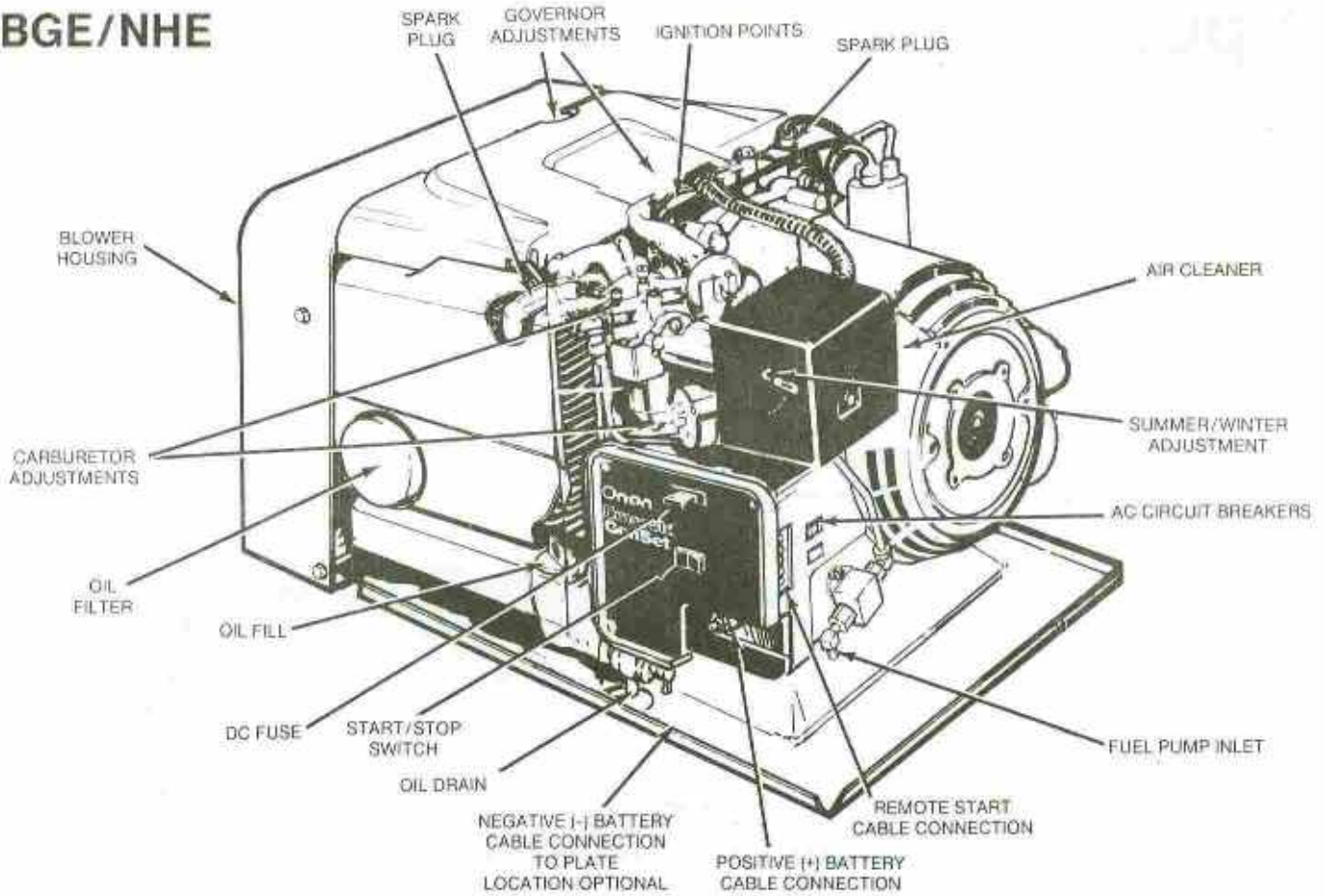


# Specifications

	BGE/BGEL		NHE/NHEL	
	50 Hz	60 Hz	50 Hz	60 Hz
<b>GENERAL</b> Weight Control Fuse	204 lb (92.5 kg) 5 Ampere		230 lb (104 kg) 5 Ampere	
<b>ENGINE</b> Oil Capacity (Includes filter) Tune-Up Specifications Spark Plug Gap Breaker Point Gap Fuel Consumption - Gasoline No-load Half-load Full-load Fuel Consumption - LPG No-load Half-load Full-load Speed (r/min)	4 U.S. quarts (3.8 L)  0.025 in. (0.64 mm) 0.016 in. (0.41 mm)  0.35 gal/hr (1.3 L/hr)    0.4 gal/hr (1.5 L/hr) 0.53 gal/hr (2.0 L/hr)    0.6 gal/hr (2.3 L/hr) 0.73 gal/hr (2.8 L/hr)    0.8 gal/hr (3.0 L/hr)		4 U.S. quarts (3.8 L)  0.025 in. (0.64 mm) 0.016 in. (0.41 mm)  0.35 gal/hr (1.3 L/hr)    0.4 gal/hr (1.5 L/hr) 0.57 gal/hr (2.2 L/hr)    0.7 gal/hr (2.5 L/hr) 0.8 gal/hr (3.0 L/hr)    1.3 gal/hr (4.9 L/hr)	
<b>GENERATOR</b> Power (Watts) Voltage Current (Amperes)	3500 110/220 or 120/240 31.8/15.9 or 29.2/14.6	4000 120 33.3	5000 110/220 or 120/240 45.5/22.7 or 41.7/20.8	NHE-6500, NHEL-6300 120 NHE-54.2, NHEL-52.5
<b>BATTERY RECOMMENDATIONS</b> Size Capacity Cranking Current	12 Volts 360 Cold Cranking Amperes 60 Amperes			

