SECTION 2

PARTS DESCRIPTION

ALTERNATOR DESIGN

Because of the number of different alternators available, it is important to be able to identify the rated output of the alternator being serviced. 95-amp alternator units have vendor identification data stamped into the front housing with colored paint surrounding the stamped figures. The vendor color code relates to the rated output. In addition. Cessna has incorporated an S1555-701 nameplate placard on the alternator that identifies the unit by one of the following Cessna part numbers, C611505-0101, C611505-0101A, C611505-0102 or C611505-0201.

However, it should be pointed out that the original configuration of the C611505-0101 alternator had a stamped, spot-welded. D7FF-10380-AA fan assembly. The C611505-0101 alternator has now been superseded by a new C611505-0102 alternator which incorporates a modified version of the single-piece, oven-brazed, E3FF-10300AA alternator fan and pulley assembly. In addition. some aircraft are equipped with a C611505-0101A alternator that has been modified at Cessna to incorporate the new E3FF-10300-AA fan and pulley assembly. All T303 aircraft delivered with the C611505-0101 alternators are to be modified per Service Kit SK210-109A. Refer to Section 9A for instructions on how to modify the C611505-0101 alternator to make it equivalent to the C611505-0101A or C611505-0102 alternators. This modification called out in Section 9A, is also recommended for all A188, T182, R182, TR182, U206, TU206, T207, 210, T210 and P210 aircraft in order to increase the service life of the C611505-0101 alternators.

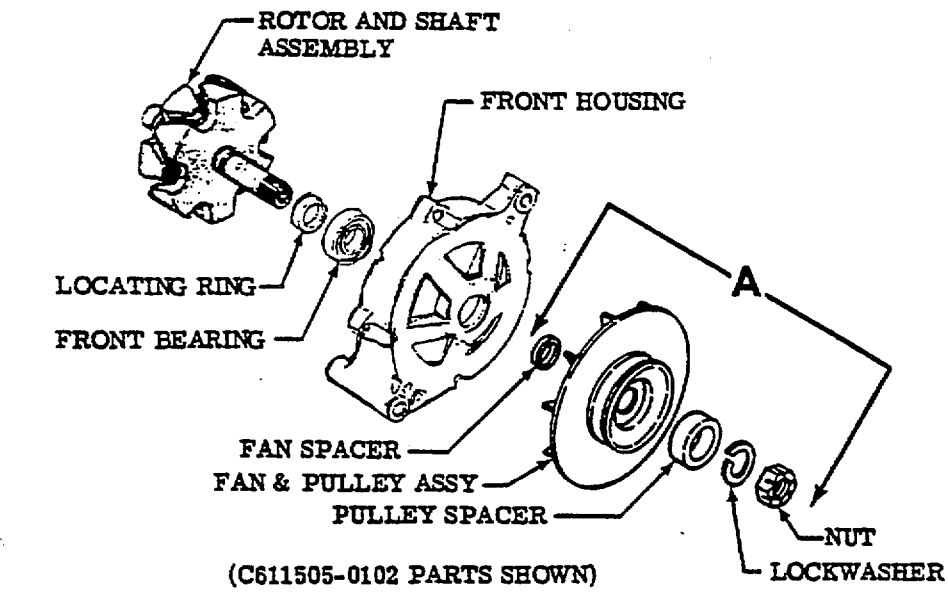
To obtain the 95-amp rating, the alternator is rated at a higher specified RPM than alternators having a lesser RPM rating. If necessary, we suggest that you study the parts in Figure 1-2, until you feel that you are familiar with component part names and their relative positions. Then, proceed to the information given for the components themselves.

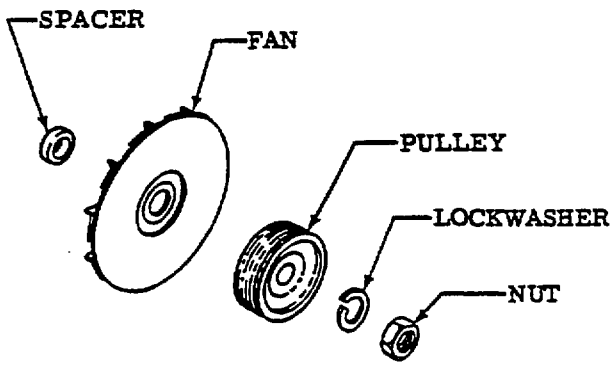
ALTERNATOR COMPONENTS

Front Housing. Fan and Pulley

A die-cast aluminum front housing, figure 2-1, is used to meet design requirements for a light-weight, non-magnetic meterial. This casting incorporates the bosses used to attach the assembly to its mounting bracket It also provides the supporting surface for the rotor shaft front bearing; and, as mentioned earlier, provides a place for identifying the unit.

