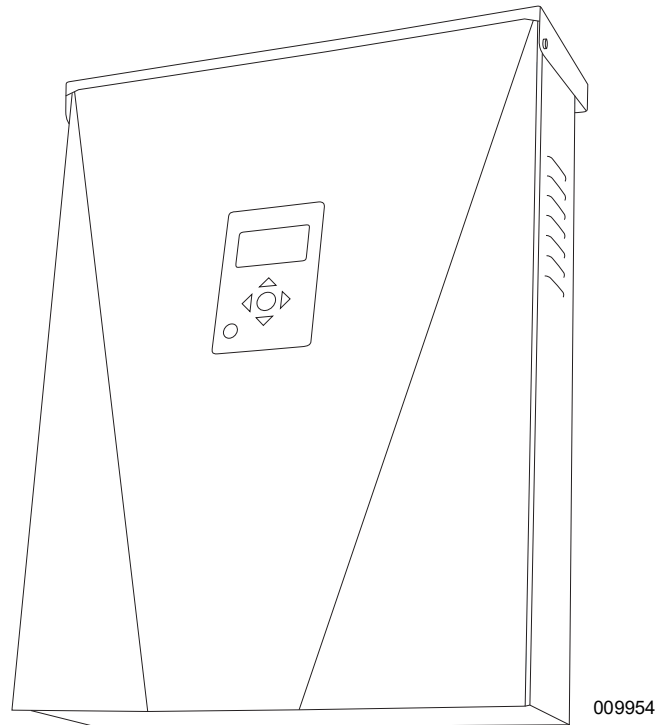


Installation and Owner's Manual

Generac PWRcell® Inverters
XVT076A03



WARNING

Loss of life. This product is not intended to be used in a critical life support application. Failure to adhere to this warning could result in death or serious injury. (000209b)

Register your Generac product at:

<https://pwrfleet.generac.com>

1-888-GENERAC
(888-436-3722)

Para español, visita: <http://www.generac.com/service-support/product-support-lookup>

Pour le français, visiter: <http://www.generac.com/service-support/product-support-lookup>

SAVE THIS MANUAL FOR FUTURE REFERENCE

Use this page to record important information about your Generac Product

Record the information found on your unit data label on this page. See .

When contacting an Independent Authorized Service Dealer (IASD) or Generac Customer Service, always supply the complete model number and serial number of the unit.

Table 1: PWRcell Inverter Important Information

Unit Model Number	
Unit Serial Number	
Date Purchased	
Commissioning Date	

 **WARNING**

CANCER AND REPRODUCTIVE HARM

www.P65Warnings.ca.gov

(000393a)

Table of Contents

Section 1: Safety Rules & General Information

Introduction	1
Read This Manual Thoroughly	1
Safety Rules	1
How to Obtain Service	1
General Hazards	2
PVRSE Warning	2
PVHCE/PVHCS Warning	3
Electrical Hazards	3

Section 2: General Information

Specifications	5
Serial Number Location	6
Unit Dimensions	6
Component Locations	6
About PWRcell Inverters	6
Inverter Control Panel	7
REbus Status LED	7
Inverter Status LED	7
Internet Status LED	7
Shutdown Mode	8

Section 3: Location and Standards

Location	9
Standards	9
Immunity	9
Photovoltaic Rapid Shutdown	10
PVRSS Initiation	10
PVRSS Self-Test	11
Photovoltaic Hazard Control	11
Voltage and Frequency Trip Settings	12
Voltage Trip	12
Frequency Trip	12

Section 4: Installing PWRcell Inverter

Mounting Clearances	13
Mounting Bracket Dimensions	13
Mounting the Inverter	14

Section 5: Electrical Connections

Accessing Wiring Compartment	15
PWRcell Inverter Wiring Compartment	15
Wiring Guidelines	17
Grounding Bar Wiring	17
DC Wiring	18
STOP Terminal Wiring	18
For PV only installations without a PWRcell Battery:	18
For Installations with a PWRcell Battery:	18
AC Wiring	19
Partial Home Backup	20
Managed Whole Home Backup	22
AC Generator Integration	24
PWRcell ATS Controller Upgrade Kit	25
Connecting Ethernet	25
Configuring Static IP Settings	25
Verifying Connectivity	26
Current Transformers (CTs)	27
Locating Current Transformers	27
Connecting CTs to the Inverter	28
Connecting Multiple Sets of CTs	28
Connecting CTs to Multiple PWRcell Systems /Inverters	28
CT Calibration	29
Other Equipment	31
PWRcell ATS	31
Load Management Options	31
LTE Modem Kit	32
Revenue Grade Meter (RGM) Kit	32

Section 6: Commissioning

Before You Start: 33

Commissioning Overview 33

Commissioning Steps 33

Turn on AC Power to Inverter 33

Check AC Voltages 33

Verify Internet Connection 34

Register System 34

Select Inverter System Mode 34

Configure Inverter Settings and Enable Inverter 35

Configure Rebus Devices and Enable REbus
Devices 39

Test Island Mode 39

Advanced Commissioning Steps 39

Configure Time of Use 39

Access Installer Configuration Tool 43

Set Inverter Grid Compliance 44

Set Import / Export Compliance 45

Commissioning Multiple Inverter Systems 47

Multiple Inverter System Pre-Commissioning
Checklist 47

Multiple Inverter System Commissioning Procedure 47

How to identify PLM Crosstalk 48

PLM Crosstalk Recovery Procedure 48

Section 7: System Operation

General Information 49

Operation and User Interface 49

Home Screen 49

Home Screen Icons 49

Activating the System Post Permission to Operate (PTO) 50

Activating Post PTO: System Operating 50

Activating Post PTO: System Disabled 50

Confirm Inverter Settings 52

PV Only System 52

PV + Battery w / a Protected Loads Subpanel for Partial
Home Backup 52

PV + Battery w / a PWRcell ATS and Load Management
for Managed Whole Home Backup 53

System Modes Overview 54

Grid Tie 54

Self Supply 54

Clean Backup 55

Priority Backup 55

Remote Arbitrage 56

Sell 56

Island Mode 56

AC Generator Control Modes 57

AC Generator Manual Override 57

To perform an AC Generator Manual Override 57

Automatic Generator Override Conditions 58

Section 8: Maintenance

Service 59

Accessing Wiring Compartment 59

Replacing Fuses 59

Annual Maintenance 60

Inspecting Vents 60

Cleaning Intake Filter 60

Section 9: Troubleshooting

General Troubleshooting 61

Overload Behavior 62

Section 10: Appendix A

**Grid Support Functions: Parameter Values and
Range of Adjustability** 67

Section 1: Safety Rules & General Information

Introduction

Thank you for purchasing a Generac PWRcell® product. The Generac PWRcell Inverter is a storage-ready inverter that connects to the PV Link™ optimizers and PWRcell Batteries to form the Generac PWRcell system.

This manual provides instructions for installing the PWRcell Inverter, including mounting, wiring, and battery integration information.

The information in this manual is accurate based on products produced at the time of publication. The manufacturer reserves the right to make technical updates, corrections, and product revisions at any time without notice.

Read This Manual Thoroughly



Consult Manual. Read and understand manual completely before using product. Failure to completely understand manual and product could result in death or serious injury. (000100a)

If any section of this manual is not understood, contact the nearest Independent Authorized Service Dealer (IASD) or Generac Customer Service at 1-888-436-3722 (1-888-GENERAC), or visit www.generac.com for assistance. The owner is responsible for correct maintenance and safe use of the unit.

This manual must be used in conjunction with all other supporting product documentation supplied with the product.

SAVE THESE INSTRUCTIONS for future reference. This manual contains important instructions that must be followed during placement, operation, and maintenance of the unit and its components. Always supply this manual to any individual that will use this unit, and instruct them on how to correctly start, operate, and stop the unit in case of emergency.

Installation and commissioning of a PWRcell system should be performed after obtaining the necessary approvals and permitting from local authorities and utility.

Safety Rules

The manufacturer cannot anticipate every possible circumstance that might involve a hazard. The alerts in this manual, and on tags and decals affixed to the unit, are not all inclusive. If using a procedure, work method, or operating technique that the manufacturer does not specifically recommend, verify that it is safe for others and does not render the equipment unsafe.

Throughout this publication, and on tags and decals

affixed to the unit, DANGER, WARNING, CAUTION, and NOTE blocks are used to alert personnel to special instructions about a particular operation that may be hazardous if performed incorrectly or carelessly. Observe them carefully. Alert definitions are as follows:



Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

(000001)



Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

(000002)



Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

(000003)

NOTE: Notes contain additional information important to a procedure and will be found within the regular text of this manual.

These safety alerts cannot eliminate the hazards that they indicate. Common sense and strict compliance with the special instructions while performing the action or service are essential to preventing accidents.

How to Obtain Service

For assistance, contact the nearest Independent Authorized Service Dealer (IASD) or Generac Customer Service at 1-888-436-3722 (1-888-GENERAC), or visit www.generac.com.

When contacting an IASD or Generac Customer Service, always supply the complete model and serial number of the unit as given on its data decal located on the unit. Record the model and serial numbers in the spaces provided on the front cover of this manual.

General Hazards



⚠ DANGER

Electrocution. Do not wear jewelry while working on this equipment. Doing so will result in death or serious injury.

(000188)

⚠ DANGER

Automatic start-up. Disconnect utility power and render unit inoperable before working on unit. Failure to do so will result in death or serious injury.

(000191)



⚠ WARNING

Electrocution. Potentially lethal voltages are generated by this equipment. Render the equipment safe before attempting repairs or maintenance. Failure to do so could result in death or serious injury.

(000187)

⚠ WARNING

Risk of injury. Do not operate or service this machine if not fully alert. Fatigue can impair the ability to operate or service this equipment and could result in death or serious injury.

(000215a)



⚠ WARNING

Loss of life. This product is not intended to be used in a critical life support application. Failure to adhere to this warning could result in death or serious injury.

(000209b)

⚠ WARNING

Equipment damage. Connecting inverter to electric utility grid must only be done after receiving prior approval from utility company. Failure to do so could result in equipment or property damage.

(000640)

⚠ WARNING

Electric shock. Only a trained and licensed electrician should perform wiring and connections to unit. Failure to follow proper installation requirements could result in death, serious injury, and equipment or property damage.

(000155a)

⚠ WARNING

Equipment damage. Only qualified service personnel may install, operate, and maintain this equipment. Failure to follow proper installation requirements could result in death, serious injury, and equipment or property damage.

(000182a)

⚠ CAUTION

Equipment damage. Connect only to REbus-compatible devices to the DC bus. Never connect to any other DC power source. Connecting to other DC power sources could result in equipment damage.

(000598a)

- PWRcell system is required to be connected to a 120/240 VAC 1-Phase (Wye) utility grid. Connecting the PWRcell Inverter to the electric utility grid must only be done after receiving prior approval from the utility company.
- Generac does not currently support autonomous, off grid installations with PWRcell equipment. If this installation is in Canada, the installation shall be in accordance with the Canadian Electrical Code, Part I.
- Only competent, qualified personnel should install, operate, and service this equipment. Strictly comply to local, state, and national electrical and building codes. When using this equipment, comply with regulations established by the National Electrical Code (NEC), CSA Standard, and the Occupational Safety and Health Administration (OSHA), or the local agency for workplace health and safety.
- Protection against lightning surges in accordance with local electric codes is the responsibility of the installer.

NOTE: Lightning damage is not covered by warranty.

- Never work on this equipment while physically or mentally fatigued.
- Any voltage measurements should be performed with a meter that meets UL3111 safety standards, and meets or exceeds overvoltage class CAT III.

PVRSE Warning

This photovoltaic rapid shutdown equipment (PVRSE) does not perform all of the functions of a complete photovoltaic rapid shutdown system (PVRSS). This PVRSE must be installed with other equipment to form a complete PVRSS that meets the requirements of NEC (NFPA 70) section 690.12 for controlled conductors outside the array. Other equipment installed in or on this photovoltaic (PV) system may adversely affect the operation of the PVRSS. It is the responsibility of the installer to ensure that the completed PV system meets the rapid shutdown functional requirements. This equipment must be installed according to the manufacturer's installation instructions.

Follow all instructions included in this manual and use appropriate practices for all product wiring and installation.

PVHCE/PVHCS Warning

The XVT076A03 inverter may be installed as part of a PVHCS to meet the requirements of NEC 690.12.

Replacing any equipment connected to this system may compromise the PVHCS. Only PVHCE certified PV Links may be used to replace PV Links installed in a PVHCS. Only PVHCE certified PWRcell Inverters may replace inverters installed in a PVHCS. The replacement of any other system component noted in the PWRcell PVHCS Instructions must carry the same or better ratings and certifications.

Electrical Hazards



⚠ DANGER

Electrocution. Water contact with a power source, if not avoided, will result in death or serious injury.

(000104)



⚠ DANGER

Electrocution. PWRcell Battery front cover should be removed by a qualified technician only. Removing the front cover could result in death, serious injury, equipment or property damage.

(000604)



⚠ DANGER

Electrocution. In the event of electrical accident, immediately shut power OFF. Use non-conductive implements to free victim from live conductor. Apply first aid and get medical help. Failure to do so will result in death or serious injury.

(000145)



⚠ DANGER

Electrocution. Turn battery disconnect OFF and de-energize REbus before touching terminals. Failure to do so will result in death, serious injury, equipment and property damage.

(000599)



⚠ DANGER

Electrocution. Verify electrical system is properly grounded before applying power. Failure to do so will result in death or serious injury.

(000152)

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Section 2: General Information

Specifications

Description	Units	XVT076A03
Max. cont. grid-tied AC power @ 122°F (50°C)	kW	7.6
Max. cont. AC power in island mode w/ external transfer switch and single 6 module battery cabinet ²	kW	9.0
Max. cont. AC power in island mode w/ external transfer switch and 2 battery cabinets (8 modules minimum) ¹	kW	11.0
Peak motor starting current (2 sec)	A rms	50
Normal output frequency AC	Hz	60
Grid Voltage Line to Neutral (L-N)	VAC	120
Grid Voltage Line to Line (L-L)	VAC	240
Peak efficiency	%	97.3
Optimal split phase imbalance for max. system performance	%	≤ 30
CEC weighted efficiency	%	96.5
AC terminals wire size	AWG	8 to 6
DC terminals wire size	AWG	10 to 6
STOP terminals wire size	AWG	20 to 14
Normal Operating Performance Category	-	Category B
Abnormal Operating Performance Category	-	Category III
Weight	lb (kg)	70.9 (32.1)
Thermal management	-	forced convection
Weatherization rating	-	NEMA Type 3R
Enclosure Material	-	powder-coated steel

Description	Units	Min	Nominal	Max
REbus voltage	V dc	360	380	420
REbus current	A dc			30 [†]
REbus input short circuit current ²	A dc			30
Max input circuit backfeed current (fault condition)	A dc			0
Output power factor rating AC (25%, 50%, 100% of rated power)	-	0.96	0.98	0.99
Operating voltage range AC, XVT076A03 / (L-N)	V rms	106	120	132
Operating voltage range AC, XVT076A03 / (L-L)	V rms	212 ⁴	240	264
Continuous output current AC grid-tied	A rms			32
Output controlled current AC grid-tied	A rms	0		32
Continuous output current AC islanded	A rms			45
Synchronization Inrush Current	A rms/p-p			32.1 / 94.83
Output fault current duration	A / ms		50 / 2,000	
Protected Loads output overcurrent protection	A			50
Full Power operating ambient temperature range ³	°F (°C)	-4 (-20)		+122 (+50)
Trip voltage and frequency limits	See Voltage and Frequency Trip Settings			
Measurement and Calculation Accuracy	See Table 2-1 .			

¹ Peak performance, values provided for 104° F (40° C)

² Rating for one DC input. Four total.

³ Includes ambient temperature rising from inverter operation.

⁴ Minimum voltage before disconnection is subject to UL 1741-SB low voltage ride-through and regional configurations requirements. Per requirements, the inverter shall perform required low voltage ride-through operation for one second. If required as specified by an Electric Utility, the inverter may continue in operation past one second so long as the line-to-line voltage is greater than 40 Vrms

[†]Inverter limits its REbus current to adhere to its AC power rating. Total REbus current capability from multiple REbus sources may safely exceed this value as the inverter safely limits the amount utilized.

Table 2-1. Measurement and Calculation Accuracy^{a,c}

Parameter	Steady-state measurements			Transient measurements		
	Measurement Accuracy	Measurement Window	Range	Measurement Accuracy	Measurement Window	Range
Voltage, RMS	± 1.2 V (1%)	10 cycles	60 V - 144 V	± 2.4 V (2%)	5 cycles	60 V - 144 V
Frequency ^b	10 mHz	60 cycles	50 Hz - 66 Hz	100 mHz	5 cycles	50 Hz - 66 Hz
Active Power	± 380 W (5%)	10 cycles	1,520 W - 7,600 W	Not required	N/A	N/A
Reactive Power	± 285 var (5%)	10 cycles	1,140 - 5,700 var	Not required	N/A	N/A
Time	1% of measured duration	N/A	5 s to 600 s	2 cycles	N/A	100 ms < 5 s

^aFor voltage THD < 2.5% and individual voltage harmonics < 1.5%

^bFor when the fundamental voltage is greater than 30% of the nominal voltage

^cFor Normal Ramp Rate accuracy, see [Table 10-1](#)

Serial Number Location

Refer to [Figure 2-2](#) to locate unit serial number (D). Record the information from the product nameplate in [Table 1: PWRcell Inverter Important Information](#) on the inside front cover of this manual.

Unit Dimensions

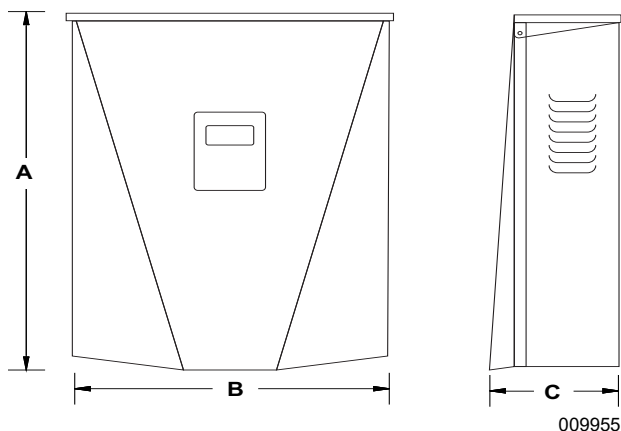


Figure 2-1. Unit Dimension

- A** 24-3/4 in (628 mm)
- B** 19-3/8 in (491 mm)
- C** 8-3/8 in (214 mm)

Component Locations

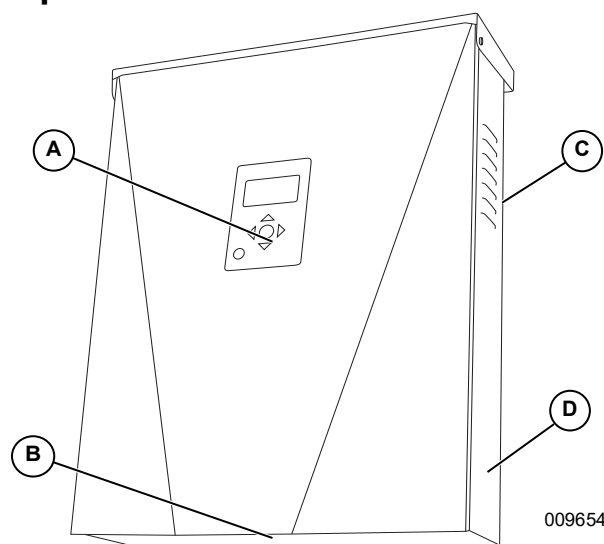


Figure 2-2. Component Locations

- A** Control Panel
- B** Intake Filter
- C** Exhaust Vent
- D** Nameplate

About PWRcell Inverters

The PWRcell Inverter connects PV Link™ optimizers and PWRcell Batteries to form the PWRcell system for grid-interactive solar-plus-storage. Upon the loss of utility grid power, the PWRcell Inverter disconnects from the grid and provides AC power to support protected loads when configured to do so with PWRcell ATS. This capability is referred to as Island Mode. For more information, see [Island Mode](#) in [Section 7: System Operation](#).

PWRcell Inverter uses the REbus™ 380 VDC nanogrid to connect DC-coupled PWRcell devices. The REbus nanogrid automates and regulates the flow of power to enable plug-and-play setup and operation of PWRcell equipment. For more information about REbus, visit www.generac.com. In [Figure 2-3](#), the PWRcell Inverter (E) is directly connected to PV Link optimizers (B) and PWRcell Battery (C) on DC (REbus) lines (D). To the right of the inverter are AC lines for the Grid (F), home loads (G), PWRcell ATS (H), and backup loads (J).

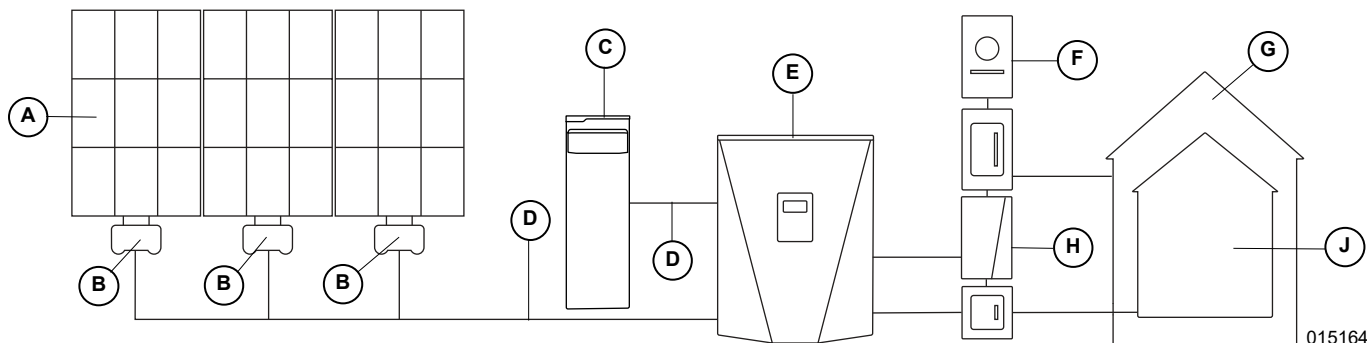


Figure 2-3. Generac PWRcell System Example

- A** Solar Panels
- B** PV Link
- C** PWRcell Battery
- D** REbus
- E** PWRcell Inverter
- F** Grid
- G** ATS
- H** Loads
- J** Backup Loads

Inverter Control Panel

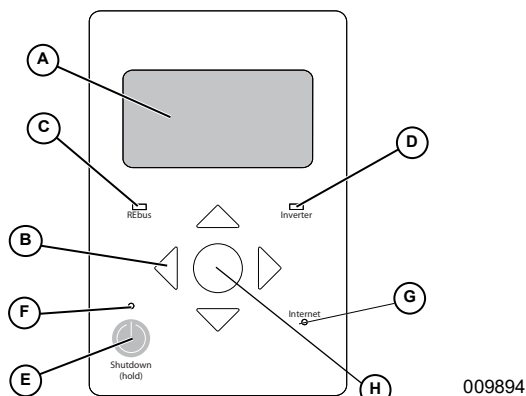


Figure 2-4. Inverter Control Panel

- A** LCD Display
- B** Navigation Keys
- C** REbus Status LED
- D** Inverter LED
- E** Shutdown Button
- F** Shutdown LED
- G** Internet LED
- H** Select

See [Figure 2-4](#). The PWRcell system is controlled through the PWRcell Inverter control panel. The inverter control panel is used for adjusting system settings and for interacting with devices.

REbus Status LED

REbus Status LED (C) communicates REbus nanogrid status through LED color.

LED Color	REbus Status
Green	All devices are enabled and functioning normally on REbus.
Yellow	One or more devices are disabled, or no devices are detected.
Red	A serious fault has been detected on a device or the REbus wiring.

Inverter Status LED

Inverter LED (D) communicates the status of the utility grid and / or inverter through LED color and state.

LED Color	Inverter Status
Green	Utility is connected and within normal operational voltage and frequency.
Green Blinking	Inverter is in Island Mode due to a utility service interruption. Utility is not within normal operational voltage and frequency.
Yellow	Inverter is disabled or powering up.
Yellow Blinking	Inverter is waiting to connect to the grid, in the process of connecting to REbus, or waiting to connect to REbus.
Red	Inverter is overloaded, or a serious fault has been detected on the inverter. Manual intervention is likely required before the equipment will resume operation.
No Light	Inverter is powered down.

Internet Status LED

Internet LED (G) is illuminated when the inverter has a connection to the Generac server. Internet LED (G) will slowly strobe when REbus Beacon is updating its firmware.

LED Color	Internet Status
Blue	Internet connected
Blue Strobing	Internet connected and Beacon firmware auto-update is in progress. Note: Do not power off the inverter or unplug REbus Beacon while update is in progress.
No Light	Not internet connected.

Shutdown Mode



⚠ DANGER

Electrocution. Initiate a system-wide shutdown and turn the PWRcell DC Disconnect Switch OFF on all connected batteries before performing service. Failure to do so will result in death, serious injury, or equipment and property damage. (000600)

NOTE: A loss of grid power will not de-energize REbus in a PWRcell system configured to enter Island Mode with enabled energy storage.

Shutdown button (E) activates a transition to shutdown mode.

Disabled PWRcell equipment limits output voltages to a safe level for servicing.

After pressing the Shutdown button and entering Shutdown Mode, the AC section of the inverter will still be powered, unless there is an active utility service interruption, or the AC solar backfeed breaker, AC solar disconnect, building AC disconnect, or main service breaker is shut off.

To enter shutdown, press and hold shutdown button (E).

In shutdown mode:

- The PWRcell Inverter will stop sourcing power to REbus, and immediately disable all communicating power sources on REbus by sending a system-wide system mode change signal.

NOTE: Successful signal transmission relies upon proper configuration of PLM channels across REbus devices (PV Links and Batteries).

- Shutdown LED (F) will illuminate.
- Inverter screen (A) will display REbus DC bus voltage and text indicating Shutdown mode has been initiated.

To exit shutdown, follow the prompts provided on the LCD screen.

Section 3: Location and Standards

Location

When installing the PWRcell Inverter, consider the following:

- The inverter installation location must meet the working space requirements in NEC Article 110.26.
- The unit can be installed in indoor or outdoor locations.
- If installing indoors, an external switch must be installed to be the PV rapid shutdown initiator, or additional DC disconnects must be sourced and installed on the PV circuits. See [Photovoltaic Rapid Shutdown](#) for more information.
- If installing outdoors, mount the unit near the utility service entrance to allow the inverter DC disconnects to be the compliant PV rapid shutdown initiators. See [Photovoltaic Rapid Shutdown](#) for more information.
- If using the inverter DC disconnects as the compliant PV rapid shutdown initiator(s), verify the height of the DC disconnects in the inverter do not exceed 6' 7" (2 m) to comply with NEC Article 404.8(A).
- Ensure proper labeling of PV equipment and add placards where necessary to indicate location of PV disconnects.
- If possible, avoid mounting locations where the inverter may be subject to direct sunlight or where liquids may be prone to drip/collect.

Standards

DANGER

Loss of life. Property damage. Installation must always comply with applicable codes, standards, laws and regulations. Failure to do so will result in death or serious injury. (000190)



WARNING

Electrocution. Refer to local codes and standards for safety equipment required when working with a live electrical system. Failure to use required safety equipment could result in death or serious injury. (000257)

WARNING

Equipment damage. Only qualified service personnel may install, operate, and maintain this equipment. Failure to follow proper installation requirements could result in death, serious injury, and equipment or property damage. (000182a)

The PWRcell Inverter is designed and evaluated to the following standards:

- * UL 1741:2021 Ed.3
- * UL 1741:2021 Ed 3 (Supplement SA)
- * UL 1741:2021 Ed.3 (Supplement SB)
 - IEEE 1547:2018
 - IEEE 1547.1:2020
 - IEEE 1547a-2020
- * CSA C22.2#107.1:2016 Ed.4

NOTE: Refer to the latest version of this manual for the most current product listings.

Immunity

Immunity testing was conducted in accordance with: IEEE C62.41.2:2002, IEEE C62.45:2002, and IEEE C37.90.2:2004 per IEEE 1547.1:2018, and IEEE 1547.1:2020.

Surge withstand capability, as per IEEE C62.41.2:2002 COR 2012 and IEEE C62.45:2002, was shown to meet the following levels when applied to the AC Mains and Ethernet terminals:

- * 1.2x50µsec Combination: ±6kV
- * 200A 100kHz Ringwave: ±6kV
- * EFT: ±3kV

Note on DC Wiring and the NEC

Some electricians or installers may be unfamiliar with DC wiring in a residential setting. Note the following:

- NEC 690.31 for DC PV circuits in buildings
- NEC 215.12(C)(2) for correct DC wiring identification

Always adhere to applicable codes when marking and installing DC conductors. See [Table 3-1: REbus DC Wiring Coloring Convention](#). Mark or flag all conductors for their polarity as appropriate.

Table 3-1. REbus DC Wiring Coloring Convention

Wire	Color
REbus + (RE+)	Red
REbus - (RE-)	Black
Ground (GND)	Green

- It is recommended that REbus (+) conductors NOT be green, white, gray, blue, or black.
- It is recommended REbus (-) conductors NOT be green, white, gray, or red.