# BGE/NHE



# BGEL/NHEL

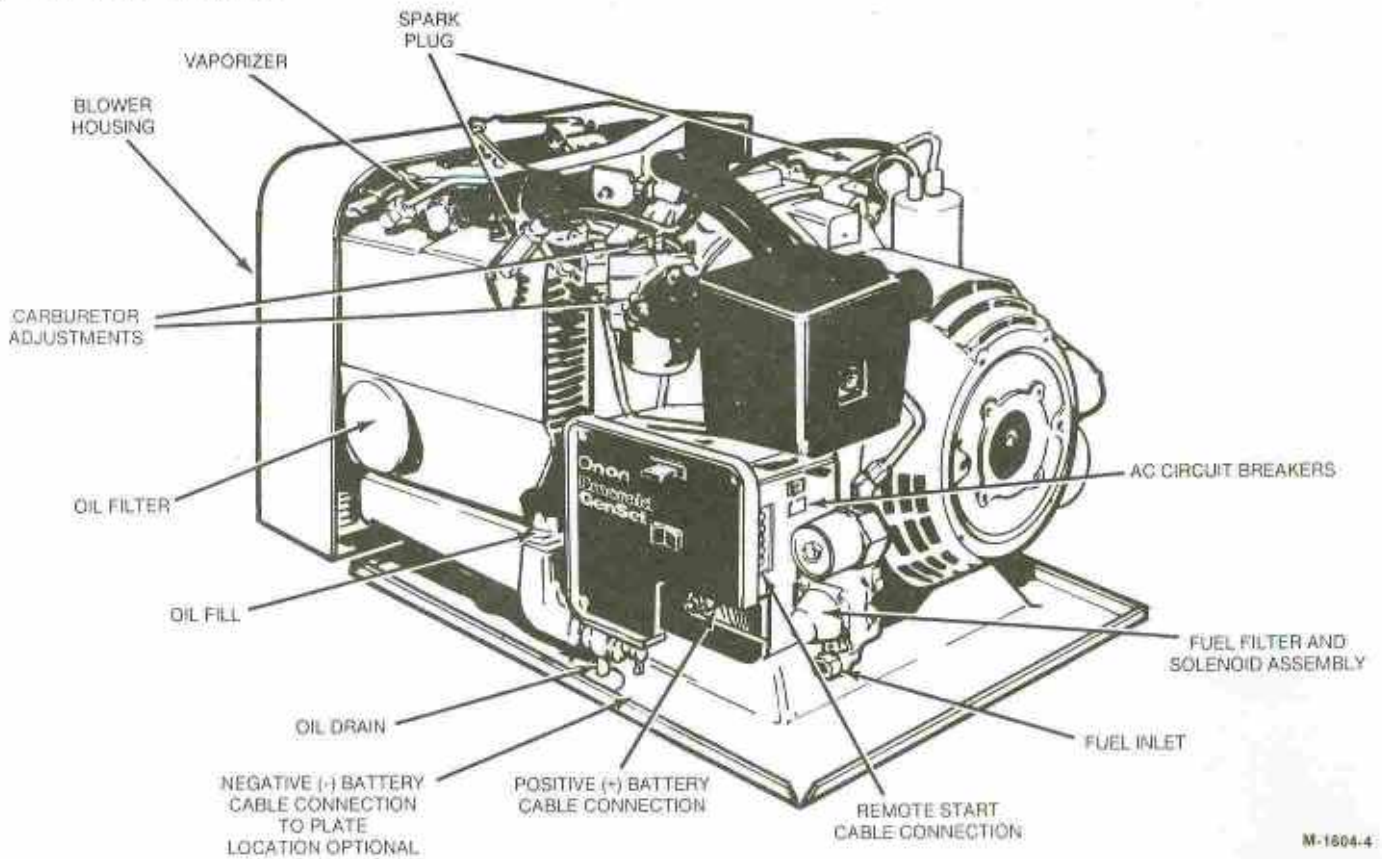


FIGURE 1. TYPICAL EMERALD GENERATOR SETS

# Operation

## ▲WARNING

### EXHAUST GAS IS DEADLY!

*Exhaust gases contain carbon monoxide, an odorless and colorless gas. Carbon monoxide is poisonous and can cause unconsciousness and death. Symptoms of carbon monoxide poisoning can include:*

- Dizziness
- Nausea
- Headache
- Weakness and Sleepiness
- Throbbing in Temples
- Muscular Twitching
- Vomiting
- Inability to Think Coherently

**IF YOU OR ANYONE ELSE EXPERIENCE ANY OF THESE SYMPTOMS, GET OUT INTO THE FRESH AIR IMMEDIATELY. If symptoms persist, seek medical attention. Shut down the unit and do not operate until it has been inspected and repaired.**

**Never sleep in vehicle with the generator set running unless the vehicle interior is equipped with an operating carbon monoxide detector. Protection against carbon monoxide inhalation also includes proper exhaust system installation and visual and audible inspection of the complete exhaust system at the start of each generator set operation.**

## BEFORE STARTING

### General Inspection

Before starting, open generator set access panel/door and perform visual inspection of unit and exhaust system. Look for loose or damaged components and fasteners. Correct as necessary.

**▲WARNING** Exhaust gas presents the hazard of severe personal injury or death. Make sure all the exhaust components are operation-worthy and secure.

Do not start generator set under a load condition. Check that vehicle switching device (if equipped) is at utility position, or vehicle AC distribution panel breakers are off. See Starting and Stopping, this section.

