



**Power. On Your Terms.**



## **SimpliPhi OutBack AccESS**

# **INSTALLATION MANUAL**

Optimized Energy Storage & Management for Residential & Commercial Applications Utilizing Efficient, Safe, Non-Toxic, Energy Dense Lithium Ferrous Phosphate (LFP) Chemistry

# SimpliPhi Your Energy Security and Independence

**and gain control of your own power.**

SimpliPhi helps you manage your power as a personal resource. Anytime. Anywhere. SimpliPhi energy storage optimizes integration of any power generation source – solar, wind, generator – on or off grid and protects your home and mission-critical business functions from power outages and intermittency. SimpliPhi storage technology eliminates operating temperature constraints, toxic coolants and the risk of thermal runaway and fire. Safe lithium ferrous phosphate. No cobalt. No hazards.

SimpliPhi's battery technology utilizes the industry's most environmentally benign chemistry combined with proprietary architecture and power electronics (BMS) that eliminate the need for cooling or ventilation to create products that provide energy security and resiliency – all with a 98% efficiency rate.

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*SimpliPhi Power offers proprietary, commercially available energy storage and management systems that are safe, non-toxic, reliable, durable, efficient, highly scalable, and economical over the lifetime of the AccESS.*

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# 1.0 – Important Safety Information



## 1.1 – Safety Instructions

1. Before using the unit, read all instructions and cautionary markings on the unit, the PHI 3.5 Batteries, and all appropriate sections of this manual.
2. PHI 3.5 Batteries must be fully charged before commissioning the AccESS unit. Failure to do so will void the Warranty.
3. Use of accessories not recommended or sold by the manufacturer may result in a risk of fire, electric shock, or injury to persons and will void the Warranty.
4. Verify system settings are in compliance with the Battery Warranty and Battery Installation Manual (which take precedence). Violating Warranty conditions specified in these documents will void the Warranty on the PHI Batteries.
5. Consult the Integration Guide for Inverter Charge Controller programming settings for relevant warnings and notices. Violating Warranty conditions specified in those Inverter Integration Guides will void the Warranty on the whole AccESS unit, not just the OutBack Power equipment. Contact SimpliPhi Power technical support regarding any inconsistencies with other referenced documents.
6. Each AccESS unit contains four PHI 3.5 Batteries. Although each PHI 3.5 Battery contains both a circuit breaker and an internal BMS with circuitry that protects the PHI 3.5 Battery cells from overcharge, over-discharge and extreme load amperage, the PHI 3.5 Batteries must always be installed with appropriate inverter charge controller settings and power electronics to protect the PHI 3.5 from open PV voltage and other high voltage charging sources. Do not attempt to replace existing power electronics without SimpliPhi's written approval. Failure to adhere to installation protocol will void the Warranty.
7. Verify polarity at all connections with a standard volt meter before 1) energizing the system and 2) turning the PHI 3.5 circuit breaker "ON/OFF" switch to the "ON" position. Reverse polarity at the PHI 3.5 Battery terminals will void the Warranty and destroy the PHI 3.5 Batteries.
8. PHI 3.5 Batteries pose some risk of shock or sparking during the installation and initial wiring and connection process. This is consistent with all other battery-based storage formats. Be sure to turn the built-in circuit breaker to the "OFF" position to minimize the risk of shock or sparks during the installation and commissioning of the system.
9. To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that wire is not undersized. Do not operate the AccESS unit with damaged or substandard wiring.
10. Do not operate the AccESS unit if it has been damaged in any way during shipping or otherwise.
11. Only use a SimpliPhi approved LFP battery charger if ancillary charging is required before installation, testing or troubleshooting. Failure to use a SimpliPhi approved LFP battery charger will damage the PHI 3.5 Battery and void the Warranty.
12. To reduce the chance of short-circuits, always use insulated tools when installing or working with this equipment.
13. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with electrical equipment.
14. The AccESS unit does not have any user-serviceable parts. Do not disassemble the inverter except where noted for connecting wiring and cabling. See your Warranty for instructions on obtaining service. Attempting to service the components inside the AccESS unit yourself may result in a risk of electrical shock or fire and void the Warranty. Internal capacitors remain charged after all power is disconnected – wait 10 minutes before servicing.
15. To reduce the risk of electrical shock, disconnect both AC and DC power from the AccESS unit before attempting any maintenance or cleaning or working on any components connected to the inverter. Putting the AccESS unit in Standby mode will not reduce this risk.



## 1.2 – Safety & Protective Features

### 1.2.1 – 80A Breaker

All PHI 3.5 Batteries within the AccESS unit are outfitted with an 80A hydraulic/magnetic circuit breaker. This breaker increases safety during shipping and installations and allows the PHI 3.5 Battery to effectively be turned “OFF” or “ON.” The breaker works in conjunction with the built-in battery management system (BMS) and creates additional safety, efficiency and functionality to the overall power storage system.

