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Install manual/Service Letter

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EFFECTIVITY

Piper Aircraft: PA-44

REVISION HISTORY

REV	DESCRIPTION	DATE
A	Initial Release see ECN 11-048	23 Jan 2012
B	See ECN #12-005	16 Feb 2012
C	See ECN # 12-012	24 Apr 2012
D	See ECN # 12-034	12 Dec 2012
E	See ECN # 12-038	21 Dec 2012
F	See ECN # 14-005	05 Feb 2014
G	See ECN # 14-019	15 Apr 2016

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PURPOSE

For installation of 28VDC auxiliary electrical system

COMPLIANCE

Not mandatory, shall be complied with at aircraft owner's discretion

APPROVAL

FAA approval has been obtained on all technical data in this Service Letter that affects type design.

RESOURCES

40 hours of labor are required to comply with this Service Letter.

SYSTEM OVERVIEW

The Piper Seminole is a dual alternator single buss 14VDC Aircraft. These instructions will detail the installation of a 28VDC bus that can be used to install a 28VDC all Electric Air Conditioning system.

There is a dedicated alternator located on the left engine driven off the starter ring gear pulley which will be regulated by a dedicated voltage regulator. There is battery located in the nose cone near the ships main battery that will provide electrical spike protection of the components installed as the load on the Aux Bus.

A standard 28VDC ground power receptacle is also located in the nose of the aircraft so that Aux Bus components can be powered while on the ground without the left engine operating.

MATERIAL INFORMATION

The following documents list the materials required for compliance with this Installation Manual. Parts can be obtained from Kelly Aerospace Thermal Systems Drawing List NC-10-077 and Kit List NC-11-023.

INSTRUCTIONS FOR COMPLIANCE

1. Preparation

a) Conduct a parts inventory to insure all required items are present and in good condition.
b) Disconnect aircraft battery per the Piper Aircraft Maintenance Manual (AMM).
c) Remove the left engine cowling per (AMM).
d) Secure the 14VDC external power receptacle to prevent unwanted power on aircraft busses (e.g. tape over receptacle with non metallic masking tape with label warning of hazard).
e) Remove the following components utilizing the AMM and store securely:
   1) Left engine propeller.
   2) Left front baffle.
f) For all references to wire stripping, crimping and tying procedures refer to AC 43.13-1B chapter 11.
g) For all references to riveting procedures refer to AC 43.13-1B chapter 4.
h) Torque Specifications:

Unless otherwise specified, use the following torque values.	
6-32 UNC	7-9 inch-lbs
8-32 UNC	17-19 inch-lbs
10-24 UNC	20-22 inch-lbs
10-32 UNF	28-31 inch-lbs
1/4-20 UNC	70-75 inch-lbs
1/4-28 UNF	90-94 inch-lbs
5/16-24 UNF	220-230 inch-lbs
3/8-24 UNF	445-455 inch-lbs
7/16-20 UNF	760-780 inch-lbs

Table 1 – Torque Specifications

2. Installation of components

Drill holes and mount the voltage regulator (VR-202A) with AN525-10R7, AN960-10L and AN365-1032C and current limiter holder (76655-1) with MS24694-S54, AN960-10L and AN365-1032C. Reference Drawing AL-00107 and Figure 1.

Figure 1 - Approximate location of VR-202A Voltage Regulator

3. Alternator installation

a) Modify left front baffle per drawing AL-00102 and reinstall.
b) Remove 14 volt alternator, alternator drive belt and mounting bracket per AMM.
c) Remove pulley and fan from 14V alternator and replace fan with PU605A-2 fan, reassemble with original pulley and hardware per drawing AL-00103.
d) Attach AL-00138 Bracket, Idler, Spacer Assy. per drawing AL-00103. See Figure 2.
e) Mount 14 volt alternator to AL-00138 assy. using existing hardware.
f) Mount AL-00126 Bracket, Alternator, Tensioner Assy. and AL-00101 baffle support per drawing AL-00103. See figure 3.
g) Install Al-00106 belt on 28V alternator and original belt on 14V alternator.
h) Install alternator ground cable per drawing AC-00322. See figure 4.
i) Re-Install prop per AMM.
j) Refer to drawing AL-00103 for final installation configuration.
k) Tension alternator belts per drawing AL-00103.

