



Installation Manual
For
PWRcell[®] Automatic Transfer Switch

100 – 200 Amp, Service Entrance / 100 amp Non-Service Entrance

Model Number

CXSC100A301

(Non-service Entrance Rated)

CXSW100A301

(Service Entrance Rated with Utility Service Circuit Breaker)

CXSW200A301

(Service Entrance Rated with Utility Service Circuit Breaker)

SERIAL NUMBER: _____

DATE PURCHASED: _____

Register your product at <https://register.generac.com>

PWRcell ATS requires a PWRcell Energy Storage System (ESS) to function and cannot be used for Generator-only applications. Installation to a Generac Home Standby Generator without the presence of a PWRcell ESS will damage this switch and void the warranty.

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 **CALIFORNIA WARNING**

Can expose you to cadmium, a carcinogen
and reproductive toxicant

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(000765)

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Section 1: Safety

Introduction

Thank you for purchasing a Generac product. This unit has been designed to provide high performance, efficient operation, and years of use when maintained properly.



WARNING

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)

Read this manual thoroughly and understand all of the instructions, cautions, and warnings before using this equipment. If any section of the manual is not understood, contact your nearest authorized dealer, or contact Generac Customer Service at www.Generac.com, or call 888-436-3722 with any questions or concerns.

The owner is responsible for proper maintenance and safe use of the equipment. Before operating or servicing this transfer switch:

- Study all warnings in this manual and on the product carefully.
- Become familiar with this manual and the unit before use.
- Refer to the installation sections of the manual for instructions on final assembly procedures. Follow the instructions completely.

Save these instructions for future reference. ALWAYS supply this manual to any individual that will use this equipment.

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.

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:

DANGER

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

(000001)

WARNING

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

(000002)

CAUTION

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.

Electrical Hazards



⚠ DANGER

Electrocution. High voltage is present at transfer switch and terminals. Contact with live terminals will result in death or serious injury.

(000129)



⚠ DANGER

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

(000104)



⚠ 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

Electrical backfeed. Use only approved switchgear to isolate generator from the normal power source. Failure to do so will result in death, serious injury, and equipment damage.

(000237)



⚠ DANGER

Electrocution, equipment and property damage. Handle transfer switches carefully when installing. Never install a damaged transfer switch. Doing so could result in death or serious injury, equipment and property damage.

(000195)



⚠ DANGER

Electrocution. Turn utility supply OFF before working on utility connections of the transfer switch. Failure to do so will result in death or serious injury.

(000123)



⚠ DANGER

Electrocution. Do not disable or modify the connection box door safety switch. Doing so will result in death or serious injury.

(000157)

⚠ 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)

⚠ DANGER

Equipment malfunction. Installing a dirty or damaged transfer switch will cause equipment malfunction and will result in death or serious injury.

(000119)

⚠ 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)

⚠ CAUTION

Equipment damage. Verify all conductors are tightened to the factory specified torque value. Failure to do so could result in damage to the switch base.

(000120)

⚠ CAUTION

Equipment damage. Perform functional tests in the exact order they are presented in the manual. Failure to do so could result in equipment damage.

(000121)

⚠ CAUTION

Equipment damage. Exceeding rated voltage and current will damage the auxiliary contacts. Verify that voltage and current are within specification before energizing this equipment.

(000134a)

General Hazards

⚠ DANGER

Electrical backfeed. Use only approved switchgear to isolate generator from the normal power source. Failure to do so will result in death, serious injury, and equipment damage. (000237)



⚠ DANGER

Electrocution. High voltage is present at transfer switch and terminals. Contact with live terminals will result in death or serious injury. (000129)



⚠ DANGER

Electrocution. Turn utility supply OFF before working on utility connections of the transfer switch. Failure to do so will result in death or serious injury. (000123)



⚠ DANGER

Electrocution. Water contact with a power source, if not avoided, will result in death or serious injury. (000104)



⚠ DANGER

Electrocution. Do not wear jewelry while working on this equipment. Doing so will result in death or serious injury. (000188)



⚠ DANGER

Electrocution. Only authorized personnel should access transfer switch interior. Transfer switch doors should be kept closed and locked. Failure to do so will result in death or serious injury. (000213)

⚠ 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)



⚠ 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)



⚠ 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. This unit is not intended for use as a prime power source. It is intended for use as an intermediate power supply in the event of temporary power outage only. Doing so could result in death, serious injury, and equipment damage. (000247a)

- Competent, qualified personnel should install, operate and service this equipment. Adhere strictly 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; the Occupational Safety and Health Administration (OSHA), or the local agency for workplace health and safety.
- If working on this equipment while standing on metal or concrete, place insulative mats over a dry wood platform. Work on this equipment only while standing on such insulative mats.
- 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.

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Section 2: General Information

Applications

The PWRcell® Automatic Transfer Switch (ATS) can be utilized in conjunction with a PWRcell system, with or without an integrated generator. A PWRcell Inverter with a PWRcell Battery attached will be referred to as a PWRcell Energy Storage System (PWRcell ESS), or ESS herein.

When used with a PWRcell ESS alone, the PWRcell ATS enables the entire home to be powered from the ESS, within the limits of its power capacity. To ensure your PWRcell system is protected from being overloaded, see [Load Management Options](#).

The PWRcell ATS can also be used to integrate a PWRcell ESS with a compatible Generac Automatic Home Standby Generator. For more information see [Section 5: AC Generator Integration](#).

For more information, and to access the most up to date version of this installation manual, visit <http://www.generac.com/service-support/owner-support>.

Unpacking

Carefully unpack the transfer switch. Inspect closely for any damage that might have occurred during shipment. The purchaser must file with the carrier any claims for loss or damage incurred while in transit.

Check that all packing material is completely removed from the switch prior to installation.

The kit should include:

- Manual Operation Handle
- Storage Bracket for Manual Operation Handle
- Fault Current Label
- Two 3.15 A Fuses (to be installed in the PWRcell Inverter for AC Generator Integration)

Equipment Description

This automatic transfer switch is used for transferring electrical load from a utility (normal) power source to a PWRcell system or generator as an optional (standby) power source.

Transfer of electrical loads occurs automatically when there is a significant reduction or interruption in power provided from the utility grid.

The transfer switch prevents electrical backfeed between the main utility power and the optional standby power source (generator or ESS).

The transfer switch consists of a transfer mechanism, utility service disconnect circuit breaker (if equipped), and a PWRcell ATS Controller for control wiring and management of HVAC loads.

Transfer Switch Mechanism

See [Figure 2-1](#). This switch is used with a single-phase system when the single-phase neutral line is to be connected to a neutral lug and is not to be switched.

Solderless, screw-type terminal lugs are standard.

The conductor size range is as follows:

Switch Rating	Wire Range	Conductor Tightening Torque
100 A	#14-1/0 AWG (Cu/Al)	50 in-lbs (5.6 Nm)
200 A	#6-250 MCM (Cu/Al)	275 in-lbs (31 Nm)

This transfer switch is suitable for control of motors, electric discharge lamps, tungsten filament and electric heating equipment where the sum of motor full load ampere ratings and the ampere ratings of other loads do not exceed the ampere rating of the switch and the tungsten load does not exceed 30 percent of the switch rating.

This UL listed transfer switch is for use in optional standby systems only (NEC article 702).

A 100 A rated switch is suitable for use on circuits capable of delivering not more than 10,000 RMS symmetrical amperes, 250 VAC maximum, when protected by a 100 A maximum circuit breaker (Siemens types QP or BQ) or 100 A maximum circuit breaker (Square D Q2, Westinghouse CA-CAH, General Electric TQ2 and Siemens QJ2).

A 200 A rated switch is suitable for use on a circuit capable of 22,000 RMS symmetrical amperes, 240 VAC when protected by a circuit breaker without an adjustable short time response or by fuses.

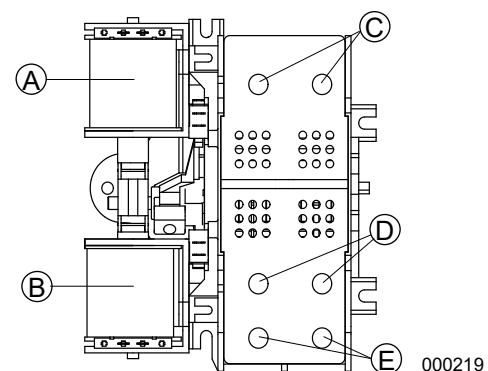


Figure 2-1. Typical Single-Phase ATS Transfer Mechanism

A	Utility Closing Coil
B	Standby Source Closing Coil
C	Utility Lugs (N1 & N2)
D	Standby Source Lugs (E1 & E2)
E	Load Lugs (T1 & T2)

Utility Service Circuit Breaker (if equipped)

The utility service and generator disconnect circuit breakers for 100 A models are:

- Type BQ, 2-pole
- 10,000 A/C
- 120 / 240 VAC, 100 A
- 50 / 60 Hertz
- Wire range: #1 - #8 AWG (Cu/Al)
- The conductor tightening torque is 50 **in-lbs.** (5.6 Nm).

The utility service circuit breakers for 200 A models are:

- Type 225AF, 2-pole
- 22,000 A/C
- 120 / 240 VAC, 150 A / 200 A
- 50 / 60 Hertz
- Wire range:
 - Line: 300 MCM - 6 STR (Cu/Al)
 - Load - ATS: 250 MCM - 6 STR (Cu/Al)
- The conductor tightening torque is:
 - Line: 375 **in-lbs** (42.4 Nm)
 - Load - ATS: 275 **in-lbs.** (31 Nm)

Transfer Switch Data Decal

A data decal is permanently affixed to the transfer switch enclosure. Use this transfer switch only with the specific limits shown on the data decal and on other decals and labels that may be affixed to the switch. This will prevent damage to equipment and property.

When requesting information or ordering parts for this equipment, make sure to include all information from the data decal.

For future reference, record the Model and Serial numbers in the space provided on the front cover of this manual.

Transfer Switch Enclosure

The standard switch enclosure is a National Electrical Manufacturer's Association (NEMA) and UL 3R type enclosure. UL and NEMA 3R (indoor / outdoor rated) type enclosures typically provide a degree of protection against falling rain and sleet and, are undamaged by the formation of ice on the enclosure.

Safe Use of Transfer Switch



WARNING

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)

Before installing, operating, or servicing this equipment, read the **Safety Rules** carefully. Comply strictly with all **Safety Rules** to prevent accidents and / or damage to the equipment. The manufacturer recommends that a copy of the **Safety Rules** be posted near the transfer switch. Also, be sure to read all instructions and information found on tags, labels, and decals affixed to the equipment.

Two publications that outline the safe use of transfer switches are the following:

- NFPA 70; National Electrical Code
- UL 1008: Standard for Safety—Automatic Transfer Switches

NOTE: It is essential to use the latest version of any standard to guarantee correct and current information.

Load Management Options

Load management systems are designed to work together to prevent a generator or PWRcell system from being overloaded by large appliance loads. A PWRcell ATS Controller is provided as standard equipment with this switch. PWRmanager and Smart Management Modules (SMMs) are available as an additional options for load management (sold separately).

