



Operator Manual

Cummins **Onan**

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RV Generator Set

HGJBB (Spec A)

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1 Important Safety Instructions

SAVE THESE INSTRUCTIONS - This manual contains important instructions that should be followed during installation and maintenance of the generator set and batteries.

Safe and efficient operation can be achieved only if the equipment is properly operated and maintained. Many accidents are caused by failure to follow fundamental rules and precautions.

1.1 Warning, Caution and Note Styles Used In This Manual

The following safety styles and symbols found throughout this manual indicate potentially hazardous conditions to the operator, service personnel or the equipment.



DANGER: Warns of a hazard that will result in severe personal injury or death .



WARNING: Warns of a hazard that may result in severe personal injury or death .



CAUTION: Warns of a hazard or an unsafe practice that can result in product or property damage .



NOTE: A short piece of text giving information that augments the current text .

1.2 General Precautions



WARNING: The generator set produces carbon monoxide, has dangerous moving parts and may be hot at times. Keep children away from the generator set.



WARNING: Evaporative starting fluids are highly explosive and may cause personal injury or death if ignited. Do not use evaporative starting fluids.



WARNING: Alcohol, drugs and mental or physical fatigue may cause impairment which may result in personal injury to the affected person or others. Do not operate, service, or install a generator set after consuming alcohol or drugs, or when mentally or physically fatigued.



WARNING: Hot, moving, or electrically charged parts can cause severe injury or death. Only trained and experienced personnel should make adjustments while the generator set is running.



WARNING: Operating the genset with the access cover off can result in severe personal injury or equipment damage. Hot components are exposed when the access cover is removed and genset cooling air does not circulate properly. Do not operate the genset with the access cover removed.



WARNING: Improper installation may cause product damage, severe injury, or death. Comply with all applicable local, state and federal codes and regulations to verify proper generator set installation.

-  **WARNING:** When equipped with an integral or add-on Auto-matic Generator Starting System (AGS) control, carbon monoxide exhaust inhalation (CO), electric shock, and moving parts hazards are possible due to unexpected starting. Turn off AGS whenever performing maintenance or service, when the vehicle is stored between uses, is awaiting service, or is parked in a garage or other confined area to avoid these hazards.
-  **WARNING:** Electricity, fuel, exhaust, moving parts and batteries present hazards which can result in severe personal injury or death. Read and adhere to all cautions and warnings found in this manual to avoid personal injury.
-  **CAUTION:** Improper battery cable disconnection may cause accidental or remote starting which may result in injury to the person servicing the generator set. Disconnect the negative (-) battery cable at the battery to prevent starting while servicing the generator set.
-  **CAUTION:** The generator set requires ample air flow to run without overheating. Keep the generator set and its compartment clean and free from obstructions at all times.
-  **CAUTION:** Restricted air flow may cause a fire. Do not store oil, rags or other gear in the generator set or generator set compartment to prevent starting a fire.
-  **CAUTION:** Operation of the generator set may loosen fasteners. Operating a generator set with loose fasteners may cause damage to the generator set. Make sure all fasteners are secured and torqued properly.

1.3 Automatic Generator Start Control Hazards

-  **WARNING:** Accidental starting can cause severe personal injury or death. Turn off the AGS whenever performing maintenance or service, when the vehicle is stored between uses, is awaiting service, or is parked in a garage or other confined area.

Unexpected starting may occur if the generator set is equipped with an inverter-charge or other Automatic Generator Start (AGS) control. This may cause exposure to:

- Unexpected generator starting.
- Moving parts hazards.
- Electric shock.
- Exhaust carbon monoxide (CO).

1.4 Generator Voltage is Deadly

-  **WARNING:** Improperly connected generator electrical output connections can cause equipment damage, severe personal injury, or death and therefore must be made by a trained and experienced electrician in accordance with applicable codes.
-  **WARNING:** Improper installations can cause equipment damage, severe personal injury, or death and therefore all installations must be conducted by a trained and experienced person in accordance with the installation instructions and all applicable codes.



WARNING: When equipped with an integral or add-on Auto-matic Generator Starting System (AGS) control, carbon monoxide exhaust inhalation (CO), electric shock, and moving parts hazards are possible due to unexpected starting. Turn off AGS whenever performing maintenance or service, when the vehicle is stored between uses, is awaiting service, or is parked in a garage or other confined area to avoid these hazards.



WARNING: Back feed to shore power can cause electrocution and damage to equipment. The generator set must not be connected to shore power or to any other source of electrical power. An approved switching device must be used to prevent interconnections.



WARNING: Live electrical equipment can cause electric shock. Use caution when working on live electrical equipment. Remove jewelry, make sure clothing and shoes are dry, stand on a dry wooden platform or rubber insulating mat, and use tools with insulated handles.

1.5 Engine Exhaust is Deadly



WARNING: When equipped with an integral or add-on Auto-matic Generator Starting System (AGS) control, carbon monoxide exhaust inhalation (CO), electric shock, and moving parts hazards are possible due to unexpected starting. Turn off AGS whenever performing maintenance or service, when the vehicle is stored between uses, is awaiting service, or is parked in a garage or other confined area to avoid these hazards.



WARNING: Carbon monoxide is a poisonous gas. Inhalation of this gas can cause severe personal injury or death. Adhere to the following bullet points to make sure carbon monoxide is not being inhaled by occupants of the vehicle as well as others working on or around the generator set.

- Inspect for exhaust leaks at every startup and after every eight hours of running.
- Never occupy the vehicle while the generator set is running unless the vehicle is equipped with a working carbon monoxide detector.
- Never operate the generator set when the vehicle is in a confined space, such as a garage, basement, or building of any kind.
- Make sure the exhaust system is installed in accordance with the generator set installation manual.
- Never use engine cooling air for heating a working or living space compartment.

Carbon monoxide poisoning symptoms include:

- headache
- dizziness
- weakness
- nausea
- vomiting
- chest pain
- confusion
- loss of consciousness

1.6 Fuel is Flammable and Explosive



WARNING: *Fuel and fuel vapor is highly explosive. Adhere to the following bullets to avoid igniting fuel and fuel vapors.*

- *Do not smoke or turn electrical switches on or off where fuel fumes are present or in areas sharing ventilation with fuel tanks or equipment.*
- *Keep flame, sparks, pilot lights, arc-producing equipment and all other sources of ignition well away from fuel lines and sources.*
- *Fuel lines must be secured, free of leaks and separated or shielded from electrical wiring.*

Leaks can lead to explosive accumulations of gas.

- **Natural gas** rises when released and can accumulate inside housings and buildings.
- **LPG** sinks when released and can accumulate inside housings and basements and other below-grade spaces.



NOTE: Propane (LPG) is identifiable by the rotten egg smell it emits.

