

SECTION 7

CHARGING SYSTEM TESTING PROCEDURES

SAFETY PRECAUTIONS.

As a preface to testing the charging system, it cannot be over-emphasized how important it is to observe the precautions listed below. Considerable time and expense can be saved by following these simple rules.

1. Always disconnect the battery ground cable before disconnecting wiring or components of system.
2. Avoid contacting alternator output terminal (BAT) as it is directly connected to the battery bus voltage anytime battery cables are connected and "BAT" portion of master switch is ON.
3. Never connect the battery ground cable until all system wiring connections and components are complete.
4. When adjusting belt tension, always apply force near pulley of the alternator to avoid damage to stator and rectifier, or use a 1 1/8 " O.E. Wrench on the adjustment lug of the alternator case casting.
5. Never attempt to polarize the alternator. Polarizing is not applicable to alternator and could damage the regulator.
6. Observe polarity when installing a battery in aircraft. Reverse polarity will destroy the diodes in alternator.
7. Always connect a booster battery in parallel, negative to negative, positive to positive.
8. Before disconnecting a booster battery, reduce engine speed to idle, operate taxi light. This will prevent voltage surge that could destroy small light bulbs.
9. Disconnect the battery ground cable before connecting a charger to the battery.

CHARGING SYSTEM TESTS - ON AIRCRAFT

Visual Inspection

Prior to testing, a visual inspection of components of charging system should be performed. What appears to be an authentic charging system problem, can in some instances be traced to some of the discrepancies outlined here that are relatively simple to correct.

1. Proper belt tension - if alternator pulley wheel can be slipped on belt by hand - The belt is too loose or glazed - replace or tighten belt per specification.
2. Specific gravity of battery is 1.275 - fully charged battery.
3. Clean and tighten battery posts and cable clamps.
4. Clean and tighten wiring connection at alternator.
5. Clean and tighten wiring connections at regulator.

Alternator Belt Tension

Loosen bottom mounting bolt and belt adjusting bolt. Adjust the belt tension to obtain 3/8" deflection at the center of the belt when applying 12 pounds pressure. After tension is set and upper bolt safetied, tighten lower mounting bolt 450 to 500 lb-in. There should be no end play in alternator mount. Add thin washers between alternator and mount to remove end play.

CAUTION

Whenever a new belt is installed, belt tension should be re-checked within 10 to 25 hours of operation.

When tightening the alternator belt, apply pressure by using a 1 1/8 inch open end wrench on adjusting lug of alternator.

Alternator Crankshaft RPM Differential Ratio as Compared to Engine RPM

The belt driven alternator crankshaft RPM differential is 2.7 to 1 as compared to Continental engine RPM for all 1978 & on 188 Models - 1978 & on 210 Series Models, 1981 & on 206 and 207 Series Models and 1982 & on T303 Models. The alternator crankshaft RPM differential ratio is 3.36 to 1 as compared to Lycoming engine RPM for all 1981 & on T182 Models, 1981 & on R182 Models and 1981 & on TR182 Models.

