Freedom e-GEN System Installation Guide

1. Important Safety Information

READ AND SAVE THESE INSTRUCTIONS - DO NOT DISCARD

This guide is intended for qualified personnel. Certain configuration tasks shall only be performed by qualified personnel in consultation with your local utility and/or an authorized dealer. Electrical equipment shall be installed, operated, serviced, and maintained only by qualified personnel. Servicing of batteries shall only be performed or supervised by qualified personnel with knowledge of lithium-ion batteries and their precautions.

Qualified personnel have training, knowledge, and experience in:
- Installing electrical equipment
- Applying applicable installation codes
- Analyzing and reducing the hazards involved in performing electrical work
- Installing and configuring lithium-ion batteries
- Selecting and using Personal Protective Equipment (PPE)

No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

2. HAZARD OF FIRE, ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

This Freedom e-GEN System Installation Guide is in addition to, and incorporates by reference, the relevant product manuals for each product in the power system. After reviewing this guide you must read the relevant product manuals. Unless specified, information on safety, specifications, installation, and operation is as shown in the primary documentation received with the product. Ensure you are familiar with that information before proceeding. Failure to follow these instructions will result in death or serious injury.

3. System Devices

- Freedom SW Inverter/Charger
  - Freedom SW 3012 (PN: 815-3012)
- ComBox for Freedom SW
  - Conext ComBox for Freedom SW (PN: 809-0918)
- Vehicle Second Alternator with Regulator Module
  - Sprinter 2-cylinder Alternator Kit (PN: 882-0010-12)
  - Sprinter 4-cylinder Alternator Kit (PN: 882-0020-012)
  - Dodge Promaster Alternator Kit (PN: 882-0030-12)
  - Sprinter 6-cylinder Alternator Kit (PN: 882-0010-12)
- Li-ion Battery Module and BMS
  - Li-ion Battery Module 60Ah (PN: 880-0600-12)
  - Li-ion Battery Management System (PN: 881-0400-12)
- Recommended DC Wiring Components
  - [A] 500A Battery Disconnect Switch, Blue Sea 3000
  - [B] 350A Class T fuse, Littelfuse JLLN350
  - [C] User-defined based on DC load branch cable size. See all NOTES under "Table 1: Cable Size Recommendations"
- DC wiring components are marked out in the "System Schematic." Follow the cabling instructions according to the manufacturer's installation guide. Follow carefully polarity markings.
- Install the recommended DC fuses to on their respective fuseholders.
- Connect the system wiring harness following the "System Schematic." Use the labels on the wiring harness as a guide. Follow the vehicle manufacturer's instructions when wiring to the vehicle's ignition circuit.
- Install a venting tube (rubber tubing) to the pressure balancing valve and secure it with a clamp. See "System Schematic."
Failure to follow these instructions can result in damage to equipment.

NOTE 1: Mount and install the equipment before making cable or wiring connections. This system schematic is not intended to guide the actual placement of equipment. Plan the installation of the system before proceeding with the actual installation. Read all safety instructions in this guide and in the installation guides of all equipment.

Failure to follow these instructions can result in damage to equipment and void the warranty.

REVERSE POLARITY DAMAGE

Check cable polarity at the battery module, the BMS, the second alternator, and the inverter before making the DC connections. Positive cable must be connected to the positive terminal; negative cable must be connected to the negative terminal.

Failure to follow these instructions can result in damage to equipment and void the warranty.

NOTE 2: Install the second alternator using the mounting bracket provided in the Alternator Kit. Check the belt tension between the engine and second alternator according to the manufacturer's recommendations and adjust accordingly using the provided tensioner.

Follow the second alternator manufacturer's wiring instructions and use the manufacturer's wiring harness to make the connection between the second alternator and the BMS.

Make sure that the second alternator’s temperature sensor is installed on the second alternator’s chassis and connected to the correct pins on the BMS to prevent equipment damage and fire.

NOTE 3: Route data cables away from devices that can potentially interfere with data communications.

Table 1: Cable Size Recommendations

<table>
<thead>
<tr>
<th>Cable is from the device to the DC busbar</th>
<th>Conduit Cable Size</th>
<th>Free Air Cable Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device</td>
<td>Typical Amps</td>
<td>Cable Size (kcmil)</td>
</tr>
<tr>
<td>Alternator</td>
<td>270</td>
<td>300</td>
</tr>
<tr>
<td>Freedom SW</td>
<td>320</td>
<td>400</td>
</tr>
<tr>
<td>BMS</td>
<td>300</td>
<td>400</td>
</tr>
</tbody>
</table>

NOTE:
- The DC cables must be rated for 105 °C insulation and must be UL listed and certified. Always use a qualified installer to ensure the installation complies with regional, national, and local electrical codes.
- Longer cables may cause excessive voltage drop and affect system performance. Keep cable length as short as practically possible.
- Use two wires (black and white) for all DC connections. Do not use the vehicle chassis as a ground or as a return path.
- Use the recommended bushings to make the DC connections to ensure sufficient current-carrying capacity.
- For the DC load branch, the total current must not exceed the main battery fuse rating. The DC load cables and fuses must be sized to meet regional, national, and local electrical standards.
- Do not expose the Li-ion battery to rain, snow, or liquid of any type. This battery pack is not suitable for marine applications.
- The Li-ion battery module must be used with the Li-ion Battery Management System (BMS).
- Always wear proper PPE (safety glass and clothing) when working on the Li-ion battery.
- Do not wear metallic items such as watches or bracelets when working on the battery. Use insulated tools to prevent accidental short circuits.
- Do not attempt to open or dismantle the Li-ion battery. If the battery module is damaged, do not touch the corrosive electrolyte or powder. In case battery content comes in contact with skin or eyes, immediately flush the affected area with large amount of clean water and seek medical help.
- If the battery module is damaged, it can release harmful gases. Ensure the work environment is well-ventilated.
- In case of fire, use only a Class ABC type (dry chemical) fire extinguisher. Water can be a dangerous extinguishing medium for energized equipment because of the risk of electrical shock.
- Dispose of Li-ion batteries through a local recycling center. Do not mix batteries with other wastes.
- Always wear proper PPE (safety glass and clothing) when working on the Li-ion battery.
- Make sure the Li-ion battery module is fastened and secured. The battery module is heavy and can become a crush hazard if not secured properly.
- Do not install the Li-ion battery module under the engine hood or adjacent to any heat source.
- You must install and use the recommended battery disconnect, fuses, and bushings. Replace expended fuses with fuses of the same specifications.
- Do not install the Li-ion battery module unless the engine hood is closed and secured.
- Always wear proper PPE when handling Li-ion battery modules.
- Failure to follow these instructions will result in death or serious injury.

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RISK OF EQUIPMENT DAMAGE OR PERSONAL INJURY
- The Li-ion battery module must be mounted upright on a non-conductive plane. Always follow the manufacturer's mounting instructions.
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- Do not install the Li-ion battery module on the engine hood or adjacent to any heat sources.
- You must install and use the recommended battery disconnect, fuses, and bushings. Replace expended fuses with fuses of the same specifications.
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CAUTION

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