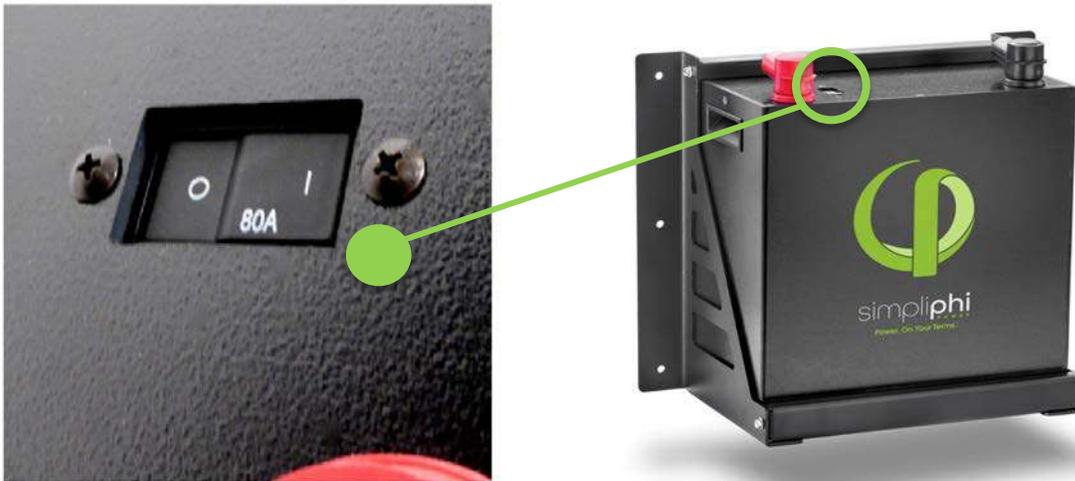


Figure 1.0 - PHI 3.5 kWh 48V Circuit Breaker



**CAUTION:** Circuit Breakers, Disconnects and Fuses should be employed throughout several points of a power storage and generation installation to effectively isolate and protect all components of the system to safeguard against faults, short circuits, polarity reversals or a failure of any component in the overall system. Fuses, breakers, wiring ratings and values should be determined by established standards and evaluated by certified electricians, licensed installers, and regional code authorities. Although each PHI 3.5 Battery contains both a circuit breaker and an internal BMS with circuitry that protects the Lithium Ferrous Phosphate cells from overcharge, over-discharge and extreme load amperage, the PHI 3.5 Batteries must always be installed with a charge controller and the appropriate settings to protect the PHI 3.5 Battery from open PV voltage and other high voltage charging sources. The PHI 3.5 Battery Management System (BMS) and internal circuit breaker alone will not protect the PHI 3.5 Batteries from these extreme electrical phenomena. Failure to adhere to installation protocol will void the Warranty.



**CAUTION:** Verify polarity at all connections with a standard volt meter before 1) energizing the system and 2) turning the PHI 3.5 circuit breaker “ON/OFF” switch to the “ON” position. **Reverse polarity** at the battery terminals will void the Warranty and destroy the PHI 3.5 Batteries.

PHI 3.5 Batteries pose some risk of shock or sparking during the installation and initial wiring and connection process. This is consistent with all other battery-based storage formats. Be sure to turn the built-in breaker to the “OFF” position to minimize the risk of shock or sparks during the installation and commissioning of the system. Use of insulated gloves, clothing and footwear is always recommended when working in close proximity to electrical devices. Cover, restrain or remove jewelry or conductive objects (metal bracelets, rings, belt buckles, metal snaps, zippers, etc.) when working with any electrical or mechanical device. Cover or restrain long hair and loose clothing when working with any electrical or mechanical device.

PHI 3.5 Batteries do not vent any harmful gasses, and do not require special ventilation or cooling.

PHI 3.5 Batteries are not capable of thermal runaway. If the cells are severely damaged due to physical abuse incurred outside of warranted specifications, which can cause electrolyte leakage and other failures, as with any PHI 3.5 Battery, the electrolyte can be ignited by an open flame. However, unlike other lithium ion batteries (LCO) there are no hazardous or toxic materials in the electrolyte or the material components of PHI 3.5 Batteries. See PHI 3.5 Installation Manual for details.

### 1.2.2 – Charging at Temperatures Below Freezing

It is important to take necessary steps to determine the temperature of the PHI 3.5 Battery prior to charging the battery, as the battery may otherwise be adversely impacted.



**CAUTION:** Do not attempt to charge the PHI 3.5 Battery below 32° F (0° C). Although cold temperatures do not harm PHI 3.5 Batteries, attempts to charge at subfreezing temperatures can adversely affect SOH and cycle life, and will void the Warranty. If the PHI 3.5 Battery must be charged below 32° F (0° C), the rate of charge must be at no more than 5% of the PHI 3.5 Battery's rated capacity (C/20).



**CAUTION:** Only use a SimpliPhi approved LFP charger if ancillary charging is required before installation, testing or troubleshooting. Failure to use a SimpliPhi approved LFP charger will damage the PHI 3.5 Battery and void the Warranty.

### 1.2.3 – Battery Management System (BMS)

The PHI 3.5 Batteries within the AccESS unit are manufactured utilizing Lithium Ferrous Phosphate (LFP) cells, which are produced under exclusive patented licensed technologies, as well as proprietary materials, architecture, assembly methods and battery management system (BMS). This assures the highest grade and quality, longest cycle-life, greatest efficiency and freedom from material impurities, toxicity and hazardous risk.

Each PHI 3.5 Battery within the AccESS unit contains circuitry that protects the Lithium Ferrous Phosphate cells from overcharge, over-discharge and extreme load amperage. If the values specified are exceeded, the protective circuitry will shut down the flow of electricity to/from the PHI 3.5 Batteries. In some cases, this will result in the need to re-initialize an inverter charger. Often, inverter system settings will be saved within the inverter memory storage and will not need to be reset. This is not an absolute standard but is common amongst most inverter chargers and should be anticipated if the PHI 3.5 Batteries go into a state of self-protection and shut down the flow of electricity. Refer to SimpliPhi's inverter integration guides for inverter charge controller settings or contact the inverter manufacturer.