1.7 Battery Gas is Explosive



WARNING: *Battery gas is highly explosive and may cause personal injury or death if ignited. Take the proper precautions to avoid personal injury.*

- *For personal safety, wear appropriate PPE when working on or around the generator set.*
- *To make sure battery gas is not ignited, do not smoke around the generator set.*
- *To reduce arcing when disconnecting or reconnecting battery cables, always disconnect the negative (-) battery cable first and reconnect it last.*

1.8 Moving Parts Can Cause Severe Personal Injury or Death



WARNING: *When equipped with an integral or add-on Auto-matic Generator Starting System (AGS) control, carbon monoxide exhaust inhalation (CO), electric shock, and moving parts hazards are possible due to unexpected starting. Turn off AGS whenever performing maintenance or service, when the vehicle is stored between uses, is awaiting service, or is parked in a garage or other confined area to avoid these hazards.*



WARNING: *Moving parts can catch on loose items such as clothing or jewelry. Do not wear loose clothing or jewelry near moving parts such as PTO (power take-off) shafts, fans, belts, and pulleys.*



WARNING: *Moving parts can entangle appendages such as fingers. Keep the protective guards in place over fans, belts, pulleys, and other moving parts and keep hands away from all moving parts.*

2 Introduction



WARNING: *Improperly connected generator electrical output connections can cause equipment damage, severe personal injury, or death and therefore must be made by a trained and experienced electrician in accordance with applicable codes.*



WARNING: *Improper installations can cause equipment damage, severe personal injury, or death and therefore all installations must be conducted by a trained and experienced person in accordance with the installation instructions and all applicable codes.*

2.1 About This Manual

This manual covers the operation and maintenance of the generator set or sets listed on the front cover. Each operator should study this manual carefully and adhere to all instructions and safety precautions therein. Keep this manual readily available for reference.

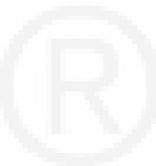
This manual provides the operator-level instructions necessary for operating the genset and maintaining it at top performance.



WARNING: *This generator set is not a life support system. It can stop without warning. Children, persons with physical or mental limitations, and pets could suffer personal injury or death. A personal attendant, redundant power or an alarm system must be used if genset operation is critical.*

2.2 Nameplate

Nameplate information is very useful in identifying a product. Have the model and serial numbers available when contacting a Cummins/Onan dealer for parts, service or product information.



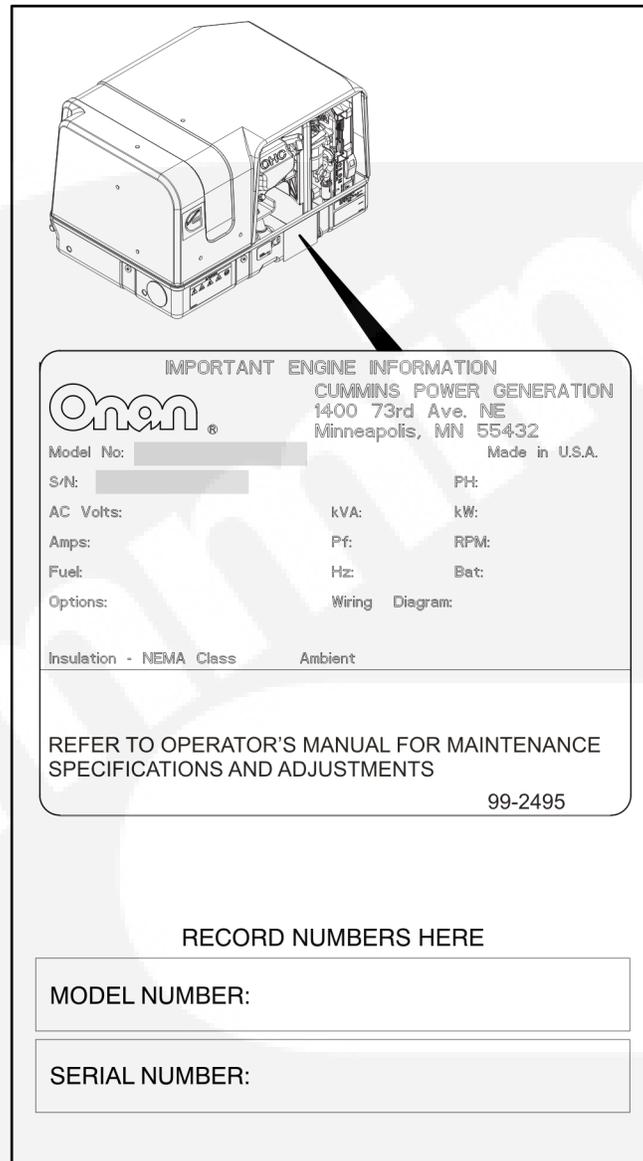


FIGURE 1. NAMEPLATE LOCATION

2.3 Typical Genset

The control panel and the components requiring attention during periodic maintenance (see *Periodic Maintenance*) are located behind a removable access cover. See Figure 2.

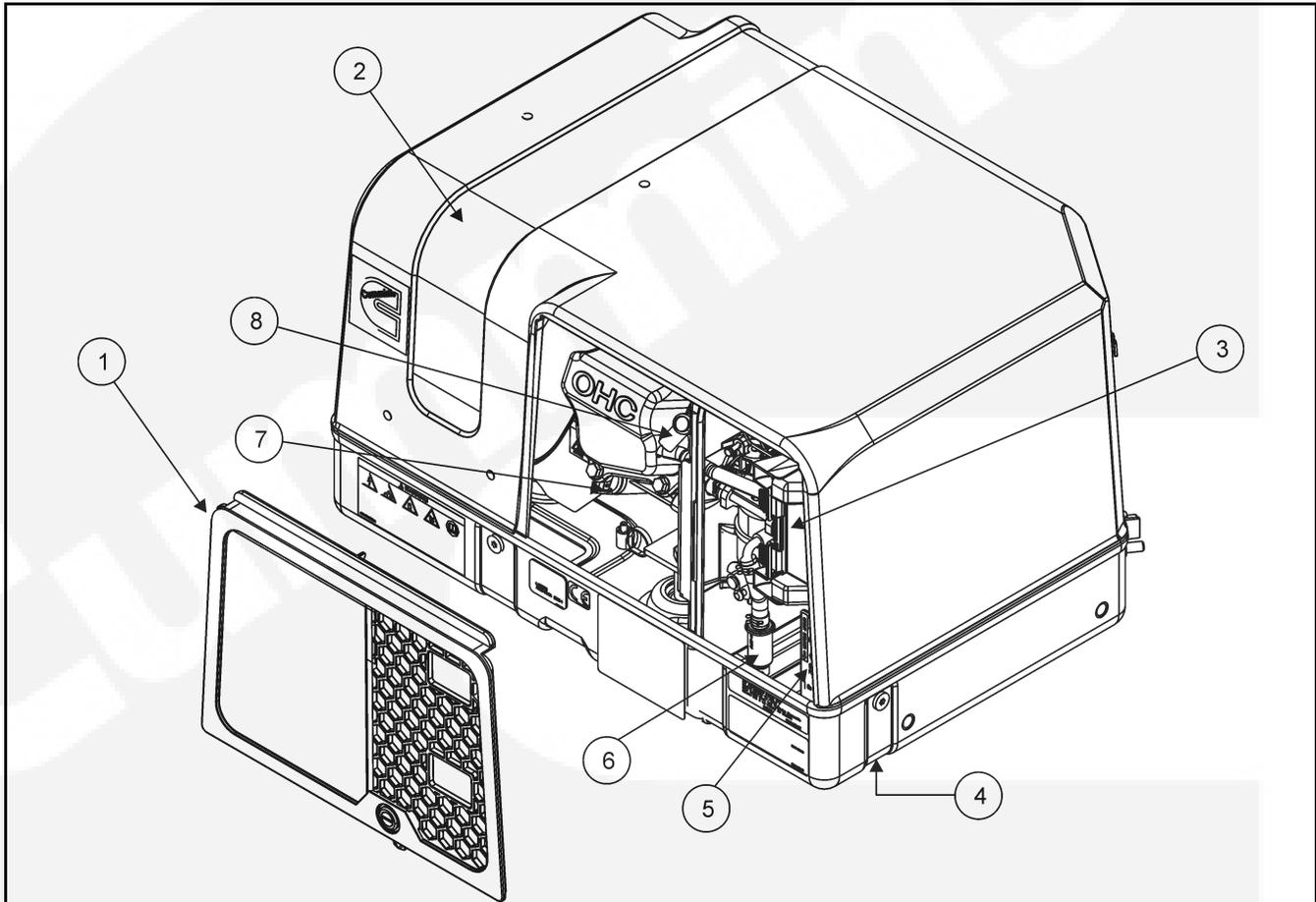
Removing the access cover: Unlock the access cover, using a flat-end tool. Pull the access cover down and out to remove the access cover.

Securing the access cover: Slide the access cover up and into the opening in the housing. Hold the base of the cover flush with the housing. Use a flat-end tool to secure the access cover.



WARNING: Operating the genset with the access cover off can result in severe personal injury or equipment damage. Hot components are exposed when the access cover is removed and genset cooling air does not circulate properly. Do not operate the genset with the access cover removed.

The genset itself is usually located behind a door in a compartment somewhere around the perimeter of the vehicle.



No.	Description	No.	Description
1	Removable Access Cover	5	Control Panel
2	Muffler (inside cover)	6	Fuel Filter (gasoline models only)
3	Air Filter Cover	7	Oil Fill Cap and Dipstick
4	Oil Drain (bottom)	8	Spark Plug Access

FIGURE 2. TYPICAL GENSET

2.4 Fuel Recommendations



WARNING: Gasoline and LPG are highly flammable and explosive and can cause severe personal injury or death. Do not smoke or turn electrical switches ON or OFF where fuel fumes, tanks or equipment are present or in areas sharing ventilation. Keep flames, sparks, pilot lights, arc-producing equipment and switches and all other sources of ignition well away. Keep a type ABC fire extinguisher in the vehicle.

2.4.1 Gasoline Models

Use clean, fresh unleaded gasoline having a minimum octane rating (Anti-Knock Index) of 87.



CAUTION: Do not use gasoline or gasoline additives containing methanol because methanol can be corrosive to fuel system components.

Avoid using leaded gasoline because of the extra engine maintenance that will be required.

2.4.2 LPG Models

Use clean, fresh HD-5 grade liquified petroleum gas (LPG) or equivalent product consisting of at least 90 percent propane. Commercial liquified petroleum gas fuels may 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 (0° C)).

Satisfactory performance on low-pressure LPG models requires that the LPG vapor be supplied at a pressure within the range indicated in *Specifications*.



WARNING: High LPG supply pressure can cause gas leaks which can lead to fire and severe personal injury or death. LPG supply pressure must be adjusted to *Specifications* by trained and experienced personnel.

2.5 Engine Oil Recommendations

Use API (American Petroleum Institute) performance Class **SJ**, **SH** or **SG** engine oil, which may be in combination with performance Class CH-4, CG-4 or CF-4 (for example: SJ/CH-4). Also look for the SAE (Society of Automotive Engineers) viscosity grade. Referring to Table 1, choose the viscosity grade appropriate for the ambient temperatures expected until the next scheduled oil change.

Single-grade SAE 30 oil is preferable when temperatures are consistently above freezing. Multigrade oils are better when wide temperature variations are expected.

The use of synthetic oils with recommended viscosity grade is acceptable. However, oil change intervals found in [Chapter 4](#) must still be followed.

TABLE 1. OIL VISCOSITY VS. TEMPERATURE

EXPECTED AMBIENT TEMPERATURES	SAE VISCOSITY GRADE
32° F (0° C) and higher	30
10° F to 100° F (-12° C to 38° C)	15W-40 (OnaMax™)
0° F to 80° F (-18° C to 27° C)	10W-30 10W-40

EXPECTED AMBIENT TEMPERATURES	SAE VISCOSITY GRADE
-20° F to 50° F (-28° C to 10° C)	5W-30

2.6 Starting Batteries

The genset has a 12 volt, direct current (DC) engine cranking and control system. See *Specifications* regarding minimum battery ratings for reliable genset cranking, especially in cold weather. Also see Periodic Maintenance Schedule and the battery manufacturer's instructions regarding battery maintenance. Reliable genset starting and starter service life depend upon adequate battery system capacity and proper maintenance.

2.7 Genset Control Panel

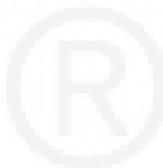
The genset control panel (Figure 3) is located behind the maintenance access cover on the genset (Figure 2) and has the following features:

Control Switch - This switch is used to prime the fuel system, start and stop the genset and display the fault code.

- **START position** - Hold the switch in this position to crank and start the genset.
- **STOP/PRIME position** - Press the switch to this position to stop the generator set.
- **STOP/PRIME position** - Hold the switch in this position to prime the fuel system (gasoline models only).

Status Indicator Light - This light is an LED (light emitting diode) in the control switch that blinks rapidly during cranking and stays on continuously when the genset is running. If the genset shuts down abnormally, the light will blink a numerical code to indicate the cause of the shutdown. See Troubleshooting about display fault codes.

Line Circuit Breaker -The line circuit breaker protects the AC power leads connected to the genset from overloads and equipment short circuits.



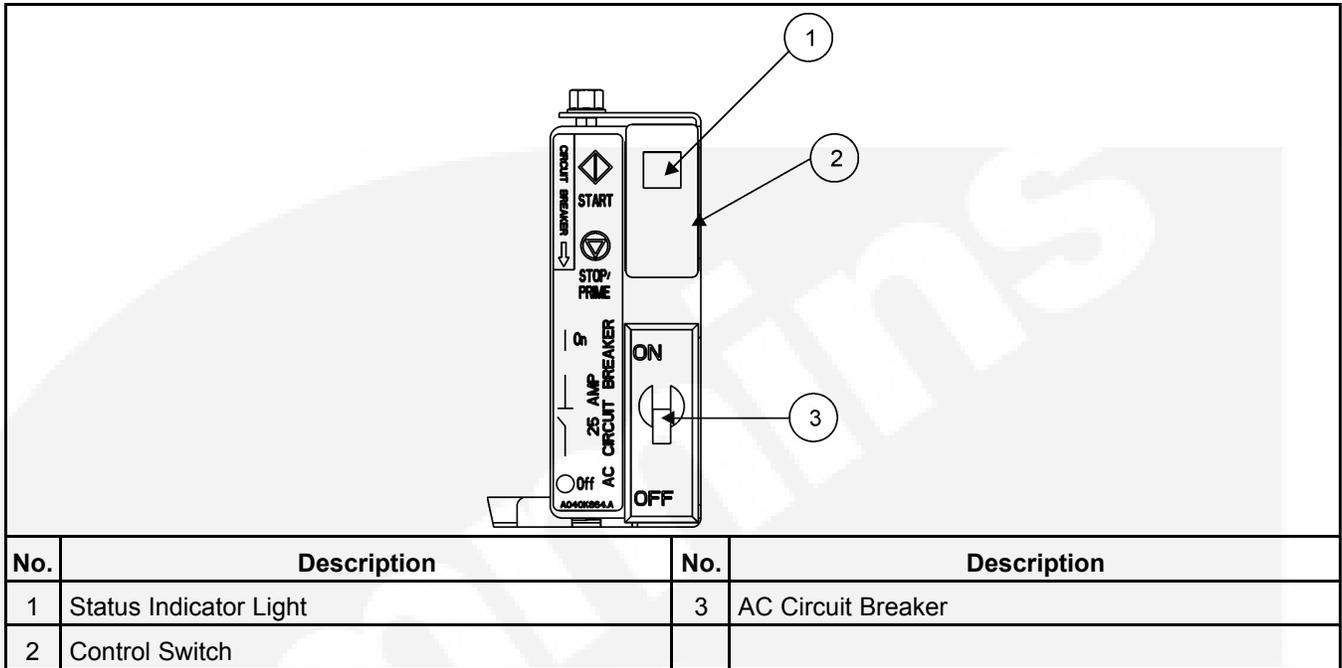


FIGURE 3. GENSET CONTROL PANEL

2.8 Remote Control Panel

The vehicle probably has a control panel inside the vehicle for remote control of the genset. Onan offers three remote control kits as follows:

- Remote switch with status indicator light only (Figure 4).
- Remote switch with status indicator light and hour meter (Figure 5).
- Remote switch with status indicator light and DC voltmeter (Figure 6).

The hour meter records genset operating time in hours. It cannot be reset.

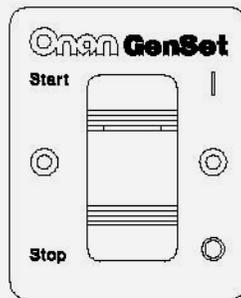


FIGURE 4. REMOTE SWITCH

The DC voltmeter indicates whether voltage across the 12 VDC control system and battery is normal. If the indicator consistently stays above or below the normal zone, see MAINTAINING THE BATTERY AND BATTERY CONNECTIONS.

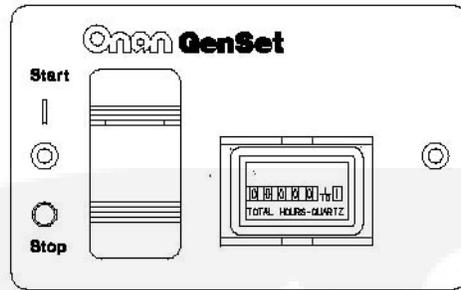


FIGURE 5. REMOTE SWITCH / HOUR METER

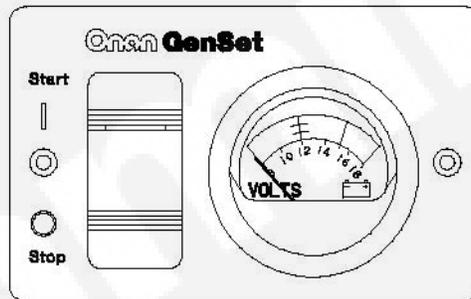
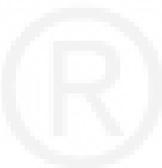


FIGURE 6. REMOTE SWITCH / DC VOLTMETER



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3 Operation



WARNING: EXHAUST GAS IS DEADLY!

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

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

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

Never occupy the vehicle with the genset running unless the vehicle is equipped with a working carbon monoxide detector. Primary protection against inhaling carbon monoxide, however, is proper installation of the exhaust system, daily (every eight hour) inspection for visible and audible exhaust system leaks.

3.1 Conducting the Pre-Start Checks

Before the first start of the day and after every eight hours of operation, inspect the genset as instructed under CONDUCTING GENERAL INSPECTIONS. Keep a log of maintenance and the hours run and perform any maintenance that may be due. See RETURNING THE GENSET TO SERVICE if the vehicle has been in storage.

Before each start:

1. Make sure all vehicle CO detectors are working.
2. Check for signs of fuel and exhaust leaks and for damage to the exhaust system.
3. Turn off the air conditioner and other large appliances.

3.2 Priming Gasoline Fuel Systems

STOP/PRIME position - Hold the control switch in this position to prime the fuel system if the generator set has run out of fuel (gasoline models only).



NOTE: The status indicator light will stay on while the pump is on.

3.3 Starting the Genset

Park the vehicle so that genset exhaust gases disperse away from the vehicle. Barriers such as walls, snow banks, high grass, brush and other vehicles can cause exhaust gases to accumulate in and around the vehicle.

Do not operate power ventilators or exhaust fans while the vehicle is standing with the genset running. The ventilator or fan can draw exhaust gases into the vehicle.

Check all CO monitors to assure proper operation.



WARNING: EXHAUST GAS IS DEADLY! Do not operate the genset if there is an exhaust leak or any danger of exhaust gases entering or being drawn into the vehicle.



WARNING: Do not park the vehicle in high grass or brush. Contact with the exhaust system can cause a fire.

