DESCRIPTION

GENERAL INFORMATION

Cessna aircraft equipped with a 38, 52 or 60 amp alternator(s); will produce ample electrical power at lower engine speeds. You will find that the alternator will supply all of the normal electrical power requirements even under adverse conditions, such as waiting for flight clearance with most of the accessory equipment in use and the engine running at low engine speed. The reduced drain on the battery will mean better starting and longer battery life.

After starting the engine(s) you will notice that the ammeter will, for a short time, indicate a fairly heavy charging current even at low engine speeds (800 to 900 RPM). This is normal; the alternator is replacing the electrical current required for starting.

This system requires no special attention; however, improper service procedures can result in damage to the alternator and wiring.

If the charging system should require service, be sure the mechanic is familiar with the alternator system. If not, suggest he read this booklet.

Be sure the master switch(es) is turned off when repairs are being made to the alternator(s), voltage regulator(s), or ACU's.

CAUTION

If booster batteries are used, the cables must be connected correctly -- positive to positive and negative to negative. Diodes will be destroyed by reverse polarity connections.

If the aircraft battery is ever removed or charged, be sure that the charger is correctly connected and that the battery is installed properly.

NOTE

When charging a battery it is possible to reverse the polarity of the battery if the charger is connected backwards. Use a voltmeter to determine battery polarity before connecting the battery in the aircraft.

Do not leave the master switch(es) on when the aircraft is parked for extended periods. By turning the switch(es) off, you will prevent needless battery drain.

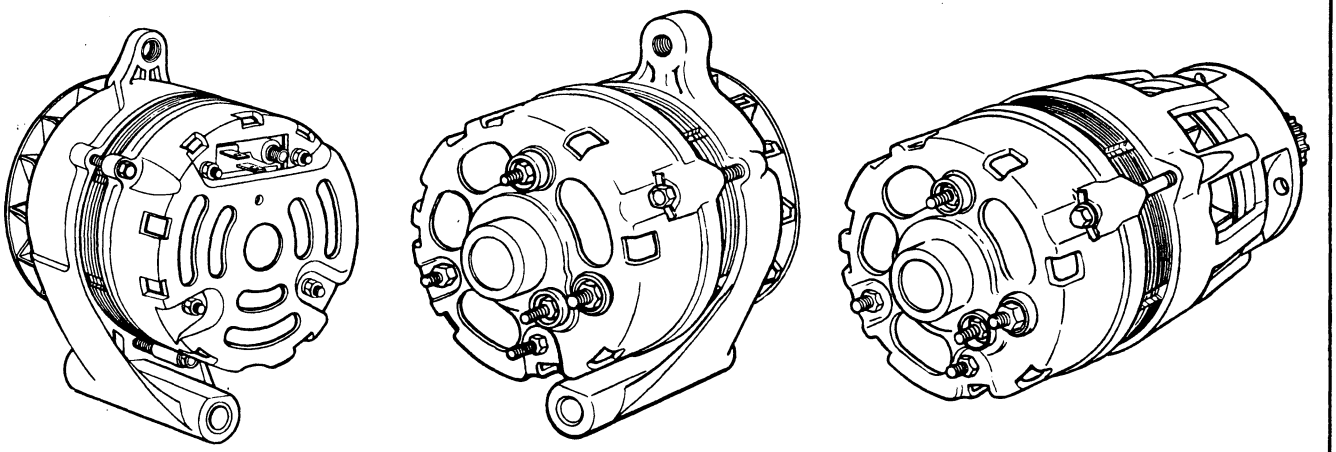
If the electrical accessory equipment is to be used for an exceptionally long time when the engine is not running, connect a ground power unit.

If at higher engine speeds the charge indicator shows a constant discharge, check the "ALT" circuit breaker(s). If the button is out, push it in to reset. If the circuit breaker button pops out again, have the electrical system inspected at a Cessna service facility.

The Cessna alternating current charging system consists of a 12 pole, three-phase, internally rectified alternator and either a voltage regulator or an alternator control unit. Some regulators contain a field relay and a voltage limiter and others are transistorized or solid-state.

