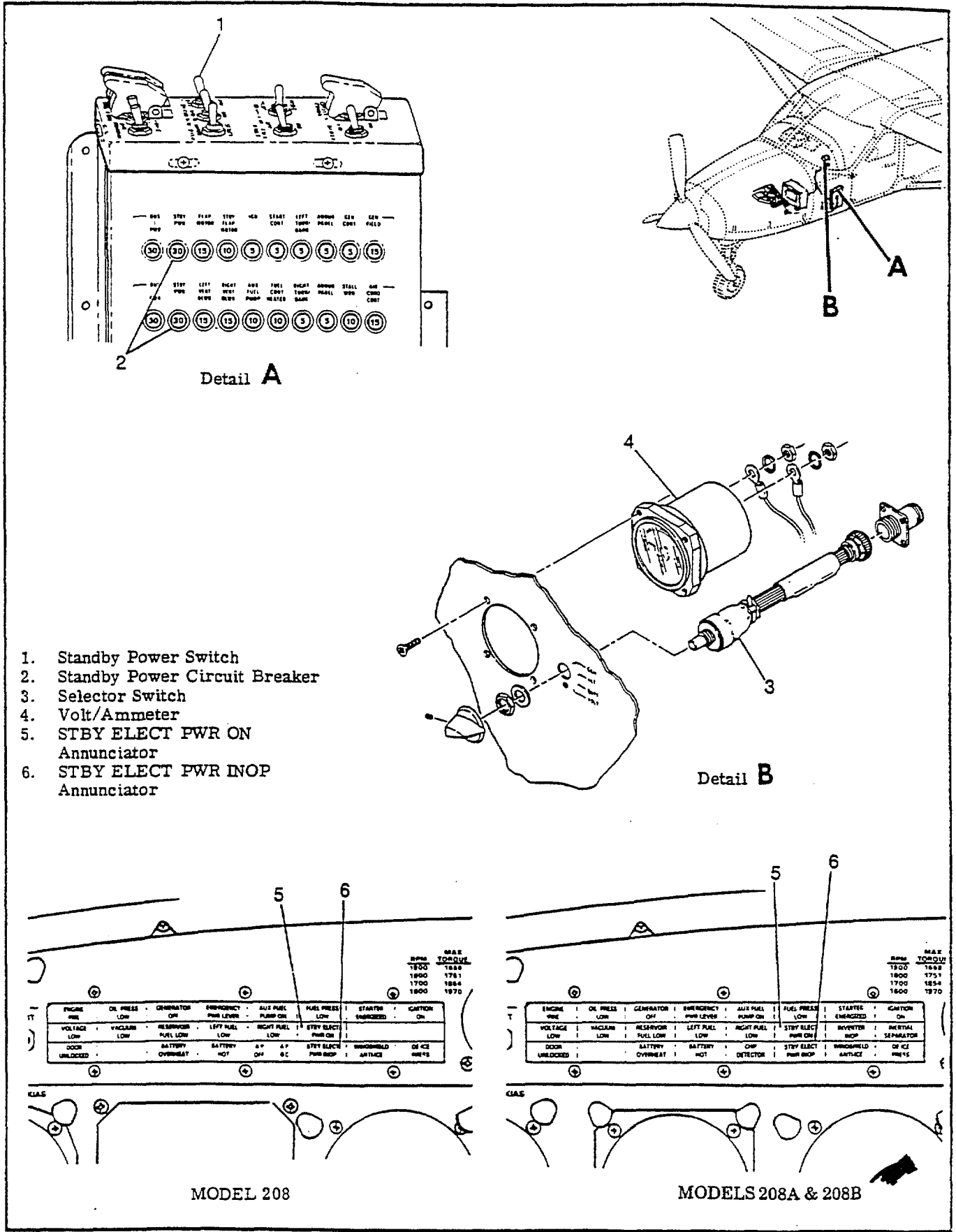


Figure 6-7. Alternator Contactor and Shunt Installation - 1982 & On T303 Models Only