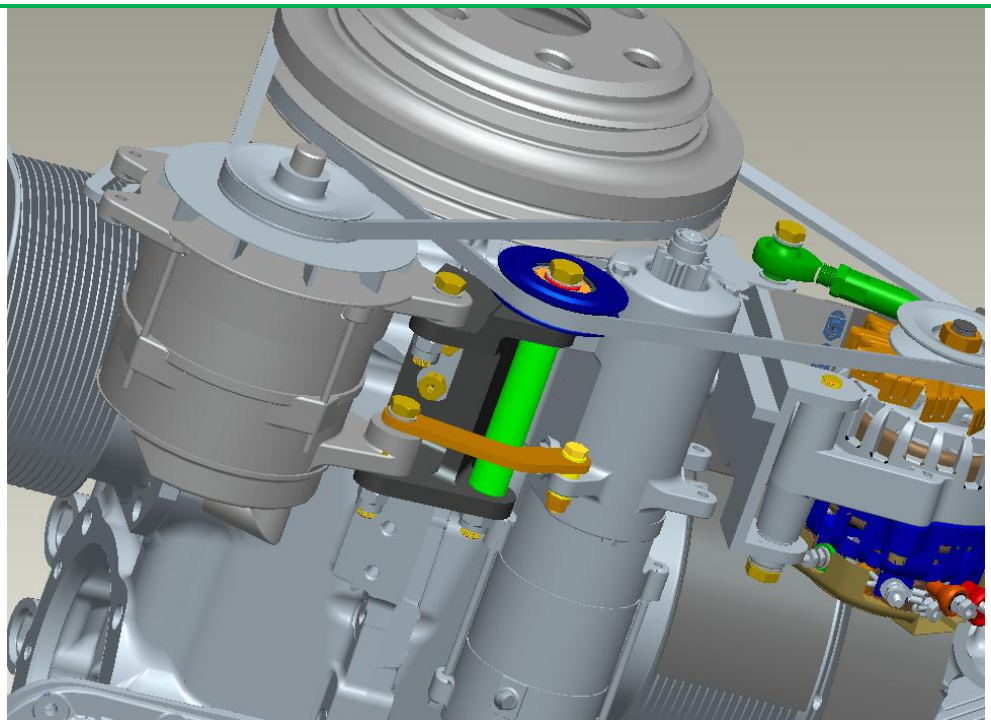

Figure 2 - AL-00138 Bracket Assy

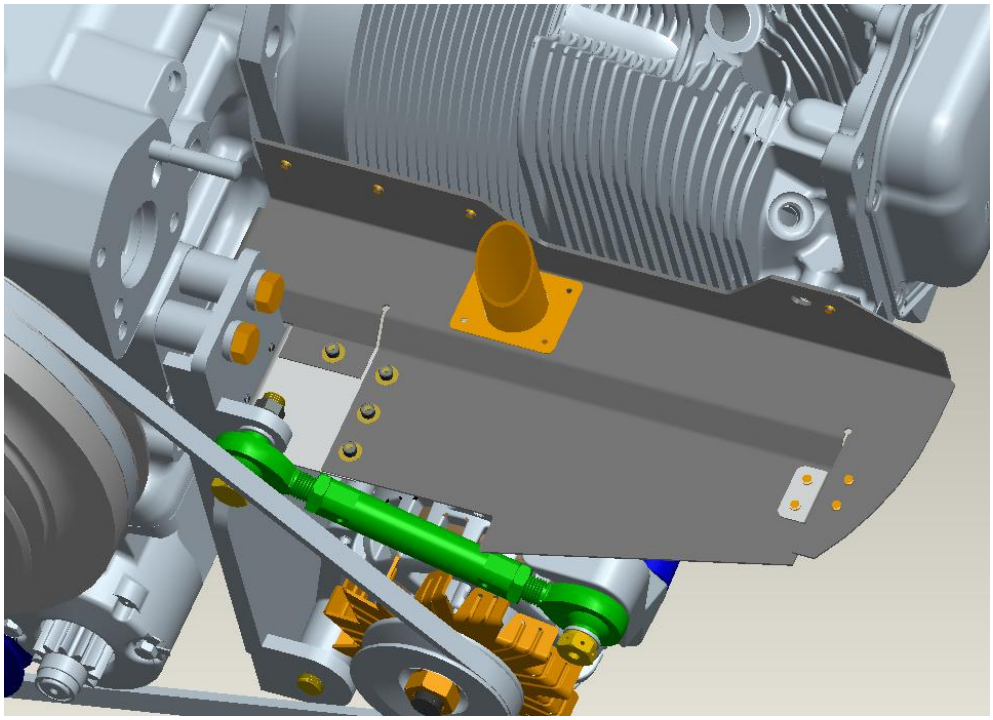

Figure 3 - AL-00137 Alternator Assy

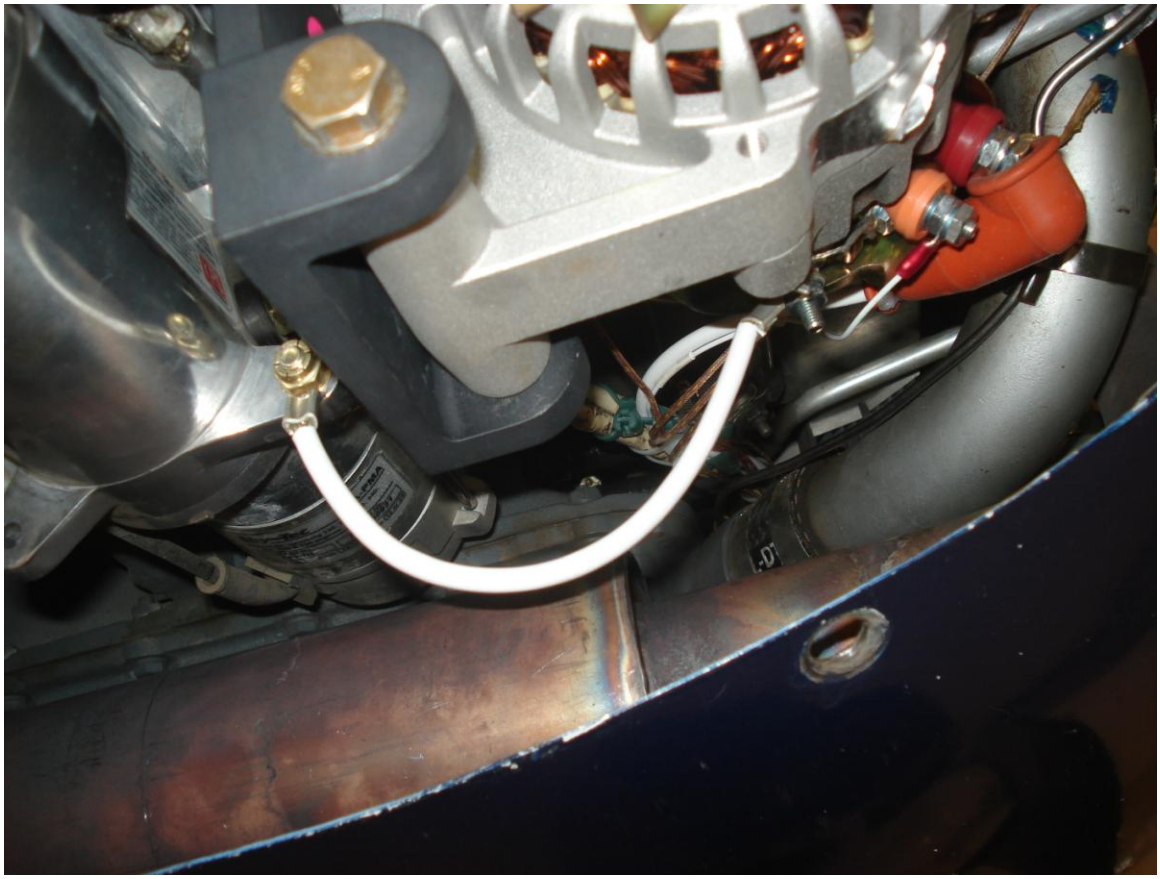

Figure 4 - Alternator Ground Cable

4. Voltmeter/Ammeter, Switch, Post Light Installation

a) Mount voltmeter/ammeter p/n VA200K, Switch p/n 688-742, Switch Cap p/n 84622-100, Toggle Switch p/n 11-04234, Placards AL-00121, AL-00125, AC-00607, AC-00608 and post light p/n 572-636 (optional) to instrument panel per manufacturer's instructions; see drawing AL-00124 for suggested locations.

b) Follow manufacturer's instructions for set up of voltmeter/ammeter using the following parameters:

i) Low operating voltage = 22V.
ii) High operating voltage = 30V.
iii) Red line voltage = 32V.
iv) Minimum charge current point for indication = 1A.
v) Maximum safe charge current = 48A.
vi) Maximum alternator capacity = 60A.
vii) Installation mode of the current shunt = loadmeter.