### 1.2.4 – PHI 3.5 Battery Connection Terminals

The PHI 3.5 Batteries are equipped with two 3/8" threaded studs with a lock washer and nut. The red colored high temperature molded insert connection is for the positive lead. The black colored high temperature insert connection is for the negative lead.



**CAUTION:** Do not attempt to loosen the large brass nut at the base of the terminals.



**CAUTION:** Do not reverse polarity. It will void the Warranty. Use a volt meter to check polarity before connecting terminals.

Water Resistant Cable Boots are also included and will be in place when your units arrive. The boots are to be placed over the cable terminations and will stretch to form a water-resistant seal around the base of the molded inserts and terminal connections.

## 1.3 – Limitations of Use

The Radian GS8048 Inverter/Charger built into the SimpliPhi Power AccESS is not intended for use in connection with life support systems or other medical equipment or devices.



## 1.4 – Explosive Gas Precautions

This equipment is not ignition protected. To prevent fire or explosion, do not install this product in locations that require ignition-protected equipment. This includes any confined space containing vented batteries, or flammable chemicals such as, natural gas (NG), liquid petroleum gas (LPG) or gasoline (Benzine/Petrol).

Do not install in a confined space with machinery powered by flammable chemicals, or storage tanks, fittings, or other connections between components of fuel or flammable chemical systems.

## 1.5 – Regulatory Specifications

OutBack Inverters intended for grid-interactive use in the United States and Canada must comply with the established standards of UL 1741 and IEEE 1547 and 1547.1. These standards provide regulation for acceptable output voltage ranges, acceptable output frequency, total harmonic distortion (THD) and anti-islanding performance when the inverter is exporting power to a utility source. The OutBack grid-interactive models are tested using the procedures listed in IEEE 1547.1 to the standards listed in both UL 1741 and IEEE 1547.

## 2.0 – Product Description

### 2.1 – Overview

The SimpliPhi AccESS offers industry leading renewable energy storage technology to provide energy security and power resiliency into a pre-assembled, pre-programmed system that is suitable for installation inside and outside. The AccESS serves all of the common residential scale renewable energy applications: Off Grid, Grid Tied Back Up, Self Consumption – with Zero Export.

### 2.2 – Specifications

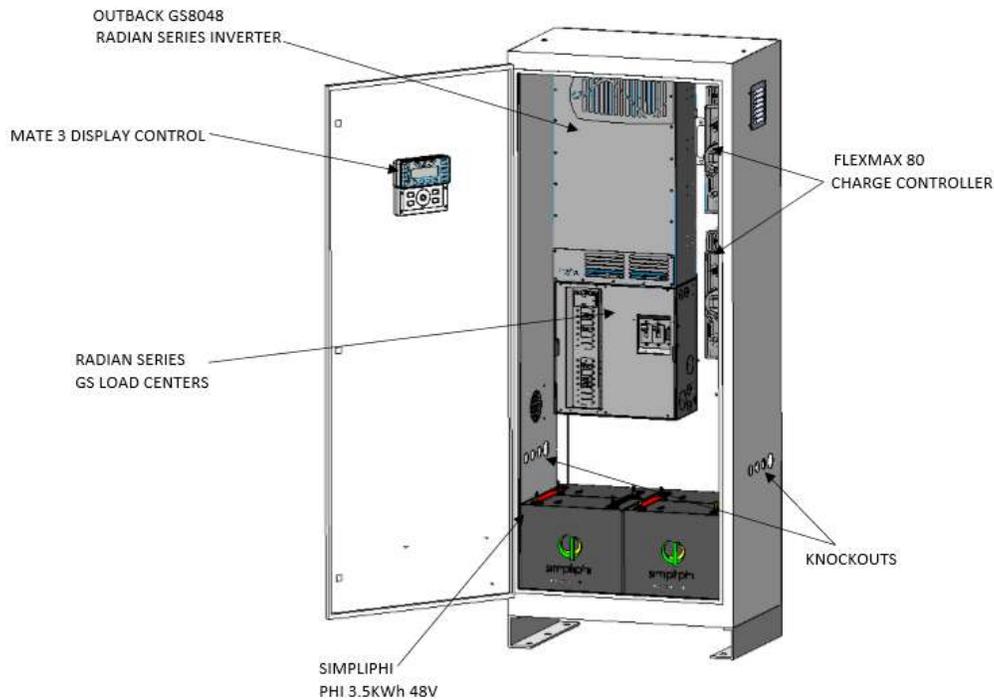
Please review Table 1.0 below for AccESS unit specifications, including physical dimensions, Warranty period, and technical data.

