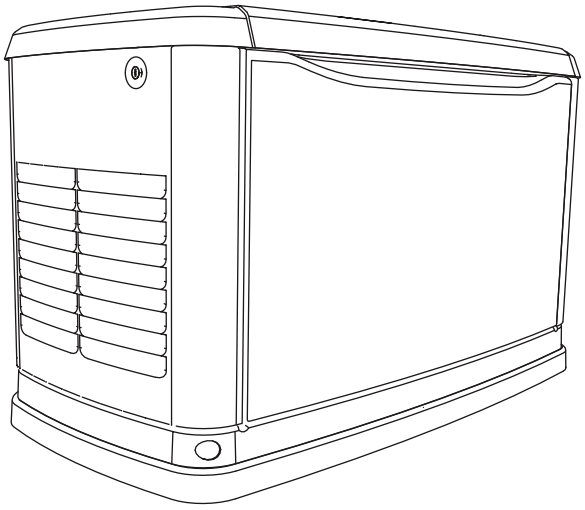
Installation Guidelines

60 Hz Air-cooled Generators

8 kW to 22 kW



⚠WARNING

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. (000209a)

Register your Generac product at:
WWW.GENERAC.COM
1-888-GENERAC
(888-436-3722)

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

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

SAVE THIS MANUAL FOR FUTURE REFERENCE

Use this page to record important information about your generator set.

Model:	
Serial:	
Prod Date Week:	
Volts:	
LPV Amps:	
NG Amps:	
Hz:	
Phase:	
Controller P/N:	

Record the information found on your unit data label on this page. For the location of the unit data label, see your Owner's Manual. The unit has a label plate affixed to the inside partition, to the left of the control panel console.

When contacting an Independent Authorized Service Dealer about parts and service, always supply the complete model number and serial number of the unit.

Operation and Maintenance: Proper maintenance and care of the generator ensures a minimum number of problems and keeps operating expenses at a minimum. It is the operator's responsibility to perform all safety checks, to make sure that all maintenance for safe operation is performed promptly, and to have the equipment checked periodically by an Independent Authorized Service Dealer. Normal maintenance, service and replacement of parts are the responsibility of the owner/operator and, as such, 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, contact an Independent Authorized Service Dealer for assistance. Authorized service technicians are factory-trained and are capable of handling all service needs.To locate the nearest Independent Authorized Service Dealer, please visit the dealer locator at:

www.generac.com/Service/DealerLocator/.

⚠WARNING

California Proposition 65. Engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

(000004)

⚠WARNING

California Proposition 65. This product contains or emits chemicals known to the state of California to cause cancer, birth defects, and other reproductive harm.

(000005)

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Section 1: Safety Rules & General Information

Introduction

Thank you for purchasing this compact, high performance, air-cooled, engine-driven generator. It is designed to automatically supply electrical power to operate critical loads during a utility power failure.

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

NOTE: When sized properly, this generator is suitable for supplying typical residential loads such as induction motors (sump pumps, refrigerators, air conditioners, furnaces, etc.), electronic components (computer, monitor, TV, etc.), lighting loads and microwaves.

Read This Manual Thoroughly



⚠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)

If any portion of this manual is not understood, contact the nearest Independent Authorized Service Dealer for starting, operating and servicing procedures.

This manual must be used in conjunction with the appropriate Owner's Manual.

SAVE THESE INSTRUCTIONS: The manufacturer suggests that this manual and the rules for safe operation be copied and posted near the unit installation site. Safety should be stressed to all operators and potential operators of this equipment.

Throughout this publication and on tags and decals affixed to the generator, DANGER, WARNING, and CAUTION 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. Their 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 provide additional information important to a procedure or component.

These safety warnings cannot eliminate the hazards they indicate. Observing safety precautions and strict compliance with the special instructions while performing the action or service are essential to preventing accidents.

The operator is responsible for proper and safe use of the equipment. The manufacturer strongly recommends that if the operator is also the owner, to read the Owner's Manual and thoroughly understand all instructions before using this equipment. The manufacturer also strongly recommends instructing other users to properly start and operate the unit. This prepares them if they need to operate the equipment in an emergency.

How to Obtain Service

When the generator requires servicing or repairs, contact an Independent Authorized Service Dealer for assistance. Service technicians are factory-trained and are capable of handling all service needs. For assistance locating a dealer, go to ***www.generac.com/Service/DealerLocator/*****.**

When contacting an Independent Authorized Service Dealer about parts and service, always supply the complete model number and serial number of the unit as given on its data decal, which is located on the generator. Refer to Owner's Manual for decal location. Record the model number and serial numbers in the spaces provided on the inside front cover of this manual.

Safety Rules

Study these SAFETY RULES carefully before installing, operating or servicing this equipment. Become familiar with this Owner's Manual and with the unit. The generator can operate safely, efficiently and reliably only if it is properly installed, operated and maintained. Many accidents are caused by failing to follow simple and fundamental rules or precautions.

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

General Hazards



⚠WARNING

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. (000209a)

⚠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)

⚠DANGER

Automatic start-up. Disconnect utility power and render unit inoperable before working on unit. Failure to do so will result in death or serious injury. (000191)



⚠WARNING

Electrocution. Potentially lethal voltages are generated by this equipment. Render the equipment safe before attempting repairs or maintenance. Failure to do so could result in death or serious injury. (000187)

⚠WARNING

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

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

⚠WARNING

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 damage to equipment or property. (000155)



⚠WARNING

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)



⚠WARNING

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)

⚠WARNING

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)

- When working on this equipment, remain alert at all times. Never work on the equipment when physically or mentally fatigued.
- Inspect the generator regularly, and contact the nearest Independent Authorized Service Dealer for parts needing repair or replacement.
- Never use the generator or any of its parts as a step. Stepping on the unit can stress and break parts, and may result in dangerous operating conditions from leaking exhaust gases, fuel leakage, oil leakage, etc.

Exhaust Hazards



⚠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)



⚠WARNING

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)

- Adequate, unobstructed flow of cooling and ventilating air is critical to correct generator operation. Do not alter the installation or permit even partial blockage of ventilation provisions, as this can seriously affect safe operation of the generator. The generator must be installed and operated outdoors only.

Electrical Hazards



⚠DANGER

Electrocution. Contact with bare wires, terminals, and connections while generator is running will result in death or serious injury. (000144)



⚠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)

⚠DANGER

Electrical backfeed. Use only approved switchgear to isolate generator when electrical utility is the primary power source. Failure to do so will result in death, serious injury, and equipment damage. (000131a)



⚠DANGER

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



⚠DANGER

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



⚠DANGER

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



⚠DANGER

Electrocution. Contact with bare wires, terminals, and connections while generator is running will result in death or serious injury. (000144)



⚠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



⚠WARNING

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)

- For fire safety, the generator must be installed and maintained properly. Installation must always comply with applicable codes, standards, laws and regulations. Adhere strictly to local, state and national electrical and building codes. Comply with regulations the Occupational Safety and Health Administration (OSHA) 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.
- Keep a fire extinguisher near the generator at all times. Extinguishers rated "ABC" by the National Fire Protection Association are appropriate for use on the standby electric system. Keep the extinguisher properly charged and be familiar with its use. Consult the local fire department with any questions pertaining to fire extinguishers.

Explosion Hazards



⚠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)

⚠DANGER

Connection of fuel source must be done by a qualified professional technician or contractor. Incorrect installation of this unit will result in death, serious injury, and damage to equipment and property damage. (000151)



⚠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)



⚠WARNING

Risk of Fire. Hot surfaces could ignite combustibles, resulting in fire. Fire could result in death or serious injury. (000110)

General Rules

⚠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)

⚠DANGER

Electrical backfeed. Use only approved switchgear to isolate generator when electrical utility is the primary power source. Failure to do so will result in death, serious injury, and equipment damage. (000131a)

⚠WARNING

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

- Follow all safety precautions in the Owner's Manual, Installation Guidelines manual and other documents included with your equipment.
- Refer to NFPA 70E for safety equipment required when working with a live system.
- Never energize a new system without opening all disconnects and breakers.
- Always consult your local code for additional requirements for the area in which the unit is being installed.

Improper installation can result in personal injury and damage to the generator. It may also result in the warranty being suspended or voided. All the instructions listed below must be followed including location clearances and pipe sizes.

Before You Begin

- Contact the local inspector or City Hall to be aware of all federal, state and local codes that could impact the installation. Secure all required permits before starting the job.
- Carefully read and follow all of the procedures and safety precautions detailed in the installation guide. If any portion of the installation manual, technical manual or other factory-supplied documents is not completely understood, contact an Independent Authorized Service Dealer for assistance.
- Fully comply with all relevant NEC, NFPA and OSHA standards as well as all federal, state and local building and electric codes. As with any generator, this unit must be installed in accordance with current NFPA 37 and NFPA 70 standards as well as any other federal, state, and local codes for minimum distances from other structures.
- Verify the capacity of the natural gas meter or the LP tank in regards to providing sufficient fuel for both the generator and other household and operating appliances.

NEC Requirements

Local code enforcement may require that Arc Fault Circuit Interrupters (AFCIs) be incorporated into the transfer switch distribution panel. The Transfer Switch provided with this generator has a distribution panel that will accept AFCIs (pre-wired transfer switches only).

Siemens Part No. Q115AF - 15A or Q120AF - 20A can be obtained from a local electrical wholesaler and will simply replace any of the single pole circuit breakers supplied in the pre-wired transfer switch distribution panel.

Standards Index

⚠WARNING



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. (000209a)

Strictly comply with all applicable national, state and local laws, as well as codes or regulations pertaining to the installation of this engine-generator power system. Use the most current version of applicable codes or standards relevant to the local jurisdiction, generator used, and installation site.

NOTE: Not all codes apply to all products and this list is not all-inclusive. In the absence of pertinent local laws and standards, the following publications may be used as a guide (these apply to localities which recognize NFPA and IBC).

1. National Fire Protection Association (NFPA) 70: The NATIONAL ELECTRIC CODE (NEC) *
2. NFPA 10: Standard for Portable Fire Extinguishers *
3. NFPA 30: Flammable and Combustible Liquids Code *
4. NFPA 37: Standard for Stationary Combustion Engines and Gas Turbines *
5. NFPA 54: National Fuel Gas Code *
6. NFPA 58: Standard for Storage and Handling Of Liquefied Petroleum Gases *
7. NFPA 68: Standard On Explosion Protection By Deflagration Venting *
8. NFPA 70E: Standard For Electrical Safety In The Workplace *

9. NFPA 110: Standard for Emergency and Standby Power Systems *
10. NFPA 211: Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances *
11. NFPA 220: Standard on Types of Building Construction *
12. NFPA 5000: Building Code *
13. International Building Code **
14. Agricultural Wiring Handbook ***
15. Article X, NATIONAL BUILDING CODE
16. ASAE EP-364.2 Installation and Maintenance of Farm Standby Electric Power ****

This list is not all-inclusive. Check with the Authority Having Local Jurisdiction (AHJ) for any local codes or standards which may be applicable to your jurisdiction. The above listed standards are available from the following internet sources:

* ***www.nfpa.org***

** ***www.iccsafe.org***

*** ***www.rerc.org*** Rural Electricity Resource Council P.O. Box 309 Wilmington, OH 45177-0309

**** ***www.asabe.org*** American Society of Agricultural & Biological Engineers 2950 Niles Road, St. Joseph, MI 9085

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Section 2: Unpacking and Inspection

General

NOTE: After unpacking, carefully inspect the contents for damage. It is advised to unpack and inspect the unit immediately upon delivery to detect any damage that may have occurred in transit. Any claims for shipping damage need to be filed as soon as possible with the freight carrier. This is especially important if the generator will not be installed for a period of time.

- This standby generator set is ready for installation with a factory supplied and pre-mounted base pad and has a weather protective enclosure that is intended for outdoor installation only.
- If any loss or damage is noted at time of delivery, have the person(s) making the delivery note all damage on the freight bill or affix their signature under the consignor's memo of loss or damage.
- If a loss or damage is noted after delivery, separate the damaged materials and contact the carrier for claim procedures.
- "Concealed damage" is understood to mean damage to the contents of a package that is not evident at the time of delivery, but is discovered later.

Required Tools

- General SAE and Metric hand tools
  - – Wrenches
  - – Sockets
  - – Screwdrivers
- Standard electrician's hand tools
  - – Drill and bits for mounting and routing conduits
- 4mm Allen wrench (for access to customer connections)
- 3/16 Allen wrench (test port on fuel regulator)
- Manometer (for fuel pressure checks)
- Meter capable of measuring AC/DC Voltage and Frequency

Unpacking

1. Remove cardboard carton.
2. Remove the wood frame.

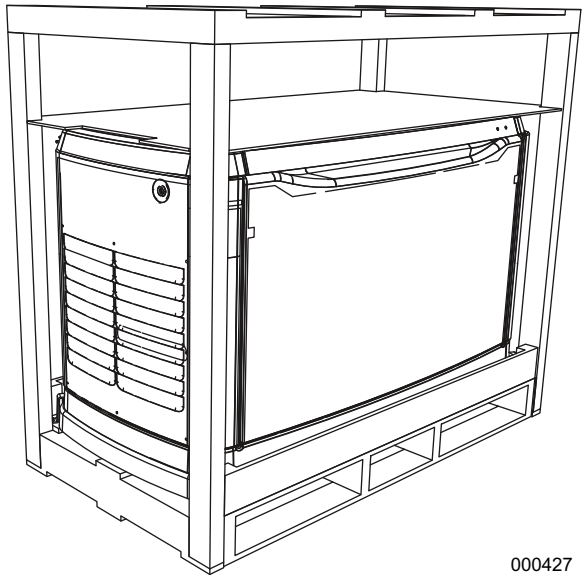


Figure 2-1. Crated Generator

3. Remove bolts and pallet brackets (A). Exercise caution when removing the generator. Dragging it off the pallet will damage the base. The generator must be lifted from the wooden pallet to remove.