5. 24V Battery Installation

Install 24V battery, Aux Bus relay, Ground Power relay, and ammeter shunt in nose cone per drawing AL-00116.

6. Ground Power Receptacle Installation.

Install Ground Power receptacle, bracket and cover in nose cone per drawing AC-00336.

7. Wiring

a) See drawing AC-00294 & AC-00322 for all wiring details.
b) Care should be taken to insure a neat and tidy wiring installation and adequate additional wire protection (spiral wrap, wire loom, heat shrink, zip ties et.) where required. All wire runs should be installed as per standard practices and follow existing wire runs where practical.

8. Cowling Modifications.

a) Assemble the 2 front cowling halves together and cut 2" dia hole using middle screw hole as center point. See figure 5 & 6.
b) Attach AC-00942 Cowling Cover to cowling halves using 2 remaining holes and existing hardware. Match drill 2 holes for additional nutplates. See figure 7.
c) Drill, countersink and attach MS21059L3 nut plates to inside of the cowling halves with CCR264SS3-3 pulled rivets. See Figure 8.
d) Modify left front cowl by cutting out section for alternator blast tube. See figure 9.

Figure 5 - Cowling Clearance Hole Location

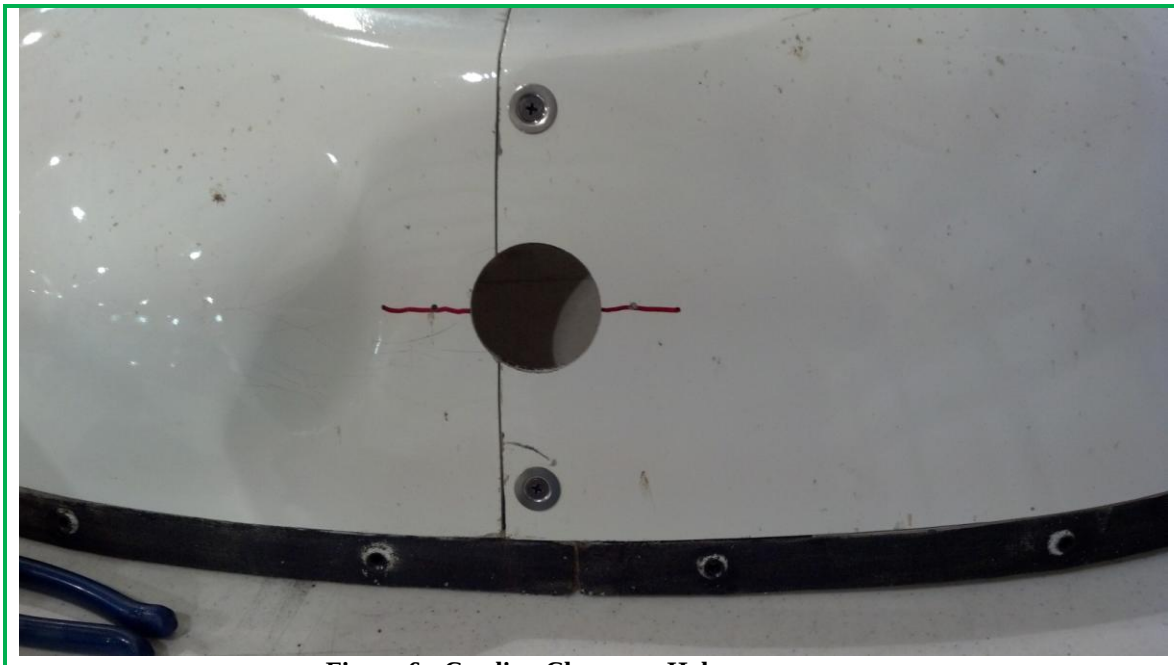

Figure 6 - Cowling Clearance Hole

Figure 7 - Mount AC-00942 cover and match drill

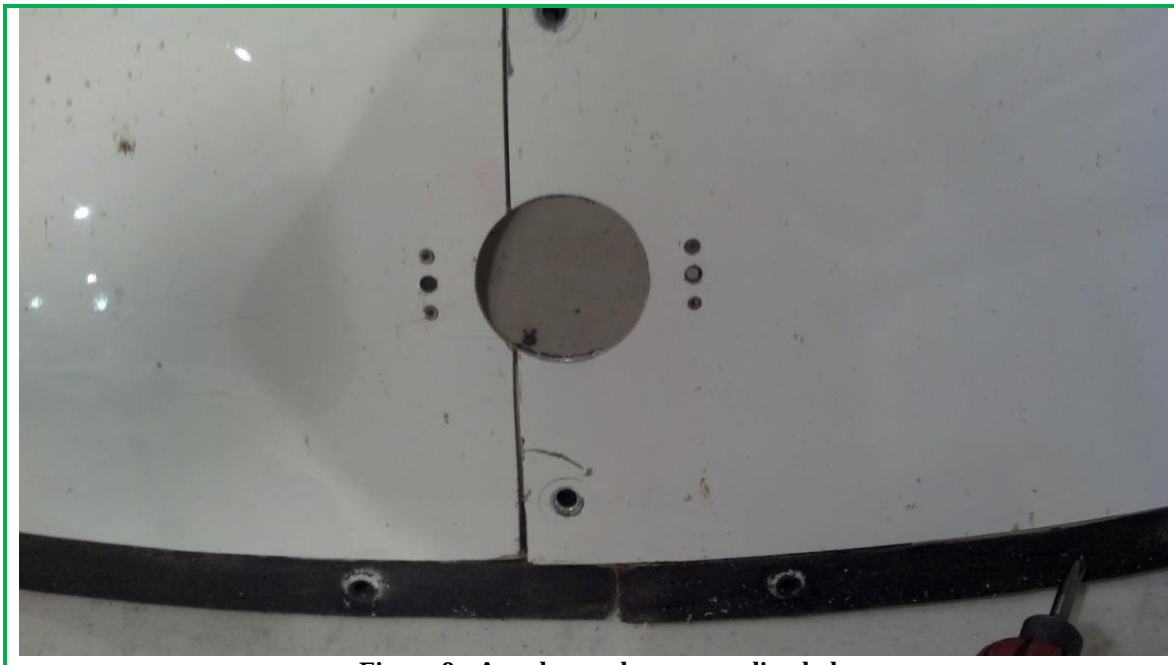

Figure 8 - Attach nut plates to cowling halves

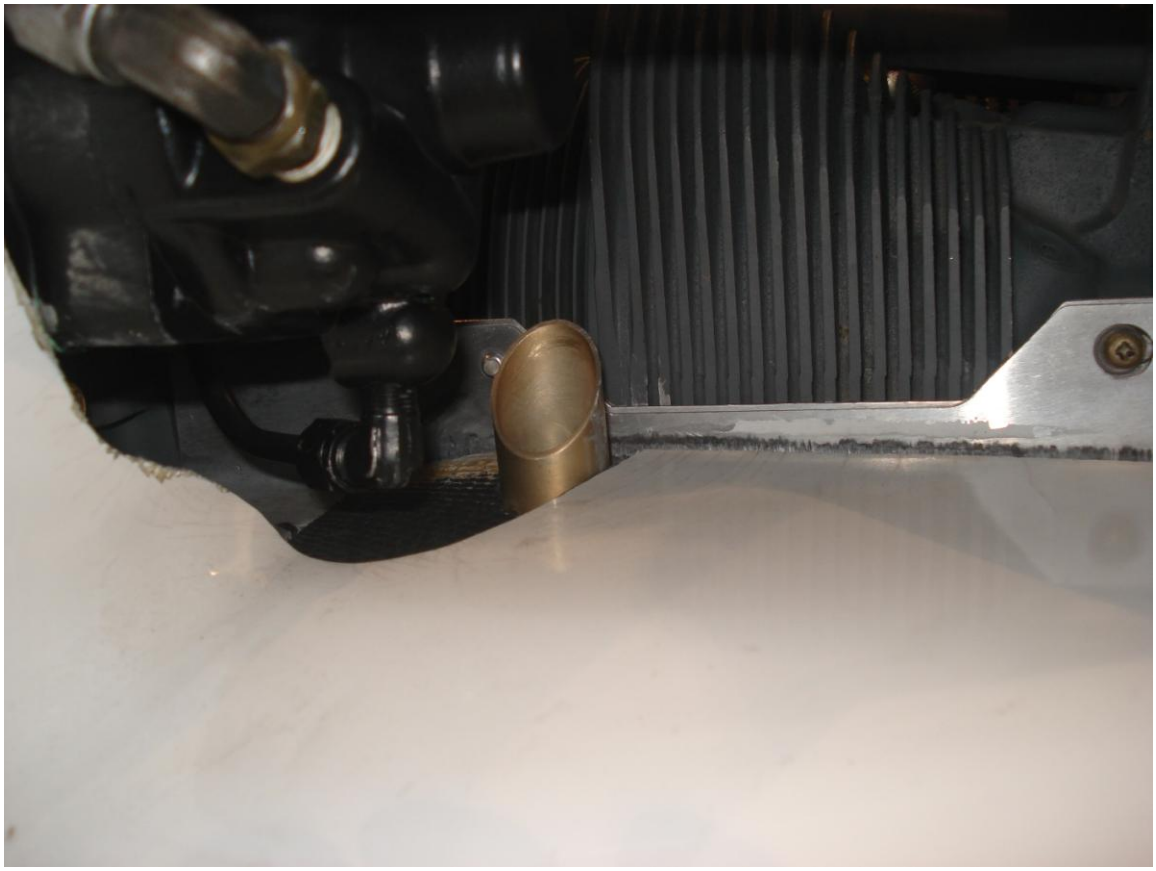

Figure 9 - Cowl modification for blast tube.

9. Reassembly of aircraft

