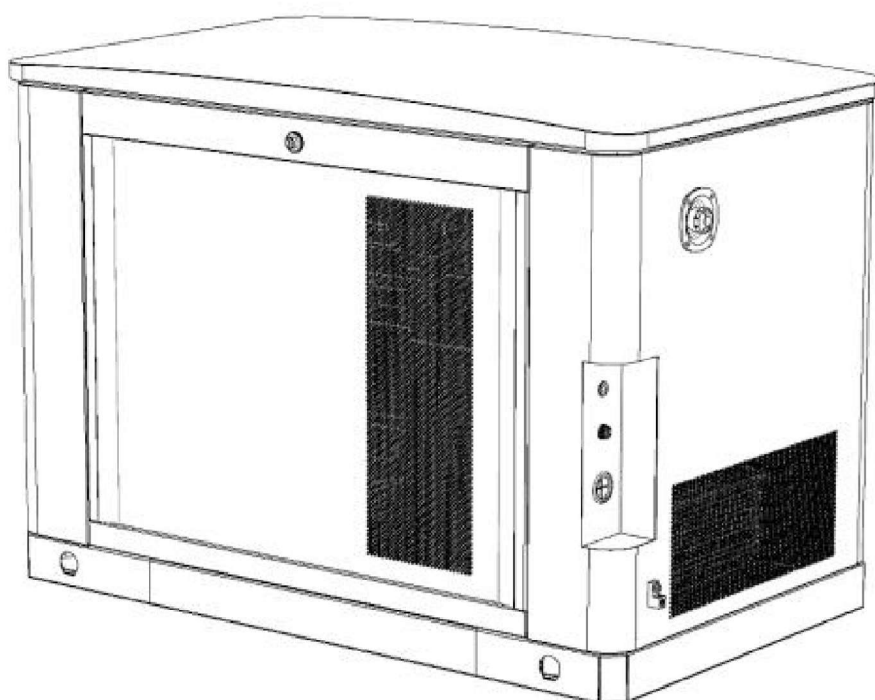




Generator for Standby and Non-Emergency Use Installation and Operation Manual



60 Hz Air-Cooled Generators

Models: HDS20RCA



WARNING

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

(NFPA110)

SAVE THIS MANUAL FOR FUTURE REFERENCE

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Safety Alert Symbols and Signal Words

The manufacturer cannot anticipate every possible hazard. The safety symbols and signal words used in this manual identify potential hazards that may result in personal injury. The safety symbols and signal words used in this manual identify potential hazards that may result in personal injury.

DANGER indicates a hazard that, if not avoided, will result in death or serious injury.

WARNING Indicates a hazard that, if not avoided, could result in death or serious injury.

CAUTION Indicates a hazard that, if not avoided, could result in minor or moderate injury.

NOTICE Indicates important information unrelated to hazards.

Safety Information

WARNING

This product can expose you to chemicals including used engine oil, which is known to the State of California to cause cancer, and

carbon monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information, visit www.P65Warnings.ca.gov.

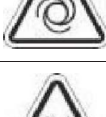
WARNING

This product contains lead and lead compounds, which are known to the State of California to cause birth defects or other reproductive harm. Wash hands after handling this product. For more information, visit:
www.P65Warnings.ca.gov.

Important Safety Instructions

SAVE THESE INSTRUCTIONS

This manual contains important instructions that must be read, understood and followed during the installation and operation of the generator and any accessories.

Symbol	Meaning
	Safety alert symbol shows a potential personal injury hazard.
	Read Manual. Failure to follow instructions may result in death or serious injury.
	Explosion
	Electric Shock
	Auto-start
	Fire
	Chemical Burn
	Toxic Fumes
	Eye Protection Required
	Hot Surface
	Rotating Parts

Caution: Improper handling of the generator may damage the equipment and shorten service life.

- Use the generator only for its intended purpose. Please refer to the 'Product Use' section of this manual.
- If you have questions about the intended use, please contact your authorized dealer.
- The generator should only be operated on a level surface.
- Ensuring adequate, unobstructed cooling and ventilation airflow is crucial for the proper operation of the generator.
- The access panel/door must be installed whenever the unit is running.
- DO NOT expose the generator to excessive moisture, dust, dirt, or corrosive vapors.
- Always remain alert when using this equipment. Never work on the equipment when physically or mentally fatigued.
- DO NOT insert any objects through the cooling slots.
- DO NOT use the generator or any of its components as a step. Doing so may damage the unit and create hazardous conditions such as: exhaust gas leakage, fuel leakage, and engine oil leakage, etc.
- Shut down the generator immediately if any of the following occurs:
 - Loss of power output.
 - sparks, smoke, or emits flames.
 - Excessive vibration or abnormal noise from the generator set.

General Information

Thank you for purchasing this compact, high-performance, air-cooled, engine-driven generator. This unit is factory-installed in an all-weather metal enclosure, specifically designed for outdoor installation. This generator will operate on liquid propane (LP) or natural gas (NG).

Note: This generator is suitable for supplying typical residential loads such as induction motors (sewage pumps, refrigerators, air conditioners, furnaces, etc.), electronic devices (computers, monitors, televisions, etc.), lighting loads, and microwaves. Proper sizing is required for optimal performance.

The Installation and Operation Manual contains the information necessary for the correct installation, operation, and maintenance of the generator. The information in this manual applies only to products manufactured at the time of publication. The manufacturer reserves the right to make technical updates, changes, or otherwise improve the product and this document at anytime without prior notice.

This manual is provided to any individual who will use this machine and guides them on how to correctly start, operate, and stop the machine in emergency situations.

Thank you

Thank you for purchasing this high-quality generator. When operated and maintained in accordance with the instructions in this manual, this generator will provide years of reliable service. This manual contains safety information to make you aware of the hazards and risks associated with backup generators and how to avoid them.

Save these instructions. This manual contains important instructions that must be followed by users during the installation, operation, and maintenance of the generator and battery.

For Future Reference

Record the following information and retain it with your purchase receipt. This information will be required when contacting your installer or authorized dealer for service or repairs.

Date of Purchase : _____

Dealer/Retailer : Dealer's/Retailer's Phone Number: _____

GENERATOR :

Model Number: _____

Model Revision : _____

Serial Number : _____

ENGINE:

Model Number: _____

Serial Number : _____

Equipment description and product use

- Standby generator models and non-emergency generator models are EPA certified for optional standby applications. Non-emergency generator models are suitable for non-emergency demand response use and optional standby applications. Optional standby provides an alternate source of electric power such as heating, cooling systems, and communication systems.
- If operation is interrupted during a power outage, it may result in user discomfort or inconvenience. Non-emergency generators used for demand response serve as energy resources relied upon by utility companies or cooperative suppliers during peak demand periods, and may also be dispatched during times of grid capacity constraints..

Note: Generator models do not comply with emergency standby or legally required standby systems as defined by NFPA 70 (NEC).

- The emergency generator system is used to automatically provide lighting, power, or both to designated areas and equipment in the event of a normal power supply failure. The emergency system can also supply power for functions essential to life support, such as ventilation, where an interruption in the normal power supply would pose a serious life safety or health hazard.
- Legally required backup generator systems are designed to automatically provide backup power for systems that could create hazards or interfere with rescue or firefighting operations if power is lost.

Installer Responsibility

- Read and comply with the safety, installation, and operation instructions in this installation and operation manual.
- Only install transfer switches approved by a Nationally Recognized Testing Laboratory (NRTL) that are compatible with the generator.
- Ensure installation comply with all applicable specifications, industry standards, laws, and regulations.
- Provide sufficient clearance on all sides of the generator for maintenance and service.
- Review the placement of the generator with the owner.
- ???Discuss carbon monoxide (CO) and smoke detectors with the owner. The owner is responsible for the indoor installation and maintenance of carbon monoxide and smoke detectors according to the manufacturer's instructions and recommendations.
- Ensure that ALL manuals are provided to the owner after completion of the installation.

User Responsibility

- Read and follow all instructions in this installation and operation manual.
- Follow the regular maintenance schedule and use the generator as specified in this manual.
- Carbon monoxide detectors must be installed and maintained indoors according to the manufacturer's instructions and recommendations. Smoke alarms do NOT detect carbon monoxide gas.
- Smoke detector(s) must be installed and maintained indoors according to the manufacturer's instructions and recommendations. Carbon monoxide alarms do NOT detect smoke.

Carbon Monoxide (CO) Detector

Note: Installing a functional CO alarm indoors is the only way to detect CO gas. Ordinary smoke alarms do not detect CO gas, nor do they alert residents to its presence.

- A (CO) detector is an electronic device that monitors CO level. When hazardous levels are detected, the detector alerts the user by sounding an alarm and activates a flashing warning indicator.
- According to the law, many states require homes to be equipped with effective (CO) detectors. Installers must discuss (CO) detectors with homeowners.
- (CO) detectors must be installed and maintained indoors according to the manufacturer's instructions and recommendations. Smoke alarms do not detect CO gas.
- For any related requirements regarding the use of (CO) detectors, please contact the local building inspection department. For more detailed information, please refer to the National Fire Alarm and Signaling Code (NFPA) 72 and the additional details in Section R315 of the International Residential Code (ICC).

Installation Factors to consider

The illustrations shown in this manual depict typical circumstances. They are intended to familiarize you with the installation options available for the generator.

Always consider installation factors such as federal and local regulations, appearance, noise levels, fuel type, and distance. As the distance from existing electrical service and gas fuel supply increases, and as the number of bends in the fuel supply increase, installers must compensate by proper conductor sizing and proper fuel pipe sizing. These adjustments are necessary to comply with applicable codes and to compensate for voltage drop and gas pressure loss.

Delivery Inspection

- Avoid damage caused by dropping, or impact during handling.
- Remove the carton and carefully inspect the generator for any possible damage during transportation.
- If any damage is observed at the time of delivery, the owner must notify the carrier and request that the loss or damage be documented on the freight bill.
- The carrier must sign the memorandum of loss or damage. If any loss or damage is discovered after delivery, the owner must separate the damaged items and contact the carrier to file a claim. Lost or damaged parts are not covered by warranty.

Installation

Only currently licensed electrical professionals are qualified to perform system installations. Installations must comply with all relevant specifications, industry standards, and regulations. Failure to meet these requirements will void the warranty.

Generator Placement

Before installing the generator, consult with the owner and communicate the following requirements. These requirements must be met before the installation is completed.

Before installation, review all placement requirements with the owner. Two critical safety concerns must always be addressed: Carbon monoxide (CO) exposure and fire hazards. Note the following: All general location guidelines provided in this manual must be followed prior to completion of the installation.



Engine exhaust contains carbon monoxide (CO), a colorless, odorless, and deadly gas that can cause death within minutes. You cannot see, smell, or taste CO.

- When using this product, ensure that it is in an outdoor environment where lethal exhaust gases will not accumulate.
- Exhaust gases should be directed away from any windows, doors, vents, soffit vents, crawl spaces, open garage doors, or other openings that could allow exhaust gases to enter or be drawn into potentially occupied buildings or structures.
- The carbon monoxide detector must be installed and maintained indoors according to the manufacturer's instructions/recommendations. Smoke alarms do not detect carbon monoxide gas.

If you experience nausea, dizziness, or weakness, or if a carbon monoxide alarm activates while this product is in use, move to fresh air immediately and call emergency services. You may be experiencing carbon monoxide poisoning.

Do NOT operate this product indoors, including in homes, garages, basements, crawl spaces, sheds, or any partially enclosed areas—even if using fans or opening doors and windows for ventilation. Carbon monoxide can rapidly accumulate in these areas and may remain present for hours, even after the product has been turned off.