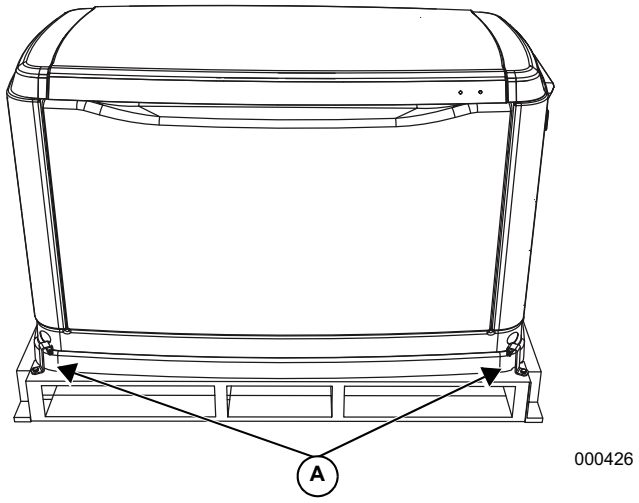


Figure 2-2. Generator on Pallet

4. The lid will be locked. A set of keys is attached to the circuit breaker box door with a cable tie. Cut the cable tie to remove the keys. Use the keys to open the lid of the generator.

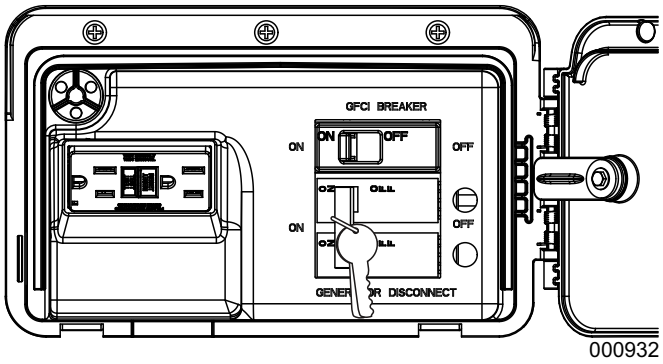


Figure 2-3. Circuit Breaker Box and Keys (As Shipped)

5. There are two locks securing the lid, one on each side. To properly open the lid, press down, on the lid, above the side lock and unlock the latch.
6. Repeat for the other side. If pressure is not applied from the top, the lid may appear stuck.

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

7. Once the lid is open, remove the front access panel by lifting it up and out. Also remove the black panel, indicated by the arrow, over top of the customer connection area. See ***Figure 2-4***

8. Perform a visual inspection for any hidden freight damage. If damage is present, contact the freight carrier.

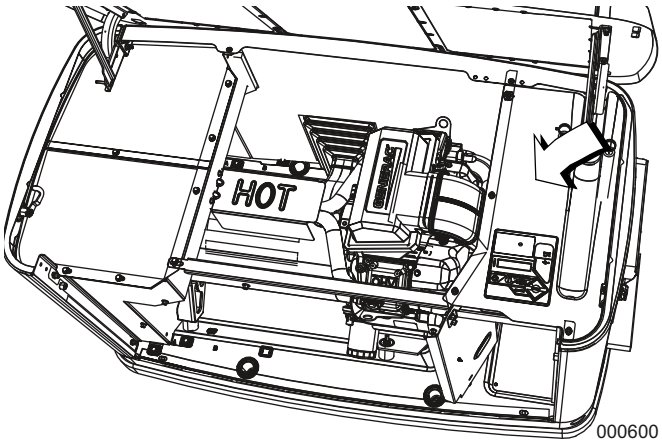


Figure 2-4. Inspect for Damage

9. ***Figure 2-5*** illustrates the following:

A	Customer connection area (underneath and behind the control panel)
B	Fuel regulator
C	Battery compartment
D	Positive (+) and Negative (-) Battery Cables
E	Location of “Loose Shipped Parts”

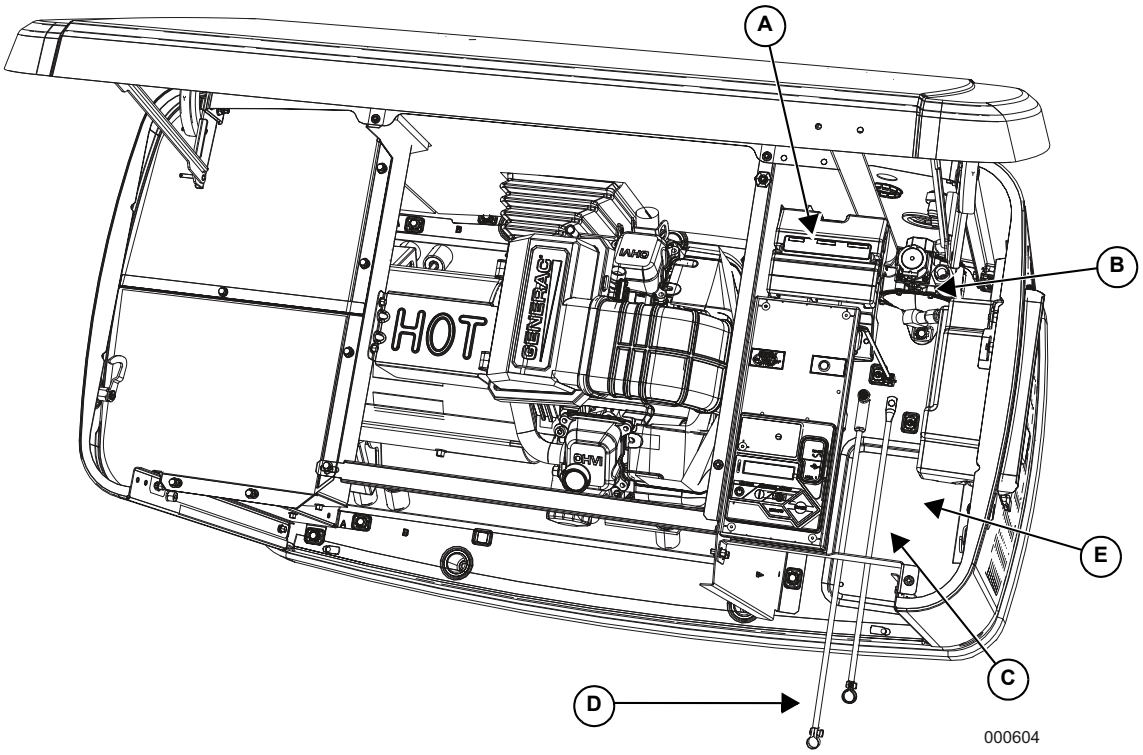
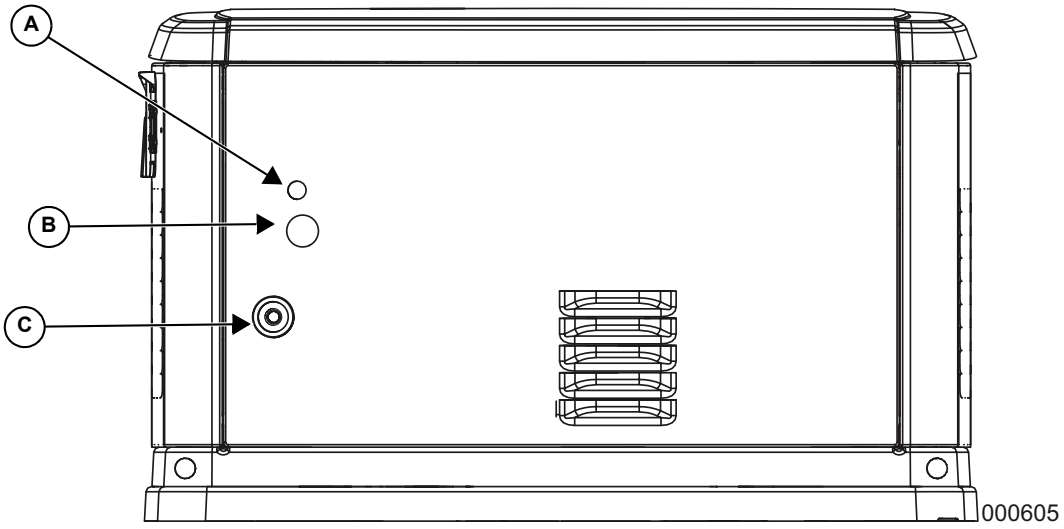


Figure 2-5. Customer Connection Area and Loose Parts Location



A. Main AC/Control Wiring hole for 3/4 inch conduit
B.Main AC/Control Wiring hole for 1-1/4 inch conduit
C. Fuel Connection Hole

Figure 2-6. Rear of Generator

Parts Shipped Loose

1. Keys
2. Battery Terminal Cap
3. Main Line Circuit Breaker (MLCB) Terminal Caps
4. Wire Shielding to separate AC from DC control wires
5. Main Line Circuit Breaker (MLCB) Locking Mechanism
6. Flexible Fuel Line
7. Rubber Mounts (only for units that include fascia)
8. Wire Nuts (for pre-wired switches only)
9. Installation and Owner's Manuals (not shown)

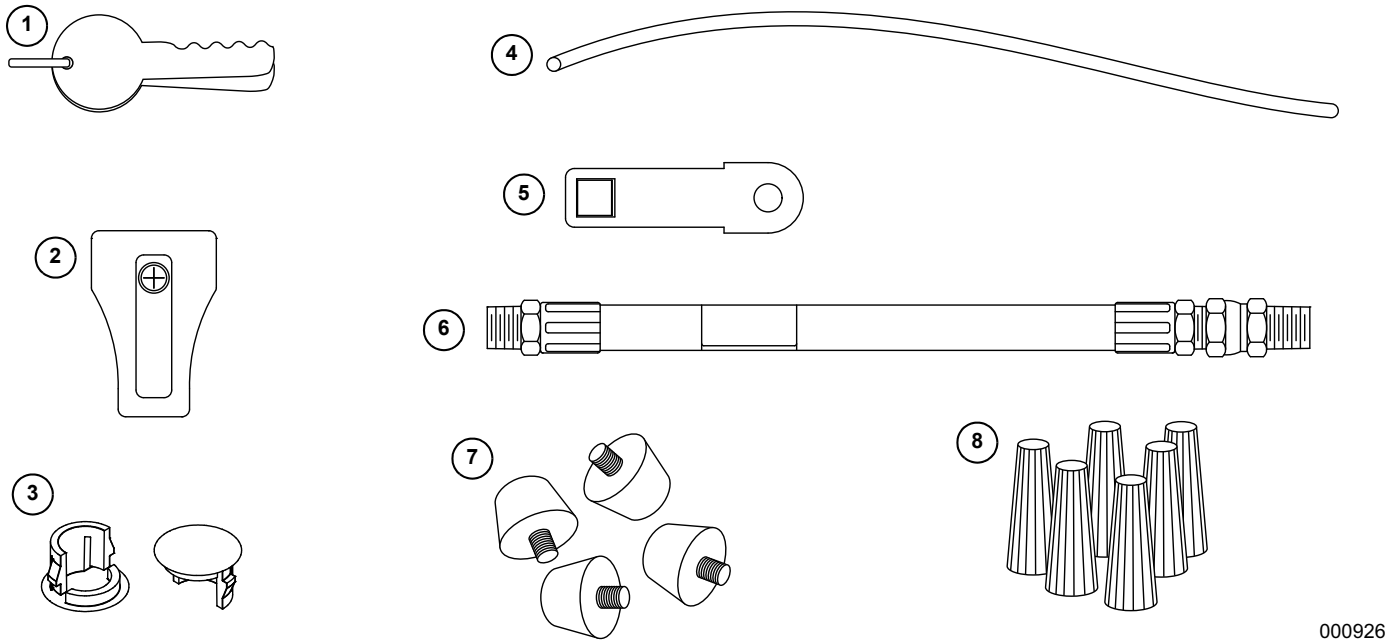


Figure 2-7. Parts Shipped Loose

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Section 3: Site Selection and Preparation

Site Selection

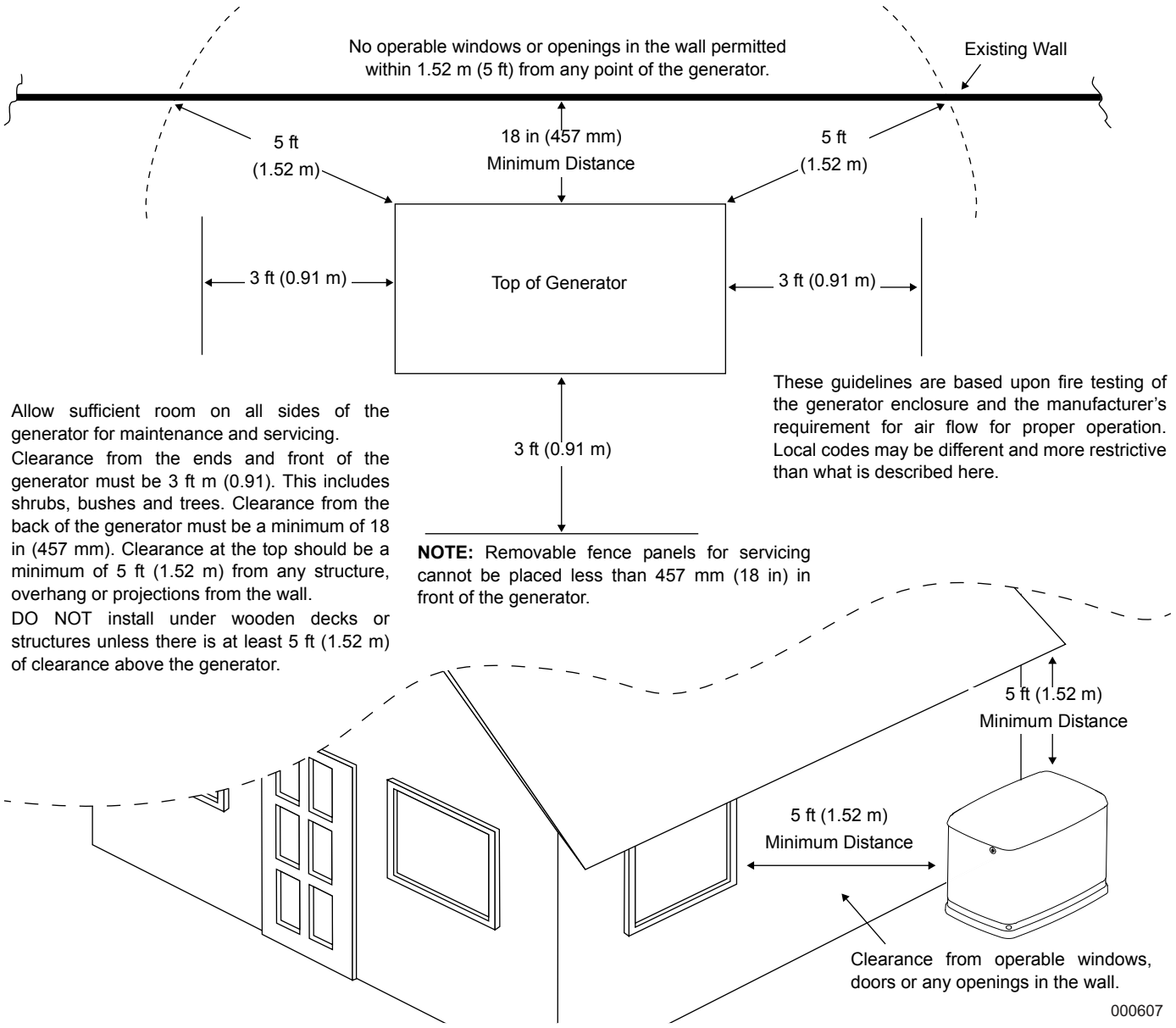


Figure 3-1. Installation Guidelines

Install the generator set, in its protective enclosure, outdoors, where adequate cooling and ventilating air is always available (***Figure 3-1***). Consider these factors:

- The installation of the generator must comply strictly with NFPA 37, NFPA 54, NFPA 58 and NFPA 70 standards.
- Install the unit where air inlet and outlet openings will not become obstructed by leaves, grass, snow, etc. If prevailing winds will cause blowing or drifting, consider using a windbreak to protect the unit.
- Install the generator on high ground where water levels will not rise and endanger it. It should not operate in or be subjected to standing water.
- Allow sufficient room on all sides of the generator for maintenance and servicing. This unit must be installed in accordance with any codes that are in place in your country or local jurisdiction for minimum distances from other structures.
- Clearance from the ends and front of the generator must be 3 ft (0.91 m). This includes shrubs, bushes and trees. Clearance from the back of the generator must be a minimum of 18 in (457 mm).

