

Electrical and Mechanical Specifications

Specification	Measurement
Maximum Voltages	240 Vac and 300 Vdc
Maximum Continuous Currents ¹	40 Aac and 100 Adc
Operating Frequency Range	50/60 Hz or DC
Operating Temperature Range	-20 to 50°C
Dimensions (H × W × D)	17 × 16 × 8.5" (43.2 × 40.6 × 21.6 cm)
Shipping Dimensions (L × W × H)	23.25 × 20.5 × 13.25" (59.1 × 52.1 × 33.7 cm)
Weight	26 lb (11.8 kg) minimum — varies with options
Shipping Weight	34 lb (15.4 kg) minimum — varies with options
Enclosure Type	Indoor

¹ The Maximum Continuous Currents rating applies to any single device connection point within GS pre-wired system. All prewired configurations were engineered and tested to meet UL1741 and current NEC 2017 requirements. All additional conductors and connections shall be sized in accordance with the National Electric Code.

Regulatory Specifications

- UL 1741, Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources (2nd Edition)
- Canadian Electrical Code, Part II (CSA C22.2 No. 107.1-16 Ed.4)

Contact Information

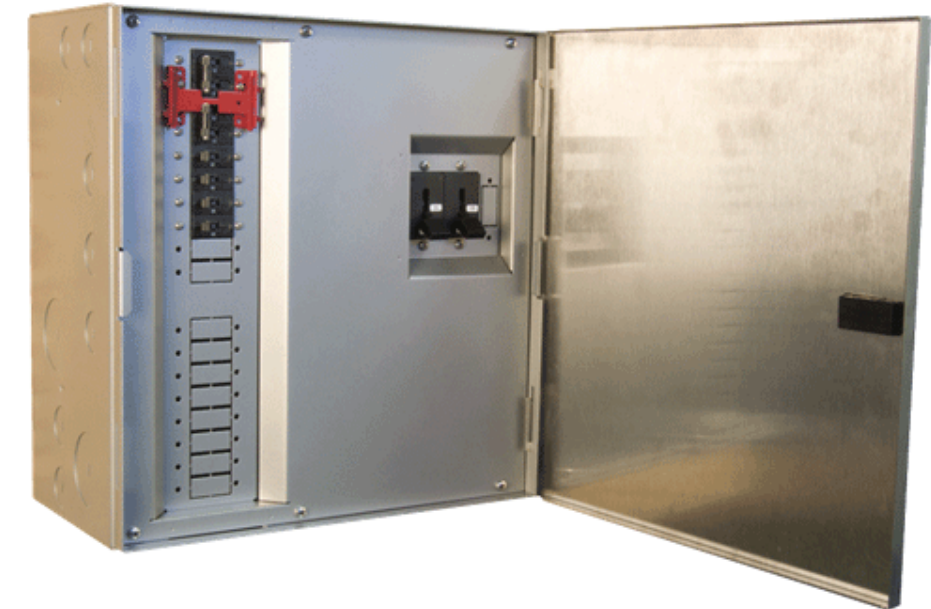
OutBack Power
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Date and Revision

January 2020, Revision D

GS Load Center



OutBack Power's GS Load Center (GSLC) is an integrated connection enclosure for AC and DC system connections in OutBack Radian Series inverter/charger applications.

This *GSLC Planning Guide* supplements the *Radian Series Quick Start Guide*. Please refer to the *Quick Start Guide* before reading this document.

A more in-depth *GS Load Center Installation Manual* is available online at www.outbackpower.com.



WARNING: Shock Hazard

- ❖ The unit must be connected to a permanent wiring system that is grounded according to the IEC 60364 TN standard.
- ❖ For safety, the neutral and ground conductors should be mechanically bonded.
- ❖ Make sure that no more than one bond is present in the AC system at any time. Some codes require the bond to be made at the main panel only.
- ❖ The GSLC is equipped with a neutral-ground bond. If bonding is required to be in another location, the bond in the GSLC may need to be removed.
- ❖ Some generators have a neutral-ground bond. When establishing a single bond elsewhere, it may be necessary to check for a generator bond.
- ❖ Mount only in a dry indoor location.



WARNING: Shock Hazard

For all installations, the negative (-) battery conductor should be bonded to the grounding system at only one point. The GSLC comes equipped with a negative-ground bond. This bond may need to be disconnected. If the OutBack Ground Fault Detector-Interrupter (GFDI) is present, it can provide the bond.



IMPORTANT:

These instructions are for use by qualified personnel who meet all local and governmental code requirements for licensing and training for the installation of electrical power systems with AC and DC voltage up to 600 volts. This product is only serviceable by qualified personnel.



IMPORTANT:
Not intended for use with life support equipment.

Models and Options

The GSLC is available in several different configurations:

- **GSLC** – GS Load Center for Radian Series. The “basic” or “empty” version; requires almost all components to be installed if needed. Recommended for custom-built systems. Recommended for use with multiple Radian inverters (one GSLC per inverter). Can be used with other inverter models. The term “GSLC” is also used to refer generically to the product line.
 - Intended for any Radian model.
 - The following components are sold separately for the GSLC:
 - Inverter Main Disconnects (required for inverter installations)
 - AC Maintenance Bypass Assembly
 - AC Terminal Bus Bars (TBB)
 - PV Ground Fault Detector-Interrupter (GFDI)
 - FLEXnet DC Battery Monitor (FN-DC)
 - Additional DC shunts and GS-SBUS
 - PV Disconnect 80-amp circuit breaker (PNL-80-DC)

The following two “inverter-only” versions have hardware for Radian inverter AC and DC connections. Battery monitoring or PV capability must be installed as needed. For details on installing batteries and a renewable energy source such as a PV array, please see the GSLC online manual.

- **GSLC175-120/240** – GS Load Center for AC applications (split-phase). Factory-prepared with dual 175 Adc inverter circuit breakers, dual AC inputs, and 120/240 Vac maintenance bypass assembly. Recommended for systems which have a single Radian inverter and an AC source, but can be customized in other ways. See page 14.
 - Intended for Radian model GS8048A.
- **GSLC175-230** – GS Load Center for AC applications (single-phase). Factory-prepared with dual 175 Adc inverter circuit breakers, dual AC inputs, and 230 Vac maintenance bypass assembly. Recommended for systems which have a single Radian inverter and an AC source, but can be customized in other ways. See page 19.
 - Intended for Radian model GS7048E.
 - The following components are sold separately for these models:
 - PV Ground Fault Detector-Interrupter (GFDI)
 - FLEXnet DC Battery Monitor (FN-DC)
 - Additional DC shunts and GS-SBUS
 - PV Disconnect 80-amp circuit breaker (PNL-80-DC)

For instructions on installing components please refer to the GSLC online manual

These “fully-loaded” versions have all options already present and need only external wiring and devices added.

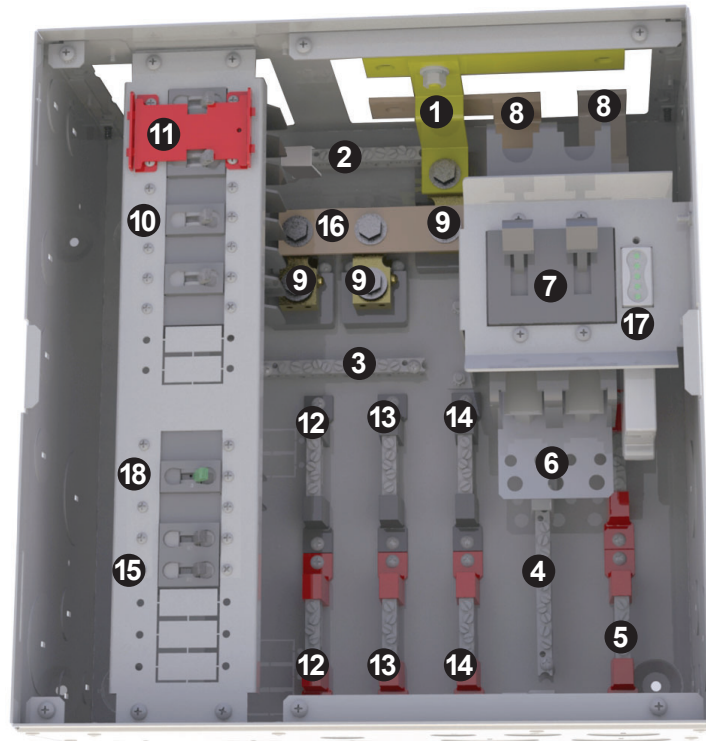
- **GSLC175-PV-120/240** – GS Load Center for PV and AC applications (split-phase). Factory- prepared with dual 175 Adc inverter circuit breakers, dual AC inputs, 120/240 Vac maintenance bypass assembly, two PV array inputs, PV GFDI, FLEXnet DC battery monitor, and three shunts. Intended as a “plug-and-play” solution for systems with a single inverter, two FLEXmax 60 or FLEXmax 80 charge controllers, and battery monitoring.
 - Intended for Radian model GS8048A and 150 Vdc charge controllers. See page 15.
- **GSLC-PV-300VDC** – GS Load Center for PV and AC applications (split-phase). Factory-prepared with dual 175 Adc inverter circuit breakers, dual AC inputs, 120/240 Vac maintenance bypass assembly, two PV array inputs, FLEXnet DC battery monitor, and three shunts. Intended as a “plug-and-play” solution for systems with a single inverter, two FLEXmax 100 charge controllers, and battery monitoring.
 - Intended for Radian model GS8048A and 300 Vdc charge controllers. See page 16.
- **GSLC175PV1-120/240** — GS Load Center for PV and AC applications (split-phase). Factory- prepared with one 175 Adc inverter circuit breaker, dual AC inputs, 120/240 Vac maintenance bypass assembly, one PV array input, PV GFDI, FLEXnet DC battery monitor, and two shunts. Intended as a “plug-and-play” solution for systems with a single inverter, one FLEXmax 60 or FLEXmax 80 charge controller, and battery monitoring.
 - Intended for Radian model GS4048A and 150 Vdc charge controllers. See page 17.
- **GSLC-PV1-300VDC** — GS Load Center for PV and AC applications (split-phase). Factory- prepared with one 175 Adc inverter circuit breaker, dual AC inputs, 120/240 Vac maintenance bypass assembly, one PV array input, FLEXnet DC battery monitor, and two shunts. Intended as a “plug-and-play” solution for systems with a single inverter, one FLEXmax 100 charge controller, and battery monitoring.
 - Intended for Radian model GS4048A and 300 Vdc charge controllers. See page 18.
- **GSLC175-PV-230** – GS Load Center for PV and AC applications (single-phase). Factory- prepared with dual 175 Adc inverter circuit breakers, dual AC inputs, 230 Vac maintenance bypass assembly, two PV array inputs, PV GFDI, FLEXnet DC battery monitor, and three shunts. Intended as a “plug-and-play” solution for systems with a single inverter, two FLEXmax 60 or FLEXmax 80 charge controllers, and battery monitoring.
 - Intended for Radian model GS7048E and 150 Vdc charge controllers. See page 20.
- **GSLC-PV-300VDC-230** – GS Load Center for PV and AC applications (single-phase). Factory prepared with dual 175 Adc inverter circuit breakers, dual AC inputs, 230 Vac maintenance bypass assembly, two PV array inputs, FLEXnet DC battery monitor, and three shunts. Intended as a “plug-and-play” solution for systems with a single inverter, two FLEXmax 100 charge controllers, and battery monitoring.
 - Intended for Radian model GS7048E and 300 Vdc charge controllers. See page 21.
- **GSLC175PV1-230** — GS Load Center for PV and AC applications (single-phase). Factory- prepared with one 175 Adc inverter circuit breaker, dual AC inputs, 230 Vac maintenance bypass assembly, one PV array input, PV GFDI, FLEXnet DC battery monitor, and two shunts. Intended as a “plug-and-play” solution for systems with a single inverter, one FLEXmax 60 or FLEXmax 80 charge controller, and battery monitoring.
 - Intended for Radian model GS3548E and 150 Vdc charge controllers. See page 22.
- **GSLCPV1-300VDC-230** — GS Load Center for PV and AC applications (single-phase). Factory- prepared with one 175 Adc inverter circuit breaker, dual AC inputs, 230 Vac maintenance bypass assembly, one PV array input, FLEXnet DC battery monitor, and two shunts. Intended as a “plug-and-play” solution for systems with a single inverter, one FLEXmax 100 charge controller, and battery monitoring.
 - Intended for Radian model GS3548E and 300 Vdc charge controllers. See page 23.