Photovoltaic Rapid Shutdown

The PV Link, SnapRS, and PWRcell Inverter are certified as Photovoltaic Rapid Shutdown Equipment (PVRSE). Review [Table 3-2: PVRSS Requirements and PWRcell PVRSE](#) to determine what PWRcell equipment is required to constitute an effective Photovoltaic Rapid Shutdown System (PVRSS). Refer to **Generac PV Link & SnapRS Installation manual** for more information on proper installation of those devices including commissioning instructions.

Table 3-2. PVRSS Requirements and PWRcell PVRSE

NEC Adoption	PVRSS Requirements (NEC 690.12)	Required PWRcell PVRSE*
2011 or older	No PVRSS requirements.	N/A
2014	Controlled conductors leaving array limited to not more than 30 volts within 10 seconds of rapid shutdown initiation.	Generac PV Link(s)
2017, 2020 and follows	Controlled conductors leaving array limited to not more than 30 volts within 30 seconds of rapid shutdown initiation. Controlled conductors located inside the array boundary (or not more than 1 m (3ft) from the point of penetration of the surface of the building) shall be limited to not more than 80 volts within 30 seconds of rapid shutdown initiation.	Generac PV Link(s), Generac SnapRS (one per PV module)

*Depending on approved method used, the PVRSS may include the Generac PWRcell Inverter but the inverter is not required for an effective PVRSS.

Following PV rapid shutdown initiation, controlled conductors will be brought within the limits defined in NEC 690.12 as described in [Table 3-2](#) above. The controlled conductors include:

- REbus conductors connecting PV Link(s) to the PWRcell Inverter (conductors leaving the array).
- PV conductors between modules in PV Link PV substring (conductors inside the array boundary).

NOTE: AC conductors exiting and entering the inverter are not considered controlled conductors for this application.

NOTE: Depending on the installation conditions (panel type, ambient temperature, etc.), leakage current methods detailed in UL 1703, Section 21 may be used to indicate compliance with the stated limits as permitted by UL 1741, Section 93.1.2.

PVRSS Initiation

There are three approved methods for initiating PV rapid shutdown with PWRcell equipment. Each method effectively disconnects the PV input circuits from the inverter's internal DC bus. This disconnection is detected by the PV Links, which in turn interrupt the PV source circuits. Interruption of the PV source circuits opens SnapRS devices, isolating PV modules within the array. All three methods are considered suitable for installations where the inverter is located outside of a one-family or two-family dwelling. In most situations, only Method 2 (external switch) or Method 3 (installer-sourced DC disconnect) will be appropriate for installations where the Inverter is located inside of a one-family or two-family dwelling (where the external device is located outside of the dwelling near the utility service entrance). Appropriate signage and/or markings in compliance with NEC 690 must be provided by the installer.

Method 1 - PVRSS initiation via PWRcell Inverter DC disconnect(s) (outdoor installations)

1. Open the inverter lid.
2. Locate the PWRcell DC disconnects located to the left of the Generac Power Core.
3. Turn DC disconnects connected to PV sources to the OFF position.

Method 2 - PVRSS initiation via external switch connected to inverter STOP terminals (indoor and outdoor installations)

NOTE: If installation includes a PWRcell Battery, the battery must be equipped with external STOP terminals. Battery STOP terminals must be wired in series or parallel to the inverter STOP terminals. See **PWRcell Battery Installation & Owner's Manual** for more details.

1. A UL listed, 12 VDC, 5 mA, lockable, weatherproof switch must be connected to the STOP terminals to use this method.

- a. The switch must indicate ON and OFF positions, where the OFF position opens the STOP terminal circuit. STOP circuit terminals are normally closed.
2. Turn switch to the OFF position.
3. Upon initiation, the inverter display will read “Shutdown Initiated”.

See [Section 5: Electrical Connections STOP Terminal Wiring](#) for installation instructions.

Method 3 - PVRSS initiation via installer-sourced DC disconnect(s) (indoor and outdoor installations)

1. A UL listed, lockable, weatherproof DC disconnect rated for at least 420 VDC and 30 A must be installed between the PV conductors leaving the junction box and the inverter DC inputs.
 - a. The switch must indicate ON and OFF positions, where the OFF position opens the PV circuit.
2. Turn DC disconnects to the OFF position.

NOTE: This equipment shall be installed and operated in an environment within the ratings and limitations of the equipment as published in these installation instructions.

PVRSS Self-Test

After commissioning, a PVRSS self-test can be performed to validate the functionality of the PVRSS using one of the methods described above. Alternatively, functionality of the PVRSS can be validated for a substring using the following instructions.

1. On the PWRcell Inverter control panel, press the right arrow key until the first PV Link device page appears.

NOTE: The device page display should read Disabled. If it does not read Disabled, press the center button and disable the PV Link.

2. Press the center button and select “Test PVRSS” to enter the ‘Testing PVRSS’ state. The display indicates ‘Testing PVRSS’ during the test process, which can take up to three minutes. Upon successful completion, the display will read ‘Test Success’.

Photovoltaic Hazard Control



Read Instructions. To reduce the risk of injury, read all instructions. Failure to do so could result in death or serious injury.

(000786)

2020 and 2023 NEC

The 2020 and 2023 NEC have multiple available methods for meeting rapid shutdown requirements within the array boundary in section 690.12. One option is to deploy a listed PV hazard control system (PVHCS). The S2502HC PV Link and the PWRcell Inverter are both UL 3741 listed PVHCE.

When installed in accordance with the guidelines provided in this section, the PWRcell Inverter and S2502HC PV Link, in combination with properly rated solar panels (see requirements below), and optionally, a properly rated external STOP switch (see requirements below) form a comprehensive PVHCS, compliant with the requirements of NEC 690.12(B)(2). PVRSS functionality is retained for conductors leaving the array boundary in accordance with NEC 690.12(B)(1).

When a rapid shutdown is initiated (see [Photovoltaic Rapid Shutdown](#)), the properly installed PVHCS will ensure hazards within the array are sufficiently reduced in accordance with UL 3741. The rapid shutdown initiator performs the PVHCE initiation, and must be installed in accordance with requirements for rapid shutdown initiators per the NEC and per the additional requirements in [Table 3-3: Required PVHCE Equipment and Component Ratings](#).

Refer to the S2502HC installation manual for instructions on how to design the array in accordance with PVHCS requirements.

Required PVHCE Equipment and Component Ratings

The equipment listed in the following table must be installed in accordance with the manufacturers installation instructions in order to establish a UL 3741 listed PVHCS. Entries that contain the text “(optional)” are not required to establish a listed PVHCS, but must meet the listed rating requirements if they are used as part of the PVHCS.

Table 3-3. Required PVHCE Equipment and Component Ratings

Required Device	Manufacturer	Model	Required Ratings/Listings
PV Link	Generac Power Systems Inc.	S2502HC	Max input voltage < 165 VDC, Type 4X rated, Operating Temperature Range -20°C to 70°C, Rapid Shutdown Device Compatible.
Inverter	Generac Power Systems Inc.	XVT076A03	Max Power: 7600 W. Type 3R rated, Operating Temperature Range -20°C to 50°C. Not for roof mount.
PV Modules	Various	Various	Series connected panels with NEC temperature corrected maximum Voc < 165 VDC, listed to UL 1703 and/or UL 61730-1 and UL 61730-2 (excluding Class 0 and Class 1)
External STOP Switch (optional)	Various	Various	Type 3R rated. Operating Temperature Range Range 40°C to 60°C, 12 VDC, 5 mA. Not for roof mount.

Voltage and Frequency Trip Settings

The PWRcell Inverter ships from the factory in compliance with UL 1741. The inverter nameplate ([Figure 2-2](#)) specifies compliance with applicable UL 1741 Supplements (e.g. UL 1741-SA, UL 1741-SB). A PWRcell Inverter compliant with UL 1741-SA is shipped with default settings per IEEE 1547-2003. A PWRcell Inverter compliant with UL 1741-SB (at minimum; may also include UL 1741-SA) is shipped with default settings per IEEE 1547-2018. A list of the default values and range of adjustability for UL 1741 SB tested functions is found in [Table 10-1](#). Where local Electric Utility requirements for smart inverters specify non-default inverter settings (per the locally adopted grid standard), follow the steps in the [Set Inverter Grid Compliance](#) section of this manual.

NOTE: Use of Grid Profiles in compliance with local Electric Utility smart inverter requirements may exceed the tested setting range(s) and/or have default activation states for grid support functions conflicting with UL 1741-SB.

Voltage Trip

See [Table 3-4](#) and [Table 3-5](#) for the default fixed voltage trip settings. All over voltage and under voltage trip conditions result in a 300-second restart delay time after the trip setting has been exceeded for the listed clearing time.

The inverter is disconnected from the grid during this 300-second delay.

Frequency Trip

See [Table 3-4](#) and [Table 3-5](#) for the default fixed frequency trip settings. All over frequency and under frequency trip conditions result in a 300-second restart delay time after the trip setting has been exceeded for the listed clearing time.

The inverter is disconnected from the grid during this 300-second delay.

Table 3-4. Voltage and Frequency Trip Default Settings (UL 1741-SA)*

Voltage Trip			Frequency Trip		
Trip Function	Voltage (% of nominal)	Clearing Time (s)	Trip Function	Frequency (Hz)	Clearing Time (s)
OV2	120	0.16			
OV1	110	1	OF1	60.5	0.16
UV1	88	2	UF1	59.3	0.16
UV2	50	0.16			

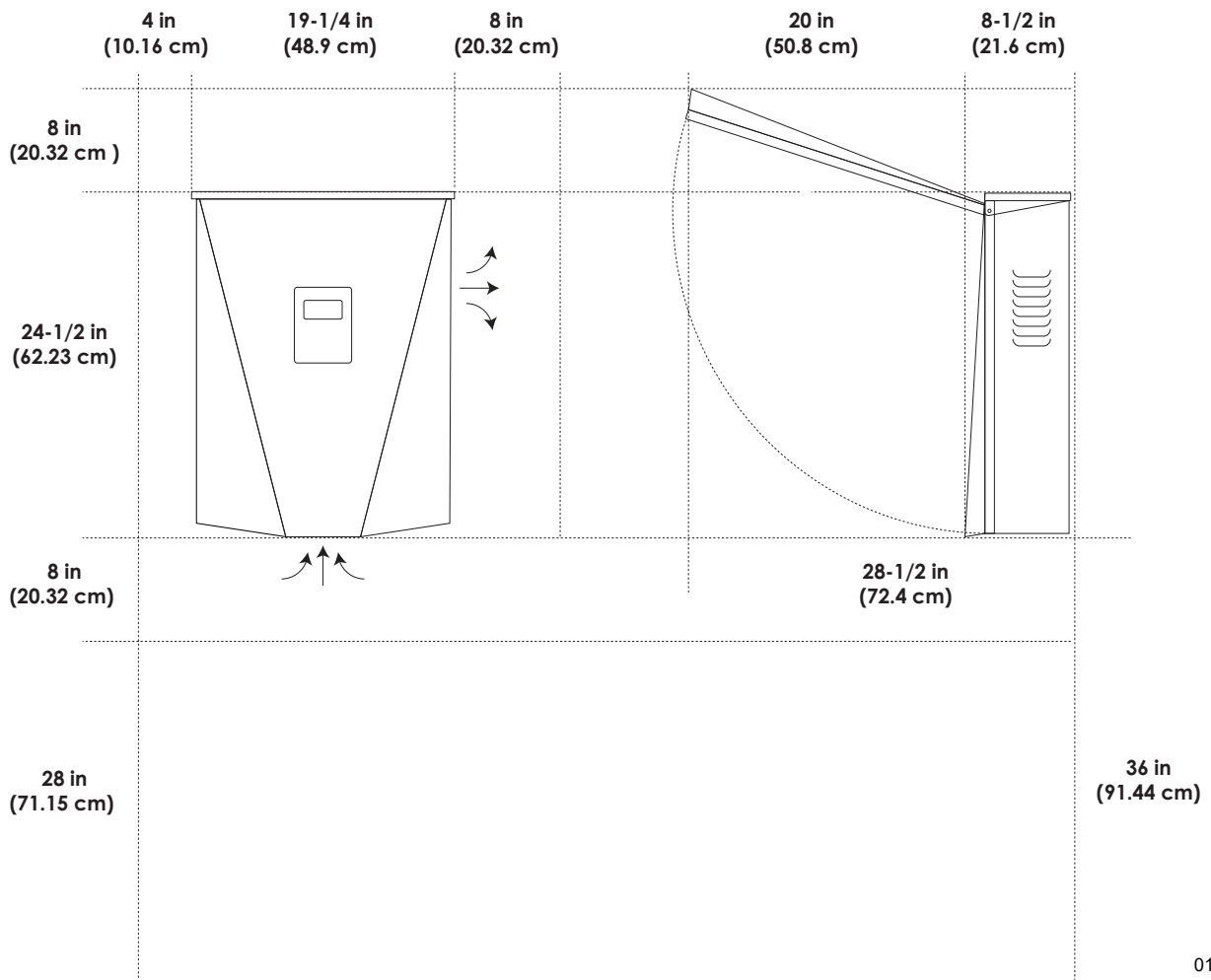
*This unit or system is provided with fixed trip limits and shall not be aggregated above 30 kW on a single point of common coupling.

Table 3-5. Voltage Trip and Frequency Trip Default Settings (UL 1741-SB)

Voltage Trip			Frequency Trip		
Trip Function	Voltage (% of nominal)	Clearing Time (s)	Trip Function	Frequency (Hz)	Clearing Time (s)
OV2	120	0.16	OF2	62	0.16
OV1	110	13	OF1	61.2	300
UV1	88	21	UF1	58.5	300
UV2	50	2	UF2	56.5	0.16

Section 4: Installing PWRcell Inverter

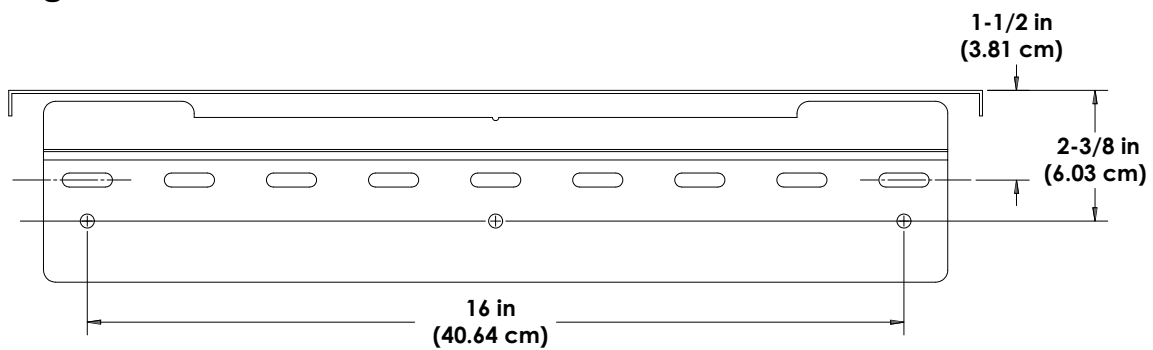
Mounting Clearances



010508

Figure 4-1. PWRcell Inverter Dimensions and Mounting Clearances

Mounting Bracket Dimensions



009990

Figure 4-2. Mounting Bracket Dimensions

Mounting the Inverter

CAUTION

Equipment damage. Mount inverter to a strong, stable surface. Never mount to drywall, plaster, or other non-structural wall treatments. Failure to mount inverter to a strong, stable surface could result in equipment or property damage.

(000641a)

1. Verify mounting location adheres to the following requirements:
 - Location must meet all PWRcell Inverter requirements listed in Section 3 of this manual. See [Location and Standards](#) for more information.
 - Inverter must be mounted upright on a vertical wall.
 - Never obstruct intake or exhaust vents.
 - Never allow water to enter intake or exhaust vents.
 - Observe all mounting clearances. See [Mounting Clearances](#).
2. Secure mounting bracket mounting surface through mounting holes.
 - Fasteners must adequately secure the 62.7 lbs (28.4 kg) inverter weight to the wall.
 - Fasteners must be suitable for the mounting surface.
 - Fasteners must engage at least two studs or other structural members.
 - Mounting bracket has clearance holes for 1/4 in fasteners with slots to accommodate different stud spacings.
3. See [Figure 4-3](#). Insert mounting bracket tabs (A) into inverter body slot (B).

NOTE: [Figure 4-3](#) is for illustration purposes only.

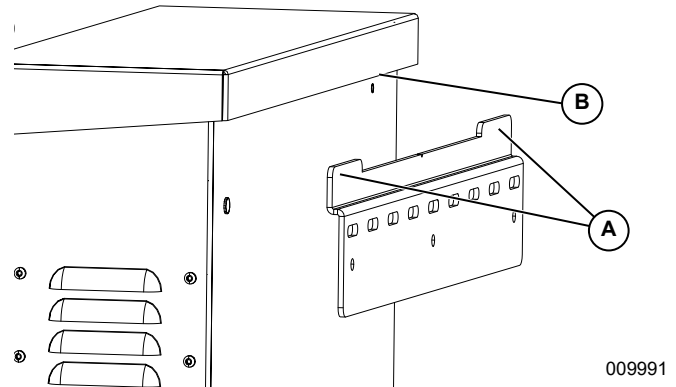


Figure 4-3. Mounting Inverter onto Bracket

4. See [Figure 4-4](#). Secure the bottom of the inverter to wall with two fasteners through mounting holes (C). Holes are spaced at 11 1/4 in. from each other. Use anchors or blocking as needed.

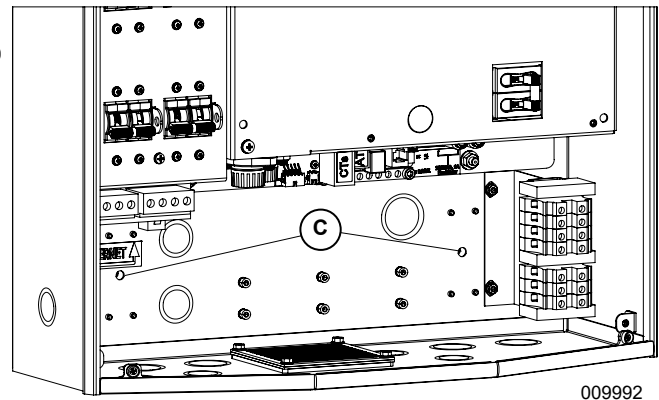


Figure 4-4. Mounting Holes

Section 5: Electrical Connections

Accessing Wiring Compartment



⚠ DANGER

Electrocution. Initiate a system-wide shutdown and turn the PWRcell DC Disconnect Switch OFF on all connected batteries before performing service. Failure to do so will result in death, serious injury, or equipment and property damage. (000600)



⚠ DANGER

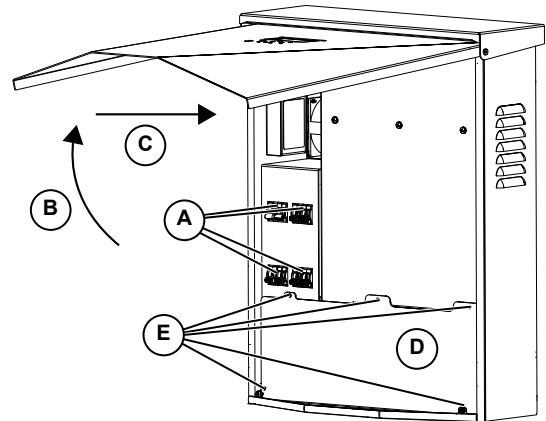
Electrocution. Verify all system voltages are safe before wiring. Disconnect all AC and DC sources of power before touching terminals. Failure to ensure no dangerous voltages are present on conductors and terminals before wiring will result in death or serious injury. (000642)

IMPORTANT: The inverter interior is not weather-proof. Do not open the inverter front cover when wet or during rain/snowfall.

See [Figure 5-1](#). To access the wiring compartment:

1. Open inverter front cover by lifting the bottom to just beyond horizontal (B) and pushing inward (C).

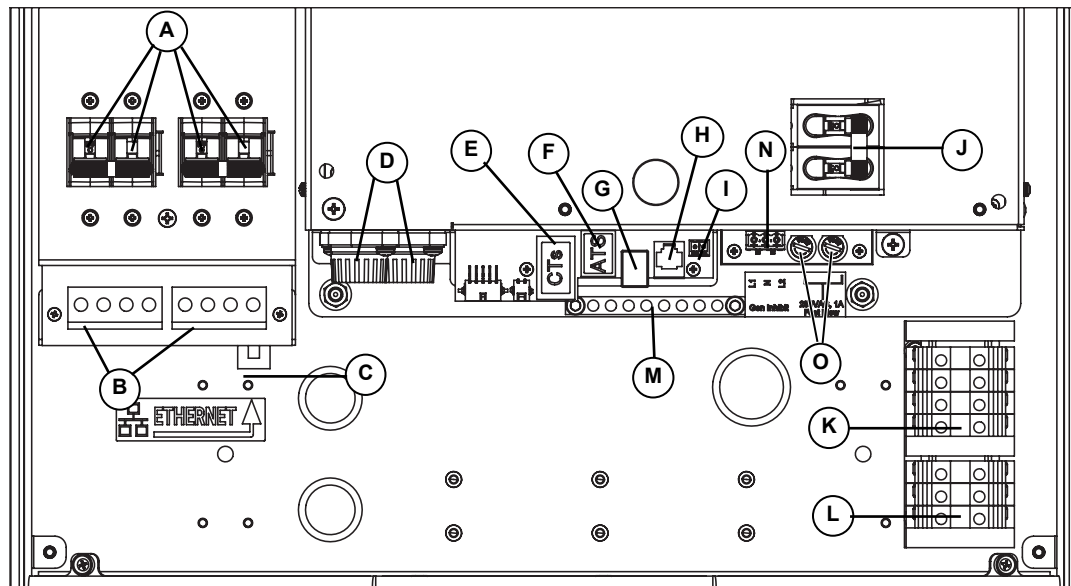
2. Locate wiring compartment cover (D).
3. Remove five M4X10 screws (E) and wiring compartment cover.
4. Verify all PWRcell DC and AC terminals are below 10 V, using a multi-meter.



010238

Figure 5-1. Wiring Compartment

PWRcell Inverter Wiring Compartment



011235

Figure 5-2. PWRcell Inverter Wiring Compartment

- | | |
|---|---|
| A PWRcell DC Disconnects | I STOP Terminals |
| B REbus Bi-directional DC Terminals | J Protected Loads Disconnect |
| C Ethernet Connection | K AC Grid Connection Terminals |
| D DC Main Fuses | L Protected Loads Terminals |
| E Current Transformers (CTs) Accessory Ports | M Grounding Bar |
| F Automatic Transfer Switch (ATS) Accessory Port | N RGM PWR / Gen Inhibit |
| G REbus Beacon Port | O Fast Blow Mini Fuses 1 A 250 V |
| H Authorized Generac Personnel Only | |

Knockout Dimensions and Locations

NOTE: All knockouts are combination knockouts, except for the 1/4 in trade knockout at the top of the left side which is intended only for mounting an optional LTE modem antenna.

See **Figure 5-3** for knockout locations and **Table 5-1** for available knockout sizes and quantities.

When using knockouts:

- Install reducing washers to accommodate smaller conduit sizes.

- Install rain-tight or wet locations hubs in compliance with UL514B.

Table 5-1. Combination Knockout Size and Quantity

Combination Knockout Size	Quantity
3/4 in X 1 in	6
1/2 in X 3/4 in	7
0.575 in use only for LTE Modem Antenna	1

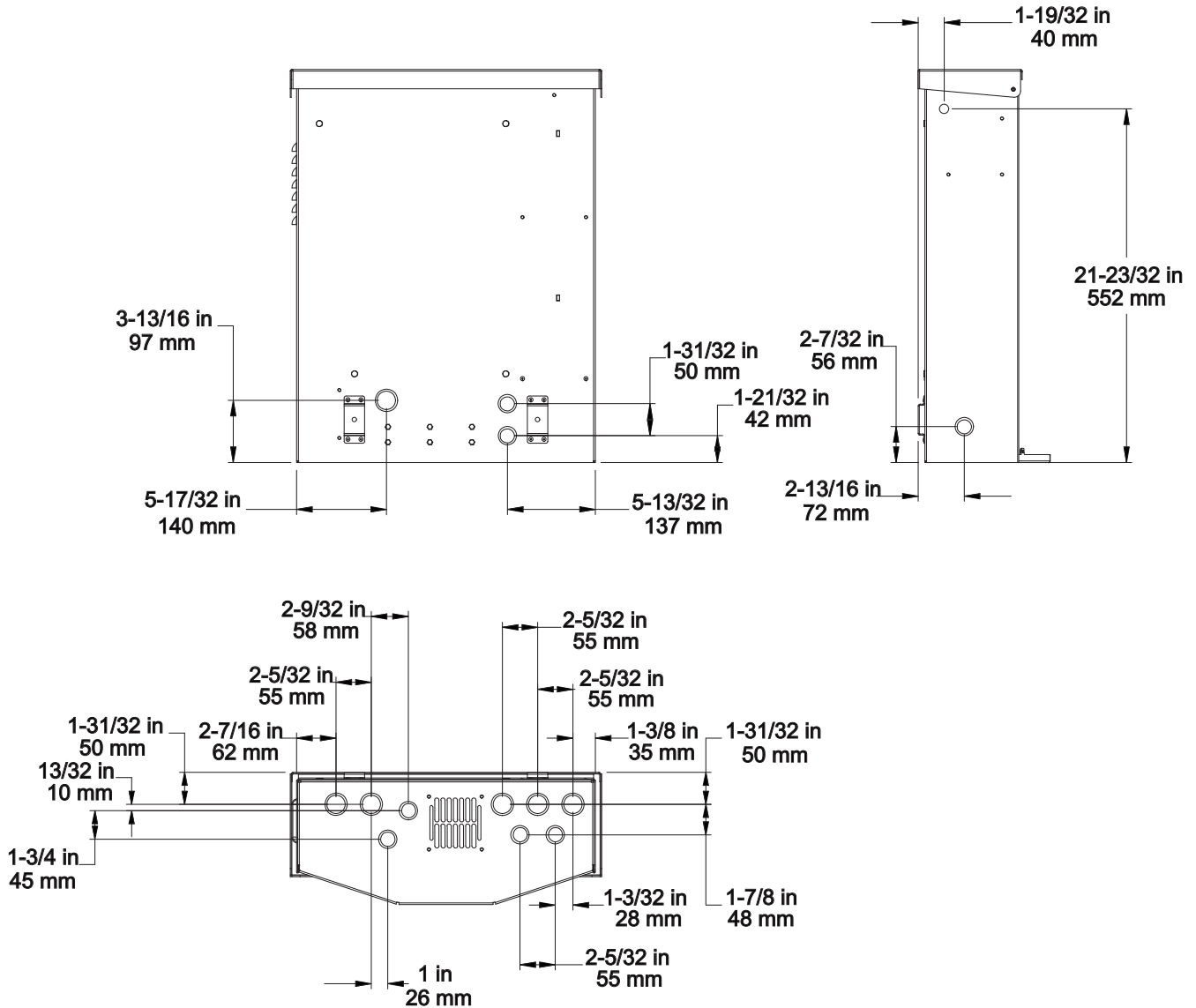


Figure 5-3. Knockout Locations

011234

Wiring Guidelines



⚠ DANGER

Electrocution. Verify all system voltages are safe before wiring. Disconnect all AC and DC sources of power before touching terminals. Failure to ensure no dangerous voltages are present on conductors and terminals before wiring will result in death or serious injury. (000642)



⚠ DANGER

Electrocution. Turn battery disconnect OFF and de-energize REbus before touching terminals. Failure to do so will result in death, serious injury, equipment and property damage. (000599)

- The inverter shall be installed in accordance with NEC Article 705.
- All conductors must be rated for at least 420 V.
- Always use wiring methods in accordance with National Electrical Code (ANSI/NFPA 70) or other applicable codes.
- Field terminals are for copper conductors only.
- All field installed conductors within the unit are to be sized in compliance with NEC Article 310.
- Torque all terminals as specified in this section.

Grounding Bar Wiring

⚠ CAUTION

Equipment damage. Never connect REbus conductors to ground. Connecting REbus conductors to ground could result in equipment or property damage. (000607a)

- Bond the inverter enclosure to the equipment grounding conductor of the normal power source power feeder.
- The grounding bar provides central grounding for up to 8 conductors.
- AC output circuits are isolated from the enclosure.
- AC system grounding, when required by Canadian Electrical Code, Part I, is to be done in the installation.
- The neutral conductor is not bonded to the equipment ground terminal bar within the enclosure.
- The inverter and its connected PV and battery sources are not separately derived systems.
- DC system grounding is critical for REbus communications. Ensure the following REbus devices have a low resistance wired connection back to the inverter grounding terminal bar:
 - PV Link
 - PWRcell Batteries
- Torque all terminals as specified in [Table 5-2](#).

Table 5-2. Grounding Bar Wiring Terminal Specifications

Wire Size (AWG)	Torque
4 – 6	45 in-lb (5 Nm)
8	40 in-lb (4.5 Nm)
10	30 in-lb (4 Nm)

DC Wiring



⚠ DANGER

Electrocution. Never touch terminals when inverter and PWRcell DC disconnects are ON. Doing so will result in death or serious injury.

(000686a)

⚠ WARNING

Equipment damage. Obey polarity markings when connecting REbus devices. Reverse-polarizing DC circuits could result in equipment or property damage.

(000646)

⚠ WARNING

Equipment damage. Do not connect raw, unregulated battery output to inverter. Connect only REbus-compatible batteries. Connecting batteries that are not REbus-compatible could result in equipment or property damage.

(000645)

⚠ CAUTION

Equipment damage. Do not connect PV string output directly to inverter. PV must be connected via Generac PWRcell PV Link. Connecting PV output directly to inverter could result in equipment or property damage.

(000644a)

⚠ CAUTION

Equipment damage. Connect only one wire to each DC wiring terminal. Doubling wires on a terminal could result in equipment or property damage.

(000647a)

⚠ CAUTION

Equipment damage. Connect only to REbus-compatible devices to the DC bus. Never connect to any other DC power source. Connecting to other DC power sources could result in equipment damage.

(000598a)

NOTE: The inverter does not itself provide ground fault detection and interruption for PV circuits. PV GFDI is provided by Generac PV Links in a PWRcell system.

- Connect all REbus devices to the REbus bi-directional DC terminals.
- Each terminal is protected by a 30 A two-pole circuit disconnect.
- PWRcell DC disconnects indicate state and may be used to disconnect DC circuits.
- PWRcell DC disconnects disconnect both ungrounded DC conductors simultaneously.
- Torque all terminals as specified in [Table 5-3](#).

NOTE: Disable inverter before turning PWRcell DC disconnects to ON position.

Table 5-3. DC Wiring Terminal Specifications

Wire Size	Terminal Temp Range	Wire Min Temp Rating	Torque
10 to 6 AWG	-40 to 266°F (-40 to 130°C)	194°F (90°C)	12 in-lb (1.35 Nm)

STOP Terminal Wiring

In the event the PWRcell Inverter will be installed indoors, or outdoors in a location far from the utility service entrance, an external switch may be installed and wired to the inverter's STOP terminals to be the compliant PV Rapid Shutdown initiator. See [Section 3: Location and Compliance PVRSS Initiation](#) for additional information.

NOTE: If installation includes a PWRcell Battery, the battery must be equipped with external STOP terminals. Battery STOP terminals must be wired in series or parallel to the inverter STOP terminals. See below and reference the *PWRcell Battery Installation & Owner's Manual* for more details.

For PV only installations without a PWRcell Battery:

1. Verify the PWRcell system is powered down.
2. Remove the jumper from the inverter STOP terminals.
3. See [Figure 5-4](#). Use 20 – 14 AWG two-conductor cable with insulation rated for 600 V to connect a switch that is lockable, UL listed, and rated for at least 12 VDC, 5 mA (consider a standard single-pole light switch in a weather proof box with a lockable lever).

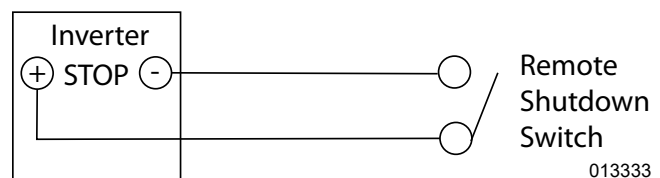


Figure 5-4. PV Only Remote Shutdown Switch Wiring

For Installations with a PWRcell Battery:

1. Verify the PWRcell system is powered down.
2. Remove the jumper from the inverter STOP terminals.
3. Remove the jumper for the battery STOP terminals.
4. See [Figure 5-5](#) and [Figure 5-6](#). Use 20 – 14 AWG two-conductor cable with insulation rated for 600 V to connect a switch that is lockable, UL listed, and rated for at least 12 VDC, 5 mA (consider a standard single-pole light switch in a weather proof box with a lockable lever).

box with a lockable lever). Wire the switch in series or parallel to the inverter and battery.

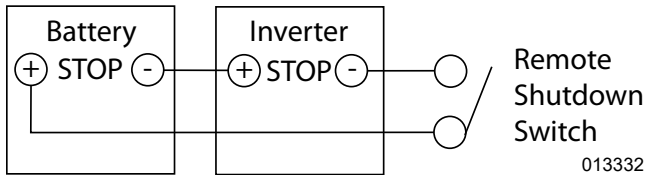


Figure 5-5. Remote Shutdown Switches Series Wiring

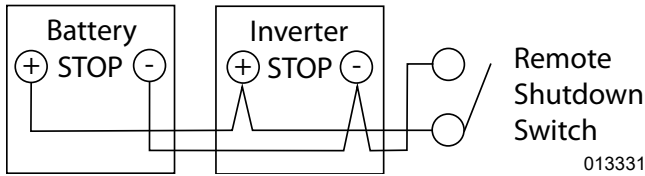


Figure 5-6. Remote Shutdown Switch Parallel Wiring

IMPORTANT NOTE: If polarity is wired incorrectly, neither device will see a STOP condition and it will not be possible to shutdown either device via the STOP terminals until the wiring is corrected.

AC Wiring

See [Figure 5-7](#). The installer is responsible for installing 40 A overcurrent protection for wiring to AC Grid Connection Terminals (A). The conductors shall be sized in accordance with NEC Article 705 for the utility power interconnection. All other conductors in the system shall be sized in accordance with NEC Article 310 and all other applicable NEC Articles.

IMPORTANT: The XVT076A03 model PWRcell Inverter is for use with 120/240 VAC 1-Phase (Wye) grid services.

NOTE: Class 2 low voltage cable shall be installed independent of other power conductors. See NEC 725.136 for additional information.

See [Figure 5-7](#). The PWRcell Inverter is equipped with four AC Grid Connection terminals and three Protected Loads terminals.

- Use the AC Grid Connection terminals (A) for connection to the utility grid.

NOTE: The L3 terminal is not used. Do not land any wiring to this terminal.

- Use the Protected Loads terminals (B) for protected loads output.
- The AC Grid Connection terminals of a PWRcell Inverter must not be powered by another PWRcell Inverter's protected loads terminals during backup operation (Island Mode).
- The protected loads terminals of two or more PWRcell Inverters must not be wired to support the same load panel simultaneously.

- Backup power ratings are separate from the power ratings for PWRcell Inverters while grid connected. See [Specifications](#).

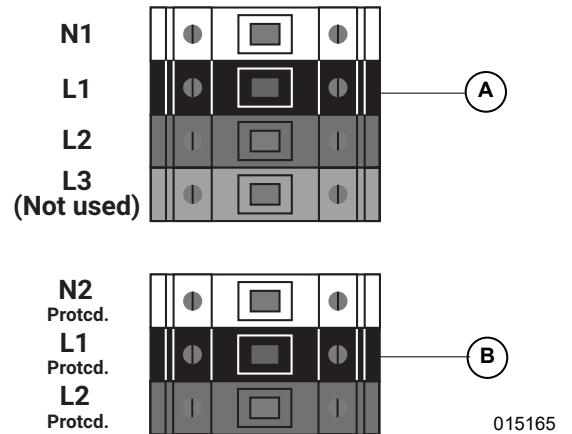


Figure 5-7. AC Wiring Terminals

- Torque all terminals as specified in [Table 5-4](#).

Table 5-4. AC Wiring Terminal Specifications

Wire Size	Terminal Temp Range	Wire Min Temp Rating	Torque
8 to 6 AWG	Up to 248°F (120°C)	194° F (90° C)	13.3 in-lb to 15.9 in-lb (1.5 Nm to 1.8 Nm)

Partial Home Backup

⚠ CAUTION

Equipment damage. Never connect protected loads terminals to other sources of power, including any other inverter, the utility grid, or a generator. Doing so could result in equipment or property damage. (000648a)

⚠ CAUTION

Equipment damage. Never connect protected loads output from inverters in parallel. Doing so could result in equipment or property damage. (000649a)

See [Figure 5-8](#). When configured to operate with a PWRcell ATS installed between a main panel and subpanel, a PWRcell system can provide backup power to the subpanel, referred to below as a protected loads subpanel, during a utility service interruption.

When a service interruption occurs, relays inside the inverter isolate the inverter's AC grid connection, the transfer switch transfers to the inverter as a power source, and the inverter powers protected loads, using PV and battery power. The ATS transfer typically takes a fraction of a second but may take up to a few seconds depending on how the grid service is interrupted.

In this configuration, the PWRcell Inverter will control the PWRcell ATS upon loss of utility voltage.

NOTE: This configuration is not suitable for three-phase installations. This includes panels powered by feeders carrying 2 of the 3 phases.

A PWRcell system configured to operate with a PWRcell ATS can accommodate up to 9 kW – 11 kW maximum continuous load. This requires at least 6 – 8 battery modules, respectively, to be installed in one – two PWRcell Battery cabinets. Please reference pertinent product specifications for desired configuration.

NOTE: A qualified installer must ensure proper load sizing of the protected loads panel so as to not overload the PWRcell system as an optional standby power source in any partial home backup installation.

NOTE: Actual power output for protected loads during a grid outage will depend on system sizing for batteries and solar array.

General Wiring Guidance:

1. See [Figure 5-8](#). Install a suitably rated, listed over-current protection device (OCPD) at the main panel.
2. Land new feeder conductors from the new OCPD at the main panel at the 'N' terminals of the PWRcell ATS.

3. Land new feeder conductors from the 'T' of the ATS to the Line side of the protected loads subpanel.
4. Land the PWRcell Inverter protected loads wiring (L1 Protcd / L2 Protcd) to the 'E' terminals of the ATS.
5. Land the inverter protected loads neutral wire (N2 Protcd) to the neutral bar in the ATS.
6. Land an equipment grounding conductor from the PWRcell Inverter to the ATS ground bar.
7. Install a 2-Pole 40 A OCPD for interconnection of the PWRcell Inverter at the protected loads subpanel.
8. Land the inverter AC Grid Connection wiring (L1 / L2) to the OCPD for interconnection.

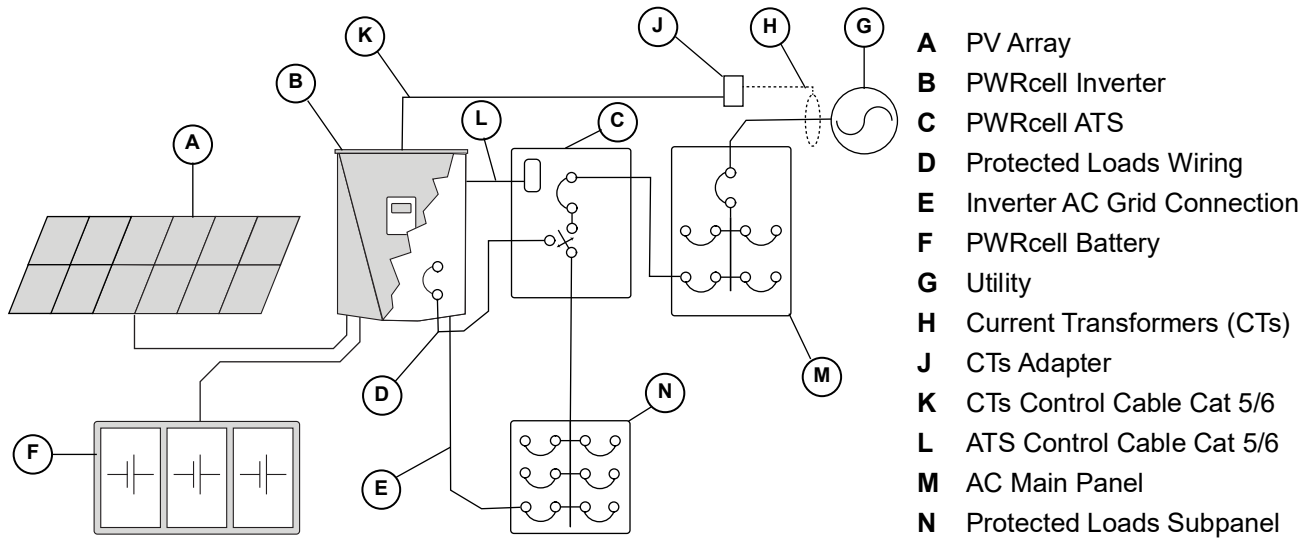
NOTE: Improper installation of a PWRcell ATS can result in an objectionable current path through a paralleled neutral connection. Reference NEC 250.6. The neutral conductor for the inverter AC Grid Connection circuit is not required to be installed to the point of interconnection with the utility as permitted by the exception in NEC 200.3. Follow the PWRcell ATS Installation Manual for proper installation. The installer is responsible for compliance with applicable national, state, and local codes.

9. Install CTs in the AC Main Panel using the CTs adapter and run Cat 5 or Cat 6 from the CTs adapter to one of the inverter CTs ports.
10. Run Cat 5 or Cat 6 from the PWRcell ATS Controller to the PWRcell Inverter for ATS controls.
11. Size protected loads subpanel loads to whichever is the lesser of...
 - a) The rating of the main panel circuit breaker installed Step 1 that connects to the PWRcell ATS.
 - b) the backup power rating of the attached PWRcell Battery(ies).

NOTE: Class 2 low voltage cable shall be installed independent of other power conductors. See NEC 725.136 for additional information.

The following is not supported with Partial Home Backup at this time:

- Parallel backup power with another PWRcell system.
- Parallel operation with other energy/battery storage solutions.
- Installations with other manufacturers' transfer switches.
- Installations without a compatible Generac transfer switch.
- Support for 3 phase 120/208 V inverter installations.



015178

Figure 5-8. Partial Home Backup Installation with Protected Loads Subpanel

Managed Whole Home Backup

When configured to operate with a PWRcell ATS installed directly after the utility service meter, a PWRcell system can provide power to the main distribution panel during a utility service interruption using PWRmanager or some other energy management equipment for load management.

When a service interruption occurs, relays inside the inverter isolate the inverter's AC grid connection, the transfer switch transfers to the inverter as a power source, and the inverter supports main panel loads using PV and battery power. The ATS transfer typically takes a fraction of a second but may take up to a few seconds depending on how the grid service is interrupted.

In this configuration, the PWRcell Inverter will control the PWRcell ATS upon loss of utility voltage.

NOTE: This configuration is not suitable for three phase installations. This includes panels powered by feeders carrying 2 of the 3 phases.

A PWRcell system configured to operate with a PWRcell ATS can accommodate up to 9 kW – 11 kW maximum continuous load. This requires at least 6 – 8 battery modules, respectively, to be installed in one – two PWRcell Battery cabinets. Please reference pertinent product specifications for desired configuration.

Install a PWRmanager for dynamic load management to prevent overloading the PWRcell system during an outage. Install Smart Management Modules (SMMs) on additional circuits as needed with PWRmanager, or utilize the PWRcell ATS Controller with SMMs for smaller applications where PWRmanager may not be required.

IMPORTANT: A qualified installer must ensure proper load management so as not to overload the PWRcell system as an optional standby power source in any managed whole home backup installation. See [Other Equipment](#) for additional details on load management options.

General Wiring Guidance:

1. See [Figure 5-9](#). Land service entrance conductors at the 'N' terminals of the PWRcell ATS.
2. Land new feeder conductors from the 'T' terminals of the PWRcell ATS to the Line side of the main distribution panel.
3. Land the PWRcell Inverter protected loads wiring (L1 Protcd / L2 Protcd) to the 'E' terminals of the ATS.
4. Land the protected loads neutral (N2 Protcd) to the neutral bar in the ATS.
5. Land an equipment grounding conductor from the PWRcell Inverter to the ATS ground bar.
6. Install a 2-Pole 40 A over current protected device (OCPD) for interconnection of the PWRcell Inverter at the AC Main Panel.

7. Land Inverter AC Grid Connection wiring (L1 / L2) to OCPD for interconnection.

NOTE: Improper installation of a PWRcell ATS can result in an objectionable current path through a paralleled neutral connection. Reference NEC 250.6. The neutral conductor for the inverter AC Grid Connection circuit is not required to be installed to the point of common coupling with the utility as permitted by the exception in NEC 200.3. Follow the **PWRcell ATS Installation Manual** for proper installation. The installer is responsible for compliance with applicable national, state, and local codes.

8. Run Cat 5 or Cat 6 from the PWRcell ATS Controller to the PWRcell Inverter for ATS controls.
9. Install CTs inside the PWRcell ATS and run Cat 5 or Cat 6 from the PWRcell ATS Controller to one of the inverter CTs ports.
10. Install HVAC 24 V thermostat wiring at the PWRmanager (if installed) to manage HVAC loads. Otherwise, install HVAC 24 V thermostat wiring at the PWRcell ATS Controller.

NOTE: Reference the PWRcell ATS Installation Manual if using the PWRcell ATS Controller to manage HVAC loads. The 24 V HVAC relays on the PWRcell ATS Controller are not compatible for use with PWRmanager.

11. Wire 240 V loads to PWRmanager (if installed) to manage large house loads. Otherwise, install SMMs for 240 V loads.
12. Wire any 120 V loads to PWRmanager (if installed) to manage those 120 V loads.

NOTE: When installed with PWRmanager, SMMs should be used with lockout switch set to "Lockout Load on Generator" only.

NOTE: Class 2 low voltage cable shall be installed independent of other power conductors. See NEC 725.136 for additional information.

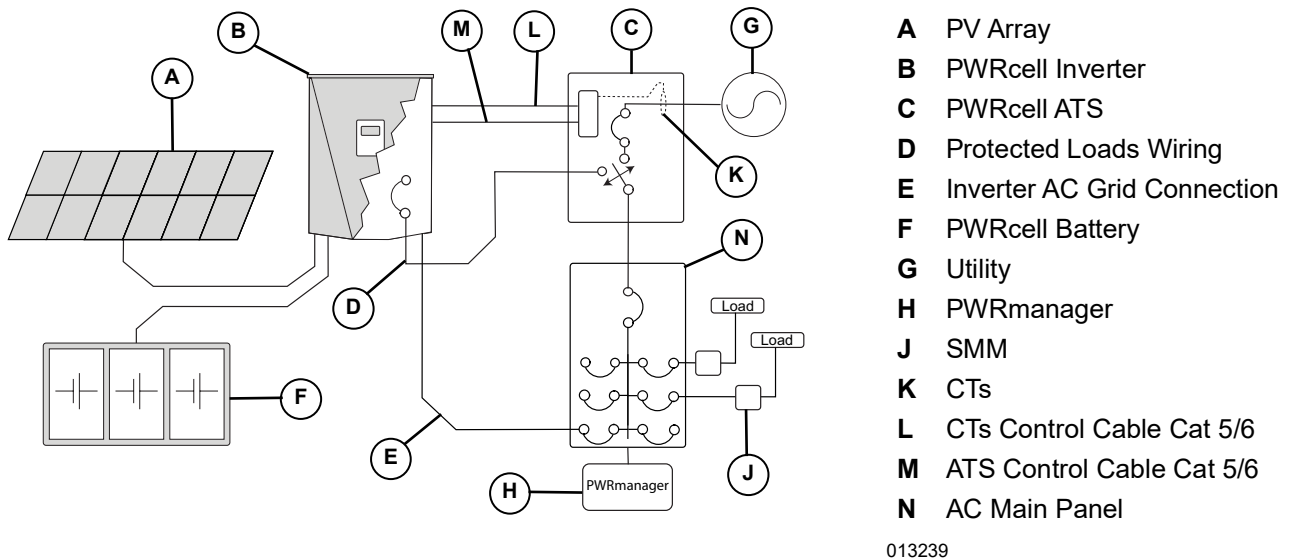


Figure 5-9. Managed Whole Home Backup

The following is not supported with Managed Whole Home Backup at this time:

- Parallel backup power with another PWRcell system.
- Parallel operation with other energy/battery storage solutions.
- Installations with other manufacturers' transfer switches.
- Support for 3 phase 120/208 V inverter installations.

AC Generator Integration

The PWRcell XVT076A03 Inverter has the capability to integrate a Generac Home Standby Generator for the ultimate in savings and resilience. This feature requires the inverter firmware version to be 13794 or greater. Refer to [Verifying Inverter Firmware Version](#) for instructions.

This feature also requires the use of a generator integration-compatible PWRcell ATS, and an additional PWRcell ATS Controller Upgrade Kit may be required for certain configurations.

For complete installation instructions and requirements, see the ***PWRcell ATS Installation Manual, Section 5: Generator Integration.***

For general reference, see [Figure 5-10](#) below.

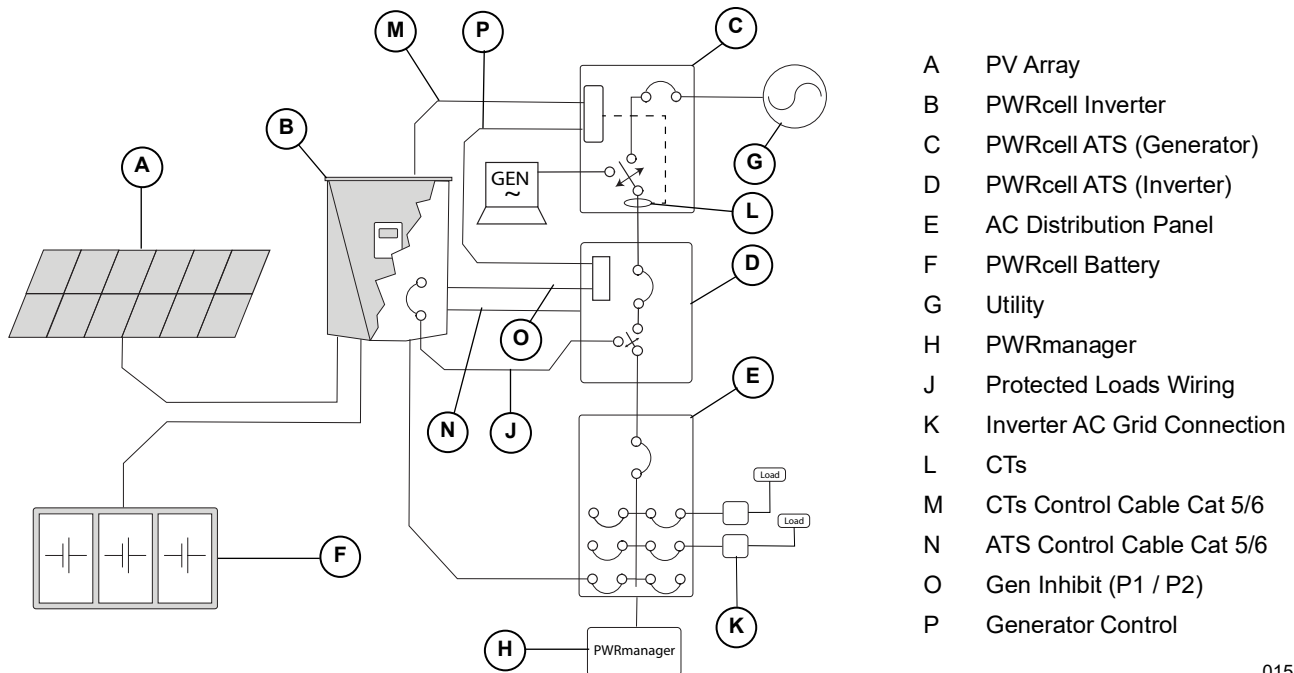


Figure 5-10. AC Generator Integration

015177

The following is not supported with AC Generator Integration at this time.

- Support for AC Generator Integration using a single ATS.
- Parallel operation with other energy / battery storage solutions.
- Installations with other manufacturers' transfer switches.
- Support for 3Ø inverter installations.
- Support for multi-inverter installations.

PWRcell ATS Controller Upgrade Kit

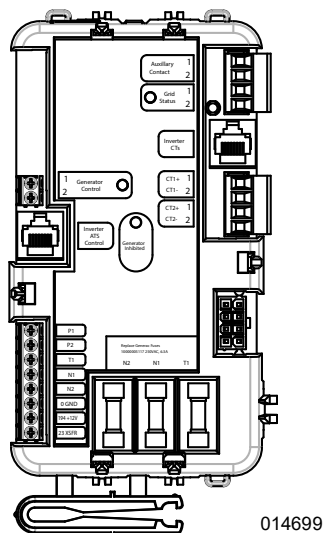


Figure 5-11. Modified PWRcell ATS Controller

See [Figure 5-11](#). For AC Generator Integration, the Inverter ATS must be upgraded with a PWRcell ATS Controller (Part #: A0002532225; pictured left). Purchase Upgrade Kit (Model G0080060) to utilize this controller. This controller may be used in all other configurations that require a PWRcell ATS.

NOTE: Use of an PWRcell ATS Controller version that is incompatible with the intended application may result in unexpected and incorrect behavior from your PWRcell system. Review the following materials closely to ensure the correct equipment is being used for the chosen configuration.

Connecting Ethernet

IMPORTANT NOTE: Generac requires all PWRcell system components to be connected to the Internet and to maintain such connection throughout the warranty period. Internet connectivity is established via the PWRcell Inverter. By installing the PWRcell Inverter and connecting it to the Internet, Customer agrees that Generac may remotely monitor the use and condition of the system and update the system's firmware, as necessary, without further notice. If the PWRcell system loses Internet connection for an extended period, Generac may not be able to provide important remote upgrades. In such cases, Generac may not be able to honor the full warranty.

- See [Accessing Wiring Compartment](#) for the Inverter Ethernet port location.
- Use an appropriate cord grip or strain-relief connector when running Ethernet cable with a conduit.
- Cat 5 or Cat 6 for Ethernet should not exceed 328 ft (100 meters) in length.

- Basic high speed broadband Internet service with 5 Mbps upload/download required.
- Inverters connected by a router to a DHCP network will automatically detect settings.
- For manual IP setup, see [Configuring Static IP Settings](#).

NOTE: It is the installer's responsibility to verify the Internet connection is reliable and secure. Generac recommends using a hardwired connection to provide Internet connectivity. Generac does not support using any wireless or power line carrier network devices. Use these devices at your own discretion.

NOTE: Ethernet cable run must be dedicated for the inverter. This cable may not be daisy-chained to another device, including another PWRcell Inverter.

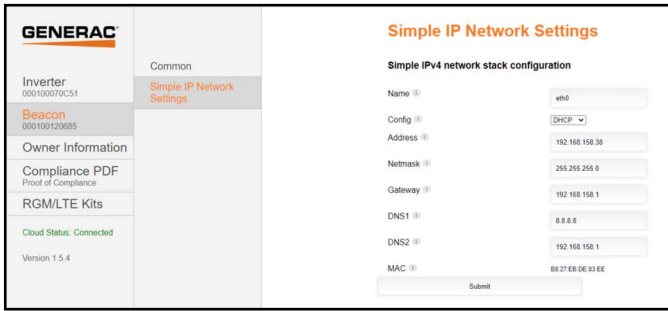
NOTE: Class 2 low voltage cable shall be installed independent of other power conductors. See NEC 725.136 for additional information.

Configuring Static IP Settings

NOTE: For networks not configured for DHCP, use the MAC address to locate the device on the network.

To manually configure settings:

1. From the REbus Beacon device page on the inverter screen, select the Installer Tool. See [Access Installer Configuration Tool](#) for more information.
2. After logging into the Installer Configuration Tool, select 'Beacon' from the menu.
3. Select 'Simple IP Network Settings'. See [Figure 5-12](#).
4. Adjust any of the following network configuration information as needed.
 - Name
 - Config
 - Address
 - Netmask
 - Gateway
 - DNS1
 - DNS2
 - MAC
5. Press Submit to commit settings.



011462

Figure 5-12. Configure Static IP Settings

NOTE: Contact your network system administrator to connect the PWRcell Inverter to a restricted network.

NOTE: The PWRcell Inverter must have a reliable Internet connection in order to view PWRcell system information in the PWRview app.

Verifying Connectivity

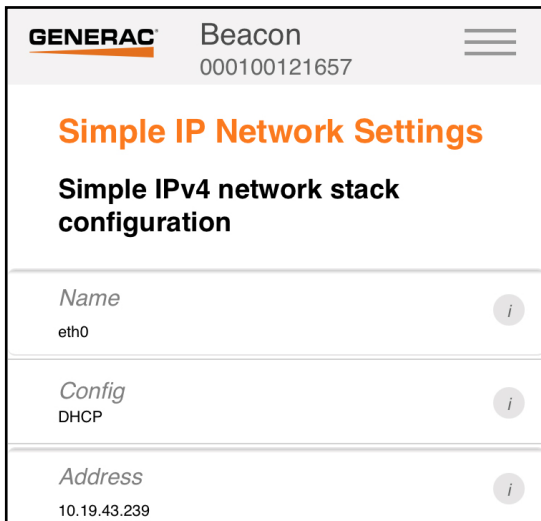
NOTE: Use a laptop or other device to verify the Internet connection on the field installed Cat 5 cable.

For a successful connection the following must be valid:

- The Internet LED on the control panel must be lit.

NOTE: Wait at least 5 minutes after the blue light illuminates to be certain the connection is stable.

- The field installed Cat 5 cable must have a “hot” signal. Check male RJ45 ends for proper installation and confirm correct Ethernet ports at the inverter and router.
- The REbus Beacon must have a device page on the inverter control panel.
- See [Figure 5-13](#). The REbus Beacon must have a valid IP Address. Log on to the Installer Configuration Tool to verify. See [Access Installer Configuration Tool](#).



