



Model: DLG4000iSE
Digital Inverter Generator

DISCLAIMERS:

All information, illustrations and specifications in this manual are based on the latest information available at the time of publishing. The illustrations used in this manual are intended as representative reference views only. Moreover, because of our continuous product improvement policy, we may modify information, illustrations and/or specifications to explain and/or exemplify a product, service or maintenance improvement. We reserve the right to make any change at any time without notice. Some images may vary depending upon which model is shown.

 **DANGER**

 This manual contains important instructions for operating this generator. For your safety and the safety of others, be sure to read this manual thoroughly before operating the generator. Failure to properly follow all instructions and precautions can cause you and others to be seriously hurt or killed.

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SAFETY

SAFETY DEFINITIONS

The words DANGER, WARNING, CAUTION and NOTICE are used throughout this manual to highlight important information. Be certain that the meanings of these alerts are known to all who work on or near the equipment.



This safety alert symbol appears with most safety statements. It means attention, become alert, your safety is involved! Please read and abide by the message that follows the safety alerts symbol.

DANGER

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

WARNING

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

CAUTION

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

NOTICE

Indicates a situation which can cause damage to the generator, personal property and/or the environment, or cause the equipment to operate improperly.

NOTE: Indicates a procedure, practice or condition that should be followed in order for the generator to function in the manner intended.

SAFETY SYMBOL DEFINITIONS

Symbol	Description
	Safety Alert Symbol
	Asphyxiation Hazard
	Burn Hazard
	Burst/Pressure Hazard
	Don't leave tools in the area
	Electrical Shock Hazard
	Explosion Hazard
	Fire Hazard
	Lifting Hazard
	Pinch-Point Hazard
	Read Manufacturer's Instructions
	Read Safety Messages Before Proceeding
	Wear Personal Protective Equipment (PPE)

SAFETY

GENERAL SAFETY RULES

DANGER



Never use the inverter in a location that is wet or damp. Never expose the inverter to rain, snow, water spray or standing water while in use. Protect the inverter from all hazardous weather conditions. Moisture or ice can cause a short circuit or other malfunction in the electrical circuit.



Never operate the inverter in an enclosed area. Engine exhaust contains carbon monoxide. Only operate the inverter outside and away from windows, doors and vents.

WARNING



Voltage produced by the inverter could result in death or serious injury.

- Never operate the inverter in rain or a flood plain unless proper precautions are taken to avoid being subject to rain or a flood.
- Never use worn or damaged extension cords.
- Always have a licensed electrician connect the inverter to the utility circuit.
- Never touch an operating inverter if the inverter is wet or if you have wet hands.
- Never operate the inverter in highly conductive areas such as around metal decking or steel works.
- Always use grounded extension cords. Always use three-wire or double-insulated power tools.
- Never touch live terminals or bare wires while the inverter is operating.
- Be sure the inverter is properly grounded before operating.

WARNING



Gasoline and gasoline vapors are extremely flammable and explosive under certain conditions.

- Always refuel the generator outdoors, in a well-ventilated area.
- Never remove the fuel cap with the engine running.
- Never refuel the inverter while the engine is running. Always turn engine off and allow the generator to cool before refueling.
- Only fill fuel tank with gasoline.
- Keep sparks, open flames or other form of ignition (such as match, cigarette, static electric source) away when refueling.
- Never overfill the fuel tank. Leave room for fuel to expand. Overfilling the fuel tank can result in a sudden overflow of gasoline and result in spilled gasoline coming in contact with HOT surfaces. Spilled fuel can ignite. If fuel is spilled on the inverter, wipe up any spills immediately. Dispose of rag properly. Allow area of spilled fuel to dry before operating the inverter.
- Wear eye protection while refueling.
- Never use gasoline as a cleaning agent.
- Store any containers containing gasoline in a well-ventilated area, away from any combustibles or source of ignition.
- Check for fuel leaks after refueling. Never operate the engine if a fuel leak is discovered.

WARNING



Never operate the inverter if powered items overheat, electrical output drops, there is sparking, flames or smoke coming from the inverter, or if the receptacles are damaged.



Never use the inverter to power medical support equipment.



Always remove any tools or other service equipment used during maintenance from the inverter before operating.

NOTICE

Never modify the inverter.

Never operate the inverter if it vibrates at high levels, if engine speed changes greatly or if the engine misfires often.

Always disconnect tools or appliances from the inverter before starting.

SAFETY

FUEL SAFETY

DANGER



Gasoline and liquid petroleum gas (LPG) are highly explosive and flammable. Explosions and fire can cause severe burns or death.

Gasoline and gasoline vapor (Gas)

- Gasoline is highly flammable and explosive.
- Gas expands and contracts with different temperatures.
- In case of a gas fire, do not attempt to extinguish the flame if the fuel shutoff valve is in the on position. Introducing an extinguisher to a generator with an open fuel valve could create an explosion hazard.
- Gas has a distinctive odor, this will help detect potential leaks quickly.
- Gas vapors can cause a fire if ignited.
- Gasoline is a skin irritant and needs to be cleaned up immediately if it comes in contact with the skin.

Liquid Petroleum Gas (Propane/LPG)

- LPG/Propane is highly flammable and explosive.
- Flammable gas under pressure can cause a fire or explosion if ignited.
- LPG/Propane can settle in low places because it is heavier than air.
- LPG/Propane has a distinctive odor added to help detect potential leaks.
- Always keep LPG/Propane tank in an upright position.
- When exchanging LPG/Propane tanks, be sure the tank valve is the same type.
- In case of a LPG/Propane fire, do not attempt to extinguish unless the fuel supply can be shut off.
- LPG/Propane will burn the skin. Prevent skin contact at all times.

WARNING



Never use a gas container, LPG connector hose, LPG tank or any other fuel item that appears to be damaged.

When starting generator:

- Make sure that the gas cap, air filter, spark plug, fuel lines and exhaust system are properly in place.
- If you spill any gasoline on the tank, allow it to fully evaporate before operating.
- Make sure the generator and propane tank are on a flat surface before operating.
- If there is a propane odor do not start the unit because there may be a potential leak.
- Never place propane tank near engine exhaust.

When transporting or servicing the generator:

- Make certain the fuel shutoff valve is off and the fuel tank is empty.
- Make sure the LPG tank and LPG hose is not attached to the generator.
- Disconnect the spark plug wire.

When storing the generator:

- Store away from sparks, open flames, pilot lights, heat and other sources of ignition.
- Do not store gas or LPG tank near furnaces, water heaters or any other appliances that produce heat or have automatic ignitions.

CAUTION



Only use approved LPG tanks with OPD (overfilling prevention device) valve. Always keep the tank in a vertical position with the valve on top and installed at ground level on a flat surface. Do not allow tanks to be around any heat source and make sure it is not exposed to the sun, rain and dust. When transporting and storing, turn off the tank valve and fuel valve, and disconnect the tank. Make sure to always cover the generator and tank outlet with protective plastic caps.

Large (500-1000 gallon) LPG tanks will require a certified plumber to install the fuel line to the generator and the loose regulator is not used (the regulator that is attached to the fuel tank). The pressure as measured at the regulator mounted to the generator must be 7" to 14" of water column. The plumber will ensure that the pressure is correct or install a step down regulator if needed.

CAUTION



Do not allow children to tamper or play with the propane tank or hose connections.