Clearance at the top should be a minimum of 5 ft (1.52 m) from any structure, overhang or projections from the wall.

- DO NOT install under wooden decks or structures unless there is at least 5 ft (1.52 m) of clearance above the generator.
- Install the unit where rain gutter down spouts, roof run-off, landscape irrigation, water sprinklers or sump pump discharge does not flood the unit or spray the enclosure, including any air inlet or outlet openings.
- Install the unit where services will not be affected or obstructed, including concealed, underground or covered services such as electrical, fuel, phone, air conditioning or irrigation. This could affect Warranty Coverage.
- Where strong prevailing winds blow from one direction, face the generator air inlet openings to the prevailing winds.
- Install the generator as close as possible to the fuel supply to reduce the length of piping. REMEMBER THAT LAWS OR CODES MAY REGULATE THE DISTANCE AND LOCATION. In the absence of local codes regarding placement or clearance, we recommend following these guidelines.
- Install the generator as close as possible to the transfer switch. REMEMBER THAT LAWS OR CODES MAY REGULATE THE DISTANCE AND LOCATION.
- The generator must be installed on a level surface. The generator must be level within a 0.5 in (13 mm) all around.
- The generator is typically placed on pea gravel, crushed stone or a concrete pad. Check local codes to see what type is required. If a concrete pad is required, all applicable codes should be followed.

Installation Guidelines for Stationary Air-Cooled Generators

The National Fire Protection Association has a standard for the installation and use of stationary combustion engines. That standard is NFPA 37, its requirements limit the spacing of an enclosed generator set from a structure or wall (***Figure 3-1***).

NFPA 37, Section 4.1.4, Engines Located Outdoors: Engines, and their weatherproof housings if provided, that are installed outdoors shall be located at least 5 ft (1.52 m) from openings in walls and at least 5 ft (1.52 m) from structures having combustible walls. A minimum separation shall not be required where the following conditions exist:

1. The adjacent wall of the structure has a fire resistance rating of at least 1 hour.
2. The weatherproof enclosure is constructed of non-combustible materials and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure.

Annex A — Explanatory Material

A4.1.4 (2) Means of demonstrating compliance are by means of full scale fire test or by calculation procedures.

Because of the limited spaces that are frequently available for installation, it has become apparent that exception (2) would be beneficial for many residential and commercial installations. With that in mind, the manufacturer contracted with an independent testing laboratory to run full scale fire tests to assure that the enclosure will not ignite combustible materials outside the enclosure.

NOTE: Southwest Research Institute testing approves 18 in (457 mm) installation minimum from structure. Southwest Research is a nationally recognized third party testing and listing agency.

The criteria was to determine the worst case fire scenario within the generator and to determine the ignitability of items outside the engine enclosure at various distances. The enclosure is constructed of non-combustible materials, and the results and conclusions from the independent testing lab indicated that any fire within the generator enclosure would not pose any ignition risk to nearby combustibles or structures, with or without fire service personnel response.

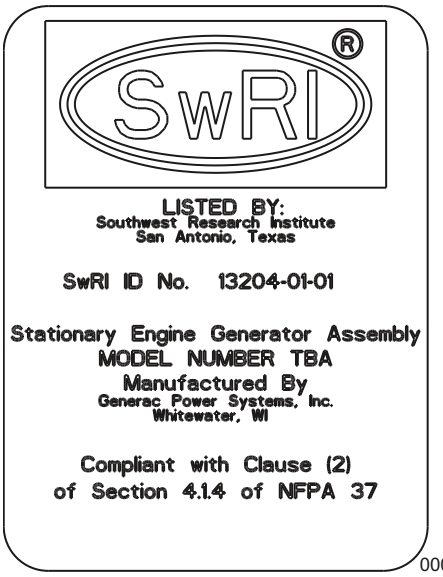


Figure 3-2. Southwest Research Institute Decal

Southwest Research Institute Decal (located inside the generator, next to the generator's data decal)

http://www.swri.org/4org/d01/fire/listlab/listprod/director.htm

Based on this testing and the requirements of NFPA 37, Sec 4.1.4, the guidelines for installation of the generators listed above are changed to 18 in (457 mm) from the

back side of the generator to a stationary wall or building. For adequate maintenance and airflow clearance, the area above the generator should be at least 5 ft (1.52 m) with a minimum of 3 ft (.91 m) at the front and ends of the enclosure. This would include trees, shrubs and bushes. Vegetation not in compliance with these clearance parameters could obstruct air flow. In addition, exhaust fumes from the generator could inhibit plant growth. See ***Figure 3-1*** and the installation drawing within the owner's manual for details.

⚠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

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

(000103)

If the generator is not set to the OFF mode, it can crank and start as soon as the battery cables are connected. If the utility power supply is not turned off, sparking can occur at the battery posts and cause an explosion.

Site Preparation

- Locate the mounting area as close as possible to the transfer switch and fuel supply.
- Leave adequate room around the area for service access (check local code), and place high enough to keep rising water from reaching the generator.
- Choose an open space that will provide adequate and unobstructed airflow.
- Place the unit so air vents won't become clogged with leaves, grass, snow or debris. Make sure exhaust fumes will not enter the building through eaves, windows, ventilation fans or other air intakes (see ***Site Selection***).
- Select the type of base, such as but not limited to gravel or concrete, as desired or as required by local laws or codes. Verify your local requirements before selecting.

Material Sufficient for Level Installation

- Dig a rectangular area approximately 5 in (127 mm) deep [A] and about 6 in (152 mm) longer and wider [B] than the footprint of the generator. Fill with 4 in (102 mm) of pea gravel [C], crushed stone or any other non-combustible material sufficient for level installation. Compact and level the material. A concrete pad can be poured if desired or required. The pad should be 4-5 in (102-127 mm) thick and extend 6 in (152 mm) beyond the outside of the generator in all directions.

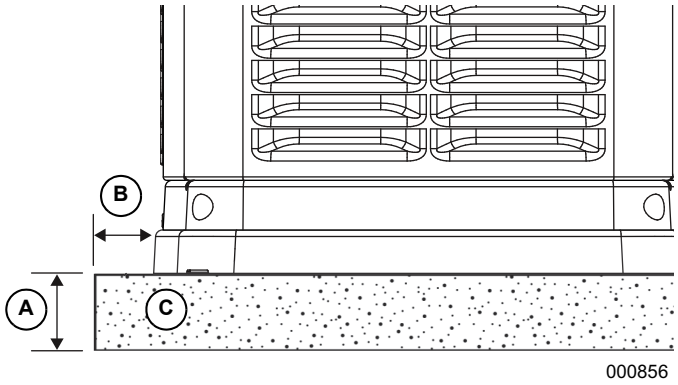


Figure 3-3. Compacted Gravel Pad

NOTE: If a concrete pad is required, follow all applicable Federal, State or local codes.

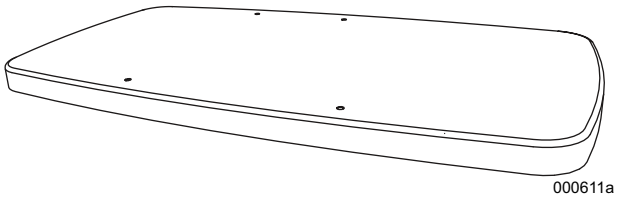


Figure 3-4. Poured or Pre-formed Concrete Pad

Transportation Recommendations

Use a two wheeled hand cart or metal rails to carry the generator (including the wooden pallet) to the installation site. Place cardboard between the hand cart and the generator to prevent any damage or scratches to the generator.

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Section 4: Generator Placement

Generator Placement

All air-cooled generators come with a composite pad. The composite pad elevates the generator and helps prevent water from pooling around the bottom of the generator (***Figure 4-1***). The generator and composite pad can be placed on 4 in (102 mm) of pea gravel that is compacted or on a concrete pad. Check local codes to see what type of site base is required. If a concrete pad is required, all federal, state and local codes should be followed. Place the generator on its mounting pad and position correctly as per the dimensional information given in ***Site Preparation*** .

NOTE: Generator must be level within 0.5 in (13 mm).

NOTE: If the composite pad is removed for concrete mounting, the fascia kit will not fit.

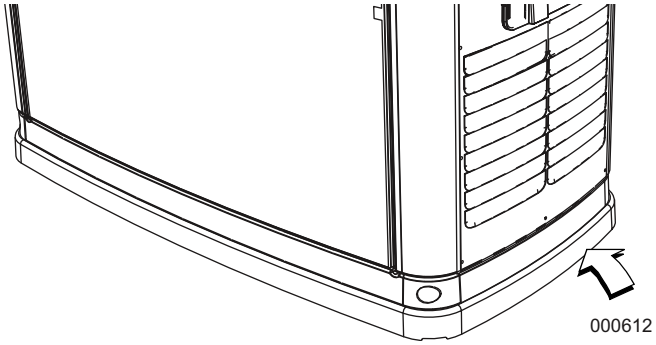


Figure 4-1. Composite Pad

When mounting the generator to concrete, there are four mounting holes available for securing the generator, if codes require (two holes inside the front of the generator compartment and two holes in the back). See ***Figure 4-2.***

NOTE: The top of the generator carton has a template that can be used to mark the concrete pad to pre-drill the mounting holes.

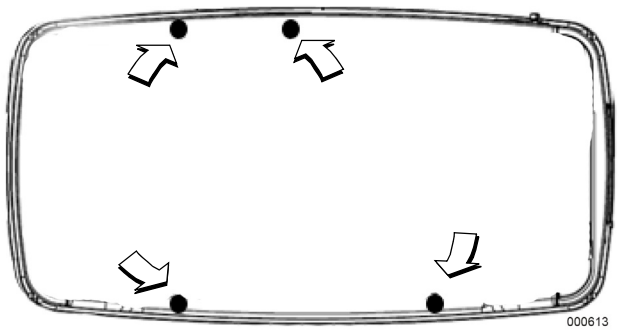


Figure 4-2. Mounting Hole Location

Fascia Installation (If Applicable)

- Locate the four (4) threaded black rubber bumpers located in the Owner's manual bag.
- Remove the four (4) bumpers from the bag and screw them into threaded holes located inside the end pieces of the fascia (two each) opposite one another (A).
- Once the bumpers are installed, snap one of the end pieces into one of the front / rear pieces of fascia. Repeat this action with the other two remaining pieces of fascia.

NOTE: Do not assemble all four pieces together at this point (B).

- Place both assemblies at the base of the generator and fit the rubber bumpers into the lifting holes in the generator base (C).
- Once aligned, snap together the two remaining connection points.

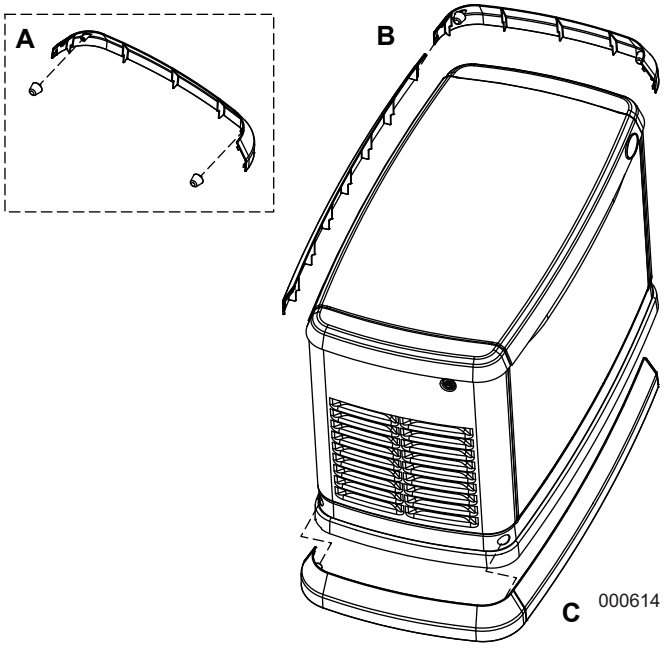


Figure 4-3. Fascia Installation

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Section 5: Fuel Conversion/Gas Connections

Fuel Requirements and Recommendations

⚠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)

NOTE: Natural gas is lighter than air and will collect in high areas. LP gas is heavier than air and will settle in low areas.

LP gas should only use a vapor withdrawal system. This type of system uses the vapors formed above the liquid fuel in the storage tank.

The unit will run on natural gas or LP gas, but has been configured at the factory to run on natural gas.