012423

Figure 5-13. Verify IP Address

NOTE: After first installing, the REbus Beacon may need to receive automated updates to its firmware. This may cause the blue Internet LED to strobe while the REbus Beacon updates, and this will interrupt the Installer Tool connection momentarily.

Current Transformers (CTs)



Equipment damage. Only connect CTs provided by Generac. Never connect to any other CTs. Connecting to other CTs could result in equipment damage.

(000732)

Current transformers (CTs) are required to use Self Supply mode and to enable Import / Export Limiting capability. CTs also allow the inverter to provide information on utility consumption through the PWRcell Inverter control panel and the PWRview™ mobile app.

NOTE: See [Figure 5-14](#). When setting for Export Limiting or Zero Import, attach the label packaged with the CTs to the CTs.

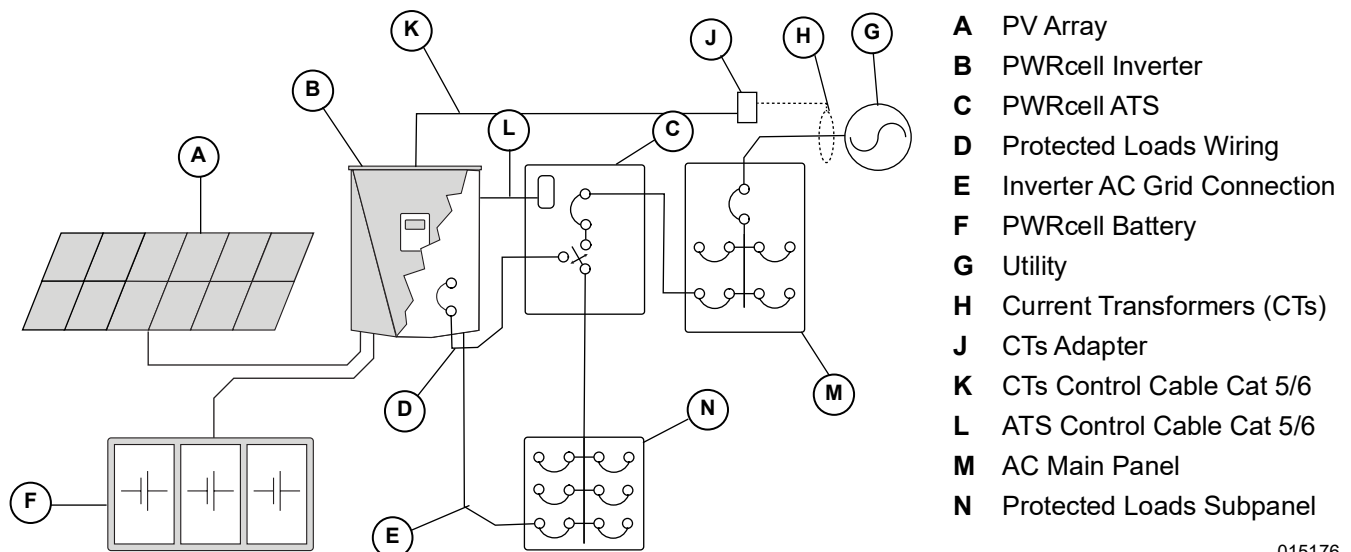
WARNING: This sensor is part of a Power Control System. Do not remove. Replace only with same type and rating.	WARNING: This sensor is part of a Power Control System. Do not remove. Replace only with same type and rating.
--	--

013844

Figure 5-14. Warning Label

Locating Current Transformers

- See [Figure 5-15](#). Install CTs around the main service conductors between the service meter and point of interconnection with the inverter.
- Install one current transformer per phase (two CTs for a 1-Phase 120 / 240 Vac Wye service).



015176

Figure 5-15. Locating Current Transformers (CTs)

Connecting CTs to the Inverter

NOTE: Class 2 low voltage cable shall be installed independent of other power conductors. See NEC 725.136 for additional information.

1. See **Figure 5-16**. Connect CT leads to the CTs Adapter with push terminals (M) or screw terminals (N) according to the label on the breakout adapter.

NOTE: Use yellow lead for CTx+ and use green lead for CTx-.

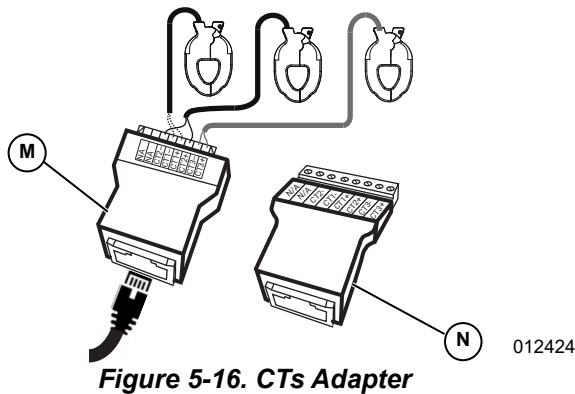


Figure 5-16. CTs Adapter

NOTE: The CTs Adapter is included in the Generac PWRcell Kit.

NOTE: See **Table 5-5**. The connection between the CTs Adapter and the inverter is made using an installer supplied Cat 5 or Cat 6 cable.

Table 5-5. CT RJ-45 Pinout

Pin	Wire Color (T-568A)	Wire Color (T-568B)	Value
1	White / Green	White / Orange	CT3+
2	Green	Orange	CT3-
3	White / Orange	White / Green	CT2+
4	Blue	Blue	CT1+
5	White / Blue	White / Blue	CT1-
6	Orange	Green	CT2-
7	White / Brown	White / Brown	Not Used
8	Brown	Brown	Not Used

2. See **Figure 5-17**. Connect Cat 5 / Cat 6 cable to a CTs accessory port (H).
 - CTs accessory ports are double-stacked RJ-45 ports.
 - Either the top or bottom port may be used.
 - Both ports may be used when multiple sets of CTs are required.

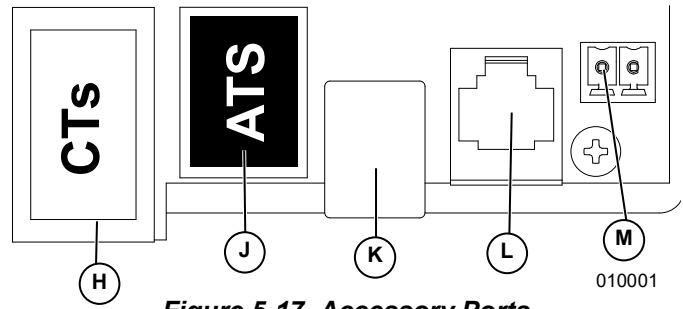


Figure 5-17. Accessory Ports

- H** Current Transformers (CTs) Accessory Port (RJ-45)
- J** Automatic Transfer Switch (ATS) Accessory Port (RJ-45)
- K** REbus Beacon Port (USB-B)
- L** Authorized Generac Personnel Only
- M** STOP Terminals

Connecting Multiple Sets of CTs

When installing CTs, local factors may require multiple sets of CTs to fully measure the utility power being sent to the building.

Installing two sets of CTs:

- Use two pairs of CTs to measure services with two sets of feeder conductors. Use each pair of CTs to measure a pair of service conductors / feeders within the main panel.
- Connect CT1 from both sets to the same phase and CT2 from both sets to the second phase.
- See **Table 5-6: Multiple CT Connection**. Connect Cat 5 cables from the adapters into the two CT accessory ports at the inverter.

NOTE: Make sure to use the same pinout and connections.

Table 5-6. Multiple CT Connection

CT	Service Phase and Wire Adapter	Adapter	Adapter Pins	CT Port Row Values
1-1	L1-1	1	4 and 5	Front Port
1-2	L2-1	1	3 and 6	Front Port
2-1	L1-2	2	4 and 5	Back Port
2-2	L2-2	2	3 and 6	Back Port

Connecting CTs to Multiple PWRcell Systems / Inverters

When an installation has multiple PWRcell Inverter systems, either:

- Run a set of CTs for each inverter.
- Run a set of CTs to one inverter and run a Cat 5 cable from the spare CT port within that inverter to either CT port within the second inverter.

NOTE: One set of CTs may be utilized for up to two inverters.

IMPORTANT: Inverter configured for AC Generator Integration cannot use this method. See [Connecting Multiple Sets of CTs](#) instead.

When running separate sets of CTs for each inverter, the load value displayed on each inverter screen will be the total load measured by the CTs.

When daisy-chaining two inverters, the total measured value is shared evenly between the inverters.

NOTE: Daisy-chaining CTs between two inverters for distributed load-share is most applicable when each inverter has a battery attached. Otherwise, this configuration may not be necessary or desirable.

To daisy-chain a CT signal:

1. Connect and calibrate a set of CTs to the first inverter.
2. Run a new Cat 5 cable between the spare CT accessory port of the first inverter to either CT accessory port on the second inverter.
3. Set GridParInvrtrs to a value of 2. See [Table 5-7](#) below.

NOTE: Running a new Cat 5 or Cat 6 cable between inverter CT ports prior to calibration in Step 1 may cause calibration issues.

CT Calibration

- Install CTs before powering ON the inverter.
- The inverter automatically detects CTs when turned ON.
- Once CTs are detected, a utility pole icon will appear on the lower right corner of the home screen power flow diagram. Verify operation by noting power flow.
 - To calibrate CTs, navigate to the inverter device page, access the menu, and select the Calibrate CTs option.
 - Watch the screen carefully for transient validation of CTs. When the CT calibration process has been successfully completed, the inverter LCD screen will provide feedback showing ct cal success. Otherwise, the screen will show ct cal = X, where the value of X can be found in [Table 5-8: Automatic Detection Troubleshooting Table](#).

- CT1 must be connected to Line 1.
- CT2 must be connected to Line 2.
- All CTs must be orientated in the same relative direction.
- In certain scenarios, additional setpoint modifications may need to be made. See [Table 5-7: CT Setpoints](#) for more information.

Table 5-7. CT Setpoints

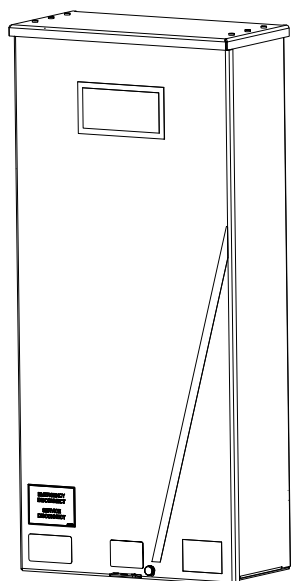
Setpoint	Behavior	Default	Units
CalOverride	<ul style="list-style-type: none"> Overrides CT calibration. When set to 'off', the inverter will automatically detect the direction and number of CTs present. When set to ON, the inverter will assume correct CT installation and will use the readings as is. 	off	N/A
CTTurnsRatio	<ul style="list-style-type: none"> Turns ratio of the CTs installed. Default turns ratio of 1,500 is compatible with included clamp type CTs If installation restriction requires larger accessory CTs, set point shall be adjusted to 3,000. Verify turns ratio of CTs before modifying this setting. 	1,500	Turns
GridParInvtrts	<ul style="list-style-type: none"> Allows two inverters to share one set of CTs. If set to "1" only one inverter should be using a single set of CTs. If set to "2" two inverters can share one set of CTs. 	1	N / A

Table 5-8. Automatic Detection Troubleshooting Table

Event Name	Event Code	Description
ct cal = 1	0x8061	Line 1 doesn't have a valid CT calibration
ct cal = 2	0x8062	Line 2 doesn't have a valid CT calibration
ct cal = 3	0x8063	Line 1 & 2 don't have a valid CT calibration
ct cal = 4	0x8064	Line 3 doesn't have a valid CT calibration
ct cal = 5	0x8065	Line 1 & 3 don't have a valid CT calibration
ct cal = 6	0x8066	Line 2 & 3 don't have a valid CT calibration
ct cal = 7	0x8067	Line 1 & 2 & 3 don't have a valid CT calibration
ct cal = 9	0x8069	Line 1 has multiple CTs on it (or a CT is on the neutral wire)
ct cal = A	0x806A	Line 2 has multiple CTs on it (or a CT is on the neutral wire)
ct cal = B	0x806B	Lines 1 and 2 have multiple or missing CTs on them (or a CT is on the neutral wire)
ct cal = C	0x806C	Line 3 has multiple CTs on it (or a CT is on the neutral wire)
ct cal = D	0x806D	Lines 1 & 3 have multiple or missing CTs on them (or a CT is on the neutral wire)
ct cal = E	0x806E	Lines 2 & 3 have multiple or missing CTs on them (or a CT is on the neutral wire)
ct cal = F	0x806F	Lines 1 & 2 & 3 have multiple or missing CTs on them (or a CT is on the neutral wire)
ct cal success	0x8070	Calibration was successful

Other Equipment

PWRcell ATS



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Figure 5-18. PWRcell ATS

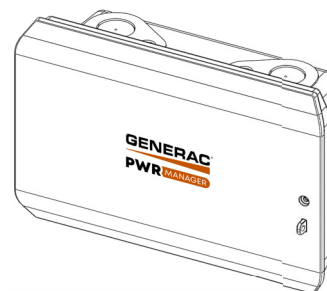
A Generac PWRcell ATS is integrated into the PWRcell installation to facilitate alternate backup power configurations. Refer to the ***PWRcell ATS Installation Manual*** for additional information regarding configurations and installation instructions.

NOTE: Improper installation of a PWRcell ATS can result in an objectionable current path through a paralleled neutral connection. Reference NEC 250.6. The neutral conductor for the inverter AC Grid Connection circuit is not required to be installed to the point of common coupling with the utility as permitted by the exception in NEC 200.3. Follow the ***PWRcell ATS Installation Manual*** for proper installation. The installer is responsible for compliance with applicable national, state, and local codes.

Load Management Options

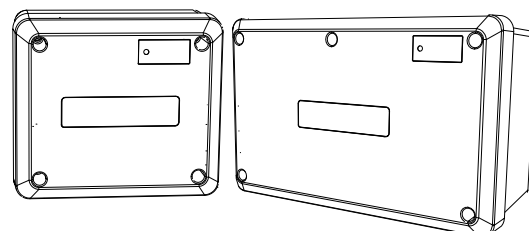
Load management systems are designed to prevent a power source such as an inverter from being overloaded by large appliance loads. Options include:

- PWRmanager: Advanced Load Controller ([Figure 5-19](#))
- Smart Management Modules (SMMs) ([Figure 5-20](#))
- PWRcell ATS Controller (24 VAC thermostat control only) ([Figure 5-21](#))



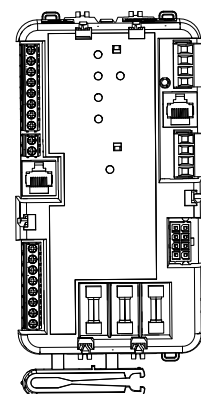
013469

Figure 5-19. PWRmanager



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Figure 5-20. 50 A and 100 A Smart Management Modules (SMMs)



011166

Figure 5-21. PWRcell ATS Controller

NOTE: PWRcell systems with AC Generator Integration should NOT use the PWRcell ATS Controller for load management. PWRmanager or other appropriate load management solutions may be used instead.

When utilizing these load management solutions be sure to select the appropriate value for the “EnaLoadShed” setpoint. This setpoint is accessible through the Mod. Settings menu via the inverter device page as shown in [Figure 5-22](#).

- Select a value of “1” if using PWRmanager and/or SMMs **only** to manage loads.
- Select a value of “2” if using the PWRcell ATS Controller (with or without SMMs) to manage loads.

NOTE: When installed with PWRmanager, SMMs should be used with lockout switch set to “Lockout Load on Generator” only. The 24 V HVAC relays on the PWRcell ATS Controller are not compatible for use with PWRmanager.

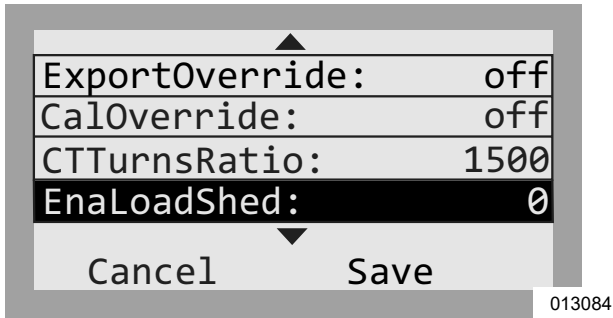


Figure 5-22. Mod Settings Menu

If this setpoint is not set to either 1 or 2 respectively, the devices will not operate correctly with the system. In addition, be sure to thoroughly read and understand each load management device manual before installation.

LTE Modem Kit

The LTE Wireless Phone Modem is an optional accessory for the PWRcell Inverter that can provide low bandwidth Internet connectivity if a hardwired Internet connection is not available. This kit is also recommended for systems participating in an incentive program with data reporting requirements.

This accessory may be factory or field installed. The modem is installed in the upper left section of the inverter enclosure adjacent to the REbus Beacon. The modem uses an antenna that is mounted to the exterior of the enclosure through a dedicated 1/4 inch knockout. The LTE modem's power cable is pre-installed in the inverter from the factory. With no LTE Modem is installed, the power cable is to be left unconnected and safely secured.

Complete installation instructions are included in the LTE Modem Kit. Order part numbers: PCLTE1, PCLTE2.

Revenue Grade Meter (RGM) Kit

A Generac PWRview Meter (part number PCRGM1) is an optional accessory for the PWRcell Inverter for certain applications requiring Revenue Grade Metering. This accessory may be factory or field installed and includes the necessary CTs.

NOTE: RGM kit is restricted to specific applications. For more information, please contact Generac at 1-888-436-3722 (1-888-GENERAC).

Section 6: Commissioning

Before You Start:

1. Check physical wiring connections – Torque to spec and perform tug tests.
2. Check isolation resistance – DC / AC.
3. Check wiring polarity – DC / AC.
4. Turn ON PWRcell DC Disconnects.
5. Turn ON PWRcell Battery Disconnect Switch (if installed).

Commissioning Overview

IMPORTANT: If multiple PWRcell Inverters are installed, do not turn on AC power to more than one inverter at a time. Refer to [Commissioning Multiple Inverter Systems](#).

NOTE: Commissioning can only be completed during daylight hours.

1. Turn on AC Power to Inverter.
2. Check AC Voltages.
3. Verify Internet Connection.
4. Register System.
5. Select Inverter System Mode.
6. Configure Inverter Settings & Enable Inverter.
7. Configure REbus Devices & Enable REbus Devices.
8. Test Island Mode.

Advanced Commissioning Steps:

1. Configure Time of Use.
2. Access Installer Configuration Tool.
3. Set Inverter Grid Compliance.
4. Set Import / Export Compliance.

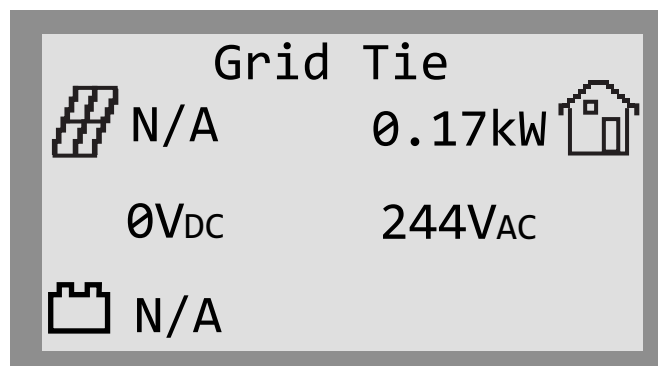
Commissioning Steps

Turn on AC Power to Inverter

IMPORTANT: If multiple PWRcell Inverters are installed, refer to [Commissioning Multiple Inverter Systems](#) in place of this commissioning step. Do not turn on AC power to more than one inverter at a time.

Turn ON the solar backfeed breaker or solar AC disconnect.

See [Figure 6-1](#). On power-up, the home screen will appear on the control panel LCD with the system mode listed at the top of the home screen.



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Figure 6-1. Inverter Power-Up

NOTE: An AC grid connection is required for commissioning. Generac does not currently support autonomous, off grid installations with PWRcell equipment.

Check AC Voltages

Verify AC voltages L-N and L-L are within typical ranges. See [Table 6-1](#). Verify AC voltages (L1-Neutral and L2-Neutral) are within the specified voltage range for connection with the AC Grid shown in [Table 6-1](#). This range is active when the inverter needs to connect or reconnect to the grid, also referred to as 'Enter Service'. Measure AC voltage L1-L2 to ensure nominal 240 VAC.

NOTE: An inverter in the 'disabled' state is not connected to the grid.

Table 6-1. Default Inverter Reconnection/Enter Service Voltage Range

AC Conductors	Inverter Listing (Grid Profile)	Voltage Range (Volts, RMS)
L-N	UL 1741 SA (IEEE 1547-2003)	114.0-126.0
L-L		228.0-252.0
L-N	UL 1741 SB (IEEE 1547-2018)	110.0-126.0
L-L		220.0-252.0

If the AC voltage range is not within the specified range specified in [Table 6-1](#), the inverter will not connect/reconnect to the grid. If the local utility specifies different Reconnection/Enter Service values, a different grid profile may be necessary. See [Set Inverter Grid Compliance](#) for more information.

NOTE: Use of Grid Profiles other than the default IEEE 1547 profile may result different reconnection voltage range settings. It is the installer's responsibility to ensure the Grid Profile active on the inverter complies with the local utility technical interconnection and (smart) inverter requirements. Reconnection/Enter Service settings active on an inverter are included in a PWRcell Compli-

ance Report. See [Proof of Compliance](#) for more information.

Verify Internet Connection

Refer to [Connecting Ethernet](#) for more information.

Register System

NOTE: If the system will not be connected to the Internet, the installer will not be able to take advantage of PWRfleet, the customer will not have access to the PWRview app, and the warranty will be limited to five years. Contact Generac at 1-888-ACTIVATE to complete the registration.

NOTE: Registering an inverter automatically registers all REbus system components connected to that inverter. Once the system is registered, every REbus-enabled device can be monitored from the PWRfleet fleet management platform and the PWRview mobile app.

To register a system:

1. See [Figure 6-2](#). Locate the serial number and registration code on the registration decal on the front of the inverter. This information will be required for registration.
2. Navigate to <https://pwrfleet.generac.com> or, if using a mobile device, scan the QR code on the registration decal and use the “Register at PWRfleet” URL provided.
3. Follow the on-screen prompts to complete the profile.



Figure 6-2. Registration Decal

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Select Inverter System Mode

NOTE: See [System Modes Overview](#) for more information.

NOTE: For systems with a PWRcell Battery, select a backup system mode. Do not select Grid Tie mode.

To select a system mode:

1. See [Figure 6-1](#). While viewing the home screen press the center button.
2. See [Figure 6-3](#). A list of system modes will be displayed with the current mode marked with an asterisk.

NOTE: The list of system modes may not include all those shown in [Figure 6-3](#).

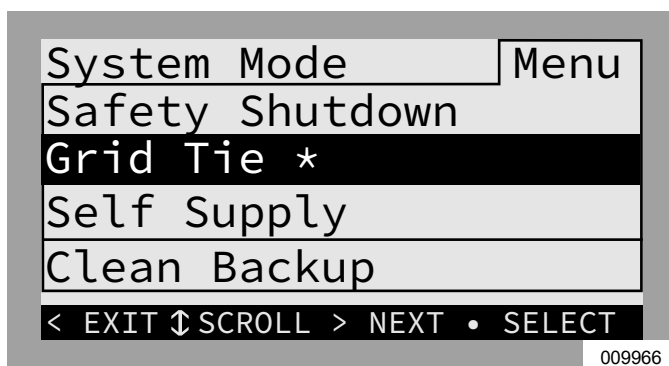


Figure 6-3. Selecting System Modes (1 of 4)

3. See [Figure 6-4](#). Use the up and down arrows to highlight the desired mode and press the center button to select.

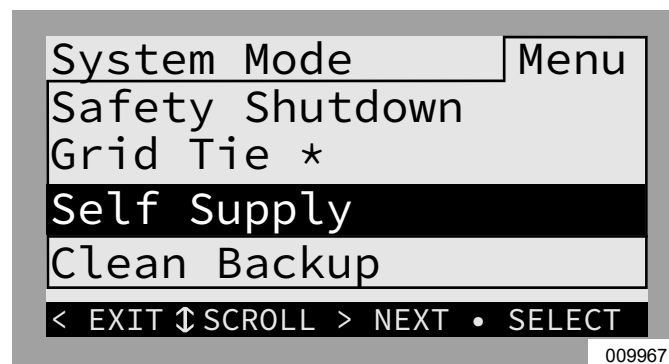


Figure 6-4. Selecting System Modes (2 of 4)

4. See [Figure 6-5](#). Arrow right and press the center button to select Confirm.

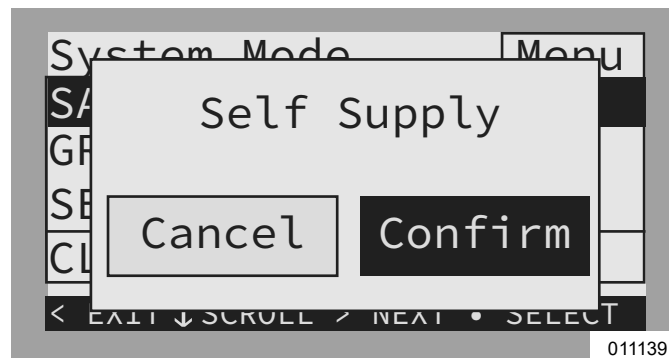


Figure 6-5. Selecting System Modes (3 of 4)

5. See [Figure 6-6](#). Verify the mode listed at the top of the home screen is the desired mode.



Figure 6-6. Selecting System Modes (4 of 4)

Configure Inverter Settings and Enable Inverter

Adjusting Inverter Settings

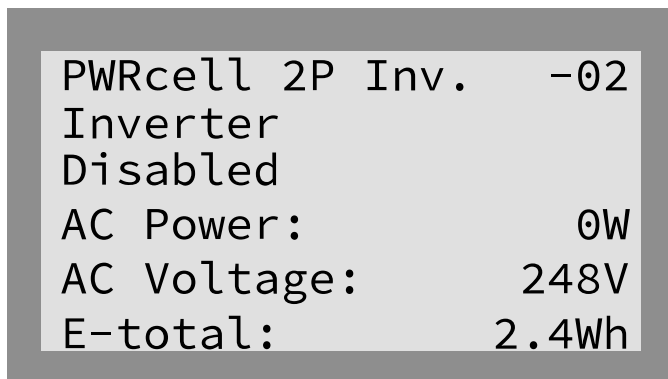
1. See [Table 6-2](#). Navigate to the inverter device page using the right arrow key (next page right of the home screen).
2. Push the center button.
3. Select Mod. Settings using the down arrow to scroll and the center button to select.
4. Scroll through the settings using the up / down arrow keys.
5. Use the center button to select a setting.
6. Use the up / down arrow keys to change the value of a setting.
7. Use the center button to deselect a setting.
8. Scroll down and save all changes before exiting the Mod. Settings menu.
9. Select Mod. Settings again to verify changes were saved.

Table 6-2. Inverter Settings

Setpoint	Range	Default	Description
PLM_Channel	0 – 12	1	Channel for REbus communications. All devices in a system must use the same channel (except REbus Beacon). Do not set equipment to channel 0 unless performing Commissioning Multiple Inverter Systems .
TargMaxImpPrP	-30,000 to +30,000 Watts	0	Maximum Threshold for importing power before the battery will discharge in Self Supply Mode to offset.
TargMinImpPrP	-30,000 to +30,000 Watts	0	Minimum power import maintained by charging the battery from the grid in Self Supply Mode.
EnaIslanding	on / off	on	Allows system to go into island mode, providing backup power during a utility service interruption. Turn this setting off for PV only installations.
NumTranSwTchs	0 / 1 / 2	0	Defines the number of external automatic transfer switches installed and enables transfer switch controls. For AC Coupled PV, this must be 1. For AC Generator Integration, this must be 2.
ExtTransVolt	80 – 140 Volts	100	Minimum voltage from the utility that must be present for the inverter to reconnect back to the grid. If an ATS is installed, this will be the voltage required for the inverter to control the ATS back to the normal (utility) position.
ExportOverride	on / off	off	Formerly called Zero Export, this setting will inhibit the PWRcell system from exporting power to the grid. This setting is for temporary use and will not satisfy CRD200 Import Only Compliance. See Set Export Override (optional) .
CalOverride	on / off	off	Overrides inverter logic for automatic detection of included Generac current transformers (CTs).
CTTurnsRatio	1,500 – 3,000 Turns	1,500	Allows a different turns ratio to be set for specific CTs.
EnaLoadShed	0 / 1 / 2	0	Select 1 if using PWRmanager and / or SMM devices to manage loads. Select 2 if using the PWRcell ATS Controller to manage loads (with or without SMMs). Do not use PWRmanager and PWRcell ATS Controller together for load management.
GridParInvrtrs	1 – 2	1	This setting allows for two inverters to share one set of CTs. Set to 2 if daisy chaining CTs between two inverters.
ACPVPower	0 – 7.6 kW	0	Do Not Use- Feature Not Supported. Power rating of the attached AC Coupled PV array. Set this value to the cumulative power rating of AC Coupled PV connected to this inverter. This value must reflect what is coupled. An incorrect higher value will result in insufficient charging of the batteries; an incorrect lower value will result in the possibility of an over voltage event.
ACGenPower	0 – 26 kW	0	Nameplate power rating of the AC coupled integrated generator. If no generator is integrated, leave at 0.
ACGenCtrlMode	0 / 1 / 2	0	To set AC Generator Control Mode, select one of the three settings below. See AC Generator Control Modes for more info. 0 = Single Transfer 1 = Source Cycling 2 = Always On

Enabling the Inverter

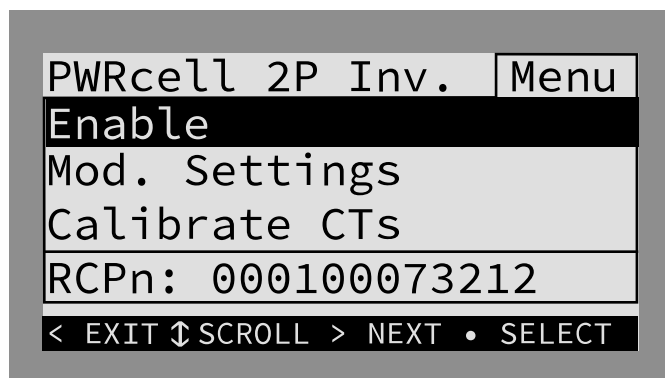
1. See [Figure 6-7](#). Use the right arrow key to scroll to the inverter device page.
2. Verify inverter status reads disabled.