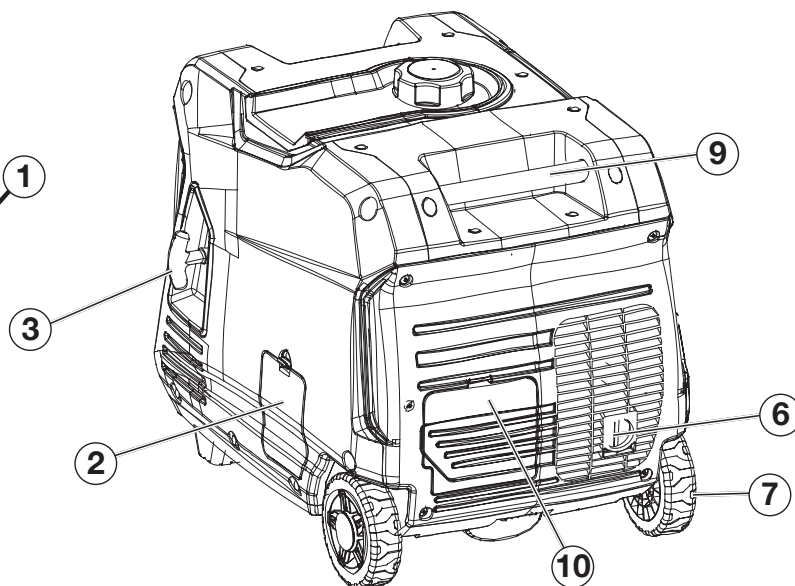
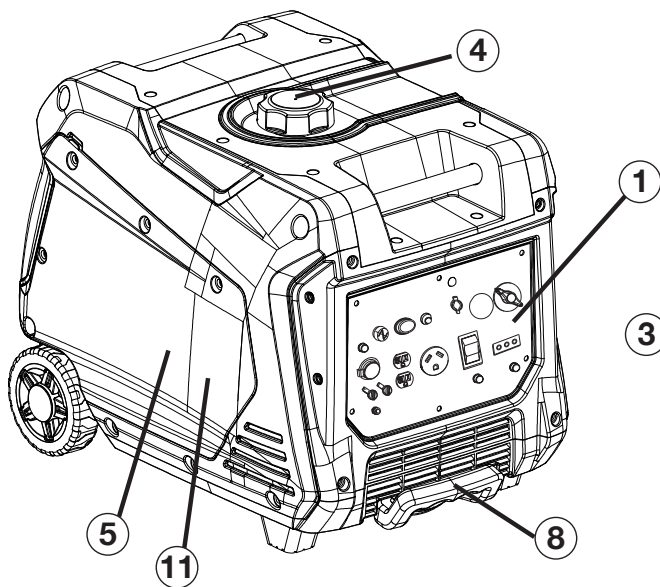
WARNING



If there is a strong smell of propane while operating the generator close the valve on the propane tank immediately. Once the propane is off, use soapy water to check for leaks on the hose and connections on the tank valve and the generator. Do not smoke or light a cigarette or check for leaks using any open flame source such as a match or lighter. If a leak is found contact a qualified technician to inspect and repair the LPG system before using the generator.

FEATURES

BASIC INVERTER FEATURES



- ① **Control Panel:** Contains the reset breaker, outlets and warning lights.
- ② **Oil Access Cover:** Remove the cover to access the oil fill/drain plug.
- ③ **Recoil Handle:** Pull to manually start the engine.
- ④ **Fuel Cap:** Close until clicking sound is heard.
- ⑤ **Engine Service Panel:** Remove the panel to access the engine, air filter, spark plug and float bowl for maintenance.
- ⑥ **Muffler and Spark Arrestor:** Avoid contact until the engine is cooled down. The spark arrestor prevents sparks from exiting the muffler. It must be removed for servicing.
- ⑦ **Roller Board Wheels:** For easy portability.
- ⑧ **Telescoping Handle:** Extends and retracts for easy access.
- ⑨ **Carry Handles:** Built in handles to allow for easy pick up.
- ⑩ **Battery Access Panel:** Easy access to battery.
- ⑪ **Automatic Choke:** Unit will automatically set choke for electric and manual start (battery must be hooked up, even if it is dead, for auto choke to work with manual start)

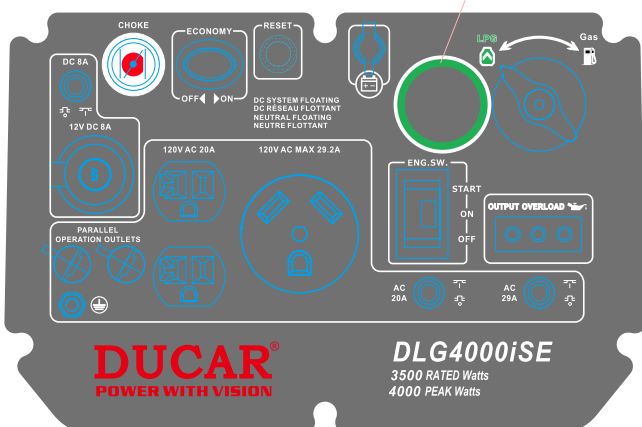
SPECIFICATIONS

Model		DLG4000iSE
AC Output	Frequency	60Hz
	Voltage	120V
	Rated Power	3500W
	Max. Power	3800W
DC Output		12V 8A
Engine DHLG225		224cc
		Single cylinder, 4 Stroke, OHV, Air Cooled
Engine Oil		10W30 (0.6L)
Fuel		Unleaded Gasoline/Propane

OPERATION

CONTROL PANEL FEATURES

- ① **Receptacles**
These can be used for operating appropriate appliance, electrical lighting, tools, and motor loads.
- ② **Choke lever:** Control the choke on and off.
- ③ **Output Ready LED:** Indicates the inverter is ready to be used.
- ④ **Overload LED:** Indicates that the inverter is overloaded.
- ⑤ **Low Oil LED:** Indicates low oil level.
- ⑥ **Fuel Selector Switch:** Select and turn on gas or propane. You can't switch fuel sources while unit is running.
- ⑦ **Push Switch Automated Start:** Push the switch to "start" to start the engine. Push the switch to "stop" to the engine.
- ⑧ **Efficiency Mode Switch:** When turned to the ON position, the engine will sense the load needed and run at a slower RPM to save fuel.
- ⑨ **DC Receptacle**
The DC receptacle should ONLY be used for charging 12 Volt automotive type batteries.
- ⑩ **Propane Hook Up:** Hook up your propane tank with the LPG hose provided to this inlet.
- ⑪ **Parallel outlets**
Parallel outlets enable a user to run two generators simultaneously.
- ⑫ **Ground Terminal:**
The ground terminal is used to externally ground the inverter.



BEFORE STARTING THE INVERTER



BEFORE STARTING THE INVERTER, REVIEW SAFETY SECTION STARTING ON PAGE 3.

Location Selection – Before starting the inverter, avoid exhaust and location hazards by verifying:

- You have selected a location to operate the inverter that is outdoors and well ventilated.
- You have selected a location with a level and solid surface on which to place the inverter.
- You have selected a location that is at least 6 feet (1.8 m) away from any building, other equipment or combustible material.
- If the inverter is located close to a building, make sure it is not located near any windows, doors and/or vents.

⚠ DANGER

Using a generator indoors
CAN KILL YOU IN MINUTES.
Generator exhaust contains carbon monoxide.
This is a poison you cannot see or smell.

 NEVER use inside a home or garage, EVEN IF doors and windows are open.	 Only use OUTSIDE and far away from windows, doors, and vents.
--	--

Avoid other generator hazards.
READ MANUAL BEFORE USE.

