



## SERVICE DIRECTIVE BULLETIN

SERVICE DIRECTIVE BULLETIN NO. 0090

Revision 2

DATE:        November 21, 2023

1. SUBJECT:    12 Vdc Voltage Control System Modification

### NOTES

Revision 2 updates an installation procedure (Para. 5.2.3.3, Notes 3 and 4 (Page 5)) and hardware part numbers (Para. 6.1) and corrects a typo (Para. 5.2.3.6).

The alternate method of compliance to the initial and repetitive inspection requirements and the terminating action specified in AD 97-20-04 as approved by the Manager, Chicago Aircraft Certification Office, ACE-115C, by the attached letter dated May 13, 2024 (which refers to SDB0090 Revision 2) is still in effect.

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.

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. Remove any paint and clean the area around the top mounting hole in the seat structure to provide a case/terminal ground. Apply CP8-TB Kopr-Shield on mounting flange of the voltage control and on the bare metal mounting surface.
- 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 +.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.

## 6. PARTS AND SPECIAL TOOLS:

## 6.1. Parts:

Description	Part Number	Quantity
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 (or MS35207-263)	2 Each
Nut	AN340-10 (or MS21083N3)	2 Each
Washer	AN960-10L (or NAS1149F0332P)	4 Each
Lock Washer	AN935-10	2 Each
Grommet	AN931-4-7	1 Each
Conductive Anti-Corrosion Surface Compound **	CP8-TB Kopr-Shield	A/R
* Not required if already installed in aircraft.		
** Not supplied, may be procured from a local source.		