NOTE: Should the primary fuel need to be changed to LP gas, the fuel system needs to be reconfigured. See the ***Fuel Conversion*** section for instructions on converting the fuel system.

Recommended fuels should have a BTU content of at least 1,000 BTU/ft^3 (37.26 MJ/m^3) for natural gas; or at least 2,500 BTU/ft^3 (93.15 MJ/m^3) for LP gas.

NOTE: BTU fuel content information is available from the fuel supplier.

Required fuel pressure for natural gas is 3.5-7 inches water column (7-13 mm mercury). Required fuel pressure for liquid propane vapor is 10-12 inH_2O (19-22 mmHG).

NOTE: The primary regulator for the propane supply is NOT INCLUDED with the generator.

NOTE: All pipe sizing, construction and layout must comply with NFPA 54 for natural gas applications and NFPA 58 for liquid propane applications. Once the generator is installed, verify fuel pressure NEVER drops below the required specification. For further information regarding NFPA requirements refer to the NFPA website at ***www.nfpa.org***.

Always consult local fuel suppliers or the fire marshal to check codes and regulations for proper installation. Local codes will mandate correct routing of gaseous fuel line piping around gardens, shrubs, and other landscaping.

Piping strength and connections should be given special consideration when installation takes place in areas at risk for; flooding, tornadoes, hurricanes, earthquakes, and unstable ground.

IMPORTANT NOTE: Use an approved pipe sealant or joint compound on all threaded fittings.

NOTE: All installed gaseous fuel piping must be purged and leak tested prior to initial start-up in accordance with local codes, standards and regulations.

Fuel Conversion

Converting from natural gas configuration to LP vapor can be accomplished with the following procedure. See ***Figure 5-1*** for fuel conversion knob locations.

NOTE: The fuel selection (LP/NG) must be updated, on the controller, during initial power up using the ***Installation Wizard*** in the navigation menu.

NOTE: The orange fuel conversion knob (A) is located on the top of the fuel mixer on V-twin engines (B) and under the fuel mixer on single cylinder engines (C).

To select the fuel type, turn the valve towards the marked fuel source arrow until it stops. Fuel knob will rotate 180° and slide into the mixer body when converting to LP.

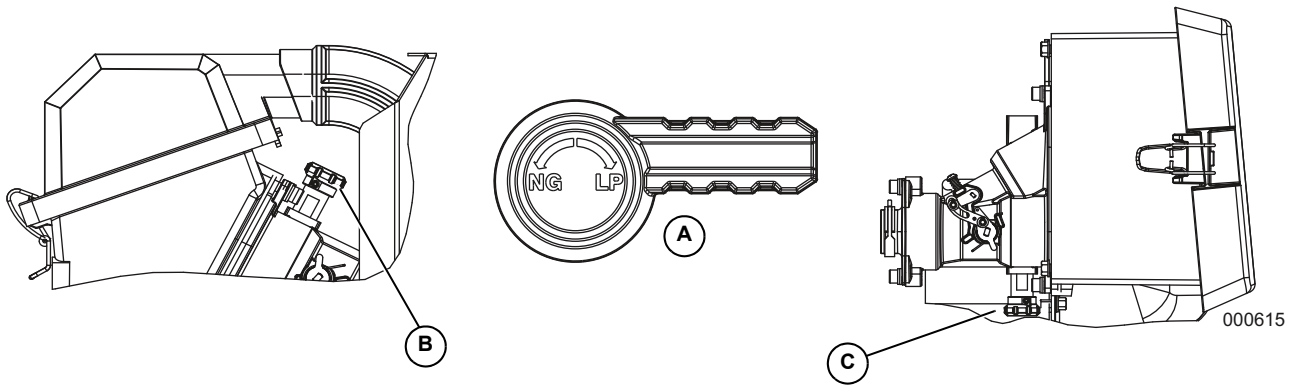


Figure 5-1. Fuel Conversion Knob Locations

Fuel Consumption

Generator	Natural Gas		Propane	
	1/2 Load	Full Load	1/2 Load	Full Load
8 kW	2.21 / 78	3.43 / 121	0.87 / 3.29 / 32	1.42 / 5.37 / 52
11 kW	3.48 / 123	5.64 / 166	1.19 / 4.49 / 43	2.01 / 7.62 / 73
16 kW	5.47 / 193	8.83 / 312	1.9 / 7.2 / 69	3.19 / 12.07 / 116
20 kW	5.8 / 205	8.72 / 308	2.08 / 7.87 / 76	3.85 / 14.57 / 140
22 kW	5.21 / 184	7.96 / 281	2.16 / 8.16 / 78	3.68 / 13.94 / 134

* Natural gas is in m^3/h / ft^3/h

** Propane is in gal/h / l/h (LP) / ft^3/h (LPV)

*** Values given are approximate

These are approximate values. Use the appropriate spec sheet or owner's manual for specific values.

Verify that gas meter is capable of providing enough fuel flow to include household appliances and all other loads.

NOTE: The gas supply and pipe MUST be sized at 100% load BTU / Megajoule rating.

Always refer to the Owner's Manual for the proper BTU, Megajoule and required gas pressures:

– Natural Gas:

BTU = ft^3/h x 1000

Megajoules = m^3/h x 37.26

– Liquid Propane Vapor:

BTU = ft^3/h x 2500

Megajoules = m^3/h / hour x 93.15

Fuel Line Sizing

Selecting the correct size fuel line is crucial to the proper operation of the unit. The generator inlet size has no bearing on the size gas pipe to be used.

For further information refer to NFPA 54 for NG or NFPA 58 for LP.

Measure the distance from the generator to the gas source.

IMPORTANT NOTE: The generator should be plumbed directly from the source, not off the end of an existing system.

NOTE: When measuring the pipe length, add 2.5 ft (0.76 m) for every angle or bend in the pipe to the overall required length of pipe needed.

Natural Gas Pipe Sizing

To determine correct gas pipe size, find the kW rating of the generator in the left column, and trace to the right. The number to the right is the maximum length (measured in meters/feet) allowed for the pipe sizes on top. Pipe sizes are measured by inside diameter (ID) to include any fittings, valves (must be full flow), elbows, tees or angles.

NOTE: Add 2.5 ft (0.76 m) per any bend, tee or angle in the pipe to the overall distance. Tables based on schedule 40 black pipe.

Table 5-1. Natural Gas Pipe Sizing

	For 5-7 inches of water column (9-13 mm mercury)					For 3.5-5 inches of water column (7-9 mm mercury)		
	Allowable Pipe Distances (feet / meters)							
Pipe Size (in / mm)	0.75 / 19	1 / 25	1.25 / 32	1.5 / 38	2 / 51	1 / 25	1.25 / 32	1.5 / 38
8 kW	55 / 16.76	200 / 60.96	820 / 249.94	—	—	20 / 6.1	60 / 18.29	175 / 53.34
11 kW	20 / 6.1	85 / 25.91	370 / 112.78	800 / 243.84	—	—	60 / 18.29	175 / 53.34
16-22 kW	—	20 / 6.1	130 / 39.62	305 / 92.96	945 / 288.04	10 / 3.05	60 / 18.29	125 / 38.1

LP Vapor Pipe Sizing

To determine correct LP Vapor pipe size, find the kW rating of the generator in the left column, and trace to the right. The number to the right is the maximum length (measured in meters/feet) allowed for the pipe sizes on top. The pipe sizes are measured by inside diameter (ID) to include any fittings, valves (must be full flow), elbows, tees or angles. Add 2.5 feet (0.76m) per any bend, tee or angle in the pipe to the overall distance.

NOTE: Pipe sizes are using a second stage regulator.

NOTE: The minimum LP tank size is 250 gallons (946 L), unless unit calculations dictate use of a larger tank. Vertical tanks, which are measured in pounds (or kilograms), will not usually meet the minimum tank size requirement. A 1050 lb (476 kg) vertical tank size minimum is required.

Table 5-2. LP Vapor Pipe Sizing

	For 10-12 inches of water column (19-22 mm mercury)		
	Allowable Pipe Distances (feet / meters)		
Pipe Size (in / mm)	0.75 / 19	1 / 25	1.25 / 32
8 kW	165 / 50.29	570 / 173.74	—
11 kW	70 / 21.33	255 / 77.72	1000 / 304.8
16 kW	25 / 7.62	130 / 39.62	540 / 164.59
20-22 kW	15 / 4.57	115 / 35.05	480 / 146.3

Installing and Connecting Gas Lines



⚠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)

Natural gas and LP vapor are highly volatile substances. Strict adherence to all safety procedures, codes, standards and regulations is essential.

Gas line connections should be made by a certified plumber familiar with local codes. Always use AGA-approved gas pipe and a quality pipe sealant or joint compound.

Verify the capacity of the natural gas meter or the LP tank in regards to providing sufficient fuel for both the generator and other operating appliances.

Shutoff Valve

Most applications will require an external manual full flow shut-off valve on the fuel line. The valve must be easily accessible. See **A** in ***Figure 5-3.***

NOTE: Local codes determine the proper location.

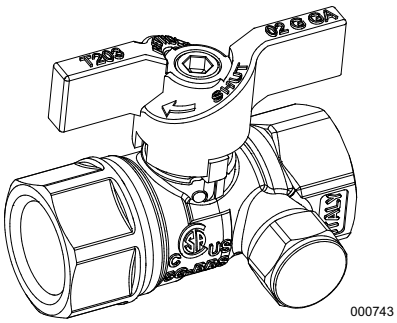


Figure 5-2. Accessory Valve with Manometer Port

NOTE: ***Figure 5-2*** illustrates a fuel shut-off valve with a manometer port for making fuel pressure checks. This accessory valve permits making pressure checks without going into the generator enclosure.

Valves available through Generac and Independent Authorized Service Dealers:

- 1/2” ball valve, part number 0K8752
- 3/4” ball valve, part number 0K8754

Flexible Fuel Line

When connecting the gas line to the generator, use a hose assembly that meets the requirements of ANSI Z21.75/ CSA 6.27 - Connectors for outdoor Gas Appliances and Manufactured Homes or AGA-approved flexible fuel line in accordance with local regulations.

The purpose of flexible fuel line is to isolate vibration from the generator to reduce possibility of a gas leak at one of the connection points. It is important the line be installed with as few bends as possible. The flex fuel line should be horizontal and plumbed parallel to the back of the generator. See **B** in ***Figure 5-3***.

⚠CAUTION

Equipment damage. Do not bend flexible fuel line. Bends in fuel line restrict fuel flow and reduce ability to absorb vibration.

(000205)

Sediment Trap

Some local codes require a sediment trap. Install the recommended sediment trap as illustrated. See **C** in ***Figure 5-3***.

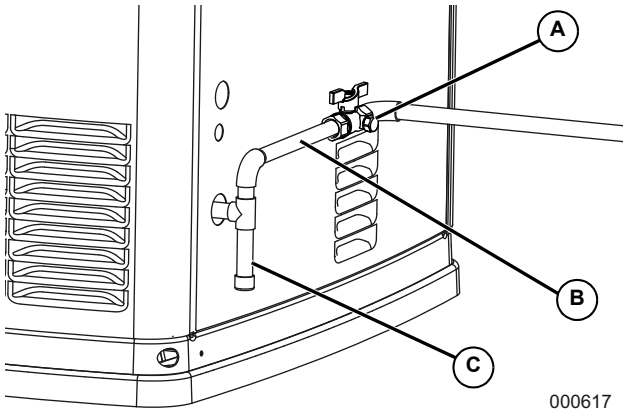


Figure 5-3. Sediment Trap, Manometer Port, and Flexible Fuel Line

Checking Gas Line Connections

1. Check for leaks by spraying all connection points with a non-corrosive gas leak detection fluid. You should not see the solution be blown away or form bubbles.
2. Check gas pressure at the regulator in the generator by following these steps.
   - Close gas supply valve.
   - Remove the top gas pressure test port from the regulator (see ***Figure 5-4***) and install the gas pressure tester (manometer).
   - Open the gas supply valve and verify the pressure is within the specified values.

NOTE: Gas pressure can also be tested at the manometer port on the fuel shut-off valve shown in ***Figure 5-3***.

NOTE: See owner’s manual or spec sheet for proper fuel pressure specifications. If the gas pressure is not within specifications, contact the local gas supplier.

