C851/C851D Alternator Retrofit/Upgrade Instructions

CEN alternator models C851 (without duct) and C851D (with duct) are cradle mount, negative ground alternators rated at 28 volts/650 amps. To insure proper installation, follow instructions below.

1. Remove Existing Alternator
   a. Turn off battery switch or disconnect battery ground.
   b. Remove alternator drive belt.
   c. Label wires for identification, then disconnect electrical connections on existing alternator.
   d. Remove alternator mounting bolts and remove alternator from mounting bracket.
   e. If replacing oil-cooled alternator, remove all oil lines and cap off ports at their sources.

2. Install C851/C851D Alternator
   a. Alternators shipped without pulley are shipped with shaft collar, disc spring washer, and nut installed. Remove and discard shaft collar. Make sure Woodruff key is securely wedged in slot in shaft.
   b. Install pulley and furnished disc spring washer with beveled side facing pulley. Torque pulley nut to 163 Nm/120 lb. ft. See Figure 1.

   **CAUTION** Do not hammer pulley when installing pulley on shaft. Carefully slip-fit pulley over shaft to prevent woodruff key from moving out of place.

   ![Figure 1: C851 Alternator](image)

   - B+ terminal
   - B- terminal
   - Regulator
   - Woodruff key
   - Pulley
   - Disc spring washer
   - Fan guard
   - Mounting rails
   - Fan

   Torque nut to 163 Nm/120 lb. ft.

   ![Figure 2: B+ Terminal Hardware Stacking Order](image)

   - Torque B+ hardware to 30 Nm/22 lb. ft.
   - Vehicle B+ cable terminal
   - Bolt
   - Lock washer
   - Flat washer

   ![Figure 3: B- Terminal Hardware Stacking Order](image)

   - Torque B- hardware to 15 Nm/11 lb. in.
   - Vehicle B- cable terminal
   - Bolt
   - Lock washer
   - Flat washer

   ![Torque B- Hardware to 15 Nm/11 lb. in.](image)

   **CAUTION** Mounting hardware should only reach 17.8-22.7 mm (.70-.88 in) into alternator mounting rail.

   d. Connect vehicle B+ cable to alternator B+ terminal. Install hardware on B+ terminal in stacking order shown in Figure 2. Torque to 30 Nm/22 lb. ft.
   e. Connect vehicle B- cable to alternator B- terminal. Install B- hardware in stacking order shown in Figure 3. Torque to 15 Nm/11 lb. in.

   **NOTICE** All cables must be supported within 300 mm (12 in.) to prevent twisting, loosening, and damage to terminals.

3. Install Fresh Air Duct (C851D only)

Attach fresh air duct to duct opening on anti-drive end housing. Duct specifications include:
- 100mm/4 in. diameter duct no more than 2.5 m/8 ft. long must be used.
- A maximum of two 90° bends is allowed.
- Installation must not obstruct airflow.
- Do not allow moisture, such as rain, road spray, or water used during vehicle cleaning, to be ingested by duct.
Charging System Wiring

Adapting Existing Electrical Connections

- If replacing Delco Remy or similar regulator, perform the following steps to modify or reuse existing vehicle cabling to complete installation:
  - 50-VR regulators with Deutsch connector (see Figure 4): Unplug Deutsch harness from regulator and plug it into a CEN A9-940 wiring adaptor. No other wiring modification is required. Secure harness as needed.
  - 50-VR regulator without Deutsch connector (see Figure 5): Disconnect IGN lead at regulator IGN terminal and re-connect to FLD terminal on regulator. Torque screw to 1.4–1.7 Nm/12–15 lb. in.

- If replacing Transtech regulator: remove regulator harness connector and jumper pins 8 and 11 (see Figure 7). Tape or cable tie jumper securely in place. Alternate method is to splice harness wires from pins 8 and 11 together.