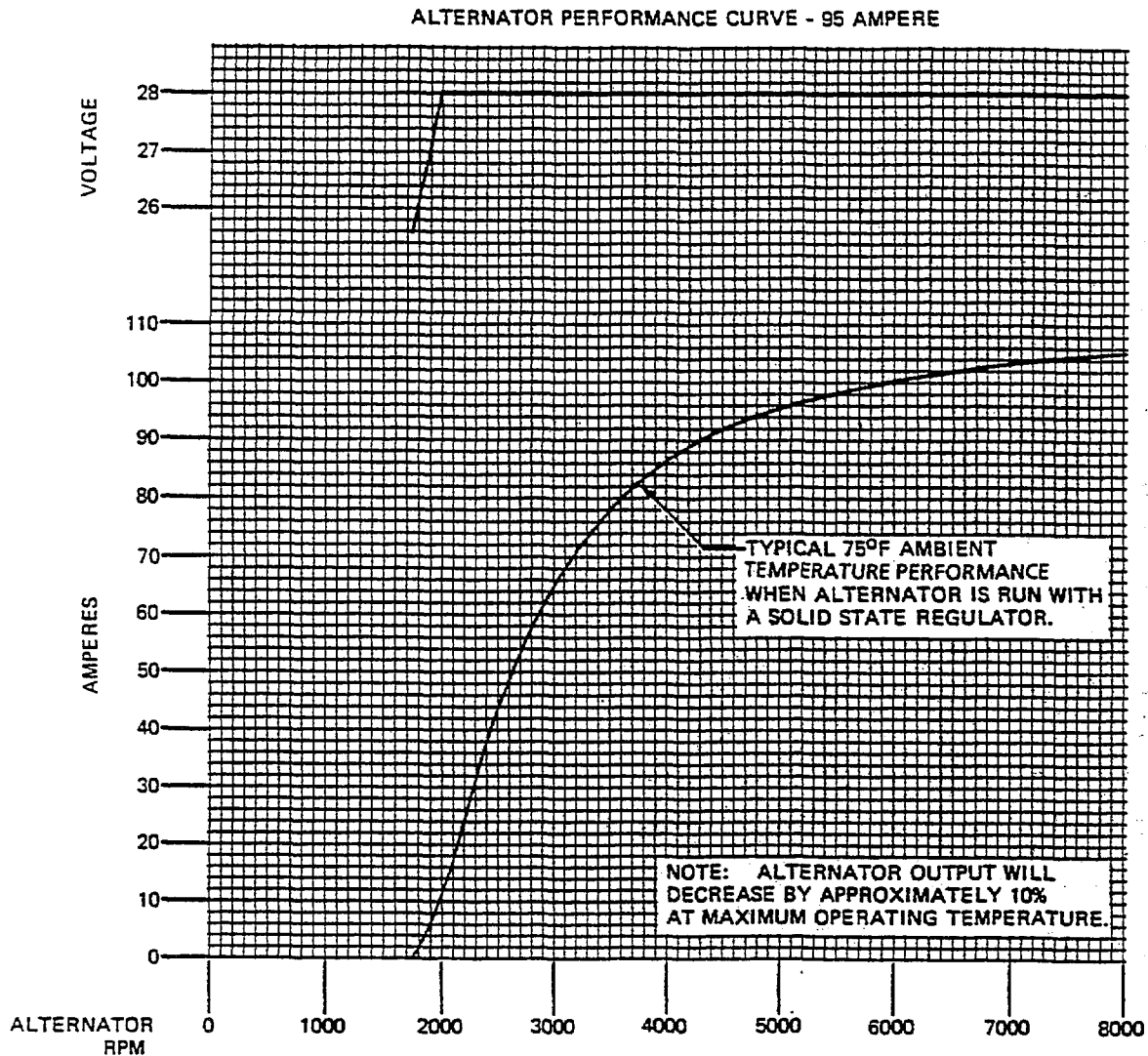


Figure 7-1. Alternator Performance Curve Chart

Alternator Crankshaft RPM Differential Ratio as Compared to Engine RPM and Ng% RPM

The belt driven alternator crankshaft RPM differential is 1.3559 + .1 as compared to Pratt and Whitney engine pad RPM for all Model 208, 208A and 208B Series Models. Refer to Figure 7-1A for engine pad RPM, Ng% RPM and alternator RPM cross reference chart.