⚠ WARNING

Always operate the inverter on a level surface. Placing the inverter on non level surfaces can cause the inverter to tip over, causing fuel and oil to spill. Spilled fuel can ignite if it comes in contact with an ignition source such as a very hot surface.

NOTICE

Only operate the inverter on a solid, level surface. Operating the inverter on a surface with loose material such as sand or grass clippings can cause debris to be ingested by the inverter that could:

- Block cooling vents
- Block air intake system

OPERATION

Weather – Never operate your inverter outdoors during rain, snow or any combination of weather conditions that could lead to moisture collecting on, in or around the generator.

Dry Surface – Always operate the inverter on a dry surface free of any moisture.

No Connected Loads – Make sure the inverter has no connected loads before starting it. To ensure there are no connected loads, unplug any electrical extension cords that are plugged into the control panel receptacles.

NOTICE

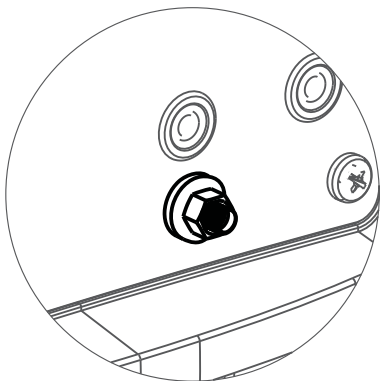
Starting the inverter with loads already applied to it could result in damage to any appliance being powered off the inverter during the brief start-up period.

Grounding

Consult with your local municipalities for your grounding codes.

Ground Terminal

The generator's ground terminal must always be used to connect the generator to a driven ground rod. Connect the ground terminal to the driven ground rod with copper wire. The wire connects to the terminal between the lock washer and nut. Tighten the nut securely to ensure good connection. Grounding the generator protects you from electric shock that results from a build up of static electricity or undetected ground faults.



WARNING!



Generator must be properly grounded to prevent electrocution.

- Only operate generator on a level surface.
- Always connect the nut and ground terminal on the frame to an appropriate ground source.

WARNING



Be sure the inverter is properly connected to earth ground before operating.

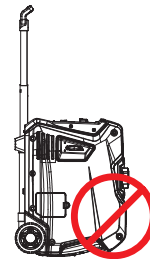
High Altitude Operation

Engine power is reduced the higher you operate above sea level. Output will be reduced approximately 3.5% for every 1000ft of increased altitude from sea level. This is a natural occurrence and cannot be adjusted by engine. Increased exhaust emissions can also result due to increased fuel mixture. Other issues include hard starting, increased fuel consumption and spark plug fouling.

WARNING



Do not rest inverter on exhaust panel. Do not move Generator while it is on. The inverter will be damaged if operated in this manner.



OPERATION

POWERCORD

Using Extension Cords


Westinghouse Portable Power assumes no responsibility for the content within this table. The use of this table is the responsibility of the user only. This table is intended for reference only. The results produced by using this table are not guaranteed to be correct or applicable in all situations as the type and construction of cords are highly variable. Always check with local regulations and a licensed electrician prior to installing or connecting an electrical appliance

Extension Cord Wire Gauge Size

AMPS	LENGTH OF EXTENSION CORD (ft)								
	10	20	30	40	50	60	80	100	120
5	20	18	16	14	12	12	10	10	8
10	18	16	14	12	12	10	10	8	8
15	16	14	12	12	10	10	8	8	6
20	14	12	12	10	10	8	8	6	6
25	12	12	10	10	8	8	6	6	6
30	12	10	10	8	8	6	6	6	6
35	10	10	8	8	6	6	6	6	6


INVERTER PARALLELING OPERATION

⚠ DANGER




Never connect the paralleling cord to the inverters with the inverters running. The inverters must not be running and both the paralleling cord switches must be off when connecting the cords.

⚠ WARNING



Do not attempt to parallel the inverter with any other manufacturers' inverters. Do not use the paralleling cord for any application other than inverter paralleling. Do not use this cord on other manufacturers' inverters.



Always ensure that both ends of the paralleling cord are switched off before connecting the inverters.

INVERTER PARALLELING OPERATION

It is possible to connect two D4000iS(E) generators to each other, using a parallel cable kit, to increase available power output.

- Connect PARALLEL OPERATION CABLES to two D4000iS(E) generators according to the instructions provided with the cable kit.
- Make sure the Economy switch is in the same position on both generators.
- All electronic devices should be turned "OFF" and disconnected from generators prior to starting generator engines.
- Start generator engines. Make sure the green output indicator light comes on for each generator.
- When engines have stabilized, plug in electronic device to AC receptacle and turn on first load.
- Allow generator output to stabilize (engine and attached devices run evenly) before plugging in the next load.

Maximum Power in Parallel Operation: 8.0kVA

Rated Power in Parallel Operation: 7.0kVA

Limit operation time to 3 seconds for load requiring maximum output. For continuous operation, do not exceed the rated output.

Note: It is strongly recommended to plug in devices with the largest output first and the smallest output last to help prevent overloading the generator.

OPERATION

INITIAL OIL FILL



BEFORE ADDING ENGINE OIL, REVIEW SAFETY SECTION STARTING ON PAGE 3.

NOTICE

Engine oil must be added when the inverter is on a flat, level surface, or an inaccurate reading may result. Do not overfill. If the engine is overfilled with oil, it can cause serious engine damage.

1. Unclip and remove the oil service panel to access the oil fill/drain plug (see Figure 3).

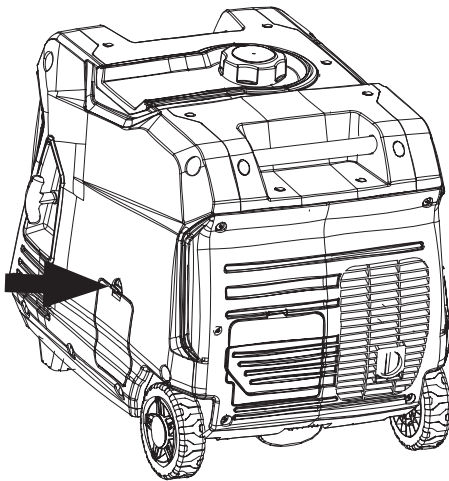


Figure 3: Oil Service Panel

2. Clean area around oil fill/drain plug and remove plug.
3. Using the supplied funnel and oil, pour the entire bottle of oil into the engine. See correct oil level in Figure 4 below.

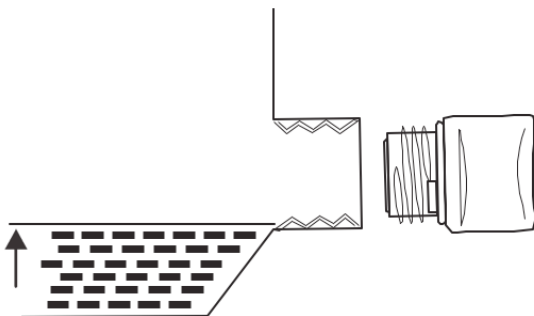


Figure 4: Engine Oil Correct Level

4. Do not overfill, if oil level is too high, oil will drain out through the fill plug.

ADDING/CHECKING ENGINE FLUIDS AND FUEL



BEFORE ADDING/CHECKING ENGINE FLUIDS AND FUEL, REVIEW SAFETY SECTION STARTING ON PAGE 3.