a) Connect aircraft battery per the Piper Aircraft Maintenance Manual (AMM).
b) Reinstall the engine cowling per (AMM).
c) Attach AC-00942 Cowling Cover to cowling using 2 existing screws and 2 AN525-10R7 screws. See Figure 10.

Figure 10 - Attach AC-00942 cover

10. Perform operational test

a) Aircraft will need to be relocated to a run up area to complete this section.
b) Utilizing qualified personnel operate the aircraft engine per the Pilot Operating Handbook and see Flight manual supplement for system operational test instructions.
c) If further assistance is needed contact Kelly Aerospace Thermal Systems Technical support @ 440-951-4744.

11. Return to service

a) Update aircraft Weight and Balance records.
b) Install Approved Flight Manual Supplement.
c) Complete FAA form 337.
d) Make aircraft log book entry.

12. Removal and Replacement Information

General Instructions Removal

Follow appropriate instructions from Section: 1 Preparation before executing procedures for Removal or Replacement below.

General Instructions Replacement / Installation

Follow appropriate instructions from: Section: 9 Reassembly of aircraft; Section: 10 Perform operational test; and Section: 11 Return to service.

1) VR-202A Voltage Regulator removal
   a. Regulator is mounted on Right engine firewall.
   b. Remove 3 AN525-10R7 screws
   c. Disconnect cannon plug from wiring harness
   d. Installation is reverse order of above.
   e. Refer to drawing AL-00107 included in this document or current revision.

