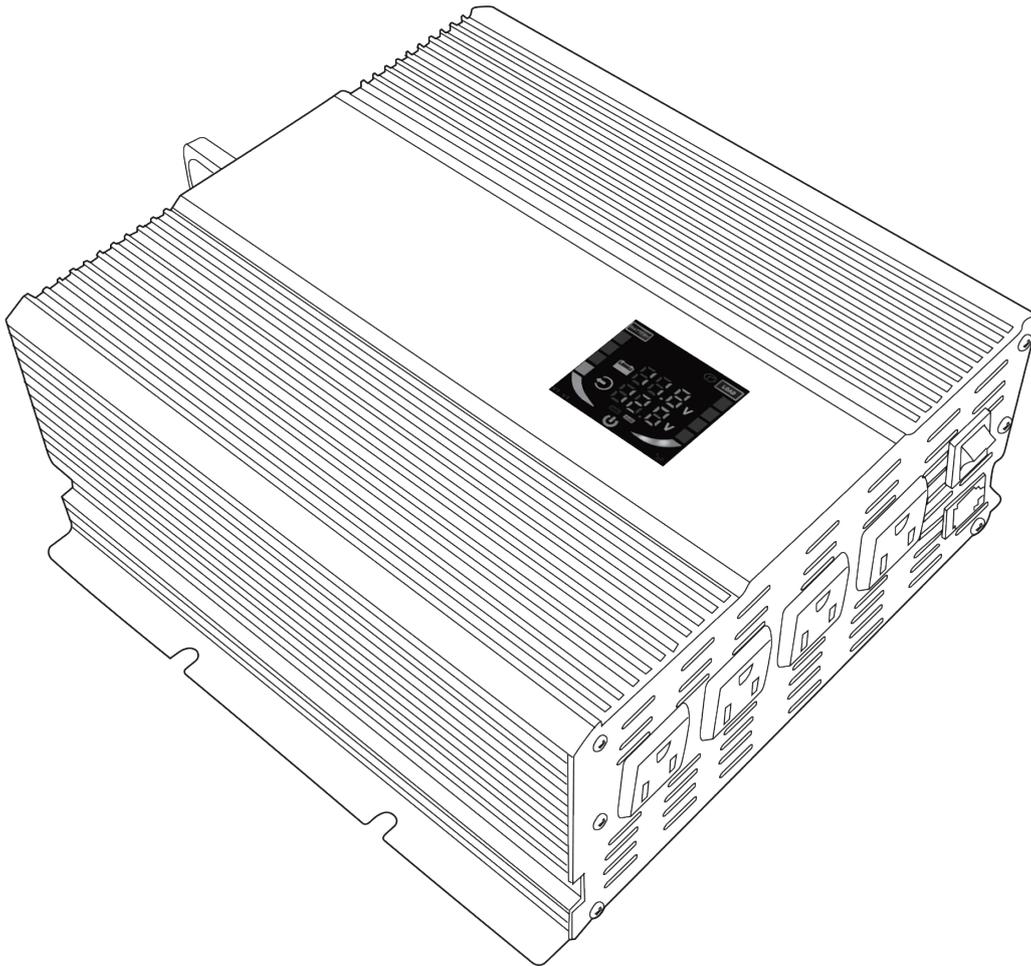


MASTERsine™ Inverter PXA Series



Installation Guide

Important Safety Instructions

IMPORTANT: Read and save this Installation Guide for future reference.

This chapter contains important safety instructions for the MASTERSine PXA Inverter.



WARNING: Shock, fire, and heat hazard. Risk of injury to persons.

1. Before installing and using the MASTERSine PXA Inverter, read all instructions and cautionary markings on or provided with the MASTERSine PXA Inverter, the batteries, and all appropriate sections of this guide.
2. Do not expose the MASTERSine PXA Inverter to rain, snow, spray, or bilge water. This product is not intended for marine applications.
3. To reduce risk of fire hazard, do not cover or obstruct the ventilation openings. Do not install the MASTERSine PXA Inverter in a zero-clearance compartment. Overheating may result.
4. To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition, adequately rated, and not undersized. Do not operate the MASTERSine PXA Inverter with damaged or substandard wiring.
5. Do not install or operate the MASTERSine PXA Inverter if it has received a sharp blow, been dropped, or otherwise damaged in any way. If the MASTERSine PXA Inverter is damaged, please contact our support service department accordingly.
6. Do not disassemble the MASTERSine PXA Inverter. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the MASTERSine PXA Inverter yourself may result in a risk of electrical shock or fire. Internal capacitors remain charged after all power is disconnected.
7. To reduce the risk of electrical shock, disconnect DC power from the MASTERSine PXA Inverter before attempting any maintenance or cleaning or working on any circuits connected to the MASTERSine PXA Inverter. Turning off controls will not reduce this risk.
8. The MASTERSine PXA Inverter must be provided with equipment-grounding conductors connected to the vehicle chassis .