Confirm that vehicle is not parked in high grass or brush.

**▲WARNING** Fire can cause severe personal injury or death. Do not operate the generator set when the vehicle is parked in high grass or brush.

Do not operate the generator set if exhaust gases will not effectively expel away from vehicle.

**▲WARNING** Exhaust gases can cause severe personal injury or death. Never operate the generator set unless the exhaust system is clear of walls, snow banks, or any obstruction that can prevent exhaust gases from dissipating. Never operate any exhaust fan in the recreational vehicle when the generator set is running. It can cause exhaust gas to be drawn into the vehicle interior.

### Lubrication

Check the engine oil level. Keep oil level near as possible to the oil fill level indicator FULL mark. Do not overfill. See the MAINTENANCE section for procedures.

### Fuel

Make sure the fuel tanks are full. See "Recommended Fuels" following.

**▲WARNING** Fuel presents the hazard of fire or explosion which can result in severe personal injury or death. Do not allow any spark, flame, pilot light, lit cigarette, or any other ignition sources around fuel or fuel system components. Keep a type ABC fire extinguisher nearby.

## RECOMMENDED FUELS

### Gasoline BGE and NHE Models

Use clean, fresh, unleaded or regular grade gasoline. Using unleaded gasoline results in extended periods between service, longer spark plug life, and reduced carbon clean-out maintenance. If regular gasoline is used, lead deposits must be removed from the cylinder heads as required to reduce engine power loss. Unleaded gasoline can be used safely after regular gasoline usage if lead deposits have been removed from the cylinder head areas.