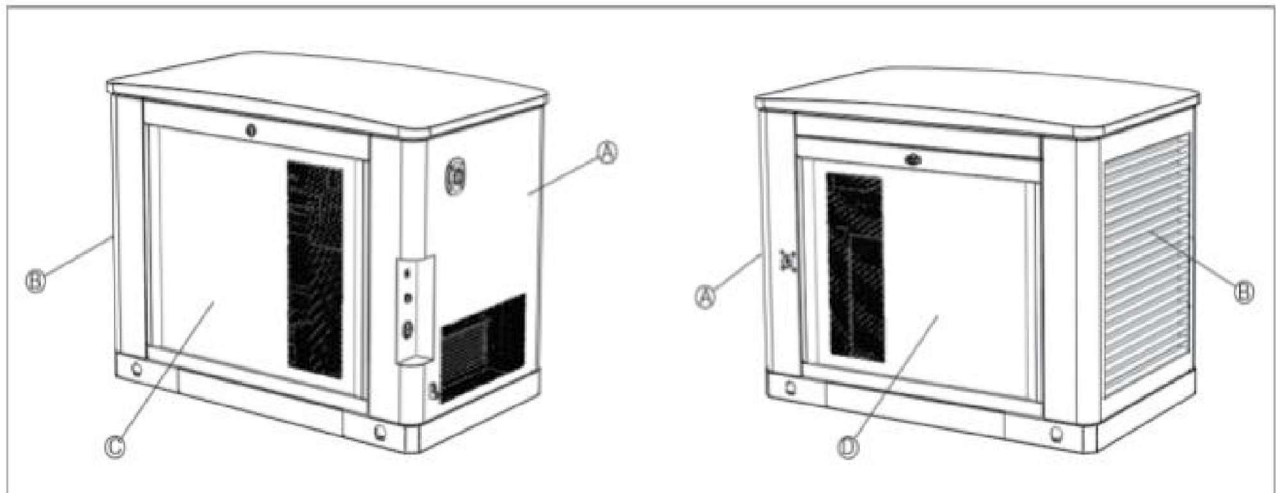


Figure 1

- (A) Right-side enclosure air intake.
- (B) Enclosure exhaust outlet.
- (C) Front of enclosure.
- (D) Rear of enclosure.

Generator Location Considerations

The installation location of the generator directly affects:

1. The amount and size of plumbing required to supply fuel to the generator.
2. The amount and size of wiring required to control and connect the generator.
3. The safety of the installation concerning exhaust gas and carbon monoxide hazards, fire risks, proximity to other utilities, and exposure to weather factors.

The **Generator Placement** section provides specific location guidelines. The owner and installers must coordinate to determine: installation feasibility, compliance with applicable codes and standards, and impact on installation cost.

Potential carbon monoxide entry points

Operation Guide:

Caution: This product must be operated outdoors only in an area where exhaust gases cannot accumulate.

Never operate this product inside a home, garage, basement, crawl space, shed, under a deck, or in any partially enclosed area, and be aware that using fans and opening doors in these areas may not provide adequate ventilation. Carbon monoxide can quickly accumulate in these restricted areas and remain present in the air for hours after the product is turned off.

Installation Guide:

- When placing the generator, follow all instructions and illustrations in this manual.
- Always direct the generator's exhaust port away from occupied areas.
- During installation, never expose your neighbor's home to the engine exhaust emitted by the backup generator.
- Do not place the generator in anywhere leaves or debris may accumulate.
- Generator exhaust can enter through windows, doors, and other openings in buildings. Be aware that exhaust gas and carbon monoxide can seep into structures through small openings or cracks.

Federal and International Standards

Generator installation must strictly comply with ICC , IFGC, NFPA 37, NFPA 54, NFPA 58, and NFPA 70 standards.

National Fire Protection Association (NFPA) 37: This standard pertains to the installation and use of stationary internal combustion engines. Its requirements describe maintaining a specific distance between enclosed generators and structures or walls. The standard also requires providing sufficient space for positioning the generator to perform maintenance and repair tasks as well as maneuvering space for emergency personnel.

NFPA 37, Section 4.1.4, Outdoor Engines: This requirement stipulates that engines installed outdoors and their weatherproof enclosures (if provided) must maintain a distance of at least 5 feet (1.52 m) from wall openings and at least 5 feet (1.52 m) from structures with combustible walls. The standard does not require minimum separation if any of the following conditions exist:

1. The structure's adjacent wall has a fire-resistance rating of at least one hour.
2. If a fire test involving the consumption of available combustibles within the engine or its weatherproof enclosure (if provided) indicates that a fire originating from the engine or its weatherproof enclosure will not ignite combustible structures.

Appendix A—Explanatory Material

A4.1.4 (2): This requirement implies that demonstrating compliance involves conducting comprehensive fire tests or following the calculation procedures in Chapter 10 of NFPA 555.

The conclusion of this requirement is that Exception (2) is beneficial for many residential and commercial installations due to the limited

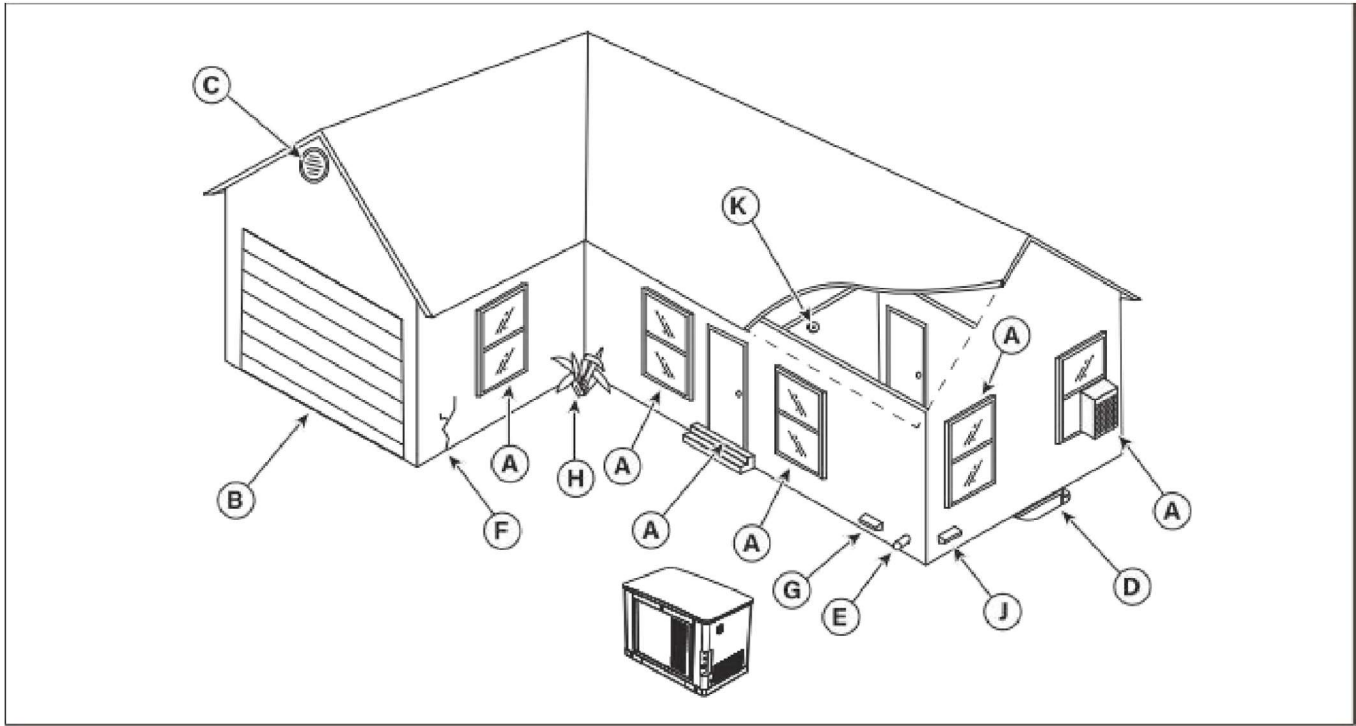
space available for installing the device. The manufacturer has contracted with an independent testing laboratory to conduct comprehensive fire testing.

The ultimate goal of the fire testing is to assess the absolute worst-case fire scenario within the generator and determine the ignition risk to items outside the engine enclosure within a specific distance. Please note that the enclosure is made of non-combustible materials. Results from independent laboratory tests indicate that a fire within the generator enclosure will not pose a combustible risk to nearby combustible materials or structures for at least one hour.

Based on the results of these comprehensive tests and the requirements of NFPA 37 Section 4.1.4, the previously mentioned generator installation guideline has been changed to 18 inches (45.7 centimeters) from the back of the generator to a fixed wall or building. For more information, please refer to the 'Distance Requirements' section in this manual.

Protective Structure

Inspect the structure to ensure that sealing and caulking are sufficient to prevent air leakage or outflow. Check for gaps, cracks, or openings around windows, doors, arches, pipelines, and vents in the structure, as these areas may allow exhaust gas and carbon monoxide (CO) to enter the structure.



Figure

2 The table below includes examples of potential entry points for CO gass.

Location	Entry point	Explanation
A	Doors and windows	Openings that are part of the structure can allow fresh air and carbon monoxide to enter the structure, especially when open.
B	Garage Door	An open or improperly sealed garage door can allow carbon monoxide to flow into the garage.
C	Attic Vent	Generator exhaust can enter through attic vents and soffits, crawl spaces, ridge, or roof vents.
D	Basement Window	Basement windows or hatches allow ventilation in and out of the lower structure and also allow carbon monoxide gas to enter the structure.
E	Furnace Intake or Exhaust Vent	Intake ports and furnace exhaust pipes are common entry points for carbon monoxide gas.
F	Wall Cracks	Any cracks in the structure's walls, including the foundation and mortar, as well as any gaps around windows, doors, and pipes, can allow carbon monoxide to enter.
G	Dryer Vent	Sometimes the dryer's exhaust port can allow carbon monoxide gas to enter the structure.
H	Airflow Restriction	Areas characterized by structural corners and dense vegetation restrict airflow and collect exhaust gases.
J	Makeup Air System	Note: Maintain a distance of 10 feet (3 m) between all mechanical and gravity outdoor intake ports of the HVAC supply system and the generator enclosure. For detailed requirements, refer to Section 401 of the ICC Mechanical Code.
K	Carbon Monoxide Detector(s)	Note: Installing a properly functioning carbon monoxide alarm indoors is the only way to identify carbon monoxide gas. Ordinary smoke alarms do not detect carbon monoxide gas and will not alert residents to its presence.

Reduce The Risk of Fire



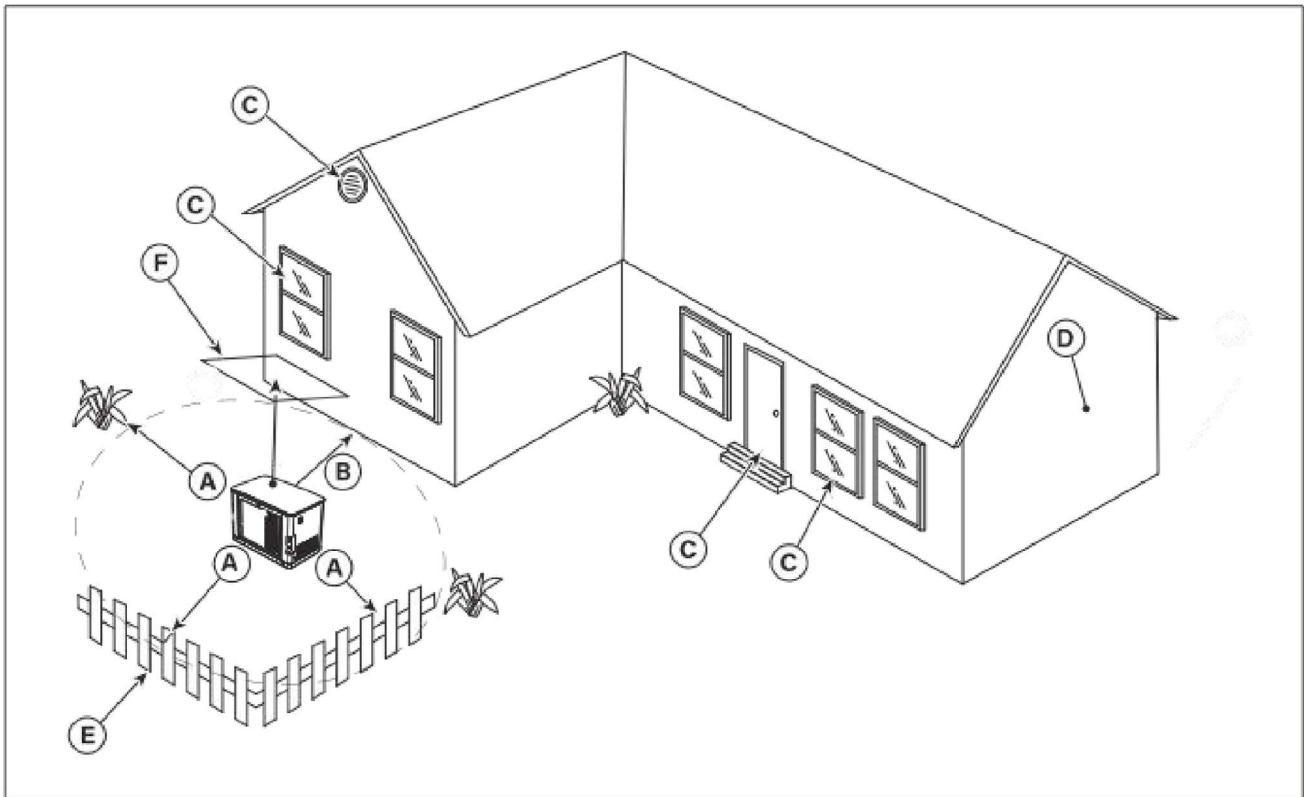
Exhaust heat/gas may ignite combustible materials, causing fire, leading to death or serious injury.