After conducting the visual inspections and after having repaired any components that did not pass inspection:

1. **START position** - Hold the switch in this position until the generator set starts.
 - The status indicator light on the switch flashes while cranking. It will stay on continuously when the generator set is running.
2. The generator set can be cranked for about 30 seconds. After this period, Fault Code 4 (over crank) will occur.
3. Wait 5 seconds for the control to reset before trying again. After five tries, let the starter motor cool down for 30 seconds before trying again.
4. See *Troubleshooting* if the engine shuts down and the status indicator light blinks.
5. For top performance and engine life, especially in colder weather, let the engine warm up for two minutes before connecting appliances.
6. Always secure the access cover after starting the genset at the genset control panel.



WARNING: Operating the genset with the access cover off can lead to severe burns and engine damage due to overheating. Always secure the cover after starting the genset.

3.4 Stopping the Genset

Turn off the air conditioner and other large appliances and let the genset run for two minutes to cool down before stopping. This reduces backfiring and run-on. Then press the switch to **STOP** to stop the genset.

3.5 Restarting the Genset

If the genset shuts down, disconnect or turn off as many appliances as possible and try restarting the genset. Reconnect only as many appliances as will not overload the genset or cause the circuit breaker to trip. See [Section 3.7](#) for tripped circuit breaker resetting instructions.

3.6 Loading the Genset

The genset can power AC motors, air conditioners, AC/DC converters and other appliances. How much appliance load* can be powered depends upon the genset power rating. The genset will shut down or its circuit breakers will trip if the sum of the loads exceeds genset power.

To avoid overloading the genset and causing shutdowns, compare the sum of the loads of the appliances that are likely to be used at the same time with the power rating of the genset. Use Table 2 or the ratings on the appliances themselves (if so marked) to obtain the individual appliance loads. ***It may be necessary to run fewer appliances at the same time—the sum of the loads must not be greater than genset rating.***

Note that the genset may shut down due to overload—even though the sum of the loads is less than genset rating—when a large motor or air conditioner is started last or cycles off and then on again. The reason for this is that a motor's startup load is much larger than its running load. ***It may be necessary to run fewer appliances when large motors and air conditioners are cycling on and off.***

TABLE 2. TYPICAL APPLIANCE LOADS

Appliance	Load (watts)
Air Conditioner	1400-2000
Battery Charger	Up to 3000
DC Converter	300-700
Refrigerator	600-1000
Microwave Oven	1000-1500
Electric Frying Pan or Wok	1000-1500
Electric Stove Element	350-1000
Electric Water Heater	1000-1500
Electric Iron	500-1200
Electric Hair Dryer	800-1500
Coffee Percolator	550-750
Television	200-600
Radio	50-200
Electric Drill	250-750
Electric Broom	200-500
Electric Blanket	50-200

Note also that air density decreases as altitude increases, causing generator set engine power to decrease. Power decreases approximately 3.5% of rated power each 1000 feet (305 m) of increase in elevation. See the following table for typical elevation/generator set power calculations. It may be necessary to run fewer appliances at higher altitudes.

As ambient temperature increases, rated generator set engine power decreases approximately 1% for every 10 °F (5.5 °C) above 77 °F (25 °C). It may be necessary to run fewer appliances at higher ambient temperatures.

TABLE 3. POWER VS. ALTITUDE

Elevation above Mean Sea Level	Maximum Genset Power ¹
up to 500 feet (152 m)	2500/2800 watts (rated)
2500 ft (762 m)	2325/2600 watts
5500 ft (1676 m)	2060/2310 watts
above 5500 ft (1676 m)	2060/2310 watts minus 87.5/98 watts each 1000 ft (305 m)
1. - This table does not take into account the effect circuit breakers may have in limiting maximum power.	

* Appliance load and genset power are measured in terms of watts (W) or kilowatts (kW), where 1 kilowatt (kW) = 1000 watts (W).

3.7 Resetting Circuit Breakers

If a circuit breaker in the main power distribution panel of the vehicle or on the genset (Figure 7) trips, either a circuit shorted or too many appliances were running. Note that the genset may continue to run after a circuit breaker trips.

If a circuit breaker trips, disconnect or turn off as many loads as possible and reset the circuit breaker. (Push the circuit breaker to **OFF** to reset it and then to **ON** to reconnect the circuit.) If the circuit breaker trips right away, either the electrical distribution system has a short circuit or the circuit breaker is faulty. Contact your local Cummins Onan dealer or distributor for generator service.

If the circuit breaker does not trip, reconnect the appliances, one by one, up to a total load that does not overload the genset or cause the circuit breaker to trip. If a circuit breaker trips right away when an appliance is connected, the appliance probably has a short.

Electrical appliances and tools must be used and maintained properly and be properly grounded to cause the line circuit breakers to trip when short circuits occur.



WARNING: *Short circuits in electrical appliances and tools can cause fire and electrical shock leading to severe personal injury or death. Read and follow the equipment and tool manufacturer's instructions and warnings regarding use, maintenance and proper grounding.*