010010

Figure 6-7. Enabling Inverter (1 of 4)

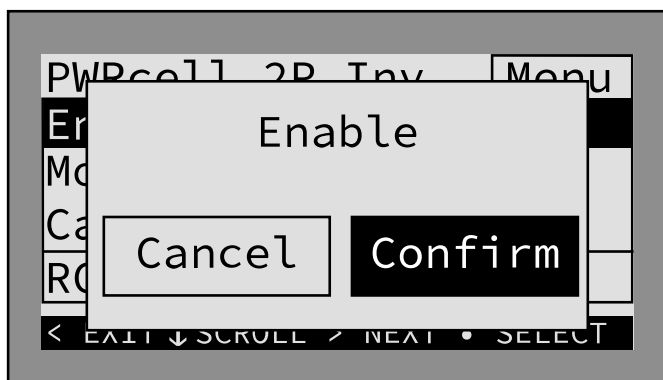
3. Press the center button.
4. See [Figure 6-8](#). Highlight Enable and press the center button.



010011

Figure 6-8. Enabling Inverter (2 of 4)

5. See [Figure 6-9](#). Arrow right and press center button to Confirm.

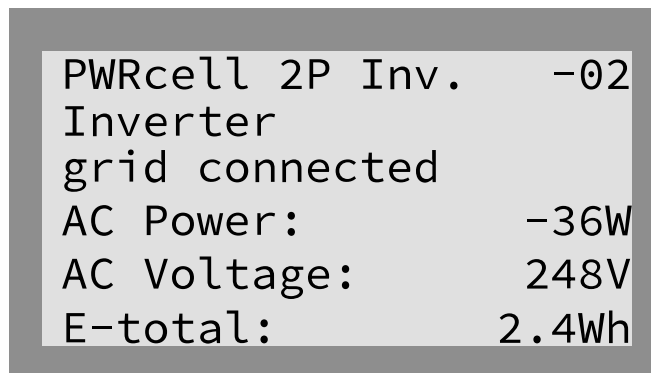


010012

Figure 6-9. Enabling Inverter (3 of 4)

6. See [Figure 6-10](#). The inverter is enabled. It will create voltage at the DC terminals and begin communicating with connected REbus devices.

NOTE: Upon enabling the inverter high voltage will be present at the REbus DC terminals and all REbus DC wiring where the DC disconnects are turned ON for those circuits.



010013

Figure 6-10. Inverter Enabled (4 of 4)

Configuring with PWRcell Batteries

Systems with the PWRcell Battery must have the “Enslaving” setpoint set to ‘on’ in order to enter Island Mode for backup. This setpoint is accessible through the Mod. Settings menu via the inverter device page.

Verify the PWRcell Inverter protected loads disconnect is in the ON position.

Verify Battery Disconnect Switch on the PWRcell Battery is ON.

NOTE: Reference the *PWRcell Battery Installation and Owner’s Manual* for advanced battery settings.

Set Export Override (optional)

NOTE: This feature requires CTs to be properly installed and calibrated prior to use. For more information on CT calibration, see [Current Transformers \(CTs\)](#).

NOTE: This feature is NOT intended to serve as a means of achieving compliance to utility interconnection requirements. To set for zero export compliance or export limiting, see [Set Import / Export Compliance](#).

This feature is suitable as a simple and easy option for systems pending permission to operate (PTO) where the utility does not specify a requirement for the system to be powered-off or otherwise disabled pending approval. When enabled, Export Override allows the user to restrict inverter export such that excess power is not sent back to the grid. The system limits solar power generation to match power consumption measured by the PWRcell CTs. Using the Inverter control panel, a user can find this feature on the “Mod. Settings” sub-menu for the inverter.

Set for Peak Shaving (optional)

The TargMaxImprtP and TargMinImprtP setpoints allow the building to deliberately import power from the grid within certain limits. This is useful for specialized applications, such as avoiding peak demand charges. When enabled, import and export compliance settings supersede these Peak Shaving setpoints for inverter operation involving importing grid power or exporting DC-coupled capacity to grid.

For more information, see [Set Import / Export Compliance](#).

These setpoints are relevant to Self Supply mode only, and are only used for specific applications. See [Table 6-3: Self Supply Setpoints](#).

Table 6-3. Self Supply Setpoints

Setpoint	Description	Default	Units
TargMaxImprtP	Target Maximum Import Power <ul style="list-style-type: none"> Maximum power imported from the grid at any point. When the overall building load exceeds this setpoint, the inverter will supply additional power from the battery and solar array to keep grid import power below this level. This maximum is not guaranteed. If insufficient battery and solar power is available to cover the load, then the grid will supply the additional power. 	0	W
TargMinImprtP	Target Minimum Import Power <ul style="list-style-type: none"> Use this setting to charge the battery from the grid. If the overall building load is less than this setpoint, the inverter will import power to the battery to keep the grid import power up to the setpoint. If the building load is above the setpoint, the inverter will stop importing additional power to charge the battery. This minimum is not guaranteed. Once the battery is full, grid import power may fall below this level. 	0	W

Set for AC Generator Integration (optional)

IMPORTANT NOTE: This feature requires the inverter firmware version to be 13754 or greater. Refer to [Verifying Inverter Firmware Version](#) for instructions. More information for requesting a firmware update can be found online at <https://www.generac.com/resources-and-tools/ce-installer-resources/installation-resources>.

NOTE: Ensure 3.15 A fuses found taped to the PWRcell ATS Controller have been installed in place of the 1 A fast-blow mini fuses in the inverter wiring compartment for RGM PWR / Gen Inhibit.

- From the home screen, use the right arrow key to navigate to the inverter device page.
- Push the center button to access inverter device main menu.
- Navigate to “Mod. Settings” using the down arrow key and use the center button to select.
- Use the down arrow key to navigate to the setting 'NumTranSwtschs.'
- Select the setting using the center button.
- Use the up / down arrow keys to change the value corresponding to the number of PWRcell ATS installed. Refer to the [PWRcell ATS Installation Manual Section 5: Generator Integration](#) for more information.

•Two PWRcell ATS installed (AC Generator Integration / Whole Home Backup)

- Deselect the setting using the center button. Use the down arrow key to navigate to 'ACGenPower' and select using the center button.
- Use the up / down arrow keys to select the rated power of the integrated AC generator.
- Deselect the setting using the center button.
- Use the down arrow key to navigate to 'ACGenCtrlMode' and select using the center button.
- Use the up / down arrow keys to change the value corresponding to the desired Generator Control Mode. For more information, refer to [AC Generator Control Modes](#):
 - 0 - Single Transfer
 - 1 - Source Cycling
 - 2 - Always On
- Deselect the setting using the center button.
- Use the down arrow key to navigate to the bottom of the “Mod. Settings” menu and select 'Save' using the center button to save settings changes.

Configure Rebus Devices and Enable REbus Devices



⚠ DANGER

Electrocution. Never enable any device during an installation or while wires are exposed. Doing so will result in death, serious injury, or equipment or property damage.

(000627a)

NOTE: All PWRcell devices are enabled and configured individually through the PWRcell Inverter control panel.

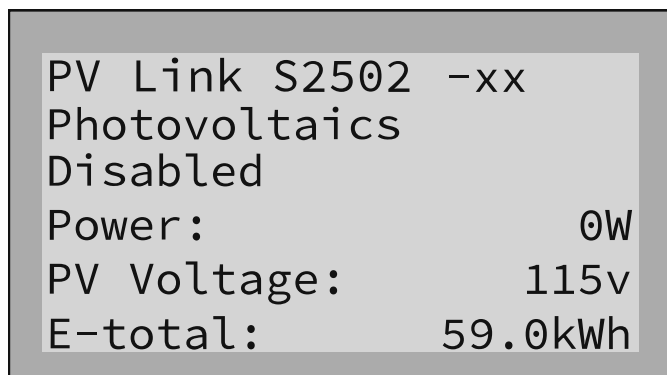
The inverter must be enabled and in state, “grid connected,” before REbus devices can be configured and enabled. If not already enabled, see [Enabling the Inverter](#).

Configure REbus Devices

Configure REbus devices settings connected to the system using the instructions provided in the Commissioning section of their respective installation manuals.

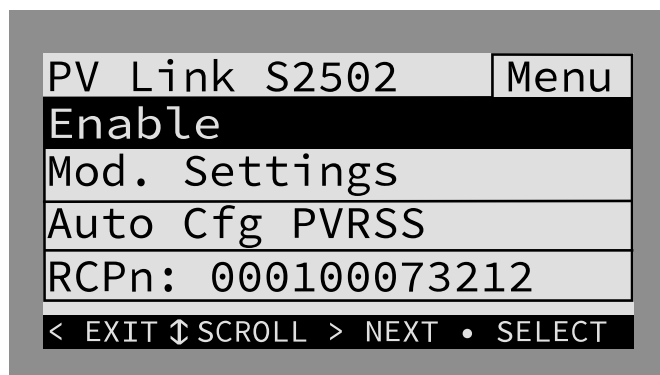
Enable REbus Devices

Enabling REbus devices is the same procedure as enabling an inverter but on the individual REbus devices pages. See [Figure 6-11](#), [Figure 6-12](#), and [Figure 6-13](#).



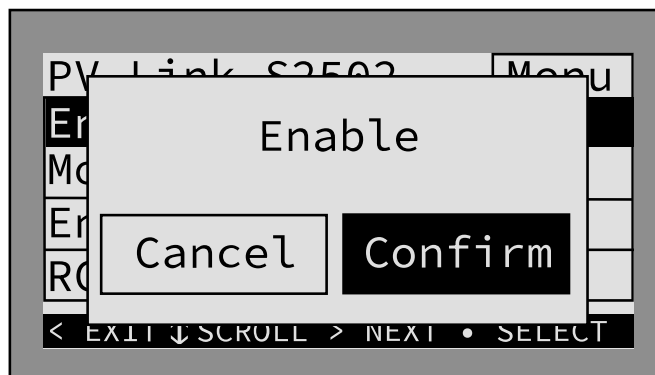
013444

Figure 6-11. Enabling Rebus Devices (1 of 3)



013443

Figure 6-12. Enabling Rebus Devices (2 of 3)



015179

Figure 6-13. Enabling REbus Devices (3 of 3)

Test Island Mode

To test Island Mode, AC power to the inverter must be disconnected. When configured to operate with a PWRcell ATS, AC power must be disconnected to the inverter and the ATS to test Island Mode.

For Service Entrance rated PWRcell ATS, this can be achieved by turning OFF the main breaker integrated into the enclosure.

For non-Service Entrance rated PWRcell ATS, this can be achieved by turning OFF the circuit breaker for conductors feeding the “N” terminals of the PWRcell ATS.

Verify the following prior to an Island Mode test:

- Inverter setting 'Enslanding' is set to 'on.'
- Ensure 'NumTranSwTchs' reflects the number of ATS installed.
- Ensure Protected Loads breaker at the inverter Power Core is in the ON position.
- Ensure system is set to an appropriate system mode (e.g., Clean Backup, Priority Backup, Self Supply).

NOTE: Exact electrical system configurations will vary. It is up to the operator to perform this test accurately for the configuration onsite.

NOTE: Per UL 1741, the PWRcell Inverter may require five minutes upon recovery from a grid outage or Island Mode test before reconnecting to the grid.

NOTE: For anti-islanding tests, turn OFF the solar back-feed breaker or solar AC disconnect connected to the inverter's AC Grid Connection terminals to properly measure absence of voltage.

Advanced Commissioning Steps

Configure Time of Use

REbus Beacon allows the PWRcell system to manage energy production and storage over the course of the day. This is called Time of Use (TOU) energy management. To take advantage of this functionality, the PWRcell

system must include a PWRcell Battery and a reliable connection to the Internet via an Ethernet connection to a router.

NOTE: Enable and setup the REbus Beacon for TOU scheduling only. Otherwise, do not enable the REbus Beacon.

Configuring and Running a TOU Schedule

1. See **Figure 6-14**. Navigate to the Beacon device page and press the center button to enter the device menu.

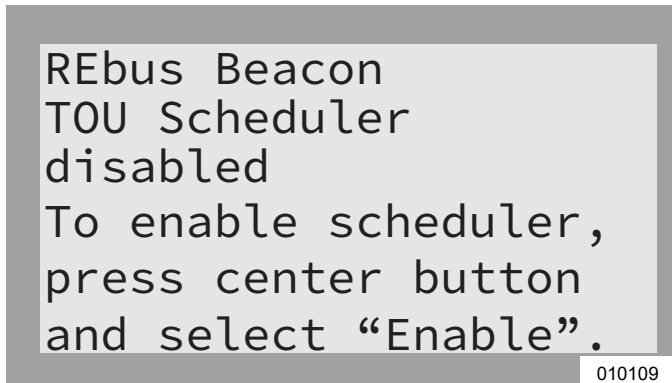


Figure 6-14. Configuring TOU Schedule (1 of 4)

2. See **Figure 6-15**. Use the up and down arrows to highlight Mod. Settings and press the center button to enter the settings menu.

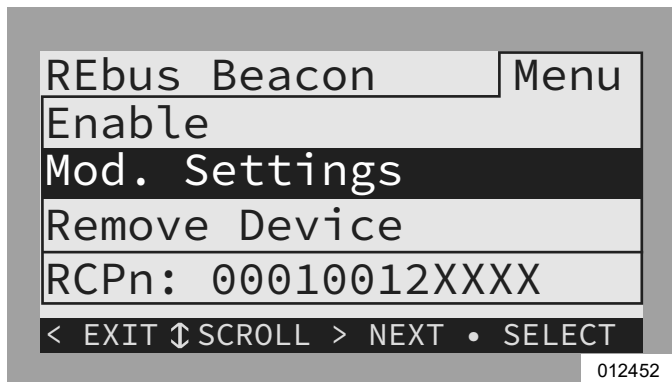


Figure 6-15. Configuring TOU Schedule (2 of 4)

3. See **Figure 6-16**. Use the up and down arrows to highlight Access Code and press the center button to select.
4. Use the up and down arrows to set the Access Code to 57, and press the center button.

NOTE: The access code is valid for five minutes. After five minutes, the access code must be entered again to enable changes.

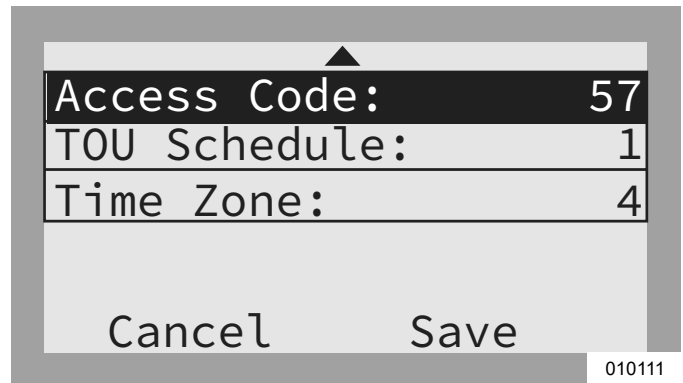


Figure 6-16. Configuring TOU Schedule (3 of 4)

5. Use the up and down arrows to highlight TOU Schedule and press the center button to select.
6. Use the up and down arrows to adjust the TOU Schedule code. Once the desired value is set, press the center button to exit edit mode.

NOTE: See the latest Time of Use Program Guide for current TOU schedule values. The program guide is available at <https://www.generac.com/resources-and-tools/ce-installer-resources/installation-resources>.

7. Set the Time Zone to the desired location based on **Table 6-4: Time Zone Codes**. Once the desired value is set, press the center button to exit edit mode.

Table 6-4. Time Zone Codes

Time Zone	Units
UTC	0
US / Eastern	1
US / Central	2
US / Mountain	3
US / Pacific	4
US / Alaska	5
US / Hawaii	6
US / Arizona	7
US / Puerto Rico	8

8. See **Figure 6-17**. To commit changes to all entries, highlight Save and press the center button.

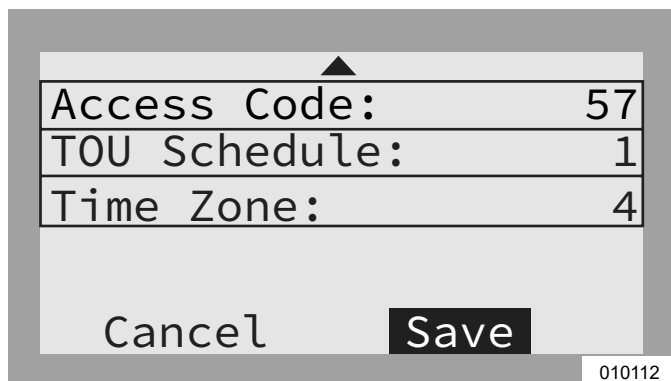


Figure 6-17. Configuring TOU Schedule (4 of 4)

See [Figure 6-18](#) and [Figure 6-19](#). When enabled, the LCD will alternate between a TOU Scheduler Running Screen and a Current System Mode screen. Both screens will display the time until the next system change and the mode the system will change to. The TOU Schedule name will be listed at the bottom of the device page.

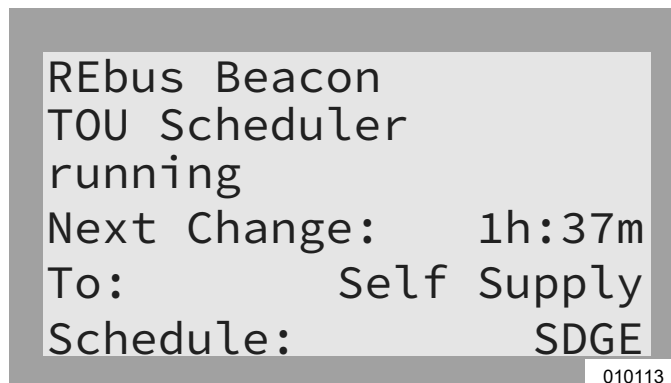


Figure 6-18. Running.

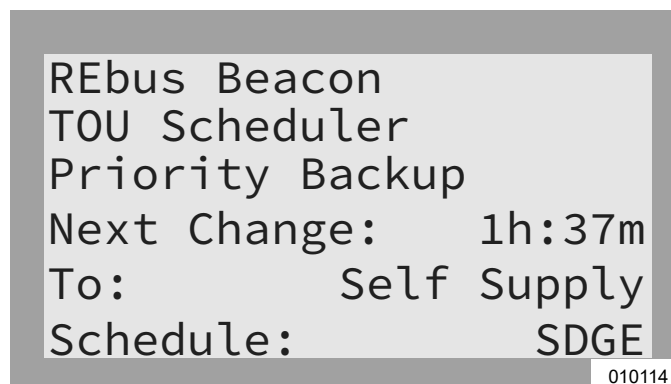


Figure 6-19. Current System Mode.

See [Figure 6-20](#) and [Figure 6-21](#). On the home page, the text above the power flow diagram will alternate between Scheduler Active and the current system mode.

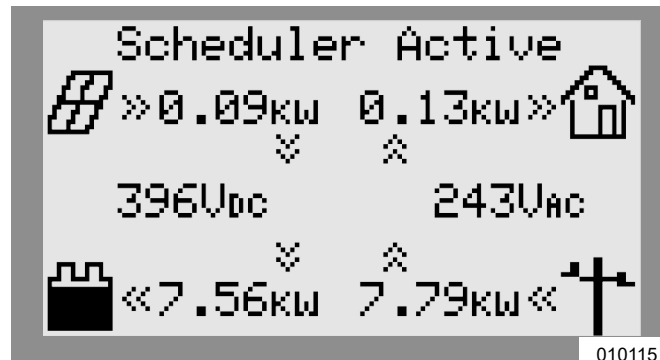


Figure 6-20. Scheduler Active

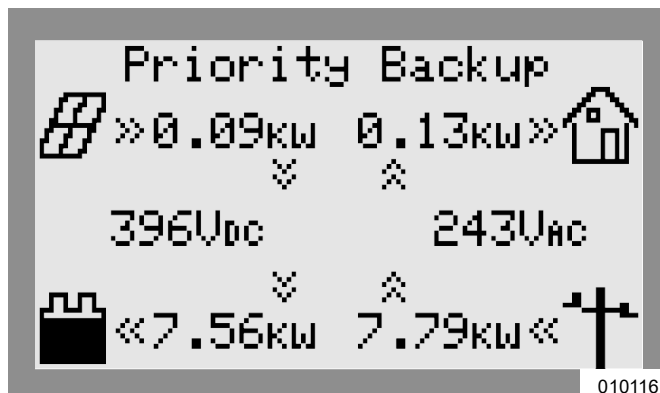


Figure 6-21. Current System Mode

Enabling Beacon TOU Scheduler

Once the TOU Schedule is set, the scheduler will automatically enable itself and begin running. However, if the scheduler becomes disabled for any reason, follow the instructions below to re-enable the scheduler:

1. See [Figure 6-22](#). Navigate to the REbus Beacon device page and press the center button to enter the device menu.

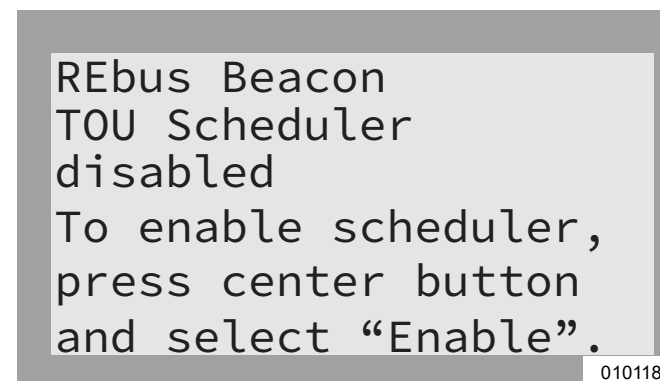


Figure 6-22. Enabling TOU Scheduler (1 of 2)

2. Highlight Enable and press the center button.
3. See [Figure 6-23](#). Arrow right to Confirm and press the center button.

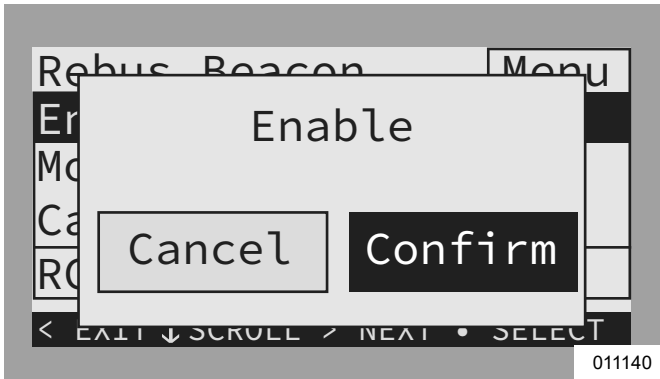


Figure 6-23. Enabling TOU Scheduler (2 of 2)

Disabling Beacon TOU Scheduler

The scheduler can be disabled at any time. To disable the scheduler:

1. See [Figure 6-24](#). Navigate to the Beacon device page and press the center button to enter the device menu.

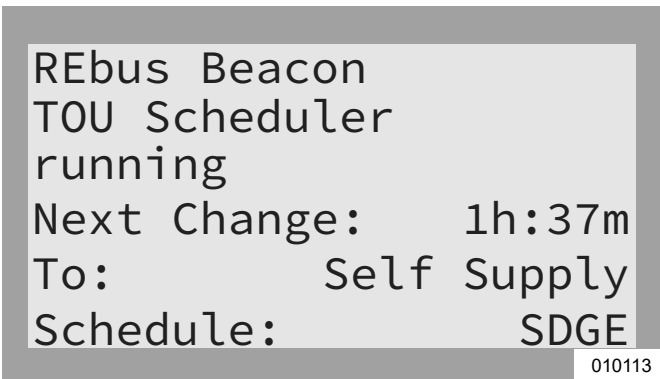


Figure 6-24. Disabling TOU Scheduler (1 of 3)

2. Highlight Disable and press the center button.
3. See [Figure 6-25](#). Arrow right to Confirm and press the center button.

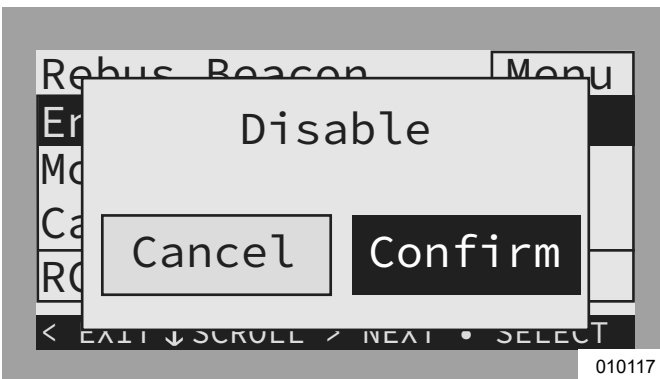


Figure 6-25. Disabling TOU Scheduler (2 of 3)

4. See [Figure 6-26](#). The status line on the Beacon device page will read Disabled.

NOTE: The system will remain in the current system mode until the mode is changed manually or the scheduler is re-enabled.

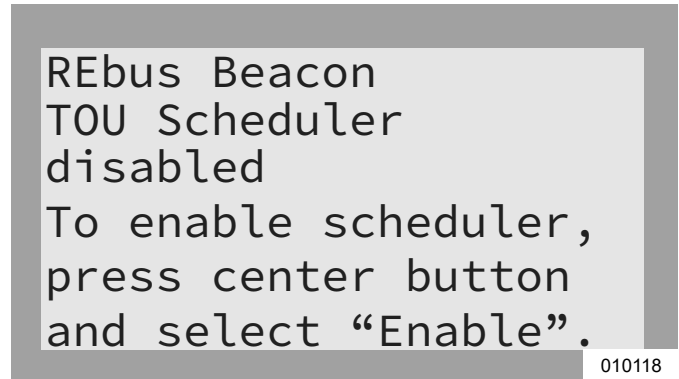


Figure 6-26. Disabling TOU Scheduler (3 of 3)

Temporarily Overriding the TOU Scheduler

The scheduler can be temporarily overridden at any time without disabling it. A manual override will apply until the next regularly scheduled system mode change.

To temporarily override the scheduler:

1. Navigate to the system home page.
2. Press the center button.
3. Select the desired temporary system mode.

When the scheduler has been overridden:

- Temporary Override will display on the home page, alternating with the words Scheduler Active and the name of the current system mode.
- See [Figure 6-27](#). Running, Overridden will display on the Beacon device page.

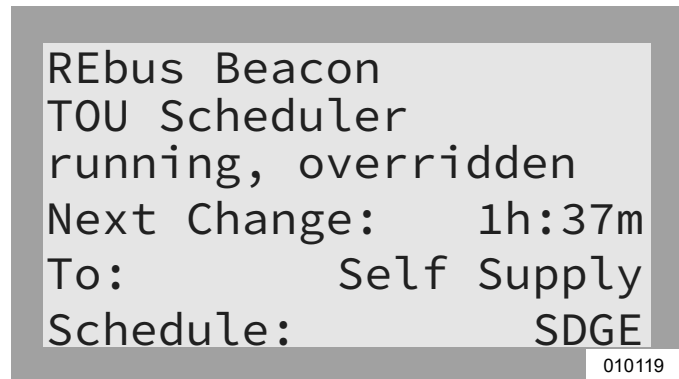


Figure 6-27. Overriding TOU Scheduler

- The countdown timer on the Beacon device page will indicate the remaining time until the next mode change.

After the next scheduled mode change, the scheduler will resume normal operation.

Disabling the TOU Scheduler in Anticipation of a Grid Outage

In the event of an impending storm and potential outage, top off the battery by disabling the scheduler and switching the system mode to priority backup or clean backup mode.

To disable the TOU Scheduler:

1. Navigate to the Beacon device page and disable the scheduler. See [Disabling Beacon TOU Scheduler](#) for more information.
2. Navigate to the system home page and change the system mode to a backup-only mode, such as Priority Backup or Clean Backup.
3. Once the emergency has passed, re-enable the scheduler. See [Disabling Beacon TOU Scheduler](#) for more information.

