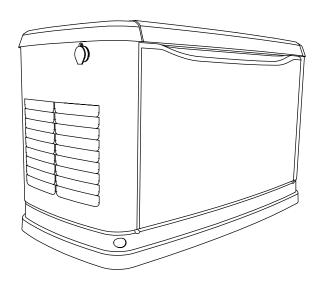


Owner's Manual PWRgenerator™ Air-Cooled Generators

9 kW





AWARNING

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: WWW.GENERAC.COM 1-888-GENERAC (888-436-3722)

Use this page to record important information about this generator.

Model:	
Serial:	
Production Date:	
Volts:	400VDC
Amps:	22.5A
DC Output:	
Engine Speed:	2,300 rpm
Controller P/N:	
STA MAC ID:	
SSID:	

Record the information found on the unit data label on this page. See *General Information* for the location of the unit data label. The unit has a label plate affixed to the inside partition, to the left of the control panel console as shown in *Figure 2-1*. See *Operation* for directions on how to open the top lid and remove the front panel.

Always supply the complete model and serial numbers of the unit when contacting an Independent Authorized Service Dealer (IASD) about parts and service.

Operation and Maintenance: Correct maintenance and care of the unit ensures a minimum number of problems, and keeps operating expenses at a minimum. It is the operator's responsibility to perform all safety inspections, to verify all maintenance for safe operation is performed promptly, and to have the equipment inspected periodically by an IASD. Normal maintenance, service, and replacement of parts are the responsibility of the owner/operator and are not considered defects in materials or workmanship within the terms of the warranty. Individual operating habits and usage may contribute to the need for additional maintenance or service.

When the generator requires servicing or repairs, Generac recommends contacting an IASD for assistance. Authorized service technicians are factory-trained and are capable of handling all service needs. To locate the nearest IASD, please visit the dealer locator at: www.generac.com/Dealer-Locator.

⚠WARNINGCANCER AND REPRODUCTIVE HARM

www.P65Warnings.ca.gov.

(000393a)

Table of Contents

Section 1: Safety Information		Menu System Navigation	17
Introduction	1	Setting the Exercise Timer	19
Read This Manual Thoroughly	1	Battery Charger	19
Safety Rules	1	Automatic Sequence of Operation	19
How to Obtain Service	1	Cranking	
General Hazards	2	Cleaning Cycle	19
Exhaust Hazards	3	Shutting Generator Down While Under Load	
Electrical Hazards	3	or During a Utility Outage	
Fire Hazards	3	PWRcell System	
Explosion Hazards	4	CommunicationInverter Control Module	
Battery Hazards	4	Auto Start/Stop State of Charge (SoC) Setpoints	
		PWRgenerator Start/Stop Commands	
Section 2: General Information		Adjusting PWRgenerator Setpoints	
Generator Component Locations	7	, ш,	
Data Decals	8	Section 4: Maintenance	
Specifications	9	Maintenance	23
Generator	9	Preparing for Maintenance	23
Engine	9	Performing Scheduled Maintenance	
Protection Systems	10	Service Schedule	
Emissions	10	Maintenance Log	
Fuel Requirements	10	Checking Engine Oil Level	25
Battery Requirements	10	Engine Oil Requirements	25
Battery Charger	10	Changing the Oil and Oil Filter	25
Engine Oil Requirements	10	Servicing the Air Cleaner	26
Activating the Generator		Spark Plug(s)	26
Replacement Parts		Battery Maintenance	26
Accessories		Inspecting the Battery	27
		Cleaning the Sediment Trap	27
Section 3: Operation		Post Maintenance Checks	
Site Prep Verification	13	Performing Fuel System Leak Test	28
Generator Enclosure	13	Attention After Submersion	29
Opening the Lid	13	Corrosion Protection	29
Front Access Panel Removal	13	Remove From and Return To Service Procedure	29
Intake Side Panel Removal	14	Remove From Service	
Main Line Circuit Breaker (Generator Disconnect)	14	Return to Service	29
LED Indicator Lights		Section 5: Troubleshooting / Quick Reference Guide	
Generator Emergency Shutdown Switch		Generator Troubleshooting	21
Control Panel Interface	15	Quick Reference Guide	
Using the AUTO/OFF/MANUAL Interface	15	Quick Reference Guide	3 3
Operating Modes	16		
Interface Menu Displays			
I CD Panal	16		

This page intentionally left blank.

Section 1: Safety Information

Introduction

Thank you for purchasing this compact, high performance, air-cooled, engine-driven generator. It is designed to automatically supply direct current (DC) electrical power to the Generac PWRcell Clean Energy System for the purpose of charging storage batteries during utility outages or periods of low solar output.

This unit is factory installed in an all-weather, metal enclosure intended exclusively for outdoor installation. This generator will operate using either vapor withdrawn liquid propane (LP) or natural gas (NG).

NOTE: This unit is specifically designed as a backup power source and to communicate with the PWRcell inverter. Generator will charge PWRcell batteries when solar cells through PVlink™ and utility power are not sufficient to maintain minimum battery state of charge.

NOTE: California Residents: This unit may only be utilized as an emergency backup power source, used only when grid power is unavailable.

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



AWARNING

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 starting, operating, and servicing procedures. 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.

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:

A DANGER

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

(000001)

AWARNING

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

(000002)

ACAUTION

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

When the unit requires servicing or repairs, contact Generac Customer Service at 1-888-GENERAC (1-888-436-3722) or visit **www.generac.com** for assistance.

When contacting Generac Customer Service about parts and 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

A 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)

A DANGER

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

(000750)



▲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)

AWARNING

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)

AWARNING

Accidental Start-up. Disconnect the negative battery cable, then the positive battery cable when working on unit. Failure to do so could result in death or serious injury. (000130)

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)



AWARNING

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)

AWARNING

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)

1

AWARNING

Moving Parts. Do not wear jewelry when starting or operating this product. Wearing jewelry while starting or operating this product could result in death or serious injury. (000115)



WARNING

Moving Parts. Keep clothing, hair, and appendages away from moving parts. Failure to do so could result in death or serious injury.

(000111)



AWARNING

Hot Surfaces. When operating machine, do not touch hot surfaces. Keep machine away from combustibles during use. Hot surfaces could result in severe burns or fire. (000108)

AWARNING

Equipment and property damage. Do not alter construction of, installation, or block ventilation for generator. Failure to do so could result in unsafe operation or damage to the generator. (000146)

AWARNING

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)

AWARNING

Environmental Hazard. Always recycle batteries at an official recycling center in accordance with all local laws and regulations. Failure to do so could result in environmental damage, death, or serious injury. (000228)

AWARNING

Injury and equipment damage. Do not use generator as a step. Doing so could result in falling, damaged parts, unsafe equipment operation, and could result in death or serious injury. (000216)

Exhaust Hazards



A DANGER

Asphyxiation. Running engines produce carbon monoxide, a colorless, odorless, poisonous gas. Carbon monoxide, if not avoided, will result in death or serious injury.

(000103)



AWARNING

Asphyxiation. Always use a battery operated carbon monoxide alarm indoors and installed according to the manufacturer's instructions. Failure to do so could result in death or serious injury.

(000178a)

AWARNING

Equipment and property damage. Do not alter construction of, installation, or block ventilation for generator. Failure to do so could result in unsafe operation or damage to the generator.

(000146)



AWARNING

Fire risk. Fuel and vapors are extremely flammable. Do not operate indoors. Doing so could result in death, serious injury, or property or equipment damage. (000281)

Electrical Hazards



A DANGER

Electrocution. Contact with bare wires, terminals, and connections while generator is running will result in death or serious injury.

(000144)



A DANGER

Electrocution. Never connect this unit to the electrical system of any building unless a licensed electrician has installed an approved transfer switch. Failure to do so will result in death or serious injury.

(000150)

A 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)



A DANGER

Electrocution. Verify electrical system is properly grounded before applying power. Failure to do so will result in death or serious injury. (000152)



A DANGER

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

(000188)



A DANGER

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

(000104)



A 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)

Fire Hazards



AWARNING

Fire hazard. Do not obstruct cooling and ventilating airflow around the generator. Inadequate ventilation could result in fire hazard, possible equipment damage, death or serious injury.

(000217)



AWARNING

Fire and explosion. Installation must comply with all local, state, and national electrical building codes. Noncompliance could result in unsafe operation, equipment damage, death, or serious injury.

(000218)



AWARNING

Fire hazard. Use only fully-charged fire extinguishers rated "ABC" by the NFPA. Discharged or improperly rated fire extinguishers will not extinguish electrical fires in automatic standby generators.

(000219)



AWARNING

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)



AWARNING

Risk of Fire. Hot surfaces could ignite combustibles, resulting in fire. Fire could result in death or serious injury.