TABLE 6-2. TROUBLE SHOOTING 208, 208A AND 208B STANDBY ALTERNATOR SYSTEM

TROUBLE	PROBABLE CAUSE	REMEDY
<p>STBY ELECT PWR INOP LIGHT ILLUMINATED WITH ENGINE RUNNING.</p>	<p>Alternator drive belt loose or broken.</p> <p>Wiring open or shorted.</p> <p>5-amp circuit breaker on standby alternator relay assembly and 5-amp keep alive circuit breaker on electrical power box are both open.</p> <p>Defective diode on standby alternator relay assembly and defective diode in electrical power box.</p> <p>Defective STBY PWR switch.</p> <p>Defective alternator control unit.</p> <p>Defective alternator.</p>	<p>Adjust belt tension or replace broken belt.</p> <p>Check wiring continuity. Auxiliary sense resistance is normal 100 ohms.</p> <p>Close both circuit breakers.</p> <p>Check diodes with multimeter, if defective, replace.</p> <p>Replace switch.</p> <p>Verify power and ground to alternator control unit (ACU). Check power out of ACU to alternator field and to alternator relay assembly. Check ACU and replace if defective.</p> <p>Verify field voltage. Check voltage output of generator with engine running. If voltage not indicated, remove and repair or replace alternator as required.</p>
<p>WITH GENERATOR OFF, STBY ELECT PWR INOP, LIGHT NOT ILLUMINATED AND AMPERAGE NOT INDICATED ON VOLT AMMETER WITH AMMETER SELECTOR SWITCH IN ALT POSITION.</p>	<p>Both STBY PWR circuit breakers on circuit breaker panel are open and AVIONICS STBY PWR switch is open.</p> <p>All three limiters in standby alternator relay assembly are open.</p> <p>Defective standby alternator relay.</p>	<p>If open, close STBY PWR circuit breakers. If AVIONICS STBY PWR switch is open, lift guard and place switch to ON (UP) position.</p> <p>Visually inspect limiters. If open, determine cause and correct. Replace open limiters.</p> <p>Verify alternator output. Check for voltage at relay assembly bus with standby power breakers open. If none, check internal assembly wiring and relay operation. Replace defective components.</p>
<p>VOLT-AMMETER WORKS IN ALL POSITIONS EXCEPT ALT POSITION.</p>	<p>Defective wiring or open limiter. (Limiters are located in electrical power box on forward firewall.)</p>	<p>Remove wires from volt-ammeter. Check continuity across disconnected volt-ammeter wires with selector switch in ALT position. If no continuity, check wiring and visually inspect limiters. Repair or replace wiring or replace open limiter.</p>



1. Standby Power Switch
2. Standby Power Circuit Breaker
3. Selector Switch
4. Volt/Ammeter
5. STBY ELECT PWR ON
Annunciator
6. STBY ELECT PWR INOP
Annunciator