Components

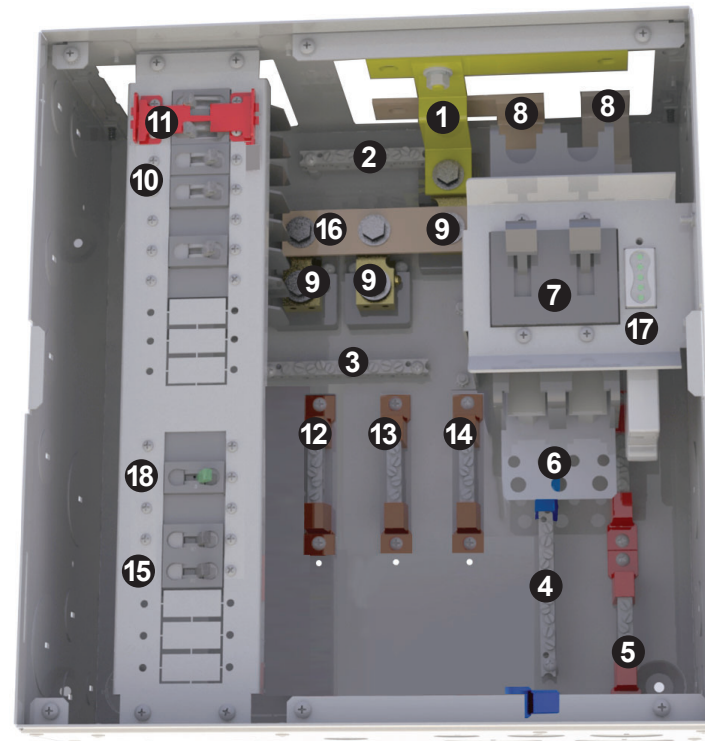
Different versions of the GSLC come with different components installed. The diagrams on this page depict the most common versions--GSLC175-PV-120/240 and GSLC175-PV-230. For diagrams of other versions and details about separate components available, please see pages 10-16 of the *GS Load Center Installation Manual*.

- ① Inverter Negative (-) DC Bus Bar
- ② Negative (-) Terminal Bus Bar (TBB-WHITE)
- ③ Ground TBB (TBB-GROUND)
- ④ Neutral TBB (NA: TBB WHITE or EU: TBB-BLUE)
- ⑤ PV Positive (+) TBB (TBB-RED)
 - in 300 Vdc models, this TBB is PV Negative (-) (TBB-BLACK)
- ⑥ DC Positive (+) Cable Plate (FW-BBUS)
- ⑦ Main Inverter Disconnect(s) (PNL-175-DC)
- ⑧ Inverter Positive (+) DC Bus Bar
- ⑨ Shunt (FW-SHUNT500)
- ⑩ AC Input Circuit Breakers (PNL-50-AC-230V)
- ⑪ Maintenance Bypass Interlock
- ⑫ AC TBB (Inverter Output)
 - NA: L1 (TBB-RED) and L2 (TBB-BLACK)
 - EU: L1 (TBB-BROWN)
- ⑬ AC TBB (Grid)
 - NA: L1 (TBB-RED) and L2 (TBB-BLACK)
 - EU: L1 (TBB-BROWN)
- ⑭ AC TBB (Generator)
 - NA: L1 (TBB-RED) and L2 (TBB-BLACK)
 - EU: L1 (TBB-BROWN)
- ⑮ PV Input Disconnects (PNL-80-DC or PNL-80-300VDC)
- ⑯ Shunt Bus (GS-SBUS)
- ⑰ Battery Monitor (FN-DC)
- ⑱ Ground Fault Detector / Charge Controller Disconnect (GSLC-PV-300VDC-230 has PNL-125-300VDC)