(000110)



AWARNING

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)



AWARNING

Risk of Fire. Unit must be positioned in a manner that prevents combustible material accumulation underneath. Failure to do so could result in death or serious injury. (000147)

Comply with regulations the local agency for workplace health and safety has established. Also, verify that the generator is installed in accordance with the manufacturer's instructions and recommendations. Following proper installation, do nothing that might alter a safe installation and render the unit in noncompliance with the aforementioned codes, standards, laws, and regulations.

Explosion Hazards



A DANGER

Explosion and fire. Fuel and vapors are extremely flammable and explosive. No leakage of fuel is permitted. Keep fire and spark away. Failure to do so will result in death or serious injury.

(000192)

A DANGER

Explosion and fire. Connection of fuel source must be completed by a qualified professional technician or contractor. Incorrect installation of this unit will result in death, serious injury, and property and equipment damage.

(000151a)



A DANGER

Risk of fire. Allow fuel spills to completely dry before starting engine. Failure to do so will result in death or serious injury.

(000174)

Battery Hazards



A DANGER

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

(000188)



AWARNING

Explosion. Do not dispose of batteries in a fire.
Batteries are explosive. Electrolyte solution can cause burns and blindness. If electrolyte contacts skin or eyes, flush with water and seek immediate medical attention.

(000162)



AWARNING

Explosion. Batteries emit explosive gases while charging. Keep fire and spark away. Wear protective gear when working with batteries. Failure to do so could result in death or serious injury.

(000137a)



▲WARNING

Electrical shock. Disconnect battery ground terminal before working on battery or battery wires. Failure to do so could result in death or serious injury. (000164)



AWARNING

Risk of burns. Batteries contain sulfuric acid and can cause severe chemical burns. Wear protective gear when working with batteries. Failure to do so could result in death or serious injury.

(000138a)



AWARNING

Risk of burn. Do not open or mutilate batteries.

Batteries contain electrolyte solution which can cause burns and blindness. If electrolyte contacts skin or eyes, flush with water and seek immediate medical attention.

(000163a)

▲WARNING

Environmental Hazard. Always recycle batteries at an official recycling center in accordance with all local laws and regulations. Failure to do so could result in environmental damage, death, or serious injury. (000228)

Always recycle batteries in accordance with local laws and regulations. Contact your local solid waste collection site or recycling facility to obtain information on local recycling processes. For more information on battery recycling, visit the Battery Council International website at: http://batterycouncil.org.

Safety Information

This page intentionally left blank.

Section 2: General Information

Generator Component Locations

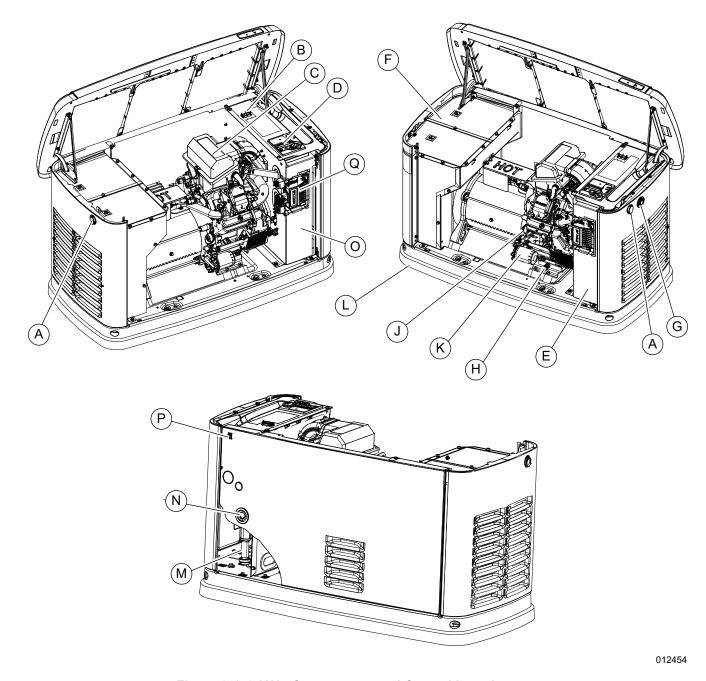
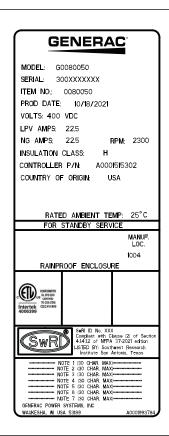


Figure 2-1. 9 kW—Components and Control Locations

Α	Lock with cover	E	Battery compartment (battery not supplied)	J	Oil fill cap/dipstick	N	Fuel inlet
В	Main line circuit breaker (generator disconnect)	F	Exhaust enclosure	K	Oil filter	0	Data decal location
С	Airbox with air cleaner	G	Status LED indicators	L	Composite base	Р	Generator emergency shutdown switch
D	Control panel	Н	Oil drain hose	M	Sediment trap	Q	ECM

Data Decals

Two decals on the generator provide information about the unit itself and required fuel inlet pressure for correct operation

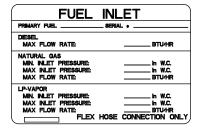


Model Data Decal

Includes important information about the unit including:

- Model number
- Serial number
- · Production date
- Voltage
- Amps
- · Country of origin
- · Rated ambient temperature

The model data decal also displays certification symbols by Intertek (cETLus) and the Southwest Research Institute (SwRI).



Fuel Inlet Pressure

Displays unit serial number, along with minimum and maximum inlet pressures for natural gas (NG) and liquid propane (LP) supply. Space is provided for installer to enter maximum flow rates based on installed pipe sizes and lengths.

Specifications

Generator

Model	9 kW
Rated voltage	400 VDC
Rated maximum load current (amps) at rated voltage with LP*	22.5
Main line circuit breaker (generator disconnect)	30 amp
Battery requirement (field supplied)	12 volts, Group 26R-540CCA Minimum (see <i>Replacement Parts</i>)
Enclosure	Aluminum
Weight (lb / kg) (without battery)	416 / 189
Normal operating range	This unit is tested in accordance to UL 2200 standards with an operating temperature of -20 °F (-29 °C) to 122 °F (50 °C). For areas where temperatures fall below 32 °F (0 °C), a cold weather kit is recommended. When operated above 77 °F (25 °C), there may be a decrease in engine power. See <i>Engine</i> .

These generators are rated in accordance with UL 2200, Safety Standard for Stationary Engine Generator Assemblies, and CSA-C22.2 No. 100-04 Standard for Motors and Generators.

Engine

Model	9 kW
Engine type	G-Force 800 Series
Number of cylinders	2
Displacement	816 cc
Cylinder block	Aluminum with cast iron sleeve
Recommended spark plug	See Replacement Parts
Spark plug gap	0.020 in (0.508 mm)
Hydraulic Lifters	Yes
Valve clearance	N/A
Starter	12 VDC
Oil capacity including filter	Approx. 2.2 qt (2.1 L)
Recommended oil filter	See Replacement Parts
Recommended air filter	See Replacement Parts
Recommended air filter	

Engine power is subject to and limited by such factors as fuel BTU/joules, ambient temperature, and altitude. Engine power decreases approximately 3.5% for each 1,000 ft (304.8 m) above sea level, and also will decrease approximately 1% for each 10 °F (6 °C) above 60 °F (15 °C) ambient temperature.

A detailed specification sheet for a particular generator is available from a local IASD.

^{*} NG ratings will depend on specific fuel joules/BTU content.

Protection Systems

The generator may need to run for long periods of time with no operator present to monitor engine or generator conditions. The generator is equipped with protection systems to automatically shut down the unit to protect against potentially damaging conditions. Some of these systems include:

Alarms:

- High Temperature
- Low Oil Pressure
- Overcrank
- Overspeed
- Overvoltage
- Undervoltage
- Overload
- Warnings:
- Charger Warning
- Low Battery
- Battery Problem

- Underspeed
- RPM Sensor Loss
- Controller Fault
- Wiring Error
- Stepper Overcurrent
- Exercise Set Error
- USB Warning
- Download Failure

The control panel contains a display alerting the operator when a fault condition occurs. The above list is not allinclusive. See **Operation** for more information about alarms and control panel operation.

NOTE: A warning indicates a condition on the generator which should be addressed, but will not shut down generator. An alarm shuts down the generator to protect system from any damage. In event of an alarm, an owner can clear the alarm and restart generator prior to contacting an IASD. Contact an IASD if the intermittent issue occurs again.

Emissions

The United States Environmental Protection Agency (US EPA) (and California Air Resources Board (CARB), for engines/equipment certified to California standards) requires this engine/equipment to comply with exhaust and evaporative emissions standards. Locate the emissions compliance decal on the engine to determine applicable standards. See the included emissions warranty for emissions warranty information. Follow the maintenance specifications in this manual to ensure the engine complies with applicable emissions standards for the duration of the product's life.

