**Setup and Programming**

**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**
Check the firmware revision of all OutBack devices before use. The Radian inverter and MATE3 system display may not communicate or operate correctly unless their firmware is above a specified revision number. For models GS8048A and GS4048A, the firmware must be revision 001.005.xxx or higher. The MATE3 must be revision 002.017.xxx or higher.

---

**Configuration Wizard**

- **Grid Tied**
  - System Type: Grid Tied
  - System Voltage: 48 VDC
  - Array Wattage: 1000
  - Battery Type: FLA 500 Ah

- **Backup**
  - System Type: Off Grid
  - System Voltage: 48 VDC
  - Array Wattage: 1000
  - Battery Type: FLA 500 Ah

---

**Setup and Programming**

**WARNING: Fire/Explosion Hazard**
Do not place combustible or flammable materials within 12 feet (3.7 m) of the equipment. This unit employs mechanical relays and is not ignition protected. Fumes or spills from flammable materials could be ignited by sparks.

**WARNING: Personal Injury**
Use safe lifting techniques and standard safety equipment when working with this equipment.

**IMPORTANT:**
Clearance and access requirements may vary by location. Maintaining a 36” (91.4 cm) clear space in front of the system for access is recommended. Consult local electric code to confirm clearance and access requirements for the specific location.

---

**Components Included**

- **FP-R404A**
  - Inverter/Charger: GS8048A
  - GS Load Center: GSLC175-PV-120/240
  - Charge Controller: FM80-150VDC (x 2)

---

**Customer-Supplied Components**

- AC Source: Utility Grid or AC Generator
- Main Electrical Panel (or overcurrent device for the AC source)
- Electrical Distribution Subpanel (Load Panel)
- Photovoltaic (PV) Array and Combiner
- Battery Bank

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**Contact Technical Support**

- Telephone: +1.360.618.4363
- Email: Support@outbackpower.com
- Website: www.outbackpower.com

---

**Masters of the Off-Grid.**
**First Choice for the New Grid.**
### AC Wire Sizes and Torque Values

<table>
<thead>
<tr>
<th>Wire Size</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWG</td>
<td>Nm</td>
</tr>
<tr>
<td>#14 to #16</td>
<td>2.5</td>
</tr>
<tr>
<td>#8</td>
<td>10</td>
</tr>
<tr>
<td>#4 to #6</td>
<td>16 to 25</td>
</tr>
<tr>
<td>#3</td>
<td>35</td>
</tr>
<tr>
<td>#2</td>
<td>35</td>
</tr>
<tr>
<td>#1</td>
<td>50</td>
</tr>
</tbody>
</table>

Note: OutBack recommends that conductors be #6 AWG THHN copper, or larger, rated to 75°C (minimum) unless local code requires otherwise.

### 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>#4 AWG (15 mm²)</td>
<td>35</td>
</tr>
<tr>
<td>80</td>
<td>#4 AWG (25 mm²)</td>
<td>35</td>
</tr>
<tr>
<td>125</td>
<td>#10 (70 mm²)*</td>
<td>50</td>
</tr>
<tr>
<td>175</td>
<td>#20 (70 mm²)*</td>
<td>225</td>
</tr>
<tr>
<td>250</td>
<td>#40 (120 mm²)*</td>
<td>225</td>
</tr>
</tbody>
</table>

*Minimum DC cable based on the AC OUT Bus Bar L2 (GFDI)

### Torque Requirements

<table>
<thead>
<tr>
<th>Circuit Breaker Stud</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8</td>
<td>20</td>
</tr>
<tr>
<td>5/16 - 18</td>
<td>35</td>
</tr>
<tr>
<td>3/8 - 16</td>
<td>225</td>
</tr>
</tbody>
</table>

### Preferred locations are depicted here

1. Plywood (optional)
2. Wall board
3. Wall stud
4. Wall bracket
5. Plywood (optional)
6. Wall board
7. Wall stud
8. Wall bracket

**NOTE:**
- 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.
- Attach the wall bracket. Center the mounting holes on the wall studs. Use all 6 mounting screws to secure the bracket.
- Lift the inverter high enough that the inverter bracket is above the wall bracket.
- Lower the inverter so that the top of the back plane flange slips into the wall bracket. Ensure the unit is centered on the wall bracket.
- Install the mounting screws. See illustration below for preferred locations for maximum mounting strength.

**CAUTION:**
- Integrate the wall bracket. Center the mounting holes on the wall studs. Use all 6 mounting screws to secure the bracket.
- Lift the inverter high enough that the inverter bracket is above the wall bracket.
- Lower the inverter so that the top of the back plane flange slips into the wall bracket. Ensure the unit is centered on the wall bracket.
- Install the mounting screws. See illustration below for preferred locations for maximum mounting strength.