Precautions When Working With Batteries



WARNING: Explosion or fire hazard

1. Follow all instructions published by the battery manufacturer and the manufacturer of the equipment in which the battery is installed to reduce the risk of battery explosion.
2. Working in the vicinity of lead-acid batteries is dangerous. Batteries generate explosive gases during normal operation. Therefore, you must read this guide and follow the instructions exactly before installing or using your MASTERSine PXA Inverter.
3. This equipment contains components which tend to produce arcs or sparks. To prevent fire or explosion, do not install the MASTERSine PXA Inverter in compartments containing batteries or flammable materials, or in locations that require ignition-protected equipment. This includes any space containing gasoline-powered machinery, fuel tanks, as well as joints, fittings, or other connections between components of the fuel system.
4. Make sure the area around the battery is well ventilated.
5. Never smoke or allow a spark or flame near the engine or batteries.
6. Use caution to reduce the risk of dropping a metal tool on the battery. It could spark or short circuit the battery or other electrical parts and could cause an explosion.
7. If you need to remove a battery, always remove the ground terminal from the battery first. Make sure all accessories are off so you don't cause a spark.



WARNING: Risk of personal injury due to burns or battery acid

8. Remove all metal items, like rings, bracelets, and watches when working with lead-acid batteries. Lead-acid batteries produce a short circuit current high enough to weld metal to skin, causing a severe burn.
9. Have someone within range of your voice or close enough to come to your aid when you work near a lead-acid battery.
10. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
11. Wear complete eye protection and clothing protection. Avoid touching your eyes while working near batteries.
12. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters your eye, immediately flood it with running cold water for at least twenty minutes and get medical attention immediately.

Designing Your Installation

Before doing anything else, you need to determine how you are going to use your inverter, and then design a power system that will give you maximum performance. The more thorough your planning, the better your power needs will be met. In particular, you will need to:

- Calculate your battery requirements
- Choose an effective charging system
- Choose an appropriate location and mounting orientation
- Calculate the cable size for your inverter
- Select the correct fuses or circuit breakers

Study Figure 1-1 “Configuration for Normal Loads” and Figure 1-2 “Configuration for Heavy Loads” for an example of a setup for normal or heavy loads in a vehicle. When you have decided upon your configuration, then you can calculate battery requirements.