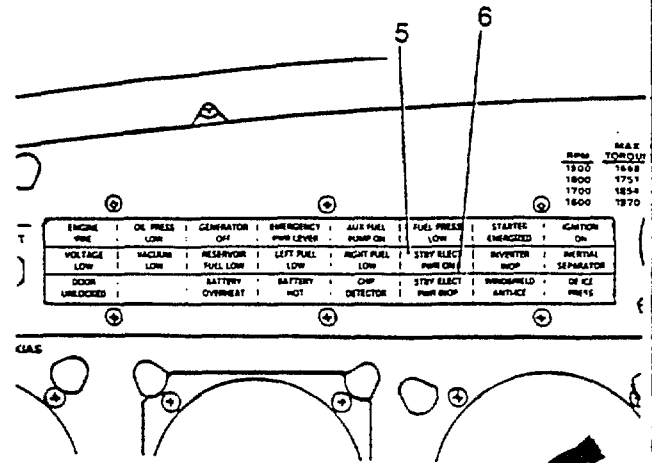
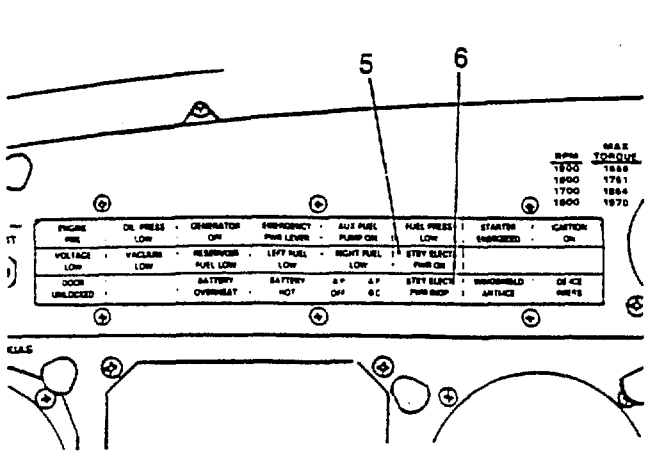
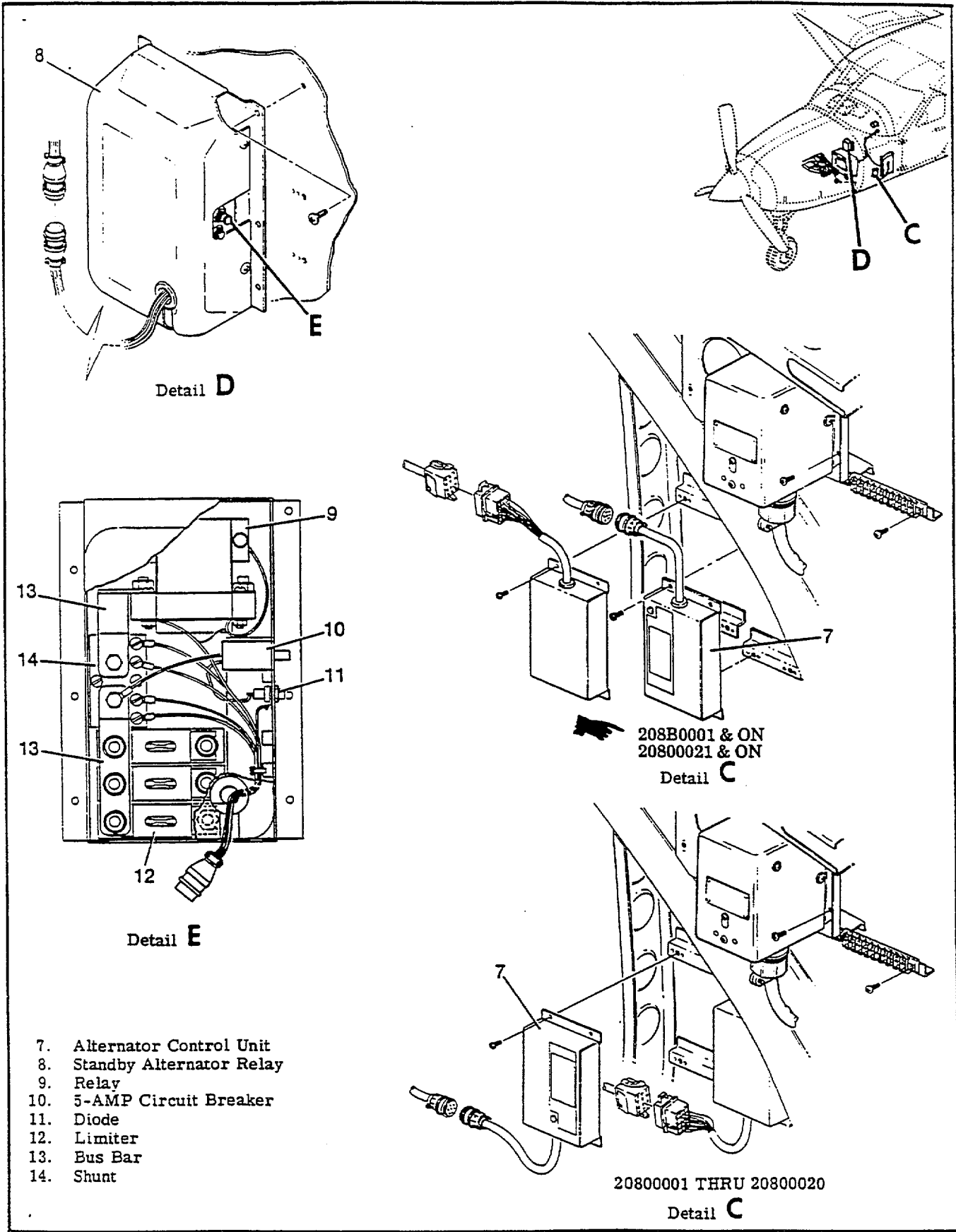
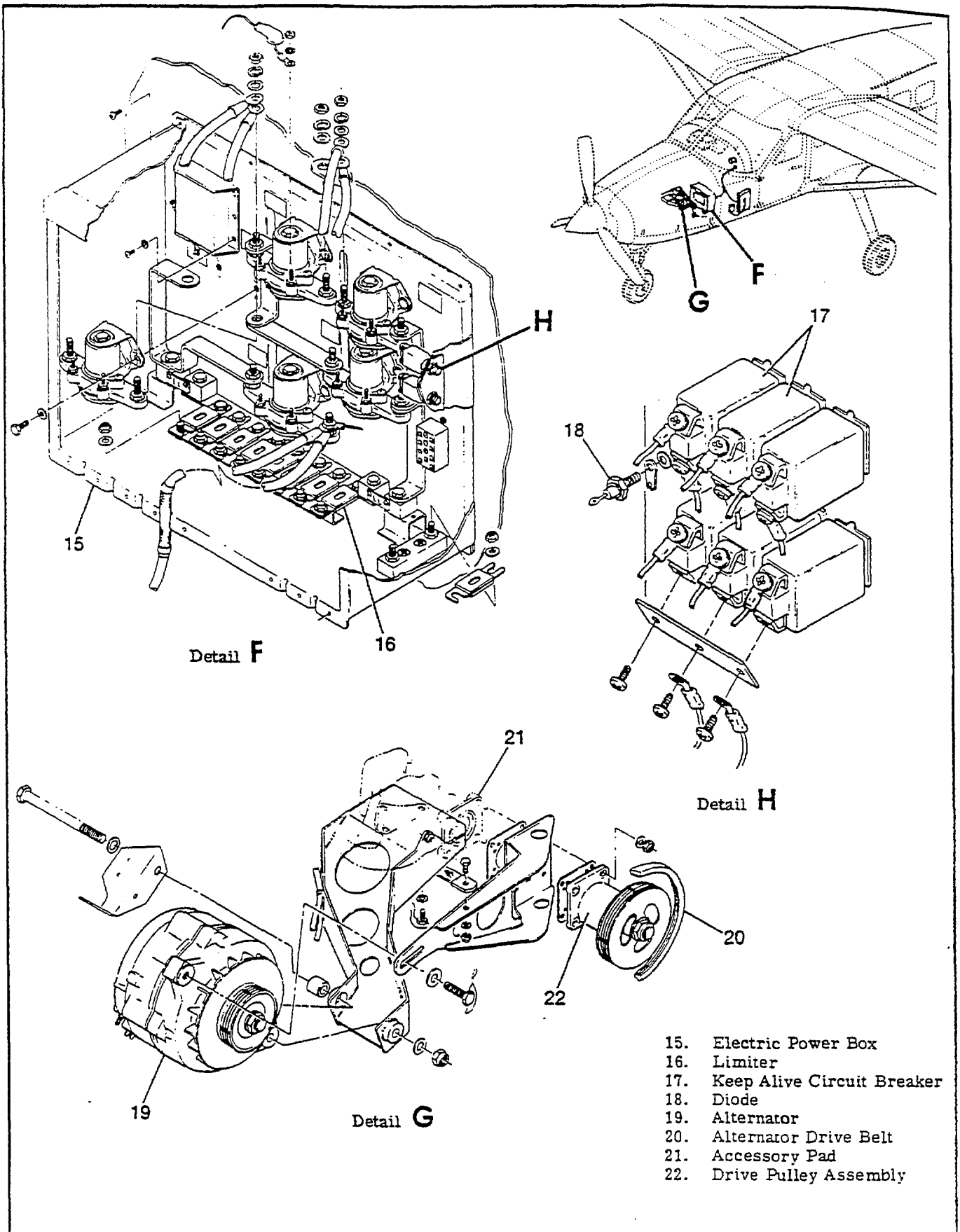


Figure 6-8. Standby Alternator System (Sheet 1 of 3) - 208, 208A and 208B Models Only



- 7. Alternator Control Unit
- 8. Standby Alternator Relay
- 9. Relay
- 10. 5-AMP Circuit Breaker
- 11. Diode
- 12. Limiter
- 13. Bus Bar
- 14. Shunt

Figure 6-8. Standby Alternator System (Sheet 2 of 3) - 208, 208A and 208B Models Only



- 15. Electric Power Box
- 16. Limiter
- 17. Keep Alive Circuit Breaker
- 18. Diode
- 19. Alternator
- 20. Alternator Drive Belt
- 21. Accessory Pad
- 22. Drive Pulley Assembly

Figure 6-8. Standby Alternator System (Sheet 3 of 3) - 208, 208A and 208B Models Only