

# Conext™ SW Inverter Charger

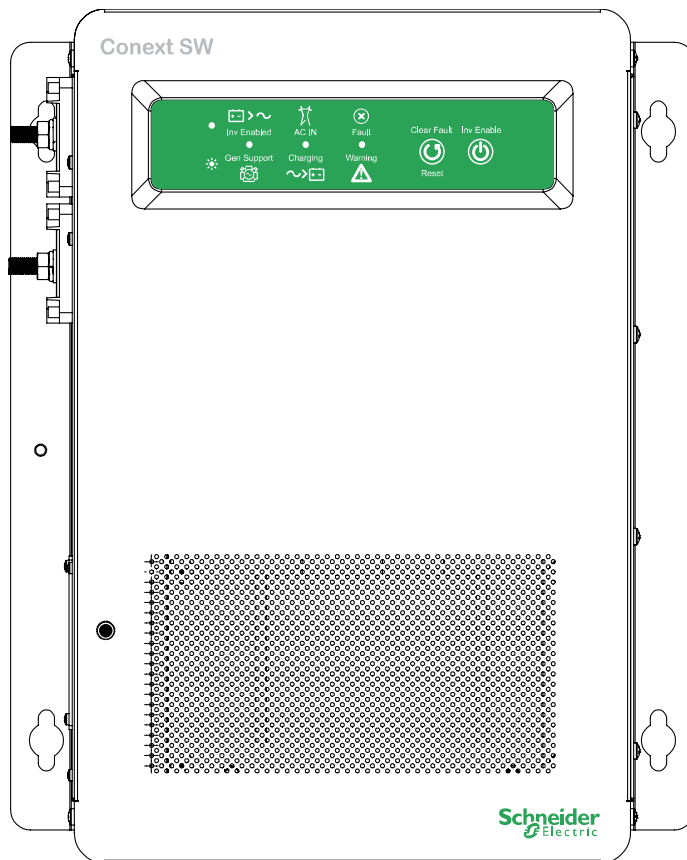
Conext SW 2524 230 (865-2524-61)

Conext SW 4024 230 (865-4024-61)

Conext SW 4048 230 (865-4048-61)

## Installation Guide

975-0637-01-01 Rev E  
7-2015



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This guide for use by qualified personnel only

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# Conext SW Inverter/Charger

Conext SW 2524 230 (865-2524-61)

Conext SW 4024 230 (865-4024-61)

Conext SW 4048 230 (865-4048-61)

**Installation Guide**

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**Document Number:** 975-0637-01-01      **Revision:** Rev E      **Date:** 7-2015

**Product Part Numbers:** 865-2524-61, 865-4024-61, 865-4048-61

**Contact Information**      solar.schneider-electric.com

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### Information About Your System

As soon as you open your product, record the following information and be sure to keep your proof of purchase.

Serial Number      \_\_\_\_\_

Product Number      \_\_\_\_\_

Purchased From      \_\_\_\_\_

Purchase Date      \_\_\_\_\_

# About This Guide

## Purpose

The purpose of this Installation Guide is to provide explanations and procedures for installing the Conext SW Inverter/Charger to a main AC power source such as an AC generator for off-grid application or AC mains (main power grid) for power backup application.

## Scope

The Guide provides safety and installation guidelines as well as information on tools and wiring. Complete balance of system installation is not covered in detail. For a balance of system wiring illustration with the Conext SW AC Switchgear, DC Switchgear, solar charge controllers and other accessories, see the Wiring Diagrams in this guide.

The Guide does not provide details about particular brands of batteries. You need to consult individual battery manufacturers for this information.

## Audience

The Guide is intended for use by anyone who plans to install an off-grid/backup system involving the Conext SW Inverter/Charger. The information in this manual is intended for qualified personnel. Qualified personnel have training, knowledge, and experience in:

- Installing electrical equipment and PV power systems (up to 1000 volts).
- Applying all applicable installation codes.
- Analyzing and reducing the hazards involved in performing electrical work.
- Selecting and using Personal Protective Equipment (PPE).

## Organization







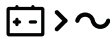







This Guide is organized into:

Chapter 1, "Installation" covers installation instructions.

Chapter 2, "Specifications" covers product specifications.

Chapter 3, "Wiring Diagrams" covers overviews of Conext SW BOS installations and wiring diagrams.

## Abbreviations, Acronyms, and Symbols

<b>AC</b>	Alternating Current	<b>LED</b>	Light Emitting Diode
<b>AGS</b>	Automatic Generator Start	<b>SCP</b>	System Control Panel
<b>BOS</b>	Balance of System	<b>SW</b>	Sine Wave
<b>DC</b>	Direct Current	<b>VAC</b>	Volts, Alternating Current
<b>PPE</b>	Personal Protective Equipment	<b>VDC</b>	Volts, Direct Current
<b>PV</b>	Photovoltaic	<b>IP20</b>	Ingress protection rating
	Reference to see guide (or manual) for more information		Earth
	AC		DC
	Denotes a steady LED		Denotes a flashing LED
	<b>Inv Enabled</b> – see Owner's Guide for definition.		<b>Gen Support</b> – see Owner's Guide for definition.
	<b>AC IN</b> – see Owner's Guide for definition.		<b>Charging</b> – see Owner's Guide for definition.
	<b>Fault</b> – see Owner's Guide for definition.		<b>Warning</b> – see Owner's Guide for definition.
	<b>Clear Fault   Reset</b> – see Owner's Guide for definition.		<b>Inv Enable</b> – see Owner's Guide for definition.

## Related Information

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# Important Safety Instructions

## READ AND SAVE THESE INSTRUCTIONS - DO NOT DISCARD

This guide contains important safety instructions for the Conext SW Inverter/Charger that must be followed during operation and troubleshooting. **Read and keep this Installation Guide for future reference.**

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

### **DANGER**

DANGER indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.

### **WARNING**

WARNING indicates a potentially hazardous situation, which, if not avoided, can result in death or serious injury.

### **CAUTION**

CAUTION indicates a potentially hazardous situation, which, if not avoided, can result in moderate or minor injury.

### **NOTICE**

NOTICE indicates a potentially hazardous situation, which, if not avoided, can result in equipment damage.

## Safety Information

### DANGER

#### **ELECTRICAL SHOCK AND FIRE HAZARD**

Installation must be done by qualified personnel to ensure compliance with all applicable installation and electrical codes and regulations. Instructions for installing the Conext SW are provided here for use by qualified installers only.

**Failure to follow these instructions will result in death or serious injury.**

### DANGER

#### **ELECTRICAL SHOCK AND FIRE HAZARD**

- Read all instructions, cautionary markings, and all other appropriate sections of this guide before installing the Conext SW.
- Exercise extreme caution at all times to prevent accidents.
- Do not cover or obstruct ventilation openings.
- Do not mount in a zero-clearance compartment. Overheating may result.
- Do not open nor disassemble the inverter/charger. There are no user-serviceable parts inside.
- Do not expose to rain or spray.
- Disconnect and lockout all AC and DC sources before servicing. Servicing includes maintenance or cleaning or working on any circuits connected to the inverter/charger. See following note.

**Failure to follow these instructions will result in death or serious injury.**

**NOTE:** Turning off inverter mode using the Inv Enable switch on the front panel, disabling the inverter and charger functions using the SCP, and putting the unit in Standby mode will not reduce an electrical shock hazard.



**⚠ DANGER****ELECTRIC SHOCK HAZARD**

- For indoor use only. This inverter/charger is designed for off-grid, solar, backup, and hybrid applications.
- Do not operate the inverter/charger if it has been damaged in any way.
- Do not operate the inverter/charger with damaged or substandard wiring. Wiring must be done by qualified personnel to ensure compliance with all applicable installation codes and regulations.

**Failure to follow these instructions will result in death or serious injury.**

**⚠ WARNING****EXPLOSION AND FIRE HAZARD**

- Charge properly rated lead-acid (GEL, AGM, Flooded, or lead-calcium) rechargeable batteries because other battery types may explode.
- When using Lithium-Ion batteries, ensure that the battery pack being used includes a Battery Management System (BMS) with safety controls.
- Do not work in the vicinity of lead-acid batteries. Batteries generate explosive gases during normal operation. See note #1.
- Do not install and/or operate in compartments containing flammable materials or in locations that require ignition-protected equipment. See notes #2 and #3.
- Do not cover or obstruct the air intake vent openings and/or install in a zero-clearance compartment.

**Failure to follow these instructions can result in death or serious injury.**

**NOTES:**

1. Follow these instructions and those published by the battery manufacturer and the manufacturer of any equipment you intend to use in the vicinity of the battery. Review cautionary markings on these products.
2. This inverter/charger contains components which tend to produce arcs or sparks.
3. Locations include any space containing gasoline-powered machinery like a generator, fuel tanks, as well as joints, fittings, or other connections between components of the fuel system.

**⚠ CAUTION**

**FIRE AND BURN HAZARD**

Do not cover or obstruct the air intake vent openings and/or install in a zero-clearance compartment.

**Failure to follow these instructions can result in moderate or minor injury.**

**⚠ CAUTION**

**PHYSICAL INJURY HAZARD**

This Conext SW Inverter/Charger is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

**Failure to follow these instructions can result in moderate or minor injury.**

## Precautions When Working With Batteries

---

**IMPORTANT:** Battery work and maintenance must be done by qualified personnel knowledgeable about batteries to ensure compliance with battery handling and maintenance safety precautions.

---

**⚠ WARNING**

**BURN AND FIRE HAZARD**

- Always wear proper, non-absorbent gloves, complete eye protection, and clothing protection.
- Batteries have high short-circuit current.
- Do not lay tools or metal objects on top of batteries.
- Disconnect charging source before disconnecting battery terminals.
- Remove all personal metal items, like rings, bracelets, and watches when working with batteries.
- Never smoke or allow a spark or flame near batteries.
- Batteries can produce a short circuit current high enough to weld a ring or metal bracelet or the like to the battery terminal, causing a severe burn.

**Failure to follow these instructions can result in death or serious injury.**

**⚠ WARNING****CHEMICAL, BURN, AND EXPLOSION HAZARD**

- Do not open or use a battery which is cracked or otherwise damaged. Battery electrolyte is toxic and highly corrosive.
- Never place the Conext SW Inverter/Charger unit in the same compartment as batteries due to an explosive hazard.
- Make sure the area around the battery is well ventilated.
- Make sure the voltage of the batteries matches the output voltage of the inverter/charger.
- Never allow battery acid to drip when reading specific gravity or filling battery.

**Failure to follow these instructions can result in death or serious injury.**

**⚠ WARNING****LIMITATIONS ON USE**

Do not use in connection with life support systems or other medical equipment.

**Failure to follow these instructions can result in death or serious injury.**

***NOTICE*****RISK OF INVERTER/CHARGER DAMAGE**

Never place the Conext SW Inverter/Charger unit directly above batteries; gases from a battery will corrode and damage the inverter/charger.

**Failure to follow these instructions can result in damage to equipment.**

***NOTICE*****RISK OF BATTERY DAMAGE**

Study and follow all of the battery manufacturer's specific precautions, such as removing or not removing cell caps while charging, whether equalization is acceptable for your battery, and recommended rates of charge.

**Failure to follow these instructions can result in damage to equipment.**



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# 1

# Installation

The following topics will be covered in this chapter.

- Materials List
- Installation Information
- Xanbus Network System
- Installation Planning
- Inverter/Charger Installation
- Multiple Unit Configuration
- Battery Information
- Wiring Diagrams

## Materials List

The Conext SW ships with the following items:

- One Conext SW unit
- One set of owner's and installation guides
- One Battery Temperature Sensor (BTS)
- Two Xanbus network terminators
- Two sets of 5/16"-18 nuts and washers for the DC terminals
- Two DC terminal covers (red and black) with two sets of #6-32 screws
- One Installation bracket with one set of M6 nuts for mounting (not shown)

**NOTE:** Keep the carton and packing material in case you need to return the Conext SW for servicing.

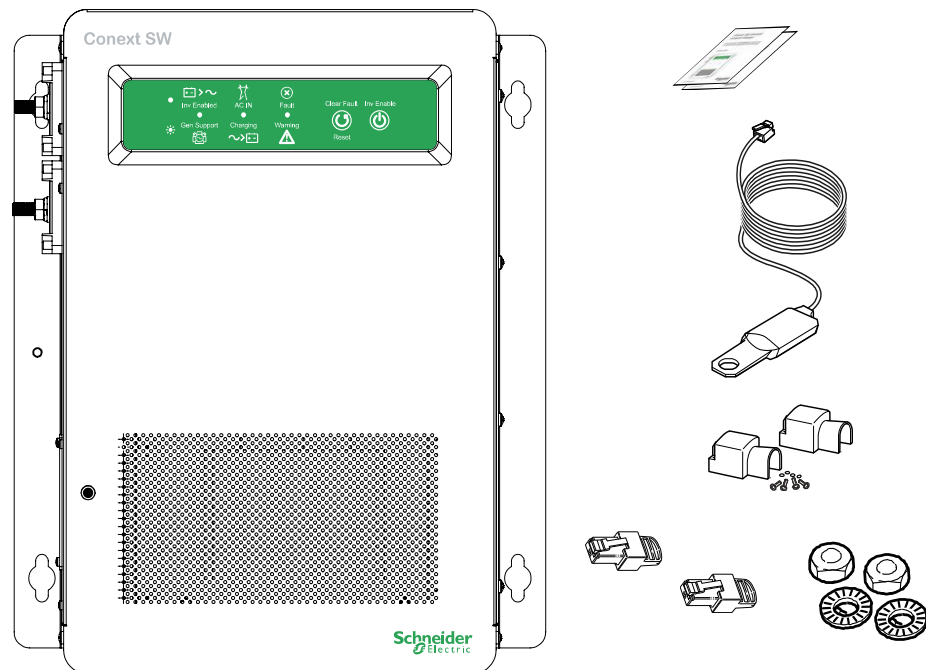
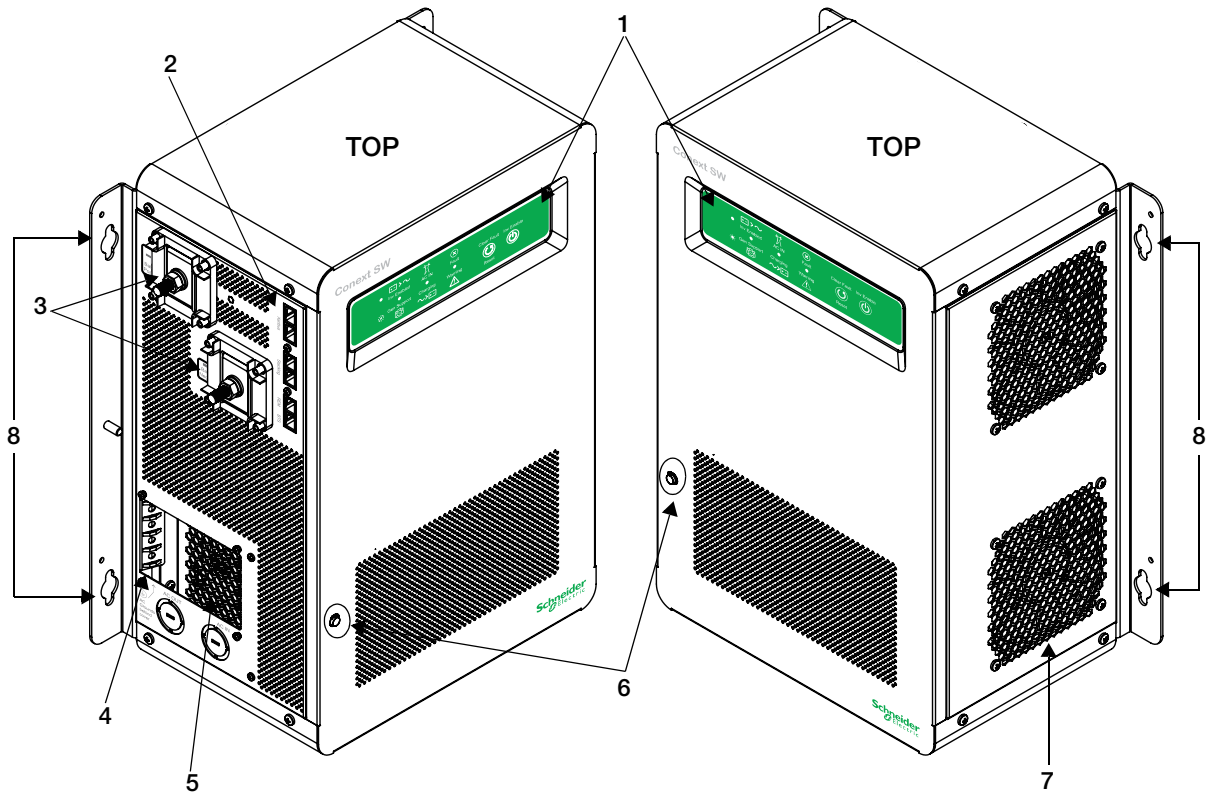


Figure 1-1 Materials List

## Conext SW Front and Side Panels



**Figure 1-2** Conext SW Front and Side Panels

Before you begin to operate the Conext SW after installation, review the front panel features shown in Figure 1-3 and described in the next table. A detailed view of the lights and buttons on the front panel is also shown.

Item	Description
1	Front Panel contains the Inv Enable and Clear Fault   Reset buttons, as well as various LEDs (status indicator lights). See “Front Panel Buttons and Status LEDs” on page 1-4.
2	Network and communications ports. See “AC and DC Terminals, Network and Communication Ports Panel” on page 1-5.
3	DC battery terminals. See “AC and DC Terminals, Network and Communication Ports Panel” on page 1-5.
4	AC Ground terminals. See “AC and DC Terminals, Network and Communication Ports Panel” on page 1-5.

Item	Description
5	AC line terminals. See “AC and DC Terminals, Network and Communication Ports Panel” on page 1–5.
6	Manual reset button for the built-in 30-amp AC input circuit breaker.
7	Two variable-speed cooling fans maintain a cool internal temperature of critical components. The two fans control airflow through the transformer and power compartments of the unit. Ensure at least 250 mm of clearance for proper ventilation.
8	Mounting holes for permanent installation. See “Step 2: Mounting the Inverter/Charger” on page 1–18.

### Front Panel Buttons and Status LEDs

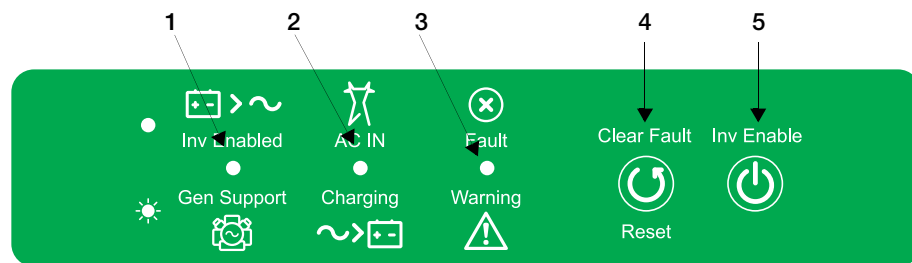


Figure 1-3 Front Panel Buttons and Status LEDs

Item	Description
1	<p>The <b>Inv Enabled</b> LED illuminates steadily when invert mode is enabled. If AC is present and invert mode is enabled, this LED remains illuminated even though AC power is being passed through.</p> <p><b>Gen Support</b> LED flashes intermittently when the inverter is in AC support mode and load shaving mode.</p>
2	<p>When AC is present and qualified, the <b>AC IN</b> LED will illuminate steadily indicating also that AC is passing through.</p> <p><b>Charging</b> LED flashes intermittently when the Conext SW is in charge mode and is producing DC output to charge your batteries.</p>
3	<p><b>Fault   Warning</b> LED illuminates steadily if a fault is detected (a fault detection condition) and flashes intermittently when a warning condition is active.</p>
4	<p><b>Clear Fault   Reset</b> button is used to clear any detected faults if pressed momentarily. If held down for more than three seconds, the unit will reset (reboot) itself.</p>
5	<p><b>Inv Enable</b> button is used to enable and disable inverter mode. “Enabled” is different from the inverter being “on”. When enabled, the inverter can be on or off. When disabled, the inverter is always off.</p>

## Conext SW AC/DC/Ports Side Panel

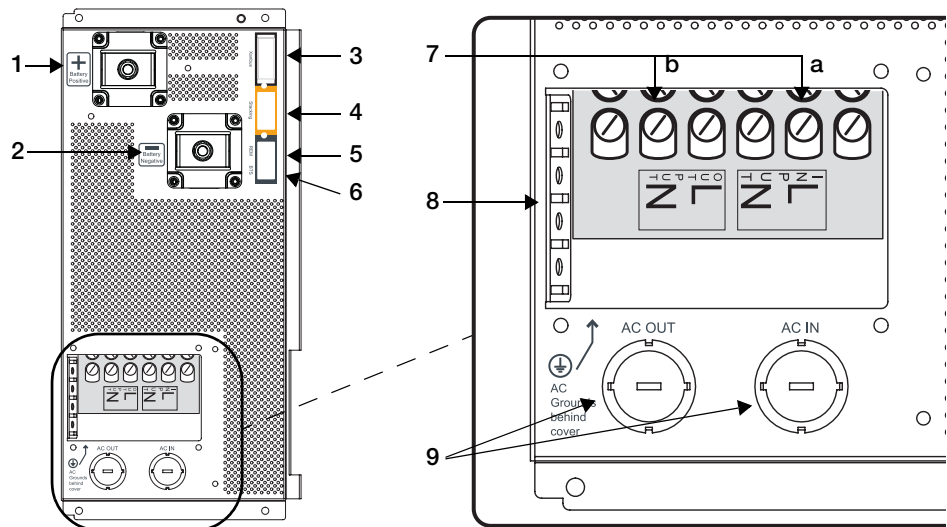
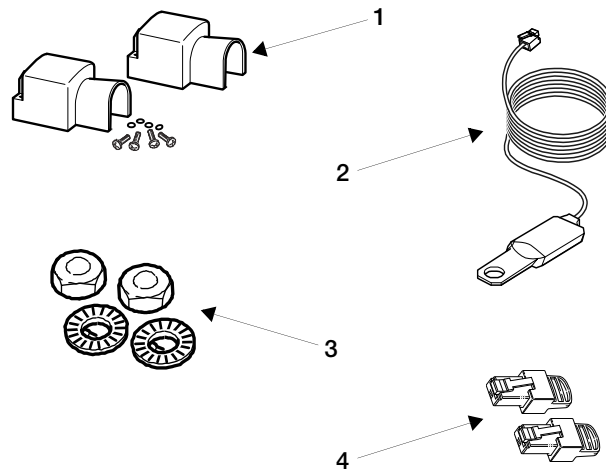


Figure 1-4 AC and DC Terminals, Network and Communication Ports Panel

Item	Description
1	<b>Battery Positive (+)</b> DC terminal connects to the positive battery cable (red). Install a DC terminal cover (supplied) over the terminal.
2	<b>Battery Negative (-)</b> DC terminal connects to the negative battery cable (black). Install a DC terminal cover (supplied) over the terminal.
3	<b>XANBUS</b> interface ports are used to connect Xanbus-enabled devices including the optional SCP and AGS.
4	<b>STACKING</b> port. Feature not available in these models.
5	Remote ( <b>REM</b> ) port provides connection for the on/off remote switch.
6	Battery temperature sensor ( <b>BTS</b> ) port provides connection for the battery temperature sensor (supplied).
7	AC input/output lines wiring compartment access panel without the compartment cover.  (a) AC Input terminal block is a screw-type terminal block for attaching AC input wires. The terminals are labeled INPUT <b>N</b> for Neutral and INPUT <b>L</b> for AC line respectively.  (b) AC Output terminal block is a screw-type terminal block for attaching AC output wires. The terminals are labeled INPUT <b>N</b> for Neutral and INPUT <b>L</b> for AC line respectively.
8	All earth $\oplus$ ("ground") terminals are along the tab (as shown) of the AC wiring compartment access panel opening.
9	AC knockouts 1" and 3/4" provide access for AC cables (both input and output wiring). Detach the knockout covers and install strain-relief clamps available in hardware and electrical stores.
Not shown	AC wiring compartment cover. Remove during wiring and replace when wiring has been completed.

## Conext SW Supplied Accessories



**Figure 1-5** Supplied Accessories

**NOTE:** If any of the supplied accessories are missing, contact customer service for replacement. See “Contact Information [solar.schneider-electric.com](http://solar.schneider-electric.com)” on page ii.

Item	Description
1	Two DC terminal covers prevent accidental contact with the DC cable connectors after installation. The red cover is for the positive cabling terminal, and the black cover is for the negative cabling terminal.
2	BTS, the Battery Temperature Sensor consists of: <ul style="list-style-type: none"> <li>• Connector that plugs into the BTS port on the Conext SW.</li> <li>• Sensor cable is 7.6 meters.</li> <li>• Sensor can be mounted on the side of the battery case or on the negative battery terminal.</li> </ul> <p><b>NOTE:</b> The BTS continuously measures the temperature of the battery and adjusts the charger output for a more accurate, temperature-compensated charge.</p>
3	Two sets of 5/16"-18 nuts and washers are used to secure DC cable ends to the DC battery terminals.
4	Two Xanbus network terminators are used to properly terminate each of the two ends of the daisy-chained Xanbus network. For example, if the SCP is connected to the inverter/charger, one terminator will be plugged to the SCP, one network cable will connect both devices, and one terminator will be plugged to the inverter/charger. <b>IMPORTANT:</b> The SCP may perform erratically if the Xanbus network is not properly terminated.
5	Installation bracket (not shown)



---

## Installation Information

### Before You Begin the Installation

Before beginning your installation:

- Read the entire Installation Guide so you can plan the installation from beginning to end.
- Assemble all the tools and materials you require for the installation.
- Review the Important Safety Instructions on page v.
- Be aware of all safety and electrical codes which must be met.

#### **DANGER**

##### **ELECTRICAL SHOCK AND FIRE HAZARD**

- All wiring must be done by qualified personnel to ensure compliance with all applicable installation codes and regulations.
- Disconnect and lockout all AC and DC power sources.
- Disable and secure all AC and DC disconnect devices and automatic generator starting devices.

**Failure to follow these instructions will result in death or serious injury.**

### Installation Codes

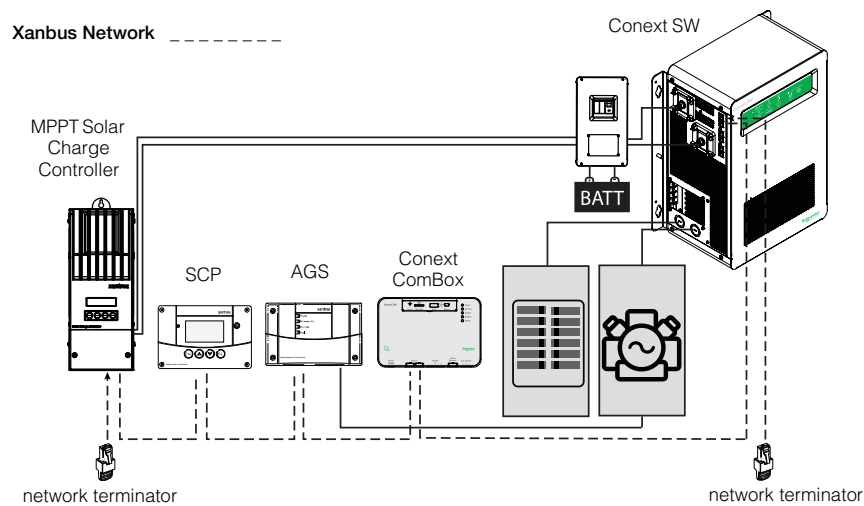
Applicable installation codes vary depending on the specific location and application of the installation. Some examples are:

- IEC 60364
- BS 7671
- NF C 15-100
- AS/NZS 3000
- AS/NZS 5033

# Xanbus Network System

## Xanbus System

The Xanbus system includes the Conext SW and other Xanbus-enabled devices. The Conext SW is the device in a Xanbus system that typically provides network power—500 mA at 12 VDC. All of the Xanbus-enabled devices, such as the Conext SW, the SCP, and the AGS are able to communicate their settings and activity to each other.



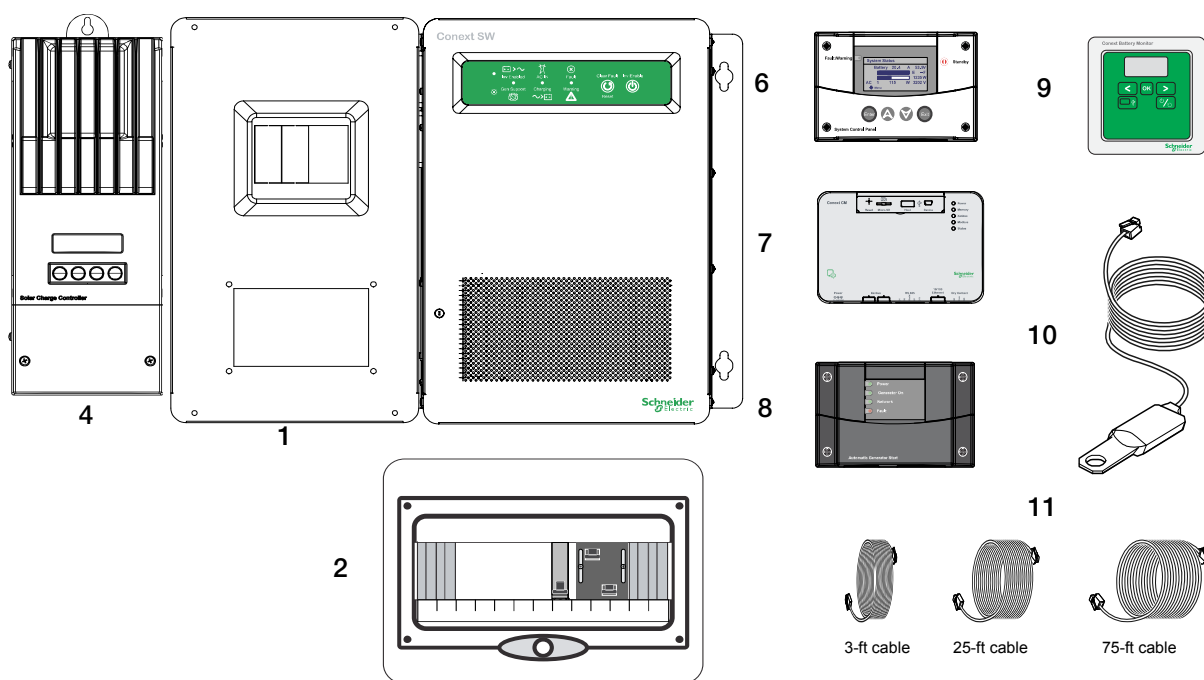
**Figure 1-6** Xanbus System Diagram Example

The Xanbus-enabled designation (see below) means that this product works on a Xanbus network. Xanbus-enabled products are:

- Simple to operate and routine tasks are automated.
- Controlled by software that eliminates analog signalling errors.
- Less susceptible to interference and line loss.
- Upgradable through new software releases.

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E N A B L E D

## Xanbus-enabled Products and Other Accessories



	Product/Accessory (Shown above)	Product Number/s
1	Conext SW DC Switchgear	865-1016
2	Conext SW AC Switchgear	865-1017-61
3	Stacking Kit (not shown)	865-1019-61
4	MPPT 60 150 Solar Charge Controller	865-1030-1
	MPPT 80 600 Solar Charge Controller (not shown)	865-1032
5	Conext SW On/Off Remote Switch (not shown)	865-1052
6	System Control Panel (SCP)	865-1050
7	Conext ComBox	865-1058
8	Automatic Generator Start (AGS)	865-1060
9	Conext Battery Monitor	865-1080-01
10	Battery Temperature Sensor (BTS)	808-0232-02
11	3-ft network cable (0.9 m)	809-0935
	25-ft network cable (7.6 m)	809-0940
	75-ft network cable (22.9 m)	809-0942

## Installation Planning

### Planning Preparations

This section provides information to help plan for a basic installation of the Conext SW. There are two key factors that will have a major impact on system performance.

#### 1. Size and Length of DC Cables

To select the appropriate size and length of DC cables, see “DC Cabling” on page 1–13.

The DC cables should be as short as possible and large enough to handle the required current, in accordance with the electrical codes or regulations applicable to your installation. If there are long battery cables which are in excess of 3 meters each and not of sufficient size, the voltage drop across the cables will have a negative impact on overall system performance.

#### 2. Mounting Location of the Conext SW

See “Step 1: Choosing a Location for the Inverter/Charger” on page 1–18.

### Components of the Inverter Power System

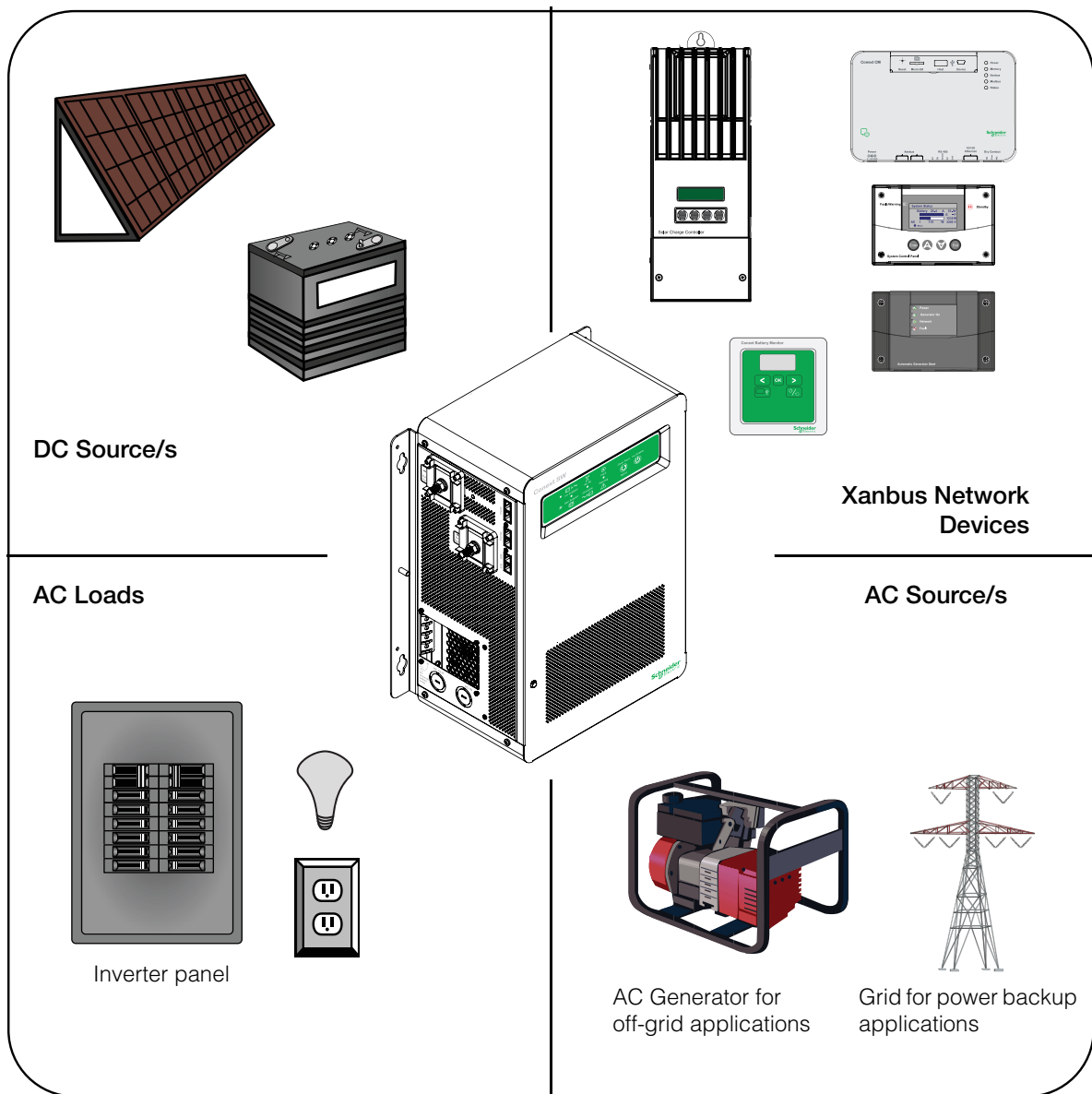
Inverter power systems vary depending on the power requirements of the user and where the user is located. Inverter power systems typically involve one AC source, one DC source, one inverter/charger, and a control and monitoring device.

One example is an off the grid house with an AC generator, a battery, and a Conext SW inverter/charger with a System Control Panel (SCP). Another example is a house in the city, that is connected to the power grid but needs a power backup solution to cope with rolling blackouts during summer. Some power systems involve harvesting renewable energy such as solar energy in conjunction with off-grid or power backup solutions.

Before installing a Conext SW inverter/charger, know your power requirements then divide the components of the power system into AC, DC, and Xanbus network devices. Xanbus network devices control and monitor the Conext SW inverter/charger as well as AC generators and solar panels.

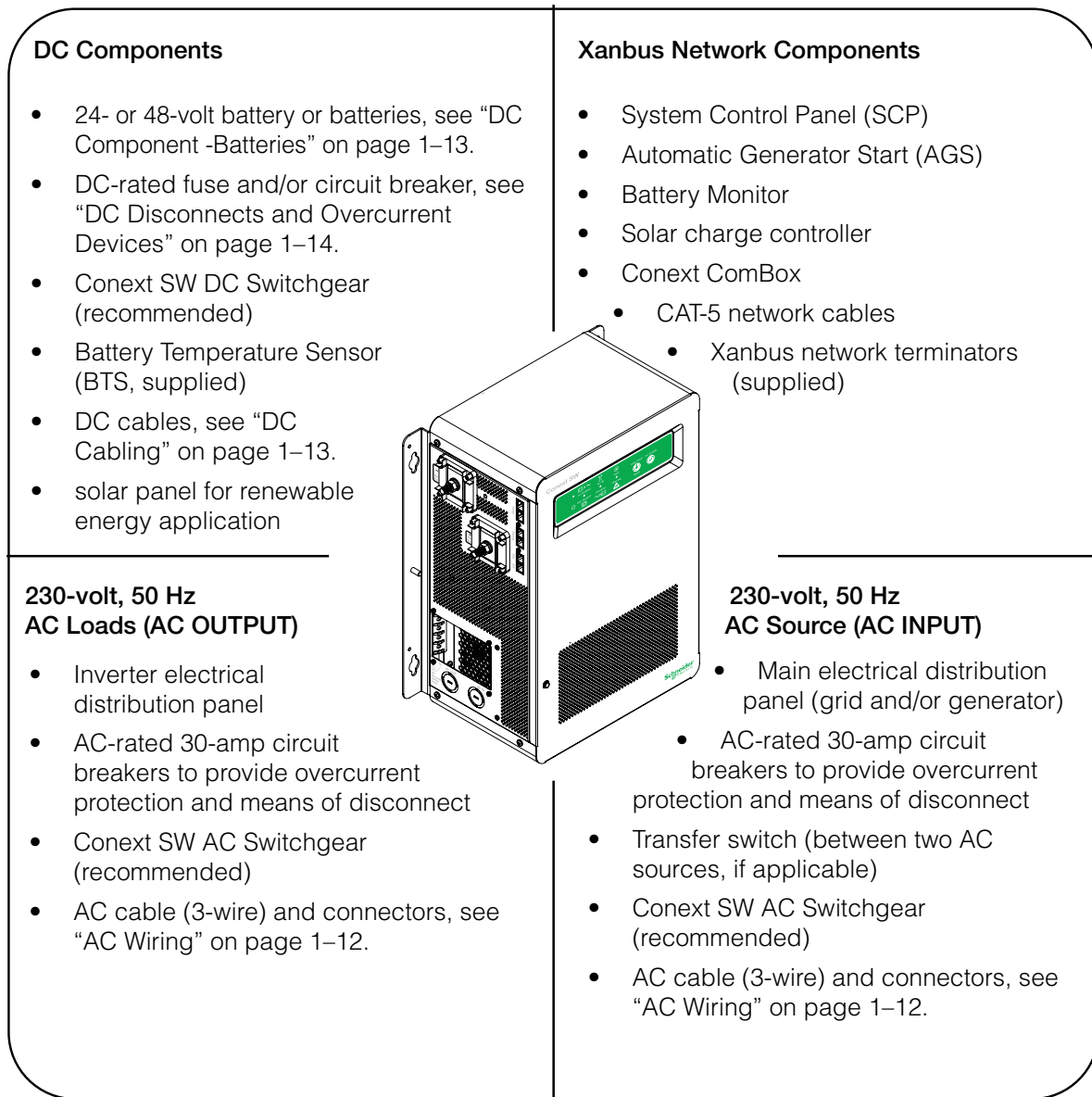
## AC, DC, and Network Components

The illustration below shows the different components that can go into a Conext SW inverter/charger installation.



**Figure 1-7** AC, DC, and Network Components

The illustration below shows which components you may need before you begin your installation.



**Figure 1-8** AC, DC, and Network Components

**AC Wiring**

**Definition** AC wiring includes input wiring (all the wires and connectors between the main AC source panel and the inverter/charger AC INPUT) and output wiring (all the wires between the inverter/charger AC OUTPUT and the AC load panels, circuit breakers, and loads).

**Type** The type of wiring required varies according to the electrical codes or regulations applicable to your installation. Wiring may be solid in multi-conductor cables, but stranded wire is required if single conductors are used. All wiring must be rated 90 °C or higher.

## Size of AC Input Wiring

**IMPORTANT:** Wire size must be coordinated with the overcurrent protection provided ahead of the wire involved, in accordance with the electrical codes or regulations applicable to your installation.

Therefore, the wiring used between the main AC source panel's circuit breaker and the inverter/charger AC INPUT must be sized to match the input breaker rating.

**Table 1-1** AC Wire Size In and Out of the Inverter/Charger

	Conext SW
Breaker Size Used	30 amps per line
Wire Size	6 mm <sup>2</sup> (minimum)
Color Coding	L: brown, black, or grey N: blue ⊕: green with yellow stripe

**Size of AC Output Wiring** Wire size must be coordinated with the current the wiring will carry. This current may be determined by the 16-amp maximum inverter current, or by the bypass current, which is determined by the overcurrent protection provided ahead of the Conext SW.

**Size of Wiring Downstream of the AC Output Breaker** The wiring used between the AC output breaker and your loads must be sized to match the output breaker.

## DC Component - Batteries

The Conext SW system requires a 24-volt or 48-volt, lead-acid deep-cycle battery or group of batteries to provide the DC current that the inverter/charger converts to AC power. The battery may be a flooded, gel, or AGM type.

See "Battery Information" on page 1–34 for information on:

- Estimating the battery size that will meet your requirements.
- Designing battery banks.
- Restrictions on the size of appliances.

For information on cabling and hooking up batteries, see "Battery Cabling and Hook-up Configurations" on page 1–38.

For detailed information about specific brands of batteries, consult individual battery manufacturers or a local battery distributor.

## DC Cabling

**Definition** DC cabling includes all of the cables and connectors between the batteries, the DC disconnect and overcurrent protection device, and the inverter/charger.

**Type** All installations require multi-strand insulated cables. The DC cables must be copper and must be rated 70 °C minimum.

**Size and Length** See Table 1-2 for required DC cable length, cable size and required fuse size for the Conext SW. Wire size is usually marked on the cables.

**Table 1-2** Recommended Battery Cable<sup>a</sup> Sizes

Model	Maximum Current (A)	Cable Length < 1.5 m	Cable Length 1.5 to 3.0 m
		Conduit / (Free Air)	
SW 2524 230	120	50 mm <sup>2</sup> (25 mm <sup>2</sup> )	70 mm <sup>2</sup> (35 mm <sup>2</sup> )
SW 4024 230	200	240 mm <sup>2</sup> (120 mm <sup>2</sup> )	300 mm <sup>2</sup> (150 mm <sup>2</sup> )
SW 4048 230	105	50 mm <sup>2</sup> (25 mm <sup>2</sup> )	70 mm <sup>2</sup> (35 mm <sup>2</sup> )

a. 70°C thermoplastic insulated cable

**IMPORTANT:** Using a smaller gauge cable or a longer cable may cause the inverter to shut down under heavy load.

**⚠ WARNING**

**FIRE AND BURN HAZARD**

Do not use battery cables that are insufficiently sized for expected current. Check local electrical codes carefully.

**Failure to follow this instruction can result in death or serious injury.**

**DC Disconnects and Overcurrent Devices**

The DC circuit from the battery to the inverter/charger must be equipped with a disconnect and overcurrent protection device. Refer to your applicable installation code.

**Type** This device usually consists of a circuit breaker, a “fused-disconnect,” or a separate fuse (installed at each positive cable near the battery terminal) and DC disconnect. Do not confuse AC circuit breakers with DC circuit breakers. They are not interchangeable.

**Rating** The rating of the fuse or breaker must be matched to the size of cables used in accordance with the applicable installation codes.

**Location** The breaker or fuse and disconnect 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.

**Table 1-3** Recommended Fuse and Breaker Sizes

Model	Fuse Size (A)	Minimum Breaker Size (A)
SW 2524 230	250	250
SW 4024 230	250	250
SW 4048 230	250	250



---

## Unpacking and Inspecting the Conext SW Inverter/Charger

**▲ CAUTION****HEAVY LOAD HAZARD**

Do not lift the unit by yourself. Use two people to lift and mount the unit. Always use proper lifting techniques during installation to prevent injury.

**Failure to follow these instructions can result in injury.**

**To unpack and inspect:**

---

**IMPORTANT:** Keep the carton and packing material in case you need to return the Conext SW for servicing.

---

1. Unpack the unit and check the materials list. If anything is missing from the shipping box, contact your local Schneider Electric customer service representative. See page ii for information.
2. Record the serial number of the Conext SW and other purchase information in the beginning section under Information About Your System of the *Conext SW Inverter/Charger Owner's Guide*.
3. Save your purchase receipt to use as proof of purchase. This receipt is required if the inverter/charger requires warranty service.
4. Save the original shipping carton and packing materials. If the inverter/charger needs to be returned for service, it should be shipped in the original carton. Packing the Conext SW in the original shipping carton is also a good way to protect the inverter/charger if it ever needs to be moved.

## Installation Tools and Materials

### Tools

You will need the following tools to install the Conext SW and the battery temperature sensor.

- Wire stripper
- Crimping tools for fastening lugs and terminals on DC cables
- Phillips screwdriver: #2 bit
- Slot screwdriver (6mm wide blade max.)
- Needle-nose pliers
- Wrench for DC terminals and Installation bracket: 5/16" and M6
- Power drill/driver

### Materials

You will need the following materials to complete your installation:

- Strain-relief clamp(s) for AC cables (not provided): 1" and 3/4"
- DC battery cables sized according to Table 1-2 on page 1–14
- Terminals and/or crimp connectors for DC cables (3/8" [9.5mm] stud size)
- AC and DC disconnect switches and overcurrent protective devices and connectors as required. See page 1–13
- AC output and input wire. See "AC Wiring" on page 1–12
- If the AC earth wire is stranded, each earth wire requires a ring terminal
- Four M6 screws or bolts to mount the installation bracket to the wall
- Four M6 nuts to secure the unit to the installation bracket (supplied)

# Inverter/Charger Installation

## Overview

This section provides detailed information on installing the Conext SW. The overall procedure is divided into seven steps:

Step 1: Choosing a Location for the Inverter/Charger on page 1–18

Step 2: Mounting the Inverter/Charger on page 1–18

Step 3: Connecting the AC Input and AC Output Wires on page 1–20

Step 4: Connecting the DC Cables on page 1–22

Step 5: Connecting the BTS and Xanbus-enabled Components on page 1–25

Step 6: Performing Checks Prior to Initial Start-Up on page 1–27

Step 7: Testing Your Installation on page 1–27

## Step 1: Choosing a Location for the Inverter/Charger

<b>⚠ WARNING</b>	
<b>FIRE HAZARD</b>	
<b>For indoor use only.</b>	
<ul style="list-style-type: none"><li>• Do not install and/or operate in compartments containing flammable materials or in locations that require ignition-protected equipment.</li><li>• Do not cover or obstruct the ventilation openings.</li><li>• Do not install this unit in a compartment with limited airflow.</li><li>• Do not install where access to disconnecting means is obstructed.</li></ul>	
<b>Failure to follow these instructions can result in death or serious injury.</b>	

The inverter should only be installed in a location that meets the following requirements:

<b>Dry</b>	Do not allow water or other fluids to drip or splash on the inverter/charger. Do not expose to rain, snow or water.
<b>Cool</b>	Normal ambient air temperature should be between 0 °C and 25 °C.
<b>Close to battery but not in the same compartment</b>	The length and size of your DC cables will affect performance. Use the DC cables recommended in Table 1-2 on page 1–14. The unit should not be installed in the battery compartment due to the possible presence of explosive hydrogen gas from the batteries.
<b>Clearance</b>	Allow as much space around the inverter/charger as possible. It is recommended that other objects and surfaces be at least 250 mm away from the ventilation openings for best performance.

## Step 2: Mounting the Inverter/Charger

<b>⚠ CAUTION</b>	
<b>HEAVY LOAD HAZARD</b>	
<ul style="list-style-type: none"><li>• Do not lift the unit by yourself. Use two people to lift and mount the unit. Always use proper lifting techniques during installation to prevent injury.</li><li>• Make sure that the wall can support a load of up to 70 kilos for a two-unit stacked configuration.</li><li>• Do not install in plasterboard (drywall) using drywall anchors. Attach the unit to wall studs. Use appropriately sized screws.</li></ul>	
<b>Failure to follow these instructions can result in injury.</b>	

---

**IMPORTANT:** Mount the inverter/charger before connecting any wires or cables.

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**TIP:** Align the mounting holes in the center of wall studs. If necessary, fasten a plywood board first to a wall with non-standard-spaced wall studs. Then mount the inverter/charger on the plywood board.

**(1)** Place the installation bracket flat on the wall (or plywood) and mark the positions of the mounting holes on the wall.

**(2)** Pilot drill the four mounting holes on wall studs (or plywood).

**(3)** Fasten the installation bracket to the mounting surface with four M6 screws.

**(4)** With two people, hang the Conext SW to the installation bracket carefully aligning the Conext SW's mounting holes to the threaded bolts on the installation bracket.

**(5)** Secure the Conext SW to the installation bracket using the supplied M6 nuts.

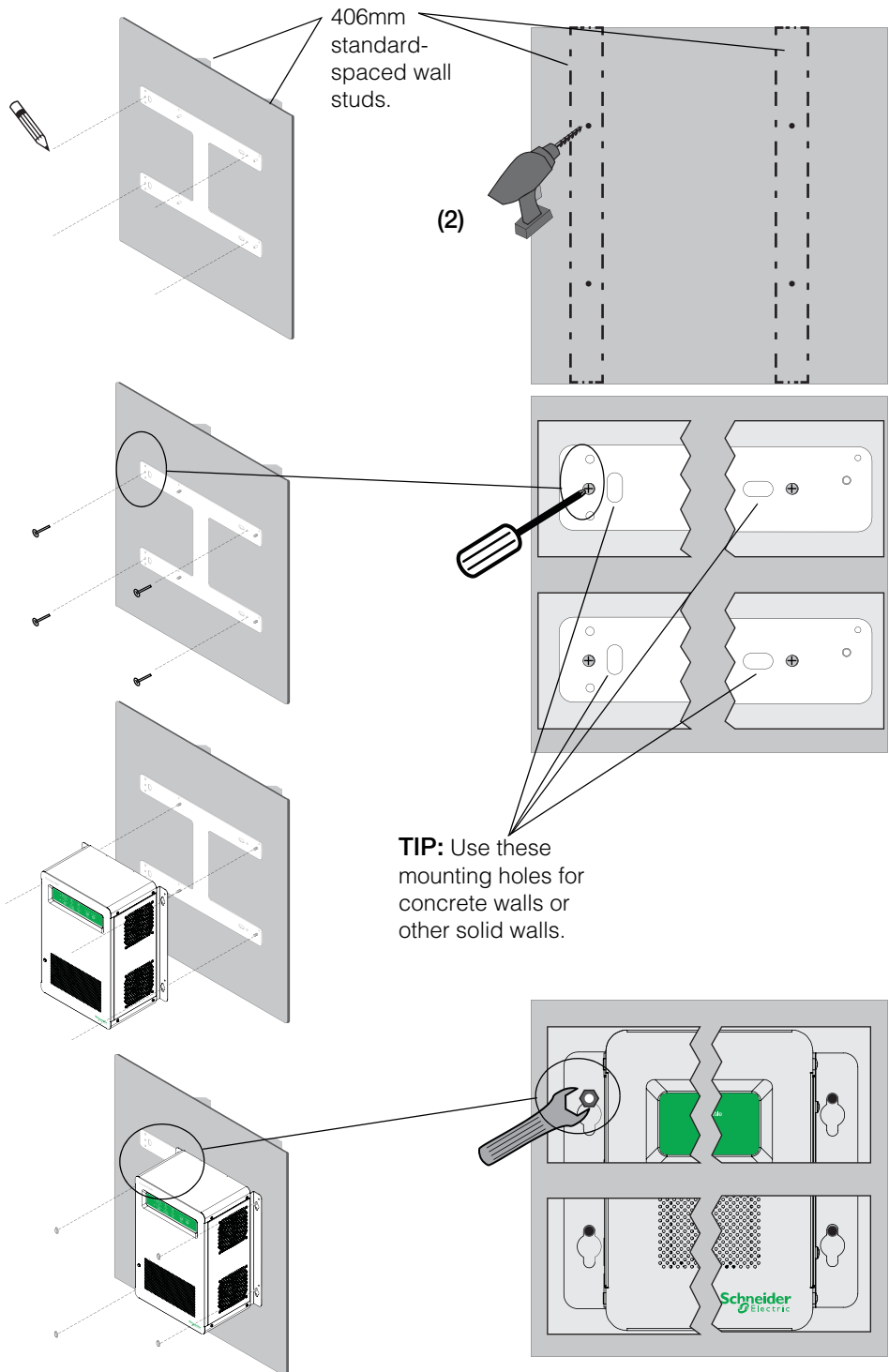


Figure 1-9 Conext SW Mounting Instructions

## Step 3: Connecting the AC Input and AC Output Wires

### **DANGER**

#### **ELECTRICAL SHOCK AND FIRE HAZARD**

- Make sure all AC and DC wiring being connected to the inverter/charger is disconnected (physically or by opening and locking out all relevant disconnecting means) from all electrical sources before handling.
- All wiring must be done in accordance with local and national electrical wiring codes.
- Replace the wiring box cover after wiring.

**Failure to follow these instructions will result in death or serious injury.**

### General AC Wiring Considerations

**AC and DC Wiring Separation** Do not mix AC and DC wiring in the same conduit or panel. Consult the applicable installation code for details.

**AC Knockouts** There are two dual 1" and 3/4" trade-size knockouts on the side panel and another two on the bottom panel for AC wiring. Use the same trade size of strain relief as the trade size of the knockout(s) you are using.

**AC Wiring Terminals** The AC wiring terminals accept cables of a specific size. See "AC Wiring" on page 1–12 for required sizes.

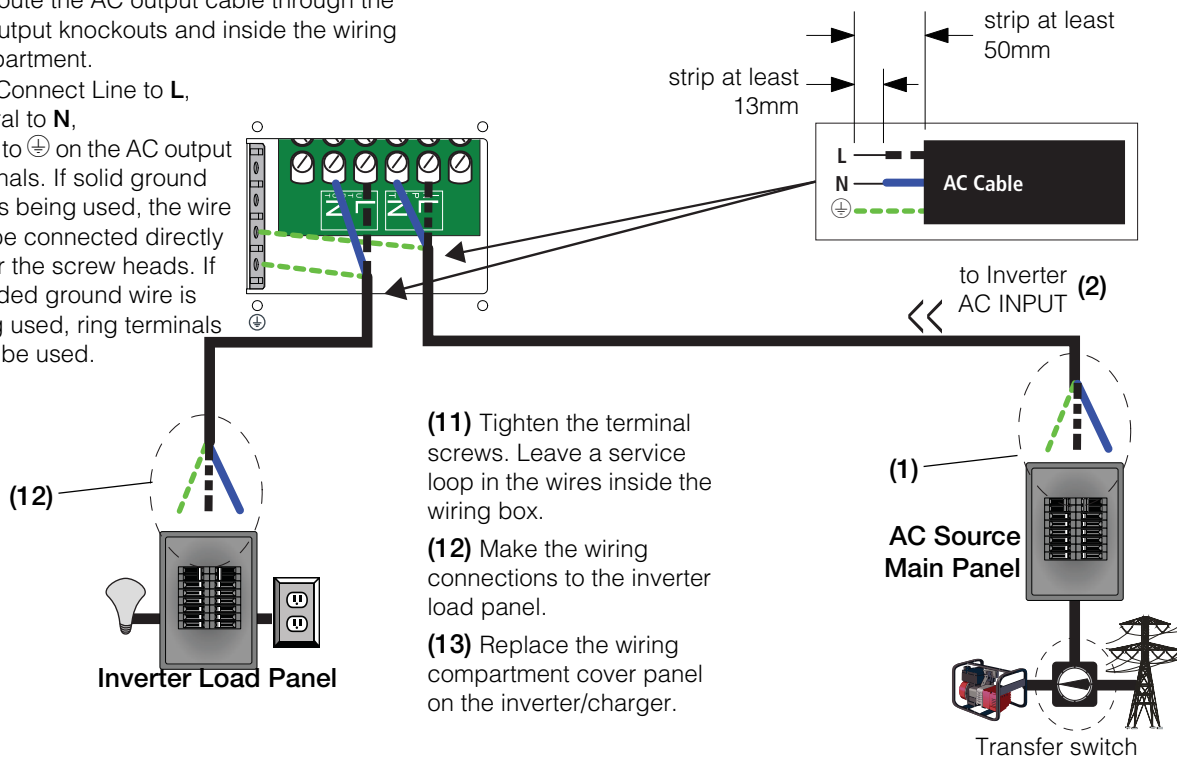
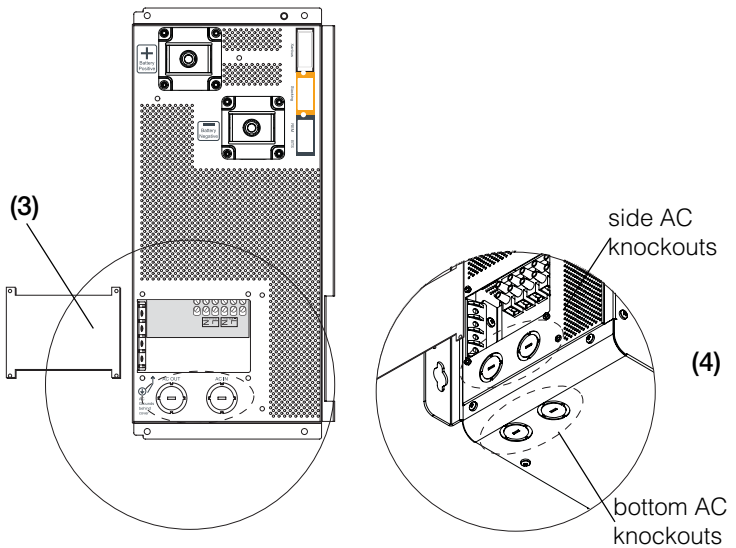
### **NOTICE**

#### **EQUIPMENT DAMAGE**

Do not remove or loosen factory installed wiring in the inverter's terminal block. The terminal block is split into INPUT and OUTPUT sections. Damage may occur if the unit is wired incorrectly.

**Failure to follow these instructions can damage the inverter/charger.**

- (1) Make the wiring connections to the AC source main panel.
- (2) Route the AC cable to the inverter/charger.
- (3) Remove the wiring compartment cover panel on the inverter/charger.
- (4) Remove the AC knockouts from the side or bottom (or both). Do not leave the knockout inside the wiring compartment.
- (5) Install strain-relief clamps in the AC knockouts.
- (6) Route the AC input cable through the AC input knockouts and inside the wiring compartment.
- (7) Connect Line to **L**, Neutral to **N**, earth to  $\oplus$  on the AC input terminals. If solid ground wire is being used, the wire can be connected directly under the screw heads. If stranded ground wire is being used, ring terminals must be used.
- (8) Tighten the terminal screws. Leave a service loop in the wires inside the wiring box.
- (9) Route the AC output cable through the AC output knockouts and inside the wiring compartment.
- (10) Connect Line to **L**, Neutral to **N**, earth to  $\oplus$  on the AC output terminals. If solid ground wire is being used, the wire can be connected directly under the screw heads. If stranded ground wire is being used, ring terminals must be used.



- (11) Tighten the terminal screws. Leave a service loop in the wires inside the wiring box.
- (12) Make the wiring connections to the inverter load panel.
- (13) Replace the wiring compartment cover panel on the inverter/charger.

**Figure 1-10** Conext SW AC INPUT and OUTPUT Connections

## Step 4: Connecting the DC Cables

### DC Connection Precautions

<b>⚠ WARNING</b>
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<b>BURN AND FIRE HAZARD</b>
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Connect and disconnect DC wiring only after opening and locking out the disconnect switches or breakers at all AC and DC sources.
---

<b>Failure to follow these instructions can result in death or serious injury.</b>
--

#### Recommended Cable Sizes and Lengths and Fuse Size

For recommended DC cables and fuse sizes, see Table 1-2 and Table 1-3 on page 1–14.

#### Preparing the Cables

Cut the negative and positive cables to the required length. Strip off enough insulation so you can install the terminals you will be using.

Use of crimp connectors – the connector should have a hole size to fit a 3/8" [9.5mm] stud size to connect to the Conext SW. If a crimp connector is used, it must be crimped using the tool indicated by the connector manufacturer.

Attach the connectors to the ends of both cables. Make sure no stray wire strands protrude from the connectors.

#### Guidelines for Routing the DC Cables

Follow these guidelines to ensure maximum performance.

<b>⚠ WARNING</b>
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<b>FIRE HAZARD</b>
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Route the cables away from sharp edges that can cut into or scrape the insulation. Wires can become exposed. Avoid sharp bends in the cable.
--

<b>Failure to follow these instructions can result in death or serious injury.</b>
--

To reduce the chance of radio frequency interference, keep the positive and negative cables close together—ideally, held together by straps, loom, or insulated clamps at regular intervals.



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## Connecting the DC Cables to the Inverter/Charger

### **⚠ WARNING**

#### **FIRE HAZARD**

- Use only appropriately sized copper cable. Loose connections, improper connections, and under-rated cables will overheat.
- Make sure the supplied nuts on the inverter/charger are tightened to a torque of 13.5–14.9 Nm. Torque all other connections to the manufacturer's specifications.
- Make sure the DC cables, washers, and nuts are assembled in the order shown in Terminal Connection in Figure 1-11 on page 1–24.

**Failure to follow these instructions can result in death or serious injury.**

### ***NOTICE***

#### **REVERSE POLARITY DAMAGE**

Check cable polarity at both the battery and the inverter/charger before making the final DC connection or closing the DC breaker or disconnect. Positive (+) must be connected to positive (+). Negative (–) must be connected to negative (–).

**Failure to follow these instructions can damage the inverter/charger.**

To help avoid damage caused by reverse polarity battery connection, it is a good idea to mark each end of each cable to identify it as a positive (red) or negative (black) cable before routing the wiring.

- (1) Route the DC cables from the battery bank to the inverter/charger.
- (2) Install a DC disconnect switch (a) and DC fuse (b) or a DC circuit breaker (c) between the inverter/charger and the battery on the positive terminal.
- (3) Open and lockout the DC disconnect switch or DC circuit breaker.
- (4) Connect one connector on the POSITIVE (+) cable to the BATTERY POSITIVE terminal on the inverter/charger. Connect in the order shown on Terminal Connection below. If the bolt has a nut and washer, remove them first.
- (5) Connect the other connector to the battery fuse or DC circuit breaker on the POSITIVE (+) line.
- (6) Connect one connector on the NEGATIVE (-) cable to the BATTERY NEGATIVE terminal on the inverter/charger. Connect in the order shown on Terminal Connection below. If the bolt has a nut and washer, remove them first.
- (7) Connect the other end of the cable to the NEGATIVE (-) terminal on the battery.
- (8) Attach the DC terminal covers to the inverter/charger using the screws provided.

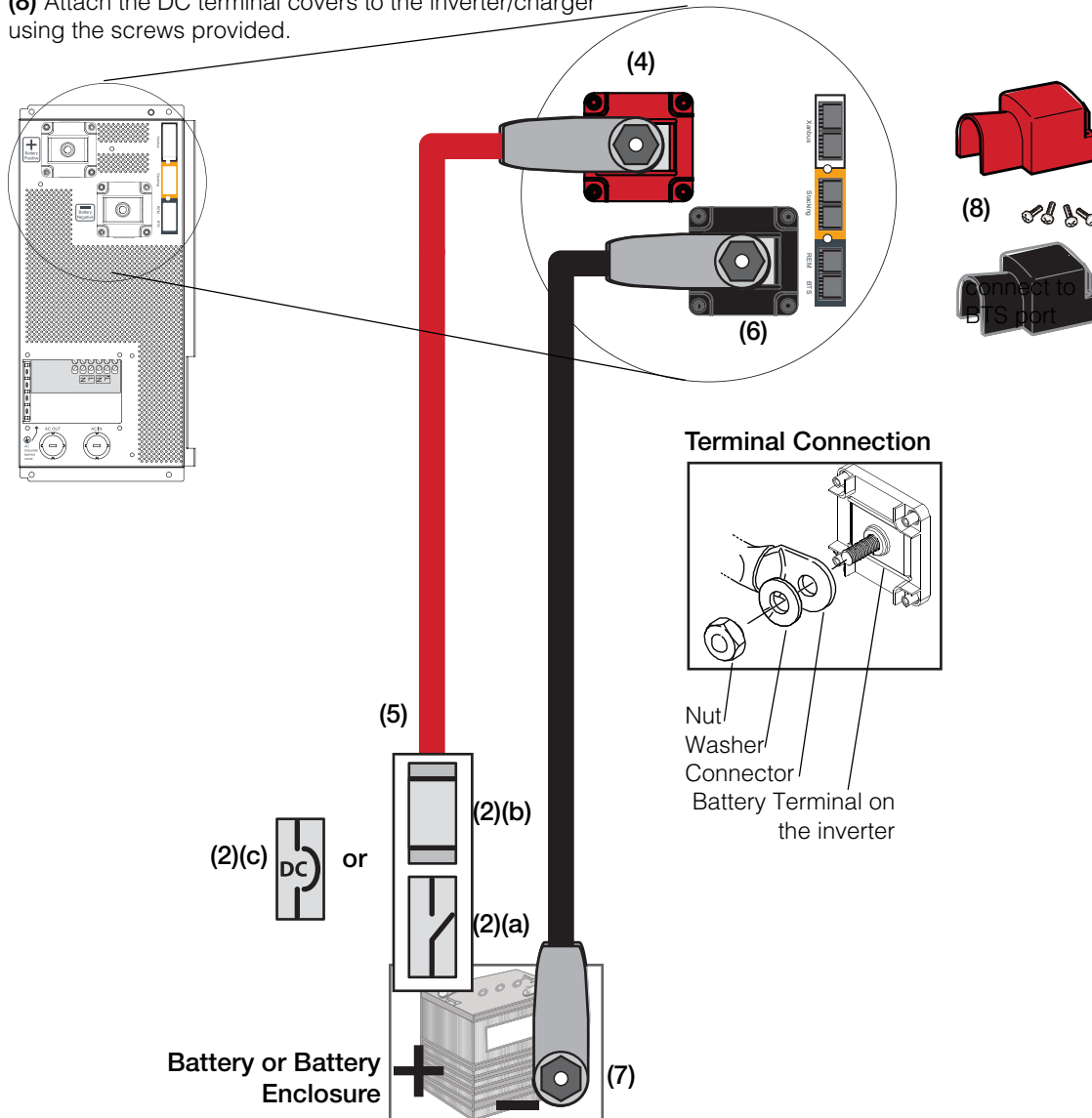


Figure 1-11 Conext SW DC Connections

## Step 5: Connecting the BTS and Xanbus-enabled Components

### **Battery Temperature Sensor (BTS)**

Installing a BTS extends the life of a battery by preventing overcharging in warm temperatures and undercharging in cold temperatures. With a BTS monitoring the battery temperature, the voltage delivered to the battery is adjusted according to the battery's actual temperature.

The BTS has a self-adhesive backing and attaches to the side of the battery. The BTS also comes with a metal tab. A 7.6-meter cable is supplied with the BTS.

### **Xanbus-enabled Components**

These include the SCP, the AGS, and a solar charge controller. The order in which the components are connected to the inverter/charger does not matter. The most important aspect of the installation of these components is the attachment of network terminators at each end of the network.

**⚠ WARNING**

**FIRE HAZARD**

Follow the stacking of wires as shown in 1(a) of the illustration below.

**Failure to follow these instructions can result in death or serious injury.**

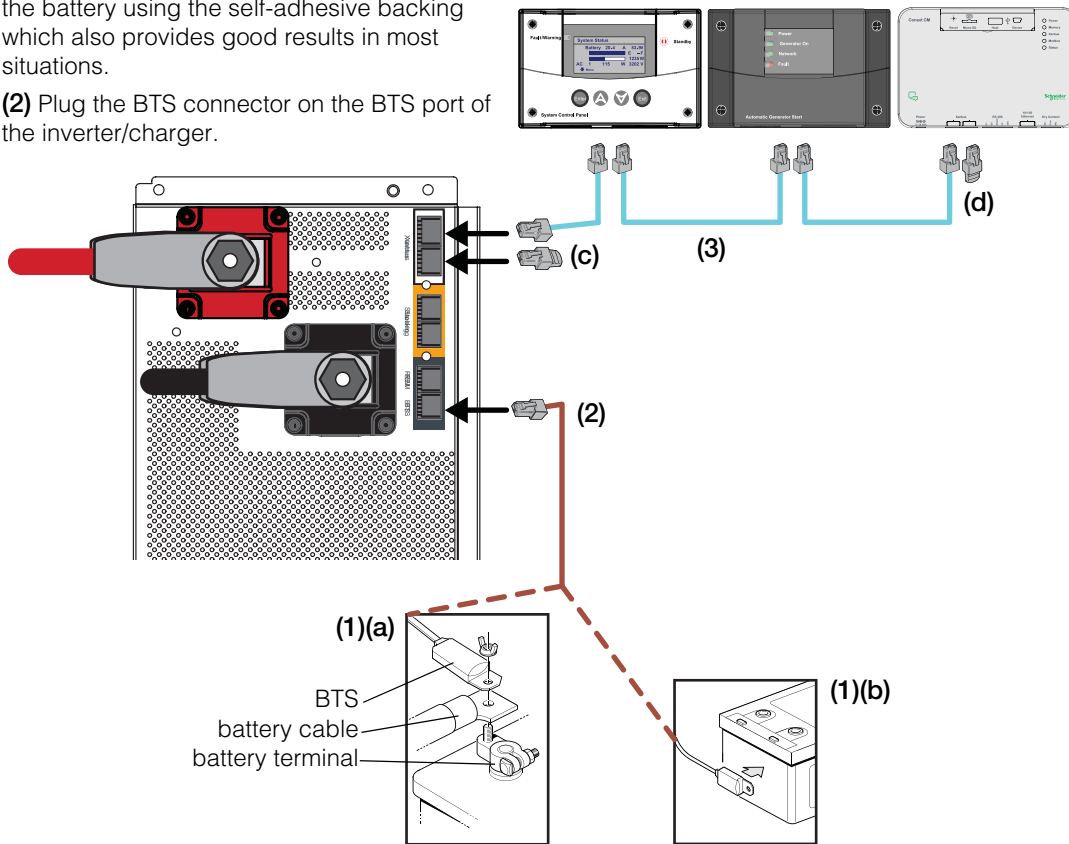
**(1)** Install the BTS sensor on the battery.

Method **(a)** involves mounting the sensor to the negative battery post which allows the internal battery temperature to be sensed providing the most accurate results.

Method **(b)** attaches the sensor to the side of the battery using the self-adhesive backing which also provides good results in most situations.

**(2)** Plug the BTS connector on the BTS port of the inverter/charger.

**(3)** Connect the Xanbus-enabled devices using the provided network cable. Terminate each end of the network with a network terminator **(c)** and **(d)**.



**Figure 1-12** Conext SW BTS and Xanbus Connections

## Step 6: Performing Checks Prior to Initial Start-Up

### ⚠ WARNING

#### ELECTRICAL SHOCK HAZARD

The Inv Enable button on the Conext SW front panel and the SCP do not disconnect DC or AC input power to the Conext SW. Open and lockout the disconnect switches or breakers at all AC and DC sources. Test with a multimeter before tightening electrical connections.

**Failure to follow these instructions can result in death or serious injury.**

Before testing your installation, ensure these conditions are met.

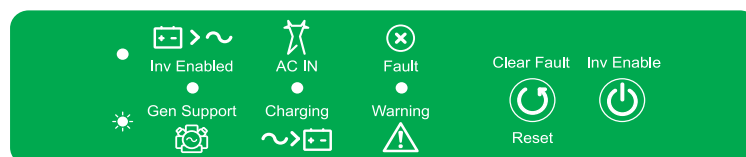
- DC disconnect switch or breaker is turned off.
- AC input and output breakers are turned off.
- AC earth are properly installed.
- AC input connections and AC output connections are wired correctly on the terminal block and not reversed.
- Positive (+) battery cable is connected to the positive (+) battery terminal through the DC fuse and disconnect switch or DC circuit breaker.
- Negative (–) battery cable is connected to the negative (–) battery terminal.
- Battery voltage is within the proper range for this unit: 21–33 VDC for 24-volt models and 42–66 VDC for the 48-volt model.
- All connections are tight.

## Step 7: Testing Your Installation

There are several tests to be performed for testing your installation. These tests will verify that:

- The Conext SW works in invert mode.
- The Conext SW works in charge mode.
- The Conext SW works in AC bypass mode.

If the test fails at any point, go to “Step 6: Performing Checks Prior to Initial Start-Up” on page 1–27 and go through the checklist again to check the installation. Then perform the test again. If the test fails again, see the troubleshooting section in the Conext SW Inverter/Charger Owner’s Guide.



**Figure 1-13** Conext SW Front Panel

## Testing in Invert Mode

**To test the Conext SW in invert mode, using a 100 watt light bulb as the test load:**

1. Close the DC disconnect switch or the DC circuit breaker to supply DC power to the Conext SW.  
Wait for the LEDs on the front panel to flash on and off, indicating that the unit is successfully initializing (10 to 30 seconds). The LEDs will turn off after initialization.  
If none of the LEDs come on or flash intermittently, make sure the voltage at the DC terminals on the Conext SW is correct, as described in “Step 6: Performing Checks Prior to Initial Start-Up” on page 1–27.
2. After initialization, observe that none of the lights on the front panel should remain illuminated.
3. Press the Inv Enable button. Verify that the green Inv Enabled LED illuminates.
4. Connect the Conext SW to the test load by closing the AC breaker that controls the circuit that the test load is connected to.  
If the light bulb illuminates, the Invert mode is working.
5. Press the Inv Enable button to disable inverter mode. The Inv Enabled LED goes off.

## Testing in Charge Mode and AC Bypass Mode

1. Start the AC generator, if off-grid. If grid-connected proceed to step #2.
  2. Close the main breaker in the AC input panel (the AC input panel feeds power from either the generator or grid) in order to supply AC power to the unit.
- Verifying charging:**
3. After a few seconds, verify that the AC IN / Charging LED on the front panel is turned on and that it starts flashing indicating that the batteries are being charged.
- Verifying AC bypass:**
4. Disable the AC source by opening the main breaker in the AC input panel and turn off inverter mode by pressing the Inv Enable button.
  5. Connect the test load to the AC output connection of the unit.
  6. Enable the AC source by closing main breaker in the AC input panel and the test load should turn on after ten seconds.

## Installation Complete

Your installation is now complete. The inverter/charger is ready for use.

The preceding tests use a light test load (a light bulb) as a test case. If you encounter problems when using a load over 1000 watts (for example, a hair dryer or microwave), see the troubleshooting information in the Conext SW Inverter/Charger Owner's Guide.

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## Multiple Unit Configuration

The Conext SW inverter/charger supports multiple unit configuration to increase power output. This gives the system engineer and/or installer more options to work with when tailoring a system to meet load demands. Multiple inverter/chargers of different power levels can be installed in a system as stand alone or in parallel.

In a multiple unit configuration, only two Conext SW inverter/chargers of the same model can be used. For example, two Conext SW 4024 230 units can be configured because both units each have a 24-volt rating and a power rating of up to 3400 watts.

In this configuration, the inverter and charger capacity of a system is doubled. In the case of two Conext SW 4024 230 units, the inverter power rating doubles to 7000 watts and the charging output current doubles to 180 amps. However, the AC transfer relay rating of 30-amps remains the same. Inverter/chargers can operate from different battery banks, meaning each unit is connected to its own battery bank. However, it is highly recommended to use only a single battery bank. See “DC Connections for Multiple Unit Configuration” on page 1–31.

---

**IMPORTANT:** In a multiple unit configuration where two Conext SW units are set up together, the AC transfer relay rating remains the same at 30 amps. This AC transfer relay rating does not double to become 60 amps.

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### **WARNING**

#### **FIRE HAZARD**

Do not power multiple loads in excess of 30 amps even in a multiple unit configuration.

**Failure to follow this instruction can result in death or serious injury.**

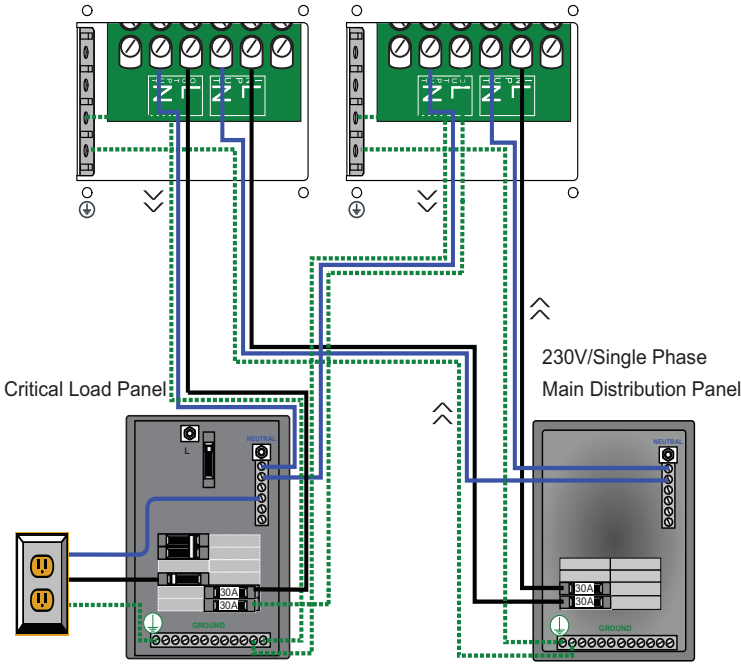


Figure 1-14 Multiple Unit Configuration Using Two Conext SW Units



## DC Connections for Multiple Unit Configuration

Individual overcurrent devices are to be used between the battery positive and each inverter. Keep cable lengths to the two inverter/chargers the same in order to balance cable losses. The battery cable between the two inverter/chargers should not exceed 30 cm in length.

### Connect the units as follows:

1. Connect the positive cables.  
Follow the steps in “Connecting the DC Cables to the Inverter/Charger” on page 1–23.  
Also, do not tie the positives in series together between inverters.
2. Connect the negative cables.  
Follow the steps in “Connecting the DC Cables to the Inverter/Charger” on page 1–23.
3. Connect the battery temperature sensors (BTS), if needed.  
Follow the steps in “Step 5: Connecting the BTS and Xanbus-enabled Components” on page 1–25.

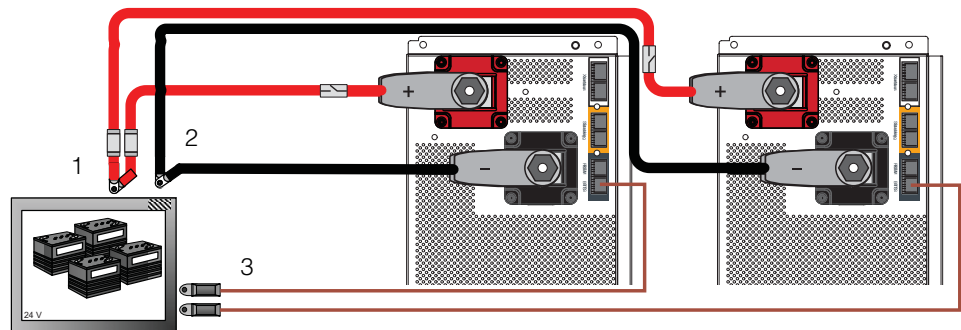


Figure 1-15 Connecting Battery Cables

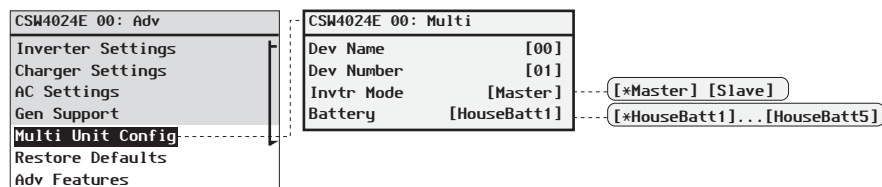
## Configuring the System for Multiple Unit Operation

Verify all DC and AC connections. Check Xanbus network connections and ensure that terminators are installed at devices at each end of the network. The simplest system includes a Xanbus SCP, the two multi-unit-configured Conext SW inverter/chargers, and two Xanbus terminators.

For both units to operate in multiple unit configuration, a Master and Slave have to be assigned. The default out-of-box configuration for all Conext SW inverter/chargers is **Master** which causes a conflict the first time the system is powered up. The installer will need to change configuration on one of the inverter/chargers to **Slave** mode.

### To configure the system for multiple unit configuration:

1. Apply DC power to both inverter/chargers.  
Power up order has no impact. Because there are now two Master units in the system, the SCP will detect an **F71** fault, a “system configuration fault”.
2. From the SCP **System Status** screen, press **Enter**. The **Select Device** screen appears.
3. Select the inverter to configure as a Slave unit from the list, then press **Enter**.
4. Bring up the **Advanced Settings** screen by pressing **Enter**, Up, and Down arrow buttons all together.
5. Select **Advanced Settings** and press **Enter**. The Advanced Settings screen appears.
6. Scroll down to select **Multi Unit Config**.  
At this point all devices in the system will be automatically placed in standby mode. All three LEDs on the inverter to be configured will start flashing



**Figure 1-16** Multi Menu Screen

7. Select **Invtr Mode** and press **Enter**.
8. Select **Slave** and press **Enter**.
9. Press the **Exit** button repeatedly until the **System Status** screen appears.

**NOTE:** The only situation in which the Slave may shut down the Master inverter is during fault detection conditions such as high or low battery voltage, overcurrent, or over-temperature conditions. Both inverters will auto reset after a fault detection condition has been cleared. The exception is that an overcurrent condition will generate a shutdown for both inverters that will require a manual restart of the system.

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## Search Mode Operation in Multiple Unit Configuration

Search mode is automatically enabled in multiple unit installations with two paralleled Conext SW units. Only the master Conext SW operates, and the slave unit comes online only when the load exceeds approximately 60% of the rated output of the master unit. When the load drops below 20% of the master's rated output, the slave unit turns off.

For more information on when to set up the Search mode, refer to the *Conext SW Inverter/Charger Owner's Guide* (document part number: 975-0636-01-01) under Chapter 4 -> Configuring Advanced Settings -> Using Search Mode.

## Wiring Schematic

**NOTE:** Please refer to "Multiple Unit Configuration" on page 1–29 that shows the wiring schematic employed between two Conext SW inverter/chargers.

**IMPORTANT:** Follow the same guidelines in "Inverter/Charger Installation" on page 1–17 when choosing cables and/or wires for AC and DC connections.

<b>⚠ WARNING</b>
<b>FIRE, ELECTRICAL SHOCK, AND EXPLOSION HAZARD</b> Make sure all wiring being used to make multiple unit configurations between inverter/chargers is disconnected (physically or by opening and locking out the breaker) from all electrical sources before handling. All wiring must be done in accordance with local and national electrical wiring codes. <b>Failure to follow these instructions will result in death or serious injury.</b>

## Battery Information

### Battery Bank Sizing

**Battery capacity** Battery size or capacity is just as important as the battery type selected for use with the Conext SW. The batteries are the most important part of your system, so it is recommended that you purchase as much battery capacity as possible. A large battery will extend running time and ensure that your inverter/charger delivers full rated surge.

It is recommended to have a minimum battery size of 100 amp-hours (Ah) for moderate loads (<1000W) and greater than 200 Ah for heavy loads.

See “Estimating Battery Requirements” for information on a more detailed calculation.

**About Amp-hours** A number of different standards are used to rate battery energy storage capacity. Automotive starting batteries are normally rated in cranking amps. This is not a relevant rating for continuous loads like an inverter. Deep-cycle batteries use a more suitable rating system such as amp-hours (Ah).

Amp-hour capacity is the number of amps a battery can continuously deliver during a specified number of hours. It is represented by the product of the two — amps multiplied by hours.

A battery rated for 100 Ah can deliver 5 amps for 20 hours (5 amps × 20 hours = 100 Ah). Depending on the battery chemistry, this battery can deliver a higher or lower current for less or more time,

## Estimating Battery Requirements

### Calculating Battery Size

#### Step 1: Compute Amp-hours

For each appliance, compute the number of amp-hours that will be used between charging cycles, as follows:

1. Obtain the wattage. If the wattage is marked on the nameplate rating, use that. Otherwise, multiply the marked voltage and amperage:  
**WATTS = VOLTS × AMPS.**
2. Obtain the Watt-hours by multiplying that amount by the hours the appliance will be used:  
**WATT-HOURS = WATTS × HOURS.**
3. Obtain the amp-hours that the appliance requires by dividing that amount by 20 (the factor for the Conext SW, which is a 24-volt system):  
**BATTERY AMP-HOURS USED = AC WATT-HOURS/20**

For example, a 100 W light bulb that is used for 4 hours will use 400 watt-hours (Wh) and the inverter will consume approximately 20 Ah from a 24-volt battery.

4. Enter this information on the blank calculation worksheet (page 1–37).

#### Step 2: Calculate Battery Size

5. Complete the rest of the worksheet; see Table 1-4, “Battery Sizing Example” on page 1–36 for an example.

Size the batteries for approximately twice the estimated total amp-hour usage. Doubling the expected amp-hour usage ensures that the batteries will not be overly discharged and extends battery life.

Do not skip this doubling step. More capacity is better since you will have more reserve capacity, be better able to handle large loads and surge loads, and your battery won't be discharged as deeply. Battery life is largely dependent on how deeply the battery is discharged. The deeper the discharge, the shorter the battery life.

**Troubleshooting** If you find that the system shuts down when appliances with large motors are started, the problem may be that this motor is too much for the battery. Even though you calculated the amp-hour requirements appropriately, the startup of a large motor makes high demands on the battery. You may find that adding more amp-hours (in the form of extra batteries or replacement with a bigger battery) solves the problem.

**Table 1-4** Battery Sizing Example

Appliance	(A) Power Consumption (Watts)	(B) Operating Time per Day (Hours)	Daily watt-hours needed for this appliance (= A × B)
TV & VCR	200 W	2 hours	400 Wh
Small microwave oven	800 W	15 min = 1/4 hour	200 Wh
3 lamps, 60 W each	180 W	4 hours	720 Wh
Coffee maker	600 W	15 min = 1/4 hour	150 Wh
Hair dryer	1500 W	6 min = 1/10 hour	150 Wh
<b>Total daily watt-hours of AC load</b>			1620 Wh
<b>× Number of days between charges</b>			3
<b>= Total watt-hours of AC load between charges</b>			4860 Wh
<b>Battery Ah used between charges (divide by 20 for 24 volt system)</b>			243 Ah
<b>Recommended Battery Bank Size in Ah (multiply by 2)</b>			486 Ah

This example illustrates how quickly your battery needs can escalate. To reduce the required battery bank size, you can either conserve energy by eliminating or reducing the use of some loads, or recharge more frequently.

## Battery Banks

As your power requirements increase, you may need to use more than one battery to obtain sufficient capacity. Batteries can be connected in parallel, in series, or in series-parallel to create higher capacity systems.

See “Battery Cabling and Hook-up Configurations” on page 1–38 for more information about battery inter-connection schemes.

**Mixing Batteries** Batteries connected in parallel should be of the same type and amp-hour rating and from the same manufacturer.

It is not recommended to connect batteries of different types, amp-hour ratings or manufacturers. Improper charging and decreased battery life will result.

## Battery Bank Sizing Worksheet

The following worksheet is a guide to help you determine your battery needs. Be generous in estimating the time for which you will run each of the loads to ensure sufficient battery capacity.

## Restrictions on Motor Size

An appliance may require three to six times its normal running current in order to start. The Conext SW can handle surges up to twice its rated amount (surge current) for five seconds. For example, the model Conext SW 4024 230 is rated as having a maximum continuous output current of 16 amps. Its surge current is twice this value, which is 32 amps. In motors, the locked rotor amp (also called its starting current) may be specified on the motor nameplate as “LRA” or “LRI”. The LRA must be no more than the surge current for the inverter to handle the motor load.

When considering appliances with large motors, follow these guidelines:

- Make sure that the motor’s LRA rating is no more than surge current amps. The Conext SW may not be able to start a motor with a higher LRA, and the Conext SW will shut down if the attempt is made.
- Make sure the battery bank, DC cables and DC fuses are capable of handling up to 600 amps DC for five seconds. A weaker circuit may not be able to provide sufficient power to the Conext SW to allow the Conext SW to start up the appliance. Again, if the circuit cannot deliver the required current, the system may shut down or the fuse may open.

**Table 1-5** Battery Sizing Worksheet

Appliance	(A) Power Consumption (Watts)	(B) Operating Time per Day (Hours)	Daily watt-hours needed for this appliance (= A × B)
	W	hours	Wh
	W	hours	Wh
	W	hours	Wh
	W	hours	Wh
	W	hours	Wh
	W	hours	Wh
	W	hours	Wh
	W	hours	Wh
<b>Total daily watt-hours of AC load</b>			Wh
<b>× Number of days between charges</b>			
<b>= Total watt-hours of AC load between charges</b>			Wh
<b>Battery Ah used between charges (divide by 20 for 24 volt system)</b>			Ah
<b>Recommended Battery Bank Size in Ah (multiply by 2)</b>			<b>Ah</b>

## Battery Cabling and Hook-up Configurations

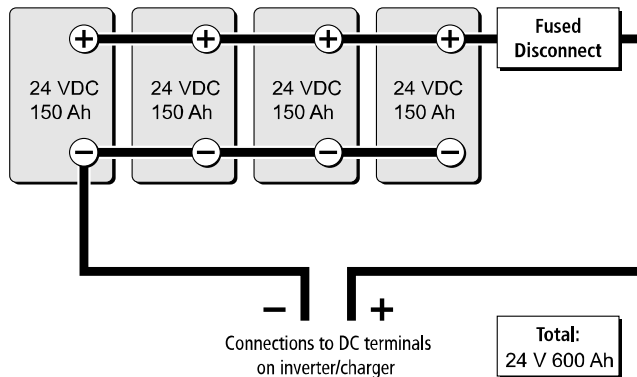
Several smaller batteries can be connected to create a battery bank of substantial size. You can connect batteries in three ways: in parallel, series, or series-parallel.

To make a larger battery bank, connect individual batteries with heavy cables. The actual size of the cable depends on whether the batteries are connected in parallel or series. Generally, the cable should not be smaller than the inverter cables—if the main cables are 120 mm<sup>2</sup>, the battery interconnects should be 120 mm<sup>2</sup>.

The best configuration is to connect the batteries in series and parallel. This requires additional cables, but reduces imbalances in the battery bank and can improve the overall performance. Consult your battery supplier for more information regarding the hook-up configuration required for your system.

### Battery Parallel Connection

Batteries are connected in parallel when all the positive terminals of a group of batteries are connected and then, separately, all the negative terminals are connected. In a parallel configuration, the battery bank has the same voltage as a single battery, but an Ah rating equal to the sum of the individual batteries. See below.

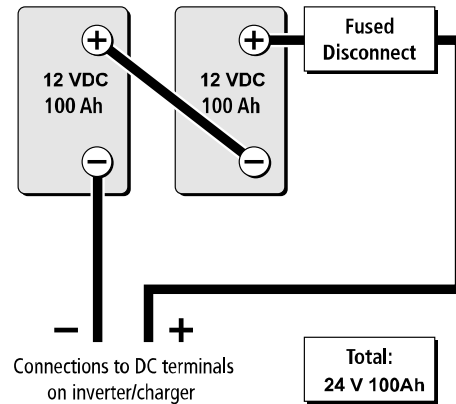


**Figure 1-17** Batteries Connected in Parallel



## Battery Series Connection

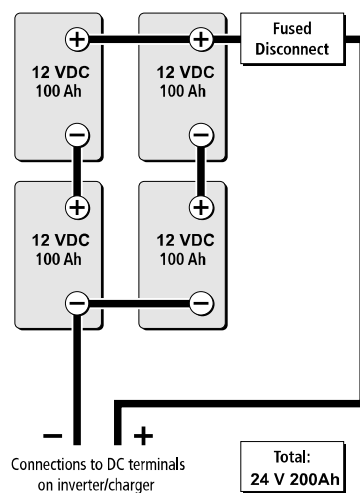
When batteries are connected with the positive terminal of one battery to the negative terminal of the next battery, they are connected in series. In a series configuration, the battery bank has the same Ah rating of a single battery, but an overall voltage equal to the sum of the individual batteries. See below.



**Figure 1-18** Batteries Connected in Series

## Battery Series-Parallel Connections

As the name series-parallel implies, both the series and parallel configurations are used in combination. The result is an increase in both the voltage and the capacity of the total battery bank. The smaller, lower voltage batteries are first connected in series to obtain the necessary voltage, and then these “batteries connected-in-series” sets are connected in parallel to increase the battery bank capacity. See below.



**Figure 1-19** Batteries in Series-Parallel Connections



# 2

## Specifications

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**NOTE:** Specifications are subject to change without prior notice.

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## Inverter Specifications

**NOTE:** All inverter specifications are at nominal conditions: ambient temperature of 25 °C, 230 VAC, 50 Hz input, unless otherwise specified

<b>AC Output</b>	<b>SW 2524 230</b>	<b>SW 4024 230</b>	<b>SW 4048 230</b>
Output waveform	true sine wave	true sine wave	true sine wave
Output power (AC) - Maximum continuous - 30 minutes - 5-second surge	3000 W 3300 W <sup>a</sup> 5000 W <sup>b</sup>	3400 W 4000 W <sup>c</sup> 7000 W <sup>d</sup>	3800 W <sup>e</sup> 4400 W <sup>e</sup> 7000 W
Maximum continuous allowable (in pass-thru)	30 A	30 A	30 A
Inverter continuous output current	13 A	16 A	16 A
Inverter peak output current	24.3 A	42 A	42 A
AC OUTPUT connection	Single-Phase (L, N, ⊕)	Single-Phase (L, N, ⊕)	Single-Phase (L, N, ⊕)
Peak efficiency	91.5%	92%	94%
Operating voltage range	216–232 VAC	216–232 VAC	219–240 VAC
Nominal voltage	230 VAC	230 VAC	240 VAC
Operating frequency range	selectable 50 or 60 Hz	selectable 50 or 60 Hz	selectable 50 or 60 Hz
Default output frequency	50 Hz	50 Hz	50 Hz
<b>DC Input</b>	<b>SW 2524 230</b>	<b>SW 4024 230</b>	<b>SW 4048 230</b>
Voltage range	20–34 VDC	20–34 VDC	40–64 VDC
Maximum short-circuit current	10,000A	10,000A	10,000A
Maximum continuous power voltage range	22–27 VDC	22–27 VDC	46–48 VDC
Maximum allowable current	250 A	250 A	250 A
No-load power draw (Inverter On)	24 W	29 W	27 W
Low battery voltage shutdown cut-off (other values selectable)	21.0 V (default)	21.0 V (default)	42.0 V (default)
High battery voltage shutdown cut-off (other values selectable)	33.0 V (default)	33.0 V (default)	62.0 V (default)

a. Duty cycle 3300 W for 30 minutes, 0 W for 45 minutes

b. Duty cycle 5000 W for 5 seconds, 3000 W for 300 seconds.

c. Duty cycle 4000 W for 30 minutes, 0 W for 45 minutes.

d. Duty cycle 7000 W for 5 seconds, 3400 W for 300 seconds.

e. Only when NoLoadVD is enabled.

## Charger Specifications

**NOTE:** All charging specifications are at nominal conditions: ambient temperature of 25 °C, 230 VAC, 50 Hz input, unless otherwise specified.

DC Output	SW 2524 230	SW 4024 230	SW 4048 230
Maximum output current	65 A	90 A <sup>a</sup>	45 A
Nominal output voltage	24 VDC	24 VDC	48 VDC
Charging output voltage operation range <sup>b</sup>	12.0–32.0 VDC	12.0–32.0 VDC	24.0–64.0 VDC
Equalization cycle	Manual by SCP	Manual by SCP	Manual by SCP
Optimal charging efficiency	90%	90%	92%
Dead battery charge voltage	> 12.0 VDC	> 12.0 VDC	> 24.0 VDC
Charging methods (two settings)	Three-stage charge (Bulk, Absorption, Float) [default] Two-stage charge (Bulk, Absorption)		
Without a battery temperature sensor (three settings)	Cool 10 °C Warm 25 °C [default] Hot 40 °C		
With a battery temperature sensor (provided)	<p>The temperature compensation coefficients on a <b>24-volt battery</b> are as follows:            Flooded: 54 mV × (25 °C – BTS °C)            Gel: 54 mV × (25 °C – BTS °C)            AGM: 42 mV × (25 °C – BTS °C)</p> <p>The temperature compensation coefficients on a <b>48-volt battery</b> are as follows:            Flooded: 108 mV × (25 °C – BTS °C)            Gel: 108 mV × (25 °C – BTS °C)            AGM: 84 mV × (25 °C – BTS °C)</p>		

a.Charging current derates up to 5% between 35 to 60 °C.

b.Recharging does not occur when battery voltage is below 12 V.

AC Input	SW 2524 230	SW 4024 230	SW 4048 230
Power factor at full charge rate	> 0.98	> 0.98	> 0.98
Current <sup>a</sup>	10.6 A	14 A	15 A
Maximum continuous allowable	30 A	30 A	30 A

## Specifications

AC Input	SW 2524 230	SW 4024 230	SW 4048 230
Voltage	230 VAC	230 VAC	230 VAC
Voltage range <sup>b</sup>	170–270 VAC	170–270 VAC	170–270 VAC
Frequency range	40 – 70Hz	40 – 70 Hz	40 – 70 Hz
Maximum short-circuit current	10,000 A	10,000 A	10,000 A
AC INPUT Connection	Single-Phase (L, N, ⊕)	Single-Phase (L, N, ⊕)	Single-Phase (L, N, ⊕)
Supplemental protector (resettable)	30 A	30 A	30 A

a. See Table 2-1, "Inverter Output Power versus Temperature Derating Graph" on page 2–5

b. Derating occurs below 206 V.

## AC Transfer Specifications

**NOTE:** All transfer specifications are at nominal conditions: ambient temperature of 25 °C, 230 VAC, 50 Hz input, unless otherwise specified.

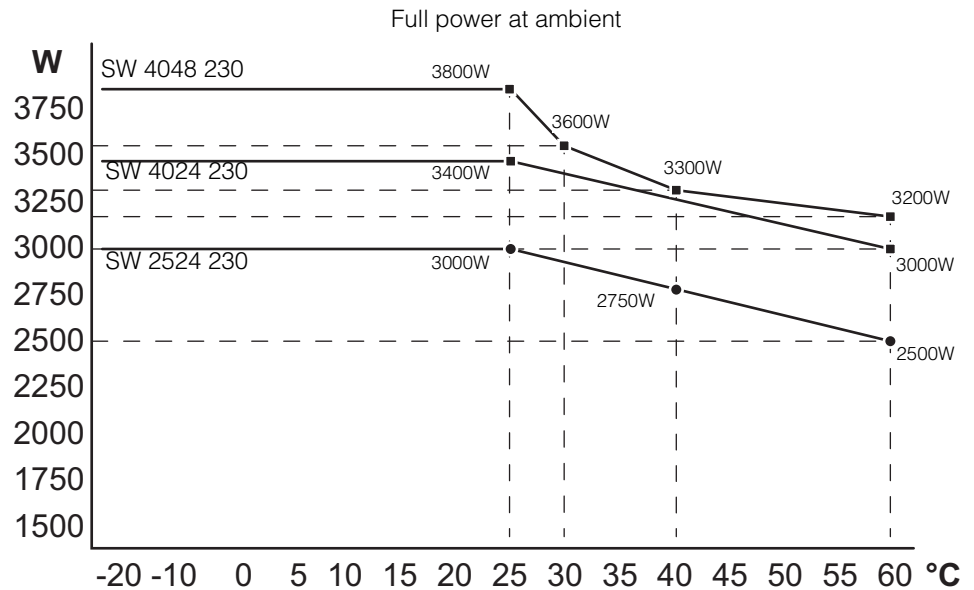
	All Models
Transfer time—utility to invert	< 20 ms
Relay current rating	30 A
Minimum AC input voltage for transfer	170 VAC RMS
Maximum AC input voltage for transfer	270 VAC RMS
Minimum AC input frequency for transfer	40 Hz
Maximum AC input frequency for transfer	70 Hz
Cooling	Fan-cooled, temperature controlled.

## Physical Specifications

	SW 2524 230	SW 4024 230	SW 4048 230
L × W × H	387×343×197 mm	387×343×197 mm	387×343×197 mm
Net Weight	28 kg	34.5 kg	34.5 kg

# Environmental Specifications

	<b>All Models</b>
Nominal ambient temperature	25 °C
Operating temperature range	-20 to 60 °C, starts derating above 25 °C (see following graph)
Storage temperature range	-40 to 85 °C
Humidity: Operation/Storage	≤ 95% RH, non-condensing
Ingress protection rating	Indoor only, IP 20
Pollution degree	3
Over voltage category (AC circuits)	CAT III
Over voltage category (DC system)	CAT II
Altitude: Operating	2,000 m
Mounting	wall mount using installation bracket



**Figure 2-1** Inverter Output Power versus Temperature Derating Graph

## Regulatory

**NOTE:** Regulatory certifications may change without notice. To see the latest information, visit [solar.schneider-electric.com](http://solar.schneider-electric.com).

	Europe	Australia/New Zealand
<b>Safety</b>	CE marked for the Low Voltage Directive 2006-95-EC per: <ul style="list-style-type: none"> <li>• IEC/EN 62109-1, Safety of power converters for use in photovoltaic power systems – Part 1: General requirements.</li> <li>• IEC/EN 62109-2, Safety of power converters for use in photovoltaic power systems – Part 2: Particular requirements for inverters</li> <li>• IEC/EN 60529-1</li> </ul>	RCM marked per: <ul style="list-style-type: none"> <li>• IEC/EN 62109-1, Safety of power converters for use in photovoltaic power systems – Part 1: General requirements.</li> <li>• IEC/EN 62109-2, Safety of power converters for use in photovoltaic power systems – Part 2: Particular requirements for inverters</li> <li>• IEC/EN 60529-1</li> </ul>
<b>EMC</b>	CE marked for EMC Directive 2004-108-EC per: <ul style="list-style-type: none"> <li>• EN 61000-3-2</li> <li>• EN 61000-3-3</li> <li>• EN 61000-6-3 (generic residential EMC emissions)</li> <li>• EN 61000-6-1 (generic residential EMC immunity)</li> </ul>	RCM marked per AS/NZS 61000.6.3, EMC generic emission standard for residential, commercial and light-industrial environments



# 3

## Wiring Diagrams

“Wiring Diagrams” illustrate the most basic BOS configurations and are for reference only. Specific installations may require additional equipment to meet national or local electric codes. Ensure all safety requirements are strictly followed.

<b>For.....</b>	<b>See....</b>
“Single-Inverter System (Off-Grid/Power Backup)”	page 3-3
“Single-Inverter System Renewable Energy (Solar)”	page 3-5
“Dual-Inverter System Renewable Energy (Solar)”	page 3-7



# Single-Inverter System (Off-Grid/Power Backup)

**⚠ DANGER**

**ELECTRICAL SHOCK AND FIRE HAZARD**

Installation must be done by qualified personnel to ensure compliance with all applicable installation codes and regulations. Instructions for installing the Conext SW are provided in a separate installation guide for use by qualified installers only.

**Failure to follow these instructions will result in death or serious injury.**

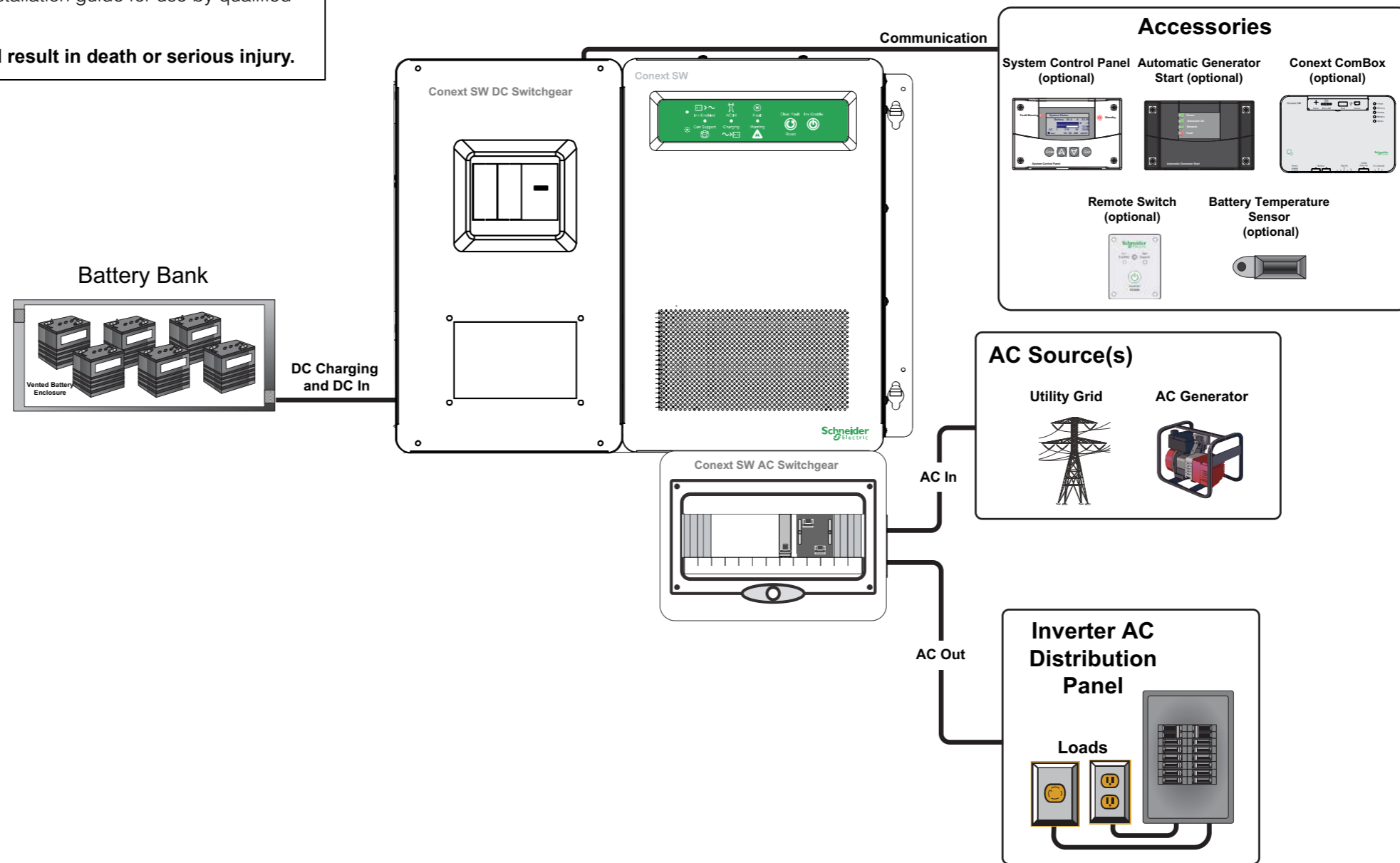


Figure 3-1 Single-Inverter System (Off-Grid/Backup) Overview

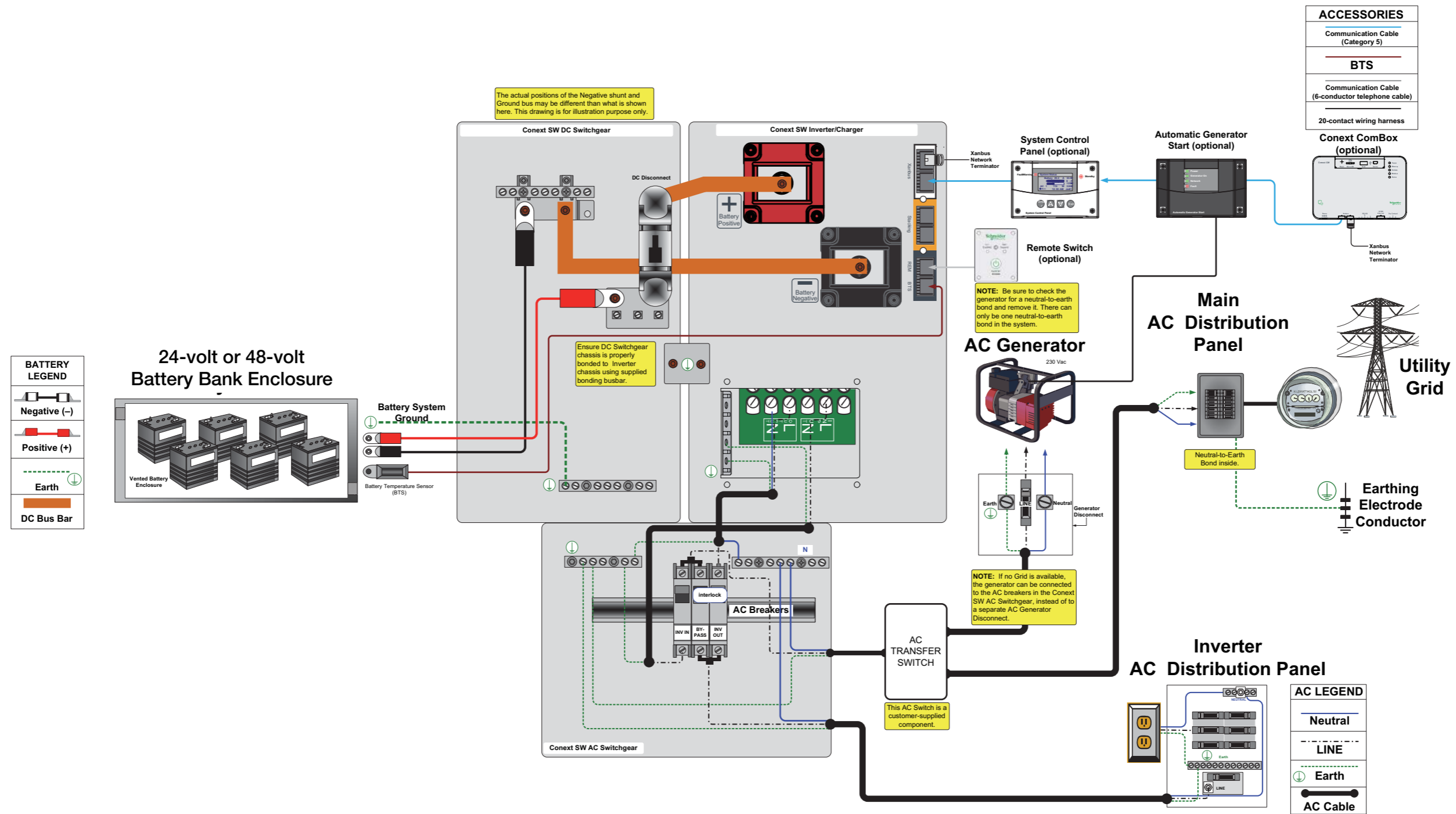


Figure 3-2 Single-Inverter System (Off-Grid/Backup) Wiring

# Single-Inverter System Renewable Energy (Solar)

**⚠ DANGER**

**ELECTRICAL SHOCK AND FIRE HAZARD**

Installation must be done by qualified personnel to ensure compliance with all applicable installation codes and regulations. Instructions for installing the Conext SW are provided in a separate installation guide for use by qualified installers only.

**Failure to follow these instructions will result in death or serious injury.**

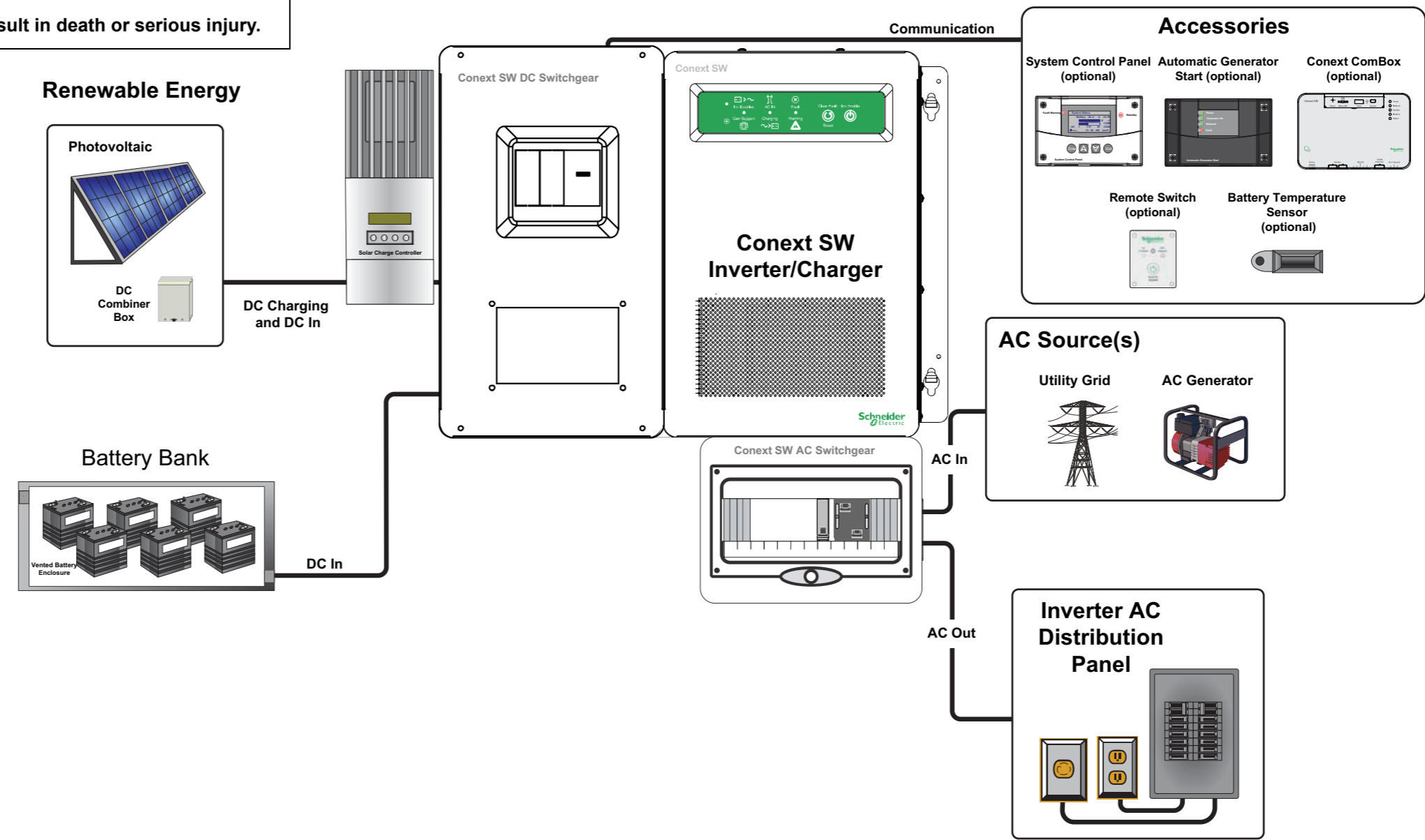


Figure 3-3 Single-Inverter System Renewable Energy (Solar) Overview

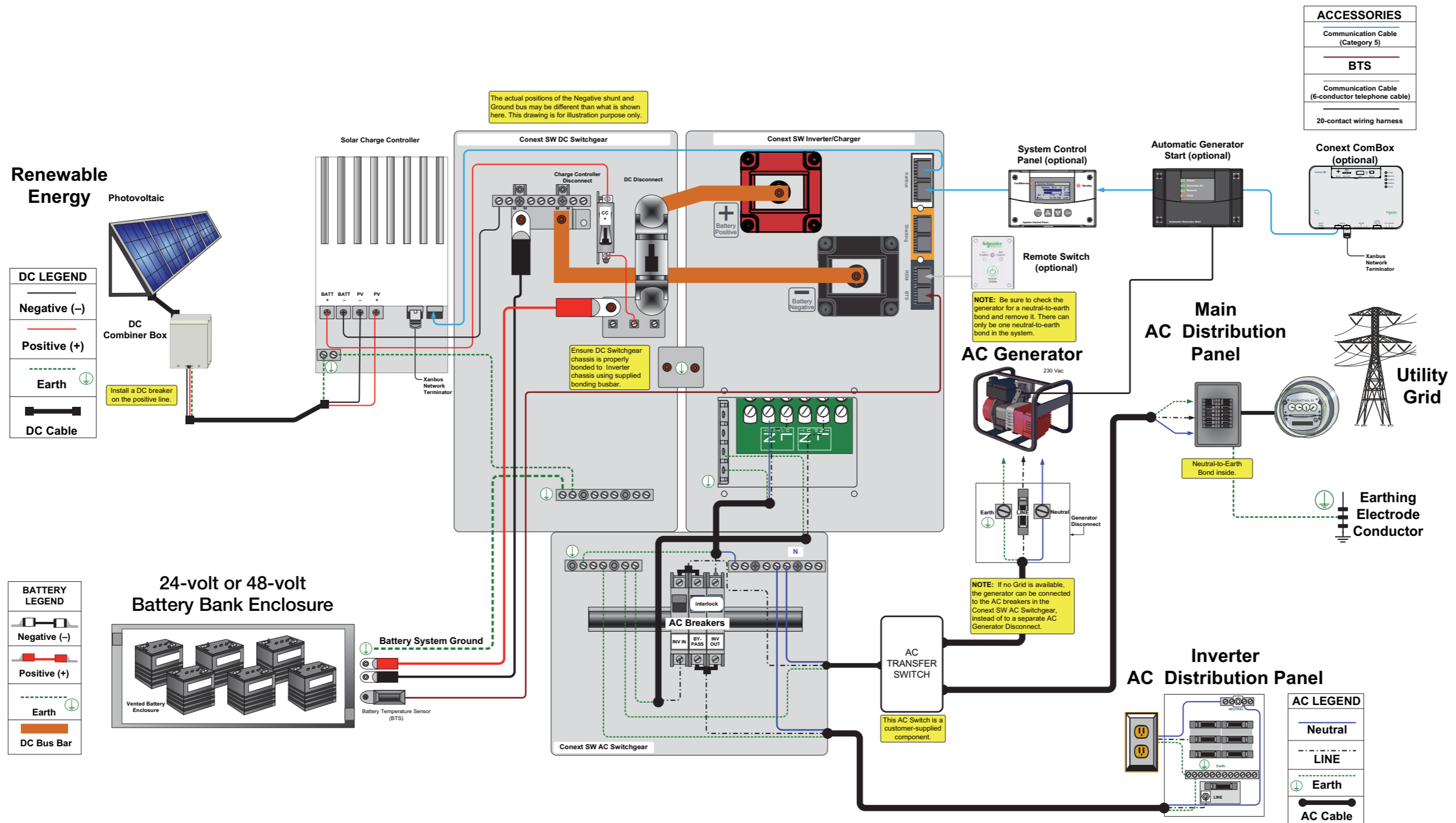


Figure 3-4 Single-Inverter System Renewable Energy (Solar) Wiring

## Dual-Inverter System Renewable Energy (Solar)

**⚠ DANGER**

**ELECTRICAL SHOCK AND FIRE HAZARD**

Installation must be done by qualified personnel to ensure compliance with all applicable installation codes and regulations. Instructions for installing the Conext SW are provided in a separate installation guide for use by qualified installers only.

**Failure to follow these instructions will result in death or serious injury.**

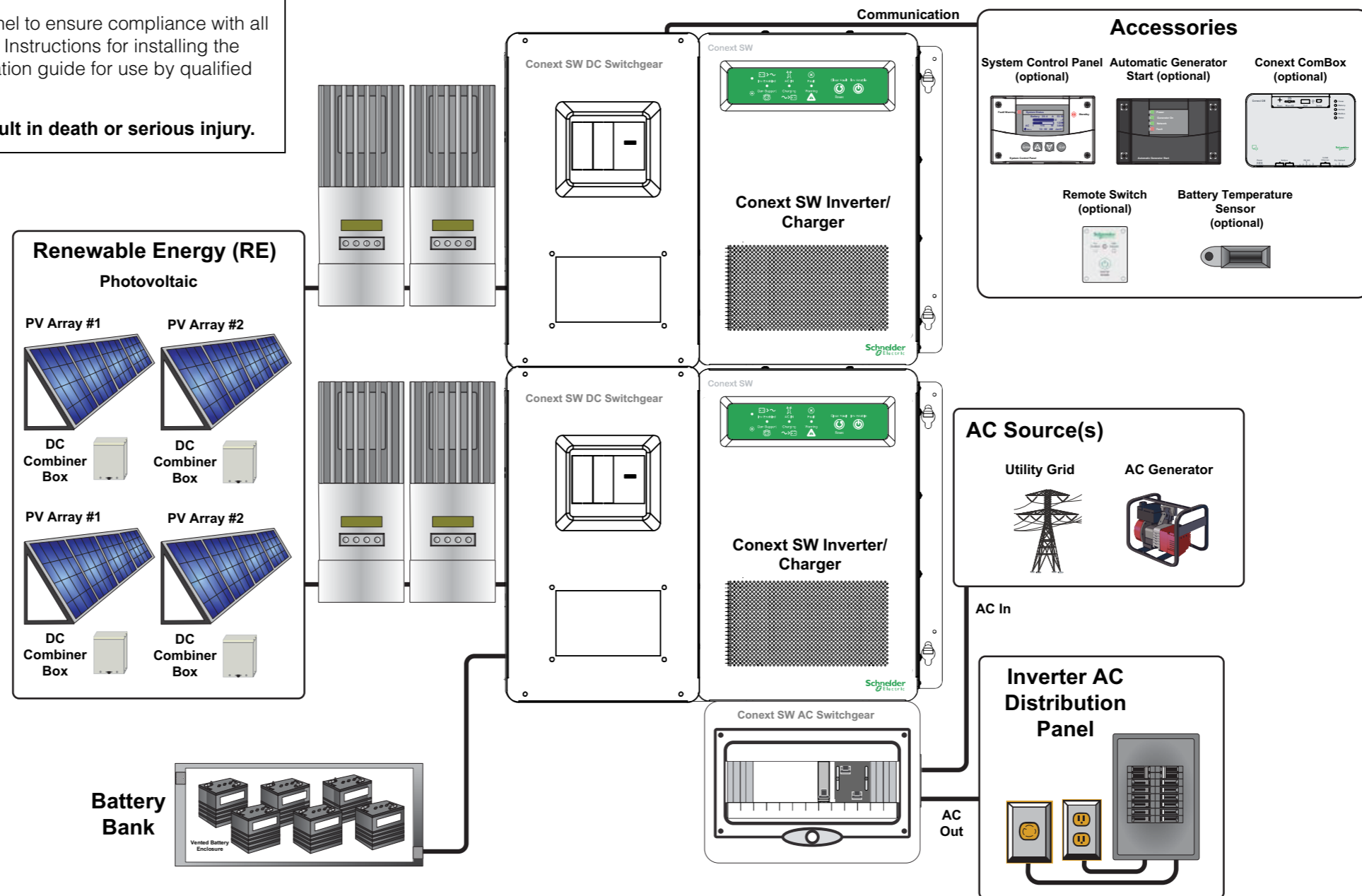


Figure 3-5 Dual-Inverter System Renewable Energy (Solar) Overview

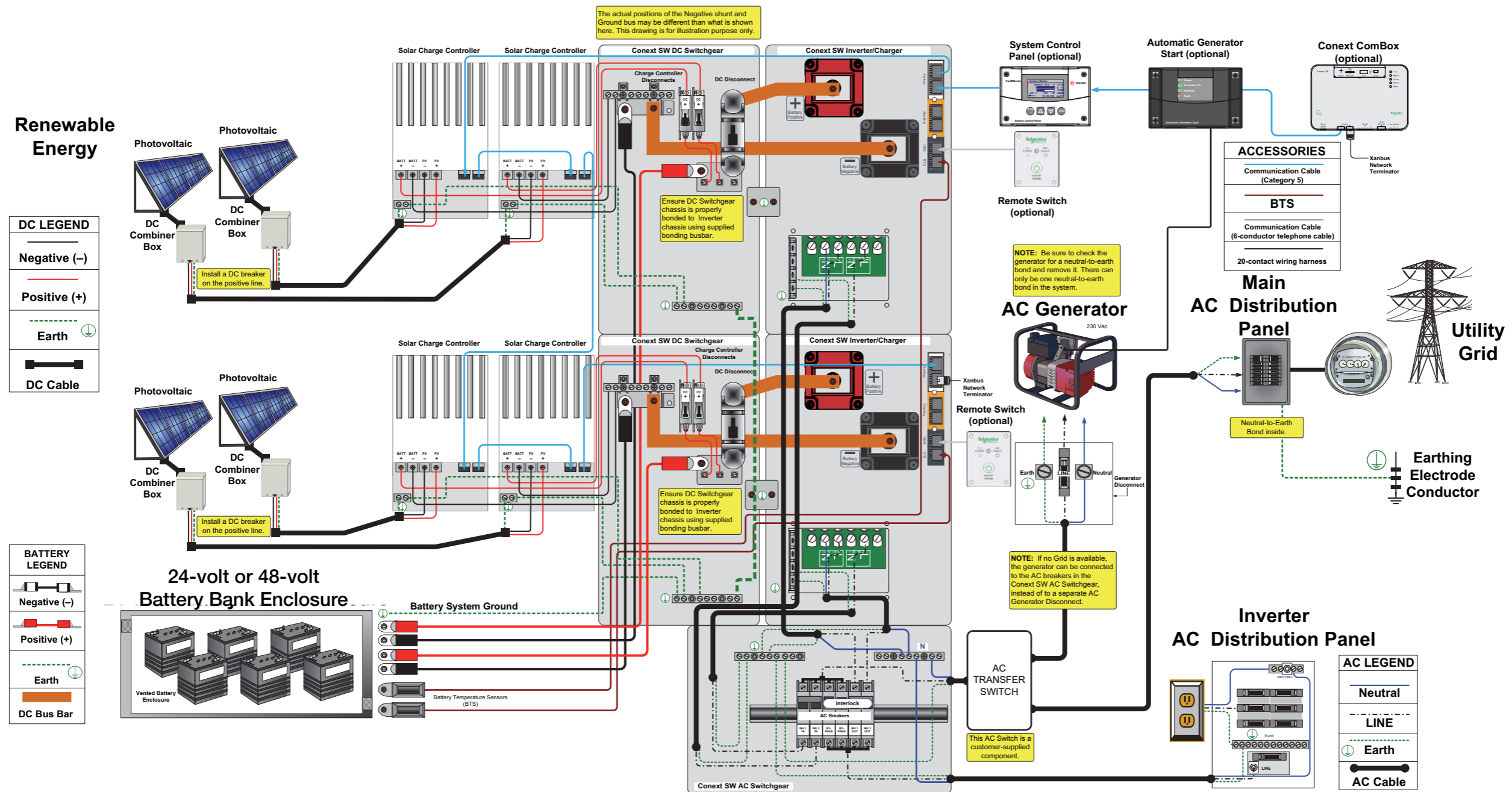


Figure 3-6 Dual-Inverter System Renewable Energy (Solar) Wiring





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As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this publication.

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975-0637-01-01 Rev E

Printed in China