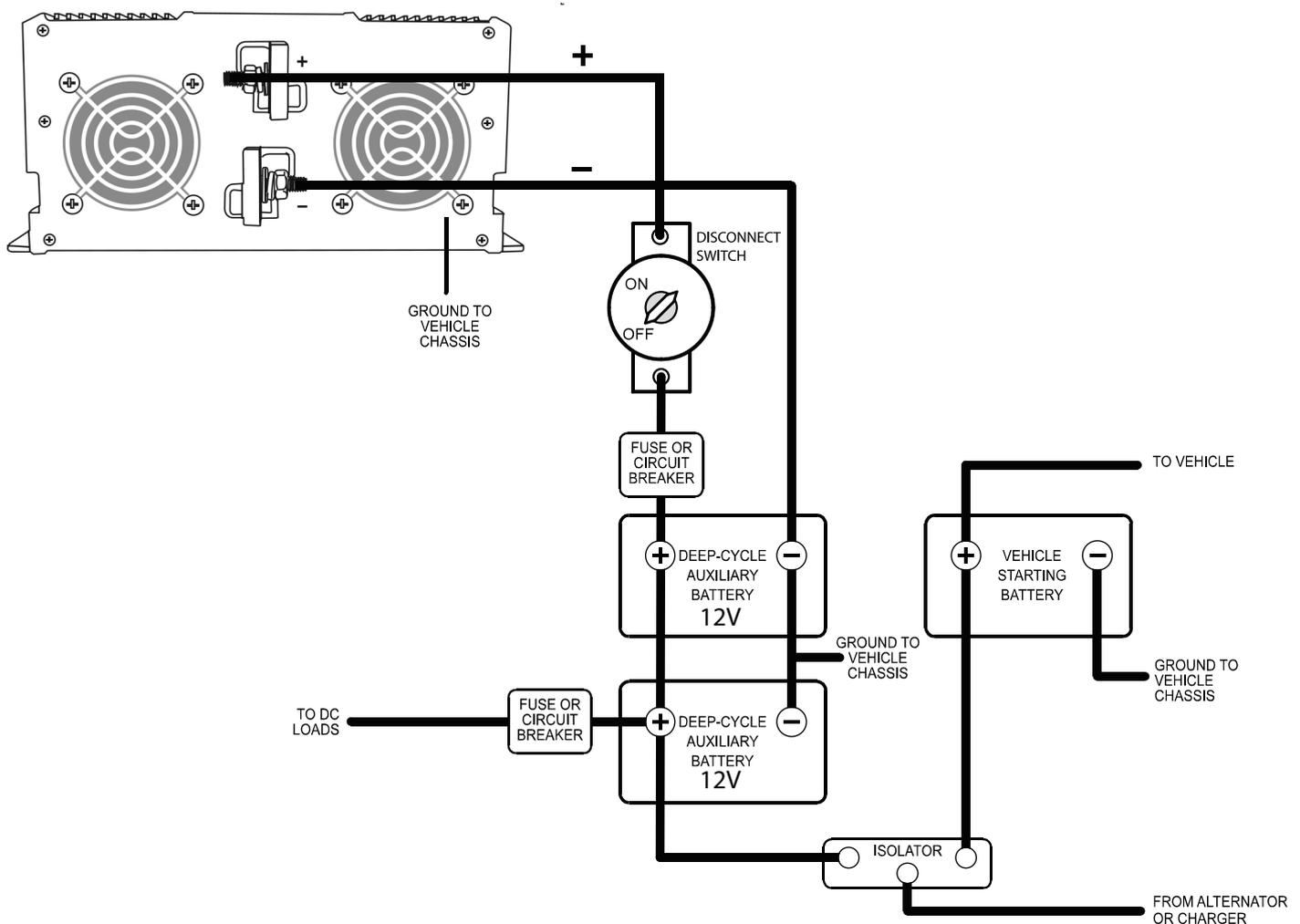


Figure 1-1 Configuration for Normal Loads

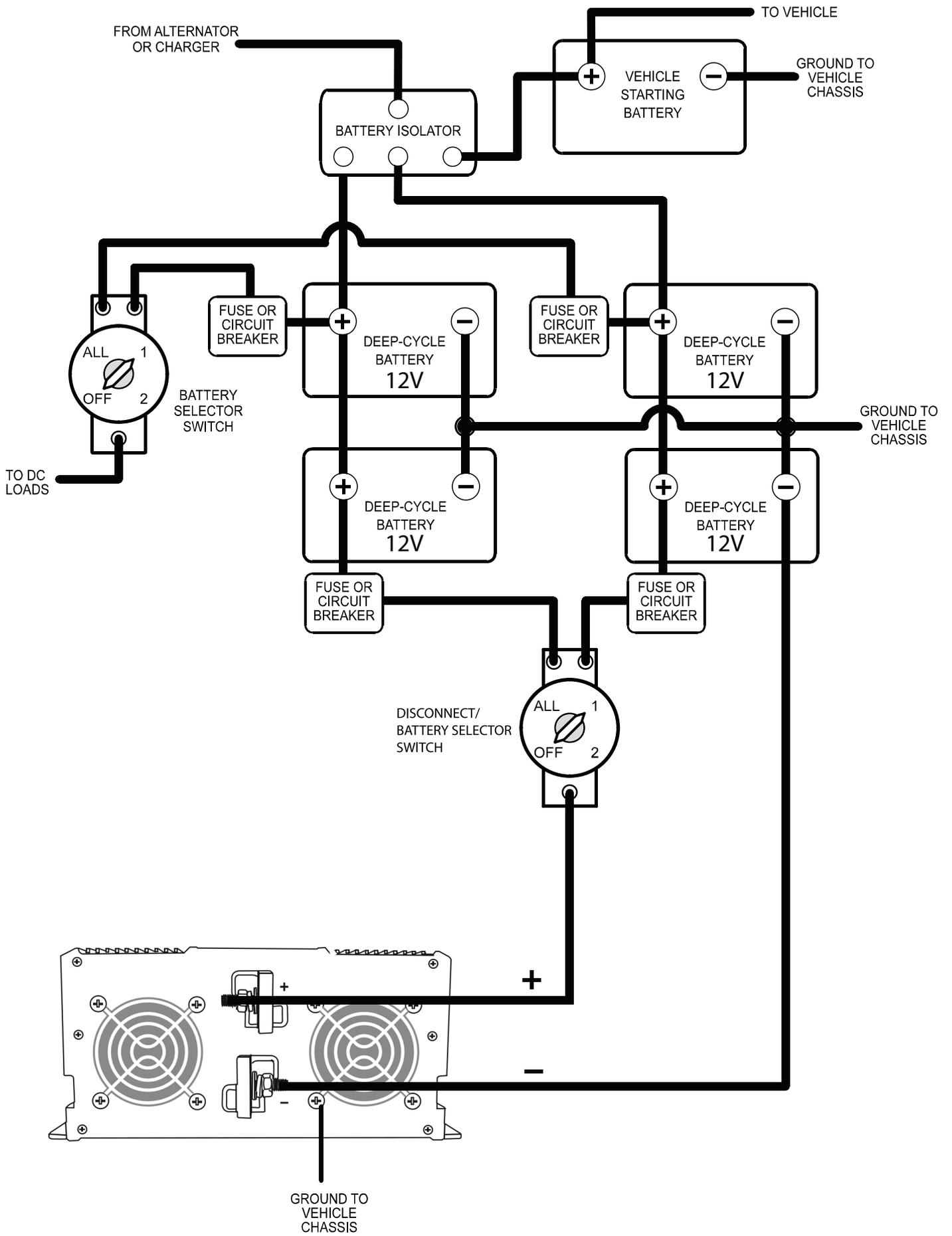


Figure 1-2 Configuration for Heavy Loads

Calculating Battery Requirements

Battery type and battery size strongly affect the performance of the inverter. Therefore, you need to identify the type of loads your inverter will be powering, and how much you will be using them between charges. Once you know how much power you will be using, you can determine how much battery capacity you need. We recommend that you purchase as much battery capacity as possible.

For information on calculating battery capacity, go to www.pooextra-inverter.com, click “Inverter Academy”, choose the “Basic Knowledge”, you can find some useful skills.



CAUTION: Equipment damage(for 12V DC input)

The inverter must only be connected to a 12 V battery system. It will not operate if connected to a 6 V battery and will be damaged if connected to a 24 V battery.

Choosing an Effective Charging System

The charging system must be appropriate for your particular installation. A well-designed charging system will ensure that power is available when you need it and that your batteries remain in top condition. Inadequate charging will degrade system performance, and the wrong type of charger will reduce battery life.

For information about choosing an effective battery charging system, go to www.pooextra-inverter.com, click “Inverter Academy”, there are lots of materials you can learn.

NOTE: If the main charging source will be the vehicle's alternator, then its voltage and current ratings must be appropriate for the size and type of battery that is selected.

Choosing an Appropriate Location and Mounting Orientation



WARNING: Fire or explosion hazard

The inverter contains components which tend to produce arcs or sparks. To prevent fire or explosion, do not install the MASTERSine PXA Inverter in compartments containing batteries or flammable materials, or in locations that require ignition-protected equipment. This includes any space containing gasoline-powered machinery, fuel tanks, as well as joints, fittings, or other connections between components of the fuel system.