**Table 1.0 – AccESS Specifications**

APPLICATIONS		
SIA (Standard Interconnection Agreement) customers: ESS allows for solar PV power to be self-consumed, while also providing a backup power source	NEM (Net Energy Metering) customers: add standby power and peak-shaving to a new or existing net-metered solar array	Off-grid customers: ESS with 8 kW Solar MPPT combines power generation and energy management in a single package
SPECIFICATIONS		
General		
Dimensions (W x H x D)	29.5 x 76 x 20 in (w/feet), (75 x 193 x 51 cm)	
Weight	700 lb (317.52 kg) (w/out batteries)	
Enclosure Rating	NEMA 3R Outdoor rated	
Operating Temperature	-4 to 122 °F (-20 to 50 °C)	
Mounting	Free-standing or pad-mounted	
Inverter/Charger		
OutBack Power	Radian GS8048A	
Application	On / Off Grid	
AC Connections	1 Grid Port, 1 Generator Port	
AC Output <sup>1</sup>	120/240V AC, 60 Hz	
Rated Power <sup>2</sup>	8 kW (7 kW <sup>2</sup> )	
Max Charge Rate	115A DC, 7.2 kW (30A AC @ 240V AC)	
CEC Weighted Efficiency	92.50%	
Battery		
SimpliPhi Power	PHI 3.5 kWh 48V DC 60 Amp (x4)	
UL Rating	UL 1973 Standard (ETL Certified)	
Rated kWh Capacity @ C/2	14 kWh	
Depth of Discharge <sup>3</sup>	up to 100%	
Round Trip Efficiency	98%	
Cycle Life	10,000+ (@ 80% DOD)	
Warranty Period	10 years	
Solar		
OutBack Power Charge Controller	FLEXmax 80 (x2)	
Output Power (max)	8 kW	
Charge Current (max)	160A DC	
PV Array Voltage (max operating)	145V DC	
PV Array Voltage (max open circuit)	150V DC	
Other Features		
Internet Connected Monitor/Command	OPTICS RE	
Automatic Generator Start	Two wire generator only	
System Display & Controller	MATE3s	
Notes: <ul style="list-style-type: none"> <li>1. 240V AC standard; 120V AC on request.</li> <li>2. When operating from battery, the maximum inverter power is half the battery capacity (kWh/2h).</li> <li>3. Max operating conditions. Refer to Warranty for recommended conditions.</li> <li>• Specifications are typical/nominal. Subject to change without notice.</li> </ul>		

## 2.3 – Inside the AccESS NEMA-3R Rated Cabinet

The AccESS system is enclosed within a NEMA-3R rated cabinet. Within, the internal layout provides easy access to clearly labeled wiring points and includes the necessary overcurrent devices, breakers and disconnects. See Figure 2.0 below for detail.



**Figure 2.0 – AccESS Unit Components**

The heart of the AccESS is the SimpliPhi Power PHI 3.5 kWh 48V 69Ah power storage modules. The power storage is modular and expandable. The base level energy storage is 14 kWh at 100 percent state of charge. This is provided by four PHI 3.5 kWh 48V 69Ah modules – combined in parallel.

The power storage is paired with industry leading battery inversion and charging technology by OutBack Power, capable of serving useful household loads. Additional storage capacity can be achieved by adding another AccESS Energy Storage Cabinet in parallel, side by side, with up to 12 of the PHI 3.5 kWh 48V batteries.

Accessories allow for a DC connected PV system up to 8 kW, remote system monitoring, automatic generator start and cellular uplink for wireless, long range monitoring/programming.

### 2.3.1 – AccESS Core Components

The core components within the AccESS unit include the below listed products. See Figure 2.0 for detail.

- OutBack Radian GS8048 inverter/charger
- 2x OutBack FM80 MPPT charge controller
- 4x SimpliPhi 3.5 kWh 48V
- See specification sheet (Table 1.0) for full list of included products

## 3.0 – Pre-Installation

The information within this section covers pre-installation procedures & considerations, namely, PHI 3.5 Battery performance parameters to be aware of during the design process, guidance on system sizing, as well as installation site requirements and pad mounting.

### 3.1 – PHI 3.5 Battery Performance Parameters and Sizing Calculations

The PHI 3.5 Batteries within the OutBack AccESS are designed to operate at a continuous C/2 rate across a large operating temperature range, as seen in Table 1.0 above. The SimpliPhi AccESS needs no increase in sizing and no special compensations when determining the size of the energy storage and management system under the circumstances and conditions seen in Table 1.0 above. Each AccESS unit comes pre-programmed to maximize the performance of the PHI 3.5 Battery bank.

PHI 3.5 Batteries within the AccESS unit do not need to be de-rated unless running continuously at more than 90% capacity, at temperatures below 0° C, or above 49° C. To achieve higher, warranted cycles of 10,000+, the PHI 3.5 Batteries are typically operated at 80% maximum Depth of Discharge. The AccESS comes pre-programmed for 80% depth of discharge. Please contact SimpliPhi Power Technical Support if alternative settings are desired. Please also refer to operating temperatures and inverter settings in Programming section.

#### 3.1.1 – Design Parameters: Maximum Sizing Guidelines

Below are the maximum sizing guidelines for installations of the AccESS:

- Maximum AC input = 25A at 240 Vac
- Maximum DC coupled PV array = 8 kW DC
- Maximum AccESS units combined in parallel: 2 Units = 16 kW AC

### 3.2 – System Sizing for Your Installation

The number of PHI 3.5 Batteries within the AccESS unit should be specified in terms of total storage capacity before the initial installation based on the goals and objectives of the project. All PHI 3.5 Batteries are balanced during final production and testing stages. Following proper wiring guidelines ensures that a system will not require any manual balancing processes.



**CAUTION:** Do not combine PHI 3.5 Batteries with other brands or chemistries. This will void the Warranty.



**CAUTION:** Do not mix PHI 3.5 Batteries from different installations, clients or job sites. This will void the Warranty.

### 3.3 – Installation Tools and Materials

- Digital Multi Meter
- AC/DC Clamp-On Current Meter
- Wire Stripper
- Impact Driver
- Masonry Bolts

### 3.4 – Installation Site Location

The AccESS may be installed indoors, such as a garage, or outdoors mounted onto a concrete pad. The cabinet is rated for NEMA-3R use. Please see Figure 3.0 below for physical AccESS dimensions, as this may impact the site location.