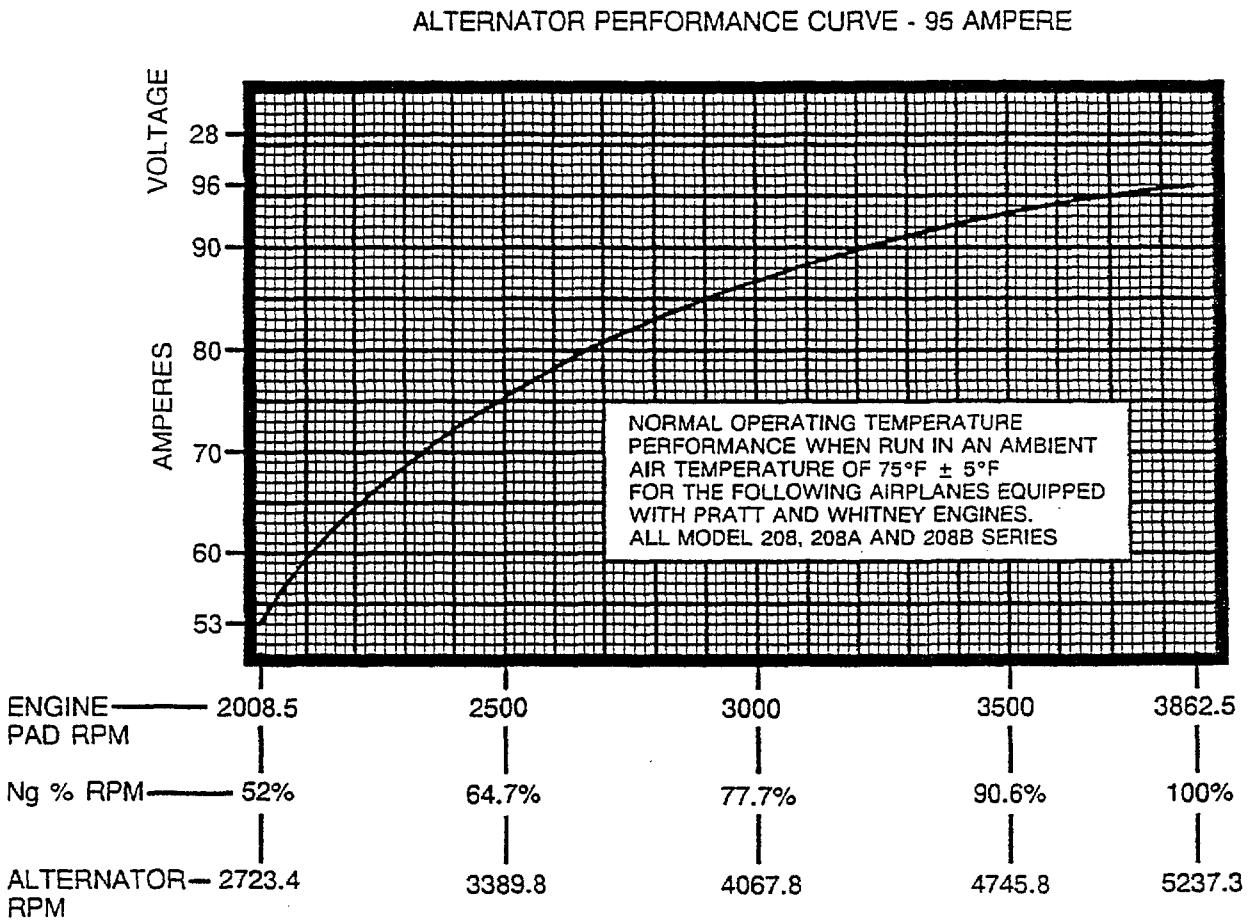


Figure 7-1A. Engine RPM, Ng% RPM and Alternator RPM Cross Reference Chart (208, 208A and 208B)

Test Conclusions

If voltage fails to increase above 0.5 volt - open alternator portion of master switch. An "under voltage" condition exists. Proceed as follows to isolate problem.

- a. Disconnect the regulator plug and install a jumper from the positive terminal of battery to pin 2 (F pin of regulator plug). Refer to Figure 7-3.