DANGER



Filling the fuel tank with gasoline while the inverter is running can cause gasoline to leak and come in contact with hot surfaces that can ignite the gasoline.

Before starting the inverter, always check the level of:

- Engine oil
- Gasoline in the fuel tank

Once the inverter is started and the engine gets warm, it is not safe to add gasoline to the fuel tank or engine oil to the engine while the engine is running or the engine and muffler are hot.

CHECKING AND / OR ADDING ENGINE OIL

WARNING



Internal pressure can build in the engine crankcase while the engine is running. Removing the oil fill plug/dipstick while the engine is hot can cause extremely hot oil to spray out of the crankcase and can severely burn skin. Allow engine oil to cool for several minutes before removing the oil fill plug/dipstick.

The unit as shipped does not contain oil in the engine. You must add engine oil before starting the inverter for the first time. See *Initial Oil Fill* for instructions on checking engine oil level and the procedure for adding engine oil.

NOTICE

The engine does not contain engine oil as shipped. Attempting to start the engine without adding engine oil will permanently damage internal engine components.

The engine is equipped with a low oil shutdown switch. If the oil level becomes low, the engine may shut down and not start until the oil is filled to the proper level.

The owner of the inverter is responsible to ensure the proper oil level is maintained during the operation of the generator. Failure to maintain the proper oil level can result in engine damage.

OPERATION

ADDING GASOLINE TO THE FUEL TANK

⚠ WARNING



Never refuel the inverter while the engine is running.



Always turn the engine off and allow the inverter to cool before refueling.

⚠ CAUTION



Avoid prolonged skin contact with gasoline. Avoid prolonged breathing of gasoline vapors.

Required Gasoline – Only use gasoline that meets the following requirements:

- Unleaded gasoline only
- Gasoline with maximum 10% ethanol added
- Gasoline with an 87 octane rating or higher

Filling the Fuel Tank – Follow the steps below to fill the fuel tank:

1. Shut off the inverter.
2. Allow the inverter to cool down so all surface areas of the muffler and engine are cool to the touch.
3. Move the inverter to a flat surface.
4. Clean area around the fuel cap.
5. Remove the fuel cap by rotating counterclockwise.

NOTICE

Do not overfill the fuel tank. Spilled fuel will damage some plastic parts.

6. Slowly add gasoline into the fuel tank. Be very careful not to overfill the tank. The gasoline level should NOT be higher than the red ring (see Figure 5).
7. Install the fuel cap by rotating clockwise.

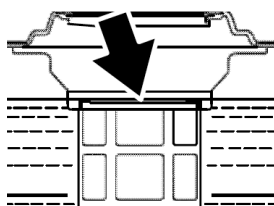


Figure 5: Maximum Gasoline Fill Level

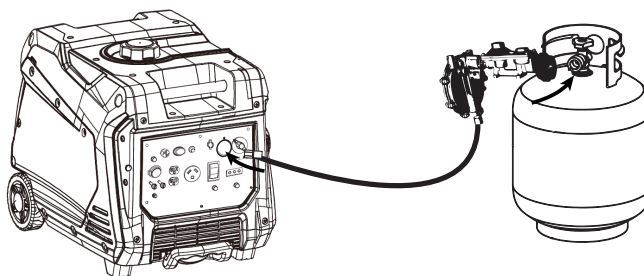
CONNECTING THE LPG/PROPANE TANK



BEFORE CONNECTING PROPANE TANK TO THE GENERATOR PLEASE REVIEW FUEL SAFETY SECTION ON PAGE 5

Connecting LPG Tank

1. Make sure the inverter is off, on a flat surface in well ventilated area.
2. Make sure propane tank valve is in the off position.
3. Make sure the fuel selector switch on the inverter control panel is pointing downward to “Propane”.
4. Remove the plastic cover on the generator propane inlet valve.
5. Using your fingers tighten the LPG hose (included) end below to the generator propane inlet. **DO NOT OVER-TIGHTEN 35-88 lb-in maximum.**



6. Attach the other end of the hose to a tank of LPG/Propane and hand tighten.
7. Check all connections for leaks by wetting the fittings with soapy water. Anywhere that bubbles appear or grow indicates a leak in the connection. If a leak exists at a fitting then turn off the tank valve and tighten the fitting. Turn the gas back on and recheck with soapy water again. If the leak continues or if the leak is not at a fitting then do not use the generator and contact customer service.

NOTICE

- The LPG tank can be of any capacity but the tank must conform to the standard as previously listed in *Fuel Safety* section.
- LPG tanks that use liquid withdrawal system can not be used on these models.
- Verify the requalification date on the tank has not expired.
- All new tanks must be purged of air and moisture prior to filling. Used tanks that have not been plugged or kept closed must also be purged
- The purging process should be done by a LPG supplier. (Tanks from an exchange supplier should have been purged and filled properly already)
- Always position the tank so the connection between the valve and the gas inlet won't cause sharp bends or kinks in the hose.

⚠ WARNING



Do not start generator if you smell propane. This may result in explosion hazard. Do not use provided LPG hose for any other appliances. Always turn off the propane tank and disconnect LPG hose when not in use.

OPERATION

STARTING THE INVERTER



BEFORE STARTING THE INVERTER, REVIEW SAFETY SECTION STARTING ON PAGE 3.

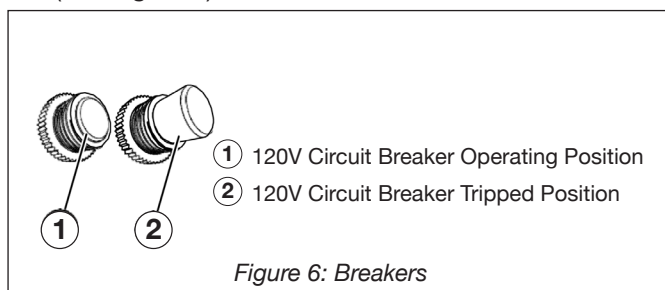
For proper starting and operation of the inverter, make sure you review the inverter features and their descriptions in *Features* section.

Before attempting to start the inverter, verify the following:

- The engine is filled with engine oil (see Figure 4: *Engine Oil Correct Level*).
- The inverter is situated in a proper location (see *Location Selection*).
- The inverter is on a dry surface (see *Weather and Dry Surface*).
- All loads are disconnected from the inverter (see *No Connected Loads*).
- The inverter is properly grounded (see *Grounding the Inverter*)

⚠ DANGER	
	Never use the inverter in a location that is wet or damp. Never expose the inverter to rain, snow, water spray or standing water while in use. Protect the inverter from all hazardous weather conditions. Moisture or ice can cause a short circuit or other malfunction in the electrical circuit.
	Never operate the inverter in an enclosed area. Engine exhaust contains carbon monoxide. Only operate the inverter outside and away from windows, doors and vents.

1. Check oil levels (see *Initial Oil Fill*)
2. Make sure nothing is plugged into any of the outlets.
3. Make sure battery is connected (see *Hooking Up the Battery*).
4. Make sure the circuit breakers are properly set (see Figure 6).



5. Select fuel source for start up:

FOR GASOLINE

- a. Make sure there is gas in the tank (see *Adding Gasoline to the Fuel Tank*).
- b. Turn fuel selector knob to **GASOLINE** (see Figure 7).