3. Close gas valve when completed.

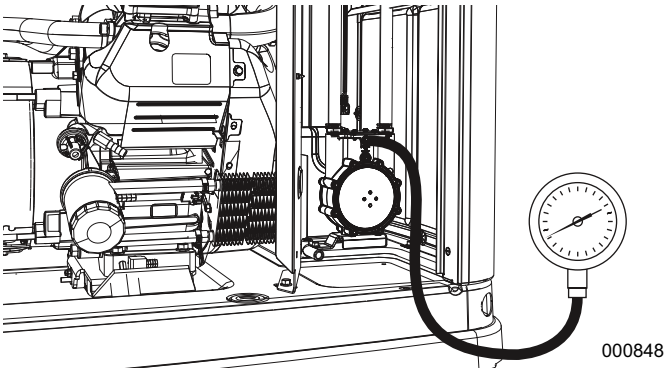
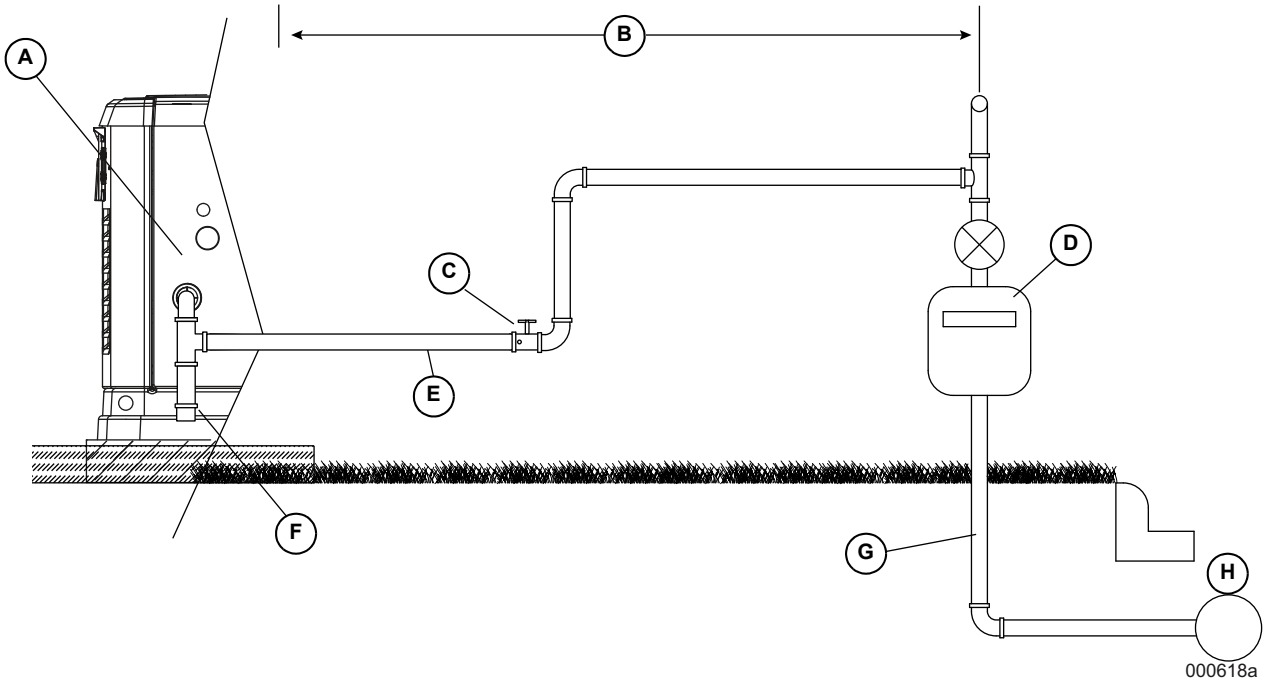


Figure 5-4. Checking Pressure with Manometer

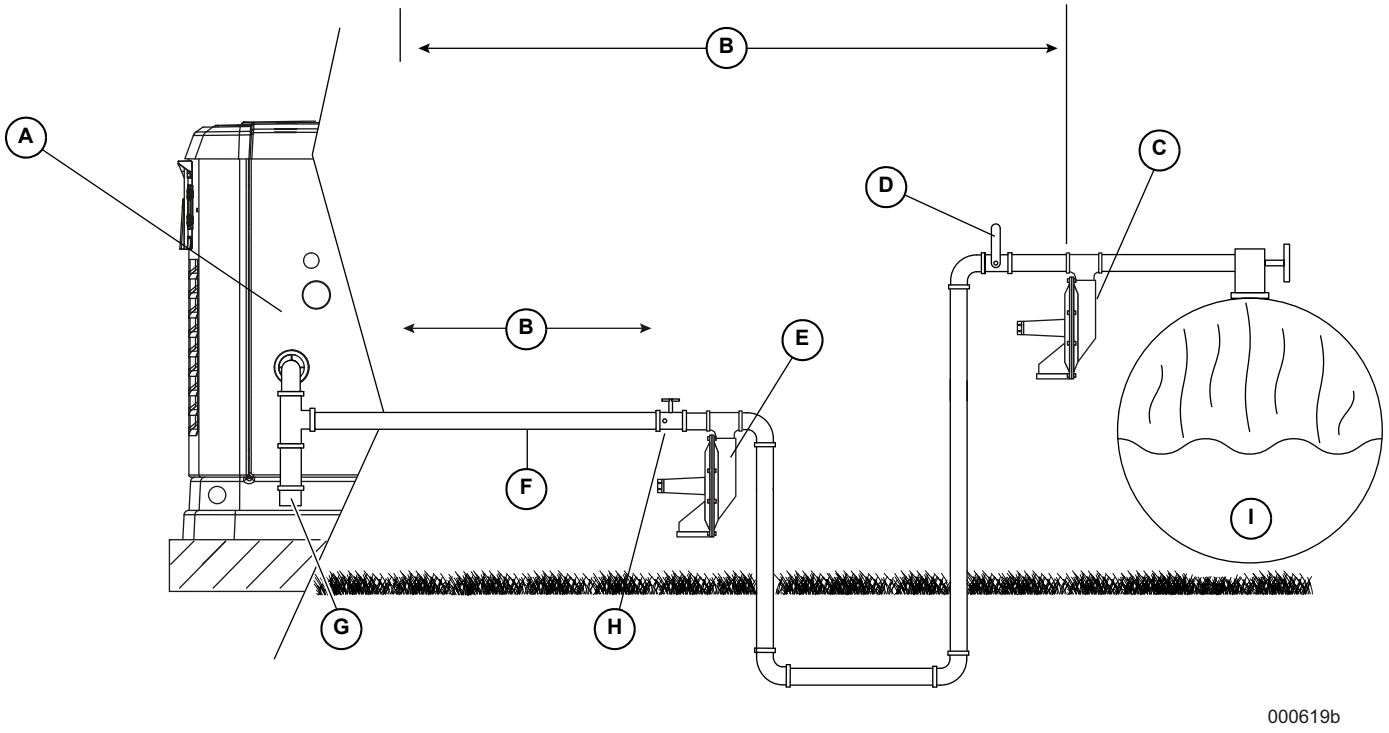
Natural Gas Vapor Installation (typical)



NG BTU = ft^3/h X 1000 Megajoules = m^3/h X 37.26	
A.	BTU and Pressure Decal
B.	Check Distance with Gas Provider
C.	Manual Shut Off Valve With Pressure Port
D.	Size Gas Meter for Generator Load Plus All Appliance Loads
E.	Flexible Fuel Line
F.	Sediment Trap
G.	For Underground Installations, Verify Piping System for Code Compliance
H.	Gas Main

Figure 5-5.

LP Vapor Installation (typical)



NG BTU = ft^3/h X 2500
Megajoules = m^3/h X 93.15

A.	BTU and Pressure Decal
B.	Check Distance with Gas Provider
C.	Primary Fuel Pressure Regulator Per LP Provider
D.	Manual Shut Off Valve
E.	Secondary Fuel Pressure Regulator
F.	Flexible Fuel Line
G.	Sediment Trap
H.	Manual Shut Off Valve With Pressure Port
I.	Size fuel tank large enough to provide required BTUs for generator and ALL connected appliance loads. Be sure to correct for weather evaporation.

Figure 5-6.

Section 6: Electrical Connections

Generator Connections

NOTE: Control wiring may be already wired on pre-wired generators. If so, tighten the 5 foot (1.5 meter) whip conduit inside of the enclosure. If not, wiring must be in accordance with local jurisdiction and codes.

1. Remove the appropriate main AC/control wiring knock-out plug from the back of the generator.
2. Install the conduit and main AC and control wires between the generator and the transfer switch. See ***Figure 2-6*** for knockout locations (verify specific transfer switch wiring/connections per model).

NOTE: These wiring connections may be present on pre-wired models.

NOTE: This wiring can be run in the same conduit if the appropriate insulation rated wire is used, or if the provided sleeve is used to separate the high and low voltage control wires.

3. Seal the conduit at the generator and in compliance with any codes.
4. Strip the insulation from the ends of the wires. Do not remove excessive insulation.
5. To connect the control wires, push down on the spring loaded connection point with a flat head screwdriver, insert wire and release.

NOTE: No wire insulation should be in the connection point, only bare wire.

Control Wiring

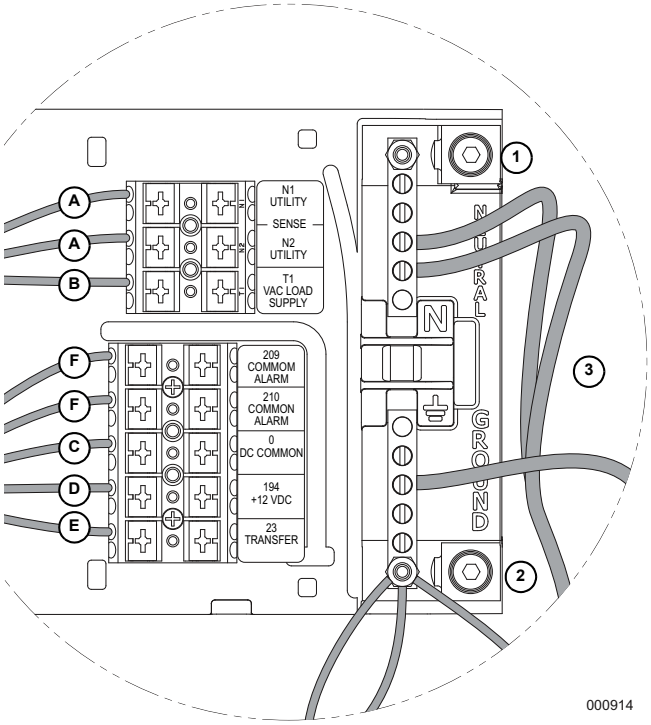


Figure 6-1. Control Wiring Connections

Table 6-1. Control Panel Connections		
Terminal Numbering Decal		Wire Numbers
A	YELLOW #1 & #2	N1 & N2 - 240 VAC - Sensing for Utility Dropout and Pickup
B*	BLUE #3	T1 - Fused 120 VAC for Battery Charger (*see NOTE)
C	BLACK #3	0 - DC (-) Common Ground Wire
D	RED #4	194 - DC (+) 12 VDC for Transfer Controls
E	WHITE #5	23 - Transfer Control Signal Wire
F	BLUE #1 & #2	Optional Alarm Relay Contacts (Normally Open)
Note: Must be connected to keep battery charged whether unit is running or not.		

Table 6-2. Ground and Neutral Connections	
1	Large Neutral Lug Torque Spec 2/0 TO 14 AWG 120 **in-lb** (13.56 N-m)
2	Large Ground Lug Torque Spec 2/0 TO 14 AWG 120 **in-lb** (13.56 N-m)
3	Ground and Neutral Bus Bar Torque Specs: 4-6 AWG 35 **in-lb** (3.95 N-m) 8 AWG 25 **in-lb** (2.82 N-m) 10-14 AWG 20 **in-lb** (2.26 N-m)

Table 6-3. Control Wire Recommended Length and Size	
Maximum Wire Length	**Recommended Wire Size**
1-115 ft (1-35 m)	No. 18 AWG
116-185 ft (36-56 m)	No. 16 AWG
186-295 ft (57-89 m)	No. 14 AWG
296-460 ft (90-140 m)	No. 12 AWG

Main AC Wiring

NOTE: Main AC wiring must be in accordance with local jurisdiction and codes.

1. Strip the insulation off the wire ends. Do not remove excessive insulation.
2. Remove the two cap plugs located behind the breaker door and to the right of the Main Breaker.
3. Loosen the lugs of the Main Breaker through the access holes.
4. Insert a power wire (E1 or E2) through the opening in the back cover and into the bottom lug. Torque to the proper specification.

NOTE: There are 3 screws inside the top of the breaker panel (behind the breaker door). Removing these screws will allow the entire breaker box to be carefully pulled out. When reinstalling, be certain that the tabs on the bottom lock into place.

5. Connect the Neutral wire to the Neutral Lug if applicable. Torque to the required specification. See ***Table 6-2.***
6. Connect the Ground wire to the Ground Lug and torque to the required specification. See ***Table 6-2***.

NOTE: Neutral Bonding - For installations that require the neutral to be bonded to the ground, this is to be done on the customer connections terminals inside the generator. Connect a suitably sized wire from the neutral bar to the ground bar. This is normally required when the generator is the source in a separately derived system. It is not required when the generator is a backup source in a utility supplied electrical system with a 2-pole transfer switch. See ***Figure 6-1***.

NOTE: Torque all wiring lugs, bus bars and connection points to the proper torque specifications. Torque specifications for the Main Line Circuit Breaker (MLCB) can be found on a decal located on the inside of the Main Line Circuit Breaker Door.

Battery Requirements

Group 26R, 12V, 540CCA (Minimum CCA)

Battery Installation

⚠WARNING

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

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)

Fill the battery with the proper electrolyte fluid if necessary and have the battery fully charged before installing it.

Before installing and connecting the battery, complete the following steps:

1. Verify that the generator has been turned OFF.
2. Turn off utility power supply to the transfer switch.
3. Remove the 7.5A fuse from the generator control panel.

Battery cables were factory connected at the generator. See ***Figure 6-2***. Connect cables to battery posts as follows:

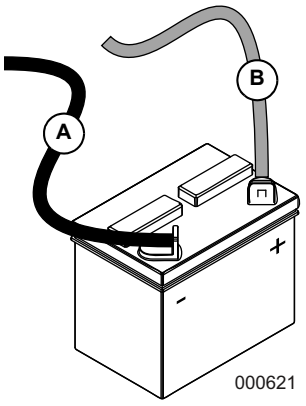
⚠WARNING

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)

4. Connect the red battery cable (from starter contactor) to the battery post indicated by a positive, POS or (+).
5. Connect the black battery cable (from frame ground) to the battery post indicated by a negative, NEG or (-).
6. Install the red battery post cover (included).

NOTE: Dielectric grease should be used on battery posts to aid in the prevention of corrosion.

NOTE: Damage will result if battery connections are made in reverse.



A. Negative (-) Black lead from frame
B. Positive (+) Red lead from starter contactor

Figure 6-2. Battery Cable Connections

Section 7: Control Panel/Start-up/Testing

Control Panel Interface

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)

Before performing any maintenance on the generator, set to OFF, remove fuses, and disconnect battery cables to prevent accidental start up. Disconnect the cable from the battery post indicated by a NEGATIVE, NEG or (–) first, then remove the POSITIVE, POS or (+) cable. When reconnecting the cables, connect the POSITIVE cable first, the NEGATIVE cable last.

Using the AUTO/MANUAL/OFF Buttons

Button	Description of Operation
Auto	Selecting this button activates fully automatic system operation. Automatic operation allows the unit to automatically start and exercise the generator according to the exercise timer settings (see Setting the Exercise Timer section).
Off	This button shuts down the engine and also prevents automatic operation and exercise of the unit.
Manual	This button will crank and start the generator. Transfer to standby power will not occur unless there is a utility failure.