PWRcell ATS Controller

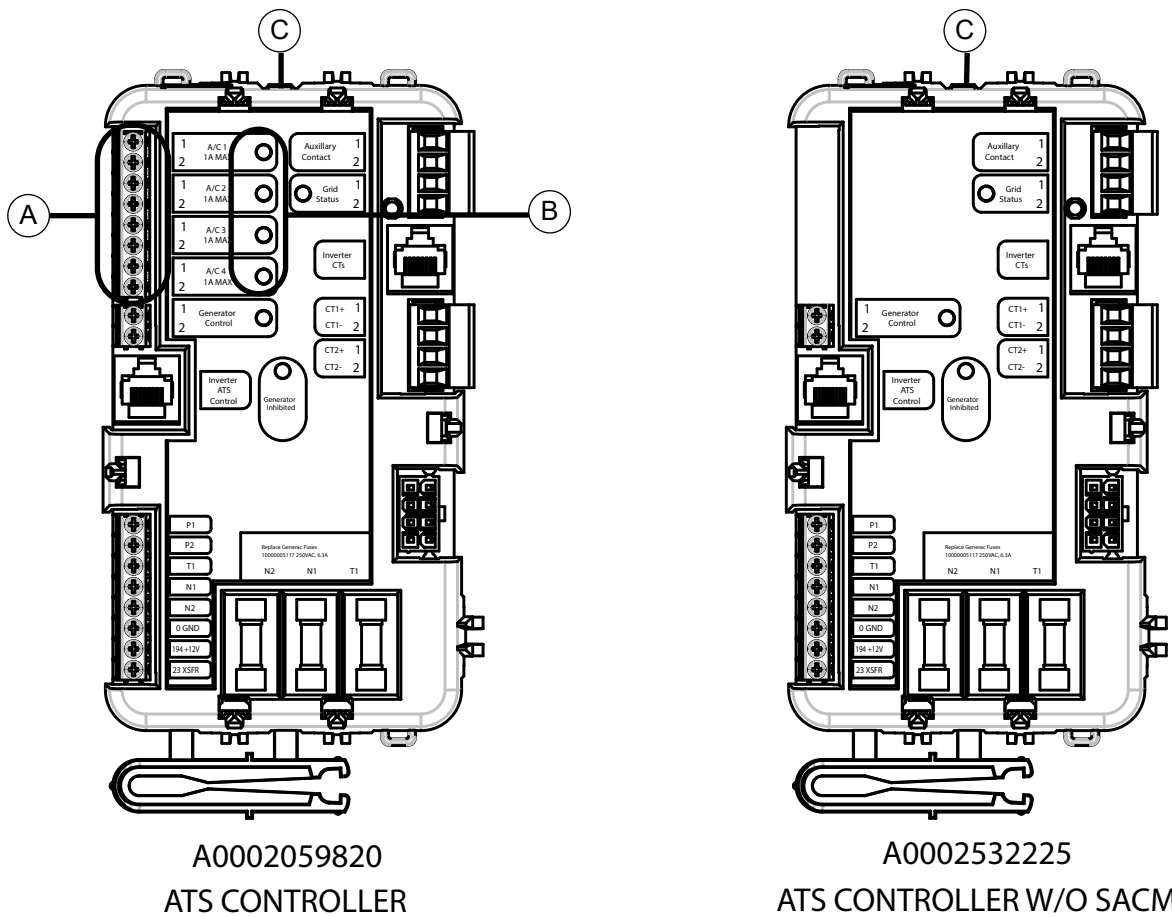
NOTE: PWRcell systems with AC Generator Integration should NOT use the PWRcell ATS Controller for load management. PWRmanager or Smart Management Modules (SMM) may be used instead.

The controller has four load management circuits for air conditioning (A/C) loads. The four load management circuits are numbered 1 to 4 and correspond to a priority level (descending in priority order). The controller manages the loads by shedding the connected loads in the event of a drop in system frequency (overload). For assistance with system design please call Generac Clean Energy Inside Sales, 1-855-635-5186, opt. 1.

See **Figure 2-2**. A/C Priorities 1 – 4 (A) have connections for an air conditioner. To control an air conditioner, no additional equipment is required. Internal normally closed relays interrupt the 24 VAC thermostat control signal to disable the air conditioner load.

Four LEDs, located on the PWRcell ATS Controller (B), illuminate when a load is connected and powered.

See **Figure 2-2**. The controller has a test button (C) used to simulate an overload condition. This button operates even when the transfer signal is inactive.



014698

Figure 2-2. PWRcell ATS Controller Versions

PWRcell ATS Controller Versions

See [Figure 2-2](#). All PWRcell ATS models will include a standard version of the PWRcell ATS controller (Part #: A0002059820; Pictured left) suitable for standard PWRcell configurations, including the Flexible Coverage Generator Integration configuration. However, this controller is not suitable for use with the Whole Home Generator Integration configuration.

For dual ATS Whole Home Backup configurations with AC Generator Integration, the Inverter ATS must be upgraded with a PWRcell ATS Controller (Part #: A0002532225; Pictured right). Purchase Upgrade Kit (Model G0080060) to utilize this controller. In addition to the dual ATS Whole Home Backup configuration for AC Generator Integration, this controller may be used in all other configurations that require a PWRcell ATS.

IMPORTANT: 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.

See [Section 5: AC Generator Integration](#) for more information.

Smart Management Module (SMM)

(sold separately)

Any 240 V loads, including central air conditioners, can be managed using an SMM. The system can accommodate up to eight individual SMMs.

NOTE: SMMs are self-contained and have individual built-in controllers. They are wired in series with the 240 V branch circuit wiring between the circuit breaker and the managed load.

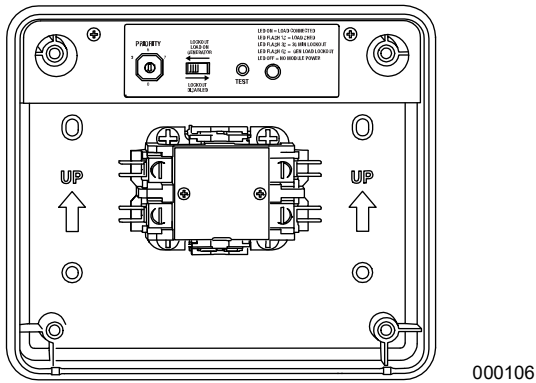


Figure 2-3. Smart Management Module (SMM)

Application Considerations

NOTE: Use of an SMM for load management of a PWRcell system is limited to operation with the SMM's Lock Out Jumper in its default (A) position. For details on jumper location and adjustment, reference the **Smart Management Module Owner's / Installation Manual**.

An overload condition is determined by the PWRcell Inverter frequency while the inverter is in Island Mode. Loads are managed and de-energized when frequency is less than 58 Hz for three seconds or less than 50 Hz for ½ second (for 60 Hz systems).

The PWRcell ATS controller can be used in conjunction with individual SMMs to manage a combined total of eight loads.

- The priority order determines the order in which managed loads are re-energized by the load management system after all of the managed loads have been de-energized due to a utility service interruption or overload condition.
- Use Priorities A/C 1 – 4 on the controller as the top priorities, then up to four SMMs as Priorities 5 – 8.
- Use only select A/C priorities on the controller as the top priorities, then use additional SMMs as the remaining priorities.
- A SMM can share a priority with an A/C priority on the controller provided the standby power source is sized to handle the combined surge load from both appliances. Sharing priorities can allow up to 12 loads to be managed in a properly sized system.

In any combination of modules, the recovery times after a loss of utility power or shutdown due to overload are shown in Table 1: **Priority Settings**.

Table 1. Priority Settings

Priority	Recovery Time	PWRcell ATS Controller	SMM
1	5 minutes	Yes	Yes
2	5 minutes 15 seconds	Yes	Yes
3	5 minutes 30 seconds	Yes	Yes
4	5 minutes 45 seconds	Yes	Yes
5	6 minutes	NA	Yes
6	6 minutes 15 seconds	NA	Yes
7	6 minutes 30 seconds	NA	Yes
8	6 minutes 45 seconds	NA	Yes

Refer to the **SMM Owner's / Installation Manual** for detailed characteristics and specifications of that product.

Section 3: Installation (ESS-Only)

Introduction to Installation

This equipment has been wired and tested at the factory. Installing the switch includes the following procedures:

1. Open Enclosure
2. Mount the Enclosure
3. Connect Utility and Standby Power Sources
4. Connect the Inverter ATS Control Cable
5. Connect Current Transformers (CTs)
6. Connect Air Conditioner Loads
7. Configure the Inverter
8. Apply Fault Current Label

Inverter Compatibility

The PWRcell ATS is compatible with all single-phase residential models of the PWRcell Inverter. For installations where a generator will be integrated, use only XVT076A03 model inverters. To determine the model of your inverter, refer to the product label on the bottom right hand side of the enclosure. You will see the model number "X7602" or "XVT076A03".

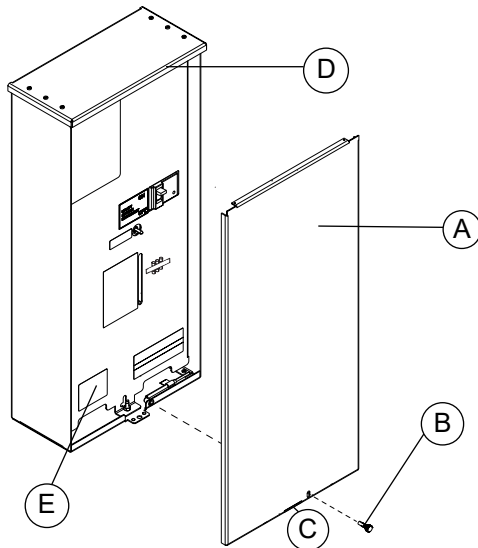


Figure 3-1. Open Enclosure

Open Enclosure

See [Figure 3-1](#). First, remove outer cover (A):

1. Remove thumb screw (B).
2. Slide slot (C) over retention tab.
3. Lower cover until clear of top flange (D), and pull away from enclosure.
4. Remove inner panel (E).

NOTE: Inner panel (E) is ONLY on Service Entrance Rated Models.

5. Loosen nut (F) until it clears t-slot (H) in inner panel.

Mount the Enclosure

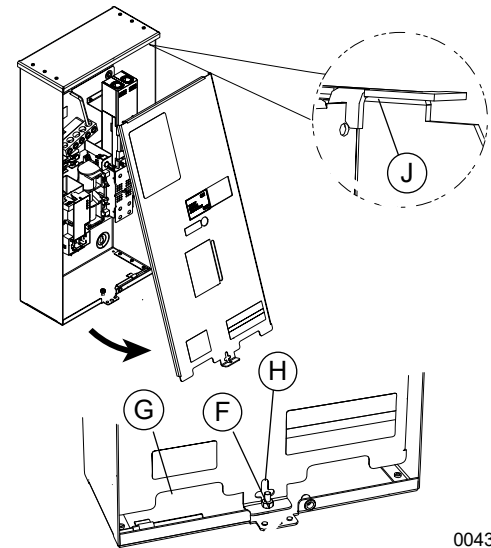
Mounting dimensions for the transfer switch enclosure are in this manual. Enclosures are typically wall-mounted. See [Drawings and Diagrams](#).

⚠ DANGER

Equipment malfunction. Installing a dirty or damaged transfer switch will cause equipment malfunction and will result in death or serious injury.

(000119)

This transfer switch is mounted in a UL type 3R enclosure. It can be mounted outside or inside and should be based on the layout of installation, convenience and proximity to the utility supply and load center. Install the transfer switch as close as possible to the electrical loads that are to be connected to it. Mount the switch vertically to a rigid supporting structure. Horizontal mounting of the switch is prohibited. To prevent switch distortion, level all mounting points. If necessary, use washers behind mounting holes to level the unit.



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6. Grasp inner panel at two cutouts (G – left and right). Tilt inner panel as shown, passing nut through t-slot.
7. Lower inner panel until clear of two retention slots (J – left and right sides), and pull away from enclosure.

NOTE: Two 3.15 A fuses, designed for the PWRcell Inverter, are taped to the front of the PWRcell ATS Controller. These fuses are a necessary component for integrating an AC coupled generator with the PWRcell system. For details, see [Replace Fuses in PWRcell Inverter for Generator Integration](#).

Connect Utility and Standby Power Sources



⚠ DANGER

Electrocution. Turn utility and emergency power supplies to OFF before connecting power source and load lines. Failure to do so will result in death or serious injury. (000116)

Installation and interconnection drawings are provided in this manual. See [Drawings and Diagrams](#).

NOTE: All installations must comply with national, state, and local codes. It is the responsibility of the installer to perform an installation that will pass the final electrical inspection.

1. Remove the finger safe barrier covers and connect utility supply at the utility service disconnect circuit breaker terminals N1 and N2. Follow torque specifications listed on the circuit breaker.
2. See [Figure 3-2](#). Connect utility neutral conductor to the neutral terminal bar (B). The grounding electrode conductors can be connected to the equipment grounding terminal bar (C) (see NEC 250.24(A)(4)). Follow all torque specifications for the terminal bars. A wire type main bonding jumper is provided to properly bond the service equipment.

NOTE: A wire type main bonding jumper (A) is provided on 200 A units and 100 A Service Entrance rated units. This bonding jumper can be removed if needed where the ATS is not installed as service equipment.

NOTE: 100 A service entrance rated model will have a service disconnect in area (D) of [Figure 3-3](#).

3. Use a 2-pole 40 A circuit breaker to connect the L1 and L2 terminals on the inverter's AC Grid Connection terminals to the main distribution panel. Follow the torque specifications listed on the circuit breaker.

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. The installer is responsible for compliance with applicable national, state, and local codes.

4. Connect the inverter protected load ungrounded feeder conductors to terminals E1 and E2 on the transfer mechanism.
5. Connect the inverter protected load neutral conductor to the neutral terminal bar. Connect the inverter protected load equipment grounding

conductor to the equipment grounding terminal bar. Follow all torque specifications for the terminal bars.

