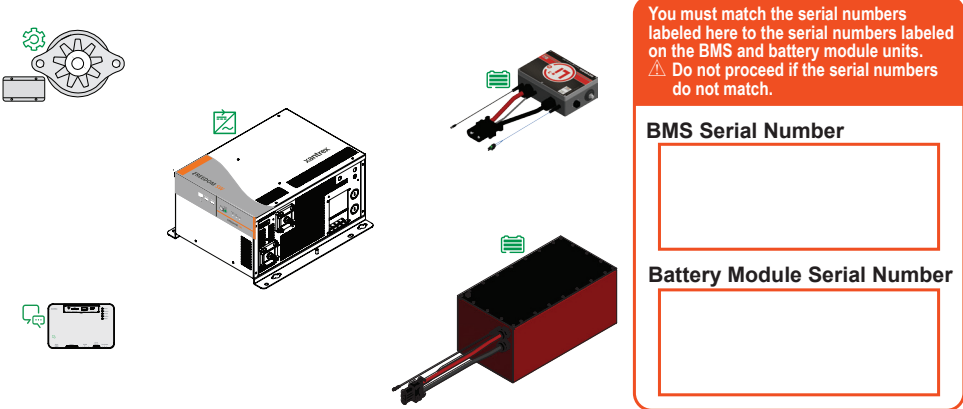


Freedom e-GEN System
Installation Guide



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 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 required precautions. See *Equipment Damage NOTICE*.

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 batteries particularly Li-ion
- Selecting and using Personal Protective Equipment (PPE)

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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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WARNING

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 connected to the AC input ground.
- 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.

CAUTION

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

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

- a Freedom SW inverter/charger for power conversion,
- 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 energy storage

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System Devices

☐ choose one required option ☐ only one option PN: product number

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

- ☐ Sprinter 6-cylinder Alternator Kit (PN: 882-0010-12)
- ☐ Sprinter 4-cylinder Alternator Kit (PN: 882-0020-012)
- ☐ 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)
- ☐ [C] 350A Littelfuse JLLN350X(-XP)
- ☐ [D] 300A Littelfuse JLLN300X(-XP)
- ☐ [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)

The fuses are called out in the schematic as [A], [B], [C], [D] & [E].

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Communication

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

Installation

- Gather and read the installation guides of each device listed in “**System Devices**”.
- 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).
- 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**.
- Install and mount the second alternator including the wiring harness using the tools and instructions provided in the alternator kit. See **NOTE 2**.
- 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.
- 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.
- Install the recommended DC fuses on to their fuseholders. See schematic.
- 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.
- Install a venting tube (rubber tubing) to the pressure balancing valve (see schematic) and secure it with a clamp. See **NOTE 3**.

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- 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.
- Download and install the ComBox web application to a computer, tablet, or smartphone.
- Check the whole installation and connections. Remove LOTO. Follow the system user guide and power up the system. See **Reverse Polarity Damage NOTICE** prior to powering up.
- Monitor system status using ComBox's Freedom SW Android app or web app.

Configuration

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

2. Using the following tables here, configure the Freedom SW inverter/charger settings (under “**Device Parameters**” for FSW).

Inverter Settings

Parameter	Value
Low Batt Cut Out	12.1 V
LBCO Delay	10 sec
High Batt Cut Out	14.8 V

Charger Settings

Parameter	Value
Battery Type	Custom

Custom Battery Settings

Parameter	Value
Equalize Support	Disabled
Bulk Voltage	14.6 V
Absorb Voltage	14.6 V
Float Voltage	13.4 V
Batt Capacity	600 Ah
Max Charge Rate	100%
Charge Cycle	3-Stage
Default Batt Temp	Warm
ReCharge Volts	12.4 V
Absorb Time	30 min
Auto Charge Enable	Enabled

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