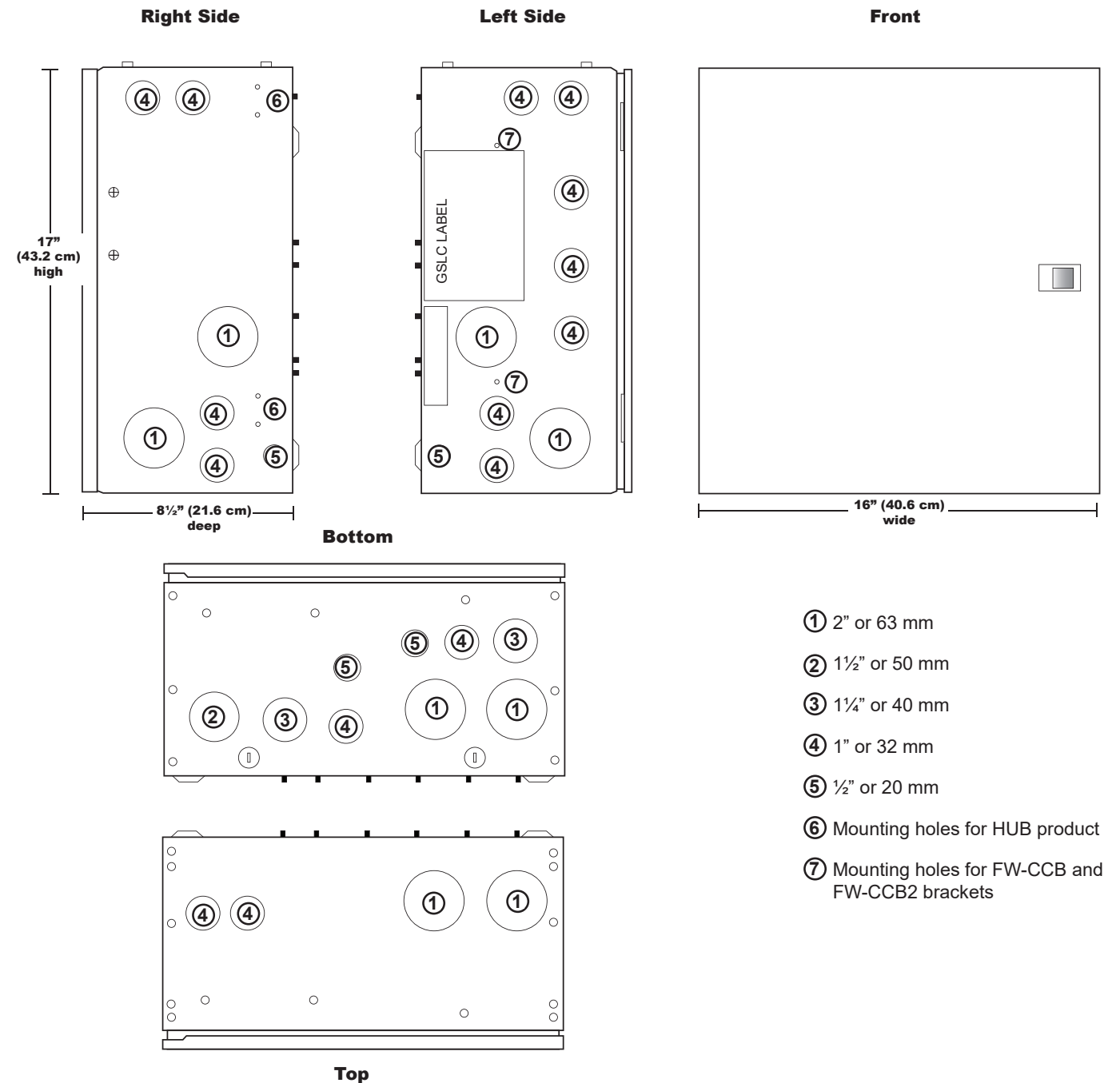
GSLC175-PV-120/240



GSLC175-PV-230



Dimensions

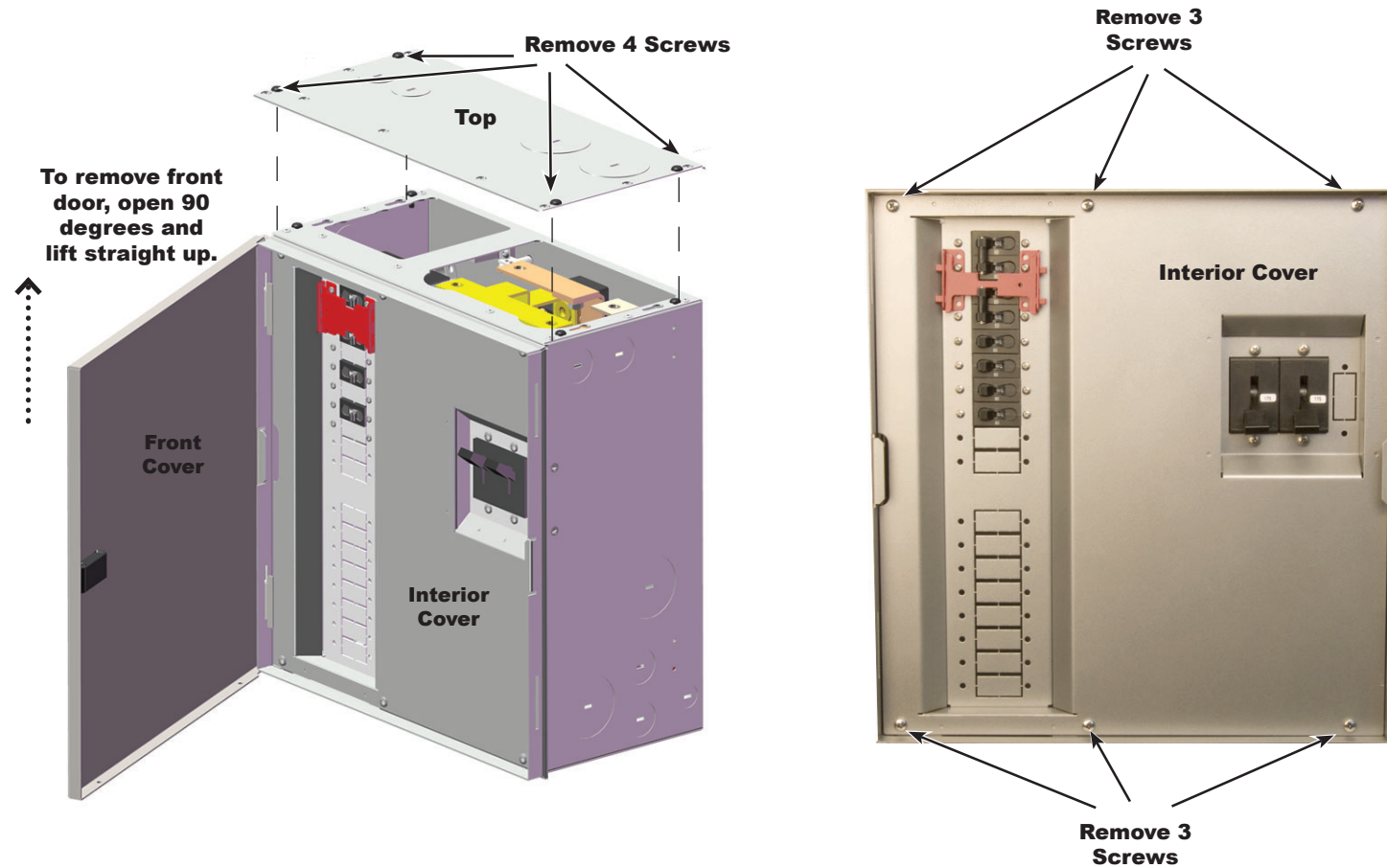


Tools Required

- Open-ended wrenches (7/16", 9/16" and 13 mm)
- Wire cutters/strippers
- Torque wrenches
- Assorted insulated screwdrivers
- Digital Voltmeter (DVM) or regular voltmeter

Installation

Remove Covers



Mounting the GSLC to the Inverter

For instructions on mounting the GSLC to the inverter, see the *Radian Quick Start Guide*; more details are also available in the GSLC online manual: www.outbackpower.com.

Wiring

Please carefully review the *Radian Quick Start Guide* for important GSLC wiring information. The information presented here highlights key wiring considerations but is not comprehensive. See also the GSLC online manual: www.outbackpower.com.



WARNING: Shock Hazard

If the GFDI is manually installed, the negative-ground bond on the GSLC must be removed. This must also be done if any other PV ground fault device is present that establishes its own negative-ground bond.



NOTE:

Models equipped with a GFDI do not include the mechanical bond inside the housing, as the GFDI provides a bond instead. The 300 Vdc models do not include an internal bond, as they are intended to be used with charge controllers that have GFDI protection built in.

Bonding

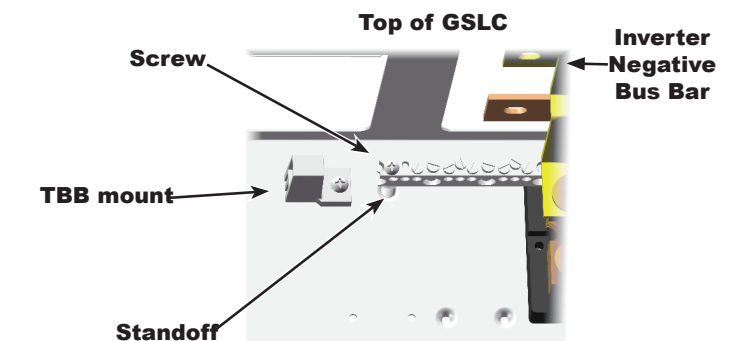
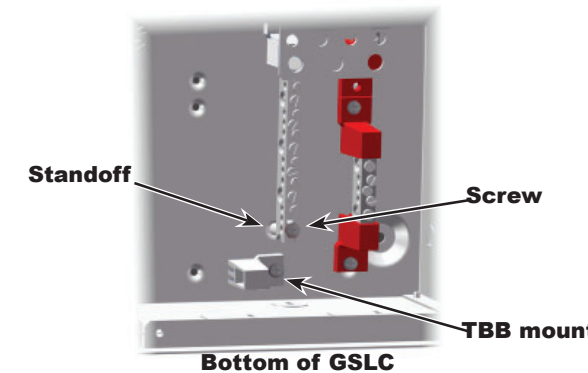
Some models are equipped with a mechanical bond between AC **neutral** and ground.

Some models are equipped with a mechanical bond between DC **negative** and ground.

If other neutral or negative bonds are present, or if a GFDI is installed later, the GSLC bond(s) must be removed. The bonds can be useful in stand-alone systems where no other bond is provided.

The GSLC's **neutral bus bar** is located in the lower right portion of the GSLC. The **neutral-ground bond** is established at one end of the bar, near the base of the GSLC.

The GSLC's **negative (-) bus bar** is located near the top of the GSLC. It is attached to the inverter negative (-) bus and its shunt.



To remove either of the bond connections:

1. Using a Phillips screwdriver, remove the screw shown above.
2. Remove the metal standoff beneath the bus bar. The screw and bus bar provide the mechanical bond to the chassis ground.
3. Rotate the TBB mount. Insert the bus bar into the open end of the TBB mount so that the TBB mount supports the bus bar. It may be necessary to loosen the TBB mount screw before rotating it.
4. Retighten the screw to secure the TBB mount.



NOTE:

- ❖ If the TBB is connected directly to the enclosure by a screw, then the bond is connected. If the TBB is held by the TBB mount and the TBB mount is secured to the enclosure, the bond is disconnected.
- ❖ The installed Neutral TBB has white insulators. A second Neutral TBB with blue insulators is included in the kit for locations where blue is standard.

DC Wiring



WARNING: Shock Hazard

Ensure all circuit breakers or disconnect devices are turned off or disconnected before connecting any wires.



CAUTION: Fire Hazard

Never install extra washers or hardware between the mounting surface and the battery cable lug. When installing multiple ring terminals or lugs, stack them on the mounting surface so that the largest conductor is in direct contact. Smaller ring terminals should be placed next in decreasing size order. Stacking the hardware in any other order can result in a loss of contact area for current flow. This may allow dangerous levels of heat to build up.

Consult the inverter Installation Manual for recommendations for cable number, sizing, and length.

Battery Wiring

Battery Positive (+) Cable

Follow the instructions below when connecting battery positive (+) cables to these models:

- GSLC175-120/240
- GSLC175-230
- GSLC175-PV-120/240
- GSLC175-PV-230
- GSLC175-PV-300VDC
- GSLC-PV-300VDC-230

Connect the positive (+) cables to the DC positive (+) wiring plate. This plate is located directly beneath the main inverter disconnects. It is intended for several ring lugs to be bolted to it.

- The smaller holes have a diameter of 0.31" (8 mm).
- The larger holes have a diameter of 0.4" (10 mm).

See the *Radian Quick Start Guide* for hardware installation order on the positive (+) plate.

Follow the instructions below when connecting battery positive (+) cables to these models:

- GSLC175PV1-120/240
- GSLC175PV1-230
- GSLC-PV1-300VDC
- GSLC-PV1-300VDC-230

Connect the positive (+) cable directly to the DC disconnect, which uses an M8 stud.

Follow the appropriate instructions when connecting to an "empty" GSLC which has been assembled with similar features to one of the models above.

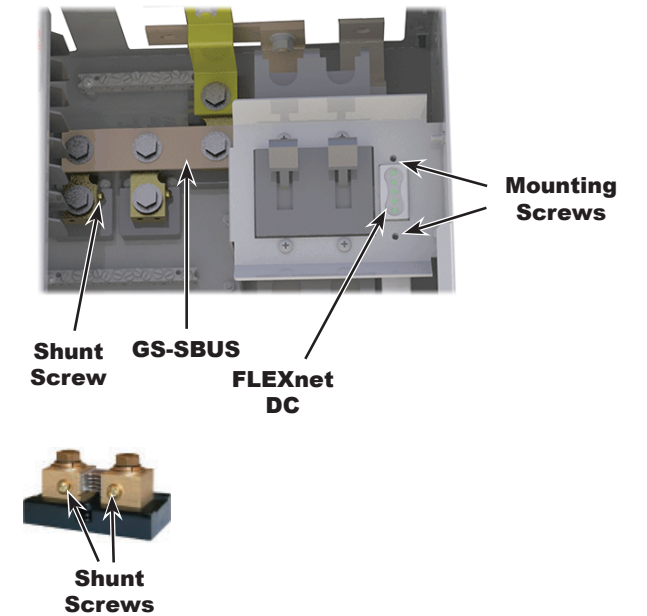
Installing the FLEXnet DC

The OutBack FLEXnet DC (FN-DC), or a similar battery monitor, may be added to the GSLC for observing DC current flow and providing battery state-of-charge information.



1. Assemble the FN-DC wiring as shown in the manual for the FN-DC.
 - Attach sense wires to the FN-DC wiring block and plug it into the FN-DC.
2. Connect FN-DC wiring to the GSLC. The positive (+) and negative (-) battery voltage sense conductors should connect directly to the battery bank.
3. Mount the FN-DC

When connecting sensing wires: The end of the shunt connected to the GS-SBUS is the negative (-) battery connection and should be wired accordingly. The other end of the shunt is the "device" or "load" end and should be wired accordingly.