The rotor coil is grounded at the alternator. Field current is obtained from the voltage regulator "F" terminal; therefore, the system may be considered as being an internally grounded type.

PURPOSE - The purpose in employing a charging system in an aircraft is to provide electrical power, in adequate quantity, to supply all accessory requirements and maintain the battery in a fully charged condition at any temperature. An alternator is able to fulfill these demands by producing a usable output, even at low engine speed.



60 AMP PULLEY DRIVEN MODEL

52 AMP PULLEY DRIVEN MODEL

38 AND 60 AMP GEAR DRIVEN MODEL

FIGURE 1

NO COMMUTATOR PROBLEMS

One of the principal advantages of an alternator is the possible higher maximum operating speed. A major limitation imposed on generator speed is commutation difficulties. Generator commutation is limited to approximately 10,000 RPM whereas an alternator will operate at speeds up to approximately 15,000 RPM. Alternator speeds are limited only by bearing life and by physical factors such as centrifugal force acting on the rotor. This permits higher pulley ratios to be used with subsequent higher output at engine idle speed. Elimination of the commutator results in the following two major advantages of the alternator:

INCREASED OUTPUT AT IDLE AND LOW SPEEDS
AND EXTENDED SERVICE-FREE OPERATION

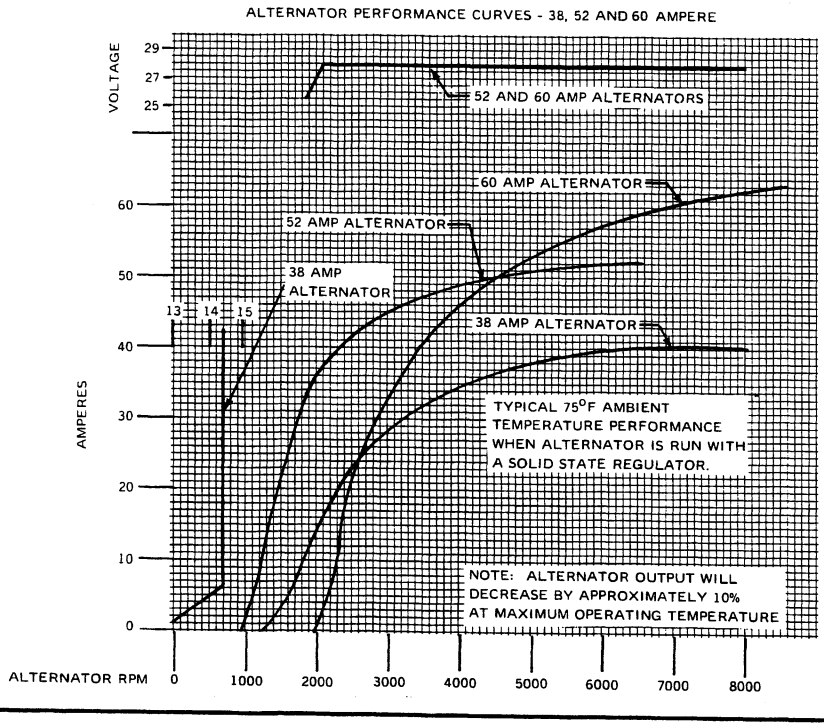


FIGURE 2

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. Refer to figure 2 for Engine RPM and Alternator RPM Cross Reference Chart.

Typical Alternator Charging System

A typical single alternator system consists of the alternator, voltage regulator system, battery solenoid, indicator light or ammeter, master/alternator switch and wire harness. All 1982 and on T303 models and some 1982 and on 210 series aircraft are equipped with a dual 28-volt alternator system. The system consists of two alternators, two alternator control units (ACU's), a battery and two alternator switches, a volt meter and selector switch, two alternator contactors, two alternator shunts, a low voltage warning light and left and right or forward and aft alternator off lights. For a complete description of the alternator system, removal, replacement, trouble shooting and wiring diagrams not covered in this manual refer to the appropriate Service Manual and Pilot's Operating Handbook.

SHOP NOTES: