

Power Control System (PCS)

Installation Instructions

IMPORTANT SAFETY INSTRUCTIONS

**CAUTION: Hazard to Equipment**

This system is equipped with a power control system (PCS). All PCS-controlled bus bars or conductors shall be protected with suitably rated overcurrent devices appropriately sized for the bus bar rating or conductor ampacity.

Scope

Models affected by these instructions include, but are not limited to, the following:

- GS8048A (Radian)
- GS4048A (Radian)
- SBX5048-120/240 (SkyBox)
- FPR-8048A (Radian)
- FPR-4048A (Radian)

General Operation

All OutBack Power PCS-tested devices referenced in this document can control the full rated currents from the inverter or energy storage system (hereafter called “inverter”). Only the power (current) to or from the inverter can be controlled. However, the inverter can reduce or increase contributions based on other installed devices if the optional current transducer (CT) is used. See the inverter literature for current or power limits, as well as required overcurrent protection (not pictured) for the controlled conductors. This document may only be used in conjunction with the inverter installation literature.

**WARNING: Lethal Voltage**

Only qualified personnel shall be permitted to set or change the setting of the maximum operating current of the PCS. The maximum PCS operating current setting shall not exceed the bus bar rating or conductor ampacity of any PCS controlled bus bar or conductor.

**NOTE:**

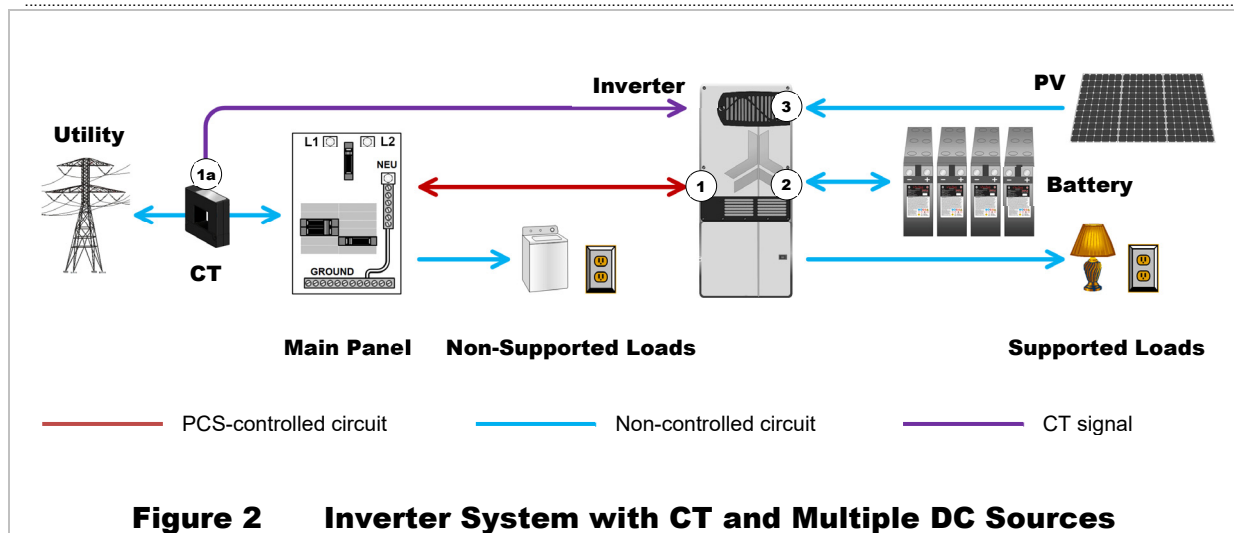
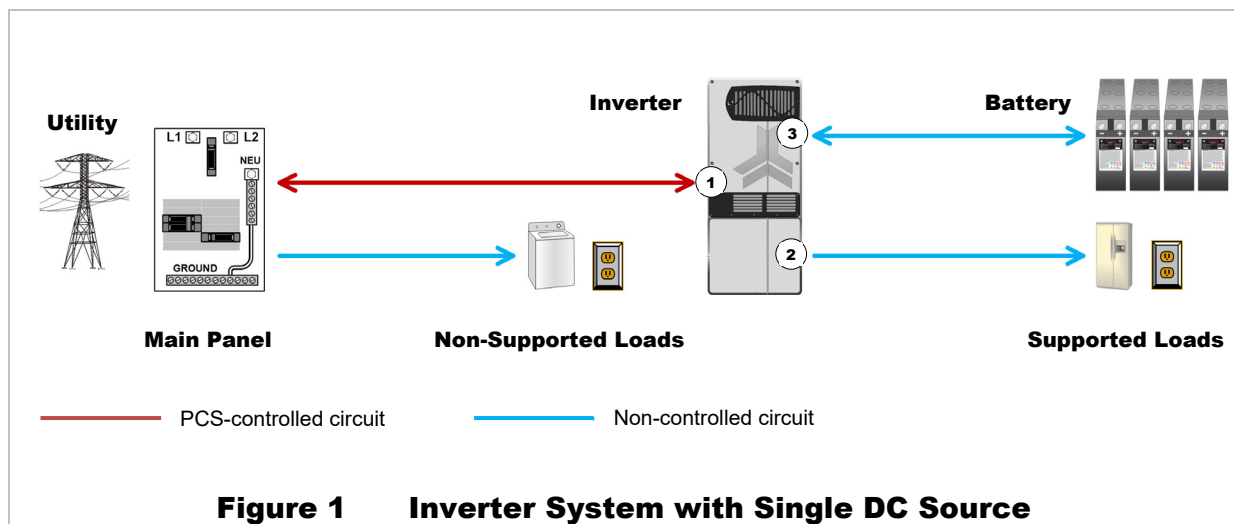
The maximum operating currents in controlled bus bars or conductors are limited by the settings of the power control system. They may be lower than the sum of the currents of the connected controlled power sources.