**▲CAUTION** Alternating between unleaded and leaded (regular) gasoline can result in engine damage unless lead deposits are removed from the cylinder head areas before using unleaded gasoline again.



## Liquid LPG BGEL and NHEL Models

Use clean, fresh commercial propane or HD-5 grade liquid propane gas in a mixture of at least 90 percent propane. Propane fuels other than HD-5 can contain more than 2.5 percent butane which can result in poor fuel vaporization and poor engine starting in low ambient temperatures (below 32°F or 0°C).

A manual shutoff valve must be mounted on the propane fuel supply tank. This supply tank valve must be opened fully when operating the generator set to ensure the excess flow valve will close with a broken propane fuel line.

## STARTING AND STOPPING

The following are general starting and stopping procedures. For initial start-up of unit, refer to Break-in Procedure.

1. Push the start-stop switch to the START position at the generator set control or at remote control (if equipped). Release the switch when the generator set starts.
2. Allow unit to warm up before connecting a load. During warm-up, observe unit operation. Confirm that unit performance is satisfactory.
3. Apply loads. Refer to SPECIFICATIONS section for generator set output and performance ratings. Then refer to Figure 2 to aid in determining appliance usage during generator operation.

**CAUTION** *Continuous generator set overloading can cause high operating temperatures that can damage the generator windings. Keep the load within the nameplate rating.*

Appliance or Tool	Approximate Running Wattage
Refrigerator	600-1000
Electric broom	200-500
Coffee percolator	550-700
Electric frying pan	1000-1350
Hair dryer	800-1500
Electric stove (per element)	350-1000
Electric iron	500-1200
Radio	50-200
Electric water heater	1000-1500
Space heater	1000-1500
Electric blanket	50-200
Television	200-600
Electric drill	250-750
Battery charger	Up to 800
Air conditioner	1400-2000
Converter	300-500
Microwave oven	700-1500

FIGURE 2. APPROXIMATE POWER REQUIREMENTS OF COMMON APPLIANCES

4. To stop generator set, remove all loads and allow unit to run for three to five minutes to cool down. Then push the start-stop switch to the STOP position at the generator set control or at remote control.

## BREAK-IN PROCEDURE

To prevent high oil consumption or glazing of the engine cylinders, Onan recommends breaking-in of the unit. The procedure is as follows:

1. After starting, plug in enough appliances to total one-half the generator set capacity (about 2,000 watts for BGE and BGEL; about 3000 watts for NHE and NHEL). Refer to Figure 2 for the approximate wattages of common appliances.
2. Run the generator set with this load for two hours.
3. Operate the generator set at three-quarters capacity for another two hours. Refer to Figure 2.

These loads are approximations. If you do not have enough appliances in the vehicle for three-quarters capacity, engage as many appliances as you can.

4. Change the engine crankcase oil after the 50 hours of operation and every 150 hours after that. See MAINTENANCE section.

## OPERATING CONDITIONS

### Hot Weather

In hot weather (above 90°F/33°C), keep the cooling fins clean and see that nothing obstructs airflow to and from the generator set.

### Cold Weather

Use the correct oil weight and type for cold weather conditions. See the MAINTENANCE section. Change the oil only when the engine is warm. If sudden temperature variations occur and your current oil is not the appropriate viscosity, change the oil following the recommendations.

**BGE and NHE (Gasoline) Models Only:** At temperatures below 40°F (4°C), move the carburetor air preheater lever to the WINTER position. The actuating lever is located on the outside of the air cleaner housing (see Figure 7). At temperatures above 70°F (21°C), move the preheater lever to the SUMMER position. Between 40°F (4°C) and 70°F (21°C), you can leave the preheater in either position.

**CAUTION** *Operation of the preheater when temperatures are above 70°F (21°C) can cause erratic operation and can result in reduced engine power and reduced engine life.*

### High Altitudes

Maximum power will be reduced about four percent for each 1000 feet (310 m) above sea level after the first 1000 feet (310 m). If operation is inhibited by high altitude (above 2000 feet or 620 m), adjust the carburetor main fuel adjustment for a slightly leaner fuel mixture. Turn the main fuel adjustment in 1/8 turn. See Figure 3.

