



SERVICE DIRECTIVE BULLETIN

SERVICE DIRECTIVE BULLETIN NO. 0090

Revision 1

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DATE: April 23, 2015

1. SUBJECT: 12 Vdc Voltage Control System Modification

NOTE

Revision 1 corrects the depiction of the alternator wiring connections and adds a step to the NOTES section to clarify the alternator ground wiring connection in Figure 2.

NOTE

Service Directive Bulletin No. 0090, dated April 23, 2015, supercedes Service Directive Bulletin No. 0086, dated March 27, 1996, as referenced in AD 97-20-04, and is approved by the Manager, Chicago Aircraft Certification Office, ACE-115C, by letter dated April 23, 2015, as an alternate method of compliance to the initial and repetitive inspection requirements and the terminating action specified in AD 97-20-04.

2. MODELS: F-28A, 280, F-28C, and 280C Models

3. EFFECTIVITY: All Models Noted That Were Manufactured Prior To April 18, 1980, Must Comply With This Service Directive Bulletin

4. BACKGROUND:

Enstrom has had several reported incidents of electrical control system problems for the models noted. Further investigation revealed at least four reports of no over-voltage relay protection installed. Other ships indicated failure of either the voltage regulator or the over-voltage relay. Enstrom has had at least one verified report of a system over-voltage failure with an over-voltage relay installed.

All of the failed systems used a Prestolite voltage regulator, P/N #VSF7203, and one of the following over-voltage relays: P/N #X17621, #X16799, or FOC-4002A. The voltage regulator typically fails in the closed or shorted position resulting in a massive voltage increase. The over-voltage relay is electromechanical and trips fast enough to protect the circuit when it is functioning correctly. These control systems become more unreliable with service and time because of increased degradation of the electromechanical relay and the sensing connections to ground.

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This Service Directive Bulletin requires replacement of the “Prestolite” voltage regulators and over-voltage relays with a “Lamar” voltage control (the failure mode of the voltage control is “0” volts output) and requires installation of an alternator field excitation circuit breaker.

5. COMPLIANCE:

During or before the next 100 hour/annual inspection, perform the following:

5.1. Inspection:

Conduct an inspection of the electrical system to determine the part numbers of the voltage regulator and the over-voltage relay that are installed (refer to the background information for part numbers).

5.1.1. If the inspection reveals “Prestolite” components, remove the “Prestolite” components and install an ECD069-11 voltage control in accordance with paragraph 5.2.

5.1.2. If the inspection reveals a voltage control, P/N ECD069-11, or a “Lamar”, P/N B00371-9, -11, or -12, is installed, verify that the voltage control is installed in accordance with paragraph 5.2. Modify the installation of the voltage control as required to comply with paragraph 5.2.

5.2. Modification:

Install the ECD069-11 voltage control using the following procedure:

NOTE

Due to the different wiring configurations used on older and newer model aircraft and aircraft in compliance with SDB 0086, Enstrom recommends completely removing the wiring associated with the voltage control system and installing “new” wiring.

NOTE

If the aircraft already has the “ALT EXC.” Or “ALT NTR EXC” circuit breaker installed, do not remove the wiring between the bus side of the alternator switch and the aircraft main bus.

5.2.1. Remove the voltage regulator, over-voltage relay, and wiring as applicable.

5.2.2. Install a 7.5 amp circuit breaker (refer to paragraph 6.1 for part number) in either the switch panel or the instrument panel. Label the circuit breaker “ALT EXC.” (Alternate Excite).

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NOTE

Later serial number F-28C and 280C helicopters will already have the 7.5 amp "ALT EXC." circuit breaker installed.

- 5.2.3. Install the ECD069-11 voltage control as follows:
 - 5.2.3.1. Remove the seats and seat deck from the aircraft.
 - 5.2.3.2. If required, remove the battery to allow easier access to the right side of the seat structure.
 - 5.2.3.3. Install the voltage control on the outside of the seat structure as far aft as possible and with the edge of the mounting flange 1 inch/2.5 cm from the top of the seat structure (refer to Figure 1). If the voltage control interferes with the battery installation in this position, the voltage control may be installed on the inboard side of the seat structure. Clean the area around the top mounting hole in the seat structure to provide a case/terminal ground.
 - 5.2.3.4. Refer to Figure 2 and install the electrical wiring for the voltage control, alternate switch, and the "ALT EXC." circuit breaker.
 - 5.2.3.5. If required, reinstall the battery.
 - 5.2.3.6. Start the engine and observe the amp meter at 2200 engine rpm. A positive load should be indicated. Using a D.C. voltmeter, check the alternator output voltage. The voltage should be 14.2 \pm .2/-4 volts. If out of tolerance, adjust the voltage control as required.
 - 5.2.3.7. Reinstall the seat deck and seats after adjusting the voltage control.