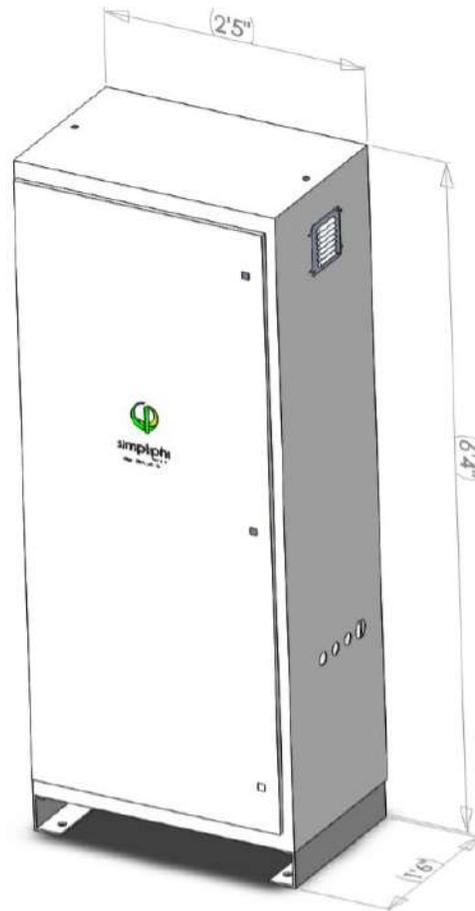


Figure 3.0 – AccESS Unit Dimensions

### 3.5 – Clearance Requirements

The AccESS should be installed with 5-inch (7.62 cm) clearance to the sides and 3-feet (0.91 m) clearance to the front. Please see Figure 4.0 below for details. All installations should comply with local code requirements and/or the local AHJ, which may exceed the requirements shown.

Note: If installing multiple AccESS units to be connected, no clearance is required between units. Enclosures may be placed directly adjacent to each other.

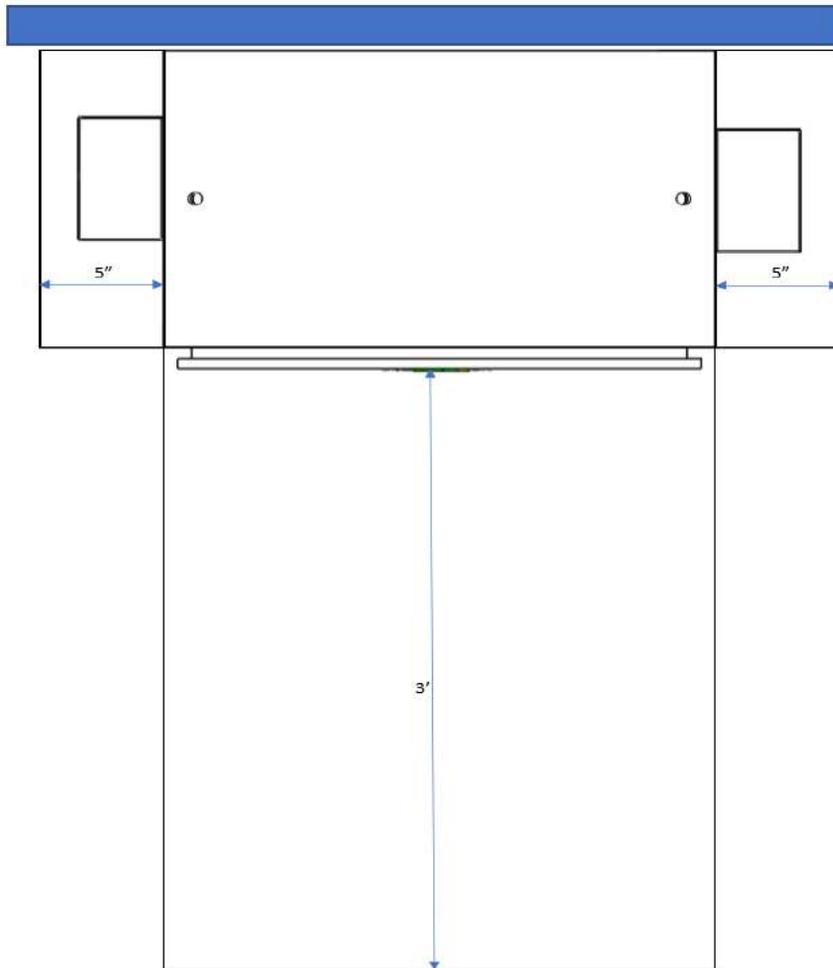


Figure 4.0 – AccESS Unit Clearances

## 3.6 – Knock Out Locations

Three 1-inch OD knockouts and one 1.5-inch OD knockout are located on both sides of the AccESS cabinet. They can be used for AC or DC inputs. Not all knockouts may be used.

## 3.7 – Pad Mounting

### 3.7.1 – Pad Requirements

The AccESS must be installed and secured on level concrete. For a pre-cast concrete pad, a 4" minimum thickness is required. The pad should be 3" wider than the AccESS on all sides (34" x 22" x 4").

The AccESS is not suited for wall mounting. Any attempt to wall mount the AccESS unit will void the Warranty.