## 6.2. Special Tools: None

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

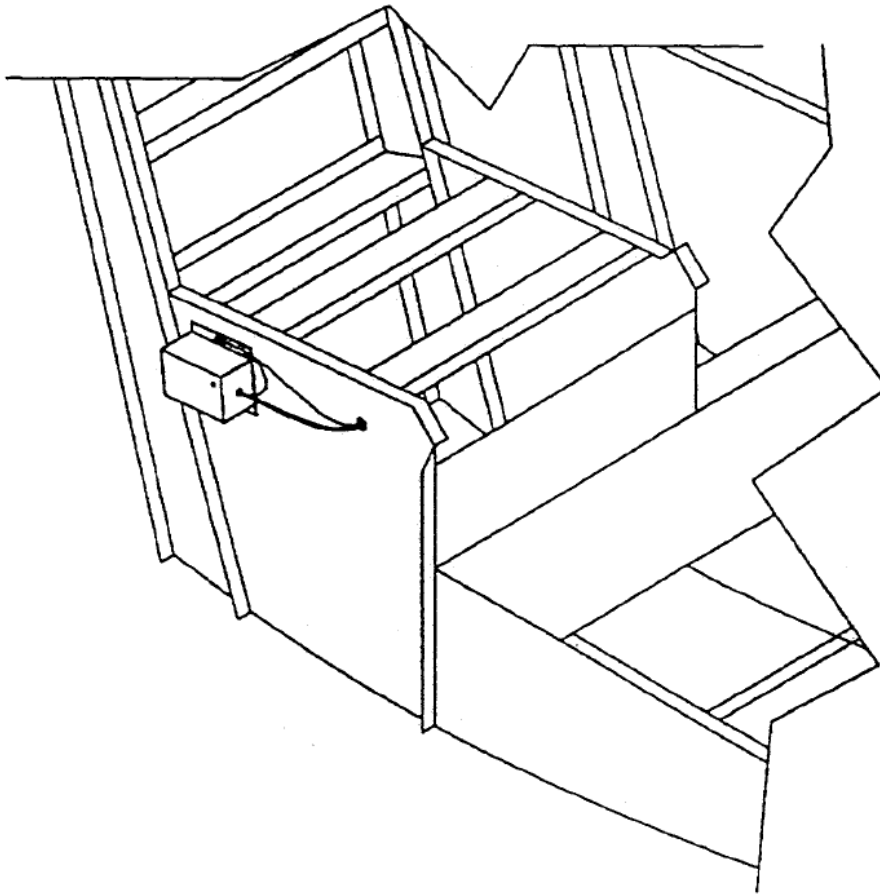
8. WARRANTY: Per Enstrom Warranty

9. WEIGHT CHANGE: None

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

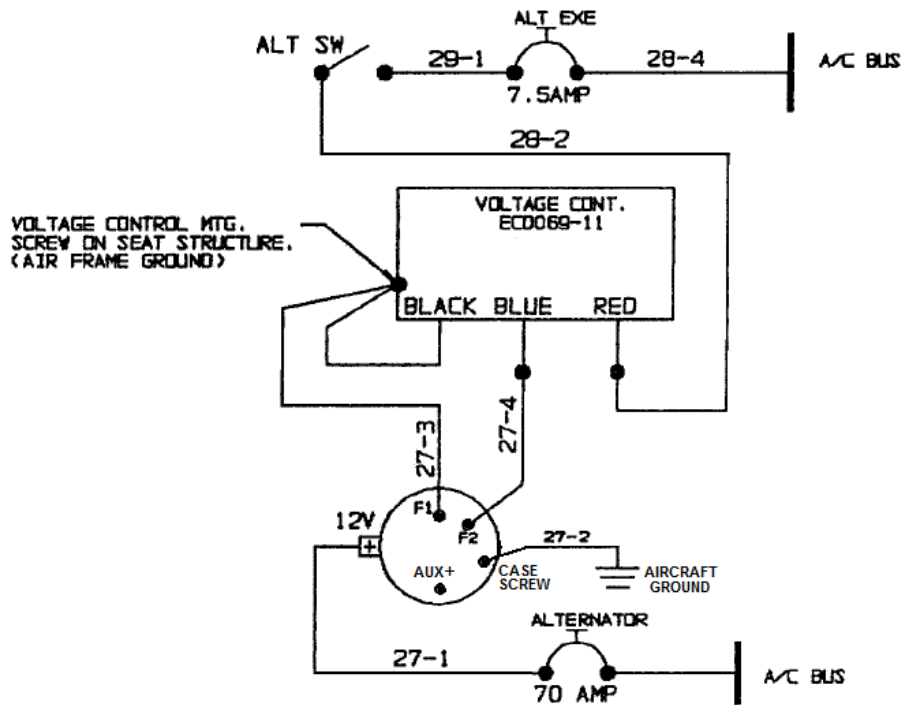
## 11. REPETITIVE INSPECTIONS:

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.



- 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. Remove any paint and clean the area around the top mounting hole in the seat structure to provide a case/terminal ground. Apply CP8-TB Kopr-Shield on mounting flange of the voltage control and on the bare metal mounting surface.
  4. Use hardware listed in Paragraph 6.1 to install the voltage control.

**FIGURE 1. VOLTAGE CONTROL INSTALLATION IN SEAT STRUCTURE**



- 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**



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**FAA APPROVED**

**BOUBACA**    Digitally signed by  
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**DIAKHITE**    T DIAKHITE  
Date: 2024.05.10  
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November 21, 2023

**CENTRAL CERTIFICATION BRANCH**

Attn: Mr. Boubacar Felix Thierry Diakhite  
Aerospace Engineer, Engine & Propulsion Section, AIR-765  
Central Certification Branch, Compliance and Airworthiness Division  
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**C & A DIVISION**

Ref. No.: 811-600-1306

Enclosure:

1. Enstrom Service Directive Bulletin SDB 0090, Revision 2

Dear Mr. Diakhite:

Enclosed for your review is Enstrom Service Directive Bulletin SDB 0090, Revision 2.

Please approve SDB 0090, Revision 2, 12 Vdc Voltage Control System Modification, as an Alternative Method of Compliance (AMOC) to the paragraph (e) requirement of AD 97-20-04.

(Revision 2 updates an installation procedure and hardware part numbers.)

We look forward to your approval of this document. If you have any questions or concerns, feel free to contact us.

Sincerely,

Steve LaCanne  
Director of Engineering

SL/ek