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6. PARTS AND SPECIAL TOOLS:

6.1. Parts:

<u>Description</u>	<u>Part Number</u>	<u>Quantity</u>
Voltage Control*	ECD069-11 or LAMAR B00371-9, -11 or -12	1 Each
Circuit Breaker*	MS25244-7 ½	1 Each
Wire, 16 Gauge	M22759/16-16-9	As Required
Hardware:		
Screw	AN520-10R8	2 Each
Nut	AN340-10	2 Each
Washer	AN960-10L	4 Each
Lock Washer	AN935-10	2 Each
Grommet	AN931-4-7	1 Each
*Not required if already installed in aircraft.		

6.2. Special Tools: None

7. MAN-HOURS: 8 Man-hours for complete installation

8. WARRANTY: Per Enstrom Warranty

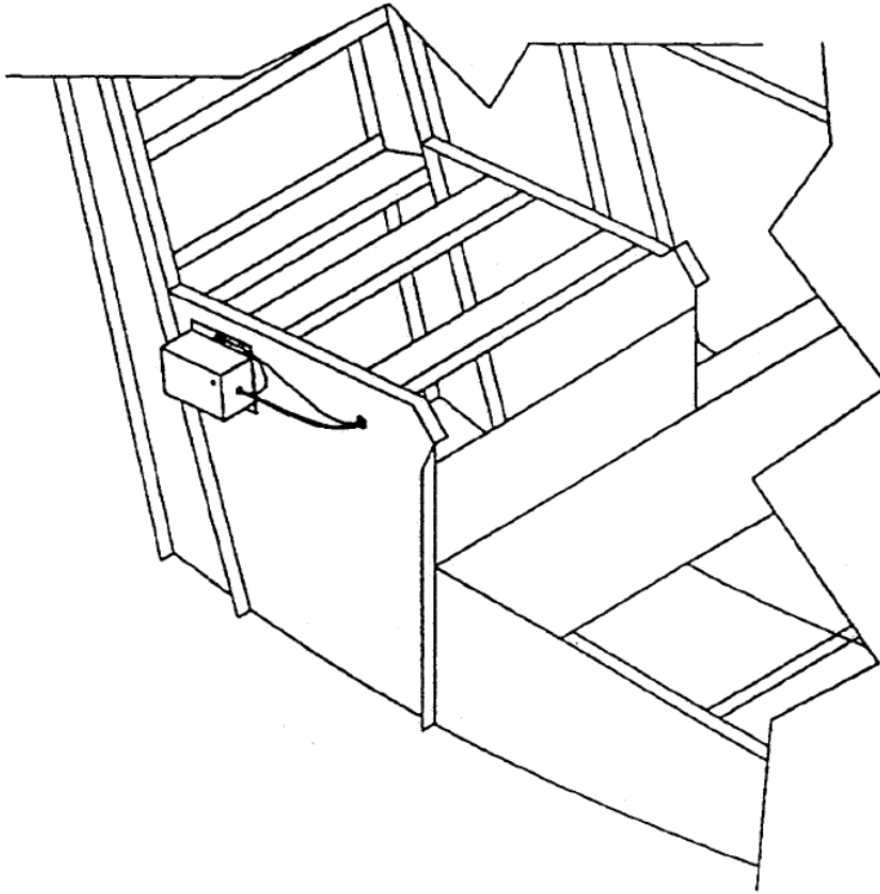
9. WEIGHT CHANGE: None

10. LOG BOOK ENTRY: Enter compliance with this Service Directive Bulletin

11. REPETITIVE INSPECTIONS:

Check the output voltage of the alternator during the 100 hour/annual inspection in accordance with paragraph 5.2.3.6. Adjust the voltage control as required.