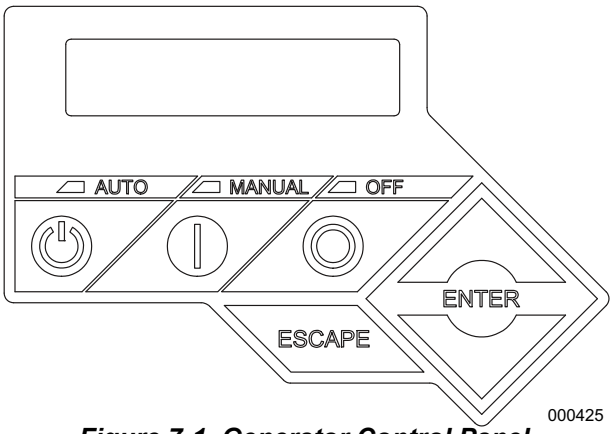


Figure 7-1. Generator Control Panel

Generator Set-up

When battery power is applied to the generator during the installation process, the controller will light up. However, the generator still needs to be activated before it will automatically run in the event of a power outage.

Activation

To receive the activation code, you must have the unit serial number and go to: www.generac.com, “Service & Support” Tab and then “Activate Your Home Standby” under the “Generac Owners” list. You can also receive an activation code by calling 1-888-9ACTIVATE (1-888-922-8482).

Activating the generator is a simple, one-time process that is guided by the controller screen prompts. Once the product is activated, the controller screen will not prompt you to activate again, even if you disconnect the generator battery, fuse and battery charge circuit (T1 60 Hz / T1 & T2 50 Hz).

After obtaining your activation code, please complete the following steps at the generator’s control panel:

1. Upon first power up of the generator, the display interface will begin an installation wizard.

NOTE: If the unit has already been powered up, it will be necessary to disconnect the generator battery, fuse and battery charge circuit (T1 60 Hz / T1 & T2 50Hz).

2. The installation wizard will prompt the user to set the fuel type and after choosing fuel type and “Enter”, the display will then annunciate “Activate me (ENT) or ESC” to run in MANUAL.
3. Press Enter and use the up/down arrows and the enter keys to put the activation code in.

NOTE: If you push ESC to run in MANUAL, the unit will not function in AUTO. To enter the activation code at a later time, it will be necessary to disconnect the generator battery, fuse and battery charge circuit (T1).

If the unit is not activated, the install wizard will only allow the programming to operate the generator. These settings are: Current Date/Time and Exercise Day/Time and annunciate “NOT ACTIVATED”.

It the unit is activated, the install wizard will allow further programming parameters and Auto operation. The maintenance intervals will be initialized when the exercise time is entered. The exercise settings can be changed at any time via the EDIT menu. If the 12 volt battery is disconnected or the fuse removed, the installation wizard will operate upon power restoration. The only difference is the display will only prompt the customer for the current Time and Date.

Cold Smart Start

The Cold Smart Start feature can be enabled in the EDIT menu. When enabled, the generator will monitor ambient temperature and adjust its warm-up delay based on temperature. If the ambient temperature conditions are below 50 ºF upon startup in AUTO mode, the generator will warm up for 30 seconds allowing the engine to warm

before the load is applied. If the temperature is at or above 50 ºF, the generator will startup with the normal warm-up delay of 6 seconds.

Setting The Exercise Timer

This generator is equipped with a configurable exercise timer. There are two settings for the exercise timer.

- **Day/Time:** Once set, the generator will start and exercise for the period defined, on the day of the week and at the time of day specified. During this exercise period, the unit runs for approximately 5 or 12 minutes, depending on the model, (see ***Table 7-1***) and then shuts down.
- **Exercise frequency (how often the exercise will take place):** It can be set to WEEKLY, BIWEEKLY or MONTHLY. If MONTHLY is selected, the day of the month must be selected from 1-28. The generator will exercise on that day each month. Transfer of loads to the generator output does not occur during the exercise cycle unless utility power is lost.

NOTE: If the installer tests the generator prior to installation, press the “enter” button to skip setting up the exercise timer.

Table 7-1.

Generator Size	8 kW	11 kW	16 kW / 20 kW	22 kW
Exercise Speed	3600 rpm	3600 rpm	2400 rpm	1950 rpm
Exercise Frequency Options	Weekly/Bi-Weekly/ Monthly	Weekly/Bi-Weekly/ Monthly	Weekly/Bi-Weekly/ Monthly	Weekly/Bi-Weekly/ Monthly
Exercise Duration	12 minutes	12 minutes	5 minutes	5 minutes

NOTE: The exercise feature will operate only when the generator is placed in the AUTO mode and will not work unless this procedure is performed. The 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.

Before Initial Start-up

NOTE: These units have been run and tested at the factory prior to being shipped and do not require any type of break-in.

⚠CAUTION

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

(000135)

NOTE: This unit comes filled with 30 weight organic oil from the factory. Check the oil level and add the appropriate viscosity and amount if necessary.

Installation Wizard

Upon power-up, the Installation Wizard immediately appears. It allows the user to input generator settings. ***Figure 7-2.***

The Installation Wizard will start every time AC and DC power are removed and re-applied to the generator.

Interconnect System Self Test Feature

Upon power up, this controller will go through a system self test which will check for the presence of utility voltage on the DC circuits. This is done to prevent damage if the installer mistakenly connects AC utility power sense wires into the DC terminal block. If utility voltage is detected, the controller will display a warning message and lock out the generator, preventing damage to the controller. Power to the controller must be removed to clear this warning.

Utility voltage must be turned on and present at the N1 and N2 terminals inside the generator control panel for this test to be performed and pass.

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

Before starting, complete the following:

1. Verify that the generator is OFF.
2. Set the generator main circuit breaker to OFF or OPEN.
3. Turn off all breakers that will be powered by the generator.
4. Check the engine crankcase oil level and, if necessary, fill to the dipstick FULL mark with the recommended oil. Do not fill above the FULL mark.
5. Check the fuel supply. Gaseous fuel lines must have been properly purged and leak tested in accordance with applicable fuel-gas codes. All fuel

shutoff valves in the fuel supply lines must be open.

During initial start up only, the generator may exceed the normal number of start attempts and experience an “OVERCRANK” fault. This is due to accumulated air in the fuel system during installation. Reset the control board by pushing the OFF button and ENTER key, and restart up to two more times if necessary. If unit fails to start, contact an Independent Authorized Service Dealer for assistance.

Check Manual Transfer Switch Operation

Refer to the “Manual Transfer Operation” section of the Owner’s Manual for procedures.

⚠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)

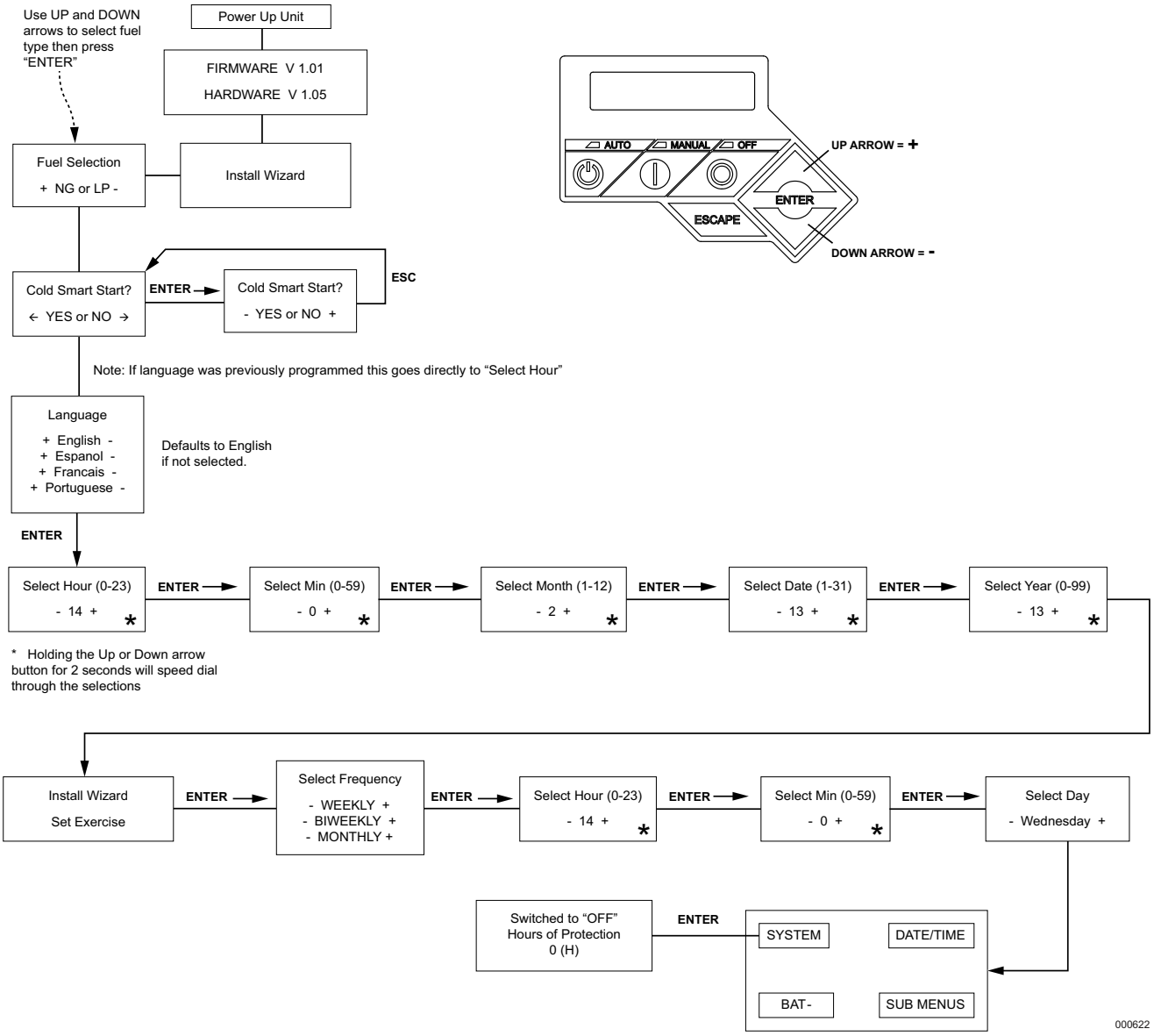


Figure 7-2. Installation Wizard Menu Map

Electrical Checks



⚠DANGER

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

(000129)

Complete electrical checks as follows:

1. Verify that generator is OFF.
2. Set the generator main circuit breaker to OFF or OPEN.
3. Turn OFF all circuit breakers/electrical loads that will be supplied by the generator.
4. Turn on the utility power supply to the transfer switch using the means provided (such as a utility main line circuit breaker).
5. Use an accurate AC voltmeter to check utility power source voltage across transfer switch terminals N1 and N2. Nominal line-to-line voltage should be 240 volts AC. If voltage is not correct, verify AC output and wiring from utility source to N1 and N2 lugs at transfer switch.
6. Check utility power source voltage across terminals N1 and the transfer switch neutral lug; then across terminal N2 and neutral. Nominal line-to-neutral voltage should be 120 volts AC (if wired with a neutral). If voltage is not correct, verify AC output and wiring from utility source to N1 and N2 lugs at transfer switch.
7. When certain that utility supply voltage is compatible with transfer switch and load circuit ratings, turn OFF the utility power supply to the transfer switch.
8. On the generator panel, push the MANUAL button. The engine should crank and start.
9. Let the engine warm up for about five minutes to allow internal temperatures to stabilize. Then, set the generator main circuit breaker to ON or CLOSED.
10. Connect an accurate AC voltmeter and a frequency meter across transfer switch terminal lugs E1 and E2. Voltage should be 238-242 at a frequency of 59.5-60.5 Hz. If voltage is not correct, verify that the MLCB is closed and verify AC output and frequency (Hertz or Hz) at the MLCB. Also verify wiring from generator to E1 and E2 lugs at transfer switch.
11. Connect the AC voltmeter test leads across terminal lugs E1 and neutral; then across E2 and neutral (if wired with a neutral). In both cases, voltage reading should be 119-121 volts AC. If voltage is not correct, verify that the MLCB is closed and verify AC output between the E1 and E2 of the MLCB and Neutral at the generator.
12. Verify wiring from generator to E1, E2 and Neutral lugs at transfer switch.
13. Set the generator main circuit breaker to OFF or OPEN.
14. Push the generator OFF button. The engine should shut down.

NOTE: It is important not to proceed until certain that generator AC voltage and frequency are correct and within the stated limits.

Generator Tests Under Load

To test the generator set with electrical loads applied, proceed as follows:

1. Verify that the generator is OFF.
2. Turn OFF all breakers/electrical loads that will be powered by the generator.
3. Turn OFF the utility power supply to the transfer switch, using the means provided (such as a utility main line circuit breaker).



⚠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)

4. Manually set the transfer switch to the STANDBY position, i.e., load terminals connected to the generator's E1/E2 terminals. The transfer switch operating lever should be down.
5. Push the generator MANUAL button. The engine should crank and start immediately.
6. Let the engine stabilize and warm up for a few minutes.
7. Set the generator main circuit breaker to ON or CLOSED. Loads are now powered by the standby generator.
8. Turn ON the circuit breaker/electrical loads that are powered by the generator one by one.
9. Connect a calibrated AC voltmeter and a frequency meter across terminal lugs E1 and E2. Voltage should be approximately 240 volts and frequency should be 60 Hz. If the voltage and frequency are rapidly dropping as the loads are applied, the generator may be overloading or there may be a fuel issue. Check amperage value of loads and/or fuel pressure.
10. Let the generator run at full rated load for 20-30 minutes. Listen for unusual noises, vibration or other indications of abnormal operation. Check for oil leaks, evidence of overheating, etc.
11. Verify gas pressure while under full load.

12. When testing under load is complete, turn OFF electrical loads.
13. Set the generator main circuit breaker to OFF or OPEN.
14. Let the engine run at no-load for 2-5 minutes.
15. Push the generator OFF button. The engine should shut down.

Checking Automatic Operation

To check the system for proper automatic operation, proceed as follows:

1. Verify that the generator is OFF.
2. Install front cover of the transfer switch.
3. Turn ON the utility power supply to the transfer switch, using the means provided (such as a utility main line circuit breaker).

NOTE: Transfer switch will transfer back to utility position.

4. Set the generator main circuit breaker to ON or CLOSED.
5. Push the generator AUTO button. The system is now ready for automatic operation.
6. Turn OFF the utility power supply to the transfer switch.