6. Connect a subpanel supply to T1 and T2 Terminals. Connect subpanel Neutral conductor to the neutral terminal bar and the equipment grounding conductor to the equipment ground. Copper or Aluminum conductors shall be sized in accordance with all applicable NEC requirements, and shall be permitted to be sized based on the 75°C column of Table 310.16 in the NEC. The installation must comply fully with all applicable codes, standards, and regulations.

Knockouts into the transfer switch can be made in the field as needed for entry of power cables and conduit. Conduit entry shall maintain the proper wire bending spaces required by Tables 312.6 (A) and (B) in the NEC. For transfer switches installed in wet locations, power cables or conduits entering above the level of uninsulated live parts shall use fittings listed for use in wet locations as required by 312.2 in the NEC.

NOTE: If aluminum conductors are used, apply corrosion inhibitor to conductors if required by the aluminum conductor manufacturer. After tightening terminal lugs, carefully wipe away any excess corrosion inhibitor.

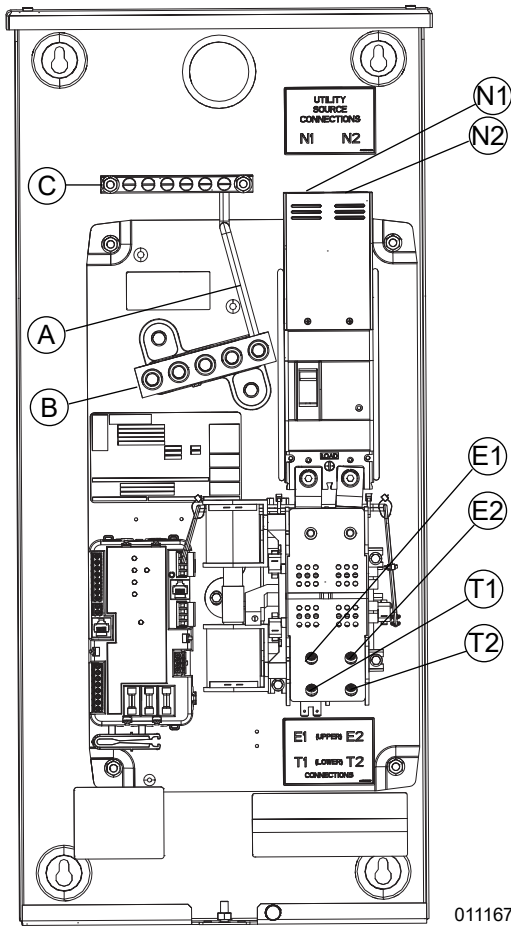


Figure 3-2. Wiring Connections 200 A Unit

A	Bonding Jumper	B	Neutral Terminal Bar
C	Grounding Terminal Bar	N1	Utility Line 1
N2	Utility Line 2	E1	Standby Power Source Line 1
E2	Standby Power Source Line 2	T1	Load Line 1
T2	Load Line 2		

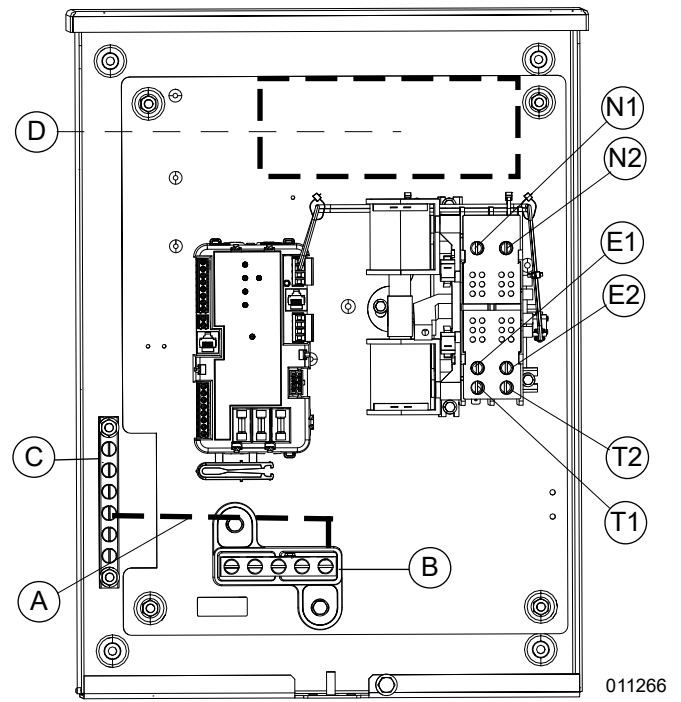


Figure 3-3. Wiring Connections 100 A Unit

A	Bonding Jumper	B	Neutral Terminal Bar
C	Grounding Terminal Bar	D	Service Disconnect
N1	Utility Line 1	N2	Utility Line 2
E1	Standby Power Source Line 1	E2	Standby Power Source Line 2
T1	Load Line 1	T2	Load Line 2

Tighten terminal lugs to the torque values as noted on the decal located on the inside of the door. After tightening terminal lugs, carefully wipe away any excess corrosion inhibitor.

CAUTION

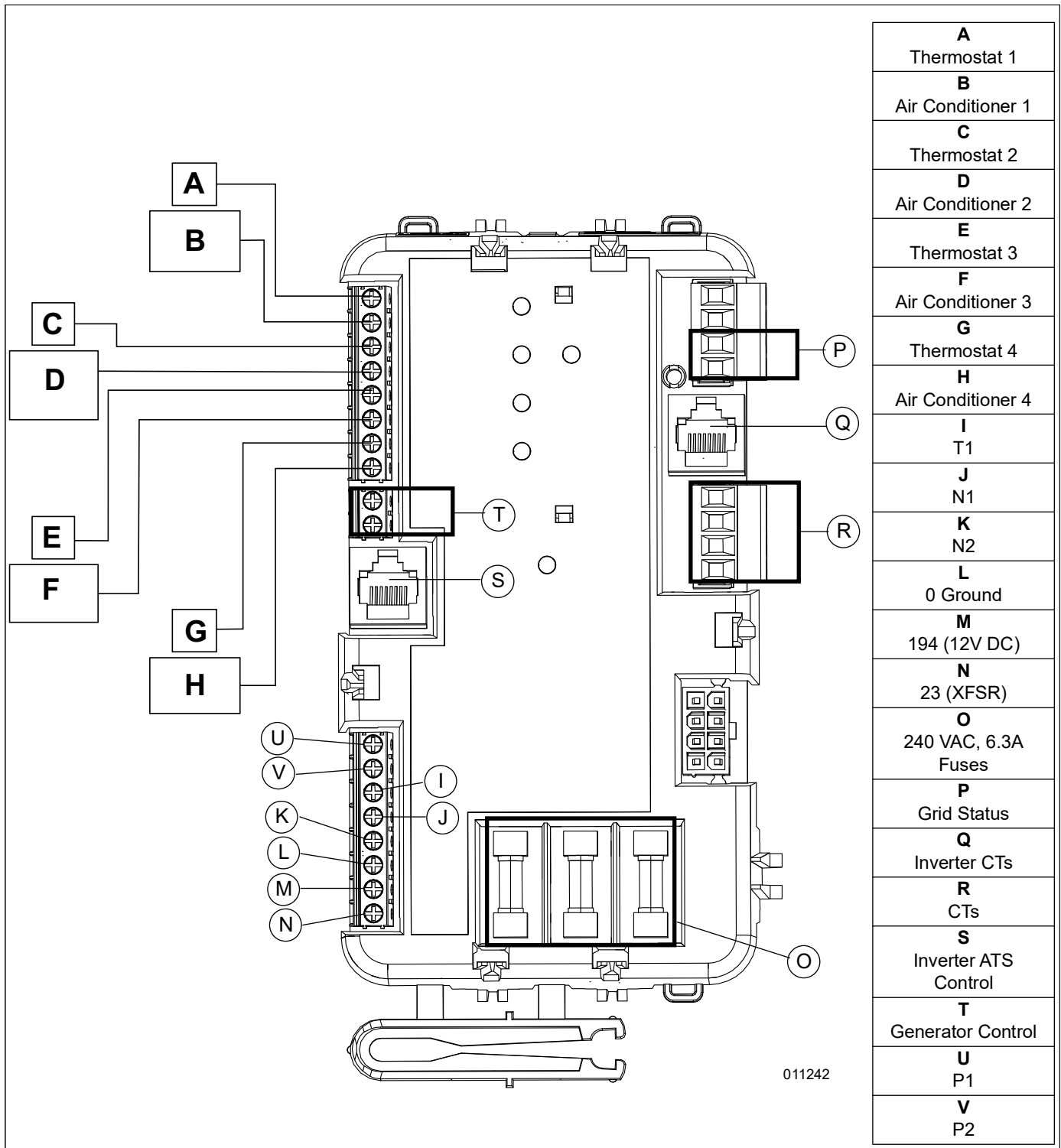
Equipment damage. Verify all conductors are tightened to the factory specified torque value. Failure to do so could result in damage to the switch base.

(000120)

Connect the Inverter ATS Control Cable

Use a minimum of a Cat 5 cable to connect the “Inverter ATS control” port on the controller to the “ATS” port on the Inverter. Use Cat 5 with 600 V insulation, and route away from the Utility and Inverter supply conductors. See NEC Article 725.136(D) for more information on the installation requirements. See [Figure 3-4](#), [Figure 3-5](#), and [Figure 3-6](#).

NOTE: Cat 5 cables are not permitted to be installed in the same raceways as the power conductors.



A	Thermostat 1
B	Air Conditioner 1
C	Thermostat 2
D	Air Conditioner 2
E	Thermostat 3
F	Air Conditioner 3
G	Thermostat 4
H	Air Conditioner 4
I	T1
J	N1
K	N2
L	0 Ground
M	194 (12V DC)
N	23 (XFSR)
O	240 VAC, 6.3A Fuses
P	Grid Status
Q	Inverter CTs
R	CTs
S	Inverter ATS Control
T	Generator Control
U	P1
V	P2

Figure 3-4. Controller Connections

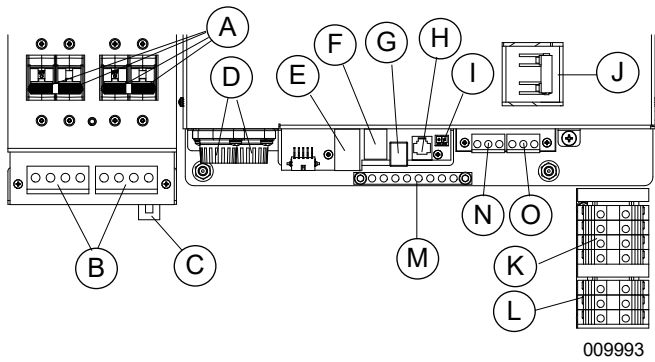


Figure 3-5. Inverter Connections for X7602

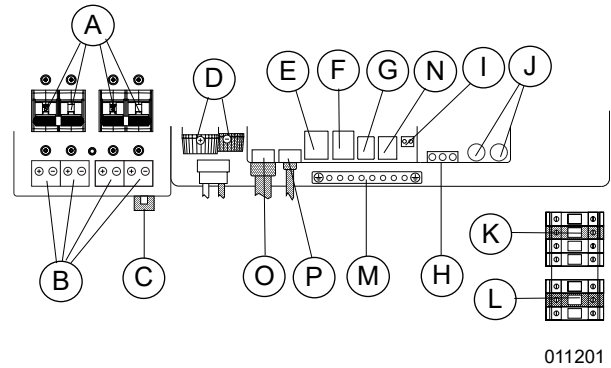


Figure 3-6. Inverter Connections for XVT076A03

A	PWRcell DC Disconnects	H	Service Port (Generac personnel only)
B	REbus Bi-directional DC Terminals	I	STOP terminals (external shutdown)
C	Internet Connection	J	Protected Loads Disconnect
D	DC Main Fuses	K	AC Grid Connection Terminals
E	Current Transformers (CTs) Accessory Ports	L	Protected Loads Terminals
F	Automatic Transfer Switches (ATS) Accessory Port	M	Grounding Bar
G	REbus Beacon Port	N	Not Used
O	Not Used		

A	PWRcell DC Disconnects	I	STOP Terminals (external shutdown)
B	REbus Bi-directional DC Terminals	J	Fast-Blow Mini Fuses 1A 250V
C	Internet 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 Switches (ATS) Accessory Port	N	Service Port (Generac personnel only)
G	REbus Beacon Port	O	Display
H	RGM PWR / Gen Inhibit	P	LTE

Connect the Current Transformers (CTs)

Connect the CTs as shown in [Table 3-1](#) below. Clamp CT1 and CT2 around the wires connected to T1 and T2, respectively.