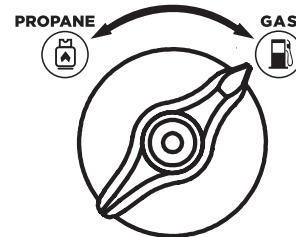


Figure 7: Turn Fuel selector to GAS position

FOR LPG/PROPANE:

- a. Make sure the LPG hose is safely secured from the generator to the tank (see *Connecting the LPG Tank*).
- b. Turn the fuel selector knob to **PROPANE** (see Figure 8).
- c. Fully open the valve on the propane tank.

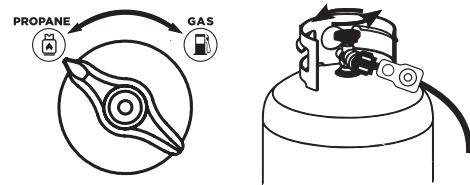


Figure 8: Turn fuel selector to PROPANE position
Propane tank valve - OPEN

6. Choose starting method:

- a. Recoil Start: Pull the choke lever out, firmly grasp and pull the recoil handle slowly until you feel increased resistance. At this point, apply a rapid pull while pulling up and slightly away from the generator. Press the choke lever in after the generator is started.
- b. Electric Start: Pull the choke lever out, press the switch button to **START**. Press the choke lever in after the generator is started.

OPERATION

SWITCHING FUEL SOURCES



PLEASE REVIEW FUEL SAFETY SECTION ON PAGE 5

The below assumes that the propane fuel line is already attached to the generator securely and safely.

While the unit is running simply turn the **FUEL SELECTOR** knob to the desired fuel source. If you want to switch from gasoline to propane make sure the propane tank valve is open before you switch. When you move from propane to gasoline shut the propane valve after you have switched to gas.

NOTICE

If you do not plan on operating the unit on propane do not leave the propane tank valve open.

When starting on propane the engine may run rough for a few seconds while it purges gasoline in the carburetor.

If the engine fails when switching fuel sources simply restart the unit on the fuel source that you switched to.

STOPPING THE INVERTER

Normal Operation

During normal operation, use the following steps to stop your inverter:

1. Remove any connected loads from the control panel receptacles.
2. Allow the inverter to run at “no load” to reduce and stabilize engine and alternator temperatures.
3. Press and hold the Push Start/ON/OFF button to OFF for 2-3 second. (see Figure 9).

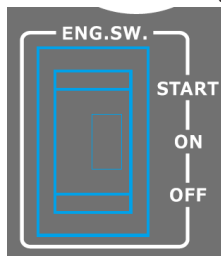


Figure 9: Stopping generator

4. Press in the choke lever.

USING EFFICIENCY MODE

The inverter is equipped with an efficiency mode switch to minimize fuel consumption. In efficiency mode, the inverter will sense the load and adjust the engine RPM to the current load requirements. Efficiency mode should be used only after the inverter has been warmed up to operating temperature.

1. To turn on the efficiency mode, press the switch to the **ON** position).
2. If no load is present, the inverter RPM will drop down to an idle speed.
3. As a load is applied, the inverter will sense the load and engine RPM will increase according to the load applied.
4. To run the inverter at maximum power and RPM, press the efficiency mode switch to the **OFF** position.

OVERLOAD RESET

An electrical overload or short circuit will trip the overload protection system by disconnecting the generator’s AC output even though the engine is still running. If this occurs, the overload alarm light will be illuminated red and the output indicator light will be off. The AC output can be restored as follows:

1. Turn off and unplug any electrical devices or cords from the 120-Volt AC receptacle on the control panel.
2. Press the generator reset button on the control panel until the overload alarm light goes off and the output indicator light is illuminated green.
3. Check that the intended electrical running and starting loads do not exceed the generator’s capacity or have a licensed electrician rectify any fault causing a short circuit in the load.
4. Reconnect any electrical devices or cords to the receptacles on the control panel and then turn on the electrical loads as required.

MAINTENANCE



BEFORE PERFORMING MAINTENANCE ON THE INVERTER, REVIEW THE SAFETY SECTION STARTING ON PAGE 3, AS WELL AS THE FOLLOWING SAFETY MESSAGES.

⚠ WARNING	
	Avoid accidentally starting the inverter during maintenance by removing the spark plug boot from the spark plug. For electric start inverters, also disconnect the battery cables from the battery (disconnect the black negative (-) cable first) and place the cables away from the battery posts to avoid arcing.
	Allow hot components to cool to the touch prior to performing any maintenance procedure.
	Internal pressure can build in the engine crankcase while the engine is running. Removing the oil fill plug/dipstick while the engine is hot can cause extremely hot oil to spray out of the crankcase and can severely burn skin. Allow engine oil to cool for several minutes before removing the oil fill plug/dipstick.
	Always perform maintenance in a well-ventilated area. Gasoline fuel and fuel vapors are extremely flammable and can ignite under certain conditions.

⚠ CAUTION	
	Avoid skin contact with engine oil or gasoline. Prolonged skin contact with engine oil or gasoline can be harmful. Frequent and prolonged contact with engine oil may cause skin cancer. Take protective measures and wear protective clothing and equipment. Wash all exposed skin with soap and water.

⚠ WARNING	
	Failure to perform periodic maintenance or not following maintenance procedures can cause the inverter to malfunction and could result in death or serious injury.

NOTICE	
Periodic maintenance intervals vary depending on inverter operating conditions. Operating the inverter under severe conditions, such as sustained high-load, high-temperature, or unusually wet or dusty environments, will require more frequent periodic maintenance. The intervals listed in the maintenance schedule should be treated only as a general guideline.	

Following the maintenance schedule is important to keep the inverter in good operating condition. The following is a summary of maintenance items by periodic maintenance intervals.

TABLE 1: MAINTENANCE SCHEDULE - OWNER PERFORMED

Maintenance Item	Before Every Use	After First 20 Hours or First Month of Use	After 50 Hours of Use or Every 6 Months	After 100 Hour of Use or Every 6 Months	After 300 Hours of Use or Every Year
Engine Oil	Check Level	Change	Change	-	-
Cooling Features	Check/Clean	-	-	-	-
Air Filter	Check	-	Clean*	-	Replace
Spark Plug	-	-	-	Check/Clean	Replace
Spark Arrestor	-	-	-	Check/Clean	-

*Service more frequently if operating in dry and dusty conditions

MAINTENANCE

ENGINE OIL MAINTENANCE

Engine Oil Specification

1. Only use the engine oil specified in Figure 10.
2. Only use 4-stroke/cycle engine oil. **NEVER USE 2-STROKE/CYCLE OIL.** Synthetic oil is an acceptable substitute for conventional oil.

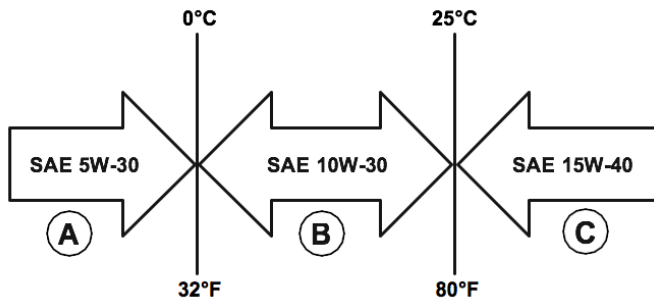


Figure 10: Recommended Oil

CHECKING ENGINE OIL

NOTICE

Always maintain proper engine oil level. Failure to maintain proper engine oil level could result in severe damage to the engine and/or shorten the life of the engine.

Always use the specified engine oil. Failure to use the specified engine oil can cause accelerated wear and/or shorten the life of the engine.

Engine oil level should be checked before every use.