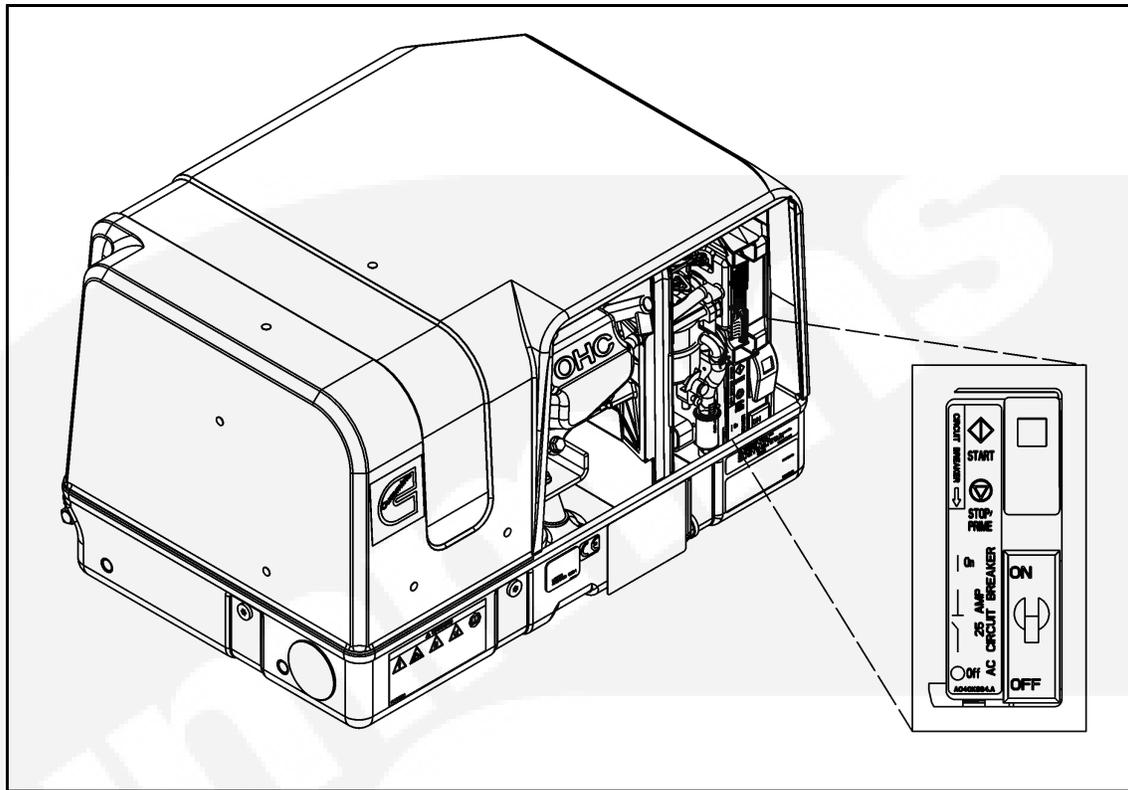


FIGURE 7. AC CIRCUIT BREAKER

3.8 Connecting Shore Power

A vehicle with provisions for connecting utility power must have an approved device to keep the genset and utility from being interconnected. See the genset Installation Manual for more information.



WARNING: *Backfeed to shore power can cause electric shock resulting in severe personal injury or death and damage to equipment. The vehicle must have an approved device to prevent the genset from being interconnected with shore power.*

3.9 Operating in Cold Weather

Pay particular attention to the following items when operating the genset in cold weather:

1. Make sure engine oil viscosity is appropriate for the ambient temperatures. Change oil if there is a sudden drop in temperature. See ENGINE OIL RECOMMENDATIONS.
2. Perform spark plug maintenance (See REPLACING THE SPARK PLUG).
3. Perform battery maintenance (See MAINTAINING THE BATTERY AND BATTERY CONNECTIONS).

3.10 Operating in Hot Weather

Pay particular attention to the following items when operating the genset in hot weather:

1. Make sure nothing blocks airflow to and from the genset.
2. Make sure engine oil viscosity is appropriate for the ambient temperatures. See ENGINE OIL RECOMMENDATIONS.
3. Keep the genset clean.
4. Perform maintenance due. See PERIODIC MAINTENANCE SCHEDULE.

3.11 Operating in Dusty Environments

Pay particular attention to the following items when operating the genset in dusty environments:

1. Do not let dirt and debris accumulate inside the genset compartment. Keep the genset clean.
2. Perform air cleaner maintenance more often (See REPLACING THE AIR FILTER ELEMENT).
3. Keep containers of engine oil that have been opened tightly closed to keep out dust.

3.12 Operating at a High Altitude

When operating a gasoline generator set at altitudes greater than 7500 ft, it is recommended to install a high altitude kit (A042V579) to avoid performance degradation. Liquid Propane generator sets are self-compensating and do not require adjustment.

3.13 Breaking in a New Engine

Proper engine break-in on a new genset or on one with a rebuilt engine is essential for top engine performance and acceptable oil consumption. Run the genset at approximately 1/2 rated power for the first 2 hours and then at 3/4 rated power for 2 more hours. See LOADING THE GENSET.

Proper engine oil and oil level are especially critical during break-in because of the higher engine temperatures that can be expected. Change the oil if not appropriate for the ambient temperatures during break-in. See ENGINE OIL RECOMMENDATIONS. Check oil level twice a day or every 4 hours during the first 20 hours of operation and change the oil after the first 20 hours of operation.

The use of synthetic oils with recommended viscosity grade is acceptable. However, oil change intervals found in [Chapter 4](#) must still be followed.

3.14 Exercising the Genset

Exercise the generator set approximately 45-60 minutes each month if use is infrequent. Run the genset at approximately 1/2 rated power. See LOADING THE GENSET. A single two hour exercise period is better than several shorter periods.

Exercising a genset drives off moisture, re-lubricates the engine, replaces stale fuel in fuel lines and carburetor and removes oxides from electrical contacts and generator slip rings. The result is better starting, more reliable operation and longer engine life.

3.15 Storing the Genset

Proper storage is essential for preserving top genset performance and reliability when the genset cannot be exercised regularly and will be idle for more than 120 days.

3.15.1 Gasoline Models



WARNING: *Gasoline preservatives (stabilizers) are toxic. Follow the instructions on the container label. Avoid skin contact. Wash hands with soap and water after dispensing the fluid.*

1. Fill the fuel tank with fresh fuel and add a fuel preservative (OnaFresh™), following the instructions on the container label.



NOTE: **Unless a preservative (stabilizer) is added, the gasoline in the fuel system will deteriorate causing fuel system corrosion, gum formation and varnish-like deposits which can lead to hard starting and rough operation.**

2. Then run the genset for about 45-60 minutes at approximately 1/2 rated power to fill the fuel lines with the fresh fuel and preservative.

3.15.2 Liquid Propane Models

Check the local ordinances if the vehicle is to be garaged.



NOTE: **Local ordinances typically require that:**

- the LP system be leak-free
- the LP container not be filled beyond specified limits
- the container shutoff valve be closed
- the vehicle not be parked near sources of heat or ignition.

3.15.3 Storing the Genset

1. Change the engine oil (See) and attach a tag indicating grade of oil viscosity (See ENGINE OIL RECOMMENDATIONS).
2. **For long term storage only:** Remove the air filter and restart the genset. While the genset is running, spray an engine fogger (OnaGard™) into the carburetor, following the instructions on the container label, and then stop the genset. The fogger leaves a protective coat of oil on the internal surfaces of the engine.
3. Disconnect the battery cables, negative (-) cable first, from the starting battery and store the battery according to the battery manufacturer's recommendations (See MAINTAINING THE BATTERY AND BATTERY CONNECTIONS).
4. Cap the exhaust tail pipe to keep out dirt, moisture, rodents and other foreign materials.
5. Close the fuel supply valve (if so equipped).
6. Turn OFF the AC circuit breaker (See RESETTING CIRCUIT BREAKERS).



WARNING: Do not open the carburetor drain when the engine is hot. Close the drain immediately after draining. Failure to heed this warning can lead to fire resulting in severe personal injury or death.

7. Draining the carburetor float bowl prevents deposits of gum from clogging the tiny passages in the carburetor as the gasoline in the bowl evaporates during storage. If the carburetor has a drain (see the following figure), drain it as follows:
 - a. Let the engine cool down thoroughly.
 - b. Place paper towels under the drain to absorb all of the drainage (less than 1/2 cup).
 - c. Open the drain valve by turning counter-clockwise with a screwdriver.
 - d. Immediately close the drain valve after draining by turning clockwise with a screwdriver until just snug.