This generator is certified to operate on liquid propane vapor fuel or pipeline natural gas.

The Emission Control System code is EM (Engine Modification). The Emission Control System on this generator consists of the following:

System	Components
Air Induction	- Intake manifold - Air cleaner
Fuel Metering	- Electronically controlled mixer assembly
Ignition	- Spark plug - Ignition module
Exhaust	- Exhaust manifold - Muffler

Fuel Requirements



▲ DANGER

Explosion and Fire. Fuel and vapors are extremely flammable and explosive. Add fuel in a well ventilated area. Keep fire and spark away. Failure to do so will result in death or serious injury.

(000105)

The engine has been fitted with a dual fuel electronic fuel injection control (EFIC) system. The unit will run on NG or LP gas, but has been factory-configured to run on NG. The fuel system will be configured for the available fuel source during installation.

Recommended fuels should have a BTU content of at least 1,000 BTUs per ft³ (37.26 megajoules per m³) for natural gas, or at least 2,500 BTUs per ft³ (93.15 megajoules per m³) for LP gas.

NOTE: If converting to LP gas from NG, a minimum LP tank size of 250 gal (946 L) is recommended. See installation manual for complete procedures and details.

Battery Requirements

12 volts, Group 26R Wet Cell 540CCA minimum (not included with unit). See Battery Maintenance for correct battery maintenance procedures.

Battery Charger

The battery charger is integrated into the converter module in all models. It operates as a smart charger, verifying output charging levels are safe and continuously optimized to promote maximum battery life.

NOTE: Do not use external battery chargers.

Engine Oil Requirements

See Engine Oil Requirements for correct oil viscosity.

Activating the Generator

The generator should be activated upon initial startup. See installation manual for complete instructions.

Replacement Parts

Description	9 kW	
26R Battery	0H3421S	
Spark plug	0G0767B	
Oil filter	070185E	
Air filter	0J8478	
Control panel fuse	0D7178T	
Converter module fuse	0E7403C	
ECM fuse		

Accessories

NOTE: Performance enhancing accessories are available for air-cooled generators. Contact an IASD or visit **www.generac.com** for additional information on replacement parts, accessories, and extended warranties. See also **http://www.ordertree.com/generac/air-cooled-homestandby-generators/**.

Accessory	Description
Cold Weather Accessories*— • Battery Pad Warmer • Oil Warmer • Breather Warmer * each sold separately	 Recommended in areas where temperatures fall below 0 °F (-18 °C). Recommended in areas where temperatures fall below 0 °F (-18 °C). Recommended in areas where heavy icing occurs.
Scheduled Maintenance Kit	Includes all items necessary to perform complete routine maintenance on the generator along with oil recommendations (oil not included).
Fascia Base Wrap	The fascia base wrap snaps together around the bottom of the new air-cooled generators. This offers a sleek, contoured appearance as well as protection from rodents and insects by covering the lifting holes located in the base. Requires use of the mounting pad shipped with the generator.
Touch-Up Paint Kit	If the generator enclosure is scratched or damaged, it is important to touch-up the paint to protect from future corrosion. The paint kit includes the necessary paint to correctly maintain or touch-up a generator enclosure.
Extended Warranty Coverage	Extend generator warranty coverage by purchasing extended warranty coverage. Covers both parts and labor. Extended coverage can be purchased within 12 months of the end-user's purchase date. This extended coverage is applicable to registered units and end-user proof of purchase must be available upon request. Available for Generac [®] and Guardian [®] products. Not available for Corepower [™] , PowerPact [™] , and EcoGen [™] products or all international purchases.

General Information

This page intentionally left blank.

Section 3: Operation

Site Prep Verification

A DANGER

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

(000750)

Generator must be installed to allow unimpeded airflow into and out of generator.

Mechanical and gravity outdoor air intake openings for air distribution and supply systems must be located not less than 10 ft (3.05 m) horizontally from generator enclosure. See Section 401.4 in the ICC Mechanical Code for additional information.

Verify all shrubs or tall grasses within 3 ft (0.91 m) of intake and discharge louvers on the sides of the enclosure have been removed. Install generator on high ground where water levels will not rise and endanger it. This unit must not operate in or be subjected to standing water. Verify all potential water sources such as water sprinklers, roof run-off, rain gutter downspouts, and sump pump discharges are directed away from unit.

Generator Enclosure

Enclosure lid is locked prior to shipment. A set of keys is attached to cardboard on top of generator. An additional set of keys is attached to pallet bracket on the front intake end of generator.

NOTE: Keys provided with this unit are intended for service personnel use only.

Opening the Lid

- 1. Use keys to open generator lid.
- See Figure 3-1. Two locks (A) secure lid; one on each side. Open protective rubber cap to access keyhole.

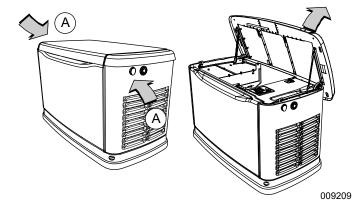


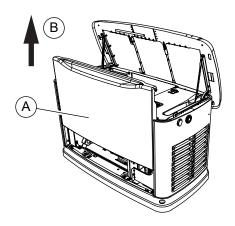
Figure 3-1. Opening the Lid

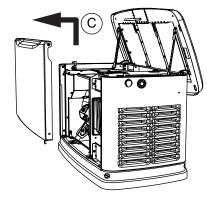
- **3.** Press down on lid above side lock, and unlock latch to correctly open lid.
- **4.** Repeat for other side. Lid may appear stuck if pressure is not applied from the top.

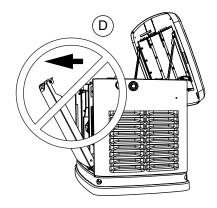
NOTE: Always verify side locks are unlocked before attempting to lift lid.

Front Access Panel Removal

See *Figure 3-2*. Remove front access panel (A) by lifting straight up and out once lid is open.







009210

Figure 3-2. Remove Front Access Panel

NOTE: Always lift front access panel straight up before pulling away from enclosure (B and C). Do not pull panel away from the enclosure before lifting up (D).

Intake Side Panel Removal

See *Figure 3-3*. Intake side panel (A) must be removed to access battery compartment, fuel regulator, and sediment trap.

- 1. Raise lid and remove front panel.
- 2. Use a hex key to remove two mounting screws (B) and L-bracket screw (C).
- 3. Lift intake panel up and away from generator.

NOTE: Always lift intake side panel straight up before pulling away from enclosure. Do not pull panel away from enclosure before lifting up (D).

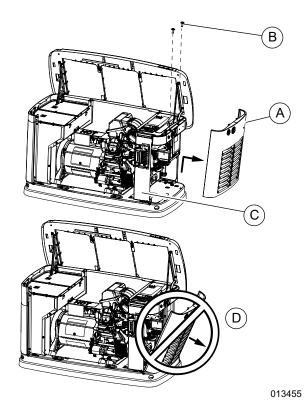


Figure 3-3. Intake Side Panel Removal

Main Line Circuit Breaker (Generator Disconnect)

See *Figure 3-4*. This is a 2-pole main line circuit breaker (MLCB) (generator disconnect) (A) rated according to relevant specifications.

The MLCB (generator disconnect) can be locked in OFF (OPEN) for security. Use an appropriately-sized padlock (not included) with a shackle long enough to pass through both lock tabs (B).

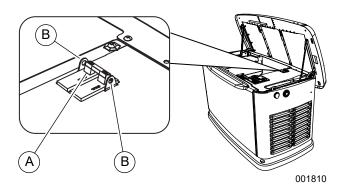


Figure 3-4. Main Line Circuit Breaker (MLCB)

NOTE: DO NOT leave generator MLCB (generator disconnect) locked in OFF (OPEN) during normal generator operation. Leaving MLCB (generator disconnect) in OFF (OPEN) will prevent generator from powering structure during a power outage when placed in AUTO mode.

LED Indicator Lights

See *Figure 3-5*. Three LEDs are visible behind a translucent lens on the generator side panel. These LEDs indicate generator operating status.

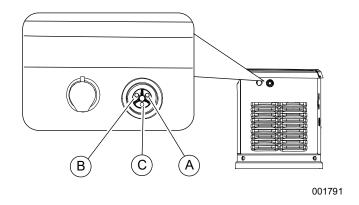


Figure 3-5. LED Indicator Lights

- Green LED "Ready" light (A) illuminates when utility is present and control panel is in AUTO. LED flashes when engine starts and generator outputs power to PWRcell Inverter/Batteries.
- Red LED "Alarm" light (B) illuminates when generator is OFF or a fault is detected. Contact an IASD.
- Yellow LED "Non-Critical Alert" light (C) illuminates when maintenance is required.

NOTE: Yellow LED may be illuminated at the same time as either the red or green LED.