NOTE: If Priority Backup mode is not listed with the other system modes, the system installer may have removed the mode to comply with utility rules. Some utilities do not permit a battery to charge from the grid.

Access Installer Configuration Tool

The Installer Configuration Tool allows configuration and provisioning of Generac PWRcell systems from a smartphone or laptop. The interface allows installers to configure basic settings, set inverter compliance, generate a compliance report, and understand system performance. The interface is only available on Generac PWRcell systems with a REbus Beacon installed. Close proximity to the Beacon is required for use. It is not possible to access this tool remotely. 45 minutes after being activated, the Beacon's WiFi signal will time out and may need to be reactivated.

NOTE: All PWRcell Inverters come with a REbus Beacon pre-installed.

NOTE: The Installer Configuration Tool is for Installer use and not accessible to system owners following the instructions and notes below.

How to Access the Installer Configuration Tool

1. Navigate to the Beacon device page on the PWRcell Inverter control screen and press the center button.
2. Select Installer Tool from the menu and click Confirm. This will activate the Beacon's Wi-Fi network.
3. Use a smartphone or laptop to connect to the Wi-Fi network SSID titled: REbus_Beacon_xxxx where xxxx is the last 4 digits of the Beacon's RCP number.

NOTE: The Beacon's RCP number can be found on the front of the Beacon located inside the inverter, as well as on the Beacon device page through the inverter's screen. To find this number through the inverter's screen press the center button on the Beacon device page. The RCP number will be displayed at the bottom of the menu screen.

4. Type in the password (labeled "CODE") for the REbus Beacon's WiFi network.

NOTE: The code for the Beacon's WiFi network is located on the Beacon device. The code label is located in one of two locations: the front facing side or the back

facing side. The Beacon is mounted on the upper left-hand sidewall of the inverter housing. If necessary, unmount the Beacon to view the code label.

NOTE: For security against post-commissioning settings adjustments, remove the code label.

5. See [Figure 6-28](#). Open a web browser on a smartphone or laptop and enter 10.10.10.10 for the browser URL. The installer tool will appear in the browser.

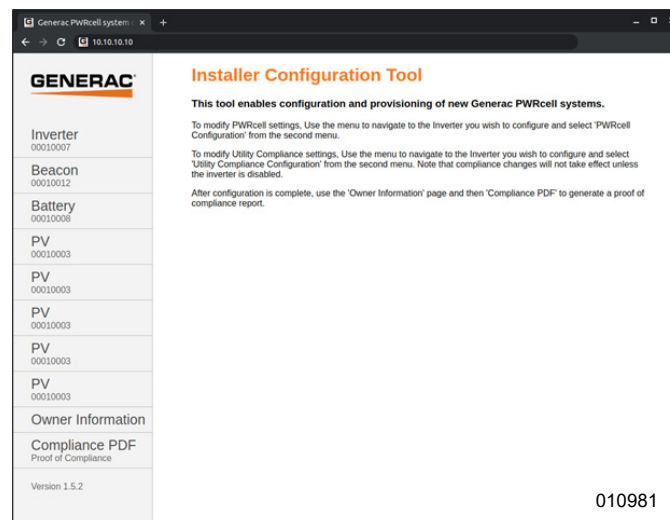


Figure 6-28. Installer Configuration Tool

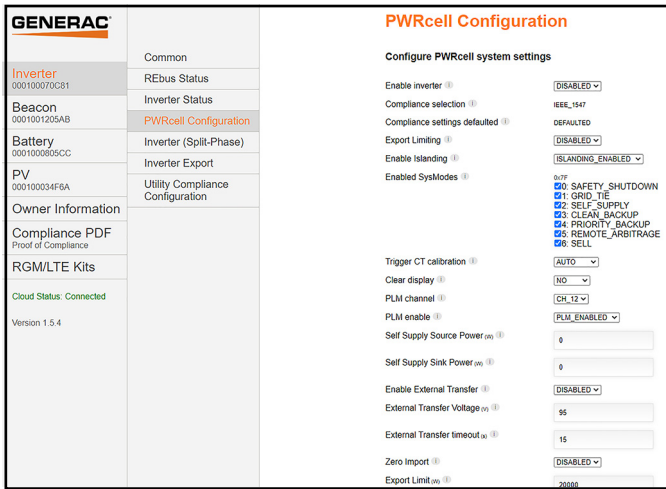
Configuring Basic PWRcell Settings

NOTE: To customize basic settings, the inverter must be disabled. Before disabling the inverter, ensure all REbus devices have first been disabled. Settings changes will not be applied if the inverter is enabled.

1. Select Inverter from the menu.

NOTE: If using a smartphone, open the menu by clicking the hamburger icon in the upper-right corner of the screen. Laptop users will see the menu displayed on the left side of the screen.

2. Select PWRcell Configuration.
3. See [Figure 6-29](#). To adjust a setting, click on it, select the desired change, and click Submit. Any changes selected to be made, will not be implemented unless Submit is selected at the end.



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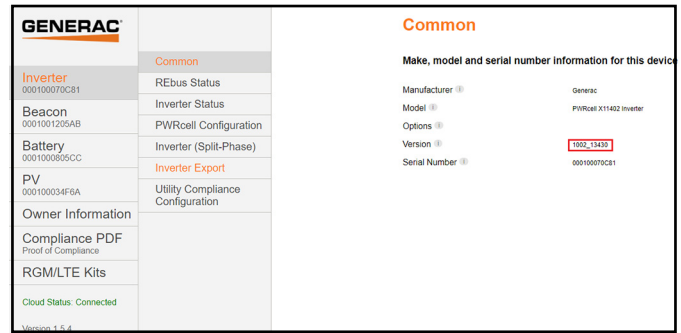
Figure 6-29. PWRcell Configuration

Most device settings can be adjusted through the inverter’s screen with the exception of the following settings, which can only be adjusted through the Installer Configuration Tool:

- **Enabled SysModes.** Allows installers the option to disable system modes, such that they cannot be enabled through the inverter control screen. To disable a system mode, tap the checkbox to uncheck the box for that mode. Click Submit to save.
- **Clear Display.** Allows installers to wipe the screen of any unwanted devices being retained by the memory card in the screen module. Select Clear and click Submit. The screen will go blank and test its LEDs. Allow time for the screen to reload before accessing.
- **Export Limiting.** UL 1741 PCS CRD Import Only compliance to limit export or achieve zero export. See [Export Limit](#).
- **Zero Import.** UL 1741 PCS CRD Export Only compliance to remove the ability of the battery to charge from the grid. See [Zero Import](#).

Verifying Inverter Firmware Version

Some features, such as those found in [Set Import / Export Compliance](#), require inverter firmware that may not come default to the unit installed. The firmware version of an inverter can be verified using the Installer Configuration Tool. To verify the inverter firmware version in the Installer Configuration Tool, select the 'Common' sub-menu option under the "Inverter" object as shown in [Figure 6-30](#).



011233

Figure 6-30. Verifying Inverter Firmware

The information populated upon selecting the 'Common' sub-menu option lists the manufacturer, model, version, and serial number for the inverter. The value displayed for 'Version' contains the hardware version and firmware version of the inverter displayed as the sequence of numbers separated by an underscore. Where an “H” represents the hardware version and an “F” represents the firmware version, the value shown for 'Version' would be “HHH_FFFFFF”.

Set Inverter Grid Compliance

NOTE: The inverter must be disabled before changing utility compliance settings. Before disabling the inverter, ensure all REbus devices have first been disabled. Compliance settings changes will not be applied if the inverter is enabled.

By default, all Generac PWRcell Inverters ship in compliance with IEEE 1547 to meet UL 1741. If the system needs to be configured to comply with a different grid interconnection standard, activate the new configuration via the Installer Configuration Tool. See [Access Installer Configuration Tool](#) for more information.

1. To set an inverter to comply with a utility’s requirements, navigate to the drop-down menu in the upper right-hand corner of the Installer Configuration Tool home page and select Inverter from the drop-down menu.
2. See [Figure 6-31](#) Click on Utility Compliance Configuration and select the appropriate utility compliance standard from the menu at the bottom of the page. Click Submit to apply the compliance standard. The settings entered will not take effect until the Submit button has been clicked.

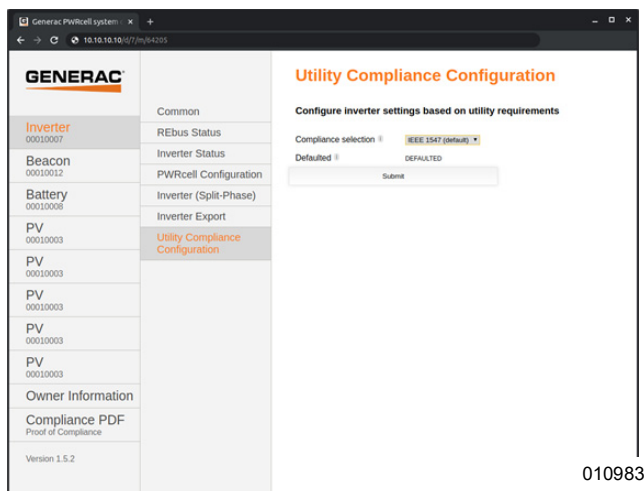


Figure 6-31. Utility Compliance Configuration

NOTE: Verify the Compliance Selection field shows the desired compliance rule after clicking Submit.

NOTE: For multi-system sites, compliance must be set on each inverter separately through each respective Beacon.

Proof of Compliance

See [Figure 6-32](#). The PWRcell Utility Compliance Report is a downloadable (PDF) document that validates whether the system has been set up to conform to a utility compliance ruleset. Please double check that the system is configured properly by observing the 'Grid Profile' line in the report.

If the utility requires proof of correct configuration, save this report and send it to the utility. It is recommend to keep a copy on file as well.

1. To generate a PWRcell Utility Compliance Report, click on the Compliance PDF tab in the navigation menu.
2. Click on Download Report.
3. A new window will open in the browser with the report. Verify the information is correct and save the document or send via email.

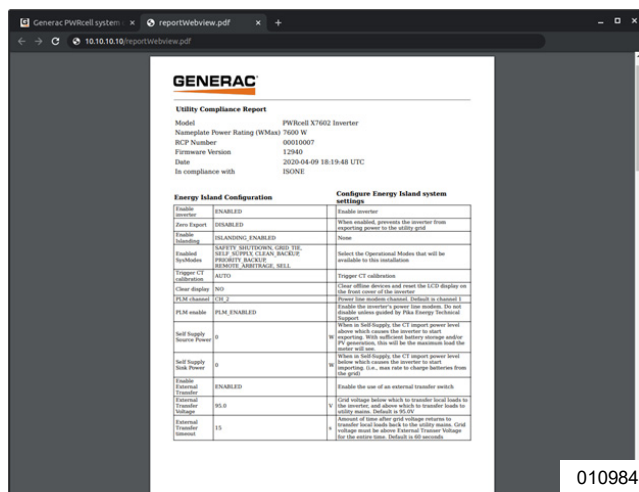


Figure 6-32. PWRcell Utility Compliance Report

Set Import / Export Compliance

A PWRcell Inverter ships from the factory without restrictions on import and export. Utility interconnection requirements may require the system to restrict or limit its ability to import or export power from or to the Utility grid. There are two UL 1741 PCS CRD compliant settings for PWRcell equipment: Zero Import and Export Limit.

NOTE: These settings are only available for inverter firmware version 13290 or greater. See [Verifying Inverter Firmware Version](#) for more details. To request a firmware update, please call 1-855-395-7841.

IMPORTANT: Import / Export compliance settings rely upon proper CT functionality. Ensure CTs placement is correct for the system configuration, and ensure CTs are calibrated and functioning. See [Current Transformers \(CTs\)](#) for more information.

Zero Import

(PCS CRD Export Only compliance): allows the battery to export power to a connected utility grid but will not allow the battery to be charged from the utility grid. In Zero Import, the battery will only be charged by connected PV power sources.

When the PWRcell CTs measure current being imported, the inverter prevents sourcing grid power to charge DC-coupled energy storage (PWRcell Battery). In the event of a loss of communications with the PWRcell CTs, the inverter will not import AC power to charge the battery.

NOTE: Zero Import is one-time settable. Once set, some utilities may require the request to unset this setting to come from the utility. To unset Zero Import, please contact Generac PWRcell Technical Support.

How to set:

1. Navigate to the inverter device page.
2. Disable inverter if enabled.
3. Access the Installer Configuration Tool through the REbus Beacon. See [Access Installer Configuration Tool](#).
4. Once logged onto the Installer Configuration Tool, select "Inverter."
5. From the Inverter menu select "PWRcell Configuration."
6. See [Figure 6-33](#). Uncheck Priority Backup from the "Enabled SysModes" list.
7. Find the Zero Import setting and select "ENABLED".
8. Click the "Submit" button at the bottom of the page.
9. Be sure to generate a compliance report once all compliance settings have been set. See [Proof of Compliance](#) section for more information.

Enabled SysModes ⓘ 0x7F
0: SAFETY_SHUTDOWN
1: GRID_TIE
2: SELF_SUPPLY
3: CLEAN_BACKUP
4: PRIORITY_BACKUP
5: REMOTE_ARBITRAGE
6: SELL

Trigger CT calibration ⓘ AUTO ▾

Clear display ⓘ NO ▾

PLM channel ⓘ CH_2 ▾

PLM enable ⓘ PLM_ENABLED ▾

Self Supply Source Power (w) ⓘ 0

Self Supply Sink Power (w) ⓘ 0

Enable External Transfer ⓘ DISABLED ▾

External Transfer Voltage (v) ⓘ 95

External Transfer timeout (s) ⓘ 15

Zero Import ⓘ ENABLED ▾

Export Limit (w) ⓘ 20000

Submit

011685

Figure 6-33. Zero Import

Export Limit

(PCS CRD Import Only compliance): allows a qualified installer to restrict the export to a connected utility grid and set an Export Limit value. When the Export Limit value is set to 0, this setting functions as a “Zero Export” mode or PCS CRD Import Only mode. For this setting’s value to be active, the setting Export Limiting must be ENABLED.

When the PWRcell CTs measure current being exported, the inverter reduces its power output until export is no longer measured. In the event of a loss of communications with PWRcell CTs, the PWRcell Inverter ramps down its power output until export is halted.

NOTE: Export Limiting is one-time settable. Once set, some utilities may require the request to unset this setting to come from the utility. To unset Export Limiting, please contact Generac PWRcell Technical Support.

NOTE: Export Limit setting can only be decreased from its current value. To reset the value of this setting, please contact PWRcell Technical Support.

How to set:

1. Navigate to the inverter device page.
2. Disable inverter if enabled.
3. Access the Installer Configuration Tool through the REbus Beacon. See [Access Installer Configuration Tool](#).
4. Once logged onto the Installer Configuration Tool, select “Inverter.”

5. From the Inverter menu select “PWRcell Configuration.”
6. See [Figure 6-34](#). Find the Export Limiting setting and select “ENABLED”.
7. Scroll to the bottom and locate Export Limit.
8. Change the setting value. If Zero Export is necessary, make this value 0 (watts).
9. Click the “Submit” button at the bottom of the page.
10. Be sure to generate a compliance report once all compliance settings have been set. See [Proof of Compliance](#) section for more information.

GENERAC

Inverter
000100070ASC

Beacon
000100121272

Battery
000100080596

Owner Information

Compliance PDF
Proof of Compliance

RGM/LTE Kits

Cloud Status: Connected

Version 1.5.4

PWRcell Configuration

Common

REbus Status

Inverter Status

PWRcell Configuration

Inverter (Split-Phase)

Inverter Export

Utility Compliance Configuration

Configure PWRcell system settings

Enable inverter ⓘ ENABLED ▾

Compliance selection ⓘ IEEE_1547

Compliance settings defaulted ⓘ DEFAULTED

Export Limiting ⓘ DISABLED ▾

Enable Islanding ⓘ ISLANDING_ENABLED ▾

Enabled SysModes ⓘ

0x7F
0: SAFETY_SHUTDOWN
1: GRID_TIE
2: SELF_SUPPLY
3: CLEAN_BACKUP
4: PRIORITY_BACKUP
5: REMOTE_ARBITRAGE
6: SELL

Trigger CT calibration ⓘ AUTO ▾

Clear display ⓘ NO ▾

PLM channel ⓘ CH_2 ▾

PLM enable ⓘ PLM_ENABLED ▾

Self Supply Source Power (w) ⓘ 0

Self Supply Sink Power (w) ⓘ 0

Enable External Transfer ⓘ DISABLED ▾

External Transfer Voltage (v) ⓘ 95

External Transfer timeout (s) ⓘ 15

Zero Import ⓘ DISABLED ▾

Export Limit (w) ⓘ 20000

Submit

011686

Figure 6-34. Export Limit

NOTE: These settings are included in the PWRcell Utility Compliance Report. See [Proof of Compliance](#) section for more information.

Commissioning Multiple Inverter Systems

NOTE: Do not energize two or more inverters before commissioning. Energizing two or more inverters prior to commissioning will result in crosstalk.

PWRcell Inverters are manufactured with some common default parameters. One of these default parameters is the default Power Line Modem (PLM) channel. PWRcell Inverters use the PLM channel to communicate with and send commands to REbus-powered devices. In this way, a PWRcell Inverter behaves like a master device. If two or more master devices are communicating on the same PLM channel, REbus devices will not respond properly to the intended master device. Instead, REbus devices may respond to the wrong master device, leading to communication and reporting issues. This is referred to as crosstalk.

Multiple Inverter System Pre-Commissioning Checklist

Before commissioning multiple inverter systems, confirm the following:

- Inverter systems (including PV Links and PWRcell Batteries) have been installed per manufacturer instructions and to local and state code requirements.
- PWRcell Batteries have their Battery Disconnect Switches in the OFF position.
- PWRcell Inverters have not been powered on. If inverters have been powered on, refer to [PLM Crosstalk Recovery Procedure](#).
- The AC Grid Connection terminals of a PWRcell Inverter are not powered by another PWRcell Inverter's protected loads terminals during backup operation (Island Mode).
- The protected loads terminals of two or more PWRcell Inverters are not wired to support the same load panel simultaneously.

NOTE: To determine if the inverter is powered off, check the inverter control panel and the inverter AC grid connection. When powered off, the inverter control panel will be blank and the inverter AC grid connection will not have voltage present.

Multiple Inverter System Commissioning Procedure

NOTE: Throughout this process, it is important that only one inverter is energized at any time. If two or more inverters are energized at any point during this process, the inverters will crosstalk. To resolve crosstalk, see [PLM Crosstalk Recovery Procedure](#).

1. Perform [Commissioning Overview](#) steps 1 – 6.
2. Modify the PWRcell Inverter PLM Channel to 0 in the inverter 'Mod. Settings' menu to maintain com-

munication with connected devices during programming.

NOTE: PLM Channel 0 is a universal channel. Only use for inverters during programming. Do not set REbus devices to channel 0. Do not leave inverter on channel 0.

3. Choose a channel from 2 – 12. This channel will be used exclusively for this inverter and its connected REbus devices. The channel must be unique to this inverter system.

Ex.

- Inverter system number 1: PV Links, battery and inverter become programmed to PLM Channel 2.
- Inverter system number 2: PV Links, battery and inverter become programmed to PLM Channel 3.

NOTE: Do not leave any device, including the inverter, on channel 0 or channel 1 by the end of the process.

4. Access 'Mod. Settings' for each PV Link and PWRcell Battery and change the PLM channel to the chosen channel (step 3) for that system. See device installation manual as needed for specific instructions.
5. Modify the PLM channel setpoint for the PWRcell Inverter to match the PLM channel its REbus devices were set to in the previous step.

NOTE: Be sure to click Save at the bottom of the menu after modifying the channel on each device.

6. Disable the system by pressing and holding the red Shutdown button.
7. Turn off the Battery Disconnect Switch for any connected PWRcell Batteries.
8. Turn off the inverter by opening the AC backfeed breaker or AC disconnect for that inverter.

NOTE: It may take a few seconds for the inverter screen to power off due to stored energy in the Power Core. Wait until the screen goes blank before energizing the next inverter.

9. Once the inverter is powered down, proceed to the next inverter and repeat steps 1 – 8, making sure to select a different and unique PLM channel for the next system.
10. After programming each system separately, restore AC power to all PWRcell Inverters by closing their AC backfeed breakers or AC disconnects, enable the inverters, and enable all REbus devices.
11. Complete the commissioning process for all inverter systems as needed by performing [Commissioning Overview](#) step 8. Advanced Commissioning steps may be skipped if not applicable.

How to identify PLM Crosstalk

Crosstalk can be easily identified by navigating to the device pages on an inverter control panel. If two inverter device pages exist, crosstalk has occurred. Similarly, if any REbus devices from one inverter show up on another, crosstalk has occurred.

NOTE: To differentiate one inverter device page from another, confirm the RCP numbers via the device page sub-menu.

NOTE: It is recommended to keep a list of which REbus devices are connected to specific inverters at multi-system sites.

PLM Crosstalk Recovery Procedure

For each PWRcell Inverter that has crosstalked, perform the following procedure:

1. Power down all but one inverter.
2. Access the Installer Configuration Tool.
3. Navigate to the Inverter and select “PWRcell Configuration.”
4. Select ‘Clear Display’ to wipe the screen of crosstalked devices.
5. Follow steps 1 – 11 for Multiple Inverter System Commissioning. See [Multiple Inverter System Commissioning Procedure](#) for more information.
6. Proceed to next crosstalked inverter and repeat this procedure.

Section 7: System Operation

General Information

The PWRcell system is a flexible, highly customizable system that can be configured in a number of ways to meet customer needs. Correct system configuration requires selecting the right equipment and the correct system mode for the system.

All REbus devices are configured and controlled through the Generac PWRcell Inverter. Connected devices will appear on the LCD display.

Operation and User Interface

See **Figure 7-1**. Generac PWRcell is controlled through the PWRcell Inverter control panel. The inverter control panel is used for adjusting system settings and for interacting with devices.

- Use left and right arrows (A) to navigate between pages.

Press center button (B) on a device page to select or deselect device settings.

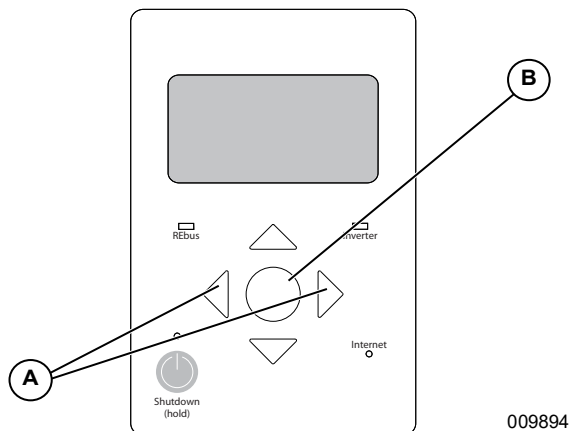


Figure 7-1. Inverter Control Panel

009894

Home Screen

See **Figure 7-2**. The power flow display on the home screen illustrates the flow of power in the system. As power is generated, stored, and consumed, animated arrows indicate the flow and direction of power. System AC and DC voltage levels are displayed near the center of the screen. The current system mode is displayed at the top of the screen.



012920

Figure 7-2. Home Screen

Home Screen Icons

	Represents the PWRcell Inverter.
	Represents the cumulative production of the solar array connected to PV Links.
	Represents PWRcell Batteries, if installed.
	Represents house loads including backup loads.
	Represents the Utility Grid when CTs are successfully calibrated. This icon will not appear on the home screen if CTs are not calibrated.
	Represents the PWRgenerator or AC coupled Generac Home Standby Generator if installed and integrated into the system.

Activating the System Post Permission to Operate (PTO)

After a PWRcell system has been installed, it will need to be inspected and granted permission to operate (PTO). A PWRcell system may be left in one of two states while it awaits PTO:

1. **System Operating:** making power with 'Export Override' turned 'on' to restrict the system from exporting to the utility grid.
2. **System Disabled:** not making power with inverter and all components in a disabled state (inverter screen may still be illuminated).

NOTE: For systems with a battery and a protected loads panel, the inverter's grid connection should be closed with its 2-pole 40 A over current protection device in the ON position and the Protected Loads Disconnect in the inverter in the ON position. This will allow the protected loads panel to remain powered should the system be disabled awaiting PTO.

Activating Post PTO: System Operating

1. From the home page on the inverter control panel, use the right arrow key to navigate to the inverter device page.
2. Press the center button to access the inverter device main menu.
3. See [Figure 7-3](#). Use the down arrow key to scroll to "Mod. Settings."
4. Select "Mod. Settings" using the center button.
5. See [Figure 7-4](#). Use the down arrow key to scroll to 'Export Override' and select using the center button.
6. Use the up/down arrow keys to change the value of 'Export Override' from 'on' to 'off.'
7. Use the center button to deselect 'Export Override.'
8. Scroll to the bottom of the "Mod. Settings" menu and select 'Save' to save the changes.

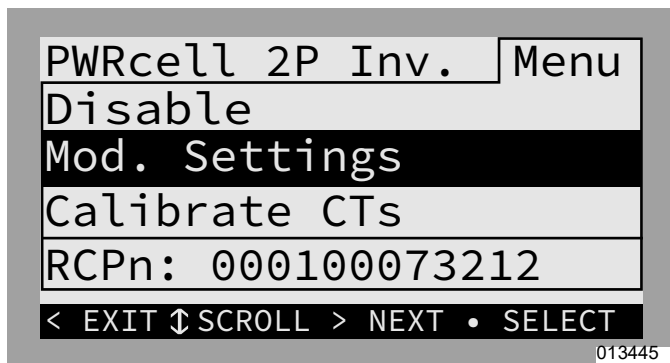


Figure 7-3. Device Main Menu

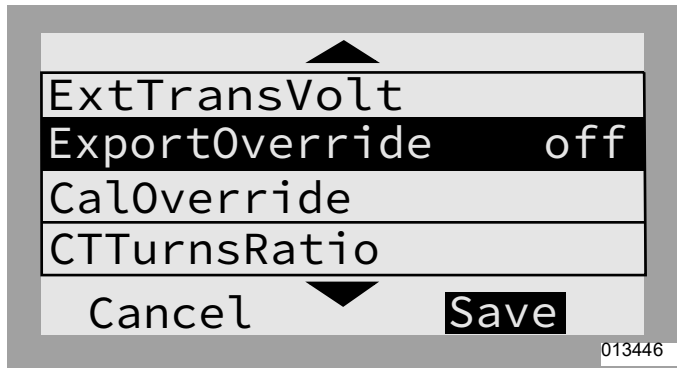


Figure 7-4. Mod Settings Menu

Activating Post PTO: System Disabled

1. Ensure the inverter is powered ON with the screen illuminated.
 - a. If the inverter is powered OFF, close the 2-pole 40 A over current protection device for the inverter's AC grid connection by turning the breaker or disconnect to the ON position.
2. Lift the inverter lid and confirm the occupied DC Disconnects on the left-hand side of the inverter are in the ON position.
3. For systems with battery backup, ensure the Protected Loads Disconnect is in the ON position.
4. With the screen illuminated, from the home page on the inverter control panel, press the center button to access the system modes menu.
5. See [Figure 7-5](#) and [Figure 7-6](#). Use the up/down arrow keys to scroll to the desired system mode and select using the center button. See [Select Inverter System Mode](#) for further instructions. See [System Modes Overview](#) for details on functionality.

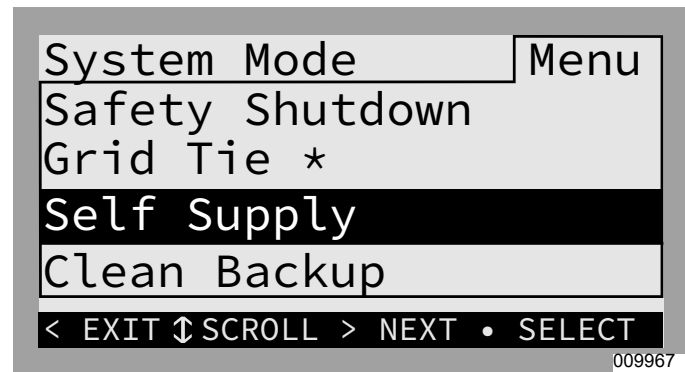


Figure 7-5. Selecting System Modes (1 of 2)



Figure 7-6. Selecting System Modes (2 of 2)

6. Enable REbus devices beginning with the inverter.
7. See [Figure 7-7](#). From the home page on the inverter control panel, use the right arrow key to navigate to the inverter device page.
8. See [Figure 7-8](#). Press the center button to access the inverter device main menu.
9. See [Table 7-9](#). Select “Enable” and 'Confirm' to enable the inverter.