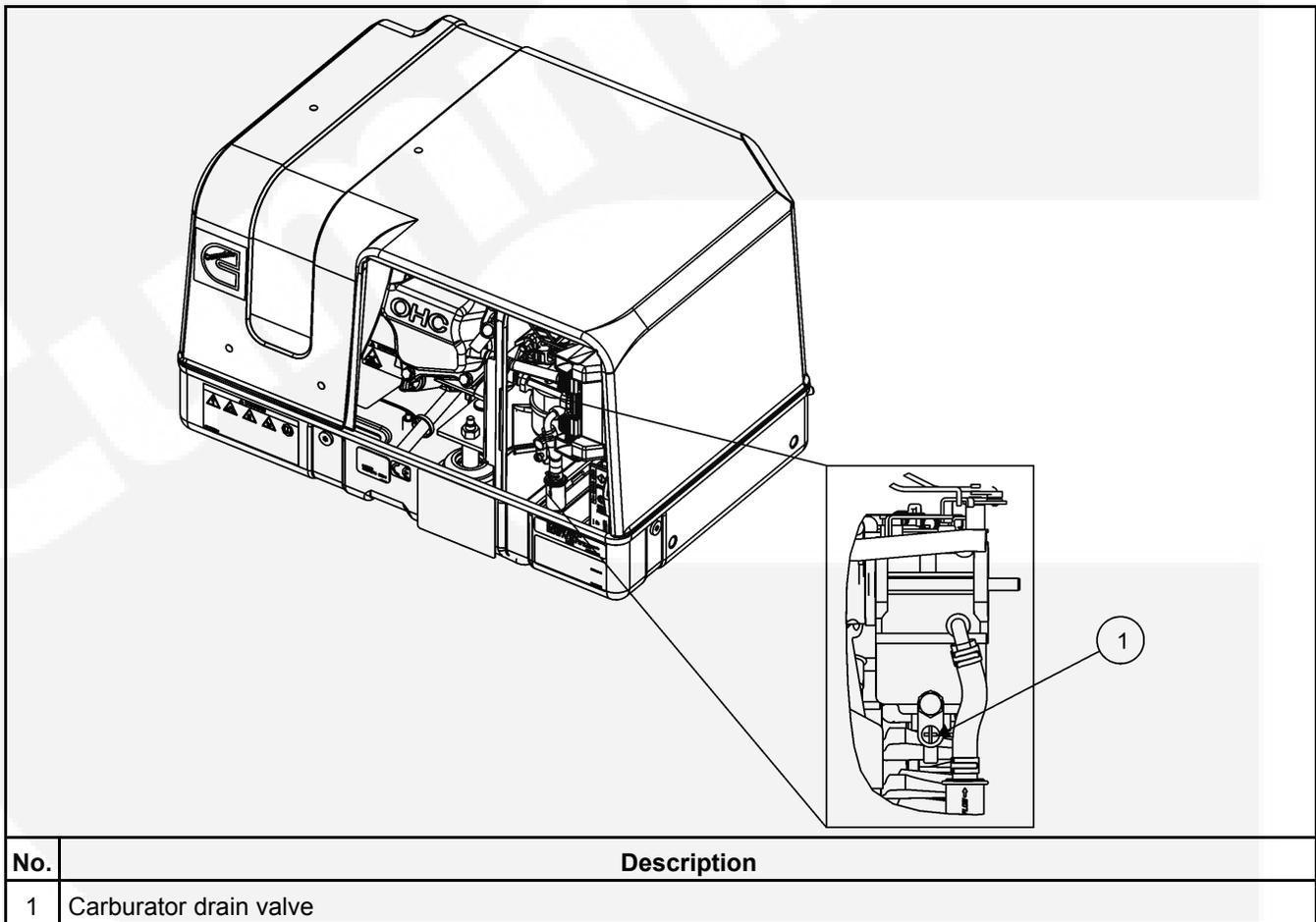


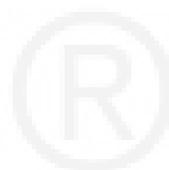
FIGURE 8. CARBURETOR DRAIN VALVE

3.15.4 Returning The Genset to Service

1. Check the oil tag on the genset and change the oil if the viscosity indicated is not appropriate for the temperatures expected. See ENGINE OIL RECOMMENDATIONS.
2. Reconnect the starting battery (negative [-] cable last). See MAINTAINING BATTERY AND BATTERY CONNECTIONS.

3. Remove the cap from the exhaust tailpipe.
4. Change the air filter element if it is dirty.
5. Open the fuel supply valve (if so equipped).
6. Inspect the genset. See CONDUCTING GENERAL INSPECTIONS.
7. **Gasoline Models** - Prime the genset fuel system by holding the control switch at **STOP/PRIME** for 30 seconds. (The status indicator light will stay on solid while the pump is on.)
8. Start the genset. There may be smoke and rough operation for a few minutes until the oil from the fogger burns off. If the engine does not start, clean or replace the spark plug, which may have been fouled by the fogger.
9. Turn on the AC circuit breaker ON (See RESETTING CIRCUIT BREAKERS) when the genset is ready to power appliances.

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4 Periodic Maintenance

Periodic maintenance is essential for top performance and long genset life. Use Table 4 as a guide for normal periodic maintenance. In hot and dusty environments some maintenance procedures should be performed more frequently, as indicated by the footnotes in the table. Keeping a log of maintenance performed and hours run will help you keep genset maintenance regular and provide a basis for supporting warranty claims (See MAINTENANCE RECORD).

Maintenance, replacement or repair of emission control devices and systems may be performed by any engine repair establishment or individual. However, warranty work must be completed by an authorized Onan dealer.

TABLE 4. PERIODIC MAINTENANCE SCHEDULE

MAINTENANCE PROCEDURE	MAINTENANCE FREQUENCY							Page
	Every Day or Every 8 Hours	After First 20 Hours	Every Month	Every 50 Hours	Every 150 Hours		Every 450 Hours	
General Inspections	X							
Check Engine Oil Level	X							
Clean and Check Battery			X ³					
Clean Spark Arrestor				X				
Change Engine Oil		X ¹			X ^{2, 3, 4}			
Replace Air Filter Element					X ²			
Clean Engine Cooling Fins						X ²		
Replace Spark Plug							X ⁵	-
Replace Fuel Filter							X ⁵	-
Adjust Valve Lash							X ⁶	-
1 - As a part of engine break-in, change the engine oil after the first 20 hours of operation. 2 - Perform more often when operating in dusty environments. 3 - Perform more often when operating in hot weather. 4 - Perform at least once a year. 5 - Perform sooner if engine performance deteriorates. 6 - Must be performed by a qualified mechanic (authorized Onan dealer).								

4.1 Conducting General inspections

Inspect the genset before the first start of the day and after every eight hours of operation.