### 3.7.2 – Pad Mounting the SimpliPhi AccESS

Six 1-inch knockouts are located in the base of the AccESS for tool accessibility when mounting the AccESS to the concrete pad. Cover knockout holes with sealing tape after pad mount

installation, and prior to installing the PHI 3.5 Batteries into the base of the cabinet. Any attempt to wall mount the AccESS unit will void the Warranty.

Secure the AccESS to the concrete with concrete anchors, such as threaded rods, masonry bolts, or carriage bolts, minimum ½” diameter. See Figure 5.0 below for details.

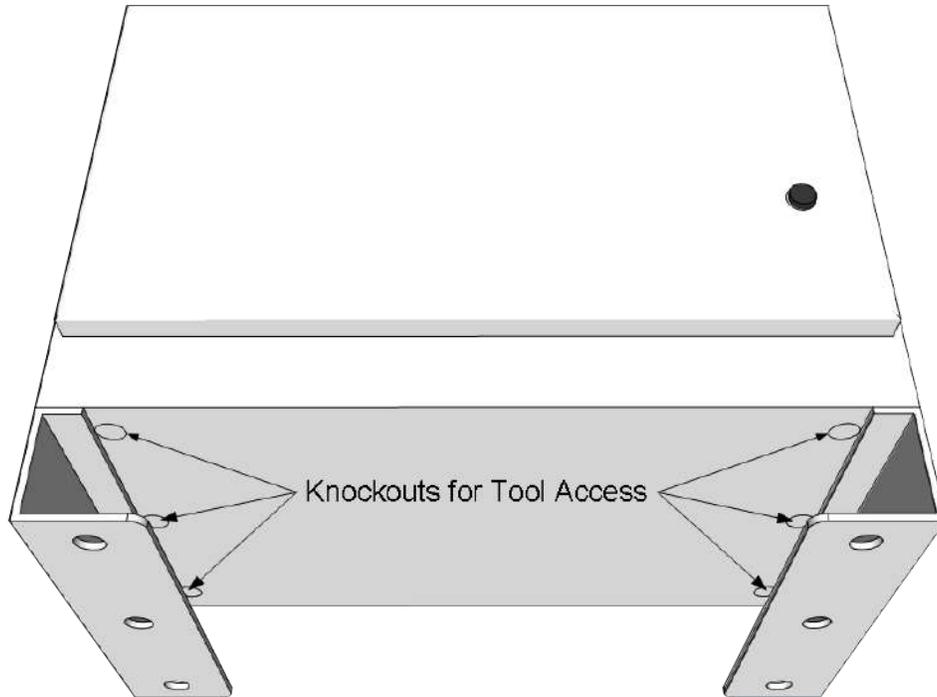


Figure 5.0 – AccESS Unit Knockouts (Bottom)

## 4.0 – Installation & Wiring

This section covers how to install the PHI 3.5 Batteries within the AccESS unit, torque values, communications and network preparation and how to wire the AccESS unit. It also provides guidance on how to install optional AccESS unit components/accessories.

### 4.1 – Basic System Configuration Concepts

Safe and reliable installation requires trained and certified technicians. The following discussion is a basic primer. Due to the variety of systems and components in the field, all possible scenarios are not covered. This is not the purpose of this section of the manual. Refer to professional installers regarding your system and its components and specifications. We encourage you or your installer to contact us with any specific questions for technical support. We are committed to working with you and your installation team to achieve a safe, reliable storage system that will provide years of maintenance free service.

### 4.2 – PHI 3.5 Battery Installation within the AccESS

#### 4.2.1 – Battery Bank Properties

The SimpliPhi AccESS utilizes SimpliPhi’s PHI 3.5 kWh 48V Batteries with Lithium Ferrous Phosphate (LFP) cells. SimpliPhi’s LFP cells are produced under exclusive patented licensed technologies, as well as proprietary materials, architecture, assembly methods and battery management system (BMS). This assures the highest grade and quality, longest cycle-life,

greatest efficiency and freedom from material impurities, toxicity and hazardous risk. They do not contain cobalt.

Each PHI 3.5 Battery contains circuitry that protects the Lithium Ferrous Phosphate cells from overcharge, over-discharge and excessive load amperage. If the values specified are exceeded, the protective circuitry will shut down the flow of electricity to/from the PHI 3.5 Batteries. In some cases, this will result in the need to re-initialize an inverter charger. Each AccESS unit is programmed to avoid such a situation, barring abnormal conditions beyond the designed parameters and Warranty terms. If low voltage incidents do occur, the inverter settings will be saved within the inverter memory storage and will not need to be reset.

## 4.2.2 – Battery Bank Installation

After mounting the AccESS unit on concrete, place 4 PHI 3.5 Batteries in the bottom of the cabinet. Connect the Battery Cable that is pre-wired into the GS Load Center to the positive and negative terminals of each PHI 3.5 Battery per the torque values in the next section. Leave the PHI 3.5 Batteries in the “OFF” position until the basic functional test.



**CAUTION:** PHI 3.5 Batteries must be fully charged before commissioning the AccESS unit. Failure to do so will void the Warranty.



**CAUTION:** Verify polarity at all connections before energizing system. Reverse polarity at the PHI 3.5 Battery terminals will void the Warranty and destroy the PHI 3.5 Batteries.



**CAUTION:**

Solid **Blue** Wire = Negative Lead  
**Blue** with **Red** Stripe = Positive Lead

## 4.3 – Torque Values

For the DC terminals on the PHI 3.5, torque bolts to 160 in-lbs (13.3 ft-lb).