DC Devices

In addition to inverter or PV connections, other devices may be connected to the GSLC, such as DC loads or sources. The wiring on these devices will vary with the application. In most cases the device will have a separate circuit breaker mounted on the rail. It will be wired into the battery system using the existing bus bars or shunts. The number and location of these connections will vary with the options or accessories installed.



NOTE:

In GSLC models designated as "PV", many of the connections to the right are already provided. The only connections necessary are those for external wiring to the charge controller.

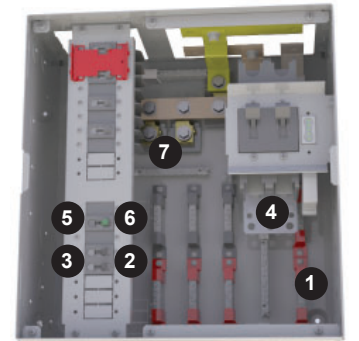
PV and Charge Controller Wiring

When wiring the FLEXmax, FLEXmax 100, or another charge controller to the GSLC, many elements are involved. These elements include the PV or RE source, the battery connections, the disconnect circuit breaker, the PV ground fault device, and the charge controller.

These instructions are written for a PV source which uses the OutBack FLEXmax charge controller and the GFDI. Other applications will be similar.

To make PV and charge controller connections:

1. Connect the PV positive wire to the GSLC's PV positive (+) TBB **1**.
 - In 300-volt models, connect this wire to the PV circuit breaker **2**.
2. Connect the PV negative wire to the charge controller's PV negative (-) terminal.
 - In 300-volt models, connect this wire to the PV negative (-) TBB **1**.
3. Install a wire from the PV positive (+) TBB **1** to the PV circuit breaker **2**.
 - In 300-volt models, this step does not apply.
4. Install a wire from the PV circuit breaker **3** to the charge controller's PV positive (+) terminal.
5. Install a wire from the GSLC's DC positive (+) cable plate **4** to the charge controller's circuit breaker **5**.
6. Install a wire from the charge controller circuit breaker **6** to the charge controller's battery positive (+) terminal.
7. Install a wire from the charge controller's battery negative (-) terminal to a shunt bolt **7**. If the FLEXnet DC or another battery monitor is in use, this wire should connect to the shunt which monitors that charge controller.
 - In 300-volt models, install a wire from the charge controller's battery negative (-) terminal to the GSLC's PV negative TBB **1**.
8. Repeat all steps for a second charge controller, if necessary.



AC Wiring



WARNING: Shock Hazard

Ensure all circuit breakers or disconnect devices are turned off or disconnected before connecting any wires.

Split-Phase Wiring

The GSLC can have multiple terminal bus bars for multiple AC connections. Because the Radian inverter possesses two sets of AC input connections and one set of output connections, up to three TBB sets are available. Each set of bus bars is paired in red and black, for the 120/240 Vac connections required by the Radian inverter.

The TBB set on the left is generally used for the inverter's AC output connections. The central TBB set is for utility grid input connections and the right TBB set is for a generator input. The preassembled GSLC models follow this convention.

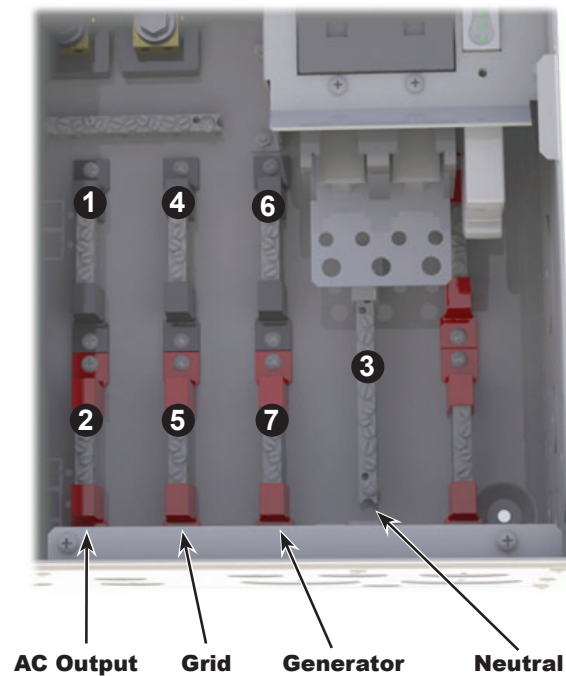
Each TBB accepts conductors from 1/0 (70 mm²) to #14 AWG (2.5 mm²). See the *Radian Quick Start Guide* for proper torque values.

If steps are inappropriate for a given system (such as instructions for a generator when none is present), they can be ignored.

To make the external AC connections to the split-phase GSLC:

1. Connect the L1 wire from the AC load panel to black TBB 1 (**AC OUT - HOT L1**). Connect the L2 wire from the AC load panel to red TBB 2 (**AC OUT - HOT L2**).
2. Connect the neutral wire from the AC load panel to neutral TBB 3.
3. Connect the L1 wire from the utility grid panel (if present) to black TBB 4 (**GRID IN - HOT L1**). Connect the L2 wire from the utility grid panel to red TBB 5 (**GRID IN - HOT L2**).
4. Connect the neutral wire from the utility grid panel (if present) to neutral TBB 3.
5. Connect the L1 wire from the generator (if present) to black TBB 6 (**GEN IN - HOT L1**). Connect the L2 wire from the generator to red TBB 7 (**GEN IN - HOT L2**).
6. Connect the neutral wire from the generator (if present) to neutral TBB 3.

NOTE: Remove the neutral-ground bond if necessary.



WARNING: Shock Hazard

Ensure all circuit breakers or disconnect devices are turned off or disconnected before connecting any wires.

Single-Phase Wiring

The GSLC allows multiple terminal bus bars (TBB) for multiple AC connections. Because the Radian inverter possesses two sets of AC input connections and one set of output connections, three terminal bus bars are available for hot connections, as well as one neutral bus bar. The hot bus bars use brown insulators in 230 Vac models. The neutral bus bar uses blue insulators in 230 Vac models.

The TBB on the left is generally used for the inverter's AC output connections. The central TBB is for utility grid input connections and the right TBB is for a generator input. The preassembled GSLC models follow this convention.

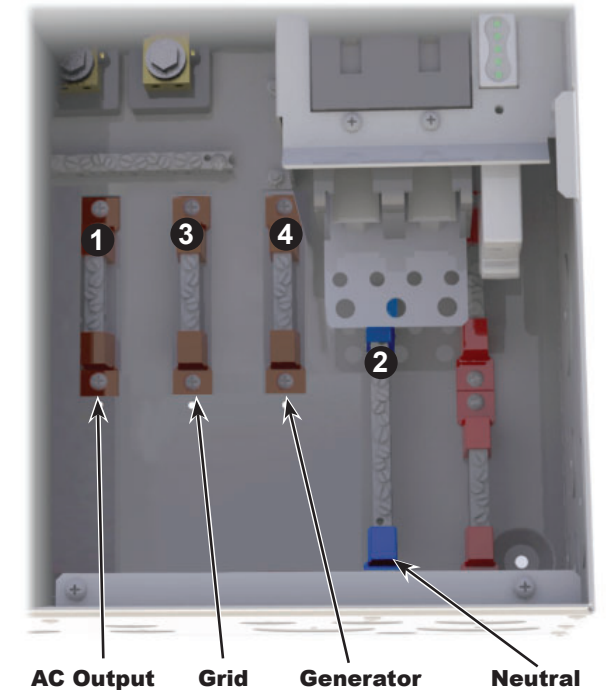
Each TBB accepts conductors from 70 mm² (1/0 AWG) to 2.5 mm² (#14 AWG). See the *Radian Quick Start Guide* for proper torque values.

If steps are inappropriate for a given system (such as instructions for a generator when none is present), they can be ignored.

To make external AC connections to the single-phase GSLC:

1. Connect the hot wire from the AC load panel to brown TBB 1 (**AC OUTPUT**).
2. Connect the neutral wire from the AC load panel to neutral TBB 2.
3. Connect the hot wire from the utility grid panel (if present) to brown TBB 3 (**GRID**).
4. Connect the neutral wire from the utility grid panel (if present) to neutral TBB 2.
5. Connect the hot wire from the generator (if present) to brown TBB 4 (**GENERATOR**).
6. Connect the neutral wire from the generator (if present) to neutral TBB 2.

NOTE: Remove the neutral-ground bond if necessary.



Bypass Switches

Bypass Switches

Inverter systems are often equipped with maintenance bypass switches or interlocks. If the inverter system ever needs to be shut down or removed, its AC sources and loads must be disconnected. A bypass device allows the AC source to “bypass” the inverter and deliver power directly to the loads. This can minimize disruption to the system and it avoids the need for extensive rewiring.

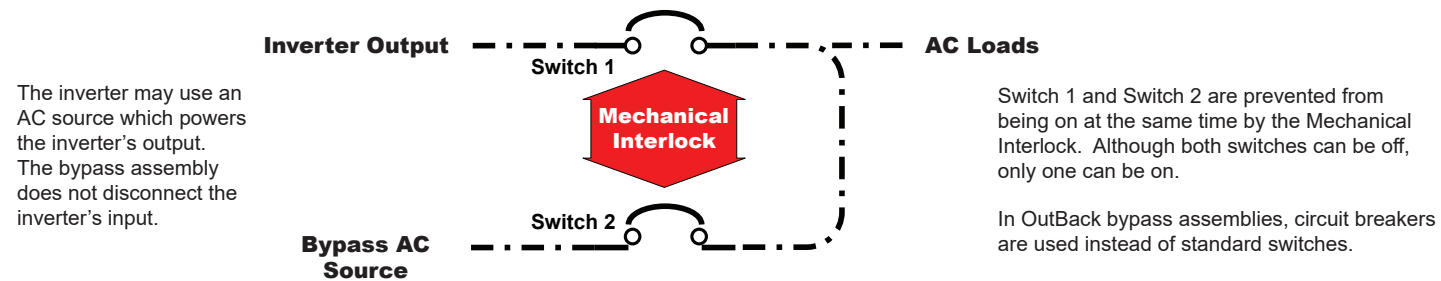


WARNING: Shock Hazard or Equipment Damage

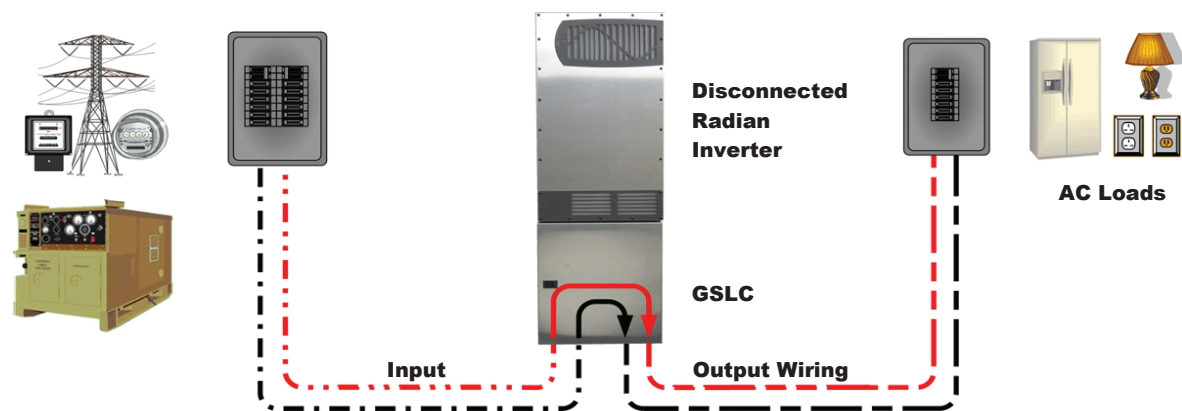
- ❖ Bypassing multiple sources will usually connect the sources to each other, which may damage one or both sources. It can otherwise result in power being routed to inappropriate places.
- ❖ The bypass assembly does not disconnect the inverter’s AC input.
- ❖ Even with the inverter bypassed, any AC input source may be a shock hazard unless disconnected.