WARNING: Fire hazard

To reduce the risk of fire, do not cover or obstruct the ventilation openings. Do not install the inverter in a zero-clearance compartment. Overheating may result.



WARNING: Shock hazard

Do not install the MASTERSine PXA Inverter in a wet environment or in any other environment where moisture can occur and enter the inverter enclosure through the ventilation openings. This unit is not intended for marine applications.

Appropriate Location

The inverter must only be installed in a location that is:

- Dry** Do not allow water or other liquids to drop or splash on it.
- Cool** Ambient air temperature should be between 0 and 40°C (32 and 105°F)—the cooler the better within this range.
- Ventilated** Allow at least 3" (76 mm) of clearance around the inverter for air flow. Ensure that the ventilation openings on each end of the inverter are not obstructed.
- Safe** Do not install the inverter in the same compartment as batteries or in any compartment capable of storing flammable liquids like gasoline.

Close to battery

Do not use excessive DC cable lengths: they increase wire resistance which leads to voltage drop and heating. Consequently, they reduce available power and run-time. Longer AC wires are preferable to longer DC wires: voltage drop is less of an issue and the cost is lower.

Protected from battery gases

Do not mount the inverter where it will be exposed to gases produced by batteries. Battery gases are corrosive, and prolonged exposure to battery gases will damage the inverter.

Mounting Dimensions

You can download our mounting dimensions from our website www.pooxtra-inverter.com, click "Inverter Academy", you will find the "Downloads" menu and click the "Installation Guides".

Mounting Orientation

The inverter must be oriented in one of the following ways:

- Horizontally on a vertical surface. (Do not mount with the fan pointing up or down.)
- On a horizontal surface.
- Under a horizontal surface.