1. Always operate or maintain the inverter on a flat surface.
2. Stop engine if running.
3. Let engine sit and cool for several minutes (allow crankcase pressure to equalize).
4. Remove the oil service panel to access the oil fill/drain plug (see Figure 3 on page 10).
5. With a damp rag, clean around the oil fill/drain plug.
6. Remove the oil fill/drain plug.
7. Check oil level: When checking the engine oil, remove the oil fill/drain plug (see Figure 4 on page 10).
 - The oil level is acceptable if oil is visible at the bottom of the threads of the oil fill plug.
 - If oil level is low, add to the correct level using the supplied oil fill bottle. Do not overfill the oil crankcase.

NOTICE

Engine oil must always be checked and added when the inverter is on a flat, level surface, or an inaccurate reading may result, causing serious engine damage.

ADDING ENGINE OIL

1. Always operate or maintain the inverter on a flat surface.
2. Stop engine if running.
3. Let engine sit and cool for several minutes (allow crankcase pressure to equalize).
4. Remove the engine service panel to gain access to the oil fill/drain plug.
5. Thoroughly clean around the oil fill/drain plug.
6. Remove the oil fill/drain plug.
7. Select the proper engine oil as specified in Figure 10.
8. Using the supplied oil funnel, slowly add engine oil to the engine. Stop frequently to check the oil level and avoid overfilling.

CHANGING ENGINE OIL

1. Stop the engine.
2. Let engine sit and cool for several minutes (allow crankcase pressure to equalize).
3. Remove the oil service panel to gain access to the oil fill/drain plug.
4. Place oil pan (or suitable container) under the oil fill/drain plug.
5. Remove oil fill/drain plug. With a damp rag, thoroughly clean around the oil fill/drain plug.
6. Insert provided funnel around oil fill/drain and carefully tilt the inverter so the oil drains down the through the funnel into the container.
7. Allow oil to completely drain.
8. Fill crankcase with oil following the steps outlined in *Adding Engine Oil* above and tighten oil plug.
9. Dispose of used engine oil properly.

NOTICE

Never dispose of used engine oil by dumping the oil into a sewer, on the ground, or into groundwater or waterways. Always be environmentally responsible. Follow the guidelines of the governmental agencies for proper disposal of hazardous materials. Consult local authorities or reclamation facility.

MAINTENANCE

AIR FILTER MAINTENANCE

⚠ WARNING



Never use gasoline or other flammable solvents to clean the air filter. Use only household detergent soap to clean the air filter.

Cleaning the Air Filter

The air filter must be cleaned after every 50 hours of use or 3 months (frequency should be increased if inverter is operated in a dusty environment).

1. Turn off the inverter and let it cool for several minutes if running.
2. Remove the Engine Service Panel to gain access to the air filter (see Figure 11).

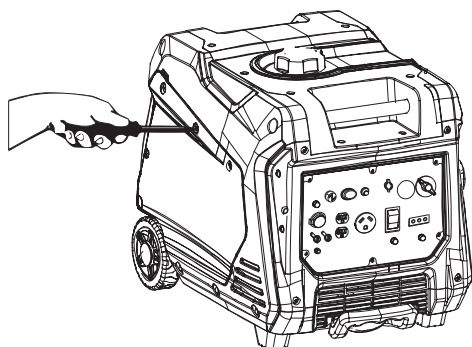


Figure 11: Remove Engine Service Panel

3. Turn the 2 knobs on the air cleaner to unlock the cover. Tip the cover down to access the foam element (see Figure 12).

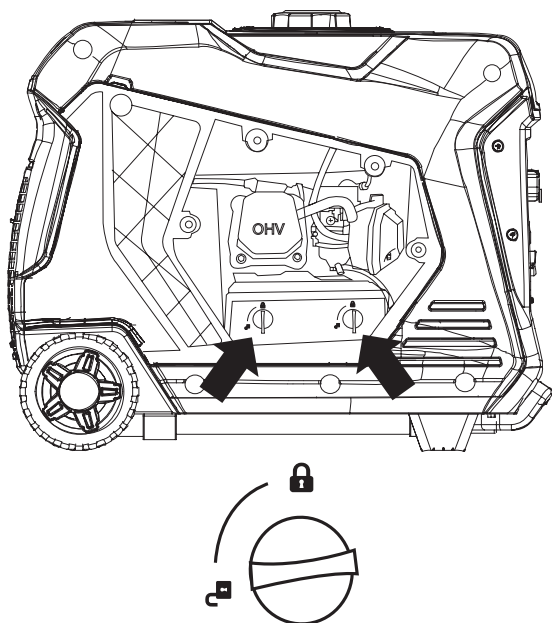


Figure 12: Unlock Air Filter Cover

4. Remove the foam element from the air cleaner housing.
5. Wash the foam air filter element by submerging the element in a solution of household detergent soap and warm water. Slowly squeeze the foam to thoroughly clean.

NOTICE

NEVER twist or tear the foam air filter element during cleaning or drying. Only apply slow but firm squeezing action.

6. Rinse in clean water by submerging the air filter element in fresh water and applying a slow squeezing action (see Figure 13).

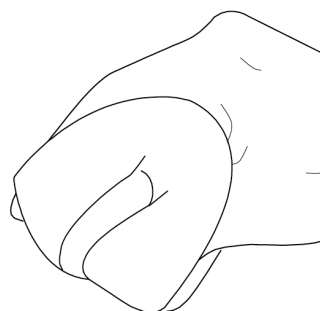


Figure 13: Squeeze Air Filter

NOTICE

Never dispose of soap cleaning solution used to clean the air filter by dumping the solution into a sewer, on the ground, or into ground water or waterways. Always be environmentally responsible. Follow the guidelines of the governmental agencies for proper disposal of hazardous materials. Consult local authorities or reclamation facility.

7. Dispose of used soap cleaning solution properly.
8. Dry the air filter element by again applying a slow firm squeezing action.
9. Return the air filter element to its position in the air cleaner housing.
10. Install the air cleaner cover, making sure the knobs lock into place.
11. Install the engine service panel.

MAINTENANCE

DRAINING THE FLOAT BOWL

1. Remove the Engine Service Panel to access the carburetor (see Figure 11 on page 16).
2. Locate the clear plastic hose from the float that is extending towards the bottom of the inverter, pull those hose outside the body and place a suitable container under it to catch the drained fuel (see Figure 14).