In the illustration below, when Switch 1 is on (normal operation), the inverter’s output sends power to the loads. Switch 2 is off, preventing the inverter from sending power back to the AC source (backfeeding).

When Switch 2 is on (bypass operation), the AC source sends power directly to the loads. Switch 1 is off, removing the inverter’s output from the loads. This also prevents the AC source from backfeeding the inverter. With the inverter removed from the circuit, maintenance can be performed as necessary.



The GSLC can be ordered with bypass circuit breakers for this purpose, or it has a bypass option (the GS-IOB-120/240VAC or GS-IOB-230VAC) which can be installed.



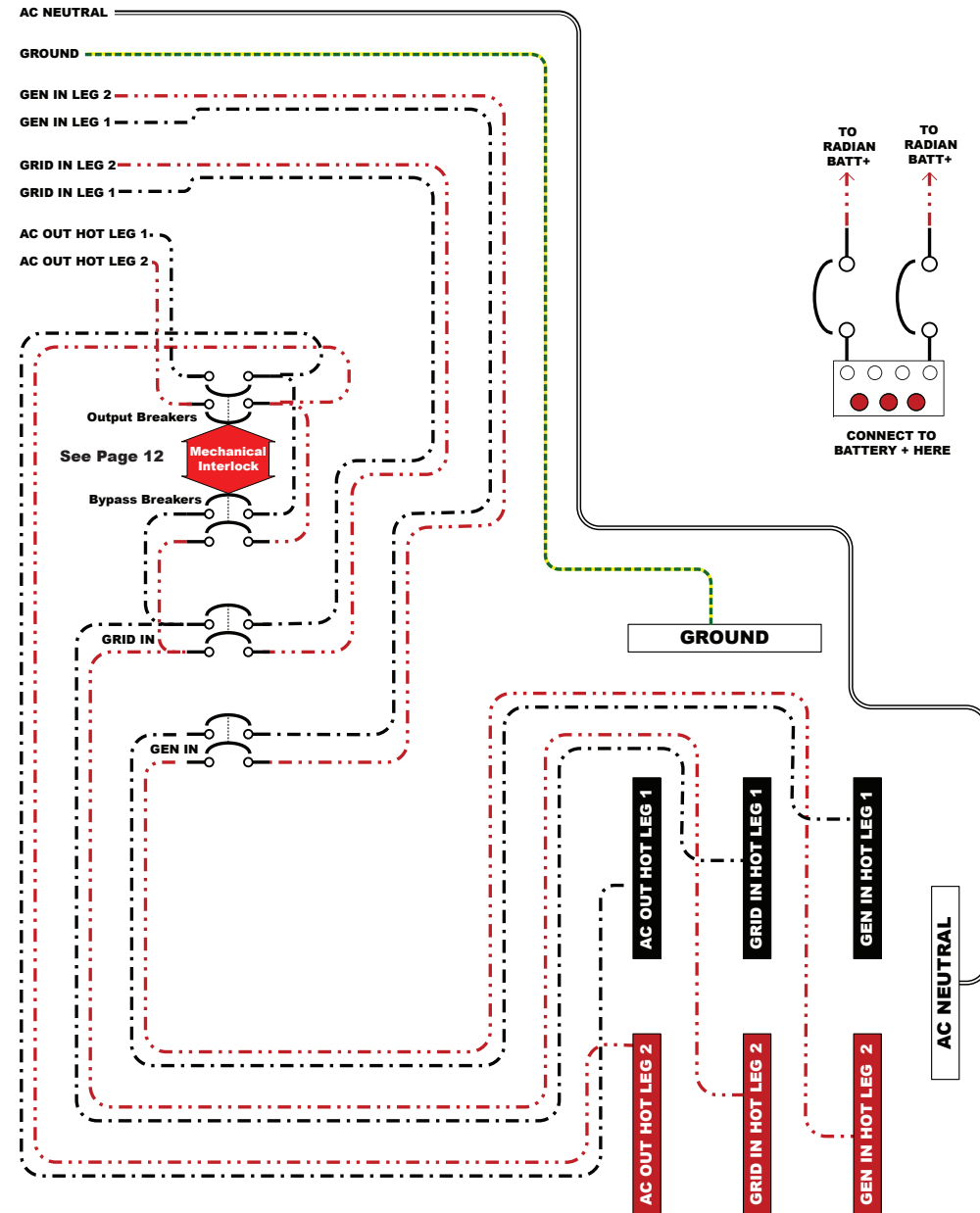
NOTES

Wiring Diagrams



NOTE:

This GSLC model has a neutral-ground bond which is added during construction. It is not depicted here. The bond can be removed if necessary. See page 7.



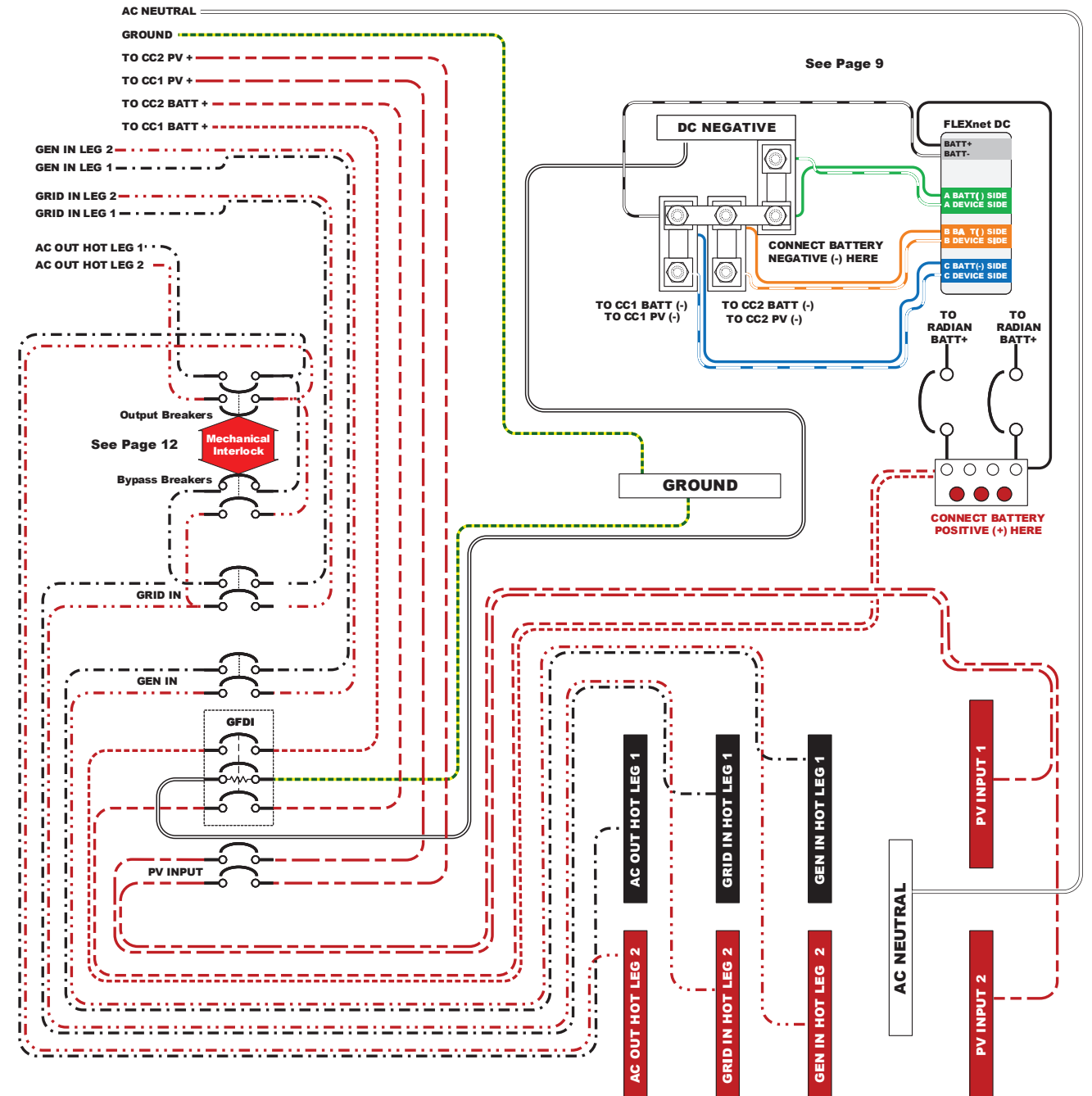
GSLC175-120/240

Wiring Diagrams



NOTE:

This GSLC model has a neutral-ground bond which is added during construction. It is not depicted here. The bond can be removed if necessary. See page 7.