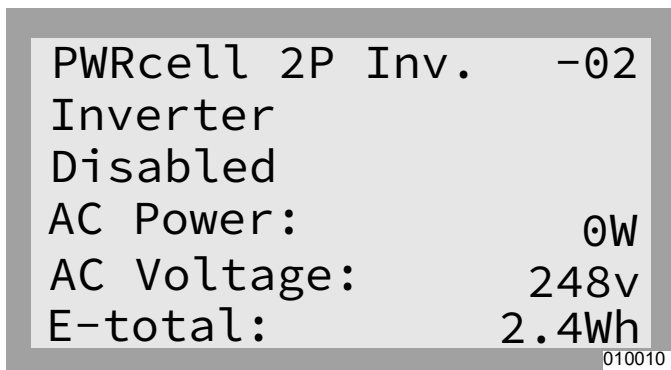


Figure 7-7. Enabling Inverter (1 of 3)

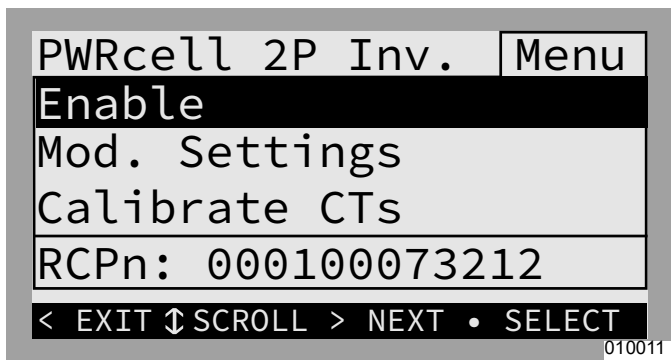


Figure 7-8. Enabling Inverter (2 of 3)

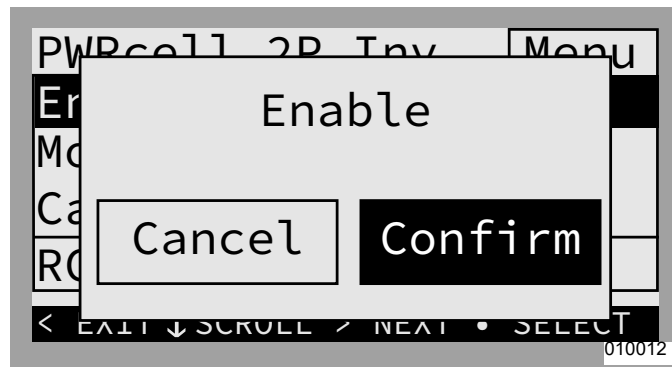


Figure 7-9. Enabling Inverter (3 of 3)

10. Once the inverter is enabled and in state, “grid connected,” scroll right and enable each PV Link and PWRcell Battery, repeating the process just performed for the inverter. See [Figure 7-10](#), [Figure 7-11](#), and [Figure 7-12](#). Also see [Configure Rebus Devices and Enable REbus Devices](#) for more information.

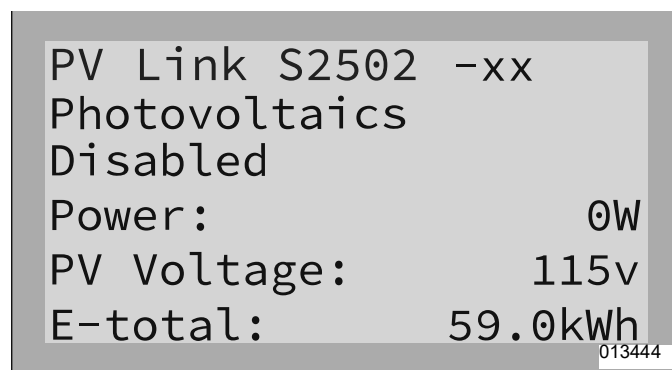


Figure 7-10. Enabling REbus Devices (1 of 3)

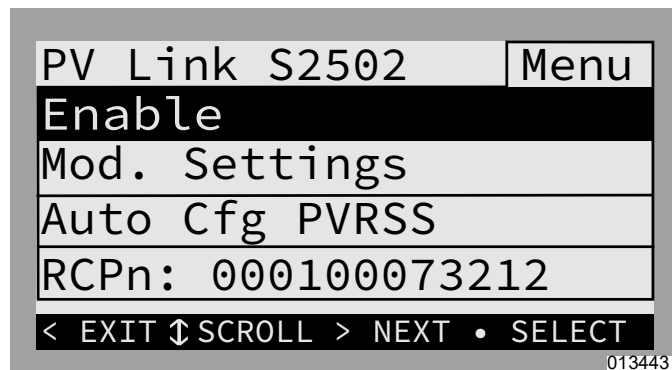


Figure 7-11. Enabling REbus Devices (2 of 3)

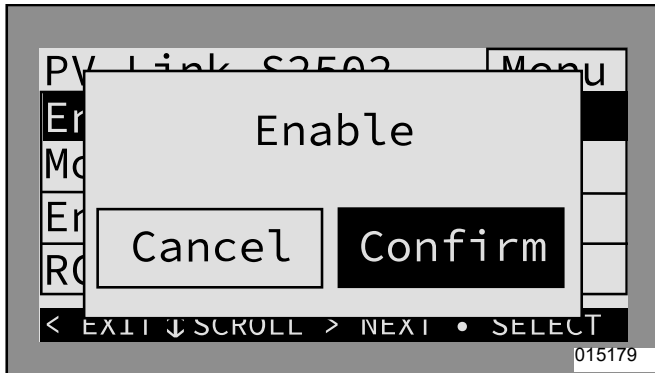


Figure 7-12. Enabling REbus Devices (3 of 3)

- a. Notice there will be multiple pages of S2502 PV Links. Watch the horizontal cursor at the top of each page to indicate a new page. Press the center button on a device to reference its RCPn and confirm the device ID.
- 11. See [Figure 7-13](#). Confirm PV Links are in state, “making power.”
 - a. See [Figure 7-14](#). If the PV Link goes directly to “low sun,” disable the device and select “Auto Cfg PVRSS.”
 - b. If the PV Link still goes directly to “low sun,” contact the Independent Authorized Service Dealer (IASD) who installed the system.

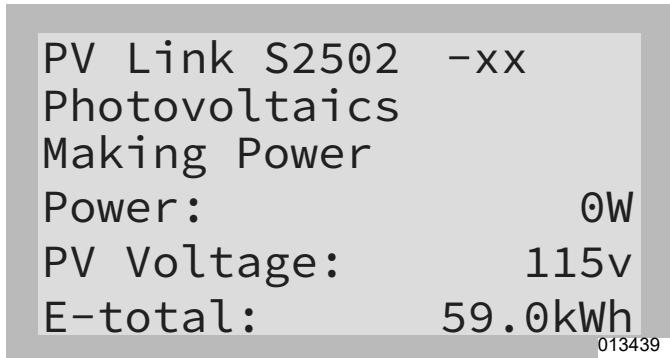


Figure 7-13. PV Link Device Page

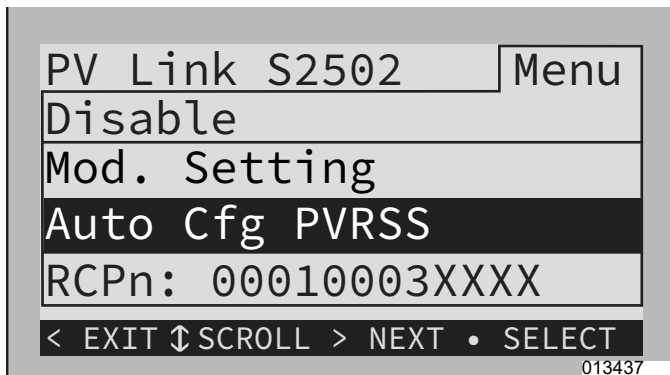


Figure 7-14. PV Link - Auto Cfg PVRSS

- 12. Confirm PWRcell Batteries are in state “standby,” “charging,” or “discharging” (state will depend on system mode selected).

NOTE: It is only necessary to enable the REbus Beacon if setting the system to operate on a Time of Use (TOU) schedule. See Section 6: [Commissioning Advanced Commissioning Steps](#) for more information.

Confirm Inverter Settings

Once the system is activated, confirm the system mode, and navigate to the inverter device page. Press the center button to access the “Mod. Settings” menu for the inverter, and confirm the settings are set correctly for the system installed.

PV Only System

- System mode should be “Grid Tie.”
- See [Figure 7-15](#) and [Figure 7-16](#). Inverter “Mod. Settings.”
 - o 'Enalstanding' should be 'off.'
 - o All other settings should be at their default values.

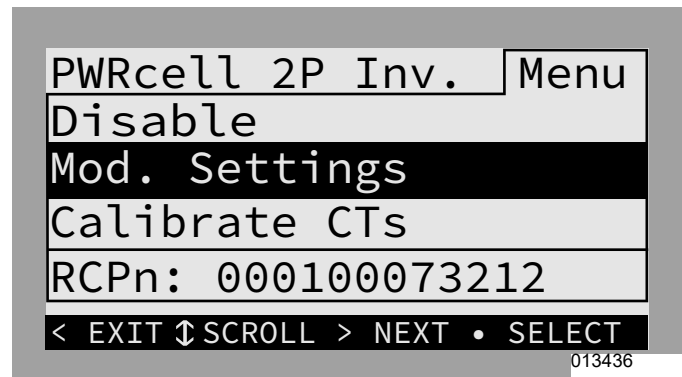


Figure 7-15. PV Only System (1 of 2)

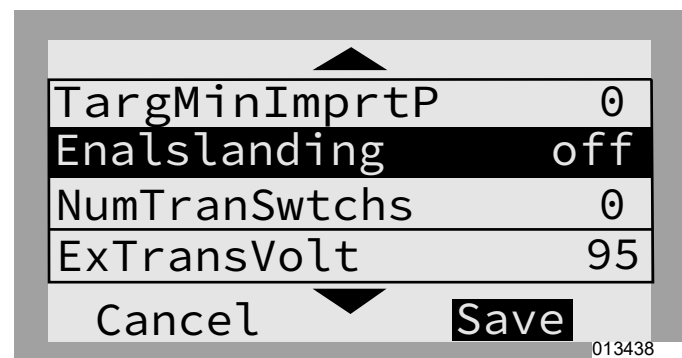


Figure 7-16. PV Only System (2 of 2)

PV + Battery w / a Protected Loads Subpanel for Partial Home Backup

- System mode should be Self Supply, Clean Backup, or Priority Backup.
- See [Figure 7-17](#) and [Figure 7-18](#). Inverter “Mod. Settings.”
 - o 'Enalstanding' should be 'on.'
 - o All other settings should be at their default values.

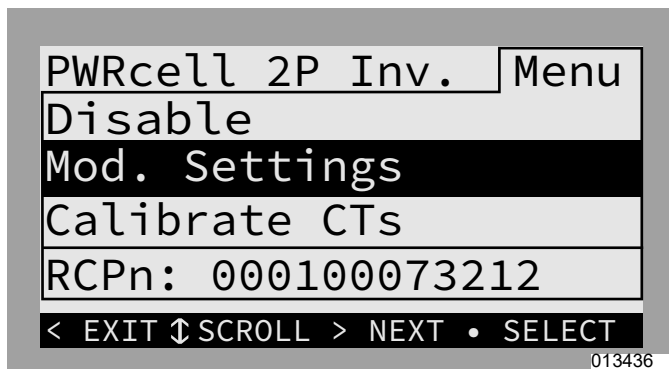


Figure 7-17. PV + Storage - Partial Home (1 of 2)

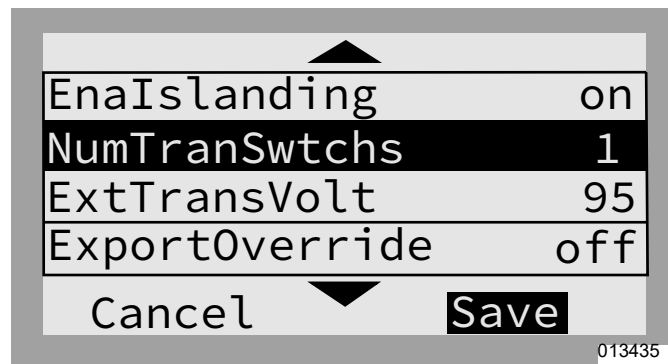


Figure 7-20. PV + Storage - Whole Home (2 of 3)

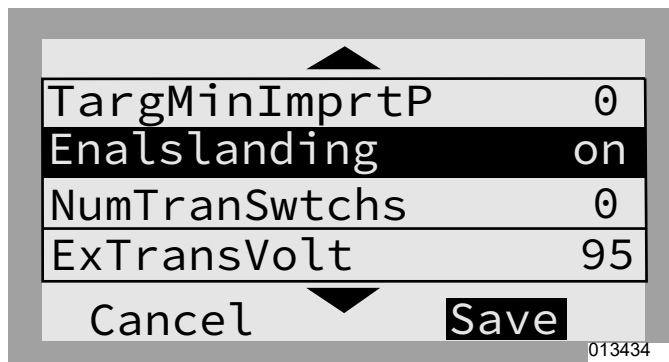


Figure 7-18. PV + Storage - Partial Home (2 of 2)

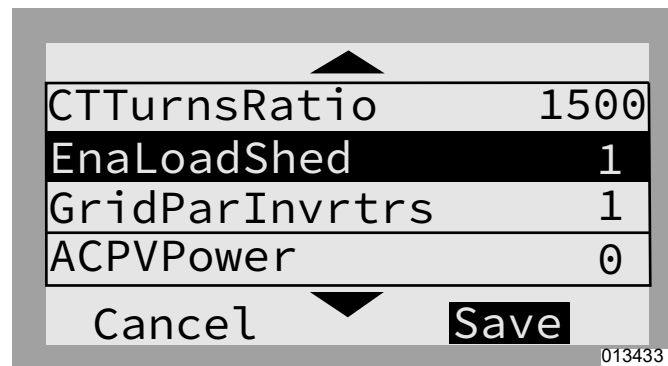


Figure 7-21. PV + Storage - Whole Home (3 of 3)

PV + Battery w / a PWRcell ATS and Load Management for Managed Whole Home Backup

- System mode should be Self Supply, Clean Backup, or Priority Backup.
- See [Figure 7-19](#), [Figure 7-20](#), and [Figure 7-21](#). Inverter “Mod. Settings:”
 - o 'EnaIslanding' should be 'on.'
 - o 'NumTranSwTchs' should be '1.'
 - o 'EnaLoadShed' should be '1' for PWRmanager and / or SMMs only and '2' for PWRcell ATS Controller (with or without SMMs).
 - o All other settings should be at their default values.

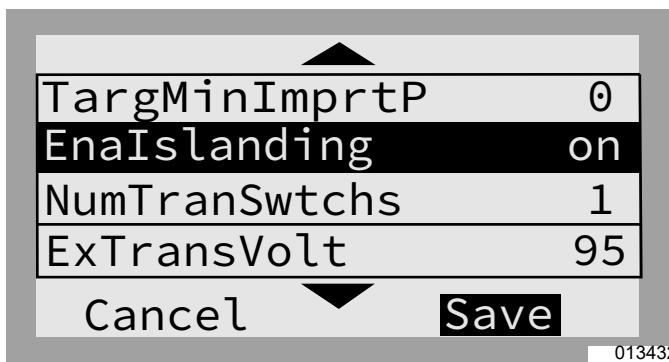


Figure 7-19. PV + Storage - Whole Home (1 of 3)

NOTE: Contact the Independent Authorized Service Dealer (IASD) who installed the system if unsure of how to proceed with any of the actions above.

System Modes Overview

Generac PWRcell offers several system modes for various installation configurations, markets, and applications. Connected REbus devices work together to manage the distribution of power based on the selected system

mode. Some modes interact with PWRcell Batteries to store power and/or balance production and consumption. See [Table 7-1](#) and [Table 7-2](#) for an overview of available system modes.

Table 7-1. Grid Connected Inverter System Modes

Priority	Grid Tie	Self Supply	Clean Backup	Priority Backup	Sell
1	Support local loads.	Support local loads with PV and batteries.	Charge batteries from PV only.	Charge batteries from PV.	Exports maximum amount of power using any energy available.
2	Export to grid.	Charge batteries from PV.	Support local loads with PV.	Charge batteries from grid.	Charge batteries from excess PV energy.
3	–	Export to grid.	Export to grid.	Support local loads with PV.	–
4	–	–	–	Export to grid.	–

Table 7-2. Optimal System Mode for Goal

Goal	Optimal Inverter Configuration
Net-metering solar energy without a battery.	Grid Tie
Use grid as little as possible.	Self Supply
Keep batteries charged using only solar power.	Clean Backup
Keep batteries charged as much as possible.	Priority Backup
Export maximum power including stored energy.	Sell

Grid Tie

In Grid Tie mode, the PWRcell Inverter functions as a conventional grid-tied inverter system. The system powers local loads and when generation exceeds load demand, excess power is exported to the utility for net metering and other credits.

NOTE: Grid Tie is intended for use with systems that do not include a PWRcell Battery. For systems where a PWRcell Battery will be connected at a later date, operate in Grid Tie mode until the battery is installed.

Self Supply

NOTE: This feature requires CTs to properly installed and calibrated prior to use.

In Self Supply mode, the inverter prioritizes powering local loads first using solar and/or stored power by attempting to maintain a zero reading at the CTs. If the home is consuming power, the inverter will first use available PV production to cover the demand. If local load demand exceeds PV production, the battery will begin to discharge to compensate and maintain the zero reading. If load demand exceeds what the PWRcell system can supply from PV and the battery, the remaining power needed will be drawn from the grid. If load demand is less than PV production, the PWRcell

system will attempt to charge the battery. Only when the battery is fully charged, and local demand is satisfied will the system export to the grid.

If there is another grid-interactive secondary power source (ex. PV system, ESS) interconnected on the load side of the PWRcell CTs, the production from this power source will be available to the PWRcell system. If other secondary power source production exceeds what the home can consume, and the PWRcell Battery can take a charge, the PWRcell Inverter will absorb the excess production to charge the battery, again attempting to maintain a zero reading at its CTs. Once house loads are covered and the battery is charged, excess production will be allowed to export to the grid.

See [Figure 7-22](#). If more power is being produced by the solar array than is needed by local loads, the inverter stores the energy in the battery for later use.

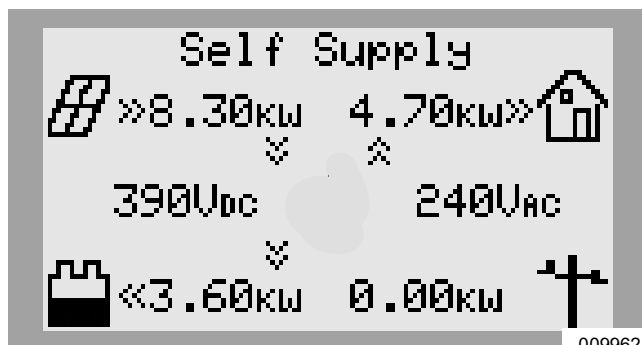


Figure 7-22. Self Supply (1 of 3)

See [Figure 7-23](#). When the battery is full and a surplus of power is available, that surplus is exported to the grid.



Figure 7-23. Self Supply (2 of 3)

See [Figure 7-24](#). When local demand exceeds available solar power, the battery will discharge to offset the demand. If the building requires more power than the battery and solar can provide, the excess demand is drawn from the grid.

Operating in Self Supply mode, the battery will discharge on a daily basis to the minimum reserve setting on the PWRcell Battery. The setting MinSocRsrv comes default set to 30 percent. This means a system operating in Self Supply, while grid connected, will only use up to 70 percent of the battery's stored capacity, leaving at least 30 percent available for Island Mode in the event of a utility service interruption.

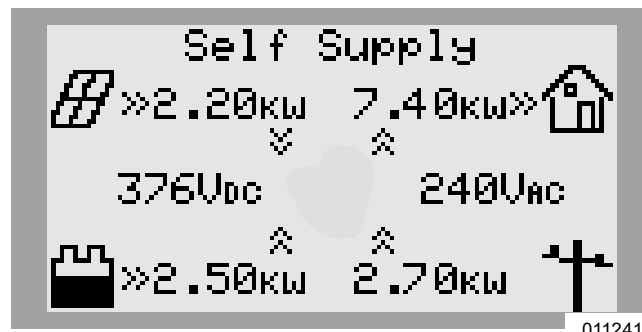


Figure 7-24. Self Supply (3 of 3)

Clean Backup

NOTE: Grid power is not used to charge batteries in this mode.

See [Figure 7-25](#). In Clean Backup mode, the inverter prioritizes keeping the battery charged and ready for a grid interruption using solar power only. If the battery is not fully charged, the inverter uses all available solar power to charge the battery. PWRcell Batteries will not export to grid in this system mode.

See [Figure 7-26](#). When the battery is fully charged, solar power will flow to local loads and the grid.

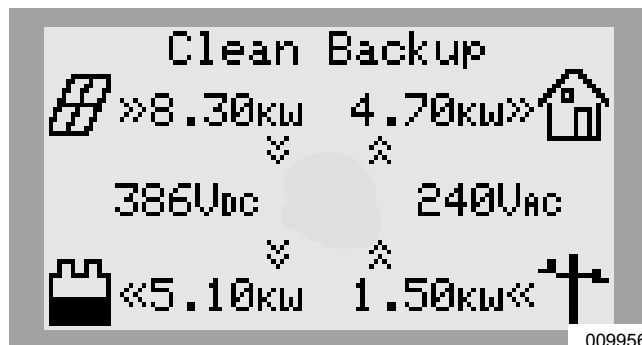


Figure 7-25. Clean Backup (1 of 2)

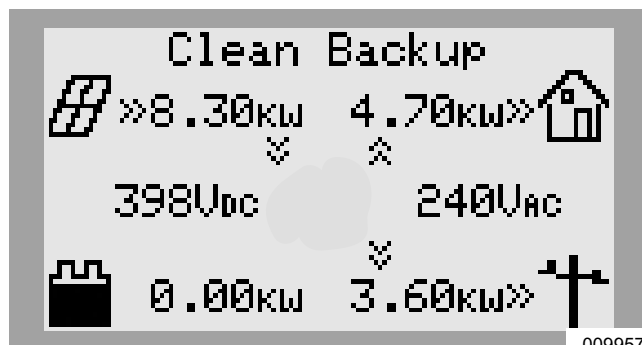


Figure 7-26. Clean Backup (2 of 2)

See [Figure 7-28](#). If there is a utility service interruption while operating in Clean Backup, the system will enter Island Mode. Protected loads will be supported by solar and battery power. If enough solar power is available, solar will simultaneously charge the battery and support the loads.

Priority Backup

In Priority Backup mode, the inverter prioritizes keeping batteries charged and ready for grid interruption using solar or grid power. If the battery is not fully charged, all available solar power is used to charge the battery. When the available solar power is lower than the battery input power rating, the inverter uses grid power to expedite battery charging. PWRcell Batteries will not export to grid in this system mode.

See **Figure 7-27**. If solar and grid power are available, both can charge the battery. The system displays the amount of power being drawn from the grid and the amount of power being consumed by local loads before reaching the battery.

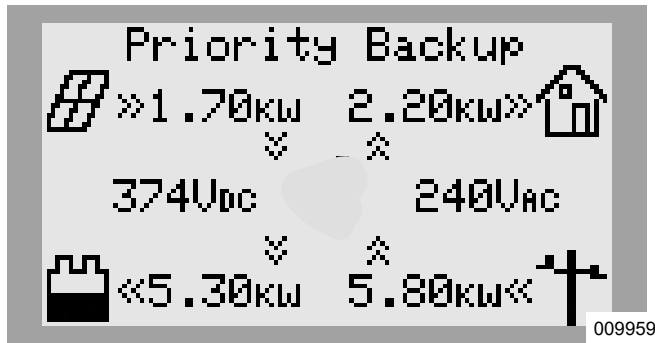


Figure 7-27. Priority Backup

See **Figure 7-28**. If there is a utility service interruption while operating in Priority Backup, the system will enter Island Mode. Protected loads will be supported by solar and battery power. If enough solar power is available, solar will simultaneously charge the battery and support the loads.

Remote Arbitrage

This system mode is only to be enabled and configured for Distributed Energy Resource (DER) aggregation for the purposes of explicit control of a PWRcell system via IEEE 2030.5 communication protocol.

By default, this system mode is not enabled or selectable via the inverter control panel. If this system mode is enabled and selected without proper configuration, the inverter will not export AC power through its AC Grid Connection terminals. By default, in the event of an outage in this system mode, local loads connected to the Protected Loads terminals may be supported by available PV and ESS power depending on the configuration of the PWRcell system and inverter settings.

Sell

Sell mode sets the system to export all available DC power to the grid up to the rated grid-tied output maximum. Available power from solar is exported first, followed by stored energy from the battery. When exporting power, connected batteries discharge to the grid until their state of charge reaches the MinSocRsrv setpoint. Once a battery is depleted to this point, it will not charge again until either of the following are true:

- Solar production exceeds the inverter rated grid-tied output power maximum.
- The inverter system mode is changed to a system mode prioritizing battery backup.

See the **Generac PWRcell Battery Installation Manual** for more information.

Island Mode

In the event of a grid outage, the PWRcell Inverter enters Island Mode. While in Island Mode, the inverter disconnects from the utility grid and powers the building from the REbus nanogrid. In a typical solar-plus-storage configuration, this means all REbus-connected batteries will work together with the PV links to supply power to REbus. The inverter will pull power from REbus to provide AC power to protected loads.

In Island Mode, the inverter will display “Islanding” on the home screen and a status of “islanded” on the inverter device page. Herein, use of islanding and islanded refer to Island Mode.



Figure 7-28. Island Mode

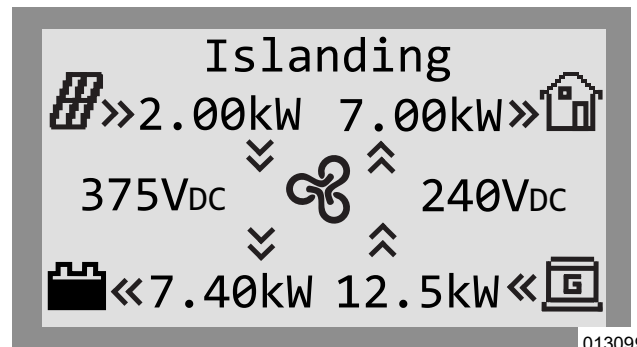


Figure 7-29. Island Mode with Integrated AC Generator

NOTE: To enter Island Mode, the inverter setpoint, “Enalstanding”, must be set to ‘on’ (default value) and the system mode can not be set to Grid Tie.

NOTE: If Enalstanding is set to “off” when an outage occurs, the inverter will disconnect from the grid and enter Standby state if DC power is available from REbus devices. If DC power is not available from REbus devices, the inverter will power off. Backup loads will not be powered.

Table 7-3. Island Mode AC Short Circuit Current Contribution

Peak AC short-circuit current contribution	370 A p-p
Peak output fault current duration	300 us
Peak output RMS fault current	125 A rms
Max 3-Cycle RMS output fault current	47.7 A rms
Max fault current duration (Current limit in overload 32 A rms)	6.23 s

AC Generator Control Modes

An AC generator integrated into a PWRcell ESS can operate using one of three control modes – ‘Single Transfer’, ‘Source Cycling’, or ‘Always On’ – depending on the installation configuration and the home owner’s usage needs.

Table 7-4. AC Generator Control Modes

Generator Control Mode	Description
Single Transfer	In the event of a power outage, the inverter will prioritize using the ESS to power the home, and the generator will be kept off. Once the ESS SoC goes below 25%, the inverter will switch the home to generator power. Spare generator power will be used to charge the ESS. The home will be powered by the generator for the remainder of the outage.
Source Cycling	In the event of a power outage, the inverter will prioritize using the ESS to power the home, and the generator will be kept off. Once the ESS SoC goes below 25%, the inverter will switch the home to generator power. Spare generator power will be used to charge the ESS. Once the ESS SoC goes above 95%, the inverter will switch the home back to ESS power, and this cycling between ESS and generator power will repeat for the remainder of the outage.
Always On	In the event of a power outage, inverter will prioritize using the generator to power the home. Spare generator power will be used to charge the ESS. The home will be powered by the generator for the remainder of the outage.

NOTE: In an outage, the inverter will prioritize solar power over generator power to charge the batteries but can use excess generator power if needed and when available.

NOTE: If the inverter system is unable to supply adequate power to the active loads, the system will switch backup supply to the integrated generator regardless of the selected operating mode.

AC Generator Manual Override

For PWRcell systems properly configured and set for AC Generator Integration, there are manual override settings selectable via the inverter control panel that are used to change the active AC Generator Control Mode. These manual override settings are explained in the table below.

Table 7-5. AC Generator Manual Override Settings

AC Generator Manual Override Command	Description
AutoACGenCtrl	Returns the system to operate using its AC Generator Control Mode after an override command. Note: Selecting ‘AutoACGenCtrl’ does not modify the Generator Control Mode.
TurnACGenOn	Sends a command to have the system turn on the integrated Generac Home Standby Generator. Use this to override Generator Control Modes, ‘Single Transfer’ or ‘Source Cycling.’ This will allow the ESS to charge from the generator.
TurnACGenOff	Sends a command to have the system turn off the integrated Generac Home Standby Generator. Use this to override the operation of the generator and allow the PWRcell system to support house loads. Note: Upon selection, the generator may come back on if the battery cannot support house loads.

NOTE: Upon restoration of grid power, the manual override command will be cleared, and the inverter will transition back to using the AC Generator Control Mode.

To perform an AC Generator Manual Override

1. From the home screen, use the right arrow key to navigate to the inverter device page.
2. Push the center button to access inverter device main menu.
3. Use the down arrow key to navigate to the bottom of the inverter device menu.
4. Use the up / down arrow keys to navigate to the AC Generator Manual Override option. Refer to [Table 7-5: AC Generator Manual Override Settings](#) for more information.
 - “AutoACGenCtrl”
 - “TurnACGenOn”
 - “TurnACGenOff”
5. Use the center button to select the AC Generator Manual Override option.