Generator Emergency Shutdown Switch

ACAUTION

Equipment Damage. The emergency shutdown switch is not to be used to power down the unit under normal operating circumstances. Doing so will result in equipment damage. (000399a)

All generators are equipped with an external means of shutting down the generator which complies with the latest NEC code requirement. Primary generator shutdown sequence is described in **Shutting Generator Down While Under Load or During a Utility Outage**.

See *Figure 3-6*. A generator emergency shutdown switch (A) is located on the exterior of the generator back panel. This emergency shutdown switch shuts down generator and disables restarts.

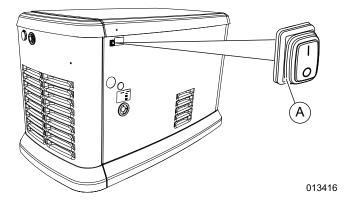


Figure 3-6. External Emergency Shutdown Switch (all models)

NOTE: Whenever possible, perform primary shutdown procedure before disabling generator with emergency shutdown switch.

NOTE: Generator will not start if emergency shutdown switch is OPEN (O). Controller displays an "Shutdown Switch" alarm, and red LED "Alarm" light illuminates. Set emergency shutdown switch to CLOSED (I) to clear this condition. Clear alarm by pressing OFF button, and then ENTER. The generator can then be placed in AUTO or MANUAL.

Control Panel Interface

See *Figure 3-7*. The control panel interface (A) is located under the enclosure lid. Verify both left and right side locks are unlocked before attempting to lift lid of enclosure. Open lid as directed in *Opening the Lid*.

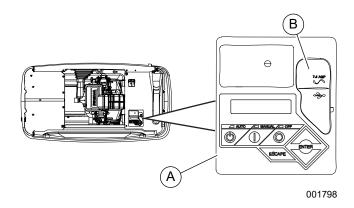


Figure 3-7. Generator Control Panel

The 7.5A fuse is located beneath rubber cover (B) to the right of the control panel.

Verify both left and right side locks are securely out of the way before closing unit.

All appropriate panels must be in place during any operation of the generator. This includes operation by a servicing technician while conducting troubleshooting procedures.

Using the AUTO/OFF/MANUAL Interface

Button	Description of Operation	
AUTO	Activates fully automatic system operation. Allows unit to automatically start and exercise generator according to exercise timer. Enables automatic remote operation. Generator will power up and run to charge PWRcell Battery when battery state of charge (SoC) falls below a predetermined threshold or PWRcell Inverter provides a remote start signal. PWRcell Inverter may apportion power generated to both the PWRcell Battery and AC voltage. Green LED flashes when generator is providing power.	
OFF	Shuts down engine and prevents automatic operation of unit.	
MANUAL	Cranks and starts generator. Power is only supplied to the PWRcell Battery if there is demand from PWRcell Inverter. Blue LED illuminates when unit starts outputting power to the PWRcell Inverter.	

NOTE: Damage caused by mis-wiring of interconnect wires is not warrantable.

NOTE: Select OFF button before selecting desired mode button.

Operating Modes

-	
Mode	Description
MANUAL	 Power will be apportioned between PWRcell Battery and PWRcell Inverter. Operation of engine without power being generated is possible in this mode if PWRcell Battery are above a predetermined FULL state of charge and PWRcell Inverter is not connected to any AC load. Unit will stop if put into OFF mode.
AUTO	 Unit starts when all conditions are met: Any battery module's SoC is below Auto-StartSoC (default 25%). MaxChargePower of any battery module with SoC below AutoStartSoC is greater than Auto-StartBatteryChargePower (default 1kW). The set AutoRestartDelay time (default 5 minutes) has passed since unit last AUTO stopped. PWRcell ESS is in Island Mode. OR:
OFF	Unit is completely shut down and must be moved to AUTO or MANUAL to operate.

NOTE: Unit will cease power production when stop conditions are met, but will continue to run while performing a cool-down. Generator controller will display COOLING DOWN. Unit will enter standby once cool-down is complete and display STANDBY.

NOTE: Generator will only perform exercise functions in AUTO.

Interface Menu Displays

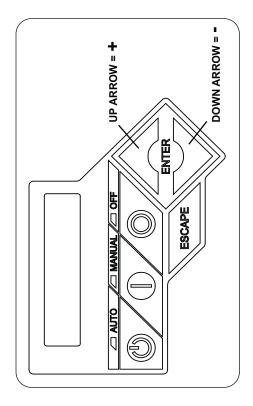
LCD Panel

Feature	Description
HOME page	Default page displayed if no buttons are pressed for 60 seconds. Normally shows current status message, and current date and time. Highest priority active alarm/warning is automatically posted on this page, as well as flashing the backlight when such a condition is detected. In the case of multiple alarms/warnings, only first message is displayed. Press OFF button and then ENTER button to clear an alarm or warning. When "Hours of Protection" is displayed, this represents total time generator has been ready to provide backup power if needed.
Display Backlight	Normally off. The backlight will automatically illuminate and remain on for 30 seconds if operator presses any button.
MAIN MENU page	Allows operator to navigate to all other pages or sub-menus by using arrow keys and ENTER button. Page can be accessed at any time with several presses of the dedicated ESCAPE button. Each press of the ESCAPE button takes operator to previous menu until MAIN MENU displays. This page contains information for History; Status; Edit; and Debug.

013283

Menu System Navigation

Press ESCAPE button from any page to access the MENU. You may need to press the ESCAPE button several times before reaching the MENU page. Navigate to the desired menu by using the \uparrow/\downarrow buttons. Press ENTER button when desired menu is displayed and flashing,



Low Volts Remove Load Overload Remove Load FIRMWARE ERROR-7 Stopping... FIRMWARE ERROR-9 Battery Problem Charger Warning SEEPROM ABUSE USB Warning Alarm Message(s) High Engine Temp Low Oil Pressure Loss of Speed Signal Warning Message(s) Service Schedule B Pwr Cnvrtr Brd Wrn CRC Mismatch Wrn Shutdown Switch Loss of Serial Link Service Schedule A RPM Sense Loss Pwr Cnvrtr Brd Flt Exercise Set Error Download Failure Controller Fault Inspect Battery Underspeed Overvoltage Undervoltage Internal Fault Fuel Pressure Overcrank Overspeed Low Battery * Hours of Protection and number of hours will flash every 5 seconds when displayed. Running Hours of Protection 0 (H) Running in Exercise Hours of Protection 0 (H) Switched to "OFF" Hours of Protection 0 (H) Switched OFF Hours of Protection 0 (H) Running - Warning "Warning Message" Utility Loss Delay Pausing for 13 sec. Running - Alarm "Alarm Message" Running Cooling Down Ready to Run Hours of Protection 0 (H) Cranking - Warning "Warning Message" Cranking Pausing for 13 sec Stopped - Warning "Warning Message" Cranking - Alarm "Alarm Message" Running Warming Up Cranking Attempt # 3

GENERAC 300 HSB MENU MAP
Note: Menu functions and features may vary
depending on unit model and firmware revision.

Figure 3-8. Navigation Menu

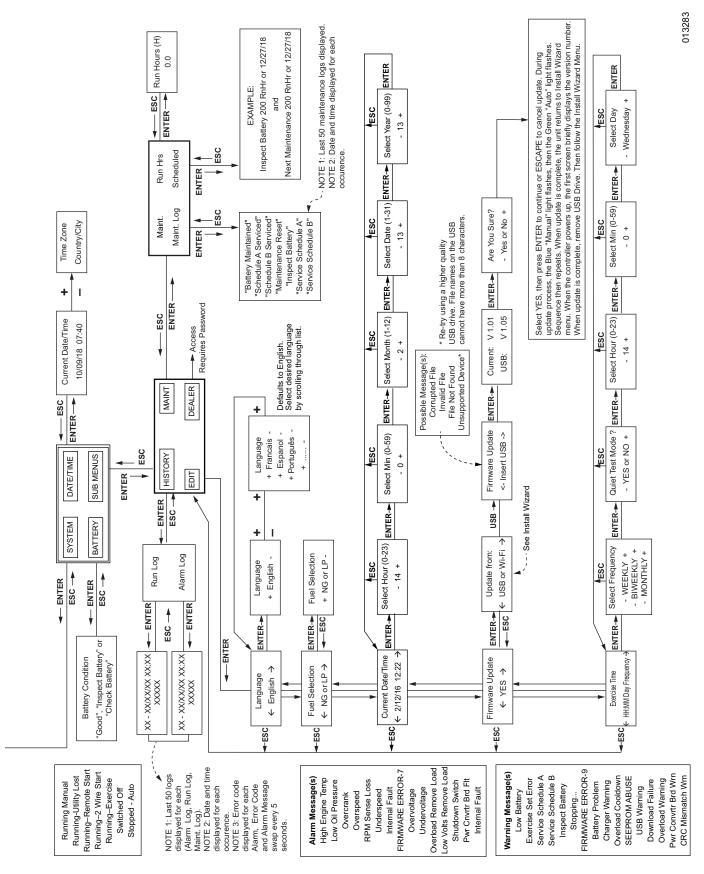


Figure 3-9. Navigation Menu

Setting the Exercise Timer

This generator is equipped with a configurable exercise timer. Configuration can be performed directly at the control panel. There are two settings for the exercise timer:

Day/Time: Generator will start and exercise for period defined, on day of week and at time of day specified. During this exercise period, unit runs for approximately five minutes and then shuts down.