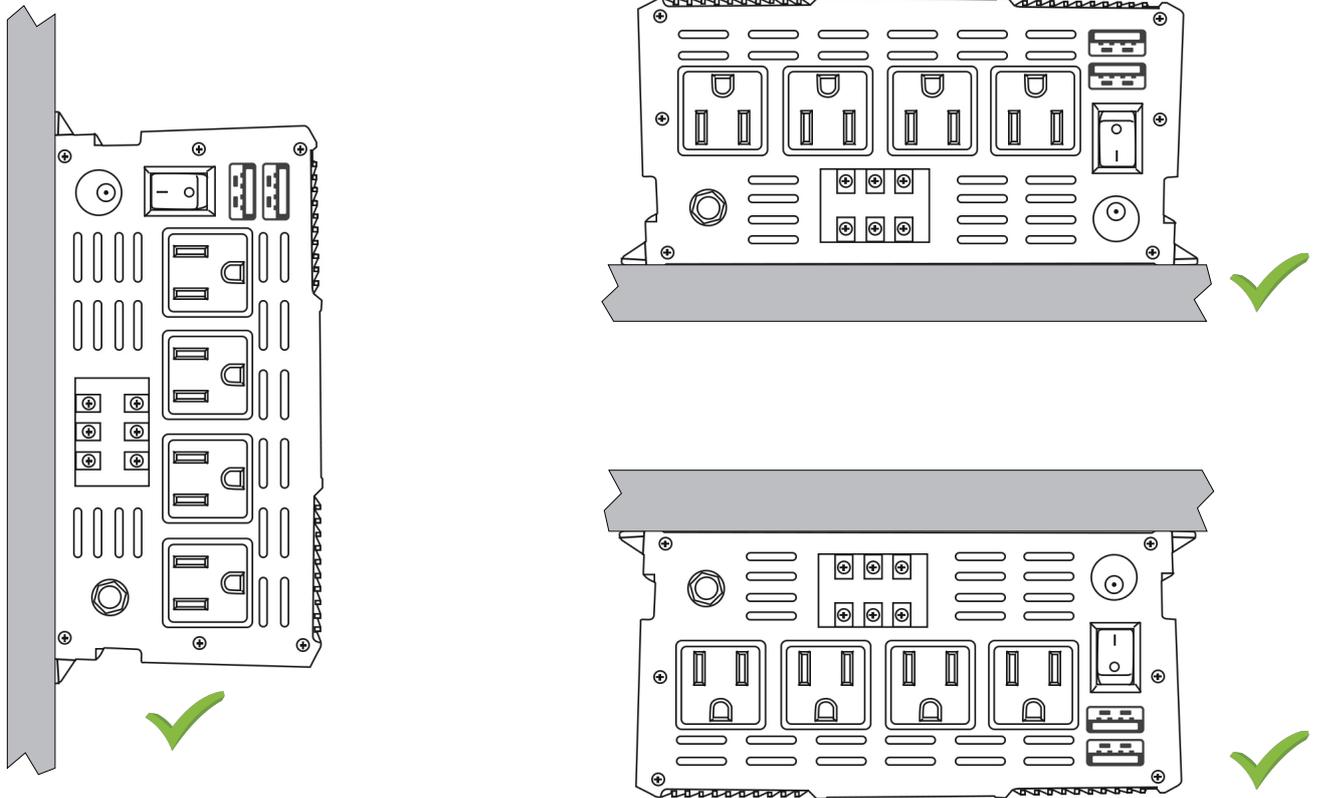


Figure 1-3 Approved Mounting Orientations

Selecting Cable Sizes

To operate safely and effectively, the MASTERsine PXA Inverter needs proper cables and fuses. The MASTERsine PXA Inverter has low-voltage and high-current input, so it is essential that you use low-resistance wiring between the battery and the inverter. This means using the largest gauge and shortest DC cables. The goal is to deliver the maximum amount of usable energy to your load.

For safe and efficient operation, you will need to calculate cable sizes for your:

- DC input cables from the battery to inverter, and
- Chassis ground cable from the vehicle chassis to the chassis ground lug on the inverter's DC panel.



WARNING: Fire hazard

Never use a DC input cable longer than specified in “DC Input Cables” below. A longer cable can potentially generate enough heat to start a fire or result in poor inverter performance.

DC Input Cables

- Keep all cables as short as possible, and ensure that each cable between the inverter and the battery is no longer than 10 feet (3 m).
- Do not use aluminum cable. It has about 1/3 more resistance than copper cable of the same size, and it is difficult to make good, low-resistance connections to aluminum wire.

Selecting a DC Input Fuse or Circuit Breaker

The DC cables from the battery to the inverter need to be provided with overcurrent protection, in the form of a fuse or circuit breaker, located as close as possible to the DC positive battery terminal. Because your batteries can provide thousands of amps of short-circuit current, you need a DC-rated fuse or circuit breaker that can safely interrupt the short-circuit current that the batteries can produce.

DC Disconnects and Over-Current Devices

The DC circuit from the battery to the inverter must be equipped with a disconnect and over-current device. This usually consists of a circuit breaker, a “fused-disconnect,” or a separate fuse and DC disconnect. Do not confuse AC circuit breakers or fuses with DC-rated ones. They are not interchangeable. The rating of the fuse or breaker must be matched to the size of cables used in accordance with the applicable installation codes. The breaker or disconnect switch and fuse should be located as close as possible to the battery, in the positive cable. Applicable codes may limit how far the protection can be from the battery.