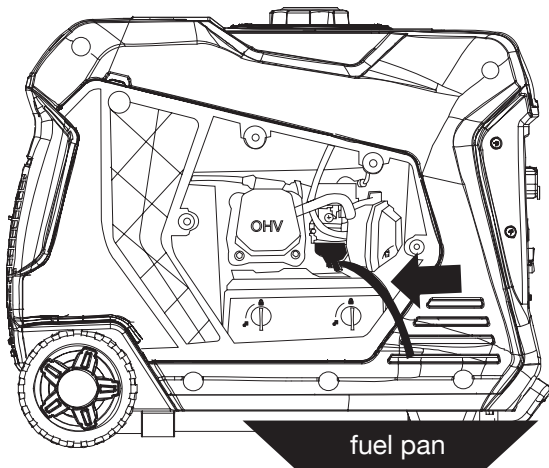


Figure 14: Fuel Drain Hose

3. Loosen the float bowl drain screw until fuel is seen draining from the float bowl (see Figure 15).

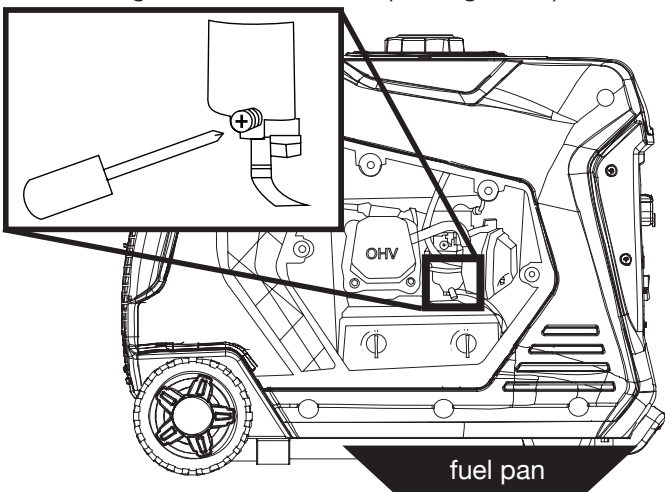


Figure 15: Loosen Float Bowl Screw

4. Allow fuel to drain into the container, and then tighten the float bowl drain screw.

NOTICE

Never dispose of fuel by dumping fuel into a sewer, on the ground, or into groundwater or waterways. Always be environmentally responsible. Follow the guidelines of the EPA or other governmental agencies for proper disposal of hazardous materials. Consult local authorities or reclamation facility.

5. Install the engine service panel.

SPARK PLUG MAINTENANCE

The spark plug must be checked and cleaned after every 100 hours of use or 6 months and must be replaced after 300 hours of use or every year.

1. Stop the inverter and let it cool for several minutes if running.
2. Move the inverter to a flat, level surface.
3. Remove the Engine Service Panel to gain access to the spark plug (see Figure 11 on page 16).
4. Remove the spark plug cover by firmly pulling the metal spark plug boot handle directly away from the engine (see Figure 16).

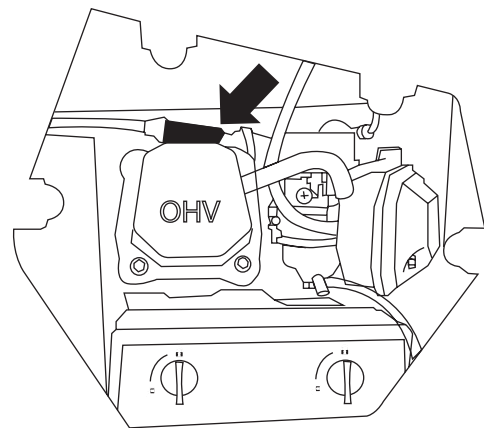


Figure 16: Pull off Spark Plug Cover

NOTICE

Never apply any side load or move the spark plug laterally when removing the spark plug. Applying a side load or moving the spark plug laterally may crack and damage the spark plug boot.

5. Clean area around the spark plug.
6. Using the spark plug socket wrench provided, remove the spark plug from the cylinder head (see Figure 17).

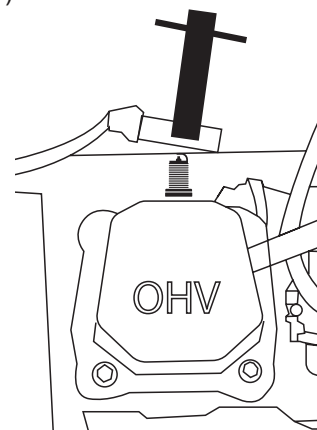


Figure 17: Remove Spark Plug

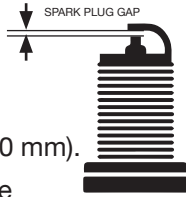
MAINTENANCE

Spark Plug Maintenance - Continued from page 18

7. Place a clean rag over the opening created by the removal of the spark plug to make sure no dirt can get into the combustion chamber.

8. Inspect the spark plug for:

- Cracked or chipped insulator
- Excessive wear
- Spark plug gap of 0.032 in. (0.80 mm).



If the spark plug fails any one of the conditions listed above, replace the plug.

NOTICE

Only use the recommended spark plug. See chart below. Using a non-recommended spark plug could result in damage to the engine.

9. Install the spark plug by carefully following the steps outlined below:
 - a. Carefully insert the spark plug back into the cylinder head. Hand-thread the spark plug until it bottoms out.
 - b. Using the spark plug socket wrench provided, turn the spark plug to ensure it is fully seated.
 - c. Replace the spark plug boot, making sure the boot fully engages the spark plug's tip.
 - d. Install the spark plug access cover.

Recommended Spark Plug Replacement:

Torch Spark plug	Champion	Bosch	Autolite
F7RTC	N9YC	W7DC	52

CLEANING THE SPARK ARRESTOR

Check and clean the spark arrestor after every 100 hours of use or 6 months.

1. Stop the inverter and let it cool for several minutes if running.
2. Move the inverter to a flat, level surface.
3. Remove the screws holding the muffler cover in place (see Figure 18).
4. Loosen the clamp holding the spark arrestor onto the muffler.
5. Slide the spark arrestor band clamp off the spark arrestor screen.

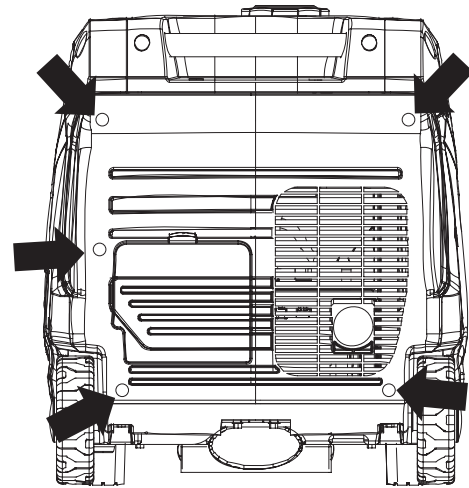


Figure 18: Remove Muffler Access Panel

6. Pull the spark arrestor screen off the muffler exhaust pipe.
7. Using a wire brush, remove any dirt and debris that may have collected on the spark arrestor screen.
8. If the spark arrestor screen shows signs of wear (rips, tears or large openings in the screen), replace the spark arrestor screen.
9. Install the spark arrestor components in the following order:
 - a. Place spark arrestor screen over the muffler exhaust pipe. Push on the screen until it fully bottoms out.
 - b. Place the spark arrestor band clamp over the screen and tighten with a flathead screwdriver
10. Replace the discharge gate.

CHECKING AND ADJUSTING VALVE LASH

⚠ CAUTION



Checking and adjusting valve lash must be done when the engine is cold.

1. Remove the rocker arm cover and carefully remove the gasket. If the gasket is torn or damaged, it must be replaced.
2. Remove the spark plug so the engine can be rotated more easily.
3. Rotate the engine to top dead center (TDC) of the compression stroke. Looking through the spark plug hole, the piston should be at the top.