Exercise frequency: Exercise frequency can be set to Weekly, Biweekly, or Monthly. If Monthly is selected, day of month must be selected from 1–28. Generator will exercise on that day each month. Transfer of loads to generator output does not occur during exercise cycle unless PWRcell inverter initiates a startup.

NOTE: The exercise feature will operate only when generator is in AUTO, and will not work unless this procedure is performed. Current date/time will need to be reset every time the 12 volt battery is disconnected and then reconnected, and/or when the fuse is removed.

Table 3-1 details exercise information and programming options for all home standby generators.

Table 3-1. Generator Exercise Characteristics

Exercise Frequency Options	Weekly/Bi-Weekly/Monthly
Exercise Time Length	5 minutes

Battery Charger

IMPORTANT NOTE: Contact an IASD if controller screen displays "LOW REBUS VOLTAGE WARNING."

NOTE: Battery charger is integrated into the converter module.

The battery charger operates as a smart charger which verifies:

- output is continually optimized to promote maximum battery life.
- · charging levels are safe.

NOTE: A warning is displayed on LCD when battery needs service.

NOTE: Do not use external battery chargers.

Automatic Sequence of Operation

Cranking

The system will control the cyclic cranking as follows:

9 kW Unit: five cranking cycles as follows: 10 seconds cranking, seven seconds resting, followed by four additional cycles of 10 seconds cranking followed by seven seconds resting.

NOTE: An alarm will be triggered if generator does not start after these five attempts.

Cleaning Cycle

If some condition impedes normal voltage creation, such as frost crystals or dust/dirt preventing a good electrical connection, start sequence will be interrupted so a cleaning cycle of the internal electrical connections can be attempted.

Cleaning cycle is an extended warm up period which lasts for several minutes while normal generator voltage output is determined to be low. During this cycle, generator controller will display "Warming Up" on the display screen.

The generator controller display will show "Under Voltage" if cleaning cycle fails to clear the obstruction. After several minutes, alarm message can be cleared, and the generator restarted.

If the problem persists, make no further attempts to start. Contact an IASD.

Shutting Generator Down While Under Load or During a Utility Outage

A DANGER

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

(000750)

IMPORTANT NOTE: To avoid equipment damage, follow these steps, in order, during utility outages. Shutdowns may be required during utility outages to perform routine maintenance or to conserve fuel.

To turn generator OFF:

- Disable generator in PWRcell Inverter device page submenu. Generator will enter 60 second cooldown. Allow cool-down to complete and generator to shut off.
- **2.** Set generator MLCB (generator disconnect) to OFF (OPEN).
- **3.** Set PWRcell Inverter DC disconnect for PWRgenerator to OFF (OPEN).
- **4.** Press OFF button on generator controller.
- 5. Remove 7.5A fuse from controller.

NOTE: See *Figure 3-10*. Remove front and intake panels from unit, and remove 15A fuse (A) from converter.

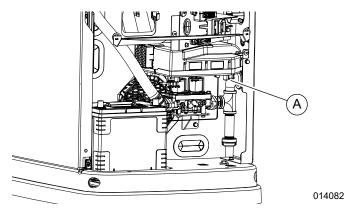


Figure 3-10. 15A Fuse Location

To turn generator back ON:

NOTE: Install 15A fuse and enclosure panels if maintenance was performed.

- **1.** Install 7.5A fuse in controller.
- 2. Complete Install Wizard.
- Verify generator MLCB (generator disconnect) and PWRcell Inverter DC disconnect circuit breaker are OFF (OPEN).
- 4. Set generator to AUTO mode at the controller.
- **5.** Set PWRcell Inverter DC disconnect circuit breaker to ON (CLOSED).
- **6.** Set generator MLCB (generator disconnect) to ON (CLOSED).

The system now operates in automatic mode.

DO NOT leave generator MLCB (generator disconnect) in OFF (OPEN) with 7.5A fuse installed for more than two hours or starter battery will discharge.

PWRcell System

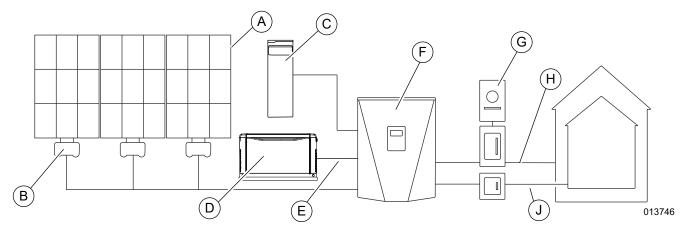


Figure 3-11. PWRcell System Example

- A Solar panels
- B PV link
- C PWRcell Battery
- D PWRgenerator
- E REbus

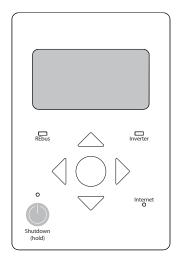
- F PWRcell Inverter
- G Grid
- H Loads
- J Protected loads

Communication

All communication between REbus devices takes place over the REbus conductors using Power Line Carrier (PLC) communication. No additional communication wiring or equipment is required for communication between PWRgenerator and PWRcell Inverter.

Inverter Control Module

See *Figure 3-12*. In addition to an on-board control panel, PWRgenerator may also receive commands and setting changes from the PWRcell Inverter control module (ICM) located on the front of the PWRcell Inverter. See PWRcell Inverter owner's manual for more information on settings and display screens.



009894

Figure 3-12. Inverter Control Module

Auto Start/Stop State of Charge (SoC) Setpoints

There are two user-adjustable PWRgenerator setpoints which dictate when the PWRgenerator will automatically be prompted to start and stop while in AUTO mode: Auto-StrtSoC and AutoStopSoC. These setpoints can be adjusted through the Mod Settings menu on the PWRgenerator device page on the ICM.

Setpoint	Behavior			
AutoStrtSoC	Battery SoC where PWRgenerator is prompted to start and provide power. GWRgenerator must be in AUTO to use this setpoint. • Default value is 25%			
	Boldan Valdo lo 2070			
AutoStopSoC	Battery SoC where PWRgenerator is prompted to stop providing power and enter a standby state. PWRgenerator must be in AUTO to use this setpoint. • Default value is 95%			

PWRgenerator Start/Stop Commands

PWRgenerator can be manually commanded to start or stop from the PWRgenerator device menu. The following criteria must be met for the commands to take effect:

- PWRgenerator must be set to AUTO at generator control panel.
- PWRcell Inverter must be in Island Mode.

 PWRcell Battery SoC is below AutoStopSoC setpoint of the PWRgenerator.

Proceed as follows to manually start or stop the PWR-generator from the PWRcell Inverter ICM:

- Press left and right arrow keys to access PWRgenerator device page. Press center button to enter PWRgenerator menu.
- Press up and down arrows to highlight Start Gen or Stop Gen depending on desired action. Press center button to select.
- Press left and right arrow keys to highlight either Confirm or Cancel from pop-up confirmation window. Press center button to select.

Adjusting PWRgenerator Setpoints

PWRgenerator setpoints are adjusting using the inverter control panel. See PWRcell Inverter owner's manual for further information.

Proceed as follows to adjust PWRgenerator setpoints:

- Press left and right arrow keys to access PWRgenerator device page. Press center button to enter PWRgenerator menu.
- **2.** Press up and down arrow keys to highlight Mod. Settings. Press center button to enter menu.
- **3.** Press up and down arrow keys to highlight desired setpoint. Press center button to select.
- **4.** Press up and down arrow keys to adjust setpoint value. Press center button to deselect the setpoint.
- See Figure 3-13. Press down arrow key to scroll to the bottom of the list and select Save. Press center button.

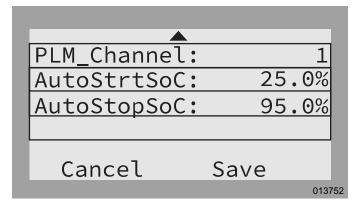


Figure 3-13. PWRgenerator Setpoint Screen Example

Section 4: Maintenance

Maintenance

Regular maintenance will improve performance and extend engine/equipment life. Generac Power Systems, Inc. recommends that all maintenance work be performed by an Independent Authorized Service Dealer (IASD). Regular maintenance, replacement, or repair of the emissions control devices and systems may be performed by any repair shop or person of the owner's choosing. To obtain emissions control warranty service free of charge, the work must be performed by an IASD. See the emissions warranty.