- If replacing EMP alternator: remove connectors from F1 and AC pigtails on alternator (see Figure 6).
  - Cut and extend F wire from vehicle and add ring terminal to feed CEN regulator IGN signal. Alternatively, use Aptiv connector P/N 12015791 or equivalent (and appropriate pin and seal for wire gauge) and ring terminal to create adapter to supply ignition voltage to IGN terminal.
  - Cut and extend AC (or R) wire from vehicle if required and add ring terminal to connect to CEN regulator P terminal. Alternatively, use Aptiv connector P/N 12010996 or equivalent (and appropriate pin and seal for wire gauge) and ring terminal to create adapter to connect to regulator P terminal.

![Figure 4: Reuse Existing FLD wire for IGN with A9-940 Adapter](image1.png)

![Figure 5: Reuse Existing FLD wire for IGN by Jumping Terminals](image2.png)

![Figure 6: Reuse Existing FLD wire for IGN and AC wire from EMP](image3.png)

![Figure 7: Reuse Existing FLD wire for IGN by Jumping Harness Sockets](image4.png)
**CEN Regulator Installation**

1. Turn regulator over and make sure set point of switch bottom of regulator is appropriate for type of battery used. If necessary, change switch set point. See Figure 10 and Table 1 for voltage set point options.

2. Mount regulator on alternator with included hardware as shown in page 1 Figure 1 and Figure 8 below or remotely with extension harness. Torque mounting screws to 8.5 Nm/75 lb. in.

3. Plug alternator-to-regulator into receptacle on regulator. See Figure 9 for receptacle location.

4. Connect regulator terminals as required by vehicle:
   - Regulator **IGN terminal** (required) must receive voltage from vehicle DC ignition source, multiplex, or F wire if retrofit from competitor’s system (see page 2) in order to energize regulator. Torque to 4.5 Nm/40 lb. in. See Figure 9.
   - Regulator **D+ terminal** (if required) provides DC system battery voltage to vehicle (5A maximum) for charge indicator lamp, relay, or multiplex while alternator is producing output. Torque terminal hardware to 4.5 Nm/40 lb. in. See Figure 9.
   - Regulator **P/AC terminal** (if required) taps AC voltage from alternator, typically half the charge voltage (3A maximum). P/AC terminal provides alternator RPM frequency at 10:1 ratio for use with tachometer. Torque terminal hardware to 4.5 Nm/40 lb. in. See Figure 9.

5. If using a J1939/temperature-voltage sense harness, plug J1939 harness into J1939 receptacle on regulator. See Figure 9 for receptacle location. Reference CEN document II184 for harness installation instructions. Harness sold separately.

---

**NOTICE** Voltage should be present at regulator IGN terminal when ignition is on or engine is running. No voltage should be present when ignition is off or engine is not running.

---

**Table 1: Regulator Voltage Switch Settings**

<table>
<thead>
<tr>
<th>Position</th>
<th>Conventional Regulator Set Point or Smart Series with Sensor/Harness Not Connected</th>
<th>Battery profile for Smart Series Regulators with Sensor/Harness or Connected (Battery Select)(^2,3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>27.5 V</td>
<td>Maintenance (D category)</td>
</tr>
<tr>
<td>2</td>
<td>28.0 V</td>
<td>Maintenance-free (Group 31)</td>
</tr>
<tr>
<td>3</td>
<td>28.5 V</td>
<td>AGM</td>
</tr>
<tr>
<td>4</td>
<td>29.0 V Flat</td>
<td></td>
</tr>
</tbody>
</table>

---

1. Contact CEN for regulator extension harness options.
2. A9-4036 Harness: 4.5 m/15 ft.
   A9-4049 Harness: 12 m/40 ft.
   A9-4048 Harness: 16.7 m/55 ft.
3. Contact CEN for alternative sensor/harness options.

---

If you have questions about your alternator or these instructions, or if you need to locate a Factory Authorized Service Distributor, please contact us at:

C. E. Niehoff & Co. • 2021 Lee Street • Evanston, IL 60202 USA
TEL: 800.643.4633 USA and Canada • TEL: 847.866.6030 outside USA and Canada • FAX: 847.492.1242
E-mail us at service@CENiehoff.com

---

C. E. Niehoff & Co. • 2021 Lee Street • Evanston, IL 60202
Tech Services Hotline 800-643-4633

Page 3 of 3