To select the correct fuse type and size:

1. Determine the total short-circuit current rating for each battery, based on the battery manufacturer's published short-circuit current sourcing ratings for the battery. Then determine the total for your battery bank. For example:
 - If you are using one battery to power your inverter and its short-circuit current rating is 500 A, the total short-circuit current rating is 500 A.
 - If you are powering your inverter with two 12 V batteries connected in parallel, and each battery has a short-circuit current rating of 500 A, the total short-circuit current rating is 1000 A.
 - If you are powering your inverter with two 6 V batteries connected in series, and each battery has a short-circuit current rating of 500 A, the total short-circuit current rating is 500 A.

Important: For batteries connected in parallel, the total short-circuit current rating is the sum of the short-circuit current ratings of all of the batteries connected in parallel. For batteries connected in series, the total short-circuit current rating is equal to the short-circuit rating of the battery with the highest short-circuit rating. It is not the sum of all the short-circuit current ratings taken from each connected battery.

2. Once you have determined the total short-circuit current rating of your batteries, select a fuse or circuit breaker that has:
 - a short-circuit interrupting capacity at least equal to the total short-circuit current rating of your battery bank, and
 - a DC voltage rating of at least 16Vdc, and
 - a current rating no more than the values given above.
3. If a fuse is used rather than a circuit breaker, a disconnect switch located between the battery and the fuse is recommended, to allow the circuit to be de-energized when replacing the fuse.

Fuses and circuit breakers can be bought at any RV supply store or electrical products store.

Output Conductor Selection for Hardwire Installation (only for PXA3000/5000)

The inverter may be used by connecting cord-connected loads to the receptacles on the front panel, and/or by connecting loads or a load circuit to the AC output hardwire terminal block. If making connections to the AC output hardwire terminal block, use jacketed No. 10 AWG 2 copper 2-wire plus ground cable. Conductors may be solid or stranded.

Some installation codes require and we recommend use of oil-resistant cable rated for damp or wet locations.

Color code for conductors:

Black = [L]ine (hot)

White = [N]eutral

Bare or green = [G]round

1. Based on US NEC 2008 article 551-20(c). Other codes may require larger chassis ground cable, in some cases as large as the DC power cables.
2. Based on US NEC 2008, table 310-16, 75C copper wire.

Installation

“Installation,” provides information on cables and fuses to help you plan for your installation and provide procedures for installing the inverter.

Read the entire chapter before beginning the installation procedures so that you can plan an installation that is suited to your power needs.

Installing the Inverter

Do not proceed with the installation of your inverter until you have read the section.

The more thorough your planning, the better your power needs will be met to achieve maximum performance from your inverter.

Safety Instructions

Before you start to install the inverter:

- Review the “Important Safety Instructions” .
- Read and follow all Warnings and Cautions in this chapter.

Overview of Installation Steps

These are the five steps for installing your inverter.

1. Install the Remote On/Off Switch.
2. Mount the inverter.
3. Connect the chassis ground.
4. Connect AC output (if connecting to an existing AC circuit).
5. Connect the DC cables.

Installing the Remote On/Off Switch

The Remote On/Off switch can be plugged into the remote switch jack on the front of the inverter. The remote switch lets you turn the inverter on and off from a convenient location—up to 9.8 feet away from the inverter.

Mounting the Inverter

Do not mount the inverter under the hood of your vehicle. See “Choosing an Appropriate Location and Mounting Orientation” .

To mount the inverter:

1. Make sure the On/Off switch is in the Off position.
2. Select an appropriate mounting location and orientation as recommended in “Choosing an Appropriate Location and Mounting Orientation” .
3. Using the measurements found in “Mounting Dimensions” on our website, mark the positions of the mounting screw holes in the mounting surface where the inverter is to be permanently placed.
4. Pilot drill the four mounting screw holes.
5. Fasten the inverter to the mounting surface using corrosion-resistant fasteners sized #10 or larger.

Connecting the AC Output

You can plug your AC loads directly into the receptacles on the inverter front panel. Output power to each receptacle is limited by a circuit protector rated at 15 A.

You can also hardwire (permanently connect) the AC output from the AC hardwire terminal through the AC knockout into a load sub-panel or additional GFCI-protected AC outlets powered by the inverter. For this hardwire connection to a load sub-panel, the branch circuit neutral must not be connected to the ground bus of the sub-panel. The neutral grounding point is already made in the inverter AC output circuit. This complies with the NEC regulations.

Important: This connection must be made in accordance with applicable electrical codes. If you are not a qualified electrician, we recommend that you let a qualified electrician install this product.



WARNING: Fire and shock hazard

For protection and control, install a branch-circuit rated breaker between the inverter and the load wiring, receptacles, and loads.

The MASTERSine PXA Inverter will not operate a combination of high-power electrical appliances that consume a total of more than rating watts (continuous operation) .



WARNING: Shock hazard

Make sure wiring is disconnected from all electrical sources before handling.



WARNING: Shock hazard and risk of equipment damage

Do not connect an AC source (such as a generator or utility power) to the AC wiring output of the MASTERSine PXA Inverter.