Preparing for Maintenance

A DANGER

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

(000750)

AWARNING

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)

Proceed as follows to prepare for maintenance:

- 1. If generator is running, allow generator to run and cool down for one minute with no load.
- Lift lid and set generator MLCB (generator disconnect) to OFF (OPEN).
- 3. Press OFF button on controller.
- 4. Remove 7.5A fuse from control panel.
- **5.** Remove front panel and intake side panel.
- **6.** Remove 15A fuse from converter.

Performing Scheduled Maintenance

It is important to perform maintenance as specified in the **Service Schedule** for correct generator operation. Engine oil and oil filter must be changed after first 25 hours of operation.

Emissions-critical maintenance must be performed as scheduled in order for emissions warranty to be valid. Emissions-critical maintenance consists of servicing the air filter and spark plug(s) in accordance with **Service Schedule**.

Controller will prompt for Schedule A or Schedule B maintenance to be performed. Schedule A maintenance consists of oil, oil filter, and battery check. Schedule B maintenance includes oil, oil filter, battery check, air cleaner, and spark plug(s).

Since most maintenance alerts occur at the same time (most have two year intervals), only one will appear on control panel display at a time. Once first alert is cleared, the next active alert will be displayed.

Service Schedule

Service	Daily If Running Continuously or Before Each Use	Every Year	Schedule A Every Two Years or 500 Hours	Schedule B Every 1500 Hours
Inspect enclosure louvers for dirt and debris *	•			
Inspect lines and connections for fuel or oil leaks	•			
Inspect engine oil level	•			
Inspect for water intrusion **		•		
Perform fuel system leak test		•		
Inspect battery condition, electrolyte level, and state of charge		•	•	•
Replace engine oil and oil filter †			•	•
Replace engine air filter				•
Clean; inspect spark plug gap; replace if necessary				•
Inspect/clean sediment trap		See loca	l codes and guidelines.	1
Replace alternator brushes				•
0 / /// // // // // // // // // // // //	1	L	I	1

Contact the nearest IASD for assistance if necessary.

- * Remove any shrubs or tall grasses which have grown within 3 ft (0.91 m) of intake and discharge louvers on enclosure sides. Clean any debris (dirt, grass clippings, etc.) which may have accumulated inside enclosure.
- ** Verify all sources of potential water intrusion such as water sprinklers, roof run-off, rain gutter downspouts, and sump pump discharges are directed away from generator enclosure.
- † Change engine oil and filter after first 25 hours of operation. In cold weather conditions (ambient below 40 °F [4.4 °C]), or if unit is operated continuously in hot weather conditions (ambient above 85 °F [29.4 °C]), change engine oil and filter every year or 100 hours of operation.

NOTE: Contact an IASD or visit **www.generac.com** for additional information on replacement parts.

Maintenance Log

Battery Inspection and Charge Check

Dates Performed:

	l			

Oil, Oil Filter, Air Filter, and Spark Plug Replacement

Dates Performed:

Checking Engine Oil Level



▲WARNING

Risk of burns. Allow engine to cool before draining oil or coolant. Failure to do so could result in death or serious injury.

(000139)

AWARNING

Skin irritation. Avoid prolonged or repeated contact with used motor oil. Used motor oil has been shown to cause skin cancer in laboratory animals. Thoroughly wash exposed areas with soap and water.

(000210)

ACAUTION

Engine damage. Verify proper type and quantity of engine oil prior to starting engine. Failure to do so could result in engine damage.

(000135)

IMPORTANT NOTE: Verify oil level daily when power outages necessitate running generator for extended periods. Generator will shut down if oil level is low.

Proceed as follows to check engine oil level:

- **1.** Allow generator to run for a cool-down period of approximately one minute, if generator was running during an outage.
- **2.** Set generator MLCB (generator disconnect) to OFF (OPEN).
- **3.** Press OFF button to turn generator off. Wait five minutes.
- **4.** See *Figure 2-1*. Remove oil dipstick and wipe it dry with a clean cloth.
- **5.** Completely insert oil dipstick into oil dipstick tube and remove.
- **6.** Observe oil level. The level should be at FULL mark on oil dipstick.
- 7. If necessary, remove oil fill cap and add recommended oil to engine (with oil dipstick removed) until level reaches FULL mark. Insert oil dipstick and install fill cap. See *Engine Oil Requirements*.

To restart generator:

- 1. Press AUTO button on control panel.
- Set generator MLCB (generator disconnect) to ON (CLOSED).
- **3.** Verify generator is enabled in PWRgenerator device page on PWRcell control panel.

The system is now operating in AUTO.

Engine Oil Requirements

ACAUTION

Engine damage. Verify proper type and quantity of engine oil prior to starting engine. Failure to do so could result in engine damage.

(000135)

Engine oil should be serviced in accordance with the recommendations of this manual to maintain product warranty. Generac Maintenance Kits are available consisting of engine oil, oil filter, air filter, and a spark plug(s). These kits can be obtained from an IASD.

All Generac oil kits meet minimum American Petroleum Institute (API) Service Class SJ, SL, or better. Do not use special additives.

Synthetic SAE 5W-20 GEO (Gaseous Engine Oil) for all temperature ranges. See *Engine*.

Changing the Oil and Oil Filter

Proceed as follows to change oil and oil filter:

- Lift lid and press MANUAL button on control panel to start engine, and run until it is thoroughly warmed up. Press OFF button on control panel to shut down engine.
- See Figure 4-1. Remove front panel when unit has cooled. Pull oil drain hose (A) free of retaining clip. Remove cap from oil drain hose and drain oil into a suitable container.

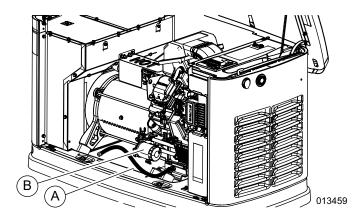


Figure 4-1. Oil Filter and Drain Location

- **3.** Install cap on oil drain hose. Position and secure oil drain hose with a retaining clip.
- 4. Remove oil filter (B) by turning it counterclockwise.
- Apply a light coating of clean engine oil to gasket of new filter.
- **6.** Screw new filter on by hand until gasket lightly contacts oil filter adapter. Tighten filter an additional three-quarter to one full turn.
- 7. Fill engine with recommended oil. See *Engine Oil Requirements*.

- **8.** Press MANUAL button on control panel to start engine. Run for one minute, and inspect for leaks.
- **9.** Press OFF button on control panel to stop engine. Wait five minutes.
- Inspect oil level. Add oil as needed. DO NOT OVERFILL.
- 11. Insert oil dipstick and/or attach fill cap.
- **12.** Press AUTO button on control panel to return unit to AUTO.
- 13. Close and lock lid.
- **14.** Dispose of used oil and filter according to national, state, or local codes.

Servicing the Air Cleaner

Proceed as follows to service air cleaner:

- **1.** Lift lid and press OFF button on control panel to stop generator. Remove front panel.
- See Figure 4-2. Remove cover clip (A) and air cleaner cover (B).

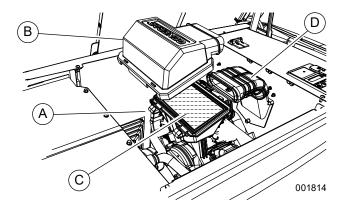


Figure 4-2. Servicing Air Cleaner

- 3. Remove old air filter element (C) and discard.
- Thoroughly clean air cleaner enclosure of any dust or debris.
- 5. Install a new air filter element.
- 6. Install air cleaner cover and fasten cover clip.
- **7.** Verify air inlet duct (D) is correctly connected to air cleaner cover.
- Press AUTO button on control panel to return unit to AUTO.

Spark Plug(s)

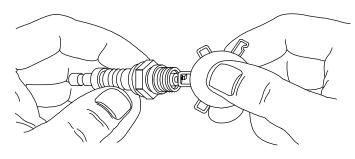
Proceed as follows to inspect spark plug gap(s) and replace spark plug(s) as necessary:

- **1.** With generator OFF and engine cool, lift lid and remove front panel.
- 2. Clean area around base of spark plug(s) to keep dirt and debris out of engine.

- Remove spark plug(s) and inspect. Install new plug(s) if existing plug(s) is worn or if reuse is questionable.
- **4.** Clean plug(s) by scraping or washing with a wire brush and commercial solvent. Do not blast plug(s) to clean.

NOTE: Clean spark plug in emergency situations only. Otherwise, replace spark plug.

5. See *Figure 4-3*. Inspect spark plug gap using a wire feeler gauge. Replace spark plug if gap is out of specification. See *General Information*.



000211

Figure 4-3. Spark Plug Gap Measurement

NOTE: New spark plugs should have spark plug gap checked prior to installation.