Table 3-1. CTs Connections

CT	Controller PORT	WIRE COLOR
1	CT1+	Yellow
1	CT1-	Green
2	CT2+	Yellow
2	CT2-	Green

Use a Cat 5 cable to connect the “Inverter CTs” port on the controller to the “CTs” port on the Inverter. Use Cat 5 with 600 V insulation, and route away from the Utility and Inverter supply conductors. See [Figure 3-4](#), [Figure 3-5](#), and [Figure 3-6](#).

Connect Air Conditioner Loads

See [Figure 3-4](#). The PWRcell ATS controller can control an air conditioner (24 VAC) directly.

Control of Air Conditioner Load

1. Route the thermostat cable (from the furnace / thermostat to the outdoor air conditioner unit) to the transfer switch.
2. Connect the wire to the terminal strip terminals (A/C 1) on the PWRcell ATS Controller as shown in [Figure 3-4](#). These are normally closed contacts which open upon load shed conditions. Route thermostat wire away from high voltage wires.
3. If required, connect additional air conditioners to the terminal strip terminals (A/C 2 – 4).

Contact Ratings	
A/C 1 – 4	24 VAC, 1.0 A Max

NOTE: These instructions are for a typical air conditioner installation. Control of certain heat pumps and 2-stage air conditioners may require special connections or the use of SMMs to control the loads.

Configure the Inverter

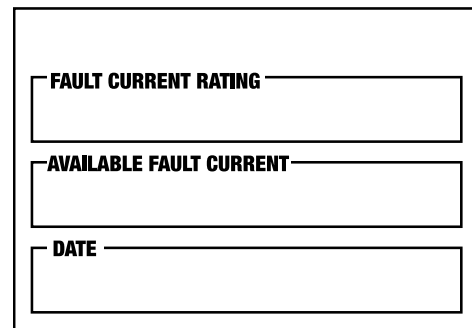
To enable control of the PWRcell ATS by a PWRcell Inverter, inverter settings must be modified. Using the inverter control panel, review and configure the inverter settings described below. For more information, see [Adjusting Inverter Settings](#) in the *PWRcell Inverter Installation and Owner’s Manual*.

Setting	Range	Default	Description
NumTran Swtchs	0 / 1 / 2	0	Defines the number of external automatic transfer switches connected to one inverter system and enables transfer switch controls.
EnaLoad Shed	0 / 1 / 2	0	Select 1 if using SMM devices to shed loads. Select 2 if using the PWRcell ATS Controller to shed loads (with or without SMMs).

Apply Fault Current Label

See [Figure 3-7](#). A Fault Current Identification Label is provided in the bag containing the unit Installation manual and transfer switch manual operation handle. The 2017 NEC requires that the short-circuit current rating of the transfer equipment, based on the type of overcurrent protective device protecting the transfer equipment, be field marked on the exterior of the transfer equipment. For NEC compliance, verify the required short-circuit current rating of the transfer switch before installation. The completed label provides the local AHJ (Authority Having Jurisdiction) with the information he or she may require during inspection.

Apply the label to the exterior of the transfer switch enclosure. Use a pen to fill in the required information, and then cover the label with the clear protective decal.



004496

Figure 3-7. Fault Current Label

NOTE: The 2020 NEC does not require the use of this label for installations in one and two-family dwelling units.

Section 4: Operation (ESS-Only)

Functional Tests and Adjustments

Following transfer switch installation and interconnection, inspect the entire installation carefully. A competent, qualified electrician should perform the inspection. The installation should comply strictly with all applicable codes, standards, and regulations. When absolutely certain the installation is proper and correct, complete a functional test of the system.

CAUTION

Equipment damage. Perform functional tests in the exact order they are presented in the manual. Failure to do so could result in equipment damage.

(000121)

IMPORTANT: Before proceeding with functional tests, read and make sure all instructions and information in this section is understood. Also read the information and instructions of labels and decals affixed to the switch. Note any options or accessories that might be installed and review their operation.

Manual Operation



DANGER

Electrocution. Do not manually transfer under load. Disconnect transfer switch from all power sources prior to manual transfer. Failure to do so will result in death or serious injury, and equipment damage.

(000132)

NOTE: Be sure to remove handle from mechanism upon completion and before installation of protective covers.

See [Figure 4-1](#). A manual handle (B) is shipped with the transfer switch manual. Manual operation must be checked BEFORE the transfer switch is operated electrically. To check manual operation, proceed as follows:

1. Verify the inverter is in the OFF mode.
 2. Turn OFF both utility (service disconnect circuit breaker) and standby power supplies to the transfer switch.
 3. Note position of transfer mechanism main contacts (A) by observing the movable contact carrier arm. This can be viewed through the long narrow slot in the inside cover. The top of the movable contact carrier arm is yellow to be easily identified.
- Manual operation handle in the UP position - LOAD terminals (T1, T2) are connected to utility terminals (N1, N2).

- Manual operation handle in the DOWN position - LOAD terminals (T1, T2) are connected to STANDBY terminals (E1, E2).

CAUTION

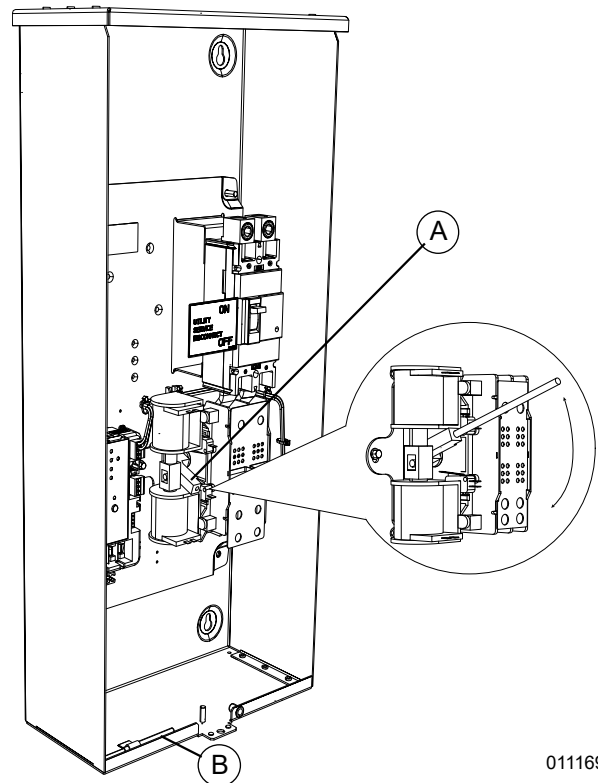
Equipment damage. Do not use excessive force while manually operating the transfer switch. Doing so could result in equipment damage.

(000122)

Close to Utility Source Side

Before proceeding, verify the position of the switch by observing the position of manual operation handle (A) in [Figure 4-1](#). If the handle is UP, the contacts are closed in the utility (normal) position, no further action is required. If the handle is DOWN, proceed with Step 1.

1. With the handle inserted into the movable contact carrier arm, move handle UP. Be sure to hold on to the handle as it will move quickly after the center of travel.
2. Remove manual operation handle from movable contact carrier arm. Return handle to storage bracket.



011169

Figure 4-1. Manual Operation

Close to Inverter Source Side

Before proceeding, verify the position of the switch by observing the position of the manual operation handle in **Figure 4-1**. If the handle is DOWN, the contacts are closed in the inverter (standby) position. No further action is required. If the handle is UP, proceed with Step 1.

1. With the handle inserted into the movable contact carrier arm, move the handle DOWN. Be sure to hold on to the handle as it will move quickly after the center of travel.
2. Remove manual operation handle from movable contact carrier arm. Return handle to storage bracket.

Return to Utility Source Side

1. Manually actuate switch to return manual operation handle to the UP position.
2. Remove manual operation handle from movable contact carrier arm. Return handle to storage bracket.

NOTE: Be sure to remove handle from mechanism upon completion and before installation of protective covers.

Voltage Checks

NOTE: Use the Digital Multimeter (DMM) LowZ low input impedance setting to collect accurate voltage measurements. LowZ eliminates the possibility of inaccurate ghost voltage readings, also known as phantom voltage or stray voltage readings. See DMM manufacturer’s literature for additional information.

Utility Voltage Checks

1. Turn ON the utility power supply to the transfer switch using the utility service disconnect circuit breaker.



⚠ DANGER

Electrocution. High voltage is present at transfer switch and terminals. Contact with live terminals will result in death or serious injury.

(000129)

2. With an accurate AC voltmeter, check for correct voltage. Measure across ATS terminal lugs N1 and N2; N1 to NEUTRAL and N2 to NEUTRAL.



⚠ DANGER

Electrocution. Turn utility supply OFF before working on utility connections of the transfer switch. Failure to do so will result in death or serious injury.

(000123)

Inverter Voltage Checks

1. Open all breakers in load center.
2. Open service entrance breaker in ATS or switch upstream of the ATS.
3. Inverter should switch the ATS and begin powering the load center.



⚠ DANGER

Electrocution. High voltage is present at transfer switch and terminals. Contact with live terminals will result in death or serious injury.

(000129)

4. Confirm voltage and frequency of each phase in load center using multimeter. Each phase should be between 118 – 124 V, and 59.9 – 60.1 Hz.
5. To end test, close the service entrance circuit breaker.

NOTE: ESS should be charged to at least 20% before performing this test.

PWRcell System Voltage Tests

1. Open all breakers in load center except one dual-pole breaker of 20 – 30 A.
2. Open service entrance breaker in ATS or switch upstream of the ATS.
3. Inverter should switch the ATS and begin powering the load center.



⚠ DANGER

Electrocution. High voltage is present at transfer switch and terminals. Contact with live terminals will result in death or serious injury.

(000129)

4. Check power output from inverter on the LCD interface on the inverter. If less than 1 kW, close more breakers in load center until load reaches 1 kW.
5. Confirm voltage and frequency of each phase in load center using multimeter. Each phase should be between 118 – 124 V, and 59.9 – 60.1 Hz.
6. To end test, close the service entrance circuit breaker, then the remaining breakers in the load center.

NOTE: ESS should be charged to at least 20% before performing this test.

Installation Summary

1. Verify the installation has been properly performed as outlined by the manufacturer and that it meets all applicable laws and codes.
2. Verify proper operation of the system as outlined in the appropriate installation and owner's manuals.
3. Educate the end-user on the proper operation, maintenance, and service call procedures.

NOTE: The Utility Power Circuit Breaker in the transfer switch must be turned OFF to simulate a utility outage. Shutting off the main disconnect in a subpanel connected to the transfer switch will NOT simulate an outage.

Maintenance

⚠ 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)

The PWRCell ATS requires no specific maintenance.

Please refer to the appropriate installation and owner's manuals for maintenance guidance on other PWRcell products in the system.

Testing the PWRcell ATS Controller

A "Test" push button is provided on top of the PWRcell ATS Controller to test the operation of the load shed functions. The test pushbutton will work when the ATS is in the utility or the inverter position.

1. Turn on the utility supply to the ATS.
2. Wait for 5 minutes.
3. Verify managed loads are powered and all LEDs illuminate on controller.
4. Press the TEST button on the controller.
5. Verify that all of the connected loads to be "shed" become disabled.
6. After five (5) minutes verify A/C 1 is energized and Status LED A/C 1 is ON.
7. After another 15 seconds, verify A/C 2 is energized and Status LED A/C 2 is ON.
8. After another 15 seconds, verify Load A/C 3 is energized and Status LED Load A/C 3 is ON.
9. After another 15 seconds, verify A/C 4 is energized and Status LED A/C 4 is ON.

PWRcell ATS Controller Fuse Service

See [Figure 4-2](#). A fuse removal and installation tool (A) is included in the controller housing.

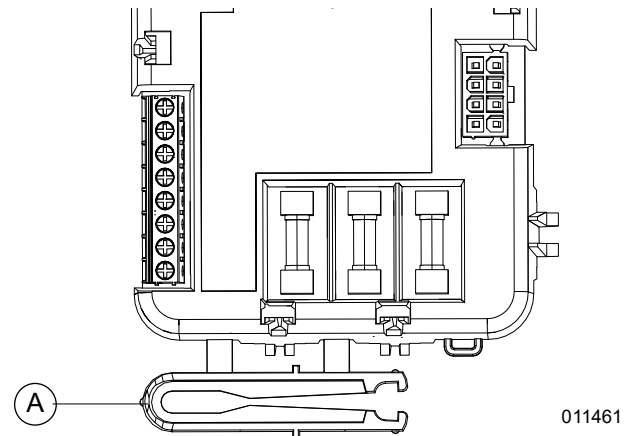


Figure 4-2. Fuse Removal and Installation Tool

If a fuse requires replacement, snap the tool free with an appropriate tool such as diagonal pliers, and use it to replace the fuse. The tool can be stored in the controller housing retainer directly above the fuses, with the large thumb tab facing out.