With the generator ready for automatic operation, the engine should crank and start when the utility source power is turned OFF after a 10 second delay (factory default setting). After starting, the transfer switch should connect load circuits to the standby side after a five (5) second delay. Let the system operate through its entire automatic sequence of operation.

With the generator running and loads powered by generator AC output, turn ON the utility power supply to the transfer switch. The following should occur:

- After approximately 15 seconds, the switch should transfer loads back to the utility power source.
- Approximately one minute after re-transfer, the engine should shut down.

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. Test and confirm 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.

Shutting Generator Down While Under Load

IMPORTANT NOTE: To turn the generator off during utility outages to perform maintenance, or conserve fuel, follow these steps:

To turn the generator OFF (while running in AUTO and online):

1. Turn the main utility disconnect OFF.
2. Turn the main line circuit breaker (MLCB) on the
3. generator to OFF (OPEN).
4. Turn the generator OFF.

To turn the generator back ON:

1. Put the generator back into AUTO and allow to start and warm-up for a few minutes.
2. Set the MLCB on the generator to ON.

The system will now be operating in automatic mode. The main utility disconnect can be turned ON (CLOSED). To shut the unit off, this complete process must be repeated.

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Section 8: Troubleshooting

System Diagnosis

Problem	Cause	Correction
Engine will not crank.	1. Fuse blown. 2. Loose, corroded or defective battery cables. 3. Defective starter contact. 4. Defective starter motor. 5. Dead Battery.	1. Correct short circuit condition by replacing 7.5 Amp fuse in generator control panel. 2. Tighten, clean or replace as necessary.* 3. *See #2. 4. *See #2. 5. Charge or replace battery.
Engine cranks but will not start.	1. Out of fuel. 2. Defective fuel solenoid (FS). 3. Open Wire 14 from engine control board. 4. Defective spark plug(s). 5. Valve lash out of adjustment.	1. Replenish fuel / Turn on fuel valve. 2. * 3. * 4. Clean, re-gap or replace plug(s). 5. Reset valve lash.
Engine starts hard and runs rough.	1. Air cleaner plugged or damaged. 2. Defective spark plug(s). 3. Fuel pressure incorrect. 4. Fuel selector in wrong position.	1. Check / replace air cleaner. 2. Clean, re-gap or replace plug(s). 3. Confirm fuel pressure to regulator is 10-12” water column (19-22mm mercury) for LP, and 3.5 - 7” water column (9-13mm mercury) for natural gas. 4. Turn fuel conversion valve to correct position.
Generator is set to OFF, but the engine continues to run.	1. Controller wired incorrectly 2. Defective control board.	1. * 2. *
No AC output from generator.	1. Main line circuit breaker is in the OFF (or OPEN) position. 2. Generator internal failure.	1. Reset circuit breaker to ON (or CLOSED). 2. *
No transfer to standby after utility source failure.	1. Main line circuit breaker is in the OFF (or OPEN) position. 2. Defective transfer switch coil. 3. Defective transfer relay. 4. Transfer relay circuit open. 5. Defective control logic board.	1. Reset circuit breaker to ON (or CLOSED). 2. * 3. * 4. * 5. *
Unit consumes large amounts of oil.	1. Engine over filled with oil. 2. Engine breather defective. 3. Improper type or viscosity of oil. 4. Damaged gasket, seal or hose.	1. Adjust oil to proper level. 2. * 3. See “Engine Oil Recommendations”. 4. Check for oil leaks.
* Contact an Independent Authorized Service Dealer for assistance.		

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Section 9: Quick Reference Guide

System Diagnosis

To clear an active alarm, press the ENTER button twice and then press AUTO. If the alarm reoccurs, contact an Independent Authorized Service Dealer.

Table 9-1. System Diagnosis

Active Alarm	LED	Problem	Things to Check	Solution
NONE	GREEN	Unit running in AUTO but no power in house.	Check MLCB.	Check MLCB if the MLCB is in the ON position. If it is in the ON position contact the Independent Authorized Service Dealer.
HIGH TEMPERATURE	RED	Unit shuts down during operation.	Check the LED's / Screen for alarms.	Check ventilation around the generator, intake, exhaust and rear of generator. If no obstruction contact Independent Authorized Service Dealer.
OVERLOAD REMOVE LOAD	RED	Unit shuts down during operation.	Check the LED's / Screen for alarms.	Clear alarm and remove household loads from the generator. Put back in AUTO and restart.
RPM SENSE LOSS	RED	Unit was running and shuts down, attempts to restart.	Check the LED's / Screen for alarms.	Clear alarm and remove household loads from the generator. Put back in AUTO and restart. If generator does not start, contact Independent Authorized Service Dealer.
NOT ACTIVATED	NONE	Unit will not start in AUTO with utility loss.	See if screen says unit not activated.	Refer to activation section in Owner's Manual.
NONE	GREEN	Unit will not start in AUTO with utility loss.	Check screen for start delay countdown.	If the start up delay is greater than expected, contact Independent Authorized Service Dealer to adjust from 2 to 1500 seconds.
LOW OIL PRESSURE	RED	Unit will not start in AUTO with utility loss.	Check the LED's / Screen for alarms.	Check Oil Level / Add Oil Per Owners Manual. If oil level is correct contact Independent Authorized Service Dealer.
RPM SENSE LOSS	RED	Unit will not start in AUTO with utility loss.	Check the LED's / Screen for alarms.	Clear alarm. Using the control panel, check the battery by navigating to the BATTERY MENU option from the MAIN MENU. If it states battery is GOOD, contact Independent Authorized Service Dealer. If it states CHECK BATTERY, replace the battery.
OVERCRANK	RED	Unit will not start in AUTO with utility loss.	Check the LED's / Screen for alarms.	Check fuel line shutoff valve is in the ON position. Clear alarm. Attempt to start the unit in MANUAL. If it does not start or starts and runs rough, contact Independent Authorized Service Dealer.
LOW VOLTS REMOVE LOAD	RED	Unit will not start in AUTO with utility loss.	Check the LED's / Screen for alarms.	Clear alarm and remove household loads from the generator. Put back in AUTO and restart.
FUSE PROBLEM	RED	Unit will not start in AUTO with utility loss.	Check the LED's / Screen for alarms.	Check the 7.5amp fuse. If it is bad replace it with an ATO 7.5Amp fuse, if not contact Independent Authorized Service Dealer.

Table 9-1. System Diagnosis (Continued)

Active Alarm	LED	Problem	Things to Check	Solution
OVERSPEED	RED	Unit will not start in AUTO with utility loss.	Check the LED's / Screen for alarms.	Contact Independent Authorized Service Dealer.
UNDERVOLTAGE	RED	Unit will not start in AUTO with utility loss.	Check the LED's / Screen for alarms.	Contact Independent Authorized Service Dealer.
UNDERSPEED	RED	Unit will not start in AUTO with utility loss.	Check the LED's / Screen for alarms.	Contact Independent Authorized Service Dealer.
STEPPER OVERCURRENT	RED	Unit will not start in AUTO with utility loss.	Check the LED's / Screen for alarms.	Contact Independent Authorized Service Dealer.
MISWIRE	RED	Unit will not start in AUTO with utility loss.	Check the LED's / Screen for alarms.	Contact Independent Authorized Service Dealer.
OVERVOLTAGE	RED	Unit will not start in AUTO with utility loss.	Check the LED's / Screen for alarms.	Contact Independent Authorized Service Dealer.
LOW BATTERY	YELLOW	Yellow LED illuminated in any state.	Check the screen for additional information.	Clear alarm. Using the control panel, check the battery by navigating to the BATTERY MENU option from the MAIN MENU. If it states battery is GOOD contact Independent Authorized Service Dealer. If it states CHECK BATTERY, replace the battery.
BATTERY PROBLEM	YELLOW	Yellow LED illuminated in any state.	Check the screen for additional information.	Contact Independent Authorized Service Dealer.
CHARGER WARNING	YELLOW	Yellow LED illuminated in any state.	Check the screen for additional information.	Contact Independent Authorized Service Dealer.
SERVICE A	YELLOW	Yellow LED illuminated in any state.	Check the screen for additional information.	Perform SERVICE A maintenance. Press ENTER to clear.
SERVICE B	YELLOW	Yellow LED illuminated in any state.	Check the screen for additional information.	Perform SERVICE B maintenance. Press ENTER to clear.
INSPECT BATTERY	YELLOW	Yellow LED illuminated in any state.	Check the screen for additional information.	Inspect Battery. Press ENTER to clear.

Section 10: Accessories

Performance enhancing accessories are available for air-cooled generators.

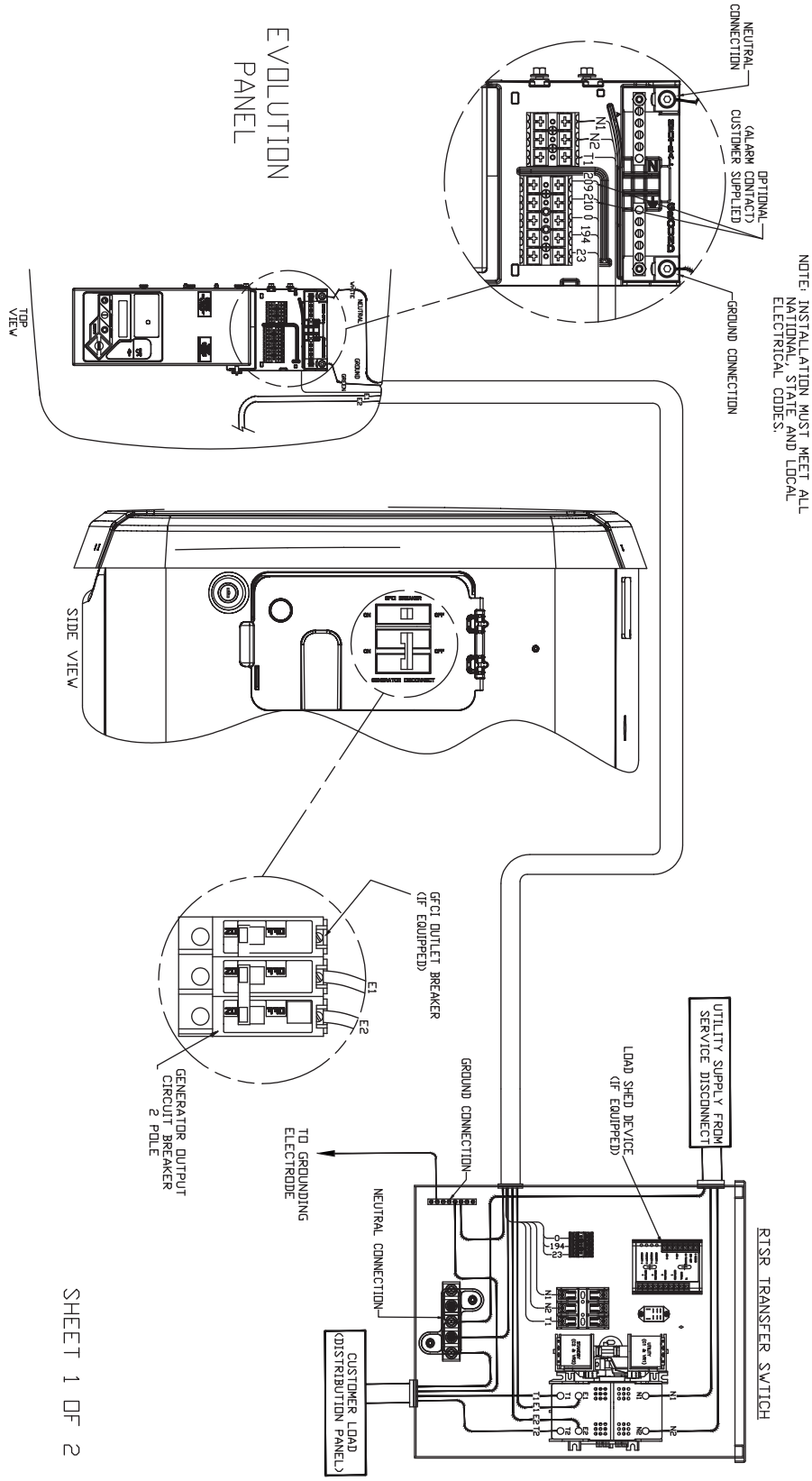
Accessory	Description
Cold Weather Kit	Recommended in areas where temperatures fall below 32 ºF (0 ºC).
Scheduled Maintenance Kit	Includes all pieces necessary to perform maintenance on the generator along with oil recommendations.
Auxiliary Transfer Switch Lockout	Enables any of the transfer switches to completely lock out one large electrical load by tying into its control system.
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 offering protection from rodents and insects by covering the lifting holes located in the base. Requires use of the mounting pad shipped with the generator.
Mobile Link™ (USA only)	Provides a personalized web portal that displays the generator status, maintenance schedule, event history and much more. This portal is accessible via computer, tablet or smart phone. Sends emails and/or text notifications the moment there is any change in the generator's status. Notification settings can be customized to what type of alert is sent and how often. For more information, visit ***www.MobileLinkGen.com***.
Touch-Up Paint Kit	Very important to maintain the look and integrity of the generator enclosure. This kit includes touch-up paint and instructions.
Wireless Local Monitor	Completely wireless and battery powered, the Wireless Local Monitor provides you with instant status without ever leaving the house. Status lights (red, yellow and green) alert owners when the generator needs attention. Magnetic backing permits refrigerator mounting and gives a 600 foot line of sight communication.
Extended Warranty Coverage	Extend your generator warranty coverage by purchasing extended warranty coverage. Covers both parts and labor. Extended coverage can be purchased within 12 months of the end-users purchase date. This extended coverage is applicable to registered units and end-user proof of purchase must be available upon request. Available for Generac®, Guardian® and Centurion® products. Not available for Corepower™ and EcoGen™ products or all international purchases.

NOTE: Contact an Independent Authorized Service Dealer or visit ***www.generac.com*** for additional information on accessories and extended warranties.