- Remove all combustible materials from inside and around the generator compartment.

To prevent fire, the generator must be installed at a safe distance from all combustible materials. The engine, alternator, and exhaust system components of the generator set become extremely hot during operation. Reduce the likelihood of fire by keeping the generator set well-ventilated, properly maintained, free of fuel leaks, and away from combustible materials. In addition, flammable debris may accumulate inside or outside the generator enclosure and could ignite, causing a fire.

Distance Requirements

The user must maintain a minimum clearance around the generator enclosure. These clearances are primarily for fire prevention, but they also ensure there is enough space for maintenance tasks, such as removing the front, rear, exhaust port side, and intake port side panels of the equipment.



Figure

3 The table below explains the correct distances required for installation.

Location	Item	Explanation
A	Front and End Clearance	Maintain a minimum clearance of 3 feet (.91 m) from the front end of the generator. Keep shrubs, bushes, plants, and trees at the same minimum distance from the equipment, and never use vegetation to conceal the equipment.
B	Rear Clearance	Maintain a minimum of 18 in (45.7 cm) unless otherwise required by local codes. This area is used for fuel and electrical connections.
C	Windows, Vents, and Openings	Install the generator at least 5 feet (1.52 m) away from all windows, doors, vents, window wells, or wall openings. Refer to the 'Protective Structures' section in this manual.
D	Existing Walls	Maintain at least 18 inches (45.7 cm) of distance between the generator and existing walls.

Location	Item	Explanation
E	Removable Enclosure	Maintain at least 3 feet (.91 m) of distance between the removable enclosure and the front of the generator. Movable enclosures include visual environments, enclosure panels, and temporary barriers without footholds.
F	Rack clearance	Maintain a minimum clearance of 5 feet (1.52 meters) from all structures, overhangs, wall projections, or trees.
G	Maintenance and Servicing (not shown)	Allow sufficient space for routine maintenance, such as repairing the engine and replacing the battery. Never use shrubs, bushes, trees, or plants to conceal the generator.

Other General Location Guidelines

- Place the standby generator in a prepared location that should be flat and has drainage provisions.
- Install the standby generator in a location where the sewage pump discharge, rain gutter downspout, roof runoff, landscape irrigation, or sprinkler will not flood the equipment or spray the enclosure and enter any intake or exhaust ports.
- Install the standby generator in a location that will not affect or obstruct any services (including covered, concealed, and underground), such as telephone, electricity, fuel (natural gas/liquefied petroleum gas vapor), irrigation, air conditioning, cable, septic tank, sewer, well, etc.
- Install the standby generator in a location where leaves, grass, snow, etc., will not block the intake and exhaust ports. If prevailing winds cause blowing or drifting, you may need to install a wind barrier to protect the equipment.

Lift the Generator



Dangerous Voltage - Contact with power lines may result in electric shock or burns, leading to death or serious injury.

- Do not contact any power lines if using lifting or hoisting equipment.
- Do not lift or move the generator without proper assistance.

Proper tools, equipment, and qualified personnel must be used at all stages of handling and moving the generator. The approximate weight of the generator is listed in the 'Generator Specifications' section.

Use the lifting holes (A, Figure 4) on the generator base to lift the generator onto the concrete slab or pad. Lift the generator according to the Occupational Safety and Health Administration (OSHA) or local lifting regulations.

Use the included touch-up paint to repair chipped paint.

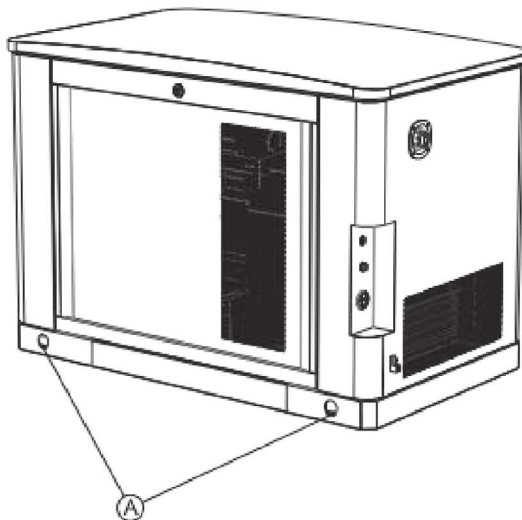


Figure 4

Electrical and Fuel Inlet Locations

The 3/4 inch (19mm) N.P.T. fuel inlet connector (A) and electrical inlet location (B) are shown in Figure 6.

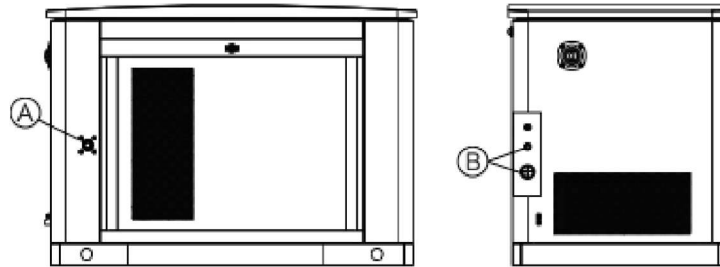


Figure 5

Access Panel

The generator enclosure has multiple access panels. Access panels and the components located behind them are referenced in the lists and images below (Figure 6):

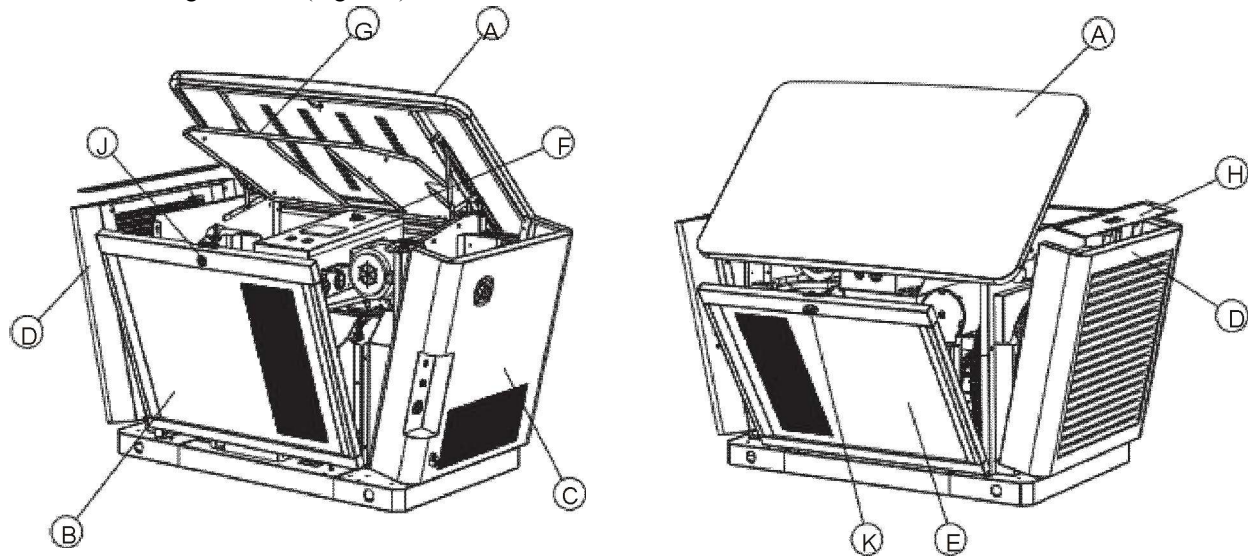


Figure 6

- (A) Top Cover Plate
- (B) Front Mesh Panel
- (C) Right Side Mesh Panel
- (D) Left Side Mesh Panel

- (E) Rear Mesh Panel
- (F) Control Box Panel
- (G) Inner Cover Plate
- (H) Muffler Cover

Open the top cover plate (A, Figure 6):

1. Insert the key into the lock (J) on the front mesh panel (B). Press and turn the key to unlock it, then lift the top cover plate (A).
2. Raise the top cover plate (A) to the open position. Ensure that the top cover plate (A) is in the open position during any panel removal or installation.

Remove the front mesh panel (B):

1. Loosen the two retaining nuts securing the front mesh panel (B) to the generator set.
2. Lift and remove the front mesh panel (B) from the generator set.

Install the front mesh panel (B):

1. Position the front mesh panel (B) into the generator set, aligning the two positioning pins at the bottom of the front mesh panel (B) with the slots on the chassis.
2. Tighten the two retaining nuts to secure the front mesh panel (B) to the generator set.

Remove the rear mesh panel (E):

1. Insert the key into the lock (K) of the rear mesh panel (E), and turn the key to unlock it.
2. Lift and remove the rear mesh panel (E) from the generator set.

Install the rear mesh panel (E):

1. Place the rear mesh panel (E) into the generator set, then align the two positioning pins at the bottom of the rear mesh panel (E) with the slots on the chassis.
2. Rotate the lock (K) handle to secure the rear mesh panel (E) to the generator set.

Remove the left side mesh panel (D):

1. Loosen the four securing fasteners that attach the muffler cover (H) to the left side mesh panel (D), then remove the muffler cover (H).
2. Loosen the eight securing fasteners that attach the left side mesh panel (D) to the equipment.
3. Lift the left side mesh panel (D) and remove it from the generator set.

Install Left Mesh Panel (D):

1. Place the left side mesh panel (D) into the generator set, aligning the mounting holes of the left side mesh panel (D) with the installation holes on the chassis.
2. Tighten the 8 securing fasteners that fix the left side mesh panel (D) to the generator set.
3. Place the muffler cover (H) onto the left side mesh panel (D) and tighten the 4 securing fasteners that fix the muffler cover (H) to the left side mesh panel (D).

Remove the right side mesh panel (C):

1. Loosen the 12 securing fasteners securing the right side mesh panel (C) to the generator set, and remove the emergency stop switch clip, ATS connector, and status indicator light.
2. Gently lift the right side mesh panel (C) and move it to clear the gas inlet position connector, then remove it from the generator set.

Install the right side mesh panel (C):

1. Place the right side mesh panel (C) into the generator set, then align the fixing holes of the right side mesh panel (C) with the mounting holes on the chassis.
2. Tighten the 12 securing fasteners that secure the right side mesh panel (C) to the generator set.
3. Then connect the emergency stop switch, ATS connector, and generator set operation indicator light.