The fan and pulley on C611505-0101 and C611505-0201 or fan and pulley assembly on C611505-0101A and C611505-0102 are attached to the rotor shaft with a nut and washer. The C611505-0101A and C611505-0102 alternators also have a spacer as part of the attaching parts. The shaft is threaded at its forward end to accept the nut. (Procedures covering removal and installation of the fan and pulley are covered in "Section 9" and fan & pulley modifications of the C611505-0101 alternator are covered in "Section 9A".





(C611505-0201 PARTS SHOWN)

Detail A

Figure 2-1. Front Housing and Rotating Members

Rear Housing and Terminal Identification

The alternator rear housing - also an aluminum die casting - supports the rotor shaft rear bearing and provides mounting bosses for the rectifier assembly. Figure 2-2 illustrates typical rear housing design and identifies the terminals for each. The housing contains the openings needed for cooling and making electrical connections.

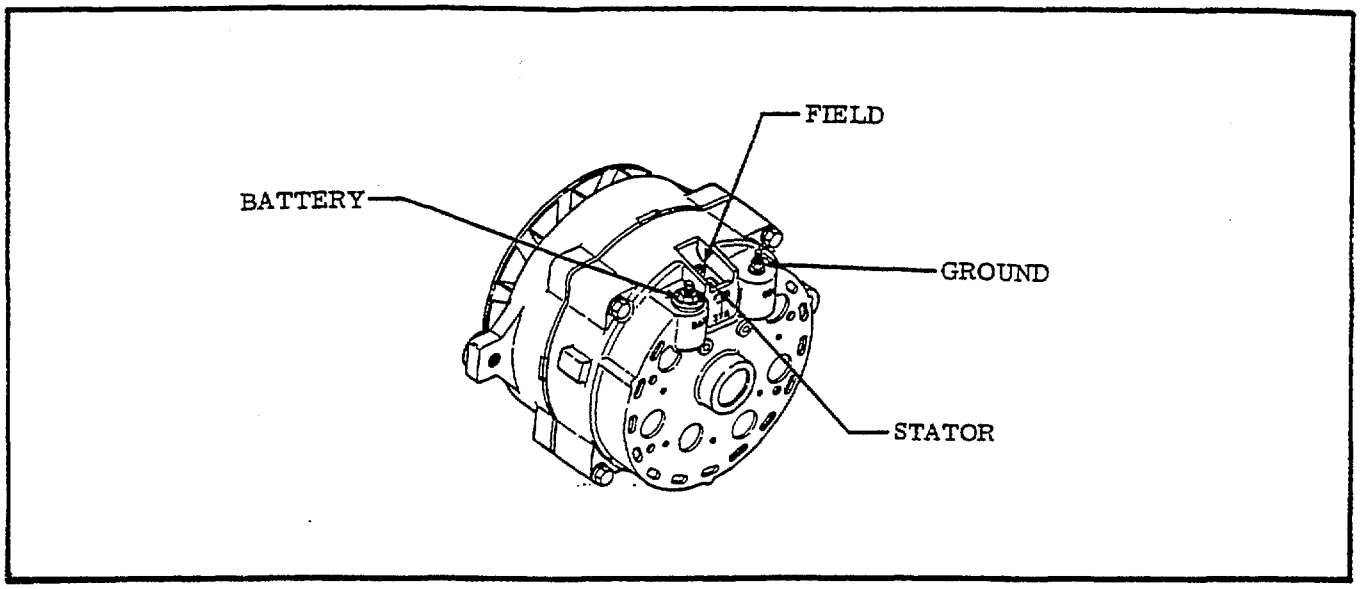


Figure 2-2. Rear View and Terminal Identification

Stator Core and Coil Assembly

A number of steel stampings are riveted together to form the stator core. See figure 2-3. The inner surface of this core contains 36 equally spaced vertical slots which accommodate the stator coil windings.

A delta type stator winding is used in the 95-ampere alternator as shown in figure 2-3. The Delta winding receives its name from its schematic symbol which resembles the Greek letter Delta △. Each coil winding end is connected to another to form a closed series circuit.