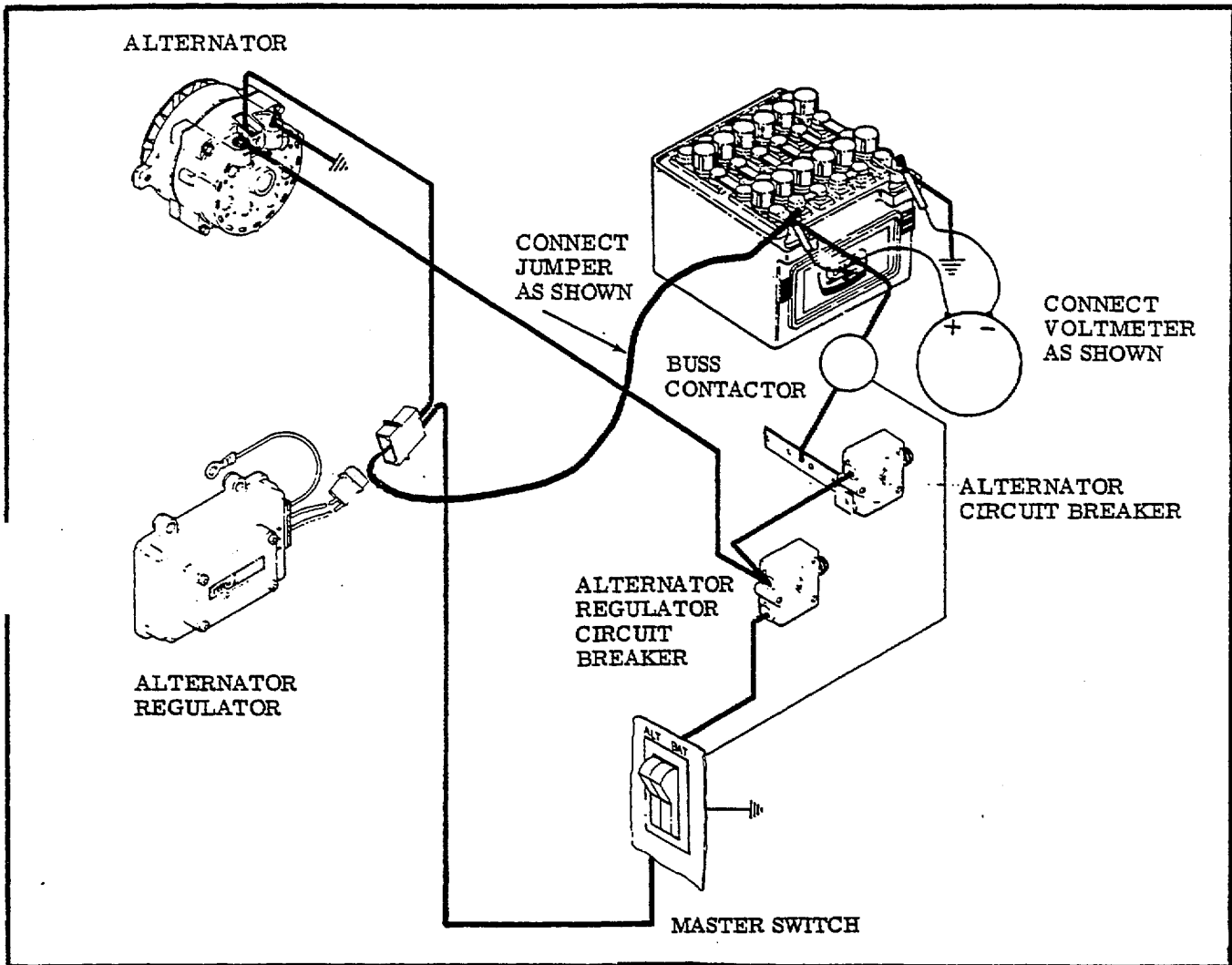


Figure 7-3. Isolating Regulator from Circuit

CAUTION

Operate engine not more than 2 minutes with jumper installed, damage to components of electrical system could occur.

- b. Start engine - turn on alternator switch - apply electrical load - (turn on taxi and landing lights). Slowly increase engine speed to determine that voltage of step 2 increases. Stop RPM increase when voltage measures 28.0 volts.
- c. Voltage reading at battery: should increase above previous reading 0.5 volts or more.
- d. Turn off landing lights - turn off alternator switch - shut down engine.

If the increase in voltage reading is still below 0.5 volt, the problem is in wiring harness or alternator.

- e. Remove the jumper end from the voltage regulator plug and connect it to the "FLD" pin of the alternator (plug removed). This eliminates the wiring harness to prove the alternator. (Refer to figure 7-4).
- f. Leave alternator regulator plug disconnected.
- g. Start engine - turn on alternator switch - apply electrical load - (turn on taxi and landing lights). Slowly increase engine speed to determine that voltage of step 2 increases. Stop RPM increase when voltage measures 28.0 volts. Observe 2 minute operation caution.