Remove the control box panel (F):

1. Use a Phillips head screwdriver to loosen the four securing screws.
2. Lift and tilt the control box panel (F) upwards to access internal wiring.

Install the control box panel (F):

1. Place the control box panel (F) onto the control box and align the fixing holes.
2. Use a Phillips head screwdriver to tighten the four securing screws.

Fuel Installation Plan



Propane and natural gas are extremely flammable and explosive. Failure to follow these instructions may result in fire, explosion, serious injury, or death.

- Installation must be performed by a licensed professional.
- Install the fuel supply system in accordance with NFPA 37 and other applicable gas codes and regulations.
- Before putting the generator into use, the fuel system lines must be properly purged and leak tested.
- No leaks are allowed.
- Do not operate the generator if fuel odor is present.



Propane and natural gas are extremely flammable and explosive, which may cause burns, fire, or explosion, leading to death or serious injury.

- Do not operate the equipment if the fuel shut-off valve is missing or not functioning.



Propane and natural gas are extremely flammable and explosive, which may cause burns, fire, or explosion, leading to death or serious injury.

- Liquefied petroleum gas is heavier than air and accumulates in low areas.
- Natural gas is lighter than air and will accumulate in high areas.
- Even the slightest spark can ignite these fuels and cause an explosion.
- Do not use any open flames, sparks, heaters, or lit cigarettes.

Caution: Do not install the included flexible fuel line underground or in contact with the ground.

Keep the entire flexible fuel line visible for regular inspection. Do not conceal it or run it through any walls, floors, or partitions.

Never allow the line to contact these structures.

Caution: Do not bend the included flexible fuel line.

The following information pertains to the installation planning phase for technicians specializing in gas fuel systems. Always comply with local applicable gas codes and regulations

affecting the installation site. If you have any questions or concerns, consult your local fuel supplier or authority having jurisdiction(AHJ).

To the installer: Review installation requirements with the owner prior to installation.

The following general rules apply to the piping of gas fuel systems:

- Piping materials must comply with federal and local regulations, with rigid installation and vibration protection.
- Protect the piping from physical damage, especially where it passes through flower beds and shrub beds, as well as other cultivated areas where damage may occur.
- Install the provided flexible fuel line (B, Fig. 8) between the generator fuel inlet (A) and the rigid piping to prevent excessive stress on the piping materials due to thermal expansion and contraction.
- Provide a joint (C) or flange connection downstream for future service removal.
- Install a manometer test port (D) for vapor fuel.

Use the port to install a manometer and check if the engine is receiving adequate fuel pressure to operate. Refer to the service center for digital or analog manometer designed specifically for vapor fuel. After completing the initial test run, remove the manometer and seal the port.

- For vapor fuel only: Protect pipelines from freezing in areas prone to hydrate formation or icing. When terminating hard piping, use a sediment collector (E) where condensate is less likely to freeze.
- Install at least one accessible, approved manual shut-off valve (F) in the fuel supply line at a distance of 6 feet (1.8 m) from the generator.

- Install the manual shut-off valve inside the building.
- Enhance the strength and flexibility of pipeline supports and connections in areas prone to earthquakes, tornadoes, flood disasters, and unstable ground.
- Ensure that the pipeline size is sufficient to maintain the required supply pressure and volume flow under different generator load conditions, and to operate all gas appliances connected to the fuel system.
- Use an approved gas-rated thread sealant or joint compound for natural gas/liquefied petroleum on all threaded joints to reduce the possibility of leaks.

Note: Keep thread sealant away from gas pipelines to prevent component damage.

- Purge and leak test the pipeline according to applicable codes and regulation.

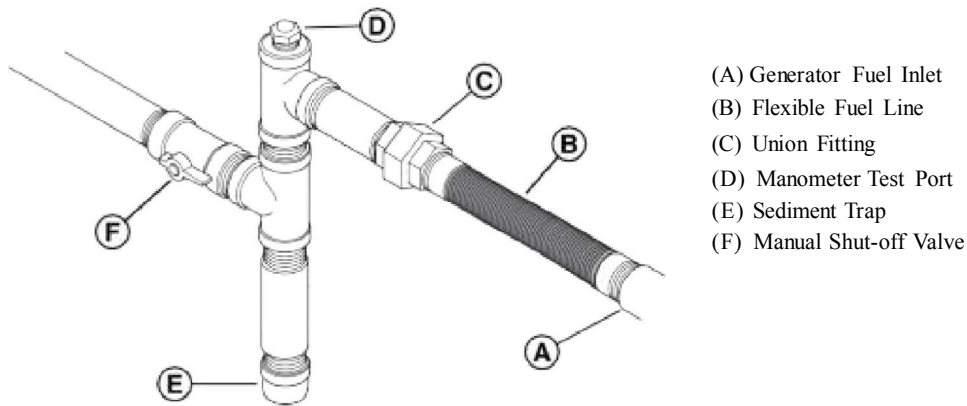


Figure 7

Fuel Consumption

The estimated fuel supply requirements for liquefied petroleum vapor (propane) and natural gas (NG) at half load and full load are shown in the table below:

		Natural Gas (NG) 18kW	Liquefied Petroleum Vapor Fuel (Propane) 20kW
Full Load	ft ³ /hr (m ³ /hr)	271 (7.67)	120 (3.4)
	Gal/hr (L/hr)	N/A	3.3 (12.6)
	BTU/hr (MJ/hr)	271000 (286)	300000 (317)
1/2 Load	ft ³ /hr (m ³ /hr)	207 (5.86)	82 (2.32)
	Gal/hr (L/hr)	N/A	2.25 (8.6)
	BTU/hr (MJ/hr)	207000 (218)	205000 (216)

Physical Properties	Natural Gas	Propane (Liquefied Petroleum Gas)
Normal atmospheric condition	Gas	Gas
Boiling point °F (°C)	-259 (-167)	-44 (-42)
Heating value		
BTU/gal (MJ/L) Liquid (Net LHV*)	63,310 (17.65)	83,340 (23.23)
BTU/gal (MJ/L) Liquid (Total**)	N/A	91,547 (25.52)

BTU/ft ³ (MJ/m ³) Gas*	1,000 (37.26)	2,500 (93.15)
Density - lb/gal (m ³ /L)	57.75 (0.43)	36.39 (0.27)
Weight - lb/gal (kg/L)	2.65 (0.32)	4.24 (0.51)

* LHV (Lower Heating Value) is a more realistic rating.

** Total heating value does not account for the heat lost in the form of water during combustion.

Fuel Type

Consider the type of fuel used by the generator, as it will affect the entire installation process. The system is factory tested and adjusted to use natural gas, but it can be converted to use liquefied petroleum vapor. To achieve proper engine functionality, consider factors affecting each type of fuel, such as the location and duration of potential utility interruptions.

When selecting the type of fuel, adhere to the following guidelines:

- Using clean, dry fuel without moisture or any particulate material. Use of improper fuel may result in poor performance or equipment damage.
- In engines set to run on propane (liquefied petroleum), you must use commercial-grade HD-5 propane.
- Natural gas or liquefied petroleum gas generator are certified to operate on natural gas or liquid propane gas.

Fuel Pressure

Both liquefied Petroleum Gas (LP) and Natural Gas (NG) fuel

The pressure at the generator fuel inlet must reach the minimum value at full load when all gas equipment is turned on and running.

The pressure for Natural Gas (NG) must be 3.5 to 12 inches of water column (0.87 — 3kPa).

The pressure for Liquefied Petroleum Gas (LP) must be 6 to 14 inches of water column (1.5 — 3.5kPa).

Ensure that all shut-off valves in the gas pipeline are in the open position to provide adequate fuel pressure for automatic operation when needed.

Power Loss

The output power of the product is affected by factors such as fuel heat, ambient temperature, altitude, humidity, and engine condition. As altitude increases, air density decreases, resulting in reduced available engine power. At altitudes above 800 feet (250m), engine power decreases by

4.8% for every 1,000 feet (305 meters) increase; at ambient temperatures above 77 °F (25 °C), engine power decreases by 2% for every 10 °F (5.6 °C) increase.

If necessary, adjust the transfer switch of any generator located in high-altitude or power-reduction areas.

Gaseous Fuel System

The gas system provides treated dry gas fuel for various combustion equipment applications. The gas can come from a natural gas supply pipeline or from gases of various processes, or a combination of both. The gas system is designed to handle gas to meet the requirements of low-pressure equipment. It is very important to understand the types of gas systems in the oil and gas industry, safe operation, monitoring, control, and safety management requirements.

Fuel Pipe Sizing

The installation procedure must use NFPA 54 and 58 as resources for this topic. Installers must consider the specific gravity of the gas, compensate for the nominal limitation of elbows and fittings, and must comply with the guidance of federal, state and local regulations.

Fuel Conversion

The dual-fuel system allows for the conversion of natural gas to liquefied petroleum gas (and vice versa) on-site while maintaining compliance with emission standards. The fuel block has connections for both types of fuel, allowing the use of natural gas and liquefied petroleum gas. The fuel metering valve is factory-configured and sealed to provide optimal cold start and hot start conditions.

Follow the steps below to replace the fuel.

