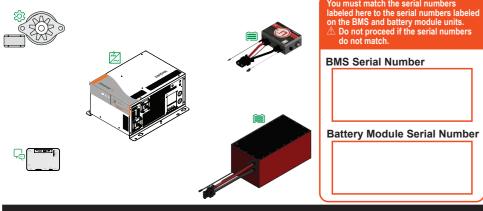
Freedom e-GEN System **Installation Guide**



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.

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Important Safety Information

This guide is intended for gualified personnel. Certain configuration tasks shall only be performed by gualified personnel in consultation with your local utility and/or an authorized dealer. Electrical equipment shall be installed, operated, serviced, and maintained only by gualified personnel. Servicing of batteries shall only be performed or supervised by gualified personnel with knowledge of lithium-ion batteries and their required precautions. See Equipment Damage NOTICE. Qualified personnel have training, knowledge, and experience in:

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Installing electrical equipment

- Applying applicable installation codes
- Analyzing and reducing the hazards involved in performing electrical work
- Installing and configuring batteries particularly Li-ion
- 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.

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

- · Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- Equipment shall only be installed and serviced by qualified electrical personnel. Never operate equipment energized with covers removed.
- Inverters are energized from multiple sources. Before removing covers of inverters and other
- equipment identify all sources, de-energize, lock-out, and tag-out and wait 2 minutes for circuits to discharge
- Always use a properly rated voltage sensing device to confirm all circuits are de-energized. Failure to follow these instructions will result in death or serious injury.

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- connected to the AC input around.

HAZARD OF HEAVY LOAD Do not lift heavy equipment by yourself. Use two or more people to lift and mount heavy equipment such as the inverter and battery. Use proper lifting techniques during installation to prevent injury. Failure to follow these instructions can result in injury.

Introduction

- a Freedom SW inverter/charger for power conversion,

5

energy storage

System Devices

O choose one required option □ only one option

Freedom SW inverter/charger unit □ Freedom SW 3012 (PN: 815-3012)

ComBox for Freedom SW

□ Conext ComBox for Freedom SW (PN: 809-0918)

Vehicle 2nd alternator/regulator module

- O Sprinter 6-cylinder Alternator Kit (PN: 882-0010-12)
- O Sprinter 4-cylinder Alternator Kit (PN: 882-0020-012)
- O Dodge Promaster Alternator Kit (PN: 882-0030-12)

Lithium Ion battery module and BMS

- Li-Ion Battery Module 600Ah (PN: 880-0600-12)
- □ Li-Ion Battery Management System (PN: 881-0400-12)

Recommended DC disconnect and fuses with fuseholder □ [A] 500A Battery Disconnect Switch Blue Sea 3000

- □ [B] 400A Littelfuse JLLN400X(-XP) The fuses are called
- □ [C] 350A Littelfuse JLLN350X(-XP) out in the schematic as
- □ [D] 300A Littelfuse JLLN300X(-XP) [A], [B], [C], [D] & [E].
- □ [E] User defined (must match and protect the DC cable and load) see "Table 1:Cable Size Recommendations"
- □ Fuseholder (for all) Littelfuse LSCR002

Accessories

- Wiring harness and junction box (PN: 881-0011-12)
- Harness plate (PN: 881-0010-12)
- LCD display (PN: 881-0401-12)

60 PN: product number

Communication

- Computer (laptop/PC) or an Android tablet Wireless (or wired) Internet Modem/router
- Xanbus cable(s) and Xanbus network terminator

Installation

- 1. Gather and read the installation guides of each device listed in "System Devices".
- 2. Prior to installation, identify and isolate all energy sources from the system. De-energize the system—remove AC power, turn off vehicle ignition, and make sure the BMS Power button is in off position throughout the entire installation process. Follow all necessary safety precautions, use personal protective equipment (PPE) and perform lock-out, tag-out (LOTO).
- 3. Plan and mount each device in "System Devices", the DC fuseholders, the modem/router, and the accessories according to the mounting instructions for each device and accessory. See NOTE 1.
- 4. Install and mount the second alternator including the wiring harness using the tools and instructions provided in the alternator kit. See NOTE 2.
- 5. Install the recommended DC disconnect at the pos(+) terminal of the BMS (as close to the pos(+) terminal) following the system overview schematic. NOTE: Perform LOTO to keep the DC disconnect in off position during installation.
- 6. Make the DC cable connections between all the system devices following the
- system overview schematic. Follow the cabling instructions according to the manufacturer's installation guide. Follow carefully polarity labels/markings.
- 7. Install the recommended DC fuses on to their fuseholders. See schematic.
- 8. Connect the wiring harness following the system overview schematic. Use labels on the wiring harness as a guide. Follow the vehicle manufacturer's instructions when wiring to the vehicle's ignition circuit.
- 9. Install a venting tube (rubber tubing) to the pressure balancing valve (see schematic) and secure it with a clamp. See NOTE 3.