If the voltage increase is now above 0.5 volt, fault is wiring harness. Repair or remove and replace harness.

If the voltage increase is still below 0.5 volt, the fault is in alternator and should be removed from the aircraft for bench test.

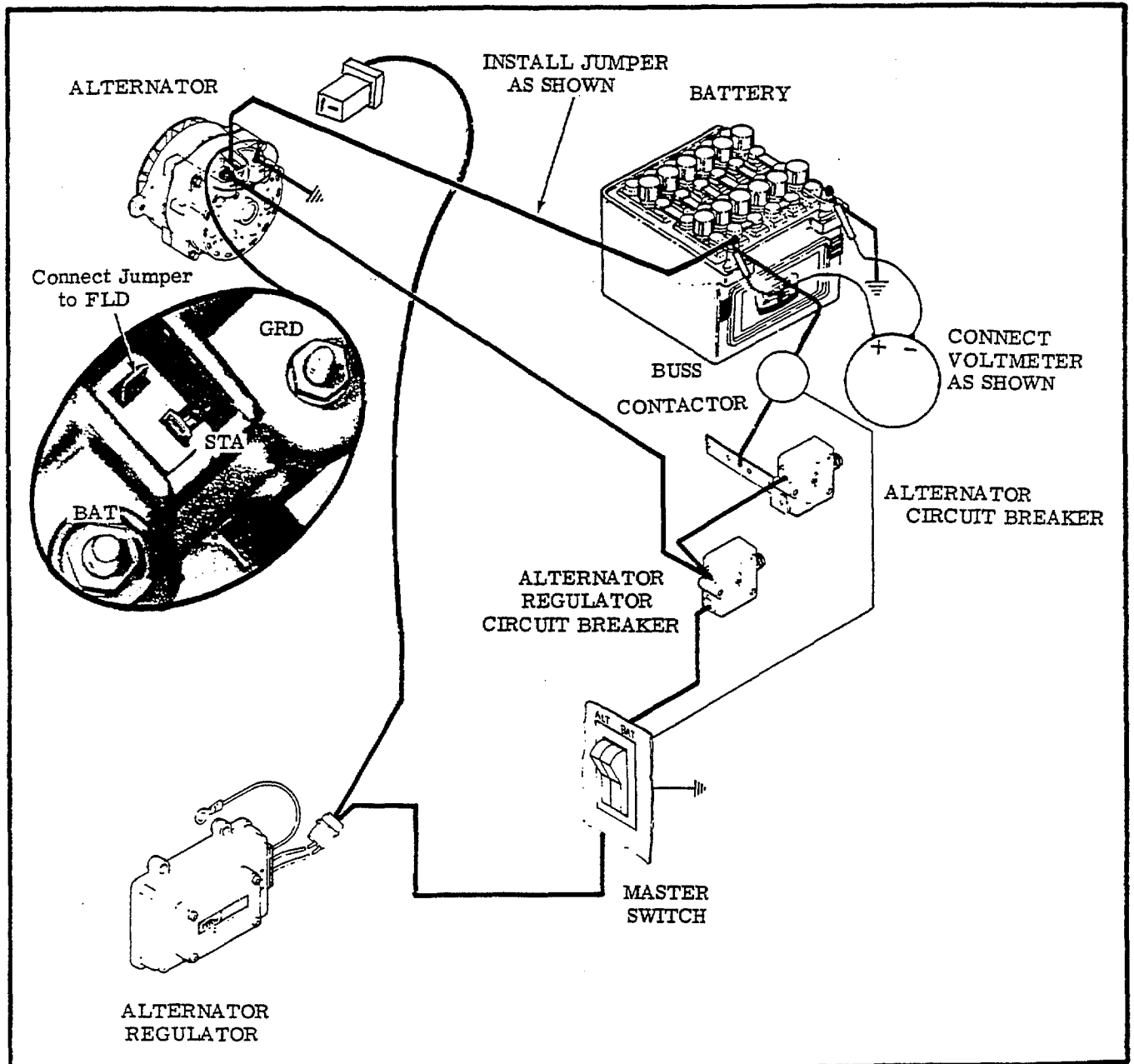


Figure 7-4. Isolating Wiring Harness Circuit