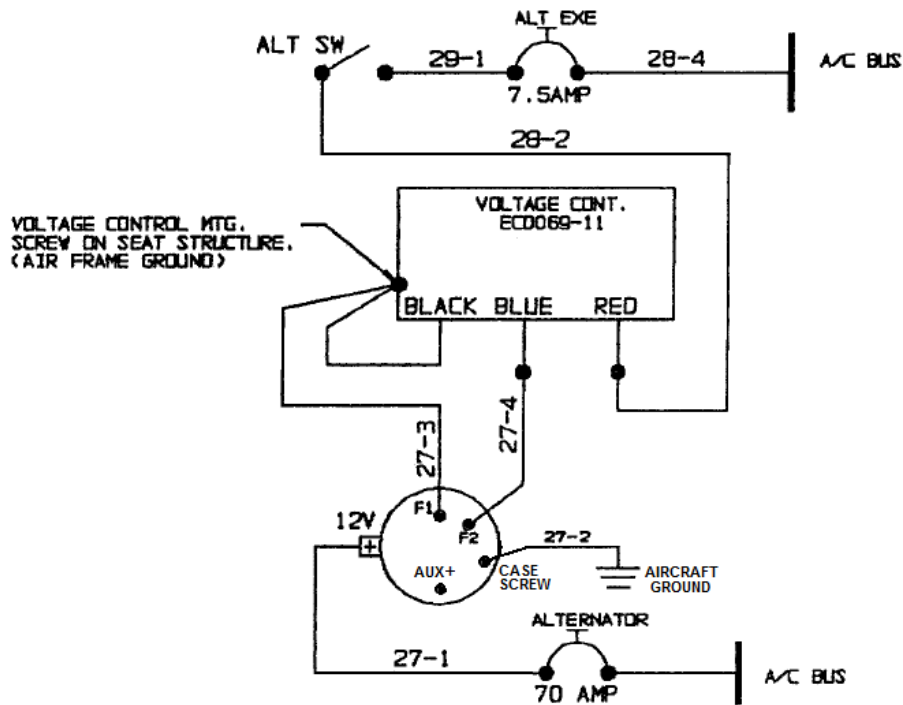
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- NOTES:
1. Install the voltage control on the outside of the seat structure as far aft as possible with the edge of the mounting flange 1 inch/2.5 cm from the top of the seat structure. Install the voltage control on the inside of the seat structure if it interferes with the battery installation.
 2. Install an AN931-4-7 Grommet in the seat structure as required for wiring installation.
 3. Clean the area around the top mounting hole in the seat structure to bare metal for the voltage control case ground and terminal ground.
 4. Use AN520-10R8 Screws, AN340-10 Nuts, AN960-10L Washers, and AN935-10 Lock Washers to install the voltage control.

FIGURE 1. VOLTAGE CONTROL INSTALLATION IN SEAT STRUCTURE

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- NOTES:
1. If the "ALT EXC." circuit breaker is already installed in the aircraft, disregard note 2 and do not modify the wiring from the bus side of the "ALT SW" to the aircraft bus.
 2. Connect wire 28-4 to the aircraft bus at one of the installed circuit breaker bus terminals.
 3. Connect the "BLACK" lead of the voltage control and wire 27-3 to the case ground/seat structure.
 4. Use 16 Gauge wire as required.
 5. F1 at alternator and the black lead of voltage control must be at the same ground potential.
 6. Connect the ground wire 27-2 to case ground. Do not connect it to the AUX+ terminal
 7. All wiring to be accomplished in accordance with AC 43B-1A.

FIGURE 2. VOLTAGE CONTROL INSTALLATION



U.S. Department
of Transportation
**Federal Aviation
Administration**

Small Airplane Directorate
Chicago Aircraft Certification Office
2300 E. Devon Avenue
Des Plaines, IL. 60018

April 23, 2015

Ms. Amy DeKing
Enstrom Helicopter Corporation
2209 22nd Street
Menominee, MI 49858

Dear Ms. DeKing:

This letter is in response to your request of April 22, 2015, for an Alternative Method of Compliance (AMOC) for Airworthiness Directive (AD) 97-20-04 that is applicable to certain Enstrom Helicopter Model helicopters. This AD, issued on October 7, 1997, requires an inspection of the voltage control system and an owner/operator cockpit check of the amperage of the electrical system.

You propose using a revision to your Service Directive Bulletin (SDB) No. 0090 (for which you had previously received and AMOC) be approved as an AMOC to the paragraph (f) requirement of AD 97-20-04.

Based on our review of this document, the Federal Aviation Administration considers your SDB No. 0090, Revision 1, to be acceptable for meeting the requirements of this AD. Accordingly, we approve the use of Enstrom Helicopter Corporation SDB No. 0090, Revision 1, dated April 23, 2015, as an AMOC to AD 97-20-04.

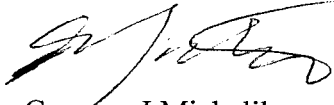
This approval is also subject to the following conditions: If in the future the Chicago Aircraft Certification Office (ACO) determines that this AMOC does not provide an acceptable level of safety, the ACO may revoke or revise the terms of the AMOC following notice to the requester and a seven day opportunity for the requester to comment on the revocation or proposed revision.

All provisions of FAA AD 97-20-04 that are not specifically referenced above remain fully applicable and must be complied with accordingly.

This AMOC only applies to the FAA AD listed above. The FAA does not have the authority to approve this as an AMOC to any AD issued by another civil aviation authority (CAA). Approval of an AMOC to another CAA's AD must come from the CAA of the State of Registry. A copy of this response will be forwarded to the CAA where these aircraft are registered for their consideration.

If you have any questions or need additional information, please contact me at (847) 294-7135 or electronic mail at Gregory.michalik@faa.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Gregory J. Michalik". The signature is fluid and cursive, with a prominent initial "G" and "M".

Gregory J Michalik
Enstrom Helicopter Program Manager
Airframe & Administrative Branch
Chicago Aircraft Certification Office