**CAUTION** *When determining fuel mixture settings, never force the fuel mixture adjustment needles against their seats. This damages the seats and the needles.*

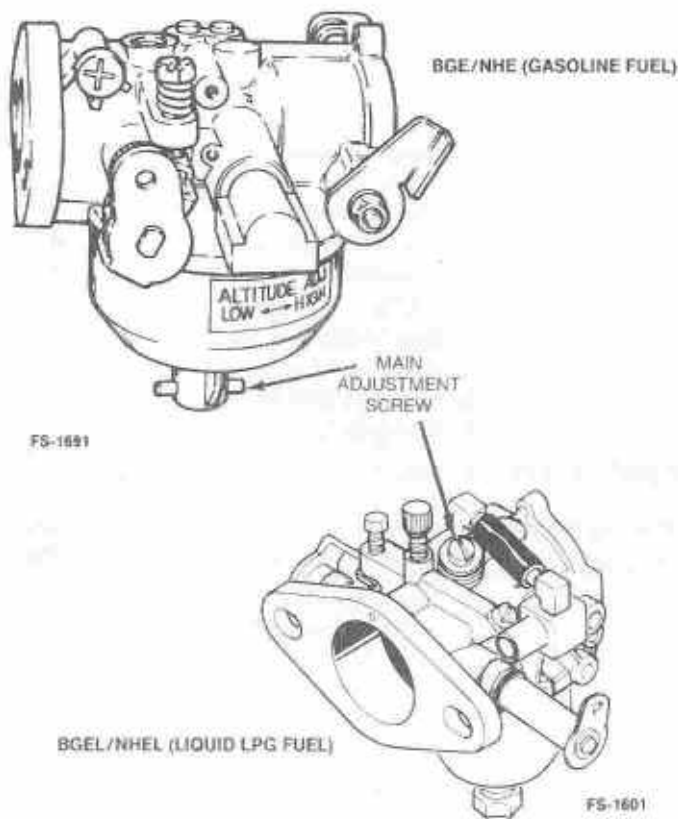


FIGURE 3. CARBURETOR MAIN ADJUSTMENT SCREW

### Extremely Dusty or Dirty Conditions

1. Keep the generator set clean. Keep cooling surfaces clean.
2. Service the air cleaner as frequently as necessary.
3. Change the engine crankcase oil every 50 operating hours.
4. Keep oil in dust-tight containers.
5. Keep the governor linkage clean. The *MAINTENANCE* section shows this procedure.

### GENERATOR SET EXERCISE

Infrequent use can result in difficult starting and moisture condensation in the engine. Moisture is caused by the engine not running enough to reach normal operating temperature. If severe enough engine damage can result.

During infrequent use, guard against engine damage. Run the generator set at 50 percent capacity (BGE/BGEL: 2000 watts; NHE/NHEL: 3000 watts; or one air conditioner) for two hours every four weeks. Exercising for longer time periods is better than several short intervals.

### REMOTE CONTROL

Optional remote start-stop controls are available for all Onan recreational vehicle generator sets. The remote control allows you to operate your generator set from inside your motor home.

The Standard remote control includes a start-stop switch, and an indicator lamp that illuminates when the unit is operating. The Deluxe control contains these items plus a running time meter and a battery condition meter. See Figure 4.