## 4.4 – Communications and Network Preparation

Communication and Monitoring is available via the included Mate 3 through the OpticsRE network. A wireless router as well as onsite internet/wifi is required.

OPTICS RE is the web-based remote monitoring and control application for OutBack devices.

- The OPTICSre menu item enables or disables the application.
- It is also possible to communicate with OutBack devices using the Modbus protocol and SunSpec client software as described in *OutBack AXS Port Owner's Manual*. The SunSpec Interface menu item enables or disables this type of data stream from the MATE3
- The Modbus Port menu item is the Modbus TCP/IP port number. The default settings is the standard internet designation. The port number can be changed if necessary.
- OPTICS RE allows you to view system health, settings, and make adjustments to programming within the connected devices

For OPTICS RE configuration, please see the OutBack Power's documentation on MATE 3 configuration.

## 4.5 – Wiring the AccESS

For Wiring information please refer to the OutBack GSLoad Center installation manual

[http://www.OutBackpower.com/downloads/documents/inverter\\_chargers/radian\\_gs\\_load\\_center/gs\\_load\\_center\\_install.pdf](http://www.OutBackpower.com/downloads/documents/inverter_chargers/radian_gs_load_center/gs_load_center_install.pdf)

For FM80 MPPT Wiring information please refer to OutBack FM80 installation manual  
[http://www.OutBackpower.com/downloads/documents/charge\\_controllers/flexmax\\_6080/owner\\_manual.pdf](http://www.OutBackpower.com/downloads/documents/charge_controllers/flexmax_6080/owner_manual.pdf)

## 5.0 – Programming

### 5.1 – Depth of Discharge

The AccESS comes pre-programmed for 80% depth of discharge (DoD). This qualifies for the 10-year / 10,000 cycle Warranty on the PHI 3.5 Batteries.

To change the DoD to the 5,000 cycle Warranty or 3,500 cycle Warranty, modify the voltages in the Basic Settings and Advanced Settings per the Programming section. Refer to the PHI 3.5 Battery Warranty.

If a firmware update is executed on the AccESS, please verify all PHI custom settings are still in place. These settings can be found at the end of this manual in Section 7.0: Operating Parameters.

### 5.2 – Configuring the OutBack Radian GS8048

The OutBack Radian is capable of many different modes of operation via configurable settings. These settings can be modified to support the function the owner would like to achieve with the AccESS unit. To configure the AccESS, please refer to OutBack Radian GS8048 manual.

The OutBack Owner's Guide contains information and procedures necessary for configuring, operating, maintaining, and troubleshooting the OutBack Radian Inverter/Charger. The guide is intended for anyone who needs to operate, configure, and troubleshoot the inverter. Certain configuration tasks should only be performed by qualified personnel.

### 5.3 – Operating Parameters Per Warranty

Although the PHI 3.5 Batteries within the AccESS unit are capable of performing at very high rates and depths of discharge within a very wide temperature range, in order to achieve extended life cycles and to comply with the Warranty, the operating parameters, indicated in the tables below, must be adhered to. The parameters shown must be applied based on desired Warranty/cycle life. The AccESS comes pre-programmed for 80% depth of discharge.

## 5.3.1 – Inverter Programming Settings

Table 2.0

Inverter Settings	10k Cycles (80% DOD)	5k Cycles (90% DOD)	3.5k Cycles (100% DOD)
Absorb Voltage (V), Time	27.8 / 55.4, 0.1 hour	28.4 / 57.2, 0.1 hour	28.4 / 57.2, 0.1 hour
Float Voltage and Time	N/A (disable float)		
Refloat Voltage	N/A (disable float)		
Re-Bulk Voltage	25.3 / 50.6		
AC Input Mode	Grid Tied (default, adjust as needed)		
SellRE (Offset) Voltage (V)	26 / 52 (default)		
AC Charger Limit in AC Amps <sup>1,2</sup>	24V = 5A (240V), 10A (120V)		
	48V = 7A (240V), 14A (120V)		
Low Battery Cut-Out Voltage (V)	25.1 / 50.2	24.8 / 49.6	24 / 48
Low Battery Cut-In Voltage (V)	26 / 52	26 / 52	26 / 52

**Notes:**

- 1. Per PHI 3.5 kWh battery – Refer to the "AC Input Charger Limit" section for conversion method of DC to AC limits.
- 2. Per PHI 3.5 kWh battery – These settings are calculated by multiplying the nominal per battery value times the # of batteries. Refer to Charge Controller Bank Sizing under the "Battery Bank Sizing" section.
- Levels are typical @ 25C and may need adjusting at temperature extremes.
- When performing rapid deep charge/discharge cycles the battery should be allowed to "rest" 15 minutes in between.



**CAUTION:** When PHI battery quantities change, the capacity & charge/discharge current settings must be reassessed. Failure to do so will void the Warranty.

## 5.3.2 – Charge Controller Settings

Table 3.0

Charge Controller Settings	10k Cycles (80% DoD)	5k Cycles (90% DoD)	3.5k Cycles (100% DoD)
Absorb Voltage (V), Time	28 / 56, 0.1 hour	28.8 / 57.6, 0.1 hour	28.8 / 57.6, 0.1 hour
Float Voltage	27 / 54(default)		
Rebulk Voltage (V)	25.3 / 50.6		
DC Current Limit <sup>1</sup>	45A / 34A		
Absorb End Amps	0 (default)		

**Notes:**

- 1. Per PHI 3.5 kWh battery – These settings are calculated by multiplying the nominal per battery value times the # of batteries. Refer to Charge Controller Bank Sizing under the "Battery Bank Sizing" section.
- Levels are typical @ 25C and may need adjusting at temperature extremes.
- When performing rapid deep charge/discharge cycles the battery should be allowed to "rest" 15 minutes in between.