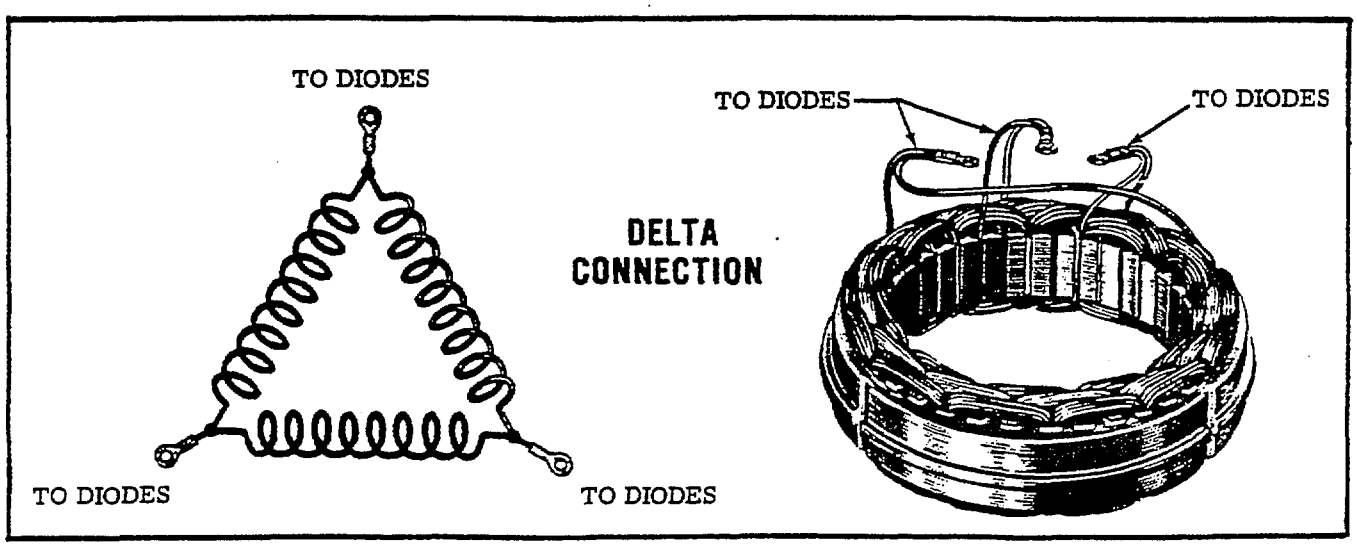


Figure 2-3. Alternator Stator Windings

The rotor core and coil assemblies includes:

A rotor shaft.

Two slip rings.

Two rotor halves.

A coil assembly.

Figure 2-4 shows these components in disassembled and assembled form.