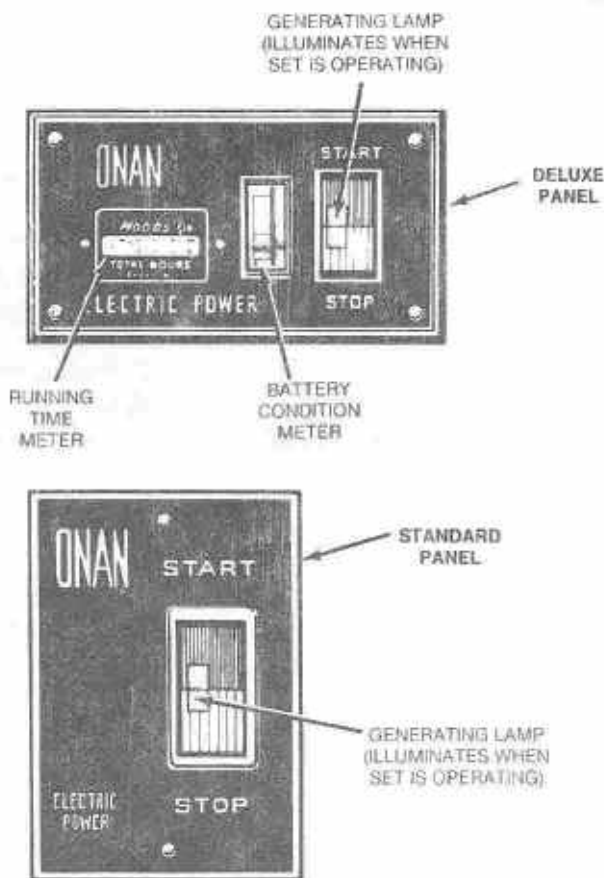


FIGURE 4. REMOTE CONTROL PANELS

### Using the Remote Control

Depress the start-stop switch to the START position and hold until the light illuminates (this indicates that the generator set is operating), then release the switch. See Figure 4.

If you held the switch at START position for ten seconds and the light does not illuminate, release the switch. Wait two minutes and try again. If the second attempt does not start the generator set, start the unit at the set control. Failure of the light to illuminate may indicate an open circuit in the remote wiring. Contact an Onan dealer for assistance.

The running time meter indicates cumulative total hours of generator set use. Record hours indicated each time unit maintenance is performed.

The battery condition meter indicates the relative condition of the battery, and battery charging circuit. The meter should remain in the normal zone. If meter reading is consistently high or low, contact an Onan dealer for assistance.

## TROUBLESHOOTING GUIDE

The following is a simplified troubleshooting guide. If these recommendations fail to resolve the problem, contact your Onan service organization generator set repair service.

Problem	Probable Cause	Solution
FAILS TO CRANK	<ol style="list-style-type: none"> <li>1. Low battery.</li> <li>2. Bad battery connection.</li> <li>3. Blown fuse.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check battery electrolyte level.</li> <li>2. Clean and tighten all battery and and cable connections.</li> <li>3. Replace fuse on control box. See specifications for proper fuse rating.</li> </ol>
CRANKS SLOWLY	<ol style="list-style-type: none"> <li>1. Low battery.</li> <li>2. Bad battery connection.</li> <li>3. Oil is too heavy.</li> <li>4. Load connected.</li> </ol>	<ol style="list-style-type: none"> <li>1. See "Fails to Crank", #1.</li> <li>2. See "Fails to Crank", #2.</li> <li>3. Replace with lighter oil.</li> <li>4. Remove load.</li> </ol>
CRANKS BUT WON'T START	<ol style="list-style-type: none"> <li>1. Fuel below genset pick-up level in tank.</li> <li>2. Fuel supply shutoff valve closed.</li> <li>3. Carbon deposits on spark plugs.</li> </ol>	<ol style="list-style-type: none"> <li>1. Add fuel.</li> <li>2. Fully open fuel supply valve.</li> <li>3. Remove spark plugs and clean.</li> </ol>
EXHAUSTING BLACK SMOKE	<ol style="list-style-type: none"> <li>1. Rich fuel mixture</li> <li>2. Dirty air filter.</li> <li>3. Excess oil.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn main fuel adjustment in 1/8 turn (location of adjustment is shown in Figure 3).</li> <li>2. Replace air filter.</li> <li>3. Reduce engine oil level.</li> </ol>
UNIT RUNS THEN STOPS	<ol style="list-style-type: none"> <li>1. Out of fuel.</li> <li>2. Low oil level.</li> <li>3. Excess oil.</li> </ol>	<ol style="list-style-type: none"> <li>1. Refill fuel tank.</li> <li>2. Add oil if necessary.</li> <li>3. Reduce engine oil level.</li> </ol>
UNIT RUNS BUT SURGES	<ol style="list-style-type: none"> <li>1. Worn breaker points.</li> <li>2. Loose or worn spark plug leads.</li> <li>3. Ignition coil, wiring, or control components defective.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust or replace breaker points.</li> <li>2. Check security of spark plug leads at spark plugs and ignition coil. Replace leads if worn.</li> <li>3. Contact an Onan representative.</li> </ol>

**▲WARNING**

*A hot generator set can cause severe burns. Always allow the generator set to cool before performing any maintenance or service.*