Use only Generac replacement fuses — part number 1000005117, rated 240 VAC, 6.3 Amps, 10,000 AIC.

Alternative fuses are Littelfuse® 021606.3MXP or Optifuse® FCD-6.3.

Testing the SMM

Refer to the **SMM Owner's / Installation Manual** for testing procedure.

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Section 5: AC Generator Integration

Generator Integration Overview

The PWRcell ATS can integrate a Generac Automatic Home Standby Generator with a PWRcell ESS to power more simultaneous loads and enable longer backup run times. Compatible generators are limited to Generac-produced, single-phase models 9 kW or larger with an air-cooled engine and an EVO I or EVO II Evolution controller. You can consult an authorized Generac installer to determine if your generator can be integrated into a PWRcell ESS.

Configuration Options

PWRcell systems that integrate a Generac generator may use one of two installation configuration options: Flexible Coverage or Whole Home Backup. Generator size, PWRcell system size, coverage needs, and application should all be considered when choosing the correct configuration for your site.

NOTE: PWRcell ATS requires a PWRcell ESS to function and cannot be used for Generator-only applications.

Configuration	Inverter Requirements	ATS Quantity*	Protected Loads Panel	Interconnection Drawing
Flexible Coverage	XVT076A03	1	Yes	A0001501194 pg 3 of 4
Whole Home Backup	XVT076A03	2**	No	A0001501194 pg 4 of 4

*ATS model and size should be selected with site requirements in mind. It is the responsibility of the installer to ensure the correct ATS is selected for the installation site and application.

**Whole Home Backup Generator Integration requires the use of PWRcell ATS Controller (part # A0002532225) to be installed in the Inverter ATS.

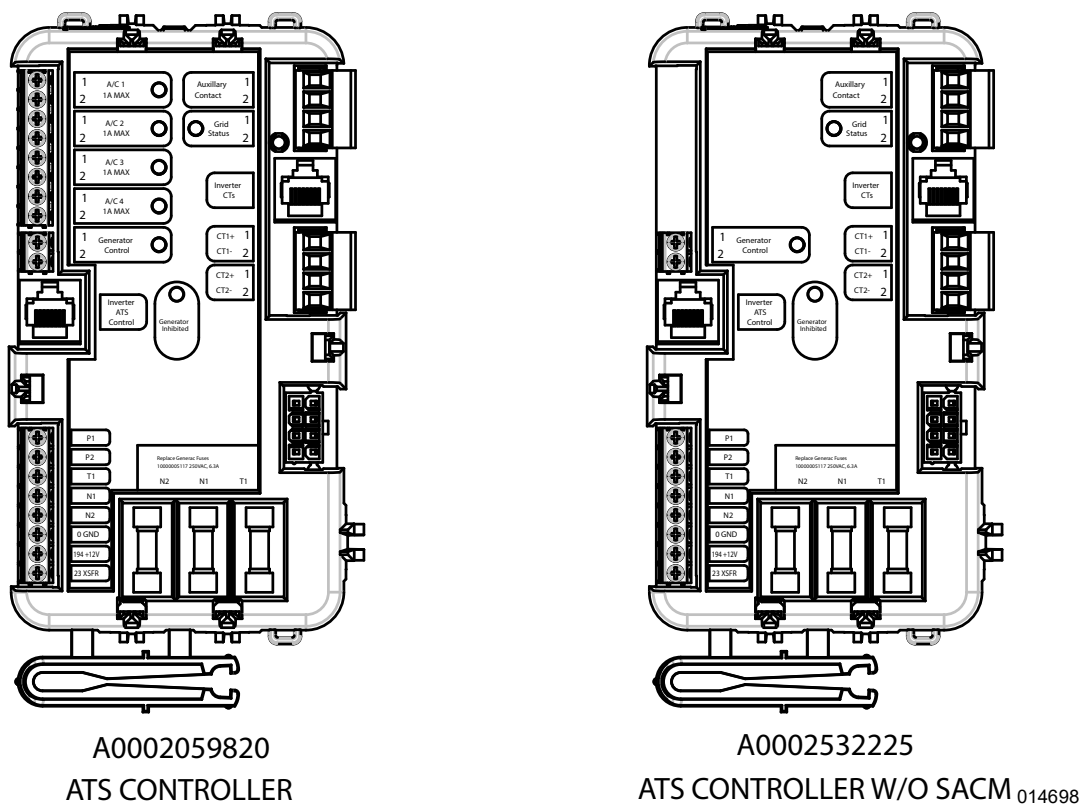


Figure 5-1. Generator Integration - PWRcell ATS Controller Requirements

PWRcell ATS Controller Requirements

See [Figure 5-1](#). All PWRcell ATS models will include a standard version of the PWRcell ATS controller (Part #:

A0002059820; Pictured left) suitable for standard PWR-cell configurations, including the Flexible Coverage Generator Integration configuration. However, this controller

is not suitable for use with the Whole Home Generator Integration configuration.

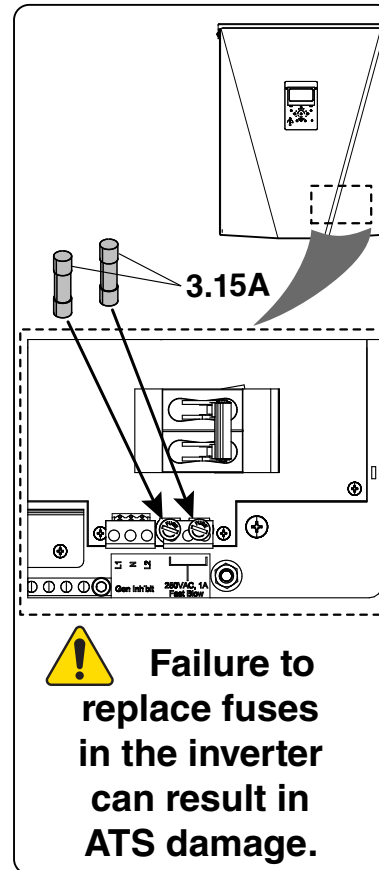
See [Figure 5-1](#). For dual ATS Whole Home Backup configurations with AC Generator Integration, the Inverter ATS must be upgraded with a PWRcell ATS Controller (Part #: A0002532225; Pictured right). Purchase Upgrade Kit (Model G0080060) to utilize this controller. In addition to the dual ATS Whole Home Backup configuration for AC Generator Integration, this controller may be used in all other configurations that require a PWRcell ATS.

IMPORTANT: 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.

Replace Fuses in PWRcell Inverter for Generator Integration

See [Figure 5-2](#). When integrating a Generac Home Standby Generator with a PWRcell system, it is required to replace the 1 A fuses in the PWRcell Inverter for the RGM PWR / Gen Inhibit circuit with the 3.15 A fuses included with this ATS.

- Locate and remove the two 1 A fuses attached to the front of the PWRcell ATS Controller.
- Remove both 1 A fuses from the PWRcell Inverter.
- Install the two 3.15 A fuses into the PWRcell Inverter.



013183

Figure 5-2. Replace Fuses for Generator Integration

Installation



▲ DANGER

Electrocution. Turn utility and emergency power supplies to OFF before connecting power source and load lines. Failure to do so will result in death or serious injury. (000116)

Begin by opening the enclosure of the PWRcell ATS. See [Open Enclosure](#) for more details.

For complete installation and interconnection diagrams, see [Drawings and Diagrams](#) in this manual.

NOTE: All installations must comply with national, state, and local codes. It is the responsibility of the installer to perform an installation that will pass the final electrical inspection.

Flexible Coverage

The Flexible Coverage configuration offers generator-powered whole home backup with optional ESS backup for a protected loads panel. Reference Interconnection Drawing [No. A0001501194 \(Part 3 of 4\) — INTERCONNECTION XFER SW 100-200 A — PWRcell Inverter](#) which is found at the end of this manual.

1. Connect utility service conductors at the utility service disconnect circuit breaker terminals N1 and N2. Follow torque specifications listed on the circuit breaker.
2. See [Figure 3-2](#). Connect the utility neutral conductor to the neutral terminal bar. The grounding electrode conductors can be connected to the equipment grounding terminal bar (see NEC 250.24(A)(4)). Follow all torque specifications for the terminal bars. A wire main bonding jumper is provided to properly bond the service equipment.

NOTE: A wire type main bonding jumper (A) is provided on 200 A units and 100 A Service Entrance rated units. This bonding jumper can be removed if needed where the ATS is not installed as service equipment.

NOTE: Service entrance rated models will have a service disconnect in area (D) of [Figure 3-3](#).

3. Connect the E1 and E2 power lugs in the generator to terminals E1 and E2 on the transfer mechanism. Connect the generator neutral wire to the neutral terminal bar. Connect the generator ground wire to the equipment grounding terminal bar.
4. Connect the main distribution panel to the PWRcell ATS T1 and T2 terminals. Connect main distribution panel neutral conductor to the neutral terminal bar and the equipment grounding conductor to the equipment ground bar.

NOTE: Copper or aluminum conductors shall be sized in accordance with all applicable NEC requirements and shall be permitted to be sized based on the 75°C column of Table 310.16 in the NEC. The installation must comply

fully with all applicable codes, standards, and regulations.

5. Use a 2-Pole 40 A circuit breaker to connect the inverter AC Grid Connection terminals L1 and L2 to the main distribution panel. Follow the torque specifications listed on the circuit breaker.
6. Connect the inverter AC Grid Connection neutral terminal N1 to the neutral bar in the main distribution panel. Also connect the inverter ground bar to the equipment grounding bar in the main distribution panel.
7. Connect the inverter Protected Loads terminals L1 Protcd and L2 Protcd to the main breaker or main lugs of the protected loads panel.
8. Connect the N2 Protcd terminal on the inverter Protected Loads terminals to the neutral terminal bar on the protected loads panel. Also connect the inverter's ground bar to the equipment grounding terminal bar in the protected loads panel.
9. Using 26-16 AWG wire, connect the inverter Gen Inhibit L1 and L2 terminals to the PWRcell ATS Controller P1 and P2 terminals, respectively.
10. Reference [Connect the Inverter ATS Control Cable](#), [Connect the Current Transformers \(CTs\)](#), and [Connect Air Conditioner Loads](#) to complete ATS wiring requirements.

Whole Home Backup

The Whole Home Backup configuration with AC generator integration offers both generator and ESS backup power for the whole home by using two transfer switches - one to transfer power between utility and a generator, and one to unlock whole home backup from the PWRcell Inverter ATS. Reference Interconnection Drawing [No. A0001501194 \(Part 4 of 4\) — INTERCONNECTION XFER SW 100-200 A — PWRcell Inverter](#) which is found at the end of this manual.

NOTE: The inverter ATS is not required to be a service rated ATS in this configuration.

NOTE: For Whole Home Generator Integration, the Inverter ATS must be upgraded with a PWRcell ATS Controller Upgrade Kit (Model G0080060) - this kit will include a modified PWRcell ATS controller (Part #: A0002532225).

1. Confirm the PWRcell ATS Controller used in the Inverter ATS is Part #: A0002532225. If it is not, cease all other installation activities and use the PWRcell ATS Controller Upgrade Kit (Model G0080060) to upgrade the Inverter ATS.
2. Connect utility service conductors at the utility service disconnect circuit breaker terminals N1 and N2 of the generator ATS. Follow torque specifications listed on the circuit breaker.
3. Connect the utility neutral conductor to the neutral terminal bar of the generator ATS. The grounding

electrode conductors can be connected to the equipment grounding terminal bar (see NEC 250.24(a)(4)). Follow all torque specifications for the terminal bars. A wire main bonding jumper is provided to properly bond the service equipment.

4. Connect the E1 and E2 power lugs in the generator to terminals E1 and E2 on the transfer mechanism in the generator ATS. Connect the generator neutral wire to the neutral terminal bar on the generator ATS. Connect the generator ground wire to the equipment grounding terminal bar on the generator ATS.
5. Connect the T1 and T2 terminals on the generator ATS to terminals N1 and N2 on the inverter ATS.
6. Connect the neutral terminal bar on the generator ATS to the neutral terminal bar on the inverter ATS. Connect the equipment grounding bar on the generator ATS to the equipment grounding bar on the inverter ATS.
7. Connect the T1 and T2 terminals on the inverter ATS to the main distribution panel supply. Connect the main panel neutral conductor to the neutral terminal bar and the equipment grounding conductor to the equipment ground bar on the inverter ATS.
8. Use a 2-Pole 40 A circuit breaker to connect the inverter AC Grid Connection terminals L1 and L2 to the main distribution panel load-side of the Inverter ATS.
9. Connect the inverter's ground bar to the equipment grounding bar in the main distribution panel.