 **CAUTION:** When PHI battery quantities change, the capacity & charge/discharge current settings must be reassessed. Failure to do so will void the Warranty.

### 5.3.3 – Battery Monitor

Table 4.0

FLEXnet DC Settings	10k Cycles (80% DoD)	5k Cycles (90% DoD)	3.5k Cycles (100% DoD)
FNDC Battery Ah <sup>1</sup>	138Ah / 69Ah		
FNDC Charge Voltage (V)	27.6 / 55.2	28.2 / 57	28.2 / 57
FNDC Charged Return Amps	8A / 4A		
FNDC Battery Charge Factor	98%		
FNDC Relay Invert Logic	No		
FNDC Relay Voltage High/Low	High = 26.5/53, Low = 28.8/49.6		
FNDC Relay SOC High/Low	SOC High = 0%, SOC Low = 0%		
FNDC Relay Delay	High = 1, Low = 0		

**Notes:**

- 1. Per PHI 3.5 kWh battery – These settings are calculated by multiplying the nominal per battery value times the # of batteries. Refer to Charge Controller Bank Sizing under the “Battery Bank Sizing” section.
- Levels are typical @ 25C and may need adjusting at temperature extremes.
- When performing rapid deep charge/discharge cycles the battery should be allowed to "rest" 15 minutes in between.

 **CAUTION:** When PHI battery quantities change, the capacity & charge/discharge current settings must be reassessed. Failure to do so will void the Warranty.

### 5.3.4 – MATE3/MATE3S Settings

Table 5.0

MATE3 / MATE3s Settings	10k Cycles (80% DoD)	5k Cycles (90% DoD)	3.5k Cycles (100% DoD)
FLEXnet DC Advanced Control	Low SOC Warning = 20%		
FLEXnet DC Advanced Control	Critical SOC Warning = 10%		

**Notes:**

- Levels are typical @ 25C and may need adjusting at temperature extremes.
- When performing rapid deep charge/discharge cycles the battery should be allowed to "rest" 15 minutes in between.

 **CAUTION:** When PHI battery quantities change, the capacity & charge/discharge current settings must be reassessed. Failure to do so will void the Warranty.

### 5.3.5 – PHI 3.5 Voltage Reference of Battery State of Charge

Figure 6.0 and Table 5.0 below depict the typical voltage levels (VDC) for the PHI 3.5 Battery at various states of charge.

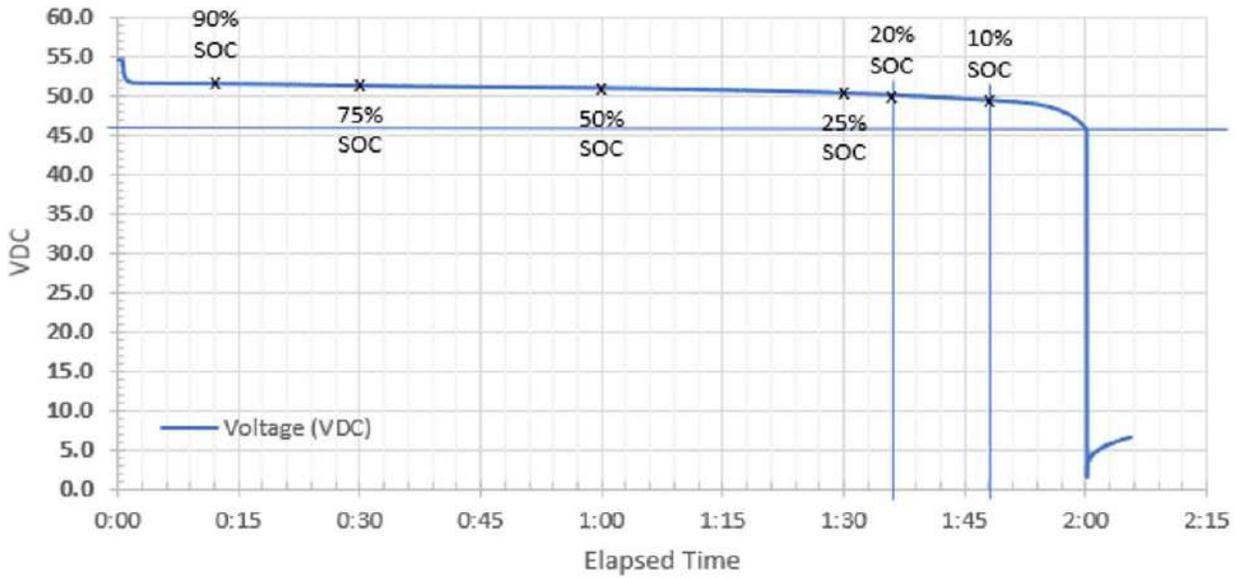


Figure 6.0 – PHI 3.5 C/2 Discharge Curve (typical)

Table 5.0

SOC	Voltage*
100%	> 52.50 V
95%	51.70 V
90%	51.65 V
75%	51.40 V
50%	51.00 V
20%	50.20 V
10%	49.50 V
0%	46.00-48.00 V

\*Levels typical @ C/2

## 6.0 – SimpliPhi Technical Support

For technical support related to your AccESS, please contact us as follows:

805.640.1874

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