10. Make AC wiring connections to the Freedom SW according to its installation guide. Ensure that circuit breakers and surge protectors are properly installed. Install the Junction Box (PN: 881-0011-12) according to the Junction Box Diagram, as close to the Freedom SW AC INPUT terminals as possible. If the Junction Box is not going to be used, the alternative and its installation must comply with regional, national, and local electrical codes.

- smartphone.
- **NOTICE** prior to powering up.

Configuration

- 2. Using the following configure the Freed inverter/charger set "Device Parameter

~ Inverter S Parameter Low Batt Cut Out LBCO Delav High Batt Cut Out [~] Charger S Parameter Battery Type

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HAZARD OF ELECTRIC SHOCK OR PERSONAL INJURY

· Make sure that existing wiring is in good condition and that wires/cables are not undersized. · Do not operate the inverter and other equipment with damaged or substandard wiring. . Do not expose any of the equipment to rain, snow, or liquids of any type. Products in the system are designed for indoor use only.

· Equipment such as the inverter must be provided with an equipment-grounding conductor

 Install means of disconnection from all power sources, such as, AC and DC circuit breakers. Failure to follow these instructions can result in death or serious injury.

The Freedom e-GEN System Installation Guide provides a system overview and installation instructions of a complete power solution that includes:

- a ComBox for communication and LCD Display for monitoring,
- a vehicle's motor/2nd alternator as a power source, and
- a Lithium Ion battery pack with a Battery Management System (BMS) for



11. Download and install the ComBox web application to a computer, tablet, or

12. Check the whole installation and connections. Remove LOTO. Follow the system user guide and power up the system. See Reverse Polarity Damage

13. Monitor system status using ComBox's Freedom SW Android app or web app.

1. Open the ComBox's FSW Android app from a tablet (or computer/smartphone). See the ComBox Owner's Guide for logging-in instructions.

tables here,	Custom Battery Settings		
dom SW ettings (under e rs " for FSW).	Parameter Equalize Support Bulk Voltage	Value Disabled 14.6 V	
Settings Value 12.1 V 10 sec 14.8 V	Absorb Voltage Float Voltage Batt Capacity Max Charge Rate Charge Cycle Default Batt Temp	14.6 V 13.4 V 600 Ah 100% 3-Stage Warm	
Settings Value	ReCharge Volts Absorb Time	12.4 V 30 min	
Custom	Auto Charge Enable	Enabled	

Schematic

NOTICE

EQUIPMENT DAMAGE The power system overview including the schematic is for information and illustration purposes only. Use a professional installer that satisfies the requirements for a qualified personne Failure to follow these instructions can result in damage to equipment.

NOTICE

REVERSE POLARITY DAMAGE

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

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

NOTICE

PROPERTY DAMAGE AND PERSONAL INJURY

Verify the weight of individual system devices from their installation guides and the weight bearing capacity of the compartments in which these devices will be mounted and installed. Always mount and fasten devices securely according to their installation guides.

Failure to follow these instructions can result in damage to property and personal injury.

NOTE 1: Mount and install the equipment before proceeding to do the cabling/wiring. The schematic is not intended to guide the actual placement of equipment. Plan the installation of the system before proceeding with the actual installation. Follow all safety instructions in this guide and in the installation guides of all equipment.

Icons, such as R appearing in the schematic correspond with "System Devices".

NOTE 2: Follow the second alternator manufacturer's wiring instructions and use the manufacturer's wiring harness to connect the second alternator to the Balmar Regulator. To avoid equipment damage and fire, install the second alternator's temperature sensor from the Alternator Kit and make sure to secure it to the second alternator's chassis. To protect from debris, install the second alternator in the vehicle with a skid plate (strongly recommended).

Install the second alternator's 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. Make sure that all electrical connections are secure and properly protected from dust and water.

NOTE 3: Mount and install all equipment with sufficient air ventilation and clearances according to each equipment's installation instructions.

