**Environmental Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Temperature Range (meets component specifications; however, please note that the Inverter output wattage is derated above 25°C)</td>
<td>-4°F to 122°F (-20°C to 50°C)</td>
</tr>
<tr>
<td>Operational Temperature Range (functions, but not rated for operation; does not necessarily meet all component specifications)</td>
<td>-40°F to 140°F (-40°C to 60°C)</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>-40°F to 140°F (-40°C to 60°C)</td>
</tr>
<tr>
<td>IP (Ingress Protection) Rating of Enclosure</td>
<td>IP20</td>
</tr>
<tr>
<td>Environmental Category</td>
<td>Indoor, Unconditioned</td>
</tr>
<tr>
<td>Wet Locations Classification</td>
<td>Wet locations: No</td>
</tr>
<tr>
<td>Relative Humidity Rating</td>
<td>93%</td>
</tr>
<tr>
<td>Pollution Degree Classification</td>
<td>PD 2</td>
</tr>
<tr>
<td>Maximum Altitude Rating</td>
<td>6561' (2000 m)</td>
</tr>
<tr>
<td>Overvoltage Category (AC Input)</td>
<td>3</td>
</tr>
<tr>
<td>Overvoltage Category (DC Input)</td>
<td>1</td>
</tr>
</tbody>
</table>

All Radian inverters can deliver their full rated wattage at temperatures up to 25°C (77°F). The Radian maximum wattage is rated less in higher temperatures. Above 25°C, the GS8048A is derated by a factor of 80 VA for every increase of 1°C. The GS4048A is derated by 40 VA per 1°C. This derating applies to all power conversion functions (inverting, charging, selling, offsetting, etc.)

**WARNING:** This inverter is intended for indoor use only. Failure to adequately protect the inverter will void the warranty.

**Contact Information**

<table>
<thead>
<tr>
<th>Mailing Address: Corporate Headquarters</th>
<th>17825 – 59th Avenue NE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hamastrasse 8</td>
</tr>
<tr>
<td></td>
<td>Suite B</td>
</tr>
<tr>
<td></td>
<td>Arlington, WA 98223 USA</td>
</tr>
</tbody>
</table>

**Warranty Summary**

OutBack Power Technologies warrants that the products it manufactures will be free from defects in materials and workmanship for a period of five (5) years subject to the conditions set forth in the warranty documentation. OutBack Power Technologies cannot be responsible for system failure, damages, or injury resulting from improper installation of their products.

**Notice of Copyright**

Radian Series Inverter/Charger Quick Start Guide © 2017 by OutBack Power Technologies. All Rights Reserved.

**Date and Revision**

July 2017, Revision A
Installation

Before starting

- This product is for indoor use only.
- These instructions generally assume the use of OutBack products from the front page; instructions may differ if not used.
- If GSLC is not used, make certain all electrical connections meet local safety standards and codes.

Materials in box:

- Inverter
- Mounting bracket
- Hardware kit
- Quick start guide (this document)
- RTS (Remote Temperature Sensor)

Tools required:

- Wrench and socket sets; should include a torque and ratchet wrenches.
- Reversible (stubby) wrenches for narrow access.
- Offset box wrench, ½” or 13 mm.
- Wire cutters/trimmers.
- Insulated screwdriver set (flat and Phillips); should include a #2 Phillips screwdriver 15 to 16” long.
- Long-nose pliers.
- High-resolution voltmeter.

1. Ensure the mounting surface is strong enough to handle 3 times the total weight of all the components. Add plywood or other reinforcing material as necessary to strengthen the surface.
2. Attach the wall bracket. Center the mounting holes on the wall studs. Use all 6 mounting screws to secure the bracket.
3. Lift the inverter so that the inverter bracket is above the wall bracket.
4. Lower the inverter so that the inverter bracket slips into the wall bracket.
5. To install the GSLC, unscrew the inverter bottom screws approximately ¼” (0.6 cm) to 3/16” (0.5 cm).
6. Align the GSLC along the bottom of the inverter. Slide the bottom screws through the keyhole slots.
7. Mark the spots for the GSLC mounting feet. (If necessary, remove the GSLC to install wall anchors.) Install screws to secure the feet.
8. Follow the appropriate instructions for installing other components. Different mounting locations are available.

The Radian has two sets of inverter mounting locations for the HUB product. The GSLC also has one location.