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. The installer is responsible for compliance with applicable national, state, and local codes.

10. Connect the N2 Protcd terminal of the inverter Protected Loads terminals to the neutral terminal bar in the inverter ATS.
11. Connect the inverter Protected Loads terminals L1 Protcd and L2 Protcd to terminals E1 and E2 on the transfer mechanism of the inverter ATS.
12. Using 26-16 AWG wire, connect the "Generator Control" terminals on the inverter's PWRcell ATS Controller to the matching "Generator Control" terminals on the generator's PWRcell ATS Controller, taking care to maintain polarity.
13. Using 26-16 AWG wire, connect the Gen Inhibit L1 and L2 terminals in the inverter wiring compartment to the P1 and P2 terminals, respectively, on the generator's PWRcell ATS Controller.

14. Reference [Connect the Inverter ATS Control Cable](#) to connect the "ATS" port on the inverter to the inverter ATS. Reference [Connect Air Conditioner Loads](#) to complete wiring requirements for the inverter ATS.
15. Reference [Connect the Current Transformers \(CTs\)](#) to complete ATS wiring requirements for the generator ATS.
16. Reference [Load Management Options](#) to ensure inverter has sufficient protection from overload.

Setup and Commissioning

Perform the following procedures to setup and commission the system:

1. Verify Wiring (Wiring Checklist).
2. Activate the Generac Home Standby Generator.
3. Validate Powering the Home with the Generator Only.
4. Commission the PWRcell System.
5. Validate Inverter and Battery Firmware Versions.
6. Configure Inverter Settings for Generator Integration.
7. Reference [Generator Manual Override Commands](#).
8. Validate Charging the ESS from the Generator.
9. Validate Powering the Home with the ESS Only.
10. Set Auto Control.
11. Validate Return to Grid Connected Operation.

Wiring Checklist

Before proceeding to the Generator Integration functionality test procedures, please first validate that the PWRcell system with the Generac Automatic Home Standby Generator is correctly wired using the following checklist.

THIS CHECKLIST MUST BE COMPLETED BEFORE ENERGIZING THE SYSTEM.

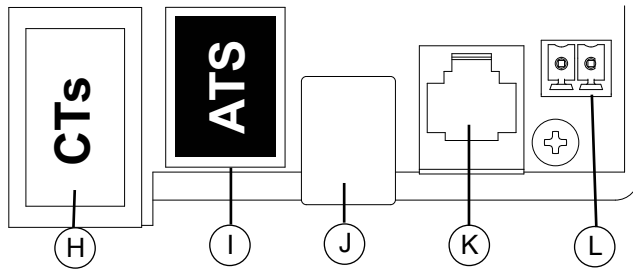


Figure 5-3. Accessory Ports

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

For Flexible Coverage:

- The Inverter ATS Control port on the PWRcell ATS controller is wired to the inverter “ATS” port via Cat 5 cable. The inverter “ATS” port is labeled 'I' in [Figure 5-3](#).
- The “Inverter CTs” port on the PWRcell ATS controller is wired to the inverter “CTs” port via Cat 5 cable. The inverter “CTs” port is labeled 'H' in [Figure 5-3](#).
- The “Gen Inhibit” L1 and L2 terminals in the inverter wiring compartment are wired to the P1 and P2 terminals, respectively, on the PWRcell ATS Controller See item “H” in [Figure 3-6](#).
- The utility is wired to the N terminals on the PWRcell ATS.
- The generator is wired to the E terminals on the PWRcell ATS.
- The main distribution panel is wired to the T terminals in the PWRcell ATS.
- The protected loads subpanel is wired to the Protected Loads terminals of the inverter.

For Whole Home:

- The “Inverter ATS Control” port on the inverter PWRcell ATS controller is wired to the inverter “ATS” port via Cat 5 cable. The inverter “ATS” port is labeled 'I' in [Figure 5-3](#).
- The “Inverter CTs” port on the generator PWRcell ATS controller is wired to the inverter “CTs” port via Cat 5 cable. The inverter “CTs” port is labeled 'H' in [Figure 5-3](#).
- The “Generator Control” terminals on the inverter ATS are connected to the “Generator Control” terminals on the generator ATS.
- The “Gen Inhibit” L1 and L2 terminals in the inverter wiring compartment are wired to the P1 and P2 terminals,

respectively, on the generator PWRcell ATS Controller. See item H in [Figure 3-6](#).

- The service conductors are wired to the N terminals on the generator PWRcell ATS.
- The generator is wired to the E terminals on the generator PWRcell ATS.
- The T terminals of the generator PWRcell ATS are wired to the N terminals of the inverter PWRcell ATS.
- The inverter's Protected Loads terminals are wired to the E terminals of the inverter PWRcell ATS.
- The T terminals of the inverter PWRcell ATS are wired to the main distribution panel.
- The main distribution panel is wired to the AC Grid Connection terminals on the inverter through a 2-Pole 40 A breaker.
- Check consistency of L1 and L2, ensuring lines do not cross over or change between the inverter ATS, the inverter, and the main distribution panel (the system must be powered off for these steps).
 - Ensure the inverter ATS is in the UP position. Use the manual operation handle as needed.
 - Verify utility power is still disconnected from entire installation and close the 2-pole 40 A backfeed breaker for the inverter AC Grid Connection. Also verify the Protected Loads Disconnect is closed.
 - With a digital multi-meter, measure continuity between the T1 and E1 terminals on the inverter ATS. If there is no continuity, check for miswiring and ensure consistency of L1 and L2 across equipment.
 - Open the 2-pole 40 A backfeed breaker for the inverter AC Grid Connection.

Activate the Generac Home Standby Generator

Activate the Generac Home Standby Generator prior to commissioning the PWRcell system. Follow the activation instructions in the generator manual accompanying the unit.

Validate Powering the Home with the Generator Only

1. Ensure the generator is in “AUTO” mode by checking the control panel on the generator and ensure the generator has enough fuel for a short test.
2. Verify the PWRcell system is not powered and the 40 A solar backfeed breaker for the inverter is open in the OFF position.
3. Disconnect the home from utility power. Be sure to disconnect power upstream from the PWRcell ATS connected to the generator. If the PWRcell ATS is service entrance rated, the main breaker inside the

PWRcell ATS can be used to disconnect utility power.

4. Verify that the generator starts and powers the main panel.
5. Reconnect to utility power and ensure the generator turns off after a few minutes. The ATS should return to the normal utility position.

Commission the PWRcell System

With the generator off, complete PWRcell system wiring and follow commissioning instructions. See Section 5: ***Electrical Connections for system wiring in the inverter Installation and Owner's Manual***. See ***Section 6: Commissioning in the inverter Installation and Owner's Manual*** for pre-commissioning checks and system commissioning.

IMPORTANT: PWRcell Battery modules will be at a low state of charge when they are new out of the box. To avoid having the generator turn on automatically during commissioning step “Test Island Mode”, it will be necessary to charge PWRcell Batteries for a minimum of 35 minutes upon commissioning. See [Automatic Generator Override Conditions](#).

Validate Inverter and Battery Firmware Versions

1. Access the Installer Configuration Tool by logging onto the REbus Beacon.
2. Select 'Inverter' from the menu.
3. Select 'Common' from the inverter submenu.
4. Verify that the inverter firmware version is 13760 or greater.
5. Select 'Battery' from the menu.
6. Select 'Common' from the battery submenu.
7. Verify that the battery firmware version is 12970 or greater.

NOTE: See Verifying Inverter Firmware Version section in ***PWRcell Inverter Installation and Owner's Manual*** for more information. To request a firmware update, please call 1-855-395-7841 or visit generac.com/resources-and-tools/ce-installer-resources/installation-resources.

Configure Inverter Settings for Generator Integration

1. From the home screen on the inverter control panel, use the right arrow key to navigate to the inverter device page.
2. Push the center button to access the inverter device main menu.
3. Navigate to “Mod. Settings” using the down arrow key and select using the center button. Modify the settings in the following table based on site configuration:

Setting	Range	Default	Description
NumTranSwthcs	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 1 in the Flexible Coverage configuration or 2 in the Whole Home Backup configuration.
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.
ACGenPower	0 – 26 kW	0	Nameplate power rating of the integrated Generac Home Standby Generator. If no generator is integrated, leave at 0.
ACGenCtrlMode	0 / 1 / 2	0	To set 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

4. Use the down arrow key to scroll to the bottom of the menu and select ‘Save’ using the center button to save settings changes.

AC Generator Control Modes

Generators 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.

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.

Generator Manual Override Commands

For PWRcell systems properly configured and set for AC Generator Integration, there are manual override commands that can be accessed using the inverter control panel. Use these commands to temporarily override the generator control mode selected. Select 'Auto Gen Ctrl' to return to using the selected generator control mode.

Generator Manual Override Command	Description
Auto Gen Ctrl	Returns the system to operate using its Generator Control Mode after an override command. NOTE: Selecting 'Auto Gen Ctrl' does not modify the Generator Control Mode.
Turn Gen On	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.
Turn Gen Off	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 Generator Control Mode.

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

Validate Charging the ESS from the Generator

1. Ensure all PWRcell system components (inverter, PV Links, and batteries) are enabled.
2. Ensure 'ACGenCtrlMode' is set to either '0' for 'Single Transfer' or '1' for 'Source Cycling.' Do not select '2' for 'Always On' for this test.
3. Disconnect the entire system from utility power. The ESS will begin powering house loads (protected loads or whole home depending on installation configuration).
4. At the inverter device page, press the center button to access the inverter device menu.
5. At the inverter device menu, use the down arrow key to scroll down to the "Turn Gen On" option and press the center button to select. This will temporarily override the Generator Control Mode to ensure the home is powered by the generator power only.
6. Navigate to the home screen on the inverter control panel and verify the generator icon is shown in the bottom right corner.
7. Verify the ESS is charging from generator power as shown by the power flow display on the home screen.

NOTE: Large house loads may limit or cause fluctuations in battery charging.

Validate Powering the Home with the ESS Only

1. Complete the procedure above to [Validate Charging the ESS from the Generator](#).
2. Confirm the ESS is charged up to 40% or higher. If not, continue charging the ESS from the generator.
3. Navigate to the inverter device page on the inverter control panel.
4. Press the center button to access the inverter device menu.
5. Use the down arrow key to scroll to the "Turn Gen Off" option and press the center button to select. This will switch the home to ESS power instead of generator power during a utility service interruption as long as the ESS has sufficient charge.
6. Verify the inverter immediately takes over powering house loads. The generator should turn off completely within a few minutes.
7. Navigate to the home screen on the inverter control panel and verify that the generator icon is no longer shown in the bottom right corner.
8. Verify the ESS is powering the home. Depending on your configuration (Flexible Coverage or Whole Home Backup), either the protected loads or the whole home will be powered.

Set Auto Control

1. Verify that 'ACGenCtrlMode' is set for the preferred Generator Control Mode.
2. Navigate to the inverter device page on the inverter control panel.
3. Press the center button to access the device menu.
4. Use the down arrow key to scroll down to the "Auto Gen Ctrl" option and press the center button to select. This will return the system to automatic control of switching between ESS and generator power during a utility service interruption, depending on the selected Generator Control Mode.

Validate Return to Grid Connected Operation

1. Reconnect utility power.
2. Verify the home is powered by the utility within 30 seconds.
3. Verify the inverter connects to the grid within 5 minutes. The inverter will show "grid connected" on the inverter device page.

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

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Section 6: Troubleshooting

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 3-6 .	Take fuses out, and check them for continuity. Replace fuses that read as open / no continuity. For more details, see the PWRcell Parts Manual. If integrating an AC Home Standby Generator, ensure the 1 A fast-blow mini fuses are replaced with the 3.15 A fuses provided with the PWRcell ATS. For more details, see Replace Fuses in PWRcell Inverter for Generator Integration .
Generator is still running after using the "Turn Gen Off" command.	Generator Signal Wires damaged or miswired.	Check that wire 23 is not shorted to ground and all generator signal wires are correctly connected.
	Loads exceed what the ESS can supply.	Reduce load to a level that the ESS can supply.
Home is unpowered while the generator is running.	ESS is below 25% SoC.	Allow the generator to charge the ESS before trying to turn the generator off.
	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.

Error Codes

The inverter can detect a variety of setpoint misconfigurations and wiring errors. If detected, the inverter will display a unique code on its device page.