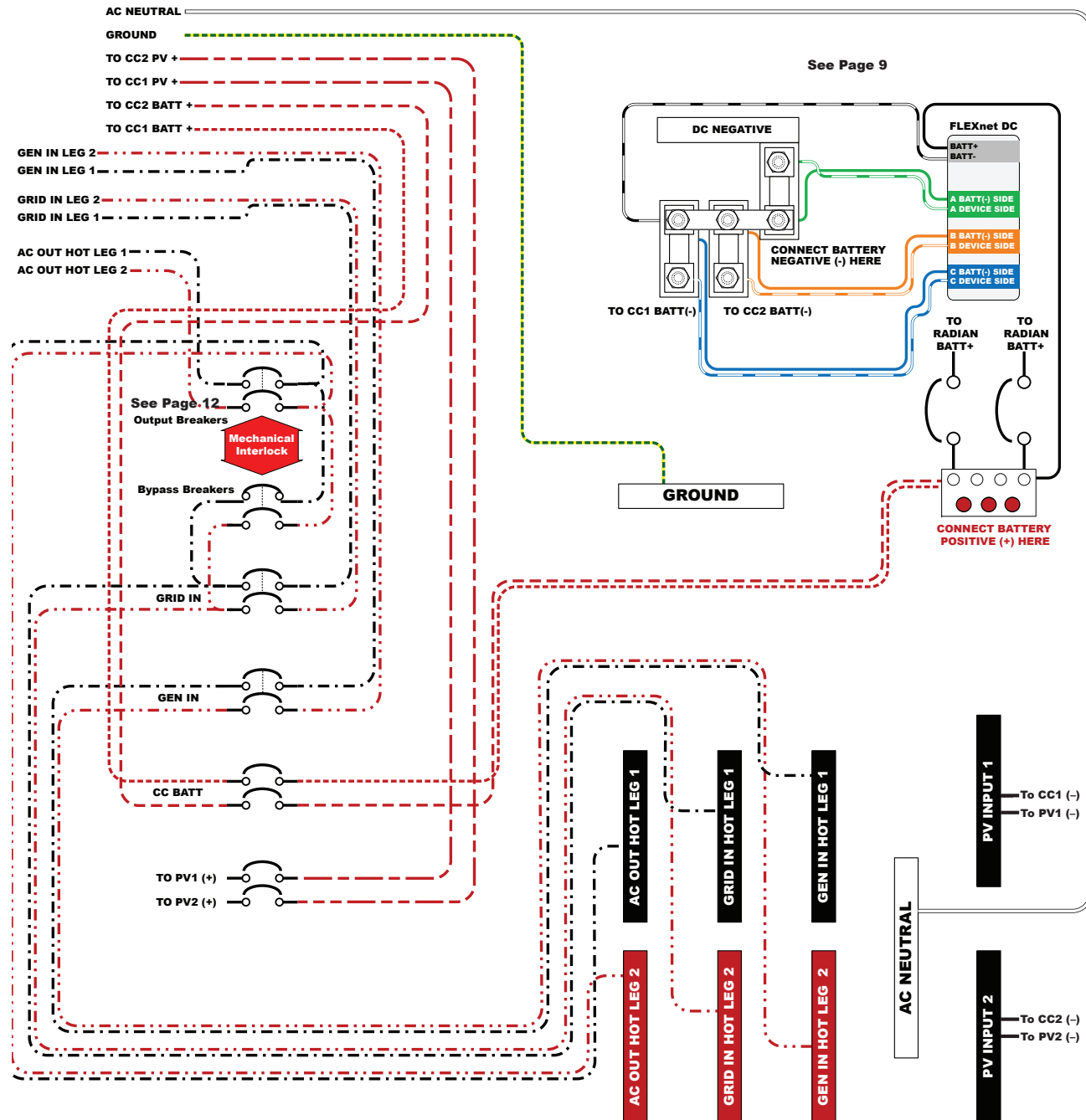
GSLC175-PV-120/240 with FN-DC

Wiring Diagrams



NOTE:

This GSLC model has a neutral-ground bond which is added during construction. It is not depicted here. The bond can be removed if necessary. See page 7.



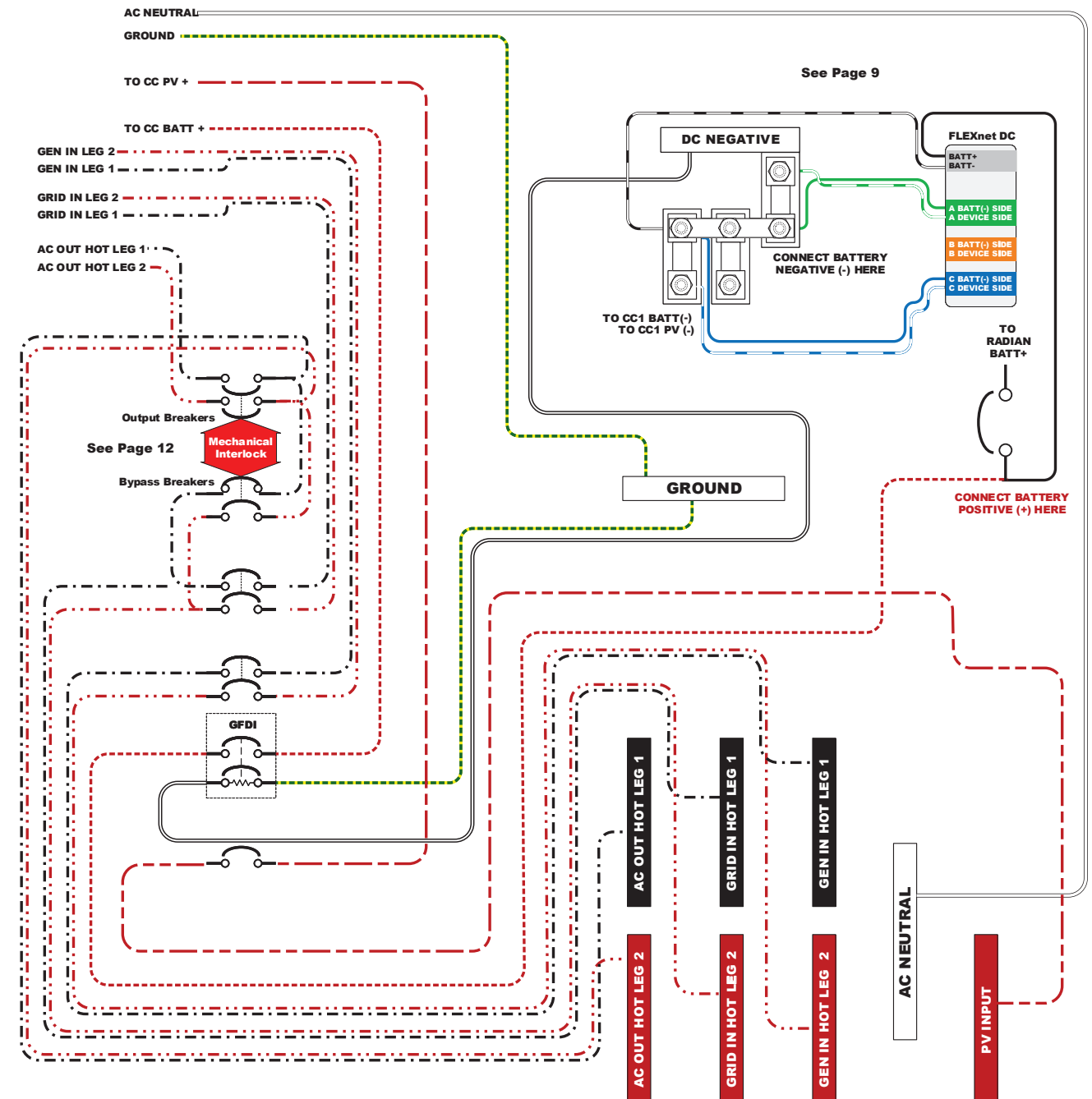
GSLC-PV-300VDC with FN-DC

Wiring Diagrams



NOTE:

This GSLC model has a neutral-ground bond which is added during construction. It is not depicted here. The bond can be removed if necessary. See page 7.



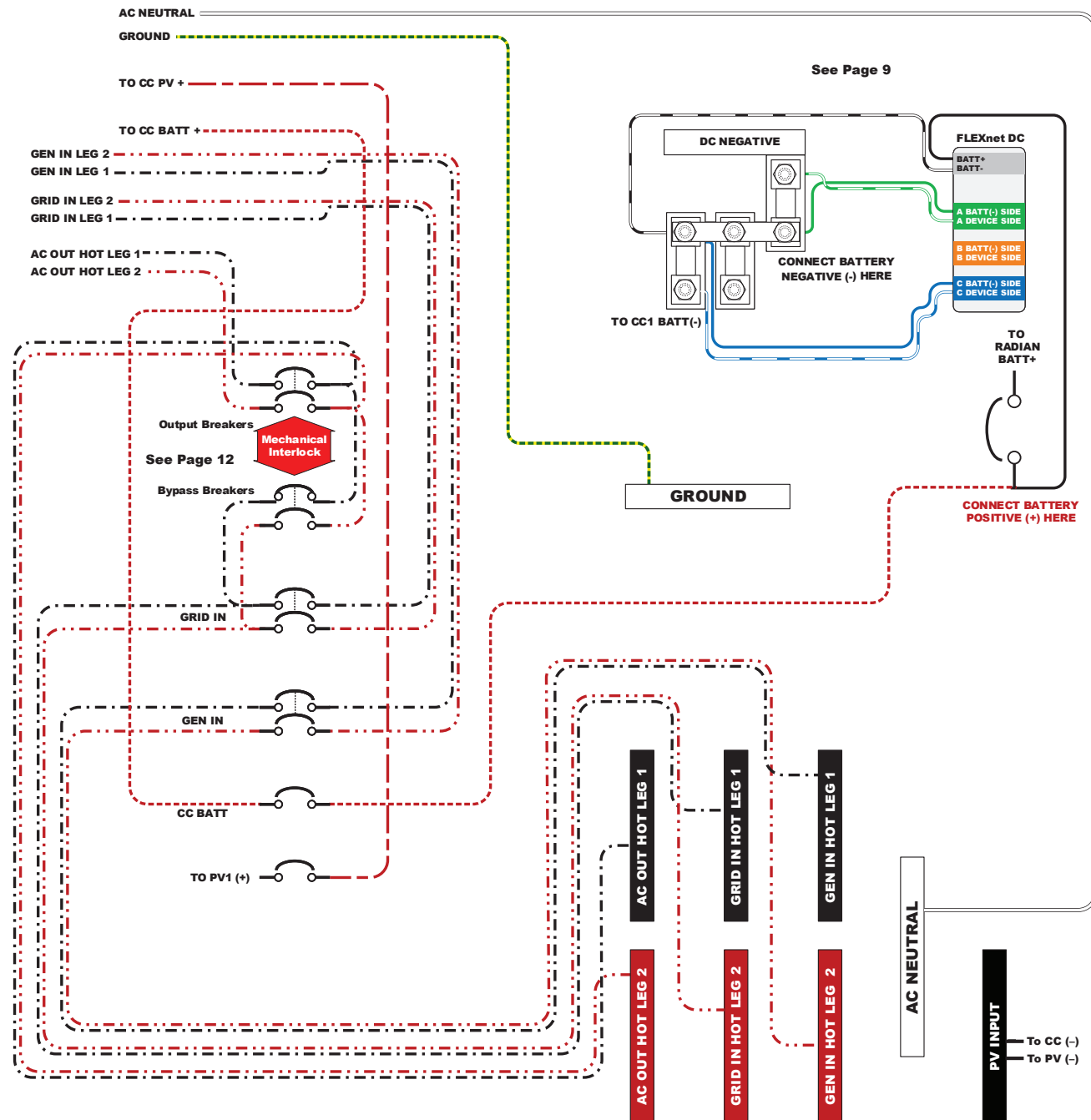
GSLC175PV1-120/240 with FN-DC

Wiring Diagrams



NOTE:

This GSLC model has a neutral-ground bond which is added during construction. It is not depicted here. The bond can be removed if necessary. See page 7.