When stacking multiple inverters:

- For GSLC door clearance, space systems 0.9” (3.2 cm) apart.
**Torque Requirements**

<table>
<thead>
<tr>
<th>Circuit Breaker Stud</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4</td>
<td>1.2</td>
</tr>
<tr>
<td>M5</td>
<td>1.5</td>
</tr>
<tr>
<td>1/4 - 20</td>
<td>35</td>
</tr>
<tr>
<td>5/16 - 18</td>
<td>72</td>
</tr>
<tr>
<td>3/8 - 16</td>
<td>125</td>
</tr>
<tr>
<td>7/16 - 14</td>
<td>225</td>
</tr>
<tr>
<td>1/2 - 13</td>
<td>475</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DC Plates</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Nuts</td>
<td>12</td>
</tr>
<tr>
<td>Lower Nuts</td>
<td>22</td>
</tr>
<tr>
<td>Shunt Bolts</td>
<td>60</td>
</tr>
</tbody>
</table>

**Minimum DC Cable based on the DC Circuit Breaker**

<table>
<thead>
<tr>
<th>Circuit Breaker</th>
<th>Cable Size</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>#8 AWG (&gt;16 mm²)</td>
<td>35 4.0</td>
</tr>
<tr>
<td>80</td>
<td>#8 AWG (&lt;16 mm²)</td>
<td>35 4.5</td>
</tr>
<tr>
<td>125</td>
<td>10/16 (19 mm²)</td>
<td>50 5.6</td>
</tr>
<tr>
<td>175</td>
<td>25/20 (19 mm²)</td>
<td>225 25.4</td>
</tr>
<tr>
<td>250</td>
<td>40/30 (19 mm²)</td>
<td>470 32.4</td>
</tr>
</tbody>
</table>

**Grounding Notes**

- This product meets the IEC requirements of Protection Class I.
- This product must be connected to a permanent wiring system that is grounded according to the IEC 60364 TN standard.
- The installer is responsible for grounding according to all applicable codes.
- The central AC ground terminals are common. Typically only one is used.
- Minimum conductor size for the ground TBB: #8 AWG (10 mm²) or 0.013 in². Torque requirements: 25 in-lb (2.8 Nm).

**WARNING: Shock Hazard**

- For safety, the neutral and ground conductors should be mechanically bonded. OutBack does not bond these conductors with the inverter.
- The GSLC is equipped with a neutral-ground bond. Remove this bond if the bond is required to be made at the main panel or another location. Make sure that no more than one bond is present in the AC system at any time.
- For all installations, the negative battery conductor should be bonded to the grounding system at only one point. If the OutBack GFDI is present, it can provide the bond.

**DC Wiring Notes**

- Battery cables should be no longer than 10 feet (3 m) each to minimize voltage loss and other possible effects.
- Turn off DC circuit breakers or remove fuses before proceeding.
- Tie, tape, or twist cables together to reduce self-inductance. Run positive and negative cables through the same knockouts and conduit.
- Each inverter battery terminal is a threaded stud which accepts a ring terminal lug. Use recommended minimum size per DC disconnect for both GS4048A and GS8048A.
- This product requires batteries for operation. The required nominal voltage is 48 Vdc.
- OutBack recommends the use of batteries designed specifically for renewable energy applications.
- Protection for the circuit breaker external to this product must be provided by the installer.
- Protection for the AC circuit external to this product must be provided by the installer.
- Prewired load centers are for single inverters only. See application notes on the OutBack website for applications with multiple inverters.

**Ground Notes**

- Minimum conductor size for the ground TBB: #8 AWG (10 mm²) or 0.013 in². Torque requirements: 25 in-lb (2.8 Nm).
- For safety, the neutral and ground conductors should be mechanically bonded. OutBack does not bond these conductors with the inverter.
- The installer is responsible for grounding according to all applicable codes.
- The central AC ground terminals are common. Typically only one is used.
- Minimum conductor size for the ground TBB: #8 AWG (10 mm²) or 0.013 in². Torque requirements: 25 in-lb (2.8 Nm).

**AC Wiring Notes**

- Recommended conductor size: #6 AWG (16 mm²) or 0.021 in².
- Inverter output varies with model; size the loads accordingly.
- The transfer relay is rated 60 Aac. AC input and output may need to be protected with branch-rated circuit breakers of maximum 60 Aac size to meet applicable code requirements.
- The neutral terminals are common; typically only one is used.
- Only one AC source can be wired at a time; use an external selector switch if more than one source is available.