For example, the Radian inverter (GS8048A) has a maximum current of 32 Aac (7.2 kVA). The maximum current may be several times this amount if there are multiple stacked inverters. However, in an actual installation, a licensed contractor may change the Radian settings to reduce the amount of current.



NOTES for Figures 1 and 2:

- ❖ Figure 1 depicts a system with a single DC input, such as a Radian system. A system of this type may be equipped with PV, but all renewable DC input is received through the battery at point **2**. Output loads are measured at point **3**. Current transducers are not used.
- ❖ Figure 2 depicts a system that supports current transducers, such as a SkyBox system. CT use is optional, but allows measurement of both supported and non-supported loads by moving the measurement location from point **1** to **1a**. If the CT is not used, the measurement location remains at point **1**.
- ❖ Figure 2 also depicts a system with multiple DC inputs, battery (point **2**) and PV (point **3**). Output loads can be measured separately, but only if the optional CT is not used.



PCS Installation

If the optional current transducers are used, they must be installed in the proper orientation. Each CT is marked to indicate proper orientation (also described in the inverter literature). The labels shown in Figure 3 below shall be installed on the CT when used as part of a PCS system.

PCS Label Installation

The labels in Figure 3 are provided for the installation. These items must be installed as part of the inverter setup process.

- The top two labels (marked **WARNING**) must be installed on the current transducers if transducers are used.
- The third label should be placed on the inverter near its main label.
- The final four labels are for the connections of the controlled wiring. These items may be placed near the circuit breakers and terminals where the wires connect.

WARNING: This sensor is part of a Power Control System. Do not remove. Replace only with same type and rating.

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The maximum operating current of this system may be controlled electronically. Refer to manufacturer's instructions for more information.

PCS controlled current setting:
_____ Amps"

PCS controlled current setting:
_____ Amps"

PCS controlled current setting:
_____ Amps"

PCS controlled current setting:
_____ Amps"

Figure 3 Labels

PCS Modes

The UL1741 PCS document describes several modes of operation for a PCS system. While these modes are not the names of specific options available in OutBack Power inverters, settings are available to meet the requirements of these modes. The specific inverter literature describes how to set these items, or which internal modes would apply these settings automatically. In the descriptions below, references to current flow apply to the measurement points in both the previous Figures 1 and 2.

- Unrestricted Mode (usually the default mode of operation): The inverter may import active power from the utility grid while charging and may export to the grid while discharging.
- Export-Only Mode (achieved by setting charging limits to zero): The inverter may export active power to the utility grid during discharging but shall not import from the grid for charging. No current shall flow to point **2** through point **1**.
 - The SkyBox system only exports to the grid when performing UL 1741 SA or SB functions, or when commanded to do so through SunSpec IEEE® 2030.5, or similar protocols.
- Import-Only Mode (achieved by setting “sell” power or current limit to zero): The inverter may import active power from the grid for charging but shall not export power to the grid. No current shall flow to point **1**.
- No-Exchange Mode (achieved by setting both of the prior settings to zero): The inverter shall not exchange active power with the utility grid for either charging or discharging purposes. No current shall flow from the inverter to point **1**. No current shall flow to point **2** through point **1**.

Response Times

This table shows the rated maximum current and open-loop response times in the above modes for several OutBack Power inverters.

Table 1 Inverter Ratings

Inverter:		SkyBox Series	Radian Series (all models)
Maximum PCS Controlled Current:		24 Aac	32 Aac
Maximum Open-Loop Response Time:	Unrestricted Mode	0.4 seconds	< 2 seconds
	No-Exchange Mode	0.4 seconds	< 2 seconds
	Export-Only Mode	12.4 seconds	< 2 seconds
	Import-Only Mode	13.6 seconds	< 2 seconds

Contact Information

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Date, Part Number, and Revision

May 2021, 900-00271-01-001 Rev B