- **6.** Install spark plug(s), and tighten to 18.4 ft-lbs (25 Nm).
- **7.** Press AUTO button to return unit to AUTO mode.

Battery Maintenance



A DANGER

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

(000188)



AWARNING

Explosion. Do not dispose of batteries in a fire.
Batteries are explosive. Electrolyte solution can cause burns and blindness. If electrolyte contacts skin or eyes, flush with water and seek immediate medical attention.

(000162)



AWARNING

Explosion. Batteries emit explosive gases while charging. Keep fire and spark away. Wear protective gear when working with batteries. Failure to do so could result in death or serious injury.

(000137a)



AWARNING

Electrical shock. Disconnect battery ground terminal before working on battery or battery wires. Failure to do so could result in death or serious injury. (000164)



AWARNING

Risk of burns. Batteries contain sulfuric acid and can cause severe chemical burns. Wear protective gear when working with batteries. Failure to do so could result in death or serious injury.

(000138a)

AWARNING

Environmental Hazard. Always recycle batteries at an official recycling center in accordance with all local laws and regulations. Failure to do so could result in environmental damage, death, or serious injury. (000228)

Always recycle batteries in accordance with local laws and regulations. Contact your local solid waste collection site or recycling facility to obtain information on local recycling processes. For more information on battery recycling, visit the Battery Council International website at: http://batterycouncil.org.

Strictly observe the following precautions when working on batteries:

- Remove 7.5A fuse from generator control panel.
- Disconnect battery charger as directed in Battery Maintenance.
- · Use tools with insulated handles.
- · Wear rubber gloves and boots.
- Do not place tools or metallic objects on top of battery.
- Set generator MLCB (generator disconnect) to OFF (OPEN) to prevent REbus voltage from CES powering battery charger in DC converter within the generator.
- Wear full eye protection and protective clothing.
- If electrolyte contacts skin, wash it off immediately with water.
- If electrolyte contacts eyes, flush thoroughly with water immediately and seek medical attention.
- Wash down spilled electrolyte with an acid neutralizing agent. A common practice is to use a solution of 1 lb (454 g) bicarbonate of soda to 1 gal (3.8 L) of water. Add bicarbonate of soda solution until evidence of reaction (foaming) has ceased. Flush resulting liquid with water and dry area completely.
- DO NOT smoke near battery.
- DO NOT cause flame or spark in battery area.

 Discharge static electricity from the body before touching battery by first touching a grounded metal surface.

Battery should be regularly inspected per **Service Schedule**. Contact an IASD for assistance if necessary.

Inspecting the Battery

Proceed as follows to inspect battery:

- **1.** Press OFF button to shut down generator, then lift lid and remove front panel.
- **2.** Set generator MLCB (generator disconnect) to OFF (OPEN).
- **3.** Remove 7.5A fuse from control panel.
- Remove intake side panel. (See Intake Side Panel Removal.)
- See Figure 4-4. Inspect battery posts and cables for tightness and corrosion. Tighten and clean as necessary.

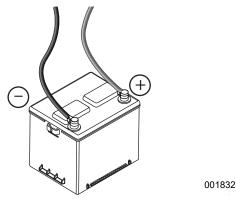


Figure 4-4. Battery Cables

- 6. Unsealed batteries only: Completely disconnect battery. Check battery fluid level and, if necessary, fill with distilled water only. DO NOT use tap water. Have an IASD or a qualified service technician verify state of charge and condition.
- **7.** Connect battery cables, install intake side panel, and install 7.5 A fuse when inspection is complete.
- 8. Press AUTO button on controller.
- **9.** Set generator MLCB (generator disconnect) to ON (CLOSED).
- 10. Install front panel and close generator lid.

Cleaning the Sediment Trap

The sediment trap removes contaminants (moisture and fine particles) from gaseous fuels before they enter the fuel regulator. Accumulated moisture and particles must be emptied from the sediment trap per local codes and guidelines.

Proceed as follows to clean sediment trap:

- Remove intake side panel. See Intake Side Panel Removal.
- 2. Turn generator fuel supply OFF.

3. See Figure 4-5. Unscrew and remove cap (A).

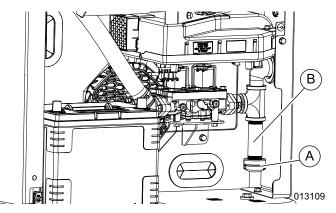


Figure 4-5. Cleaning the Sediment Trap

- **4.** Use a clean-out tool (not provided) to remove accumulated moisture and particles from cap and body (B).
- **5.** Wipe inside of each component with a clean, dry, lint-free cloth.
- **6.** Seal threads of cap with appropriate sealing compound. Install cap and hand-tighten.
- **7.** Tighten cap with an appropriately sized pipe wrench. DO NOT overtighten.
- 8. Turn generator fuel supply ON. Inspect for leaks by spraying all connection points with a non-corrosive gas leak detection fluid. The solution should not be blown away or form bubbles.
- 9. Install intake side panel.

Post Maintenance Checks

- 1. Perform required maintenance procedure(s).
- 2. Install 15A fuse in converter, if removed.
- Install intake side panel and front panel if removed. (See Intake Side Panel Removal and Front Access Panel Removal.)
- 4. Install 7.5A fuse in control panel.
- Complete Install Wizard information.
- 6. Press AUTO button on control panel.
- Set generator MLCB (generator disconnect) to ON (CLOSED).

The system is now in AUTO.

NOTE: If correct PWRcell Battery SoC is present at this time, generator will perform its usual shutdown process.

Performing Fuel System Leak Test



A DANGER

Explosion and fire. Fuel and vapors are extremely flammable and explosive. No leakage of fuel is permitted. Keep fire and spark away. Failure to do so will result in death or serious injury.

(000192)

All products are factory-tested before shipping to verify the performance and integrity of the fuel system. However, it is important to perform a final fuel system leak test before starting the generator. The entire fuel system should be tested from supply to fuel solenoid valve.

See *Figure 4-6*. Perform a final fuel system leak test after generator installation. The test will identify possible leaks at all connection points (A).

It is best practice to perform a fuel system leak test during normally-scheduled maintenance.

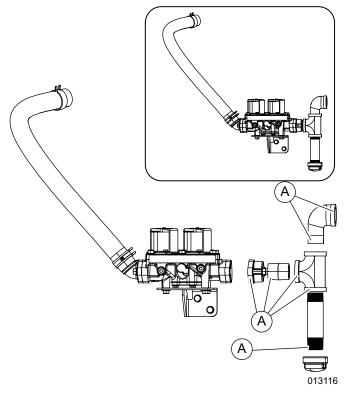


Figure 4-6. Connection Points to Leak Check

Inspect for leaks by spraying all connection points with a non-corrosive gas leak detection fluid. The solution should not be blown away or form bubbles.

Attention After Submersion

DO NOT start or operate generator if it has been submerged in water. Have an IASD thoroughly clean, dry, and inspect generator following any submersion in water. If the structure (home) has been flooded, it should be inspected by a certified electrician to verify there will not be any electrical problems during generator operation or when utility power is returned.

Corrosion Protection

Regular scheduled maintenance should be conducted to inspect unit for corrosion. Inspect all metal components of generator, including base frame, brackets, alternator can, the entire fuel system (inside and outside of the generator), and fastener locations. If there is corrosion found on generator components (e.g. regulator, engine/alternator mounts, fuel plenum, etc.), replace parts as necessary.

Periodically wash and wax enclosure using automotive type products. Do not spray unit with a hose or power washer. Use warm, soapy water and a soft cloth. Frequent washing is recommended in salt water/coastal areas. Spray engine linkages with a light oil such as WD-40.

Remove From and Return To Service Procedure

Remove From Service



AWARNING

Explosion. Batteries emit explosive gases.
Always disconnect negative battery cable first to avoid spark. Failure to do so could result in death or serious injury. (000238)

If generator cannot be exercised monthly, at a minimum, and will be out of service longer than 90 days, proceed as follows to prepare generator for storage:

- 1. Start engine and allow it to warm up.
- **2.** Close fuel shutoff valve in fuel supply line and allow engine to stop.
- **3.** Set generator MLCB (generator disconnect) to OFF (OPEN) once engine has stopped.
- **4.** Remove 7.5A fuse from generator control panel.
- **5.** Disconnect battery cables. Remove negative battery cable first.
- **6.** Drain oil completely while engine is still warm, and then fill crankcase with oil. See **Engine Oil Requirements**.
- **7.** Attach a tag to engine indicating viscosity and classification of the new oil in the crankcase.

- **8.** Remove spark plug(s) and spray a fogging agent into spark plug(s) threaded openings. Install and tighten spark plug(s) to specification.
- **9.** Remove battery and store in a cool, dry place.
- **10.** Clean and wipe down generator enclosure.