2) RG-120 Battery Removal
   a. Battery is installed in the nose compartment.
   b. Remove AL-00115 Relay shunt bracket by removing 4 screws securing bracket to base plate
   c. Disconnect wiring harness to battery by treading connector off.
   d. Remove 4 screws securing battery to base plate.
   e. Installation is reverse order of above
   f. Refer to drawing AL-00116 included in this document or current revision.

3) Ammeter Removal
   a. Ammeter is located in the instrument panel in view of the pilot.
   b. Location may vary by panel space limitations
   c. Remove 4 screws in instrument panel, instrument is rear mounted
   d. Disconnect wiring harness to ammeter
   e. Installation is reverse order of above

4) Ground power receptacle Removal
   a. GPU plug is located in the left nose.
   b. Remove wiring on MS3506-1 by working through nose floor holes
   c. Remove 2 counter sunk screws in MS3506-1 by working through GPU plug access door.
   d. Installation is reverse order of above
   e. Refer to drawing AC-00336 included in this document or current revision.

5) ES-6024 Alternator Removal
   a. Alternator is located on Left Engine, Left side of engine.
   b. Remove wiring attached to alternator, B+, field, Ground.
   c. Loosen tension bolt and reduce belt tension
   d. Remove pivot bolt and note washer stack up for pulley alignment
   e. Remove tension arm bolt from alternator arm.
   f. Installation is reverse order of above.
   g. Refer to drawing AL-00103 Included with this document or current revision.