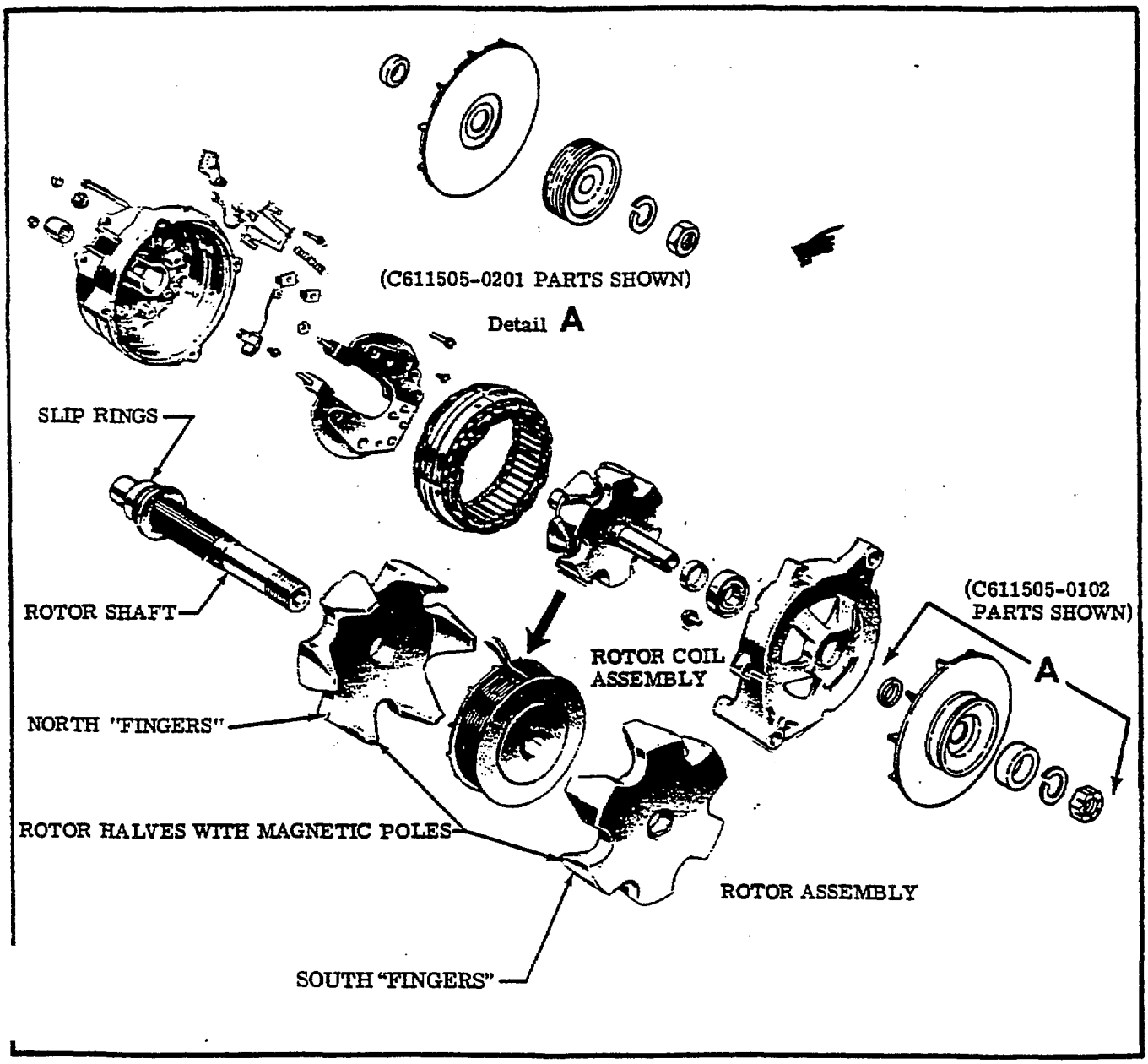


Figure 2-4. Rotor Core and Coil Assembly

The rotor shaft is supported at each end by bearings. The front bearing (ball-type) is a slip-fit on the rotor shaft and is retained in the front housing with a retainer. The rear bearing (needle-type) is pressed into the rear housing.

The slip rings and the core and coil assembly are press-fitted to the shaft with a rotor half enveloping each end of the coil.

The rotor core and coil assembly turns inside the stator core and coil assembly with a very narrow air gap between the two assemblies. This narrow clearance permits maximum magnetic induction.

Brushes and Holder Assembly

The brushes in the alternator ride the surfaces of the slip rings on the rotor shaft under spring pressure and transmit field current through their circuit to ground. One brush or field terminal is, therefore insulated from the housing. In the standard alternators, the brush and holder assembly is installed in a cavity inside the rear housing. Figure 2-5 illustrates the assembly removed, and shows the manner in which it is installed.