**NOTE:**
- The AC neutral bus bar is bonded to the GSLC chassis. If the distribution panel neutral is bonded to ground, remove the bond from the neutral bus bar.

---

### Electrical Connections

- **Positive Battery Cable Connections**
  - **Bracket**: Flat Washer, Lock Washer, Positive (+) Bus
  - **FM80**
  - **GFDC**
  - **Shunt**: Flat Washer, Lock Washer, Positive (+) Shunt

- **Negative Battery Cable Connections**
  - **Bracket**: Flat Washer, Lock Washer, Negative (-) Bus
  - **FM80**
  - **GFDC**
  - **Shunt**: Flat Washer, Lock Washer, Negative (-) Shunt

**CAUTION:**
- Equipment Damage
  - When connecting cables from the FP-Radian to the battery terminals, make sure to observe the proper polarity. Connecting the cables incorrectly can damage or destroy the equipment and void the warranty.

**Note:**
- The AC neutral bus bar is bonded to the GSLC chassis. If the distribution panel neutral is bonded to ground, remove the bond from the neutral bus bar.

---

### FN-DC LED Indicators

<table>
<thead>
<tr>
<th>Color</th>
<th>Battery State of Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>≥ 90% (unless if charge parameters are met)</td>
</tr>
<tr>
<td>Yellow</td>
<td>≥ 70%</td>
</tr>
<tr>
<td>Yellow</td>
<td>≥ 50%</td>
</tr>
<tr>
<td>Red</td>
<td>&lt; 50% and &lt; 60% solicitude, &lt; 50% blink</td>
</tr>
</tbody>
</table>

---

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Pre-startup Procedures:
1. Double-check all wiring connections.
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.

**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.

To energize or start the OutBack devices:
1. Using a digital voltmeter (DVM), verify 48 Vdc on the DC input terminals by placing the DVM leads on and . Confirm that the battery voltage is correct for the inverter and charge controller models.
   - a) placing the DVM leads on and , and
   - b) placing the DVM leads on and .
2. Turn (on) the AC input feed to the GSLC at the source.
3. Turn (on) the DC circuit breakers from the battery bank to the inverter.
4. If the inverter is in the OFF state, turn it ON.
5. Turn (on) the AC output circuit breakers.
6. Turn (on) the PV input circuit breakers.
7. Turn (on) the PV input circuit breakers.
8. Turn (on) the PV input circuit breakers.
9. Turn (on) the PV input circuit breakers.
10. Turn (on) the PV input circuit breakers.

**NOTE:** The MATE3 system display retains factory default settings. Configuration for this system may be necessary before commissioning. See Setup and Programming for more information.

**WARNING: Burn Hazard**
Internal parts can become hot during operation. Do not remove the cover during operation or touch any internal parts. Be sure to allow them sufficient time to cool down before attempting to perform any maintenance.

**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.

**De-energize/Shutdown Procedures**

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. Turn off (open) the GFDI circuit breaker.
5. Verify 0 Vdc on the first DC bus of the inverter by placing the voltmeter leads on and .
6. Verify 0 Vdc on the second DC bus by placing the voltmeter leads on and .
7. Verify 0 Vdc on one PV circuit by placing the voltmeter leads on and .
8. Verify 0 Vdc on the other PV circuit by placing the voltmeter leads on and .
9. Verify 0 Vdc on the AC output circuit breakers by placing the voltmeter leads on and . Repeat this step for and .
The FPR-4048A follows the same wiring layout as the FPR-8048A with the following exceptions (depicted):

- No DC positive (+) plate is present. A single positive battery cable is used. The positive cable lug connects to the base of the main DC disconnect (with the GFDI cable). See Battery Cable Connections.
- Neutral-Ground Bond (NEU) is pre-wired. PV negative (-) is installed at the same location with a ring terminal. (See Negative PV Cable Connections.) It can also be installed in the FM80 controller.

**IMPORTANT:** Example only. Actual wiring may vary depending on system details and local electric code. Most factory wiring is not shown.

**NOTE:**

- FM80 negative (-) is pre-wired. PV negative (-) is installed at the same location with a ring terminal. (See Negative PV Cable Connections.) It can also be installed in the FM80 controller.
- A single PV positive (+) and bus bar are used. It connects to the far right shunt. See PV Array #2
- A single PV negative (-) cable is used. It connects to the far left shunt. See PV Array #1
- The On/Off jumper is removed to enable the use of switch or Emergency Power Off (EPO)