**Generator Notes**

- A generator should be sized to provide enough power for maximum loads and charging at the same time.
- Minimum generator size is recommended to be twice the power of the inverter(s) due to overload and/or balancing issues.
### Pre-startup Procedures:

1. Double-check all wiring connections. Ensure all torque values are met. See Wiring Data.
2. Inspect the enclosure to ensure no debris or tools have been left inside.
3. Disconnect all AC loads at the backup (or critical) load panel.
4. Disconnect the AC input feed to the GSLC at the source.

### To energize or start the OutBack devices:

1. Using a digital voltmete r (DVM), verify 48 Vdc on the DC input terminals by placing the DVM leads on TBB and TBB.

### Functional Test Points

**Battery Voltage Test Points**

**PV Voltage Test Points**

**AC OUT Voltage Test Points (Terminal bus bar = TBB)**

**GRID IN Voltage Test Points (Terminal bus bar = TBB)**

**GEN IN Voltage Test Points (Terminal bus bar = TBB)**

### Functional Procedures

#### Bypass Interlock Plate Position Key

The AC bypass allows a source to power the loads directly. The Radian can be shut down for maintenance or other reasons.

- **OFF (normal)**: bypass plate down position
- **ON**: bypass plate up position

#### WARNING: Lethal Voltage

Review the system configuration to identify all possible sources of energy. Ensure ALL sources of power are disconnected before performing any installation or maintenance on this equipment. Confirm that the terminals are de-energized using a validated voltmeter (rated for a minimum 1000 Vac and 1000 Vdc) to verify the de-energized condition.

#### WARNING: Lethal Voltage

The numbered steps will remove power from the inverter and charge controllers. However, sources of energy may still be present inside the GSLC and other locations. To ensure absolute safety, disconnect ALL power connections at the source.

### To de-energize or shut down the OutBack devices:

1. Turn off (open) the AC circuit breakers.
2. Turn off (open) the DC circuit breakers for the battery.
3. Turn off (open) the PV circuit breakers.
4. Disconnect the AC input feed to the GSLC at the source.
5. Verify the battery voltage is correct for the inverter and charge controller models.
6. Confirm the polarity.

### CAUTION: Fire Hazard

Before energizing, confirm that all hardware is installed as shown on the Installation page. Stacking battery terminal hardware in any other order can overheat the terminals.

### CAUTION: Equipment Damage

Incorrect polarity will damage the equipment.
CAUTION: Equipment Damage

These procedures should be done by a qualified installer who is trained on programming inverter power systems. Failure to set accurate parameters for the system could potentially cause equipment damage. Damage caused by inaccurate programming is not covered by the limited warranty for the system.

IMPORTANT

- Ensure all settings are correct for the system. The Profile Wizard can be used for rapid setup. For Grid Support functions it may be necessary to load a .GIP file. This requires the MATE3s System Display.
- Verify the firmware revision of all OutBack devices before use. The Radian inverter and system display may not communicate or operate correctly unless their firmware is above a specified revision number.
- For full functionality, the MATE3s must be the system display used when installing Radian inverters with firmware revision 001.006.061 or higher.
- For firmware and .GIP file installation, see the Installation Manual.

Exact measurements and programming are performed with the system display. (See the system display and FLEXnet DC literature.) The LED indicators shown below provide approximate measurements of the battery state of charge.

**Profile Wizard**

In a MATE3-class system display, the Profile Wizard allows quick setup of parameters that apply to all systems. The Profile Wizard is reached from the Main Menu as shown in .

The Profile Wizard is useful for rapid setup of multiple parameters including date, time, battery charging, AC source size and limits, and System Type. It can also configure functions such as High Battery Transfer and Grid Use times. Note that the last two items are not available if the System Type is set to Off Grid.

**NOTE**: The Wizard does not configure the entire system. It does not select AC input modes for the FXR inverter, parameters for automatic generators, or “fully charged” parameters if the FLEXnet DC battery monitor is in use. If settings are made in the wrong order, the Wizard can overwrite some customized settings. See the system display literature for more information.

The firmware revision of all devices can be confirmed by navigating from the Main Menu as shown in . Upgrades to the firmware revision can be downloaded from the OutBack website www.outbackpower.com.

After commissioning and programming the FXR system, perform a full battery charge. Reset the FNX-DC by unplugging the communications cable and then plugging it back in. (The system must be energized at the time.) The FNX-DC will reset to 100% SoC to match the batteries.

**NOTE**: The FNX-DC must be programmed with correct values for battery capacity and charging requirements. The factory default values may not be correct. If not programmed accurately, the FNX-DC readings and LED indicators will not be accurate. The same is true if the shunt(s) are not wired correctly.