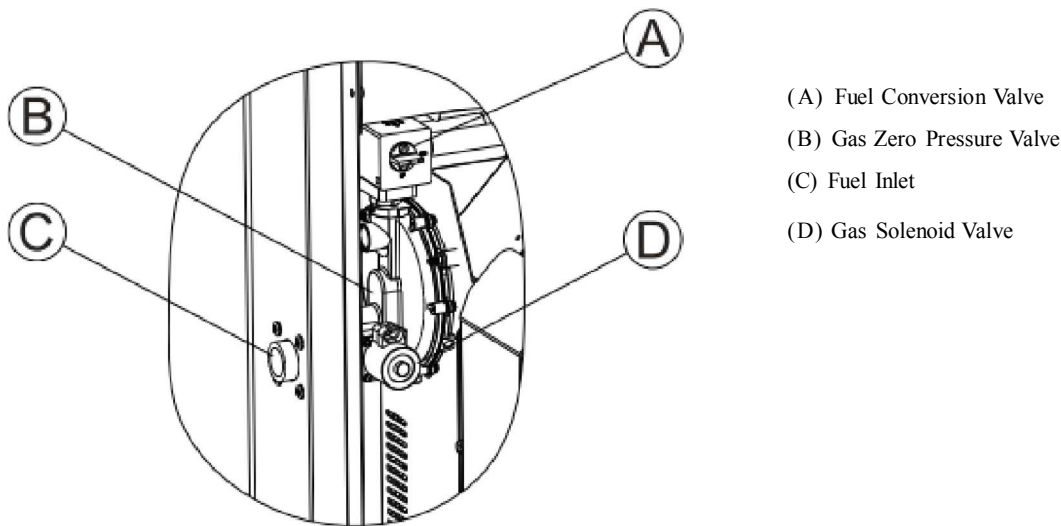


Figure 8

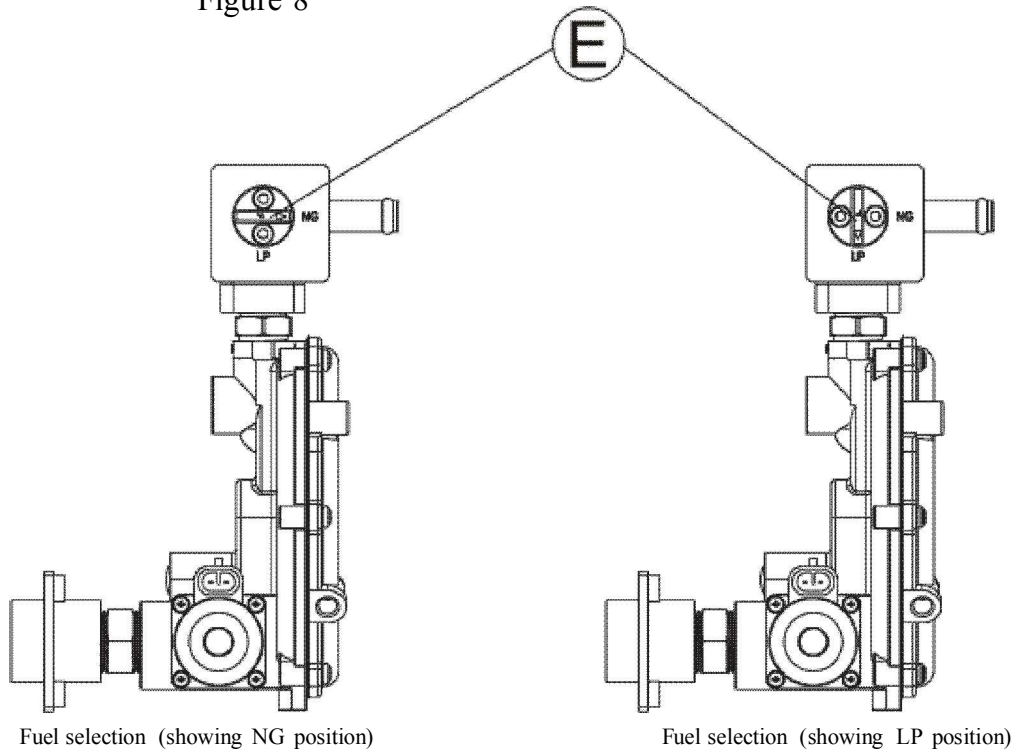


Figure 9

1. Remove the rear mesh panel on the intake side.
2. Locate the gas conversion valve (A, Figure 8) on top of the gas zero pressure valve (B).
3. Set Fuel Selector.
 - A. For NG, rotate the control handle (E, Figure 9) on the gas conversion valve (A) until the arrow on the control handle (E) aligns with the 'NG' mark on the gas conversion valve (A).
 - B. For LP, rotate the control handle (E, Figure 9) on the gas conversion valve (A) until the arrow on the control handle (E) aligns with the 'LP' mark on the gas conversion valve (A).

Electrical Connection



Generator and utility voltage may cause electric shock, burns, serious injury, or death.

- Installation must be performed by a licensed professional.
- Disconnect all power sources before installing or repairing equipment.
- Ensure the grounding system is connected before energizing.



Dangerous Voltage - Installing low and high voltage wires in the same conduit may cause electric shock, burns, serious injury or death.

- Do not lay low and high voltage wires in the same conduit unless all wiring insulation voltage ratings are 600 V. For more details, refer to NFPA 70.
- For power output connections (L1, L2, neutral (N), and ground), refer to the National Electrical Code (NEC) and local codes.

AC System Connection

The generator uses a two-phase three-wire AC connection system (Figure 10). The stator assembly consists of a pair of fixed windings, each with two leads.

The junction of leads 1 1 and 4 4 forms the neutral line, as shown in the schematic and wiring diagram.

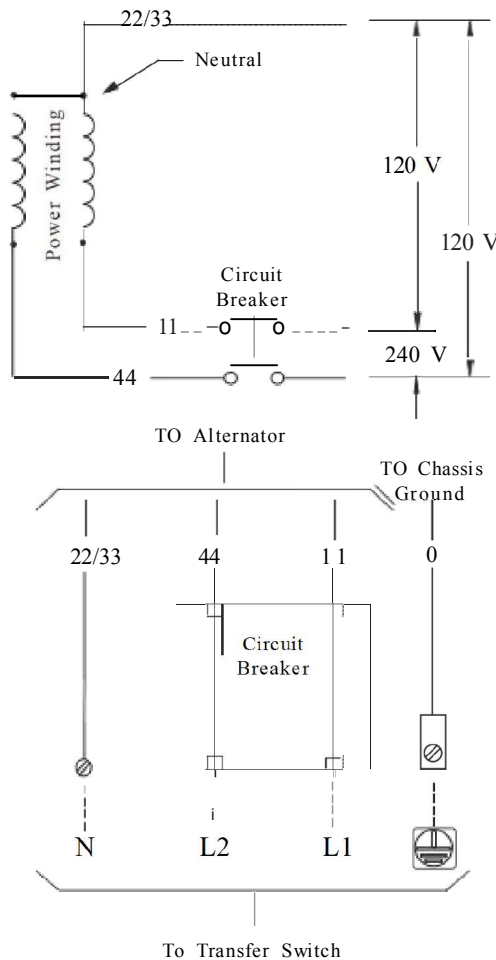


Figure 10

Note: The neutral line is not grounded at the generator.

Note: The generator must be used with a UL-certified transfer switch compatible with the generator.

Use the generator only with the listed transfer switches compatible with the unit.

Grounding the Generator

The generator does not need to be grounded at the generator enclosure unless required by local regulations.

The generator grounding must use a metal perforated lock washer (or equivalent). Any listed terminals must be installed according to the terminal supplier's instructions. All grounding and terminal installations must comply with the National Electrical Code and local requirements.

Engine Oil

Caution: Any attempt to start or crank the engine before properly adding the recommended oil will result in equipment failure.

- For information regarding oil, refer to the Maintenance section of this manual's Operation part.
- Damage to equipment resulting from failure to follow these instructions will void the engine and generator warranty.

The engine is not filled with oil when it leaves the factory. Before starting the engine, check the oil level as described in the 'Maintenance' section of this manual.

Using fully synthetic oil will not alter the required oil change intervals as described in the operation section of this manual.

Battery



The batteries release explosive hydrogen gas during charging. The slightest spark may ignite the hydrogen gas and cause an explosion, resulting in death or serious injury.

- DO NOT dispose the battery into fire. Recycle the battery properly.
- Keep the battery away from flames, sparks, heat, or lit cigarettes during and a few minutes after charging.



Battery electrolyte contains acid, which is highly corrosive. Contact with battery contents may cause severe chemical burns.

- Do not open or damage the battery.
- Wear safety goggles, a rubber apron, rubber boots, and rubber gloves.
- Immediately wash off any electrolyte on the skin with water.
- If the electrolyte comes into contact with the eyes, rinse immediately with water and seek medical attention.
- Spilled electrolyte should be rinsed with a neutralizing agent.

The installer must provide and install a rechargeable 12 V starting battery. The starting battery must meet the specifications shown in the table below.

Battery Specifications

Specifications	Standard	Cold Start (Less than 30 °F/-1°C)
Volts	12VDC	12VDC
Amps (Minimum)	450 CCA (Cold Cranking Amps)	640 CCA (Cold Cranking Amps)
Construction	Wet Lead Acid	Wet Lead Acid
Terminal Type	Top Post Type Battery	Top Post Type Battery
Dimensions (Maximum)	BCI Size 26R or BCI Size 51R	BCI Size 25 or BCI Size 35



After connecting the battery, the generator may start automatically without warning, potentially result in serious injury or death.

Do not connect the negative (-) cable on the battery until the installation is complete.

Please install the battery according to the instructions in the maintenance section of this manual. Ensure that the negative cable is connected last, and that the red positive terminal insulator is secure and reliable.

Use the battery clip and tie rod provided in the accessory kit to secure the battery to the generator set.

Generator controller

The generator control panel located inside the generator housing is shown in the figure (Figure 11). A brief description of the control devices used during installation is as follows:

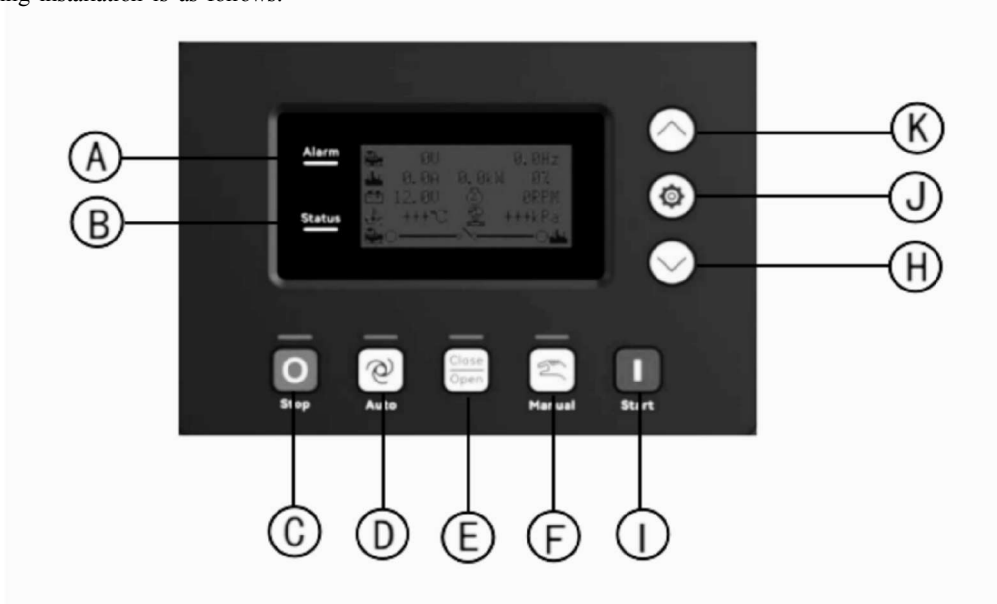


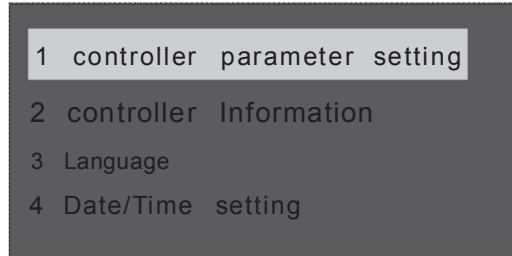
Figure11

- (A) Alarm Indicator
- (B) Status Indicator
- (C) Stop/Reset Button
- (D) Automatic Button
- (E) Close/Open Button
- (F) Manual Button
- (I) Start Button
- (H) Down/Decrease Button
- (J) Set/Confirm Button
- (K) Up/Increase Button

Note: For detailed instructions on the controller, please refer to the "HSC951 Generator Controller User Manual".

Set the Timer Start Timer

1. After the generator controller is powered on, hold down the button (J, Figure 11) to enter the parameter setting menu. The menu items include: 



2. Use the up button (K) and down button (H) to select 1 Controller Parameter Setting, then press the button (J) to enter the Controller Parameter Setting mode. 
3. Enter the password (1234) using the up button (K), down button (H), and confirm button (J). 
4. In the configuration screen, set the parameters in the table below using the up key (K), down key (H), and confirm button (J). 

Serial	Item	Parameter Range	Default	Description
72	Timed Startup Enable Setting	(0-1)	0	Factory default: Disabled.
73	Timed Startup Load Setting	(0-1)	0	Factory default: No load.
74	Timed Startup Cycle Setting	(0-2)	0	Factory default: 0 Monthly, 1 Weekly, 2 Daily.
75	Timed Startup Date Setting	(1-31)	1	The startup time on the specified date for timed startup.
76	Timed Startup Week Setting	(0-6)	0	Factory default: 0 Sunday
77	Timed Startup Hour Setting	(0-23)	0	The startup time on the specified hour for timed startup.
78	Timed Startup Minute Setting	(0-59)	0	The startup time in minutes for scheduled startup.
79	Scheduled startup runtime	(0-9999)min	0	The duration of operation after automatic startup.

Automatic startup sequence

- When the remote startup input is valid, enter 'Startup Delay';
- The LCD screen displays the countdown for 'Startup Delay';
- After the startup delay ends, the preheat relay outputs (if configured), and the LCD screen displays 'Startup Preheat Delay XX seconds';
- After the preheat delay ends, the fuel relay outputs for 1 second, the stepper motor drives the throttle to rotate to the set starting angle, and then the starter relay outputs; If the generator set does not start successfully within the 'Starting' time, the fuel relay and starter relay stop outputting, enter 'Startup Interval Delay', and wait for the next start attempt;
- Within the set number of start attempts, if the generator set fails to start successfully, the fifth line of the LCD screen will display in reverse, and the LCD will show a start failure alarm.