Return to Service



AWARNING

Explosion. Batteries emit explosive gases.
Always connect positive battery cable first to avoid spark. Failure to do so could result in death or serious injury. (000133)



ACAUTION

Equipment damage. Do not make battery connections in reverse. Doing so will result in equipment damage.

(000167a)

Proceed as follows to return unit to service after storage:

- **1.** Check tag on engine for oil viscosity and classification. Drain and fill with correct oil if necessary.
- Verify state of battery. Fill all cells of unsealed batteries to correct level with distilled water. DO NOT use tap water. Charge battery to 100% state of charge. Replace battery if faulty.
- **3.** Clean and wipe down generator enclosure.
- **4.** Verify 7.5A fuse is removed from generator control panel.
- **5.** Connect battery. Observe battery polarity. Damage will occur if battery is connected incorrectly. Install positive battery cable first.
- 6. Open fuel shutoff valve.
- 7. Insert 7.5 A fuse into generator control panel.
- **8.** Complete Install Wizard procedure (diagrammed in generator installation manual).
- **9.** Press MANUAL button to start unit. Allow unit to warm up for a few minutes.
- 10. Press control panel OFF button to stop unit.
- **11.** Set generator MLCB (generator disconnect) to ON (CLOSED).
- **12.** Press AUTO button on control panel.

The generator is ready for service.

NOTE: Exercise timer and current date and time must be reset if a battery has been completely discharged or disconnected.

Maintenance

This page intentionally left blank.

Section 5: Troubleshooting / Quick Reference Guide

Generator Troubleshooting

Problem	Cause	Correction		
	Blown fuse.	Correct short circuit condition by replacing 7.5A fuse in generator control panel or 15A fuse in bottom of DC converter. Contact an IASD if fuse continues to blow.		
Engine will not crank	Loose, corroded, or faulty battery cables.			
Grank	Faulty starter contact.	Tighten, clean, or replace as necessary. Contact an IASD for assistance.		
	Faulty starter motor.			
	Discharged battery.	Charge or replace battery.		
	No fuel.	Replenish fuel / turn on fuel valve.		
	High fuel pressure.	Check and adjust fuel pressure.		
Engine cranks but will not start	Fuel selector in wrong position.	Set fuel type on controller to match fuel type supplied.		
	Faulty fuel solenoid (FS).	Contact an IASD for assistance.		
	Faulty spark plug(s).	Clean; inspect spark plug gap; replace spark plug(s) if necessary.		
	Air cleaner plugged or damaged.	Inspect and clean air cleaner.		
	Faulty spark plug(s).	Clean; inspect spark plug gap; replace spark plug(s) if necessary.		
Engine starts hard and runs rough	Incorrect fuel pressure.	Verify fuel pressure to regulator is 10–12 in water column (2.49–2.99 kPa) for LP, and 3.5–7.0 in water column (0.87–1.74 kPa) for NG.		
	Fuel type entered on controller does not match fuel type supplied.	Set fuel type on controller to match fuel type supplied.		
	Internal engine issue.	Contact an IASD for assistance.		
Unit is set to OFF,	Controller wired incorrectly.	0 4 4 100 6		
but engine continues to run	Faulty control board.	Contact an IASD for assistance.		
	Generator MLCB (generator disconnect) is OFF (OPEN).	Set generator MLCB (generator disconnect) to ON (CLOSED).		
No DC output from generator	Generator internal failure.	Contact an IASD for assistance.		
9	Engine may be warming up. See Setting the Exercise Timer .	Check controller screen to verify status.		

Problem	Cause	Correction	
	Excessive engine oil.	Adjust oil to correct level.	
Unit consumes	Faulty engine breather.	Contact an IASD for assistance.	
large amounts of oil	Incorrect type or viscosity of oil.	See Engine Oil Requirements.	
	Damaged gasket, seal, or hose.	Inspect for oil leaks.	
	Restricted air filter.	Replace air filter.	
Power converter faults	PWRcell battery limitations		
	PLM communication error.	Contact an IASD for assistance.	
	Disconnected breakers.		

NOTE: IASD must have an active Tech ID and be air-cooled certified to perform any warrantable repairs and submit warranty claims related to air-cooled products.

Quick Reference Guide

To clear an active alarm, press OFF button on the control panel, then the ENTER button, and finally the AUTO button. Contact an air-cooled certified IASD if alarm reoccurs.

Active Alarm	LED	Problem	Action	Solution
NONE	FLASHING GREEN	Unit running in AUTO but no power in house.	Check generator MLCB (generator disconnect).	Check generator MLCB (generator disconnect). If it is ON, contact an IASD.
HIGH TEMPERATURE	RED	Unit shuts down during operation.	Check LEDs / screen for alarms.	Inspect ventilation around generator, intake, exhaust, and rear of generator. If no obstructions are present, contact an IASD.
OVERLOAD REMOVE LOAD	RED	Unit shuts down during operation.	Check LEDs / screen for alarms.	Clear alarm and remove household loads from generator. Put in AUTO and restart.
RPM SENSE LOSS	RED	Unit was running and shut down, attempts to restart.	Check LEDs / screen for alarms.	Clear alarm and remove household loads from generator. Put into AUTO and restart. If generator does not start, contact an IASD.
NOT ACTIVATED	NONE	Unit will not start in AUTO with utility loss.	Check if screen says unit not activated.	See Activation in installation manual.
NONE	GREEN	Unit will not start in AUTO with utility loss.	Check HOME screen on PWRcell Inverter control panel for PV production and export from PWRcell Batteries.	Batteries and/or solar are providing power.
NONE	GREEN	Unit will not start in AUTO with utility loss.	Check screen for start delay countdown.	If startup delay is greater than expected, contact an IASD to adjust from 2 to 1500 seconds.
LOW OIL PRESSURE	RED	Unit will not start in AUTO with utility loss.	Check LEDs / screen for alarms.	Check oil level and add oil as needed. If oil level is correct, contact an IASD.
RPM SENSE LOSS	RED	Unit will not start in AUTO with utility loss.	Check LEDs / screen for alarms.	Clear alarm. Using control panel, check battery by navigating to BATTERY MENU option from MAIN MENU. If battery condition displays GOOD, contact an IASD. If control panel displays CHECK BATTERY, replace battery.
OVERCRANK	RED	Unit will not start in AUTO with utility loss.	Check LEDs / screen for alarms.	Verify fuel line shutoff valve is ON. Clear alarm. Start unit in MANUAL. If it does not start, or starts and runs rough, contact an IASD.
LOW VOLTS REMOVE LOAD	RED	Unit will not start in AUTO with utility loss.	Check LEDs / screen for alarms.	Clear alarm and remove household loads from the generator. Put in AUTO and restart.
OVERSPEED	RED	Unit will not start in AUTO with utility loss.	Check LEDs / screen for alarms.	Contact an IASD.
UNDERVOLTAGE	RED	Unit will not start in AUTO with utility loss.	Check LEDs / screen for alarms.	Contact an IASD.
UNDERSPEED	RED	Unit will not start in AUTO with utility loss.	Check LEDs / screen for alarms.	Contact an IASD.

Active Alarm	LED	Problem	Action	Solution
OVERVOLTAGE	RED	Unit will not start in AUTO with utility loss.	Check LEDs / screen for alarms.	Contact an IASD.
SHUTDOWN SWITCH	RED	Unit will not start.	Checkemergency shutdown switches	Set emergency shutdown switch(es) to CLOSED (I). Clear alarm.
LOW BATTERY	YELLOW	Yellow LED illuminated in any state.	Check screen for additional information.	Clear alarm. Using control panel, check battery by navigating to BATTERY MENU option from MAIN MENU. If battery condition displays GOOD, contact an IASD. If control panel displays CHECK BATTERY, replace battery.
BATTERY PROBLEM	YELLOW	Yellow LED illuminated in any state.	Check screen for additional information.	Contact an IASD.
CHARGER WARNING	YELLOW	Yellow LED illuminated in any state.	Check screen for additional information.	Contact an IASD.
LOW REBUS VOLTAGE WARNING	YELLOW	Yellow LED illuminated in any state.	Check screen for additional information.	Contact an IASD.
LOW REBUS VOLTAGE WARNING	YELLOW	Yellow LED illuminated in any state.	Check screen for additional information.	Set generator MLCB (generator disconnect) to ON (CLOSED). Contact an IASD if issue persists.
SERVICE A	YELLOW	Yellow LED illuminated in any state.	Check screen for additional information.	Perform SERVICE A maintenance. Press ENTER to clear.
SERVICE B	YELLOW	Yellow LED illuminated in any state.	Check screen for additional information.	Perform SERVICE B maintenance. Press ENTER to clear.
INSPECT BATTERY	YELLOW	Yellow LED illuminated in any state.	Check screen for additional information.	Inspect battery. Press ENTER to clear.