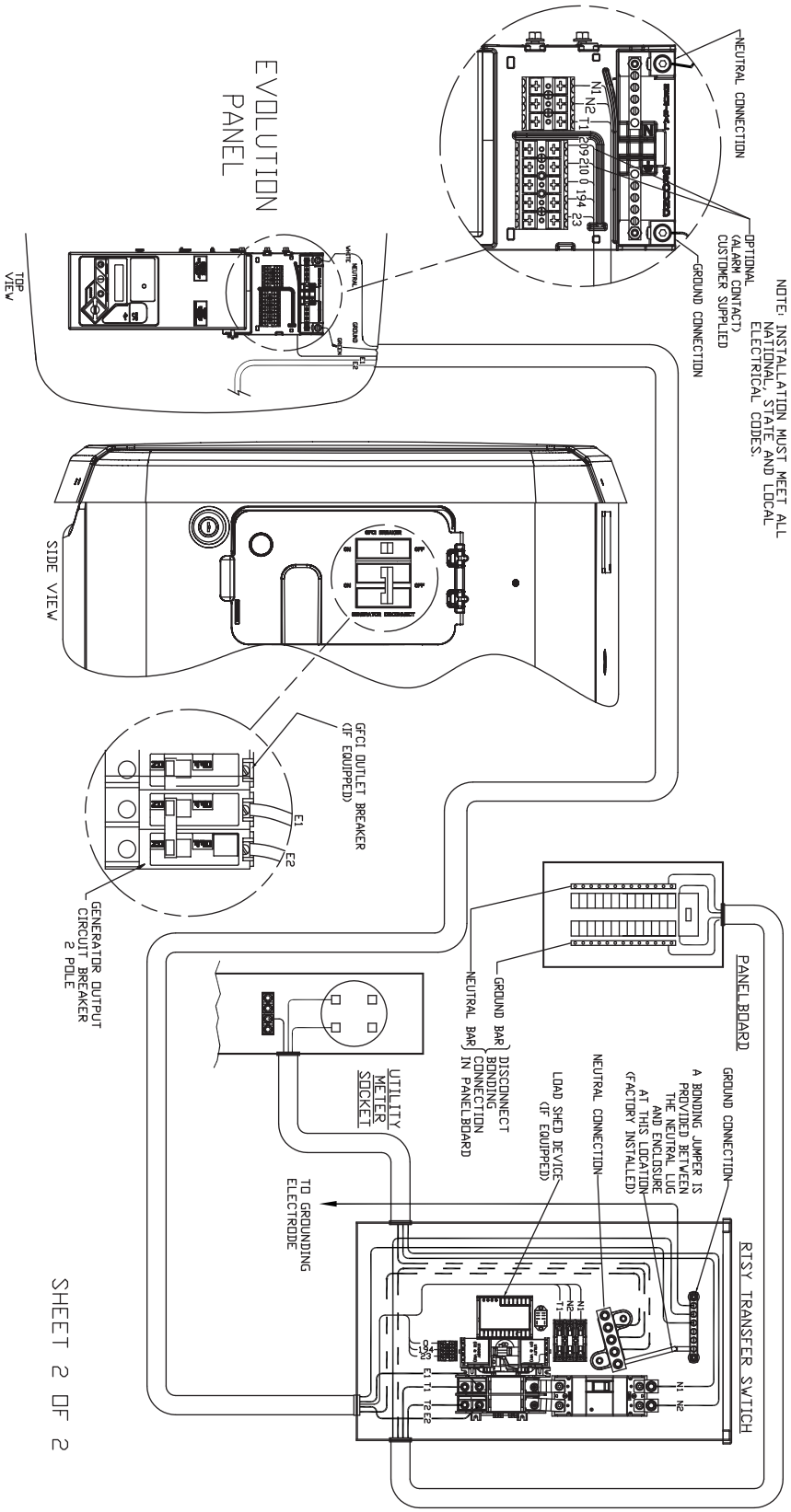
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Section 11: Diagrams

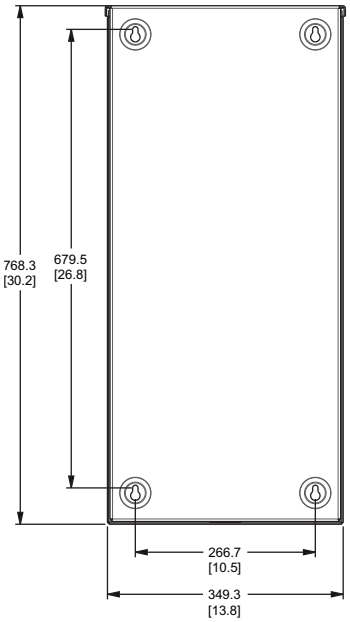
Interconnection Diagram (0K2516-C 1 of 2)



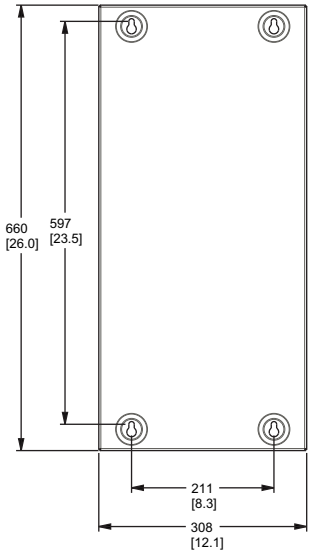
Interconnection Diagram (0K2516-C 2 of 2)



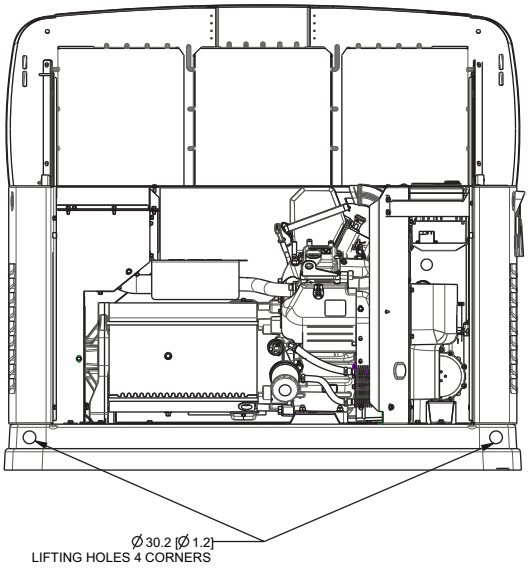
Drawing (0K7803-D 1 of 2)



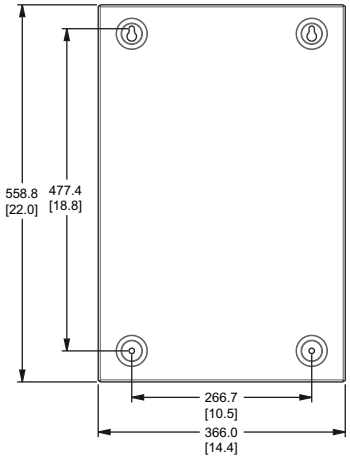
SERVICE ENTRANCE
TRANSFER SWITCH
(IF SUPPLIED)

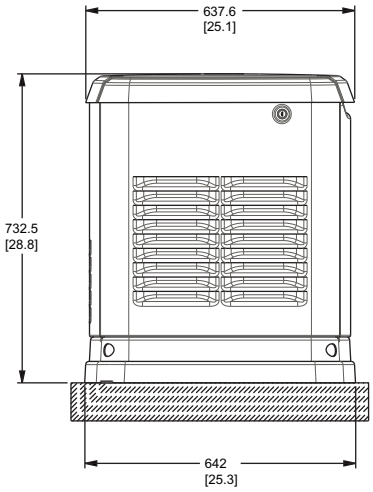


PRE-WIRED TRANSFER SWITCH
(IF SUPPLIED)

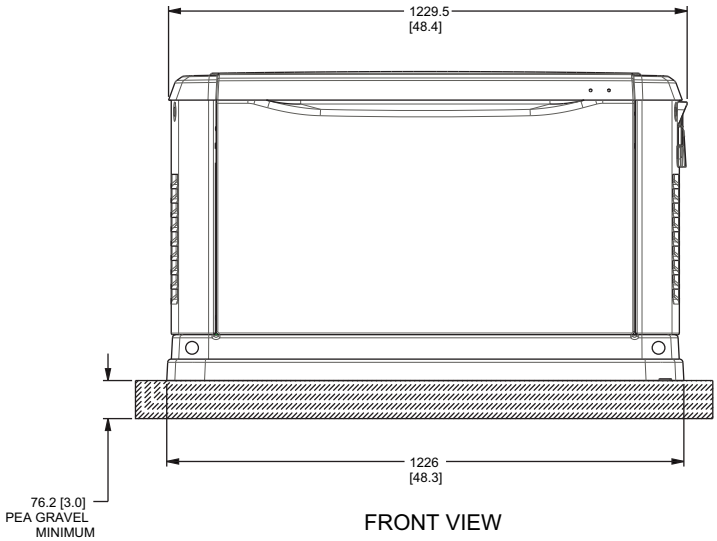


"DO NOT LIFT BY ROOF"



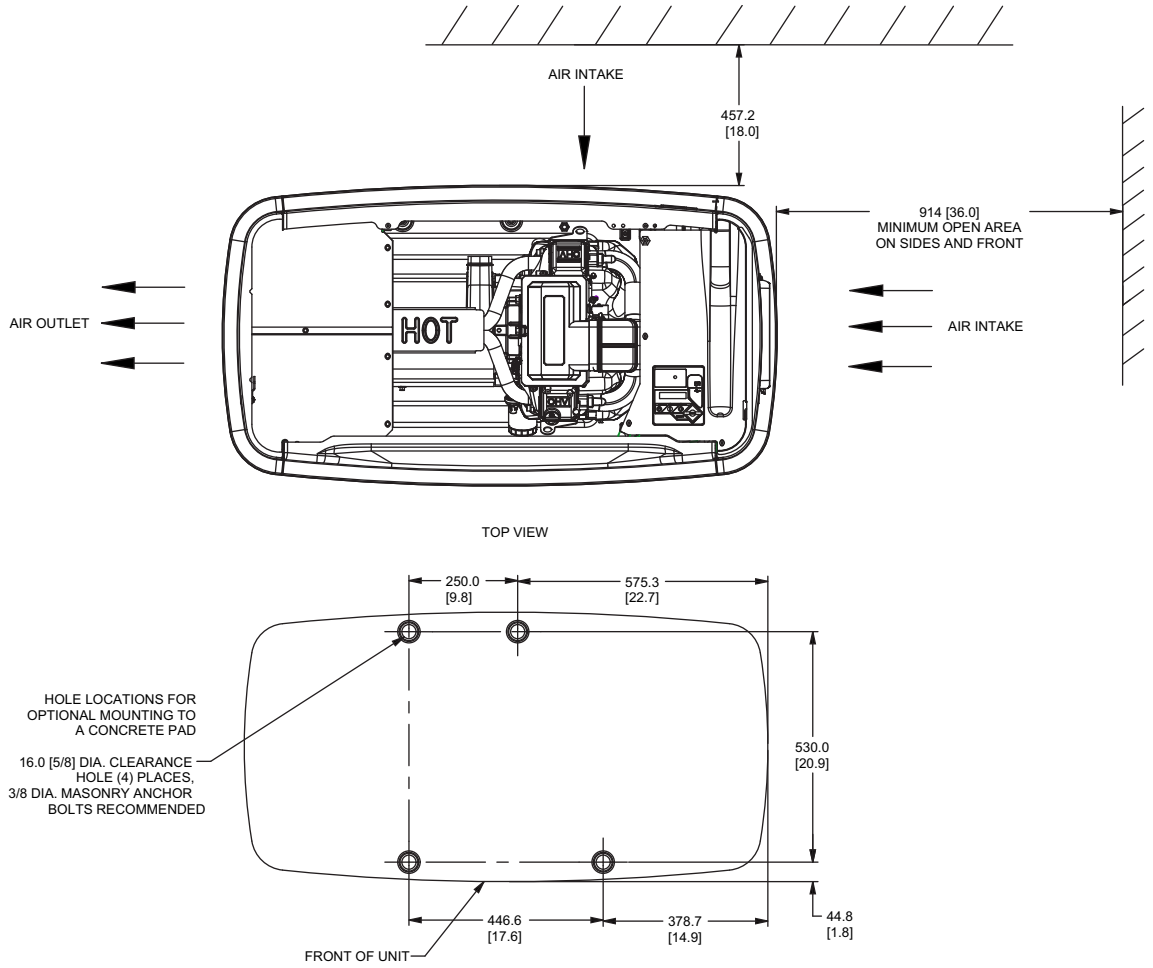


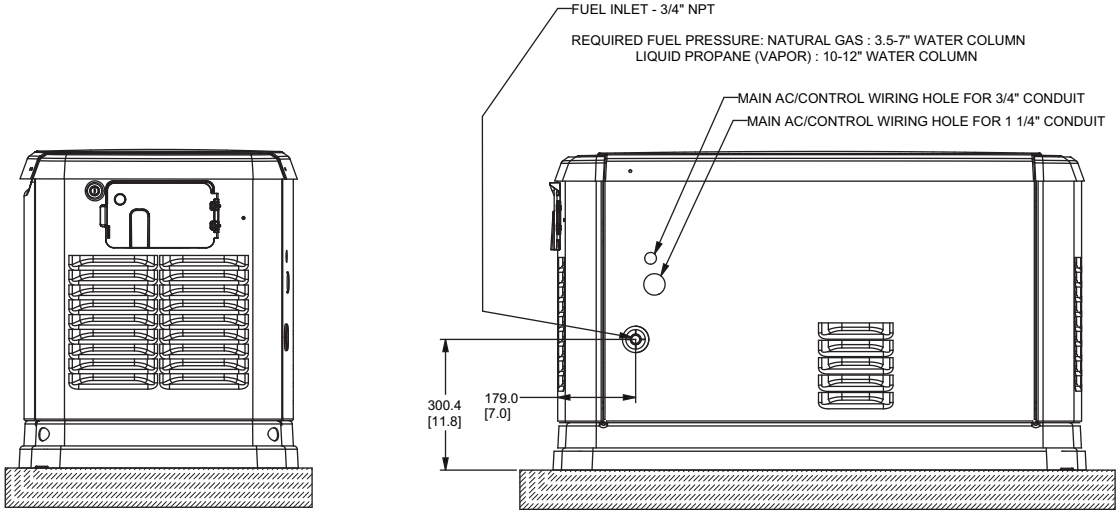
LEFT SIDE VIEW



FRONT VIEW

Installation Drawing (0K7803-D 2 of 2)





RIGHT SIDE VIEW

REAR VIEW

**ALL DIMENSIONS IN:
MILLIMETERS [INCHES]

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