Automatic Generator Override Conditions

When configured for generator integration, the PWRcell Inverter looks for reserve power. If load exceeds the reserve capacity (typically 9 kW) of the PWRcell Battery, the inverter will set a 30-minute timer allowing the generator to turn-on and cover the load until the timer runs out.

The following is a list of conditions for the PWRcell Inverter to allow an integrated generator to turn ON or OFF during a grid outage.

The PWRcell Inverter will allow a generator to turn ON if any of these conditions are met:

Condition 1 - The Generator Manual Override = 'Turn Gen On'

Condition 2 - The Generator Manual Override = 'Auto Gen Ctrl' **AND**

- Battery SoC is less than or equal to 25% **OR**
- Home Load Demand exceeds PWRcell ESS Capacity

Condition 3 - The Generator Manual Override = 'Turn Gen Off' **AND**

Home Load Demand exceeds PWRcell ESS Capacity

The PWRcell Inverter will prompt a generator to turn OFF if any of these conditions are met:

Condition 1 - The Generator Manual Override = 'Turn Gen Off'

Condition 2 - The Generator Manual Override = 'Auto Gen Ctrl' **AND**

- Battery SoC is greater than or equal to 95% **AND**
- Home Load Demand is less than PWRcell ESS Capacity **AND**
- Time since the generator turned ON exceeds 31 minutes

Section 8: Maintenance

Service



⚠ DANGER

Electrocution. Verify all system voltages are safe before wiring. Disconnect all AC and DC sources of power before touching terminals. Failure to ensure no dangerous voltages are present on conductors and terminals before wiring will result in death or serious injury. (000642)



⚠ DANGER

Electrocution. Initiate a system-wide shutdown and turn the PWRcell DC Disconnect Switch OFF on all connected batteries before performing service. Failure to do so will result in death, serious injury, or equipment and property damage. (000600)

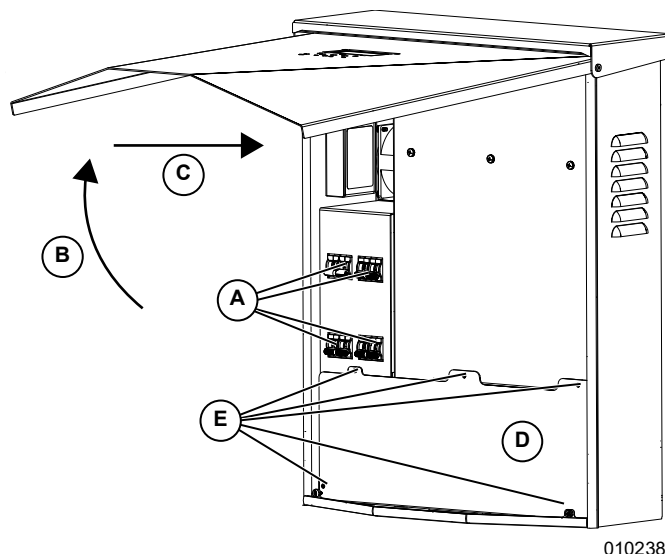
For any servicing needs, contact the nearest Independent Authorized Service Dealer (IASD), contact Generac PWRcell Technical Support at 1-855-635-5186, or call Generac Customer Service at 1-888-436-3722 (1-888-GENERAC), or visit www.generac.com.

Accessing Wiring Compartment

IMPORTANT: The inverter interior is not weather-proof. Do not open the inverter front cover when wet or during rain/snowfall.

To access the wiring compartment:

1. Initiate an inverter shutdown.
2. Allow DC voltage to drop to below 10 VDC.
3. See [Figure 8-1](#). Open all PWRcell DC Disconnects (A). Verify DC voltage reported on LCD screen has dropped to below 10 VDC.
4. Disconnect AC Grid source from inverter. Wait for Inverter LCD screen to turn off.
5. Open inverter front cover by lifting the bottom just beyond horizontal (B) and pushing inward (C).
6. Locate wiring compartment cover (D).
7. Remove five M4X10 screws (E) and wiring compartment cover.
8. Verify all PWRcell DC and AC terminals are below 10 V.



010238

Figure 8-1. Wiring Compartment

Replacing Fuses

⚠ CAUTION

Equipment damage. Never replace a fuse with a different size or style. Doing so will void the inverter warranty and could result in equipment or property damage. (000653a)

⚠ CAUTION

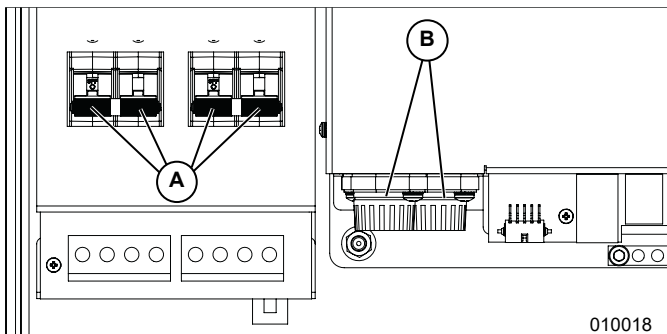
Equipment damage. Never remove DC fuses under load. Removing DC fuses under load could result in equipment or property damage. (000652a)

Two main fuses are installed between the Power Core and the PWRcell DC Disconnects. See [Accessing Wiring Compartment](#) for location.

If a main fuse has blown, determine the root cause of the issue before replacing it. For assistance, contact the nearest Independent Authorized Service Dealer (IASD), contact Generac PWRcell Technical Support at 1-855-635-5186, or call or Generac Customer Service at 1-888-436-3722 (1-888-GENERAC), or visit www.generac.com.

To replace a fuse:

1. Initiate an inverter shutdown. See [Shutdown Mode](#) for more information.
2. See [Figure 8-1](#). Open all PWRcell DC Disconnects (A). Verify DC voltage reported on LCD screen has dropped to below 10 VDC.
3. Disconnect all sources of AC and DC Power.
4. Remove wiring compartment cover. See [Accessing Wiring Compartment](#).
5. See [Figure 8-2](#). Locate DC fuse holders (B).
6. Using a multi-meter, verify all PWRcell DC and AC terminals are below 10 V.
7. Press fuse holder up and turn counterclockwise to release.
8. Remove fuse from fuse holder and check for continuity using a multi-meter.
9. Insert replacement fuse into fuse holder.
10. Reinstall fuse holder. Turn clockwise until tight.



010018

Figure 8-2. Removing Wiring Compartment Cover

Annual Maintenance

On an annual basis:

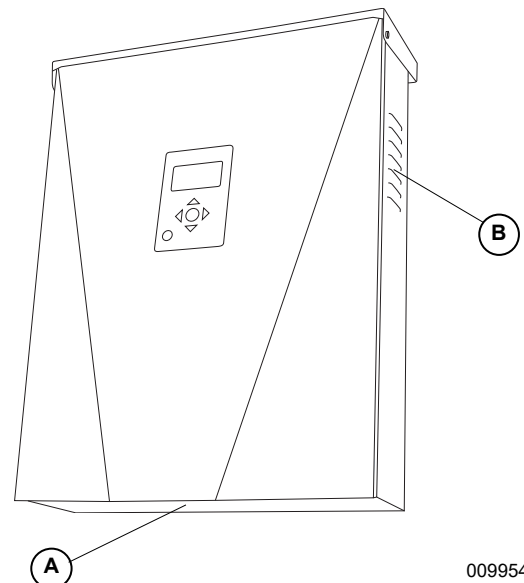
- Clean the exterior of the enclosure with a soft cloth.
- Ensure surrounding area is free of leaves, pet hair, or other debris that could obstruct airflow in or out of the unit.
- Inspect the unit. Look for conditions that could hinder performance or safety, such as (but not limited to):
 - Blocked vents
 - Dirty intake filter
 - Loose/missing hardware
 - Loose or broken electrical connections.

Inspecting Vents

See [Figure 8-3](#). Verify intake vent (A) and exhaust vent (B) are clear at all times.

Cleaning Intake Filter

See [Figure 8-3](#). Clean intake filter (A) with a soft brush or vacuum cleaner. If air filter is damaged or becomes difficult to clean contact the nearest Independent Authorized Service Dealer (IASD) or Generac Customer Service at 1-888-GENERAC (1-888-436-3722) or visit www.generac.com for a replacement filter.



009954

Figure 8-3. Intake Vent and Exhaust Vent

Section 9: Troubleshooting

General Troubleshooting

Some of the more common problems are listed in the table below. This information is intended to be a check or verification that simple causes can be located and fixed. It does not cover all types of problems. Procedures that require in-depth knowledge or skills should be referred to an Independent Authorized Service Dealer.

Table 9-1. General Troubleshooting Guide

Problem	Possible Cause	Solution
System will not exit Shutdown.	External shutdown button depressed	Release external shutdown button.
	No jumper between STOP terminals	Verify jumper is in place between STOP terminals.
CTs will not calibrate.	Loose connection	Check CT wiring.
	Improper CT placement	Ensure CTs are placed upstream of the point of interconnection.
No REbus Beacon device page.	Beacon USB cable not connected	Verify the USB cable is correctly connected to the Beacon and also to the Beacon accessory port in the inverter wiring compartment. Inspect exposed sections of cable for damage.
	Beacon wrap-around cable not connected	Verify the short wrap-around cable is plugged into Beacon, from one port to the other.
Inverter isn't connected to server.	Inverter not connect to the Internet	Verify the inverter is connected to the Internet via a router.
During an extended or multi-day grid outage, the system turned OFF overnight (i.e. the screen went blank).	The battery may have discharged to its Minimum State of Charge (SoC) and gone to sleep. See Sleep Mode in the PWRcell Battery Installation and Owner's Manual .	Wait until grid power returns or until the sun rises. In an extended outage, the battery will perform a power search every hour for four minutes (default). Once solar power is detected during a power search, the battery will keep the system awake and begin charging/powering loads. See Power Search and reference the Battery Status LED in the PWRcell Battery Installation and Owner's Manual .
Utility grid power went out; backup loads are not being powered; inverter screen is ON.	The protected loads disconnect on the inverter Power Core may be in the OFF position.	Turn the inverter protected loads disconnect to the ON position.
Utility grid power went out; backup power is cycling on and off; Inverter screen is powered ON.	This could be due to an overload condition where having too many house loads on at one time has caused the inverter to protect itself by purposely blacking out and cycling on at an increasing interval.	Inverter LED will be alternating at an interval- blinking green, then solid red. The home screen and the inverter device page will show "Islanding" or "Islanded" respectively, alternating with "Island Overload." Reduce house loads to recover from this condition.
Utility grid power went out; backup loads are not being powered; screen went blank.	The battery may not have been properly connected or fully commissioned prior to the outage. Reference Battery Status LED table in PWRcell Battery Installation and Owner's Manual for confirmation of battery state/ functionality.	Contact Independent Authorized Service Dealer (IASD) for service.
Utility grid power has been restored after an outage; backup loads are not being powered; screen is ON.	REbus sources are depleted or not available (battery / PV Links). The inverter assumed worst case scenario and protected itself from overload.	Cycle the inverter backfeed breaker OFF/ON. If problem persists, contact Independent Authorized Service Dealer (IASD) for service.

If problems persist, contact the nearest Independent Authorized Service Dealer (IASD), contact Generac PWRcell Technical Support at 1-855-635-5186, or call Generac Customer Service at 1-888-436-3722 (1-888-GENERAC).

Overload Behavior

Table 9-2. Overload Behavior

Island Overload Event	Cause	Behavior	Solution
<p>Overload on Voltage</p> <p>(vulnerable when battery has low SoC)</p>	<p>Load demand is too high and the inverter has dropped it's voltage in an attempt to compensate.</p>	<ul style="list-style-type: none"> – If inverter output voltage drops below 114 V, inverter will attempt to shed any loads connected to load management devices by dropping frequency. – If the inverter drops below 96 V for more than 6 sec (loads will brown out during this time), the system will blackout all loads. 	<ul style="list-style-type: none"> – Reduce house load
<p>Overload on Current</p> <p>(vulnerable to this condition when system does not have an external ATS)</p>	<p>There is too much load on the protected loads panel.</p>	<ul style="list-style-type: none"> – If inverter experiences current greater than 35 amps L-N, the inverter will prevent transfer back to the grid and system will stay islanded. – If inverter experiences current greater than 35 amps for more than 15 seconds it will blackout and attempt to power loads at an increasing interval, starting at 20 seconds and increasing by 20 seconds between each attempt, up to a maximum of one hour. 	<ul style="list-style-type: none"> – Reduce house load

Table 9-3. AC Generator Integration Troubleshooting

Problem	Possible Cause	Corrective Action
On the Inverter device page, "fuse blown" error shown	The ATS Cat 5 cable is faulty.	Ensure male RJ45 connectors are properly terminated. Use a data tester / Cat 5 tester to test continuity.
	The P1/P2 connections on PWRcell ATS Controller are miswired.	Check that wiring matches diagrams.
	If using two ATSES, "Generator Control" is miswired.	Check that wiring matches diagrams, and make sure that the "Generator Control" wires do not flip polarity when wiring from one ATS to the other.
	Fast-Blow Mini Fuses are blown. See Figure 5-2 .	Take fuses out, and check them for continuity. Replaces fuses that read as open / no continuity. For more details, see the <i>PWRcell Parts Manual</i> . If integrating an AC Home Standby Generator, ensure the 1 A fast-blow mini fuses are replaced with 3.15 A fuses provided with the PWRcell ATS. For more details, see <i>Replace Fuses in PWRcell Inverter for Generator Integration</i> in the <i>PWRcell ATS Installation Manual</i> .
Generator is still running after using the "Turn Gen Off" command.	Loads exceed what the ESS can supply.	Reduce load to a level that the ESS can supply.
	ESS is below 25% SoC.	Allow the generator to charge the ESS before trying to turn the generator off.
Home is unpowered while the generator is running.	The ESS experienced an overload while islanded and it can't connect the loads to the generator since they exceed the safe operating limits of the ESS.	Reduce load and then manually turn the generator off using the "OFF" button on the generator's control panel. Wait 5 seconds and then turn the generator on using the "AUTO" button. The Inverter will reconnect the loads during this 5 second period.
Switched to generator power when the ESS Soc is above 25%. (Doesn't apply to "Always On" mode)	Lost communication with the PWRcell Battery.	Check that the ground connections are robust since these are used for communication.
	Loads exceed what the ESS can supply.	Reduce loads such that they don't exceed what the ESS can supply.

Configuration Error Codes			
Code	HEX Value	Description	Corrective Action
0	0X7700	AC-Coupled PV is not supported on this inverter hardware version. Newer hardware is needed.	Replace Inverter with an XVT model Inverter (Hardware version 1010 or later) to configure the PWRcell system for AC-Coupled PV.
1	0X7701	The PWRcell Inverter is not configured for islanding. This is required for AC-Coupled PV.	Use the Inverter Mod. Settings to set "EnalIslanding" to "on". See Configure Inverter Settings and Enable Inverter for more information.
2	0X7702	The PWRcell Inverter is configured for an incorrect number of ATSEs. For AC-Coupled PV, 1 ATS should be used.	Verify that only 1 ATS is installed. Use the Inverter "Mod. Settings" to set 'NumTranSwTchs' to '1.' See Configure Inverter Settings and Enable Inverter for more information.
3	0X7703	AC Generator integration is not supported on this inverter hardware version. Newer hardware is needed.	Replace Inverter with an XVT model Inverter (Hardware version 1010 or later) in order to utilize AC Generator Integration.
4	0X7704	The PWRcell Inverter is not configured for islanding. This is required for AC Generator Integration.	Use the Inverter "Mod. Settings" to set 'EnalIslanding' to 'on.' See Configure Inverter Settings and Enable Inverter for more information.
5	0X7705	The PWRcell Inverter is configured for an incorrect number of ATSEs. For AC Generator Integration, 1 or 2 ATSEs should be used.	Verify the number of ATSEs installed. Use the Inverter Mod. Settings to set 'NumTranSwTchs' to '1' or '2' to match the number of installed ATSEs. See Configure Inverter Settings and Enable Inverter for more information.
6	0X7706	The PWRcell Inverter is configured for 2 ATSEs, but 'ACGenPower' is set to '0.' 'ACGenPower' must be set to a non-0 value for AC Generator Integration.	Use the Inverter "Mod. Settings" to set 'ACGenPower' to the correct value based on the nameplate power rating of the integrated generator. See Configure Inverter Settings and Enable Inverter for more information.
7	0X7707	The PWRcell Inverter is configured for AC Generator Integration, but the installed PWRcell ATS(s) do not have the correct controller.	Use the PWRcell ATS Controller Upgrade Kit (Model G0080060) to allow AC Generator Integration with the installed PWRcell ATSEs. See PWRcell ATS Controller Upgrade Kit in the PWRcell ATS Installation Manual for more information.
8	0X7708	'ACGenPower' setting is not configured between 9 kW and 26 kW for AC generator integration.	Adjust the value of 'ACGenPower' in "Mod. Settings" to match the AC generator nameplate power value. 'ACGenPower' must be at least 9 kW to enable Gen Integration.
9	0X7709	The PWRcell Inverter is configured for both AC-Coupled PV and AC Generator Integration. Only one of these features can be supported on a single system.	Verify which configuration will be supported. Use the Inverter "Mod. Settings" to configure the system accordingly: If supporting AC Coupled PV, set 'ACGenPower' to '0.' If supporting AC Generator Integration, set 'ACPVPower' to '0.' See Configure Inverter Settings and Enable Inverter for more information.
A	0X770A	The PWRcell Inverter is configured for 3Ø applications. AC-Coupled PV and AC Generator Integration are only supported with 1Ø applications.	Install a single-phase inverter if the application is for a single phase service. Otherwise, for three-phase services, use the Inverter "Mod. Settings" to ensure 'ACPVPower' and 'ACGenPower' are both set to '0' to indicate that neither AC-Coupled PV or AC Generator Integration will be used. See Configure Inverter Settings and Enable Inverter for more information.
B	0X770B	The PWRcell Inverter is configured for 1 or more ATS but is not configured for islanding.	Verify the presence of 1 or more ATS is installed on the system. Use the Inverter "Mod. Settings" to configure the system accordingly: If 1 or more ATS is installed, set 'EnalIslanding' to 'on.' If no ATS is installed, set 'NumTranSwTchs' to '0.' See Configure Inverter Settings and Enable Inverter for more information.
C	0X770C	The PWRcell Inverter is configured for 1 or more ATS but is also configured for 3Ø applications. An ATS may not be used for PWRcell installations on 3Ø services.	Install a single-phase PWRcell Inverter if the application is for a single-phase service. Otherwise, for three-phase services, use the inverter "Mod. Settings" to ensure 'NumTranSwTchs' is set to '0.' See Configure Inverter Settings and Enable Inverter for more information.
D	0X770D	Bad input phase angle. Phase angle has been detected to be 120 degrees or less. For single-phase services, this should be 180 degrees.	Check voltage measurement and make sure the system is wired up correctly to a 120/240 Vac single-phase (Wye) service.

Wiring Error Codes			
Code	HEX Value	Description	Corrective Action
0	0X7720	The PWRcell Inverter is configured for AC Generator Integration but no ATS has been detected.	Check to make sure the ATS & CTs Cat 5 cables are intact and connected to the correct ports of the inverter. Check the ATS limit switch is connected to the "Auxiliary Contact" port of the PWRcell ATS Controller.
1	0X7721	The PWRcell Inverter is NOT configured for an ATS, but an ATS has been detected.	Verify the number of ATSES installed. Use the Inverter "Mod. Settings" to set 'NumTranSwTchs' to '1' or '2' to match the number of installed ATSES. See Configure Inverter Settings and Enable Inverter for more information.
2	0X7722	The Line 1 and Line 2 wires are swapped somewhere between the "N" terminals of the PWRcell ATS and the Protected Loads terminals of the inverter.	Check that phase wiring does not cross over or change along each respective path from N1, N2 to L1, L2 of the Inverter.
4	0X7724	The Line 1 and Line 2 wires are swapped somewhere between the "E" terminals of the PWRcell ATS and the Protected Loads terminals of the inverter.	Check that phase wiring does not cross over or change along each respective path from E1, E2 to L1, L2 of the Inverter.
6	0X7726	The inverter ATS did not transfer back to the utility/grid-connected position (UP position for ATS manual operation arm).	Verify wiring to the "N" terminals of the inverter ATS is correct. Verify the Cat 5 cable for Inverter ATS Control is terminated properly at the inverter and the inverter ATS control board. Verify that the factory wiring at the transfer mechanism closing coils and relays are securely fastened at the transfer mechanism.
7	0X7727	The inverter ATS did not transfer to the backup power source position (DOWN position for ATS manual operation arm).	Verify wiring to the "E" terminals of the inverter ATS is correct. Verify the Cat 5 cable for Inverter ATS Control is terminated properly at the inverter and the inverter ATS. Verify the wiring to the inverter AC Grid Connection terminals goes back to a connection point load side of the inverter ATS.

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Section 10: Appendix A

Grid Support Functions: Parameter Values and Range of Adjustability

The table below contains the default values and ranges of adjustment for the function parameters evaluated to UL 1741 on the PWRcell Inverter. Grid Support Functions are listed with parameter labels in the order specified in IEEE 1547.1-2020 Annex B per IEEE 1547-2018. The default values below are implemented in the 'IEEE 1547-2018' PWRcell Grid Profile. Functions and/or parameters required for implementing evaluated capabilities of the inverter that do not have labels specified in IEEE 1547.1-2020 are included where necessary.

Table 10-1 Advanced Grid Support Functions: Parameter Values and Range of Adjustability.

Grid Support Function / Funct. Abbr.	Parameter Label	Parameter Default / Inverter Setting	Parameter Range	Units	Comments
Enter Service / ES	ES_RAMP_RATE	0.33	0.1 - 100	% / s	Enter Service Soft Start Ramp Rate
DERCtIAC ⁴	WRMP ⁴	100	1 - 100	% / s	Normal Ramp Rate; Percent power increase per second. Ramp Rate Accuracy, MSA _{RR} , = 2%/sec
Volt-VAr / Q(V)					
	QV_REF	1.00	0.95 – 1.05	V p.u.	Per Unit voltage based on Nameplate Nominal Voltage.
	QV_VREF_OLRT	300	300.0 – 5000.0	s	Use of the Vref Adjustment time constant parameter to be specified by Local Area EPS Operator.
	QV_CURVE_V2	0.98	0.92 – 1.05	V p.u.	Per Unit voltage based on Reference Voltage (Vref).
	QV_CURVE_Q2	0 ¹	-1.00 – 1.00 ²	VAr p.u.	Per-unit reactive power. Negative value indicates absorption.
	QV_CURVE_V3	1.02	0.95 – 1.08	V p.u.	Per Unit voltage based on Reference Voltage (Vref).
	QV_CURVE_Q3	0 ¹	-1.00 – 1.00 ²	VAr p.u.	Per-unit reactive power. Negative value indicates absorption.
	QV_CURVE_V1	0.92	0.77 – 1.03	V p.u.	Per Unit voltage based on Reference Voltage (Vref).
	QV_CURVE_Q1	0.44 ¹	0 – 1.00 ²	VAr p.u.	Per-unit reactive power. Negative value indicates absorption.
	QV_CURVE_V4	1.08	1.02 – 1.23	V p.u.	Per Unit voltage based on Reference Voltage (Vref).
	QV_CURVE_Q4	-0.44 ¹	-1.00 – 0 ²	VAr p.u.	Per-unit reactive power. Negative value indicates absorption.
	QV_OLRT	5.0	1.0 – 90.0	s	Open Loop Response Time; Time in seconds.
Watt-VAr / Q(P)					
	QP_CURVE_P3_GEN	1.0	0.5 – 1.0	W p.u.	Per-unit rated active power output.
	QP_CURVE_P2_GEN	0.5	0.4 – 0.8	W p.u.	Per-unit rated active power output.
	QP_CURVE_P1_GEN	0.2	0 – 0.7	W p.u.	Per-unit rated active power output.
	QP_CURVE_P1_LOAD	-0.2	-0.4 – 0	W p.u.	Per-unit rated active power absorption.
	QP_CURVE_P2_LOAD	-0.5	-0.8 – -0.4	W p.u.	Per-unit rated active power absorption.
	QP_CURVE_P3_LOAD	-1.0	-1.0 – -0.5	W p.u.	Per-unit rated active power absorption.
	QP_CURVE_Q3_GEN	0.44 ¹	-1.00 – 1.00 ²	VAr p.u.	Per-unit reactive power. Negative value indicates absorption.
	QP_CURVE_Q2_GEN	0 ¹	-1.00 – 1.00 ²	VAr p.u.	Per-unit reactive power. Negative value indicates absorption.
	QP_CURVE_Q1_GEN	0 ¹	-1.00 – 1.00 ²	VAr p.u.	Per-unit reactive power. Negative value indicates absorption.
	QP_CURVE_Q1_LOAD	0 ¹	-1.00 – 1.00 ²	VAr p.u.	Per-unit reactive power. Negative value indicates absorption.

Table 10-1 Advanced Grid Support Functions: Parameter Values and Range of Adjustability.

Grid Support Function / Funct. Abbr.	Parameter Label	Parameter Default / Inverter Setting	Parameter Range	Units	Comments
	QP_CURVE_Q2_LOAD	0 ¹	-1.00 – 1.00 ²	VAr p.u.	Per-unit reactive power. Negative value indicates absorption.
	QP_CURVE_Q3_LOAD	0.44 ¹	-1.00 – 1.00 ²	VAr p.u.	Per-unit reactive power. Negative value indicates absorption
	QP_OLRT	N/A	max 10	s	Open Loop Response Time in seconds.
Volt-Watt / P(V)					
	PV_CURVE_V1	1.06	1.05 – 1.09	V p.u.	Per-unit nominal voltage.
	PV_CURVE_P1	1.00	N/A	W p.u.	Per-unit rated active power output.
	PV_CURVE_V2	1.10	1.06 – 1.10	V p.u.	Per-unit nominal voltage.
	PV_CURVE_P2_GEN	N/A	N/A	W p.u.	Applicable only if inverter can only generate active power and not absorb power.
	PV_CURVE_P2_LOAD	0	0 – 1.0	W p.u.	Per-unit rated active power absorption.
	PV_OLRT	10.0	0.5 – 60.0	s	Open Loop Response Time in seconds.
Overvoltage Trip / OV					
	OV2_TRIP_V	1.20	1.20	V p.u.	Per Unit voltage based on Nameplate Nominal Voltage.
	OV2_TRIP_T	0.16 / 50 ms ³	0.16	s	Clearing time in seconds.
	OV1_TRIP_V	1.10	1.10 – 1.20	V p.u.	Per Unit voltage based on Nameplate Nominal Voltage.
	OV1_TRIP_T	13.0	1.0 – 13.0	s	Clearing time in seconds.
Undervoltage Trip / UV					
	UV1_TRIP_V	0.88	0 – 0.88	V p.u.	Per Unit voltage based on Nameplate Nominal Voltage.
	UV1_TRIP_T	21.0	2 – 50.0	s	Clearing time in seconds.
	UV2_TRIP_V	0.5	0 – 0.50	V p.u.	Per Unit voltage based on Nameplate Nominal Voltage.
	UV2_TRIP_T	2.0	0.16 – 21.0	s	Clearing time in seconds.
Overfrequency / OF					
	OF2_TRIP_F	62.0	61.8 – 66.0	Hz	
	OF2_TRIP_T	0.16 / 50 ms ³	0.16 – 1000.0	s	Clearing time in seconds.
	OF1_TRIP_F	61.2	61.0 – 66.0	Hz	
	OF1_TRIP_T	300.0	180.0 – 1000.0	s	Clearing time in seconds.
Underfrequency / UF					
	UF1_TRIP_F	58.5	50.0 – 59.0	Hz	
	UF1_TRIP_T	300	180.0 – 1000.0	s	Clearing time in seconds.
	UF2_TRIP_F	56.5	50.0 – 57.0	Hz	
	UF2_TRIP_T	0.16 / 50 ms ³	0.16 – 1000.0	s	Clearing time in seconds.
Frequency-Droop / P(f)					
	PF_DBOF	0.036	0.00 – 1.00	Hz	Single-sided deadband value.
	PF_DBUF	0.036	0.00 – 1.00	Hz	Single-sided deadband value.
	PF_KOF	0.05	0.02 – 0.07	N/A	Per-unit frequency change corresponding to 1 per-unit power output change.

Table 10-1 Advanced Grid Support Functions: Parameter Values and Range of Adjustability.

Grid Support Function / Funct. Abbr.	Parameter Label	Parameter Default / Inverter Setting	Parameter Range	Units	Comments
	PF_KUF	0.05	0.02 – 0.07	N/A	Per-unit frequency change corresponding to 1 per-unit power output change.
	PF_OLRT	5	0.2 – 10.0	s	Open Loop Response Time in seconds.

¹ Setting based on apparent power rating of 7600 VA.

² Setting based on 100% reactive power capability of 5700 VAR.

³ There is a max delay of 95 ms \pm 10 ms to compensate for hardware mechanical response.

⁴ Function/Parameter not specified in IEEE 1547.1-2020.

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