- If the start is successful at any attempt, it enters the 'Safe Operation Delay', during which the stepper motor drives the throttle for speed adjustment. During this time, alarms for low oil pressure, high water temperature, underspeed, charging failure, and auxiliary input (if configured) are all invalid. After the safe operation delay ends, it enters the 'Startup Idle Delay' (if the startup idle delay is configured).
- During the startup idle delay, alarms for under speed, under frequency, and under voltage are all disabled. Once the startup idle delay is over, it enters the 'Startup Warm-up Delay' (if the high-speed warm-up delay is configured).
- When the high-speed warm-up delay ends, if the power generation is normal, the power generation status indicator light will be on. If the generator voltage and frequency meet the load requirements, the power generation closing relay will output, the generator set will carry the load, the power supply indicator light will be on, and the generator set will enter normal operation. If the generator set voltage or frequency is abnormal, the controller will alarm and shutdown (the LCD screen will display the power generation alarm information).

Automatic Shutdown Sequence

1. When the remote start input is removed, the 'Shutdown Delay' begins.
2. After the shutdown delay ends, the 'Shutdown Cooling Delay' begins, and the power generation closing relay is disconnected, and the power supply indicator light goes off.
3. When entering 'Shutdown Idle Delay' (if configured), the idle relay is powered on;
4. When entering 'Power-off Shutdown Delay', the power-off shutdown relay is powered on, and the fuel relay output is disconnected;
5. When entering 'Waiting for Generator Set to Stop', it automatically determines whether it has stopped;
6. After the generator set has stopped, it enters standby mode; If the generator set cannot be shutdown, the controller will alarm (the LCD screen displays a shutdown failure warning).

Initial Start (No Load)



Waste heat/gas may ignite combustible materials, resulting in fire, serious injury, or death.

- Clear all combustible materials inside and around the generator.

This device has been set up at the factory to run on natural gas (NG). Fuel conversion must be completed before performing the following steps. Please refer to the Fuel Conversion section.

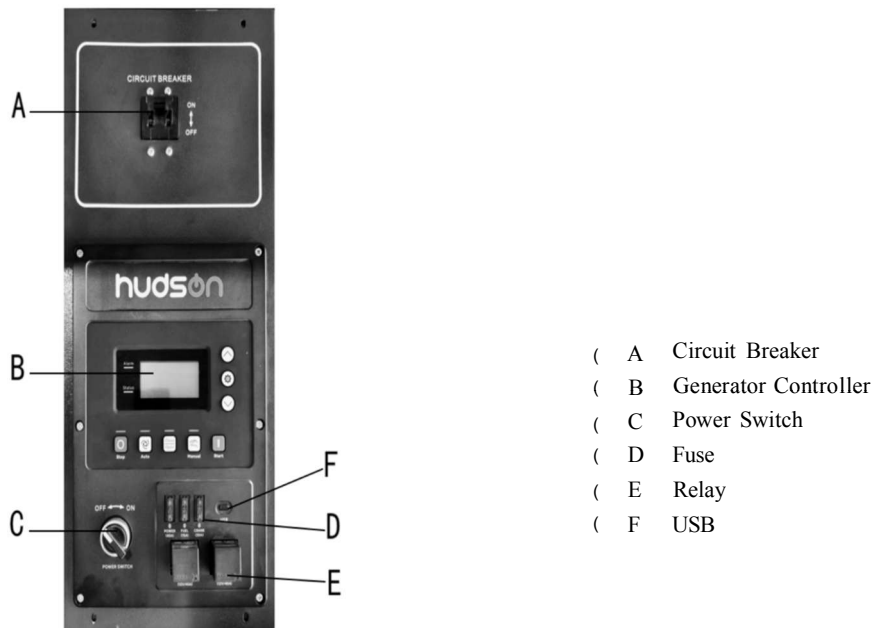


Figure 12

Before operating the backup generator or putting it into use, carefully inspect the entire unit and add synthetic oil (API SJ/CF 5W-30), checking the oil level as described in the 'Maintenance' section of this manual. Then begin testing the system without connecting any electrical load, as follows:

Note: When the generator starts for the first time, it will purge air from the gas fuel line. This process may cause the engine to run roughly for a few minutes.

- 1 . Turn on the power switch (C), and the generator controller (B) display will light up.
- 2 . Press the Manual button on the generator controller (B), then press the Start button to start the generator set.
- 3 . Listen for abnormal noises, vibrations, or other signs of abnormal operation. Check for oil leaks while the engine is running.
- 4 . Set the circuit breaker (A) of the generator to the ON (closed) position.
- 5 . Allow the engine to warm up for about five minutes to stabilize the internal temperature.
- 6 . Check the generator output at the load output section terminal block. The voltage between L1 and L2 should be 225 to 250 V, and the frequency should be 59 to 61 Hz. The voltage between L1 and N and L2 and N should be 112 to 125 V.
- 7 . Press the STOP button on the generator controller (B). The engine enters shutdown delay. After the shutdown delay ends, it enters shutdown cooling delay. After the shutdown cooling delay ends, the generator set stops.

Operation

Functions and Controls



Failure to read and follow the operation manual, all warnings, and operating instructions may result in serious injury or death.

Frontview of the generator (Figure 13)

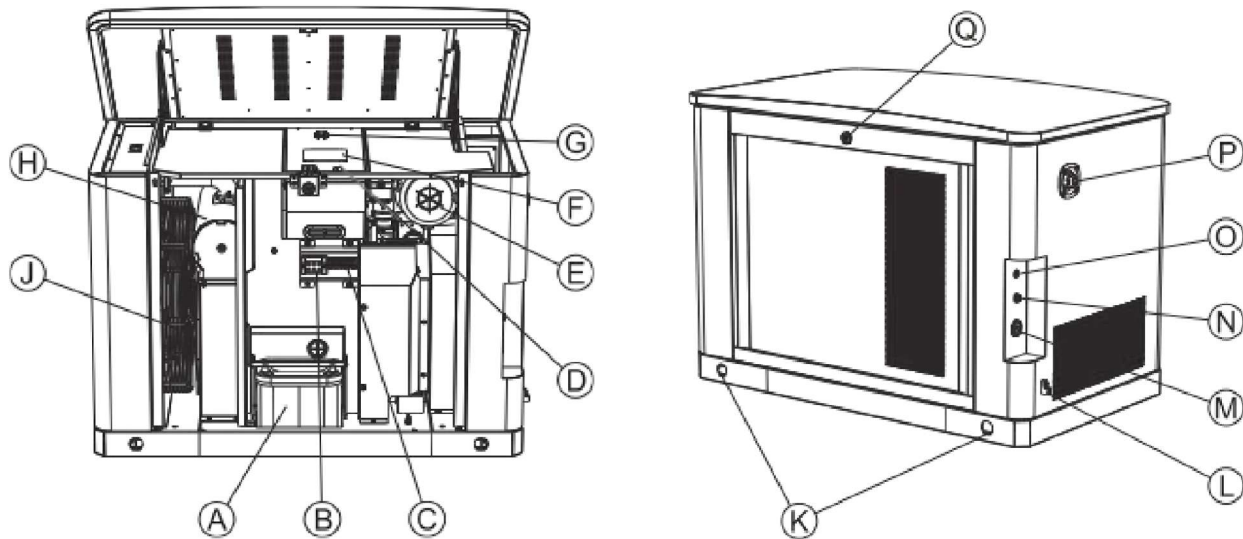


Figure 13

For clarity, the front and rear mesh panels of the generator have been removed. Component Legend:

- (A) Battery (provided by installer) — 12VDC provides power to start the engine.
- (B) Electrical terminal block — Location of incoming power wires (L1, L2, N).
- (C) ATS Connection Terminal—Connects ATS remote start and battery charger power supply.
- (D) 951 panel—Facilitates the replacement of relays and fuses.
- (E) Air Filter—Uses a dry filter element to protect the engine by filtering dust and debris from the intake air.
- (F) Generator Controller—Facilitates generator operation control, menu start, and information display functions.
- (G) Circuit Breaker—Protects the system from short circuits and other overload conditions.
- (H) Muffler—High-performance muffler reduces engine noise, complying with most residential specifications.
- (J) AC Fan—Provides high-speed cooling for the generator set.
- (K) Lifting Hole — Set lifting generators at each corner, Φ 38 Plastic round hole plug.
- (L) Grounding Stake — Provides good grounding for the generator set.
- (M) Main Power Hole — Generator power output threading hole.
- (N) ATS Socket — Connect to ATS.
- (O) Indicator Light — Generator set operation indicator light.
- (P) Emergency Stop Switch — Press this button in an emergency to shutdown the generator and prevent it from restarting.
- (Q) Front Door Lock — Protects and facilitates generator maintenance.

Rear View of Generator (Figure 14)

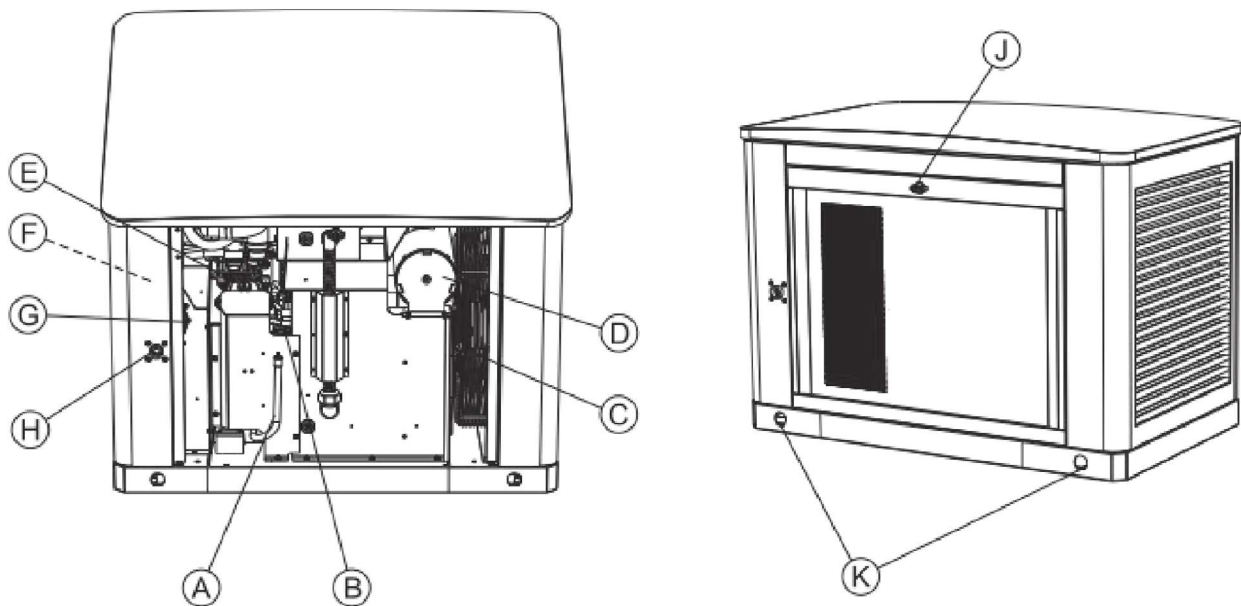


Figure 14

- (A) Oil Drain Hose — Facilitates engine oil replacement.
- (B) Engine Oil Dipstick — Allows users to check the engine oil level.
- (C) AC Fan — Provides a high-speed cooling device for the generator set.
- (D) Muffler—High-performance muffler reduces engine noise, complying with most residential specifications.

- (E) Oil cover — The location for adding engine oil.
- (F) Gas Conversion Valve (not shown) — Helps select the appropriate fuel type (LP or NG).
- (G) Gas Zero Pressure Valve — Automatically opens and closes to supply fuel to the engine as needed.
- (H) Fuel Inlet — Location of the fuel connection port.
- (J) Rear Door Lock — Facilitates maintenance (oil change, fuel conversion, etc.).
- (K) Lifting Hole — At each corner for lifting the generator.

Status LED

The generator set operating status LED has two modes:

- Solid green: The equipment is running normally.
- No light: No battery power or the generator set is in a shutdown state.