A misconfiguration error will show up as “Configuration Error: X”, where X is the unique code. The table below explains the meaning of the different codes.

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 “Enalslanding” to “on”. See Configure the 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 the 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 ‘Enalslanding’ to ‘on.’ See Configure the 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 the Inverter for more information.
6	0X7706	The PWRcell Inverter is configured for 2 ATSS, 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 the 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 Inverter Installation and Owner’s 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 the 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 the 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 ‘Enalslanding’ to ‘on.’ If no ATS is installed, set ‘NumTranSwtchs’ to ‘0.’ See Configure the 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 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 the 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 single-phase service 120/240 V.

A misconfiguration error will show up as “Wiring Error: X”, where X is the unique code. The table below explains the meaning of the different codes.

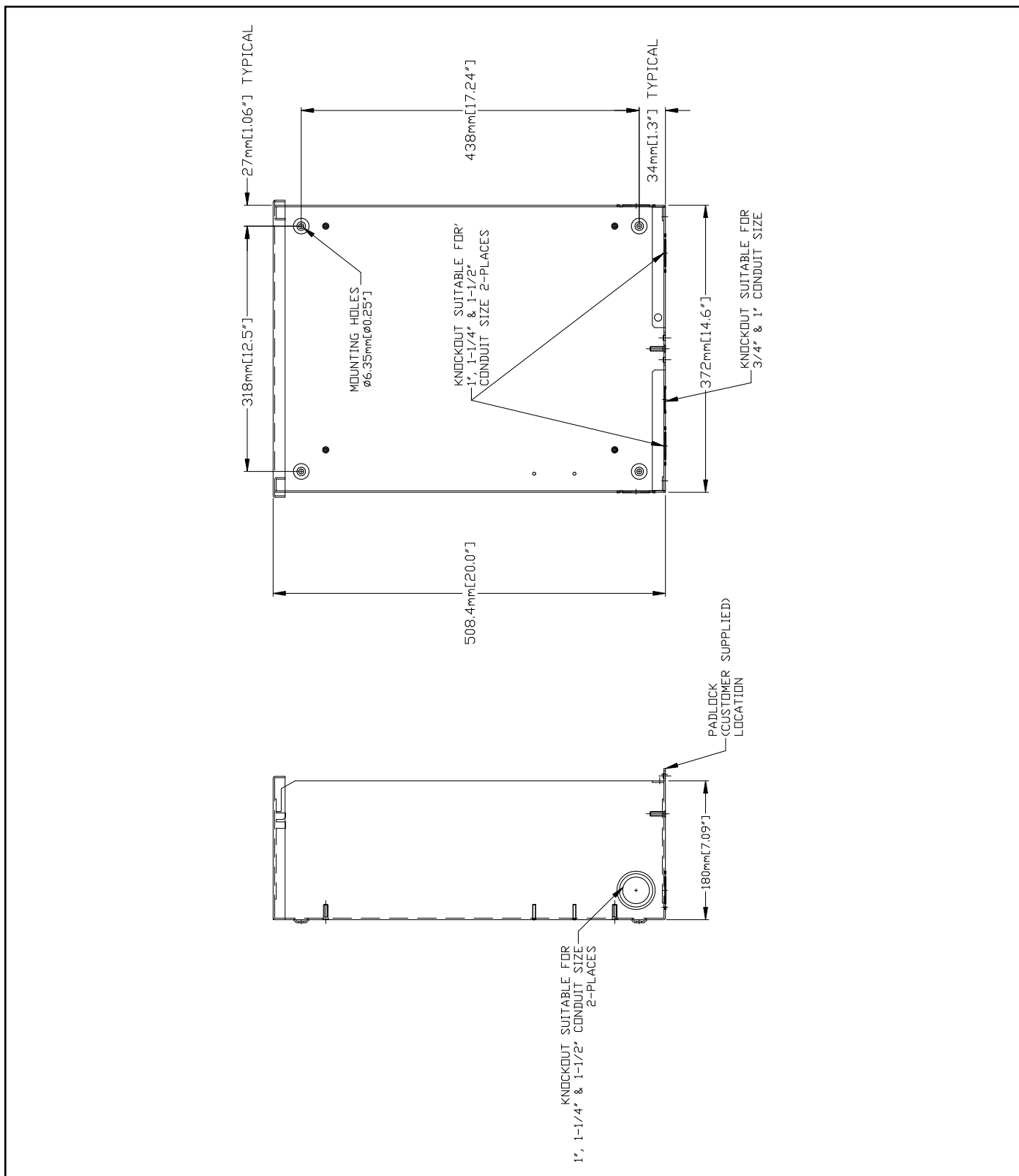
Wiring Error Codes			
Code	HEX Value	Description	Corrective Action
0	0X7720	The PWRcell Inverter is configured for AC Generator Integration but no ATS has been detected.	Check to make sure the ATS & CTs Cat 5 cables are intact and connected to the correct ports of the inverter. Check the ATS limit switch 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 'NumTranSwths' to '1' or '2' to match the number of installed ATSEs. See Configure the 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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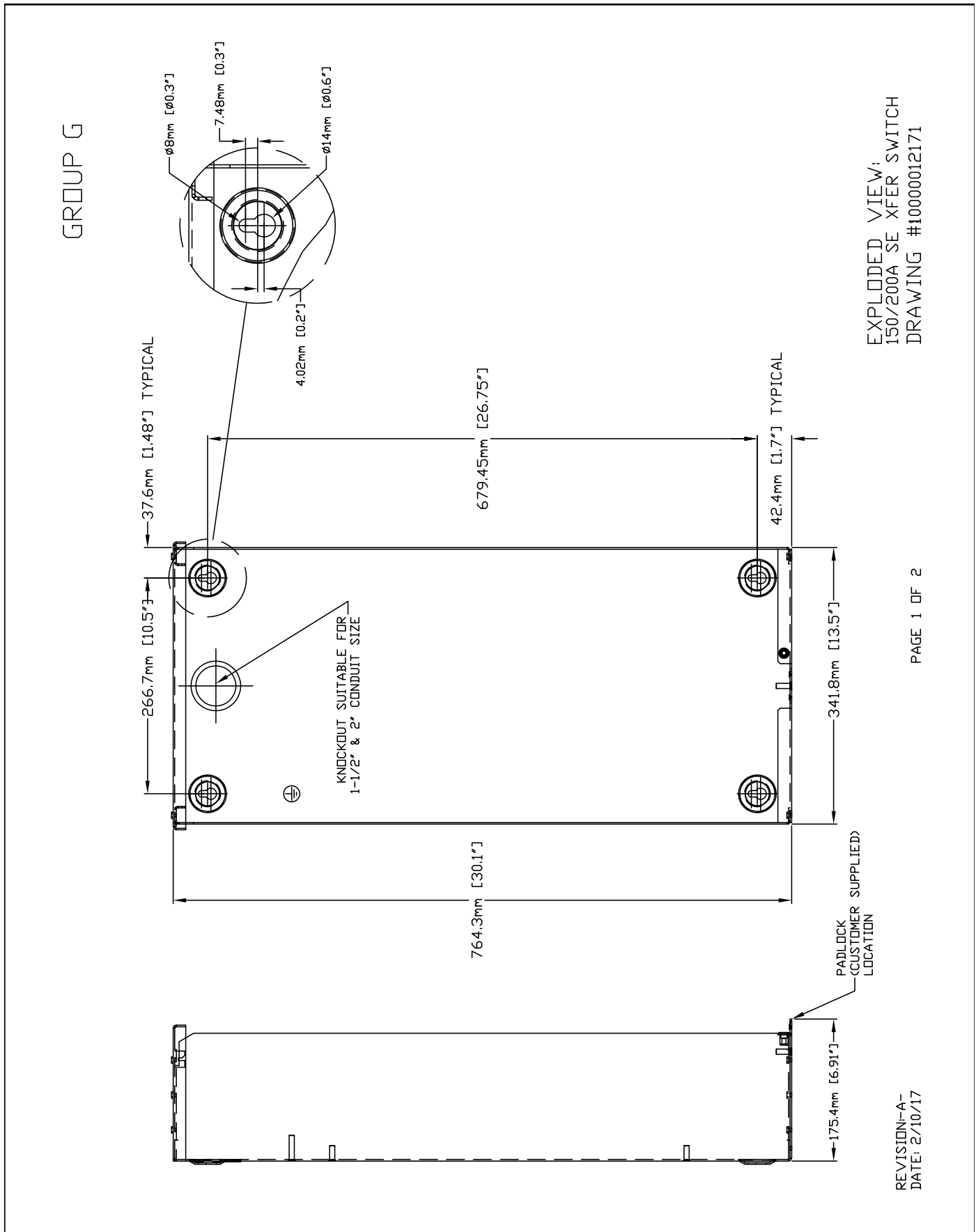
Section 7: Drawings and Diagrams

Installation Drawings

No. 0G6832-A: 100 A SE & non-SE / 150-200 A non-SE



No.10000012171-A: 150 / 200 A SE



EXPLODED VIEW:
150/200A SE XFER SWITCH
DRAWING #10000012171

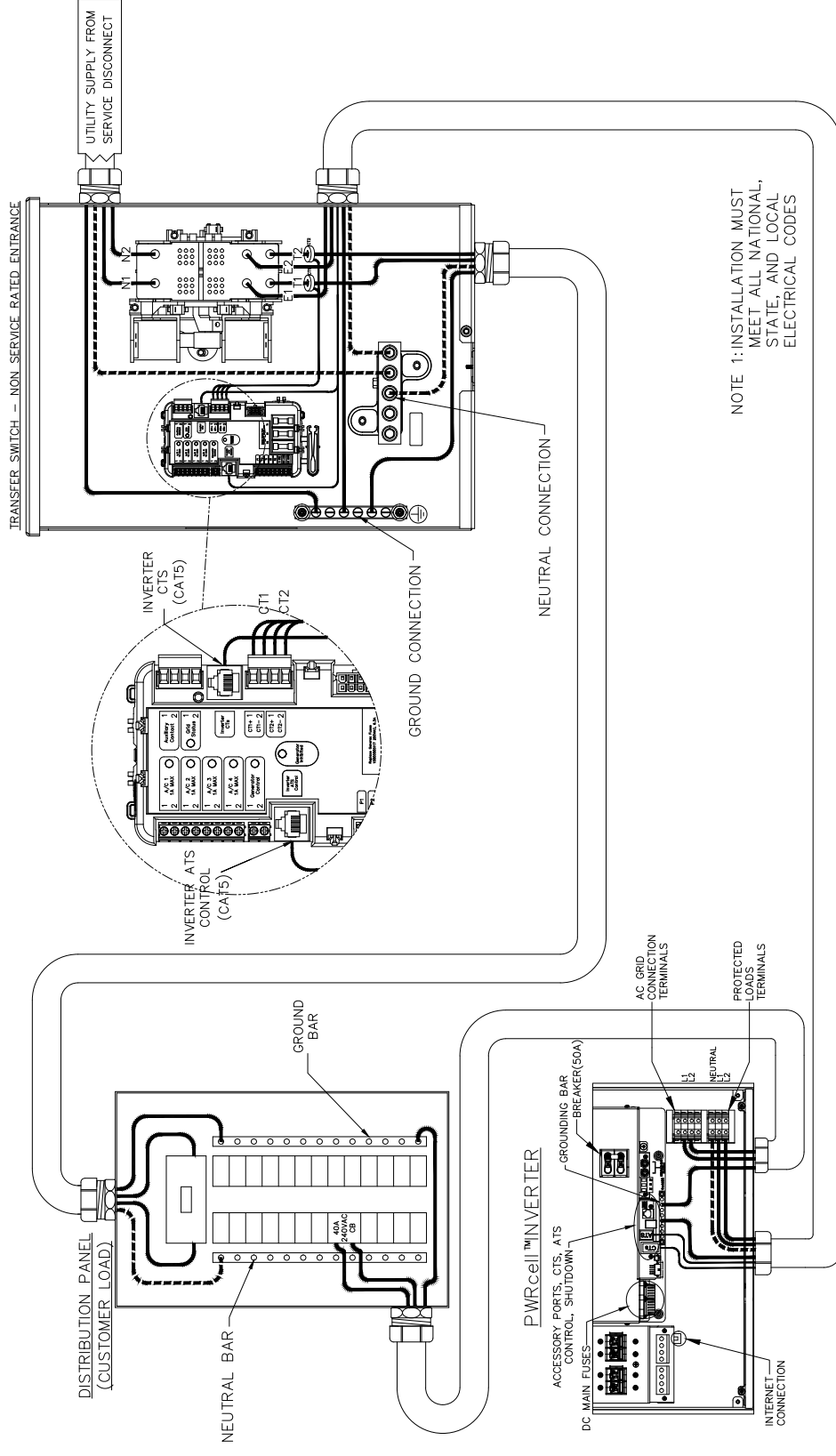
PAGE 1 OF 2

REVISION-A-
DATE: 2/10/17

Interconnection Drawings

No. A0001501194 (Part 1 of 4) — INTERCONNECTION XFER SW 100-200 A — PWRcell Inverter