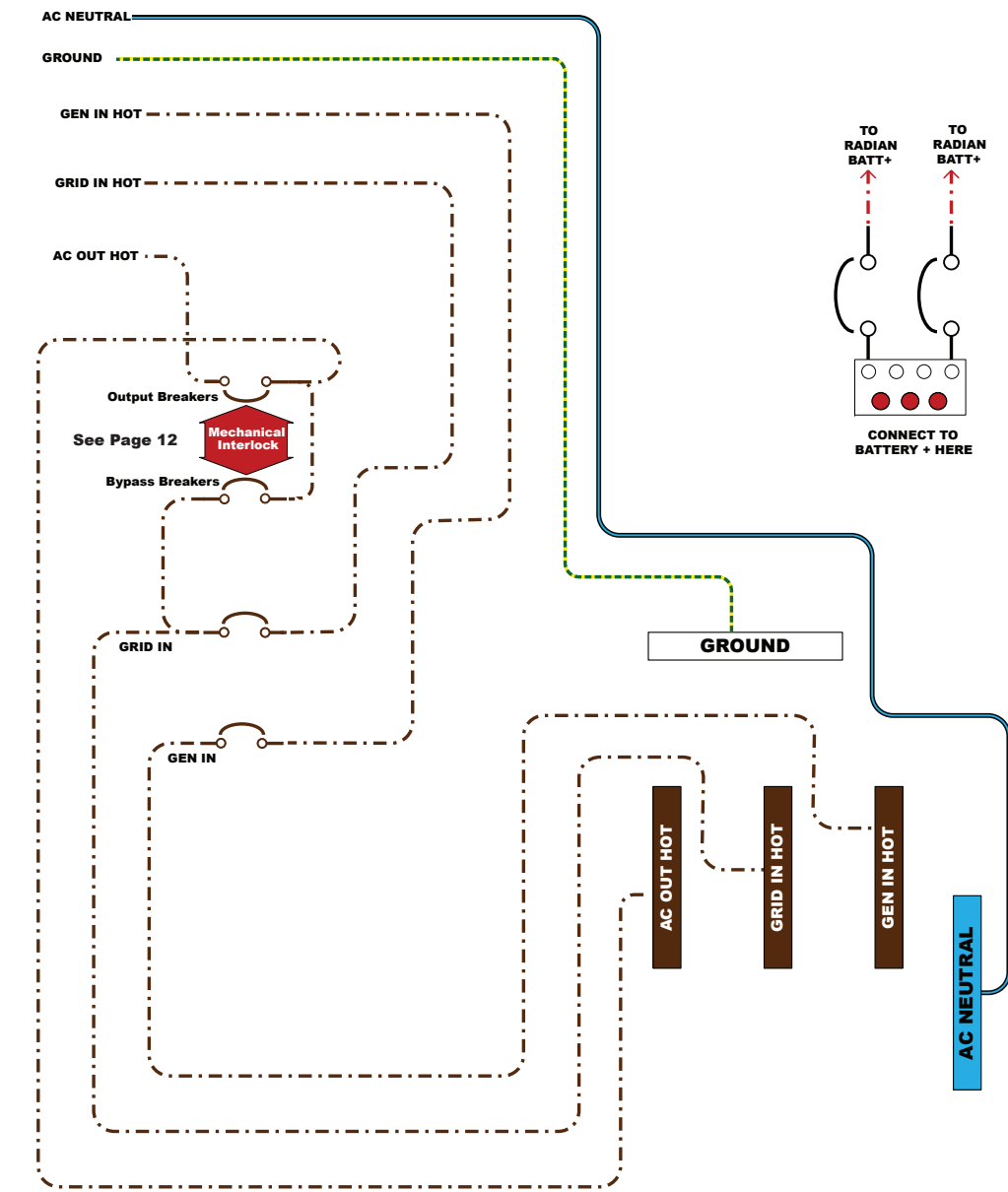
GSLC-PV1-300VDC with FN-DC

Wiring Diagrams



NOTE:

This GSLC model has a neutral-ground bond which is added during construction. It is not depicted here. The bond can be removed if necessary. See page 7.



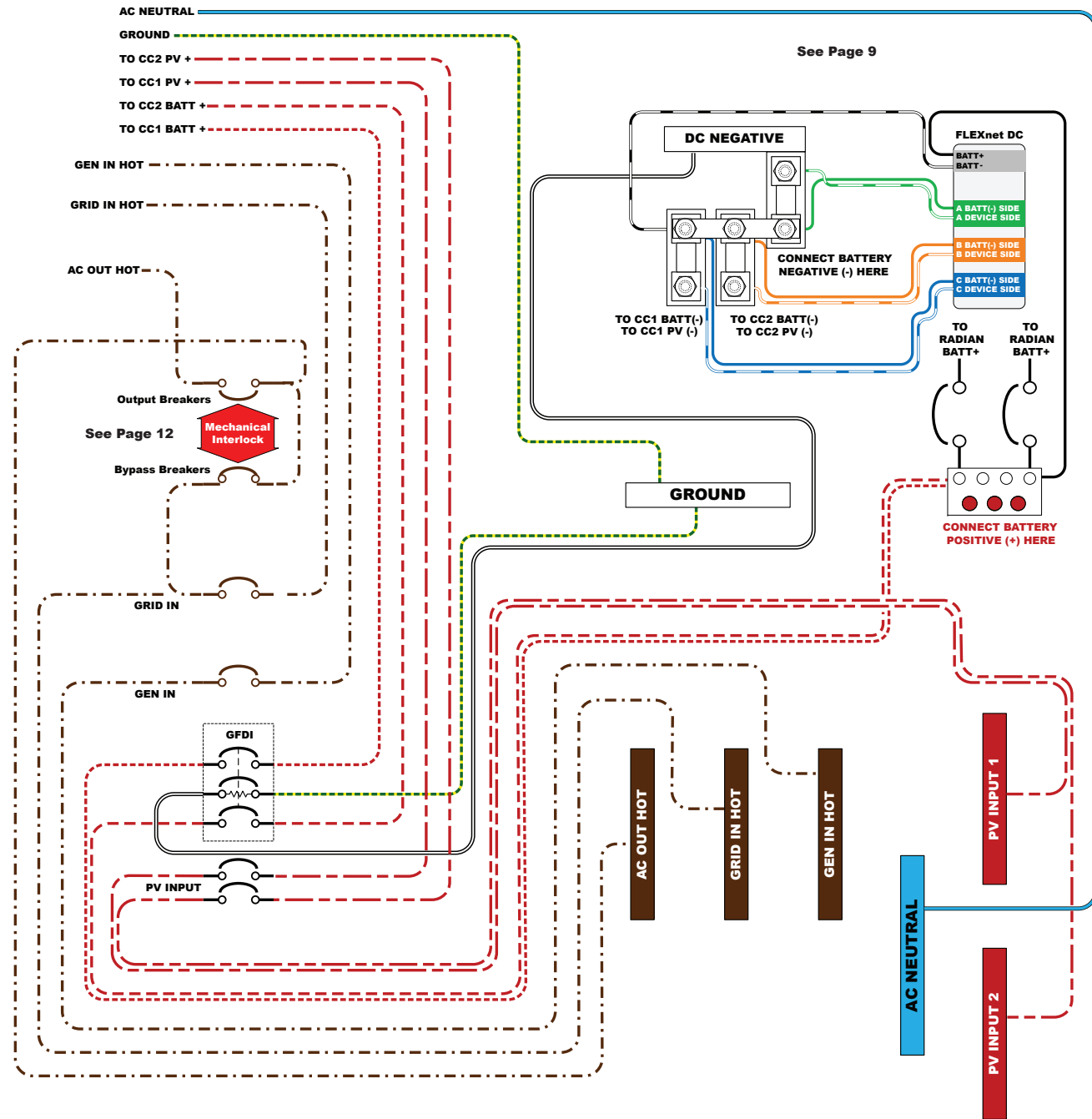
GSLC175-230

Wiring Diagrams



NOTE:

This GSLC model has a neutral-ground bond which is added during construction. It is not depicted here. The bond can be removed if necessary. See page 7.