Charger

Note: The battery charger is installed inside the control box.

- The battery charger operates as a smart charger, verifying that:
- The output is continuously optimized to maximize battery life.
- The charging level is safe.

Note: A warning will be displayed on the LCD screen when the battery requires maintenance.

Note: Do not use an external battery charger.

Important Considerations for the Owner



Engine exhaust contains carbon monoxide (CO), a colorless, odorless, invisible, and deadly gas..

- Carbon monoxide detectors must be installed and maintained indoors according to the manufacturer's instructions/recommendations. Smoke alarms do not detect carbon monoxide gas.
- If you start feeling nauseous, dizzy, weak, or if the carbon monoxide alarm sounds while using this product, immediately move to fresh air area. Call emergency services. You may be experiencing carbon monoxide poisoning.

Reduce the Risk of Carbon Monoxide Poisoning

At high concentrations, carbon monoxide (CO) can be fatal within minutes. However, the effects of lower concentrations can also be dangerous over time. This gas poses a serious danger to humans and animals because it is colorless, odorless, invisible and tasteless. Symptoms of carbon monoxide exposure include:

- | | | |
|---------------------------------|---------------------------------|---------------|
| • Watery, itchy eyes | • Flushed appearance | • Dizziness |
| • Throbbing temples | • Lack of concentration | • Vomiting |
| • Inability to think coherently | • Loss of physical coordination | • Fatigue |
| • Ringing in the ears | • Chest tightness | • Collapse |
| • Headache | • Drowsiness | • Convulsions |
| • Incoherent or slurred speech | • Nausea | |

If the carbon monoxide alarm sounds while using this product, move to fresh air area immediately (even if you do not experience the symptoms mentioned above).

If you (or someone nearby) experience any of the symptoms mentioned above or the carbon monoxide alarm sounds (even if you do not experience the symptoms mentioned above), Move to fresh air area immediately and call emergency services for medical assistance.

Maintenance

Regular maintenance will improve performance and extend the life of the engine/equipment. Regular maintenance, replacement, or repair of emission control devices and systems can be performed by any repair shop or personnel chosen by the owner. However, to obtain emission control warranty service at no charge, the work must be performed by an authorized service dealer (IASD). Refer to the Emission Warranty for details.

Prepare for Maintenance



Generator and utility voltage can cause electric shock or burns, serious injury, or death.

- Do not allow unqualified personnel to operate or repair this equipment.



After connecting the battery, the generator may start automatically and run without warning, resulting in serious injury or death.

- Before repair, stop the generator and disconnect the negative (-) cable on the battery.
- Before performing any generator maintenance, you must follow these steps.
 1. Open the top cover plate and set the generator circuit breaker to OFF.
 2. Set the power switch to OFF.

Maintenance Schedule

Follow the operational intervals based on hours or calendar, whichever comes first.

Service	once/day (if running continuously)	Annually	Every two years or 200 hours
Check the enclosure louvers for dirt and debris *	■		
Check pipes and connections for oil leaks	■		
Check engine oil level			
Check for water intrusion **		■	
Perform fuel system leak test		■	
Check battery condition			
Replace engine oil and oil filter ***			■
Replace the engine air filter			■
Replace the spark plug			■
Inspect/Adjust valve clearance (if applicable)			■
Inspect/Clean sediment trap/collector			■

If necessary, please contact the nearest IASD for assistance.

* Please remove any shrubs or tall grass within 3 feet (0.91 meters) of the generator's intake and exhaust areas, and clear any debris (such as dirt, grass clippings, etc.) that may accumulate inside the generator set.

** Ensure that all potential water sources that could lead to water entering the generator enclosure, such as sprinklers, roof drainage, rainwater downspouts, and sewage pump outlets, are kept away from the generator enclosure.

*** Change the engine oil and filter after the first 25 hours of operation. In cold weather conditions (ambient temperature below 40 °F [4.4 °C]), or if the equipment is operated continuously in hot weather conditions (ambient temperature above 85 °F [29.4 °C]), change the engine oil and filter annually or every 100 hours of operation.

Emission Control

Maintenance, replacement, or repair of emission control systems may be performed by any qualified service provider or individual. To qualify for no-cost warranty service, work must be performed by an authorized dealer. Refer to the Emission Warranty Manual for details.

Generator Maintenance

The generator's warranty does not cover items damaged due to operator abuse or negligence. To obtain full value from the warranty, the operator must maintain the generator according to the instructions in this manual.

The generator requires the owner to make periodic adjustments to maintain it properly.

Perform all services and adjustments at least once each season. Adhere to the requirements in the 'Maintenance Schedule' section.

Keep the equipment clean. Operate the equipment in an environment free of excessive dust, dirt, moisture, or any corrosive vapors. Do not allow the cooling air intake and outlet on the enclosure to be blocked by snow, leaves, or other foreign objects. To prevent the generator from being damaged by overheating, always keep the cabinet cooling inlets and outlets clean and unobstructed.

Regularly check the cleanliness of the equipment and clean it when dust, dirt, oil, moisture, or other foreign substances appear on its exterior and interior surfaces. Inspect the intake and exhaust ports inside and outside the cabinet to ensure there are no obstructions in the airflow. **Note:** Improper handling of the generator can damage it and shorten its lifespan.

- Do not expose the generator to excessive moisture, dust, dirt, or corrosive vapors.
- Do not insert any objects into the cooling slots.

Clean the Generator



Exhaust heat/gas may ignite combustible materials, causing fire, serious injury, or death.

- Keep the area around the generator clean and free of debris.

Note: Do not use a direct spray from a garden hose to clean the generator. Water can enter the engine and generator and cause damage.

Note: Regularly inspect the exterior of the engine for dirt, leaves, rodents, spider webs, insects, etc., and remove any contamination and potential damage.

Engine Maintenance

Engine Oil Requirements

Note: Before starting the engine, verify that the type and quantity of engine oil are correct. Otherwise, it may cause engine damage.

Use SAE 5W-30 full synthetic engine oil. Other acceptable high-quality full synthetic oils may be used if classified as SJ or higher service level; do not use special additives.



Oils acceptable at all temperatures include full synthetic oils, which:

- Meet the International Lubricant Specification Advisory Committee (ILSAC) GF-2 standard
- Bear the API certification mark
- Or a higher level API service symbol

Using full synthetic oil does not extend the required oil change intervals described in the operation section.

Check the engine oil level

Important Note: When the generator needs to run for extended periods during a power outage, verify the oil level daily. If the oil level is low, the generator will shutdown.

Check the engine oil level by following these steps:

1. Set the generator circuit breaker (disconnected) to OFF.
2. If the generator operates during a power outage, allow approximately one minute of cool-down time for the generator.
3. Press the STOP button on the generator controller to shutdown the generator. Wait for five minutes.
4. Disconnect the negative (-) cable from the battery.
5. Remove the dipstick and wipe it clean with a cloth or paper towel.
6. Fully insert the dipstick into the oil tube and remove it.
7. Observe the oil level. The oil level on the dipstick should be at the full mark.
8. If necessary, remove the fuel cap and add the recommended engine oil to the engine (remove the dipstick) until the oil level reaches the full mark. Refer to Engine Oil Requirements.
9. Insert the dipstick, cover the fuel cap, and wipe off any spilled engine oil.
10. Connect the negative (-) cable to the battery.

Replace the spark plug

WARNING



Accidental engine sparks can cause electric shock, fire, or explosion, and may result in entanglement, traumatic amputation, or laceration.

Before making adjustments or repairs:

- Disconnect all spark plug wires and keep them away from the spark plugs.
- Disconnect the battery cable from the battery's negative terminal (for electric-start engines only).
- Use only the correct tools.
- Spark Plug Gap: 0.028 in (0.7 mm)
- Spark Plug Torque: 180 lb-in. (20 N·m)

When checking the spark:

- Use an approved spark plug tester.
- Do not check for sparks with the spark plug removed.

Changing the spark plug will help your engine start easier and operate better. Always perform this procedure with the generator OFF and the engine cooled.

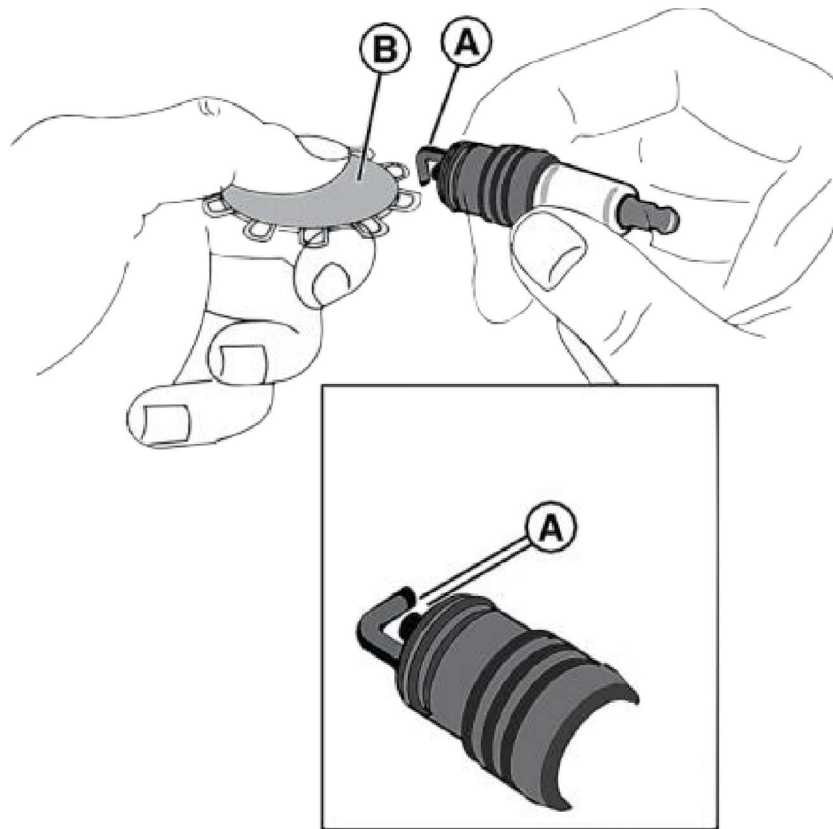


Figure 15

1. Insert the key, unlock the front mesh panel, and lift the top cover plate.
2. Set the generator circuit breaker (disconnected) to the OFF position, and set the power switch (disconnected) to the OFF position.
3. Remove the front mesh panel and rear mesh panel.
4. Remove the power side baffle R and power side baffle L.
5. Disconnect the negative (-) cable from the battery.
6. Clean the area around the spark plug.
7. Remove and inspect the spark plug.
8. Check the spark plug electrode gap using a wire gauge (B+A) (Figure 15). If the spark plug gap is not within specification, replace the plug. The recommended spark plug gap can be found in the Engine Specifications section.
9. Install the spark plug and tighten it to 180 in-lb (20 N·m).
10. Connect the negative (-) cable to the battery.
11. Install the power side baffle R and power side baffle L.
12. Install the front mesh panel and rear mesh panel.
13. Set the power switch (closed) to the ON position, and set the generator circuit breaker (closed) to the ON position. 14. Press the AUTO button on the generator controller to set the generator set to automatic mode.
15. Close and lock the top cover plate.

Engine Air Filter



WARNING Gaseous vapors are flammable and explosive. Fire or explosion may result in burns or death.

Do not start and operate the engine with the air filter assembly (if equipped) or air filter (if equipped) removed.