GROUP G



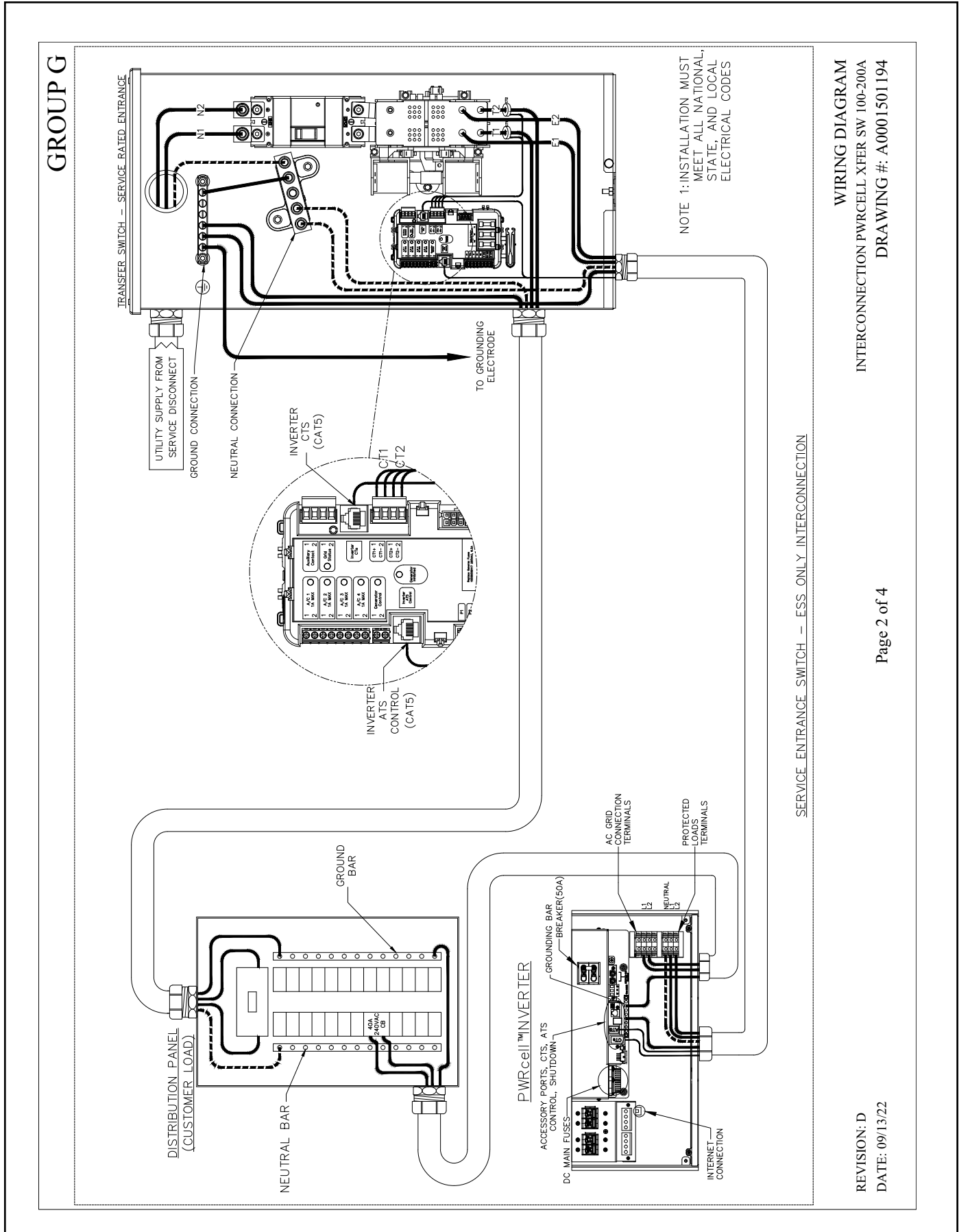
NON SERVICE ENTRANCE SWITCH — ESS ONLY INTERCONNECTION

WIRING DIAGRAM
 INTERCONNECTION PWRCELL XFER SW 100-200A
 DRAWING #: A0001501194

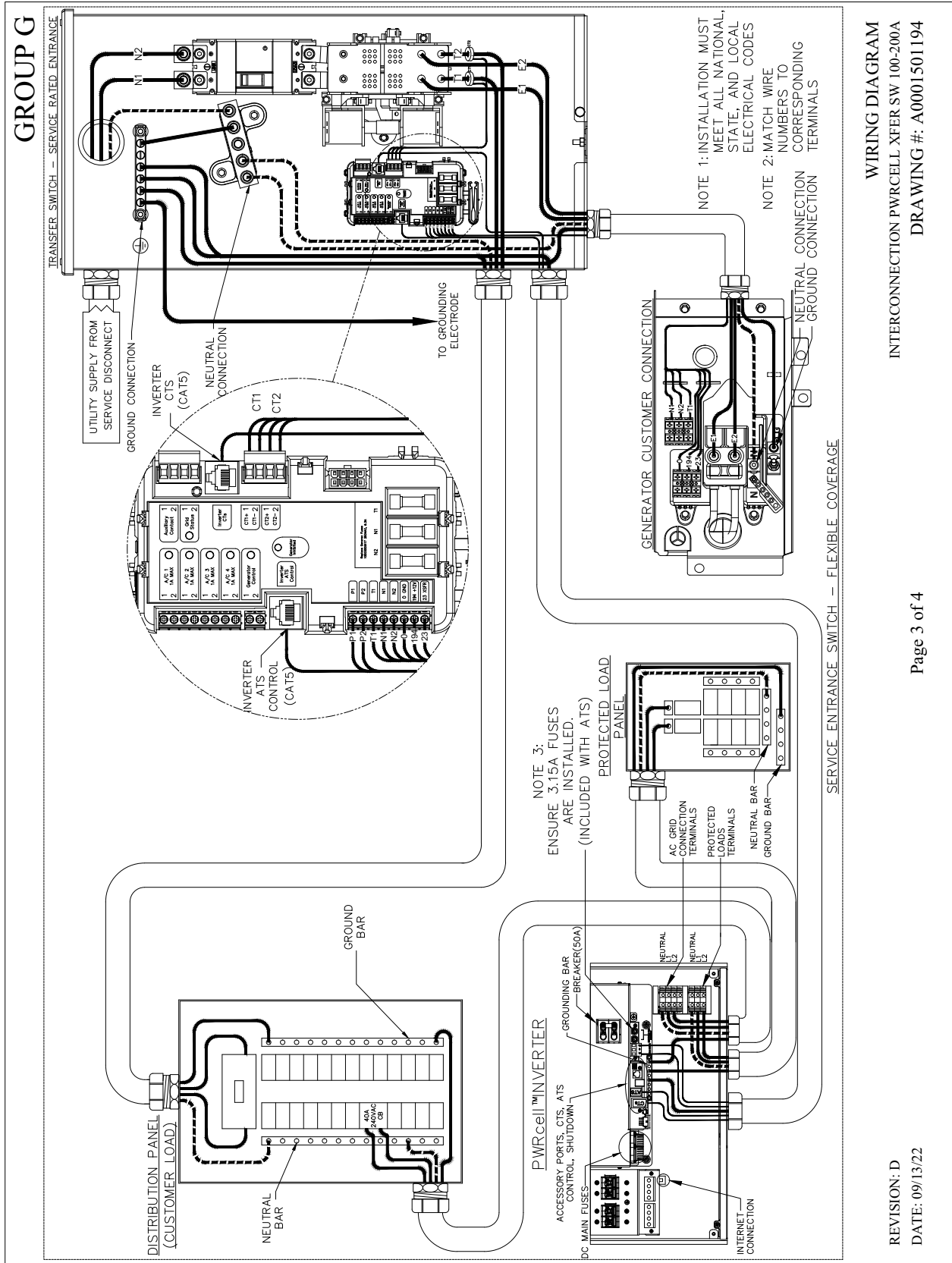
Page 1 of 4

REVISION: D
 DATE: 09/13/22

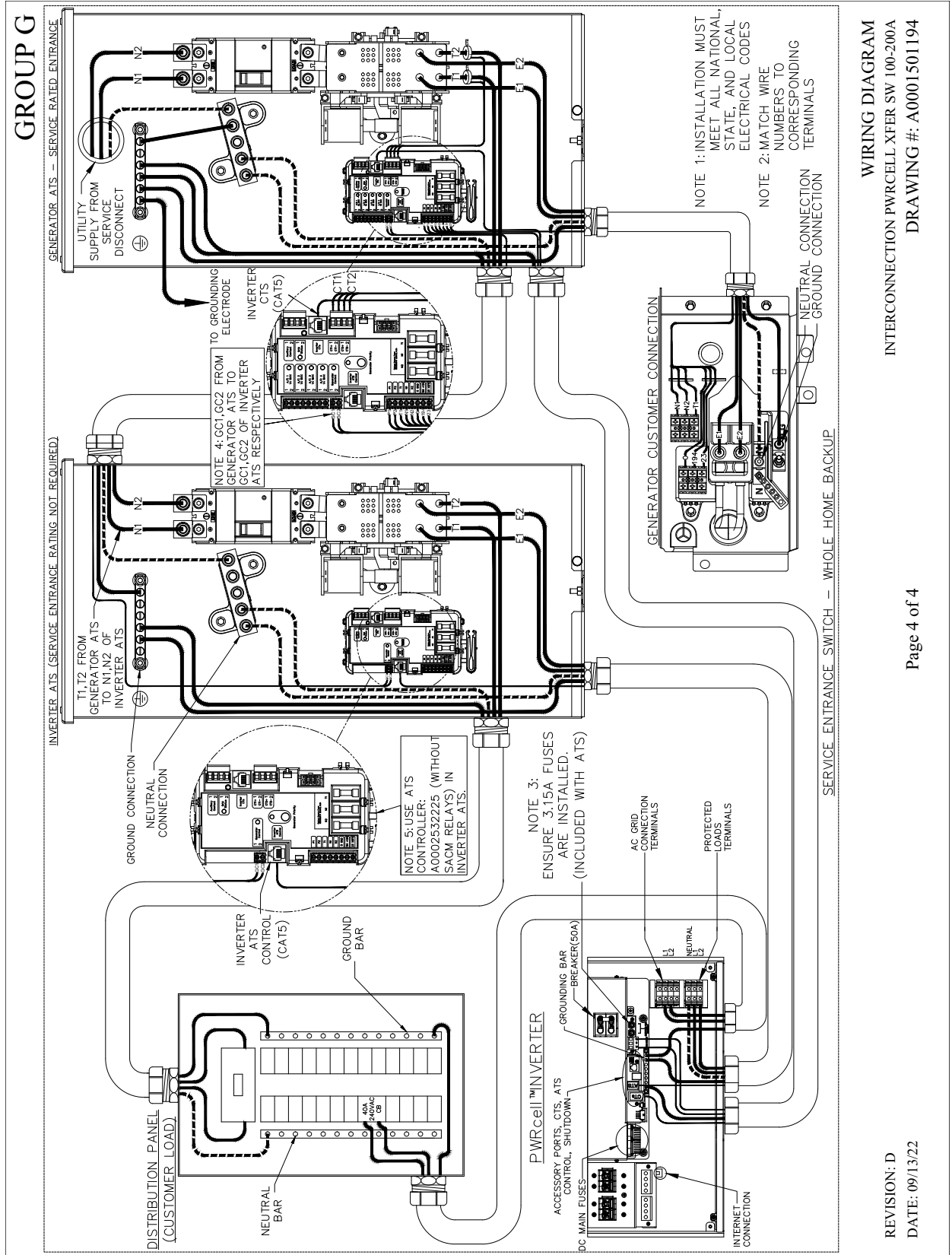
No. A0001501194 (Part 2 of 4) — INTERCONNECTION XFER SW 100-200 A — PWRcell Inverter



No. A0001501194 (Part 3 of 4) — INTERCONNECTION XFER SW 100-200 A — PWRcell Inverter



No. A0001501194 (Part 4 of 4) — INTERCONNECTION XFER SW 100-200 A — PWRcell Inverter



Part No. A0001501191 Rev. B 10/24/2022

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