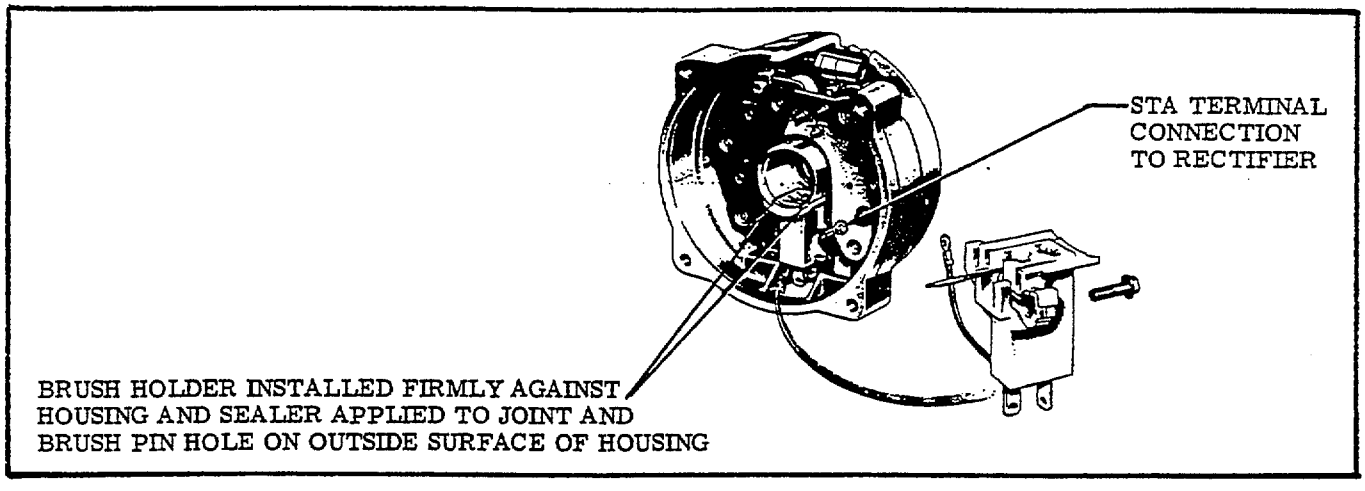


Figure 2-5. Brushes and Holder Assembly

Rectifier Assembly

The rectifier assembly is located between the stator and the inside surface of the rear housing. Attachment to the housing is made by means of mounting studs that protrude from the positive and negative diode plates . . or heat sinks as they are sometimes called. The positive plate is insulated from the housing . . . the negative plate is grounded to the housing through the studs. The rectifier assembly used in the alternator has the printed circuit board spaced away from the heat sinks, as shown in figure 2-6. For purpose of clarification, we have chosen to identify the rectifier as a "stacked type".

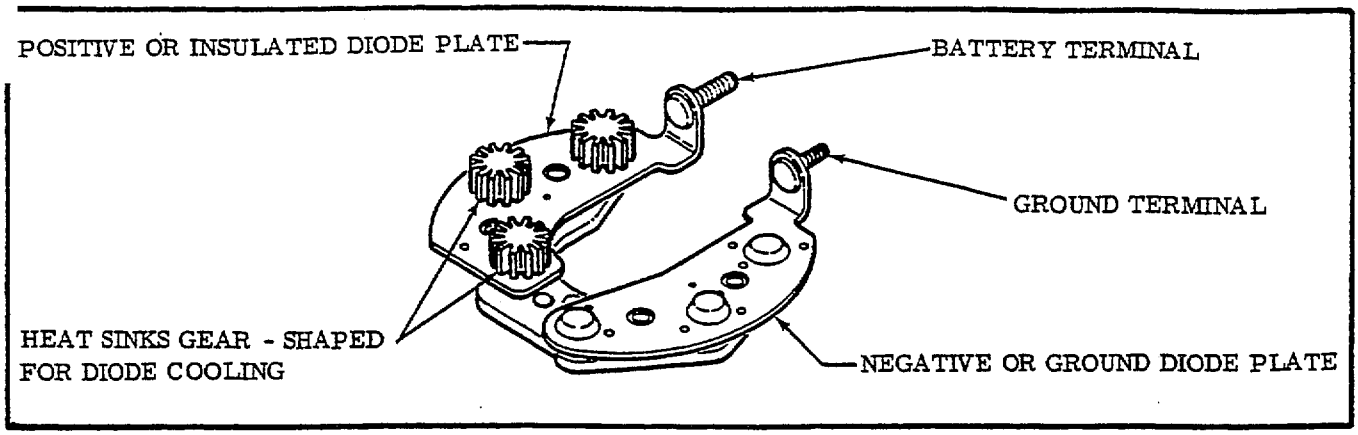


Figure 2-6. Alternator Rectifier Assembly

The stator winding leads are soldered to integral terminals on the back of the circuit board. The stator phase tap is attached to the insulated stator terminal.

The heat sinks are attached to the circuit board with insulated spacers and roll pins maintaining the necessary separation between the two assemblies. The diodes themselves are exposed. Actual construction of the diodes are covered under "Diodes" in the "Principles of Operation" (Section 3).

The rectifier assembly used in the 95-ampere alternator has three diode plates connected to an AC potential. Each of the three plates is connected to one of three stator leads. See figure 2-3.

Two steel conductor plates or "bus bars," one positive and the other negative, circle the diodes beginning at the "BAT" and "GND" terminal studs. The bus bars act as termination points for collecting the DC current from the terminal wire of each diode.

One positive and one negative diode is soldered to each of three stamped aluminum plates to form the plate and diode assemblies. The aluminum plates serve as heat sinks to cool the diodes. (These plates provide increased diode cooling surface to the alternator cooling air.) Air flows through vent slots in the rear housing. to the fan at the front of the alternator.

One plate and diode assembly is connected to each of the three leads to form the full wave bridge rectifier. One of the diode plates is connected to the stator terminal, which is not used in this application.

Diode terminal wires are connected to the bus bars by means of a flexible connector wire. One diode is connected to the positive bus bar, and the other diode, on each plate, is connected to the grounded or negative bus bar.