Potentially hazardous or damaging conditions may occur, if its output is connected to an AC voltage from another source. These conditions can occur even if the inverter is off. If installing the inverter in a system with another AC source (utility power or generator), an approved and suitably rated break-before- make AC transfer switch must be installed.

To make the AC output wiring connections (for PXA3000/5000):

1. Disconnect all DC power sources from the MASTERSine PXA Inverter.
2. Install a dedicated AC load panel or an additional circuit breaker in an existing AC load panel. This circuit breaker must have a current rating based on the load current the circuit will carry, and must be rated for 120 Vac branch circuits.
3. Remove the AC wiring knockout from the MASTERSine PXA Inverter AC panel.
4. Remove the screws securing the MASTERSine PXA Inverter AC panel.
5. Locate the white terminal block whose connectors are all properly labeled – (L)ine, (N)eutral, and (G)round.
6. Prepare and strip the line, neutral, and ground (if not bare) wires. Strip at a length of 0.35 inches (9 mm).
7. Install a strain-relief device (not provided) on the AC knockout.
8. Run each of the line, neutral, and ground wires through the knockout and through the strain-relief device.
9. Loosen the screws on the left side of the terminal block, if not already loose at the factory. Be careful not to loosen the right side screws.

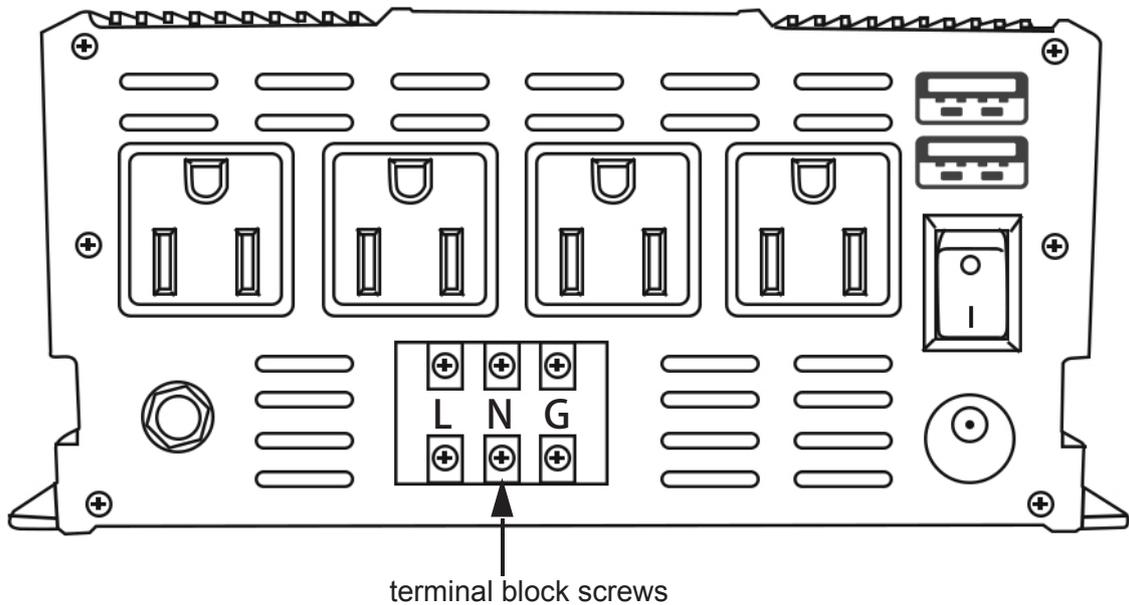


Figure 2-1 Terminal Block (for #PXA3000/5000)

10. Insert the ground (bare or green) wire into the terminal block's (G)round connector.
11. Secure the wire by tightening the ground terminal block screw to a maximum torque of 16 inch-pounds (1.8 Nm).
12. Insert the Line (black) and Neutral (white) wires into the terminal block's (L)ine and (N)eutral connectors, respectively.
13. Secure the wires by tightening the line and neutral terminal block screws to a maximum torque of 16 inch-pounds (1.8 Nm).



WARNING: Shock hazard

Exposed and uncapped wires are a shock hazard. If you cut the wires after permanently connecting the AC output wires make sure that you terminate the wires with a proper wire cap terminal.