MAINTENANCE

- Both the rocker arms should be loose at TDC on the compression stroke. If they are not, rotate the engine 360°.
- Insert a feeler gauge between the rocker arm and the push rod and check for clearance (see Figure 19). See table below for valve lash specifications

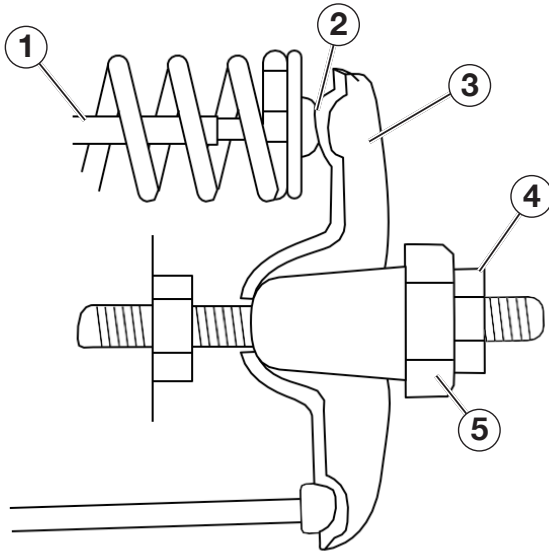


Figure 19
 (1) Push Rod, (2) Feeler Gauge Area
 (3) Rocker Arm, (4) Jam Nut, (5) Adjusting Nut

Standard Valve Lash

	Intake Valve	Exhaust Valve
Valve Lash	0.0035 ± 0.0043 in (0.09 ± 0.11 mm)	0.0043 ± 0.0051 in (0.11 ± 0.13 mm)
Bolt Torque	8-12N.m	8-12N.m

- If an adjustment is required, hold the adjusting nut and loosen the jam nut.
- Turn the adjusting nut to obtain the correct valve lash. When the valve lash is correct, hold the adjusting nut and tighten the jam nut to 106 in-lb (12 N•m).
- Recheck the valve lash after tightening the jam nut.
- Perform this procedure for both the intake and exhaust valves.
- Install the rocker arm cover, gasket and spark plug.

CLEANING THE INVERTER

It is important to inspect and clean the inverter before every use.

Clean All Engine Air Inlet and Outlet Ports – Make sure all engine air inlet and outlet ports are clean of any dirt and debris to ensure the engine does not run hot.

BATTERY SERVICE

To ensure the battery remains charged, the generator should be started every 2 to 3 months and run for a minimum of 15 minutes or a charger should be plugged into the generator and the generator should be charged overnight. Plug the cord from the charger into the charging port “⊕” on the generator. Plug the charger into a 220-volt AC outlet.

Battery Replacement

- Remove the spark plug wire from spark plug.
- Loosen the rubber strap holding the battery in place.
- Disconnect the black negative (-) battery cable from the battery first.
- Disconnect the red positive (+) battery cable second and remove the battery.

NOTICE

Dispose of the used battery properly according to the guidelines established by your local or state government.

- Install the new battery into the generator frame.
- Connect the red positive (+) battery cable to the battery first.
- Connect the black negative (-) battery cable to the battery second.
- Replace rubber strap to hold battery in place.
- Install the spark plug wire onto spark plug.

See below for the battery specification when replacing the battery.

After Market Battery Model	YT5AL
Volts	12
Amp Hr	5
Dimensions	4.63 in by 2.38 in by 5 in

MAINTENANCE

STORAGE

WARNING



Never store an inverter with fuel in the tank indoors or in a poorly ventilated area where the fumes can come in contact with an ignition source such as a: 1) pilot light of a stove, water heater, clothes dryer or any other gas appliance; or 2) spark from an electric appliance.

NOTICE

Gasoline stored for as little as 60 days can go bad, causing gum, varnish and corrosive buildup in fuel lines, fuel passages and the engine. This corrosive buildup restricts the flow of fuel, preventing an engine from starting after a prolonged storage period.

Proper care should be taken to prepare the inverter for any storage

1. Clean the inverter.
2. Siphon all gasoline from the fuel tank as best as possible.
3. Start the engine and allow the inverter to run until all the remaining gasoline in the fuel lines and carburetor is consumed and the engine shuts off.
4. Drain any remaining fuel from the float bowl. See *Draining the Float Bowl* on page 17.

5. Change the oil (see *Changing Engine Oil* on page 16).
6. Remove the spark plug (see *Spark Plug Maintenance* on page 18) and place about 1 tablespoon of oil in the spark plug opening. While placing a clean rag over the spark plug opening, slowly pull the recoil handle to allow the engine to turn over several times. This will distribute the oil and protect the cylinder wall from corroding during storage.
7. Replace the spark plug (see *Spark Plug Maintenance* on page 18).
8. Move the inverter to a clean, dry place for storage.

TROUBLESHOOTING

⚠ WARNING



Before attempting to service or troubleshoot the generator, the owner or service technician must first read the owner's manual and understand and follow all safety instructions. Failure to follow all instructions may result in conditions that can lead to voiding of the product warranty, serious personal injury, property damage or even death.

PROBLEM	POTENTIAL CAUSE	SOLUTION
Engine is running, but no electrical output.	1. Reset breaker is tripped.	1. Reset the reset breaker.
	2. The power cord's plug connector is not fully engaged in the inverter's outlet.	2. Verify plug connector is firmly engaged in the inverter's outlet.
	3. Faulty or defective power cord	3. Replace power cord.
	4. Faulty or defective electrical appliance	4. Try connecting a known good appliance to verify the inverter is producing electrical power.
Engine runs erratic; does not hold a steady RPM.	1. Choke was left in the CHOKE position.	1. Move choke to the RUN position
	2. Dirty air filter	2. Clean the air filter.
	3. Applied loads maybe cycling on and off	3. As applied loads cycle, changes in engine speed may occur; this is a normal condition.
Inverter suddenly stops running.	1. Inverter is out of fuel.	1. Check fuel level. Add fuel if necessary.
	2. The low oil shut down switch has stopped the engine.	2. Check oil level and add oil if necessary.
	3. Too much load	3. Restart the inverter and reduce the load.
Frost on the propane tank or regulator	1. This can be a normal occurrence caused when liquid propane changes phase to a gas. As this process occurs the fuel tank or regulator will cool and allow humid air surrounding the propane tank or regulator to condense into frost.	1. As this can be normal, providing all the propane fuel handling equipment is functioning normally, no remedy is needed.
	2. The propane tank is not equipped with a OPD (rollover protection device) and has been stored in a horizontal position allowing liquid propane to enter the downstream fuel handling equipment.	2. If you suspect your propane fuel tank is not equipped with a OPD device, discontinue operation immediately and replace the propane fuel tank with a propane tank equipped with a roll over protection device.
	3. Propane fuel tank over filled.	3. If you suspect your propane fuel tank has been overfilled, discontinue operation immediately and return the propane fuel tank to the place of purchase or refilling.
Propane fuel smell	1. Fuel regulator or fuel hose and fittings not securely sealed.	1. Using a soap solution check each connection and tighten as needed.
	2. Propane fuel regulator vent active.	2. The propane fuel regulator is equipped with a small vent that will allow a small amount of propane fuel vapor to escape from the regulator when the propane tank valve is opened. This can be normal providing the venting of the propane is brief. If you suspect that this is abnormal, immediately discontinue use and have the propane regulator inspected by a qualified technician.
	3. Residual fuel from the carburetor dispersing after operation.	3. Normal, no remedy is needed.

TROUBLESHOOTING

Poor performance or engine stalling on propane	1. Propane fuel line kinked or crushed.	1. Inspect propane fuel line and remove kinks or other obstructions.
	2. Fuel selector valve not properly positioned.	2. Rotate the fuel valve fully until the pointer is directly in line with the desired fuel.
	3. Gasoline not purged from the carburetor before switching to propane.	3. Turn the propane fuel tank valve to closed. Move the fuel selector valve to propane. Turn the gasoline fuel valve to off. Start the engine and allow the engine to run until the fuel has been consumed in the carburetor. Begin propane start up procedure.

WARRANTY

Ducar power products are covered by a one-year limited consumer warranty.