1. Lift the top cover plate and the inner cover plate.
2. Disconnect the generator from the mains to power off the battery charger.
3. Set the generator circuit breaker (disconnected) to the OFF position, and set the power switch to the OFF position.
4. Disconnect the negative (-) cable from the battery.
5. Remove the air filter cover and take out the air filter element.
6. Clean the outlet pipe and check the dust collector valve (if equipped). Wipe the filter sealing surface and outlet pipe surface with a clean cloth. Remove all contaminants before inserting a new filter. Do not damage the sealing area on the pipe. Inspect and press the dust removal valve connected to the service cover, ensuring it is flexible and not inverted, damaged, or blocked.
7. Clean the filter. Use a soft brush to loosen dirt, and use a vacuum cleaner to remove dirt and debris. If any holes are found in the filter media, replace the filter element.
8. Install the clean filter correctly. Carefully insert the filter. Secure the filter by hand, ensuring it is fully fixed in the air filter housing before installing the cover in place.
9. Install the air filter cover. Ensure all mounting straps, clips, bolts, and connections in the air filter system are tightened. Check the pipeline for holes and repair them.
10. Connect the negative (-) cable to the battery.
11. Set the power switch to the ON position, and set the generator circuit breaker (closed) to the ON position. 12. Press the AUTO button on the generator controller to set the generator set to automatic mode.
13. Close and lock the cover plate.

Exhaust System Maintenance



Contact with the muffler area may cause burns, resulting in serious injury.

- Do not touch high-temperature components and avoid exposure to hot exhaust gases.
- Allow the equipment to cool before touching.

Check the following items, when inspecting the exhaust system:

- Check for leaks at the exhaust manifold near the cylinder head.
- Ensure all mounting bolts and shields (if used) are in place.
- Inspect the fasteners between the manifold and exhaust pipe to ensure they are tightened and there are no exhaust leaks. Repair leaks if necessary.
- Check for leaks at the exhaust pipe connections. Repair leaks if necessary.

Comply with all federal, state, or local exhaust system requirements and regulations in your area.

Fuel System Maintenance



Propane and natural gas are highly flammable and explosive, which may cause burns, fire, or explosion, serious injury, or death.

- Regularly inspect the fuel oil system.
- No leaks are allowed.
- Do not operate the engine if fuel odor is present.

Pressure Regulator

The pressure regulator assembly is specifically designed and calibrated to meet the engine's fuel system requirements.

If the pressure regulator fails to operate or leaks, repair or replace it using the correct replacement parts recommended by OEM. When inspecting the regulator, check the following:

- Check for fuel leaks at the intake and outlet connections.
- Check for fuel leaks within the regulator body.
- Ensure the regulator is properly installed and the mounting bolts are tightened.
- Inspect the regulator for external damage.

Mixer and Throttle Control Device

The mixer and throttle body components are specifically designed to meet the engine's fuel system requirements.

A dirty air filter can significantly affect the performance of the mixer. Ensure the air filter is clean. When inspecting the mixer and throttle body, check the following:

- Check all fittings for leaks.
- Ensure the mixer and throttle body are securely installed.
- Inspect and clean the air filter element according to the recommended maintenance intervals listed in the Maintenance Schedule section.
- Inspect the intake hose connections and clamps. Check for cracks, splits, or abrasions in the hose. Replace the hose if necessary.
- Inspect the fuel lines for cracks, splits, or abrasions. Replace the fuel lines if necessary.
- Check the throttle body and intake manifold for leaks. Replace if necessary.

Electrical System Maintenance

The generator's electrical system is controlled by the control system to manage various components.

Wiring and Connections

All connections and grounding of the electrical system must be well connected. When inspecting the electrical system, please check the following:

- Check if the positive (+) and negative (-) battery cables are corroded, rubbed, scratched, or burned. Ensure both ends are tightly connected.
- Check the battery for cracks or damage. Replace if necessary.
- Check the engine harness for rubbing, scratching, squeezing, burning, and for any broken or disconnected wires.
- Ensure that the engine harness connectors are properly connected and locked.
- Check if the ignition coil wires are hardened, cracked, abraded, burned, separated, or split.
- Replace the spark plugs at the intervals listed in the 'Maintenance Schedule' section.
- Ensure that all electrical components are securely mounted on the engine or chassis.
- Ensure that any additional electrical equipment installed by the user is correctly installed in the system.

Repair the battery

Only personnel knowledgeable about the battery and its necessary precautions should repair or supervise the repair of the battery. Keep unauthorized personnel away from the battery.



Battery electrolyte contains acid, which is highly corrosive. Contact with battery contents may cause severe chemical burns.

- Do not open or damage the battery.
- Wear safety goggles, a rubber apron, rubber boots, and rubber gloves.
- Immediately wash off any electrolyte on the skin with water.
- If the electrolyte comes into contact with the eyes, rinse immediately with water and seek medical attention.
- Spilled electrolyte should be rinsed with a neutralizing agent.

WARNING

Battery release explosive hydrogen gas during charging. The slightest spark may ignite the hydrogen gas and cause an explosion, resulting in death or serious injury.

- Do not dispose of the battery in fire. Recycle the battery.
- During and for a few minutes after battery charging, do not allow any open flames, sparks, heat, or lit cigarettes.

WARNING

The high short-circuit current of the battery can cause serious injury.

- Remove watches, rings, or other metal objects.
 - Use tools with insulated handles.
 - Disconnect the charging source before connecting or disconnecting battery terminals.
 - Do not place tools or metal parts on top of the battery.
 - Disconnect the negative (-) cable from the battery during installation and maintenance.
1. Insert the key, unlock the front mesh panel, lift the top cover plate, and remove the front mesh panel.
 2. Set the generator circuit breaker (disconnected) to the OFF position, and set the power switch to the OFF position. Disconnect the generator from the mains to power off the battery charger.
 3. Disconnect the negative (-) cable from the battery.
 4. Disconnect the positive (+) cable from the battery.
 5. Repair or replace the battery if necessary.
 6. Connect the positive (+) cable to the battery.
 7. Connect the negative (-) cable to the battery.
 8. Restore the generator to utility power.
 - 9.
 10. Set the power switch to the ON position, and set the generator circuit breaker (closed) to the ON
 11. position. Press the AUTO button on the generator controller to set the generator set to automatic
 12. mode.

Install the front mesh panel, then close and lock the cover.

Replace the battery

1. Insert the key, unlock the front mesh panel, lift the top cover plate, and remove the front mesh panel.
2. Set the generator circuit breaker (disconnected) to the OFF position, and set the power switch to the OFF position. Disconnect the generator from the mains to power off the battery charger.
3. Disconnect the negative (-) cable from the battery.
4. Disconnect the positive (+) cable from the battery.
5. Remove the battery hold-down plate and rod.
6. Remove the battery and install the replacement battery.
- 7.
8.  Avoid causing pollution and conserve resources. Return used batteries to the recycling collection center. Connect the positive (+) cable to the battery.
9. Connect the negative (-) cable to the battery.
10. Restore the generator to utility power.
11. Set the power switch to the ON position, and set the generator circuit breaker (closed) to the ON position.

12. Press the AUTO button on the generator controller to set the generator set to automatic mode.
13. Install the front mesh panel, then close and lock the cover.

Charge the battery separately

If you need to charge the battery separately, please follow these steps:

1. Insert the key, unlock the front mesh panel, lift the top cover plate, and remove the front mesh panel.
2. Set the generator circuit breaker (disconnected) to the OFF position, and set the power switch to the OFF position.
Disconnect the generator from the mains to power off the battery charger.
3. Disconnect the negative (-) cable from the battery.
4. **Note:** Failure to disconnect the battery negative cable may result in equipment failure. Do not attempt to start the generator quickly.

Failure to follow these instructions will void the engine and generator warranty.

5. Use a battery charger to charge the battery at a rate of 4 amps until the battery maintains 12 V. Do not exceed 13.7 V when charging the battery.
6. Connect the negative (-) cable to the battery.
7. Restore the generator to utility power.
8. Set the power switch to the ON position, and set the generator circuit breaker (closed) to the ON position.
9. Press the AUTO button on the generator controller to set the generator set to automatic mode.
10. Install the front mesh panel, then close and lock the cover.

Generator Troubleshooting

PROBLEM	CAUSE	CORRECTION
Engine will not crank Engine Cannot Start	1. Fuse Blown. 2. Battery Fault or Loose/Corroded Battery Cables. 3. Starter Motor Fault. 4. Starter Relay Fault.	1. Install a New Fuse. 2. Tighten, Clean, or Replace as Necessary. 3. Replace. 4. Replace.
Engine cranks but will not start Engine Runs, but Fails to Start	1. No Fuel. 2. Gas Solenoid Valve Fault. 3. Spark Plug Fault. 4. Wiring Harness/Connection Issues. 5. Incorrect Fuel Selection.	1. Open the gas solenoid valve, manual valve, or refuel. 2. Please contact the local dealer for assistance. 3. Check the spark plug gap; replace the spark plug if it is out of tolerance. 4. Inspect and repair or contact the local dealer. 5. Check the fuel selector switch and set it to the correct setting.

PROBLEM	CAUSE	CORRECTION
Engine starts hard and runs rough Engine hard to start, runs unevenly	1. Incorrect gas pressure. 2. Incorrect fuel selection position. 3. Spark Plug Fault. 4. Air filter clogged or damaged. 5. Internal engine issues.	1. Verify that the pressure for NG is 3.5 to 12 inches of water column (0.87 — 3kPa), and for LP is 6 to 14 inches of water column (1.5 — 3.5kPa) 2. Check the fuel selector switch and set it to the correct setting. 3. Check the spark plug gap; replace the spark plug if it is out of tolerance. 4. Inspect and clean the air filter. 5. Please contact the local dealer for assistance.
The engine is running, but no AC output is available. The engine is running, but there is no AC output.	1. The generator circuit breaker is tripped or damaged. 2. An alarm is displayed on the controller screen. 3. Poor wiring. 4. Internal generator fault.	1. Reset or replace the circuit breaker. 2. Inspect and repair or contact the local dealer. 3. Inspect and repair or contact the local dealer. 4. Please contact the local dealer for assistance.
The engine shuts down during operation. The engine stalls during operation.	1. Fuel supply is shut off or depleted. 2. An alarm is displayed on the controller screen. 3. Internal generator fault.	1. Check the gas solenoid valve or add a propane tank. 2. Inspect and repair or contact the local dealer. 3. Please contact the local dealer for assistance.
The generator undergoes excessive vibration. Excessive generator vibration.	1. Loose mechanical fasteners.	1. Inspect and repair or contact the local dealer.
An odor of fuel is present. Presence of gas odor.	1. Fuel leak.	1. Close the manual gas shut-off valve and check the gas line, or contact the local supplier.
Unit consumes large amounts of fuel Excessive fuel consumption by the generator set	1. Excessive engine oil. 2. Incorrect type or viscosity of engine oil. 3. Air filter is blocked. 4. Gasket, seal, or hose is damaged.	1. Adjust the engine oil to the correct level, please refer to Check Engine Oil Level. 2. Please refer to Engine Oil Requirements. 3. Replace the air filter. 4. Check for oil leaks or contact the local supplier.

Specifications

Generator Specifications:

Models:	HDS20RCA
Rated AC Voltage	120 / 240V
Rated maximum load current(amps) with LP*	83.3
Phase	1
Rated AC Frequency	60Hz
Generator Breaker	90 amp
Operating Ambient Temperature / Operating Ambient Temperature	-20 °F to 104 °F (-28 °C to 40 °C)
Net Weight / Gross Weight	695lb (315kg)/809lb(367kg)
* 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. * NG ratings will depend on specific fuel joules/BTU content. Typical derates are between 10-20% off the LP gas rating.	

Engine Specifications:

Displacement/ Displacement	999cc
Bore×Stroke/ Bore×Stroke	3.543 × 3.091in (90× 78.5mm)
Spark Plug Gap/ Spark Plug Gap	0.028in (0.7mm)
Spark Plug Torque/ Spark Plug Torque	180 lb-in. (20N.m)
Intake Valve Clearance/ Intake Valve Clearance	0.02-0.036in (0.05-0.09mm)
Exhaust Valve Clearance/ Exhaust Valve Clearance	0.043-0.059in (0.11mm-0.15mm)
Oil Type	5W30 Full Synthetic
Oil Capacity (with filter)	78 to 80 oz. (2.3 to 2.4L)
Engine End Cover Bolt Torque	220 lb-in (25N.m)