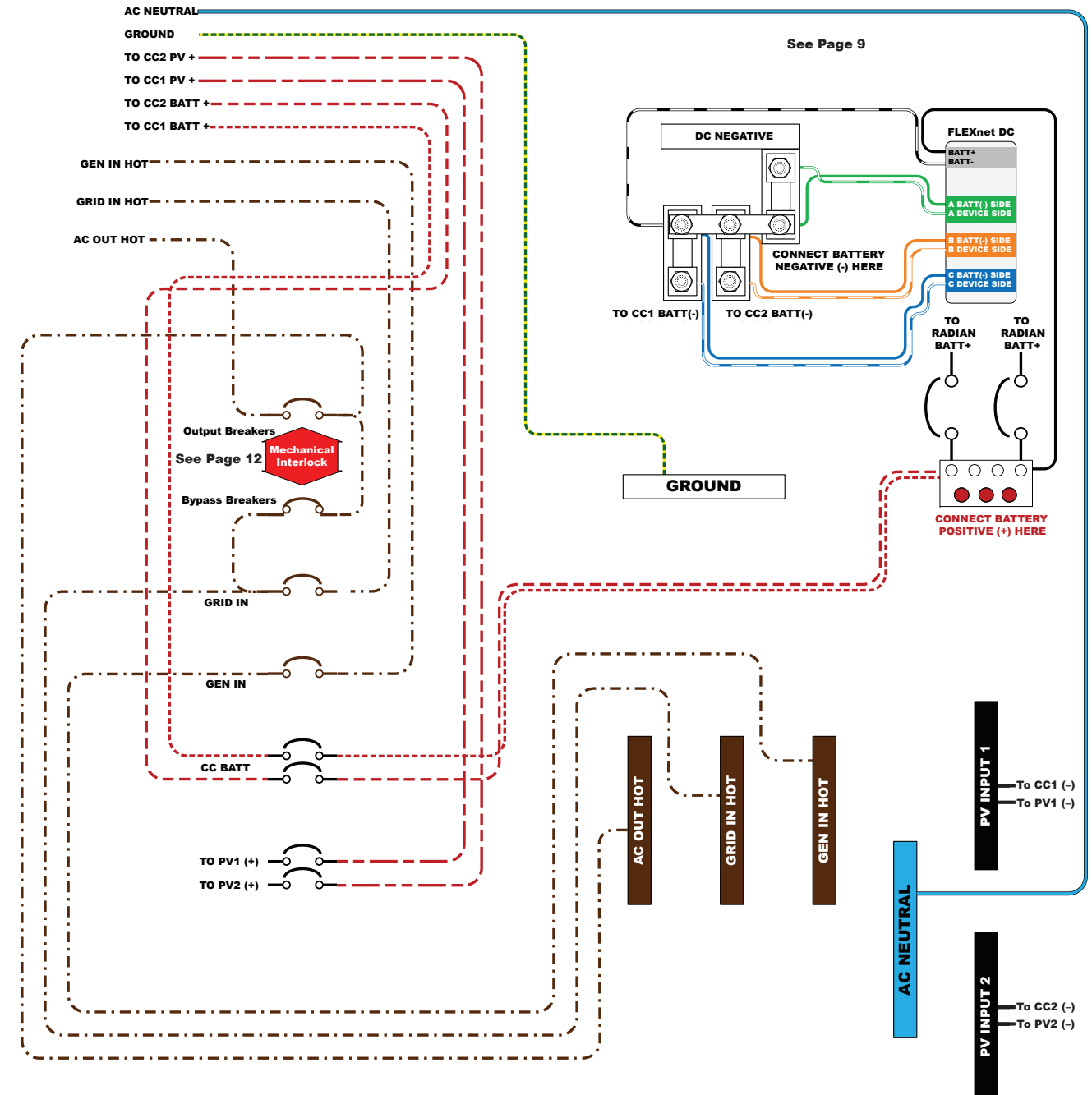
GSLC175-PV-230 with FN-DC

Wiring Diagrams



NOTE:

This GSLC model has a neutral-ground bond which is added during construction. It is not depicted here. The bond can be removed if necessary. See page 7.



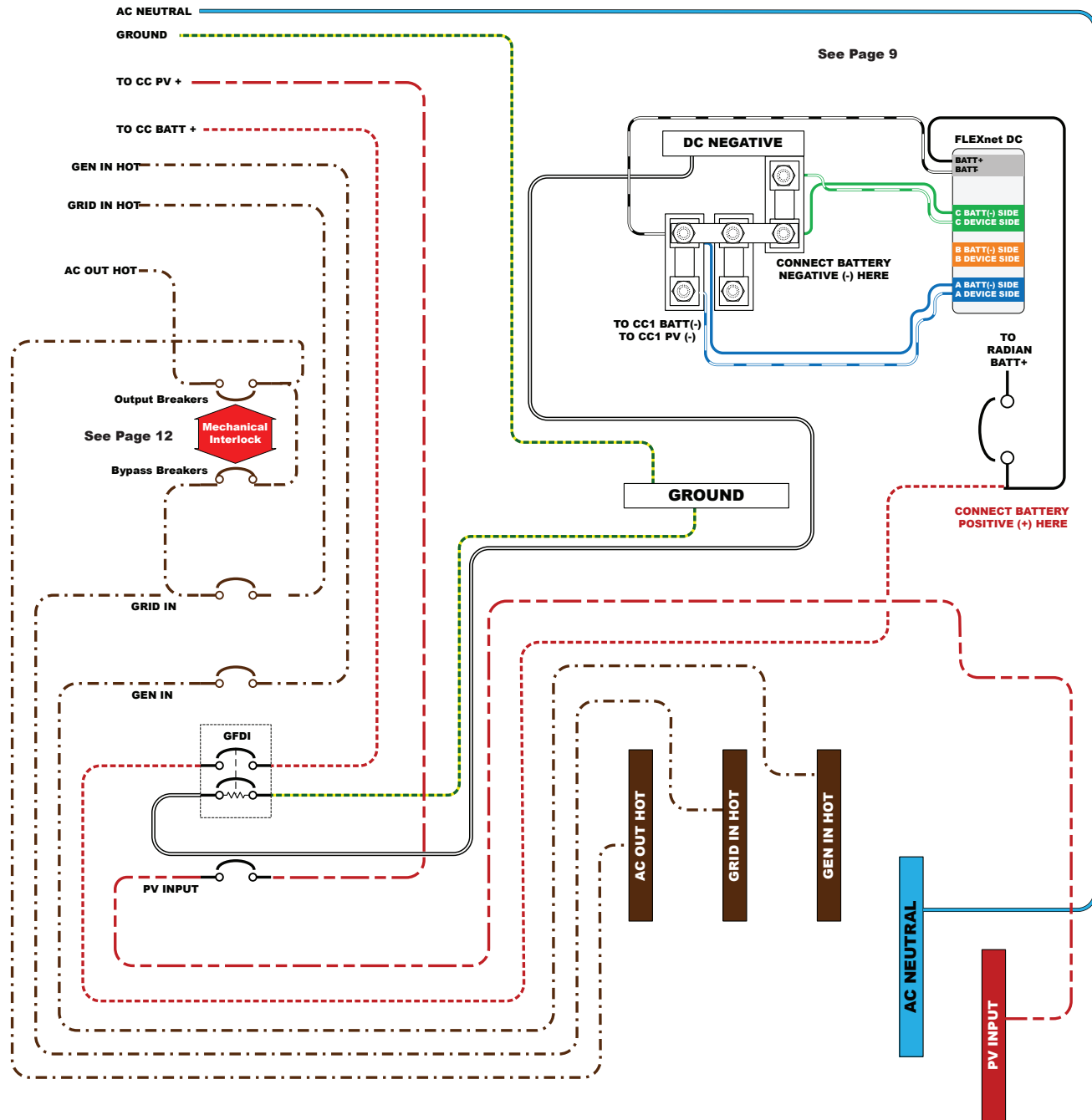
GSLC-PV-300VDC-230 with FN-DC

Wiring Diagrams



NOTE:

This GSLC model has a neutral-ground bond which is added during construction. It is not depicted here. The bond can be removed if necessary. See page 7.



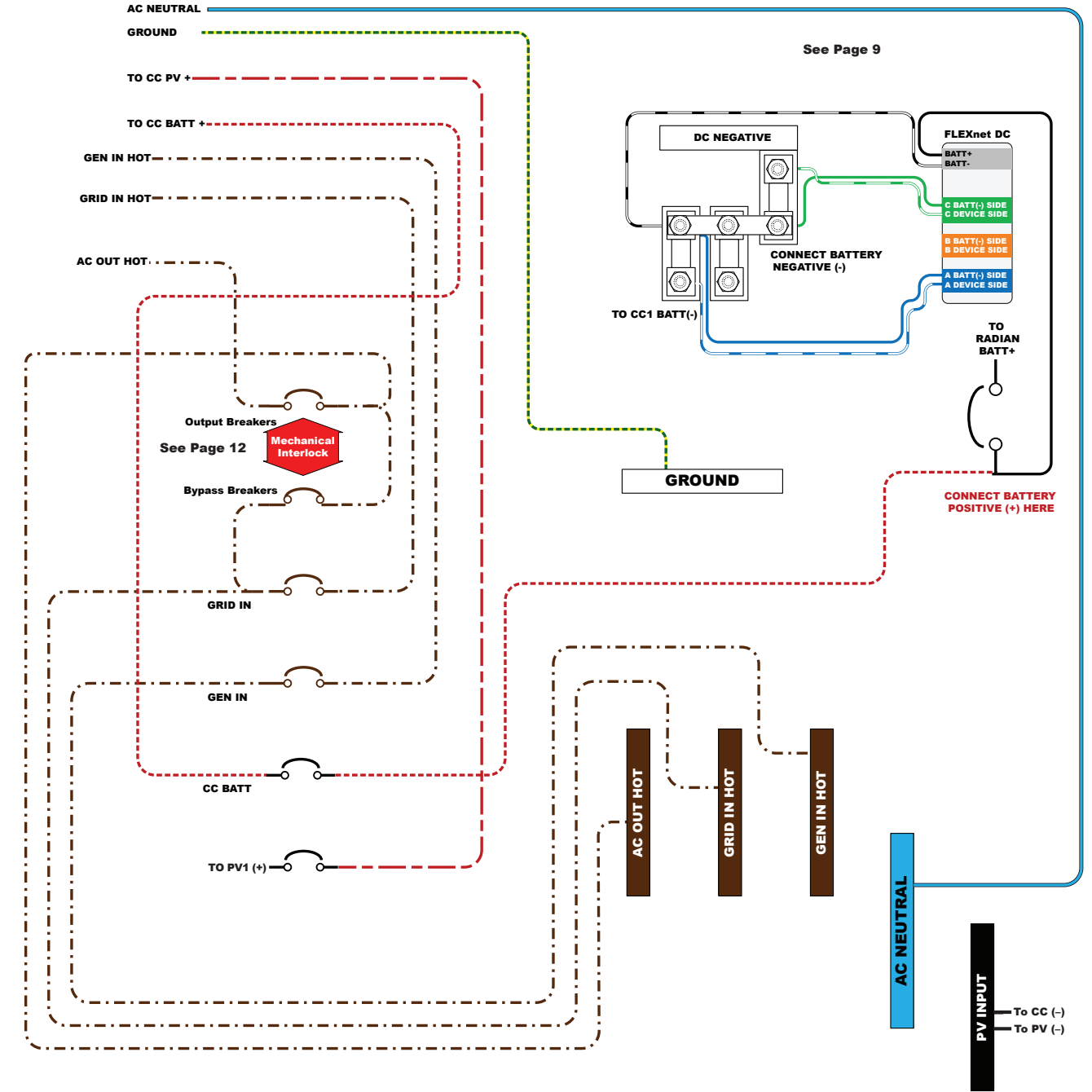
GSLC175PV1-230 with FNDC

Wiring Diagrams



NOTE:

This GSLC model has a neutral-ground bond which is added during construction. It is not depicted here. The bond can be removed if necessary. See page 7.



GSLCPV1-300VDC-230 with FN-DC