14. Complete the installation of the strain-relief device.
15. Connect the outgoing AC wires to the AC load panel.

Connecting the DC Cables

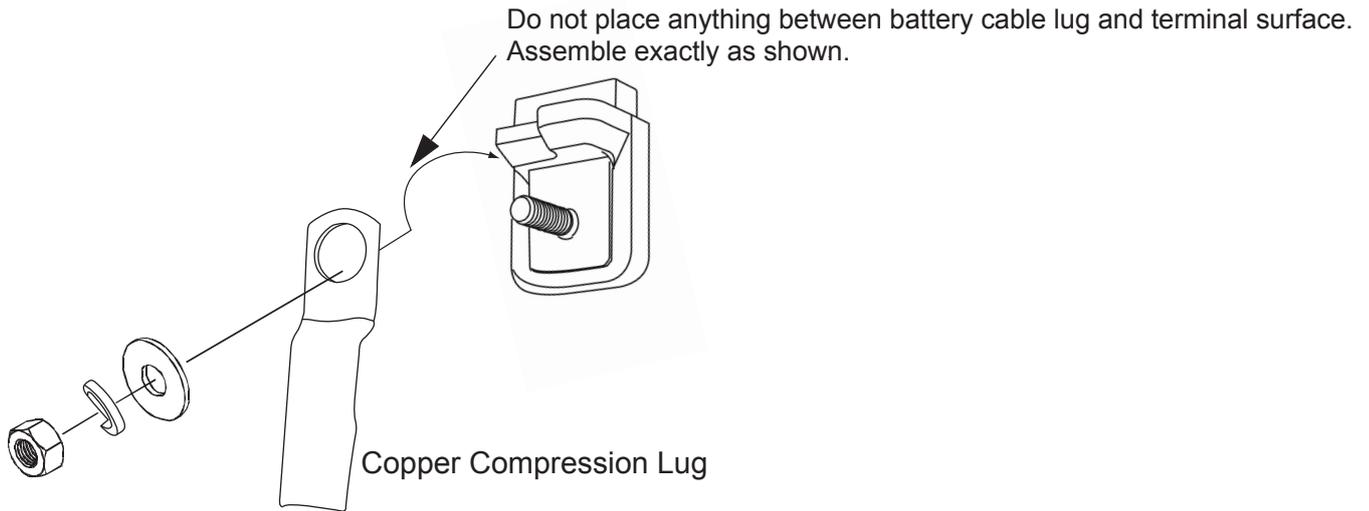


Figure 2-2 DC cable lug examples

To make the DC connections:

1. Cut the cables to the correct length with enough insulation stripped off so you can properly install the type of terminals you will be using. The terminals on the DC end are designed to fit up to 500 MCM crimp-on ring terminals (either AMP or ILSCO) or box connectors.
2. Attach the connectors to both cables. If using compression lugs, attach the terminals to both cables using the crimp tool recommended by the manufacturer of the ring terminals. There must be no stray wire strands protruding from the terminal. If using box lugs, attach the lug to the MASTERSine PXA Inverter first, then insert the wire and tighten the set screw to the torque recommended by the lug manufacturer.
3. Route the DC supply cables from the battery bank to the inverter.
4. Install a fuse and disconnect switch or breaker between the inverter and the battery. Ensure that the disconnect switch or breaker is turned off before installing. They must be installed in the positive side of the DC circuit, as close as possible to the battery. This protects your battery and wiring in case of accidental shorting.
5. Attach one connector on the positive cable to the positive DC terminal on the DC end, and then attach the other connector to the POSITIVE (+) terminal on the fuse or breaker.



CAUTION: Reverse polarity

DC power connections to the inverter must be positive to positive and negative to negative. A reverse polarity connection (positive to negative) will blow a fuse in the inverter and may permanently damage the inverter. The fuse is not user replaceable and the inverter may need to be returned for servicing. Damage caused by a reverse polarity connection is not covered by your warranty.

Observe the polarities carefully while completing the installation. Use a wrench to tighten to a torque of 216–240 inch-pounds (24–27 Nm). Test that the cable is secure.



CAUTION

Do not over-tighten the nut on the DC input terminals. Damage to the DC input terminals may result.



CAUTION

Loose connections cause excessive voltage drop and may cause overheated wires and melted insulation.

6. Connect one connector on the negative cable to the negative terminal on the DC end. Before proceeding, check that cable polarity is correct, and then connect the other end of the cable to the NEGATIVE (–) terminal on the battery. This is the last cable connection you make. If the disconnect switch or breaker is not turned off, a spark is normal when the connection is made. Use a wrench to tighten to a torque of 216–240 inch-pounds (24–27 Nm). Test that the cable is secure.
7. Before proceeding, double check that you have connected the cables properly—positive to positive, negative to negative.
8. Turn on the battery disconnect switch or breaker.
9. If you have installed a battery selector switch, use it to select one of the batteries or battery banks (house bank preferred over start bank).
10. Turn the inverter's On/Off switch to the On position.
11. Test sample loads by plugging appliances into the AC receptacles and check to see if they work properly. Alternatively, if a load sub-panel or additional AC outlets are hardwired into the inverter AC output, test that appliances plugged into the additional outlets are working properly.

IF YOU STILL HAVE ANY ISSUES WHEN INSTALLING, PLEASE KINDLY SEND EMAIL TO US:
SUPPORT@POOXTRA-INVERTER.COM