Route data cables away from devices that can potentially interfere with data communications

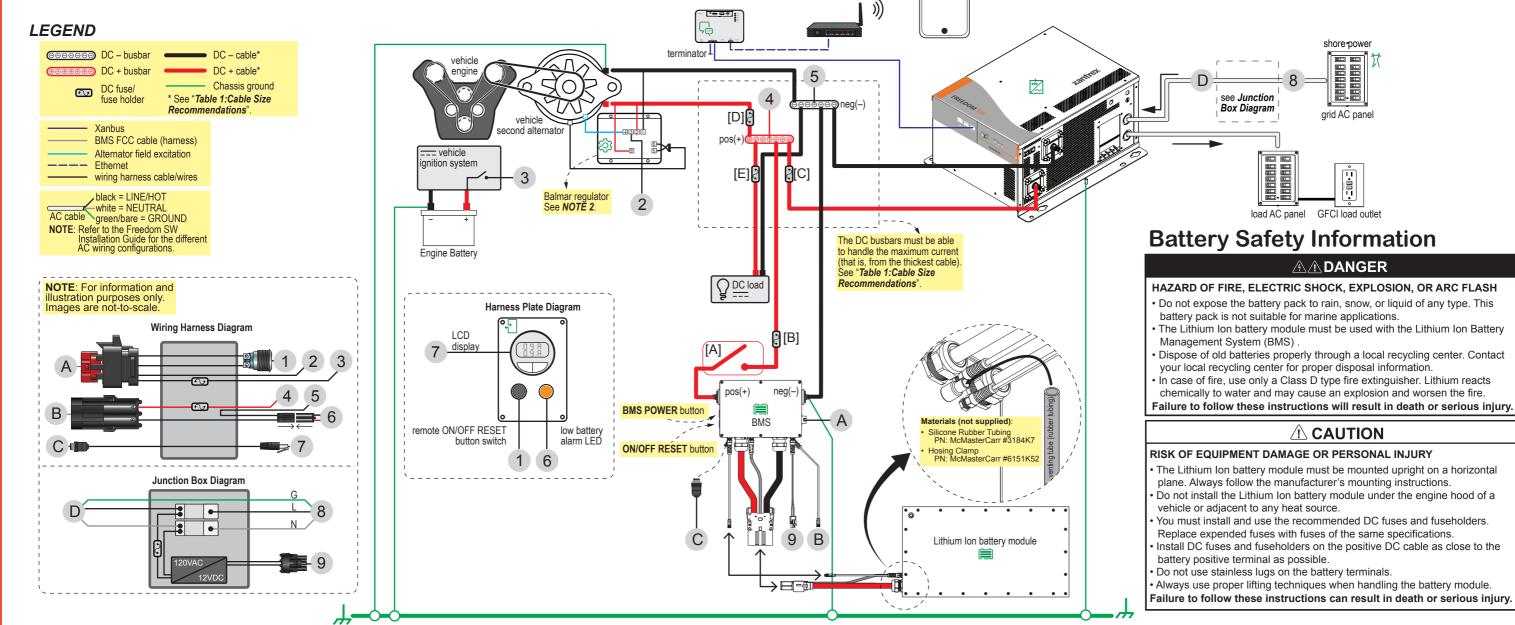
Table 1: Cable Size Recommendations

Cable is from to the DC bus

DC busbar to: T Alternator Freedom SW

BMS

NOTE: These are the minimum recommended DC cable sizes for copper conductors rated 75 °C. Always use a qualified installer to ensure compliance to regional, national, and local electrical standards. Longer cables may cause excessive voltage drop and may affect system performance. NOTE: For the DC load, the cable and fuse must be sized to meet regional, national, and local electrical standards





the device bar.	Conduit Cable length < 10 ft	Free Air Cable length < 5 ft	
ypical Amps	Cable Size	Cable Size	
270	300 kcmil	3/0 AWG	
320	400 kcmil	4/0 AWG	
400	600 kcmil	300 kcmil	

Battery Safety Information

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

• Do not expose the battery pack to rain, snow, or liquid of any type. This

• Dispose of old batteries properly through a local recycling center. Contact your local recycling center for proper disposal information.

chemically to water and may cause an explosion and worsen the fire.

RISK OF EQUIPMENT DAMAGE OR PERSONAL INJURY

• The Lithium Ion battery module must be mounted upright on a horizontal plane. Always follow the manufacturer's mounting instructions. Do not install the Lithium Ion battery module under the engine hood of a

- You must install and use the recommended DC fuses and fuseholders.
- Install DC fuses and fuseholders on the positive DC cable as close to the

Always use proper lifting techniques when handling the battery module. Failure to follow these instructions can result in death or serious injury.