4.1.1 Oil Level

Check engine oil level (CHECKING ENGINE OIL LEVEL).

4.1.2 Exhaust System

Look and listen for exhaust system leaks while the genset is running. Shut down the genset if a leak is found and have it repaired before operating the genset again.

Replace dented, bent or severely rusted sections of the tailpipe and make sure the tailpipe extends at least 1 inch (25.4 mm) beyond the perimeter of the vehicle.

Look for openings or holes between the genset compartment and vehicle cab or living space if the genset engine sounds louder than usual. Have all such openings or holes closed off or sealed to prevent exhaust gases from entering the vehicle.

4.1.3 Fuel System

Check for leaks at the hose, tube and pipe fittings in the fuel supply system while the genset is running and while it is stopped. Check flexible fuel hose sections for cuts, cracks, and abrasions. Make sure the fuel line is not rubbing against other parts. Replace worn or damaged fuel line parts before leaks occur.



WARNING: *Gasoline and LPG are highly flammable and explosive and can cause severe personal injury or death. Repair leaks right away.*

4.1.3.1 Special Considerations for LPG Fuel Systems

- Never use a flame to check for LPG leaks.
- If you smell gas, close the LPG container shutoff valve and have the genset serviced before using it again.

4.1.4 Battery Connections

Check the battery terminals for clean, tight connections. Loose or corroded connections have high electrical resistance which makes starting harder. See MAINTAINING THE BATTERY AND BATTERY CONNECTIONS.



WARNING: *Arcing at battery terminals or light switch or other equipment or flames and sparks can ignite battery gas causing severe personal injury—Ventilate battery area before working on or near battery—Wear safety glasses—Do not smoke—Switch trouble light ON / OFF away from battery—Do not disconnect battery cables while genset is running or vehicle battery charging system is on—Always disconnect negative (-) cable first and reconnect it last.*

4.1.5 Mechanical

Look for mechanical damage and listen for unusual noises and vibrations. Check the genset mounting bolts.

Check to see that the genset air inlet and outlet openings are not clogged with debris or blocked.

Clean accumulated dust and dirt from the genset. Do not clean the genset while it is running or still hot. Protect the generator, air cleaner, control panel, and electrical connections from water, soap and cleaning solvents.



WARNING: *Always wear safety glasses when using compressed air, a pressure washer or a steam cleaner to avoid severe eye injury.*

4.2 Checking Engine Oil Level

Park the vehicle on level ground and stop the genset before checking engine oil level.



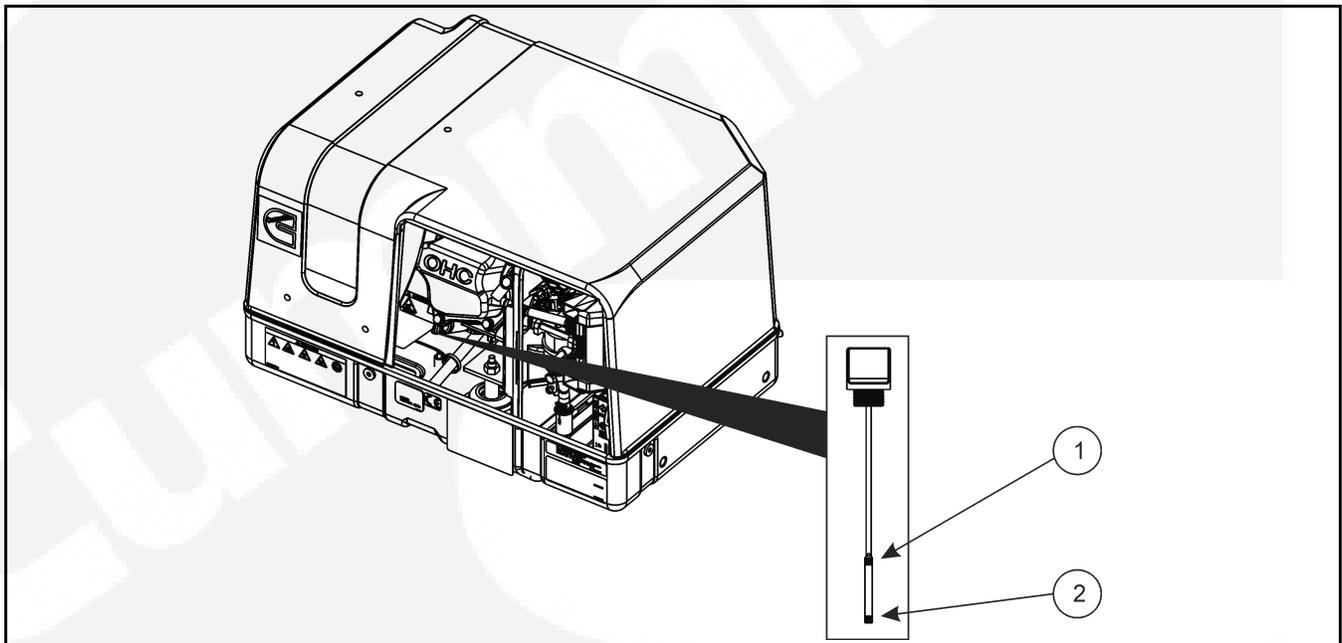
WARNING: Crankcase pressure can blow hot engine oil out the fill opening causing severe burns. Always stop the genset before removing the oil fill cap.

1. Unscrew the oil fill cap and wipe oil off the dipstick. Reinsert without screwing in the dipstick. Remove the dipstick again and check the oil level on the dip stick.
2. Add or drain oil as necessary. See ENGINE OIL RECOMMENDATIONS. Keep the oil level between the FULL and ADD marks.



CAUTION: Too much oil can cause high oil consumption. Too little oil can cause severe engine damage. Keep the oil level between the FULL and ADD marks.

3. Screw the oil fill cap back on securely.



No.	Description	No.	Description
1	Full	2	Add 300 ml (10 oz)

4.3 Changing Engine Oil



WARNING: State and federal agencies have determined that contact with used engine oil can cause cancer or reproductive toxicity. Try to avoid skin contact and breathing of vapors. Use rubber gloves and wash exposed skin.

Refer to Table 4 for scheduled engine oil change. Change oil more often in hot or dusty environments.

1. Run the engine until warm, stop it and remove the oil fill cap.
2. Place a pan underneath the oil drain plug and remove the plug with a 9/16 inch socket. Let all oil drain from the engine and then **secure the drain plug**. If you have a torque wrench, tighten plug to 5-10 ft-lbs.
3. Refill with 0.6L/0.63qt/20 oz of oil. See ENGINE OIL RECOMMENDATIONS. Check the oil level and add or drain oil as necessary.

4. Screw the oil fill cap on securely.
5. Dispose of the used oil and oil filter in accordance with local environmental regulations.

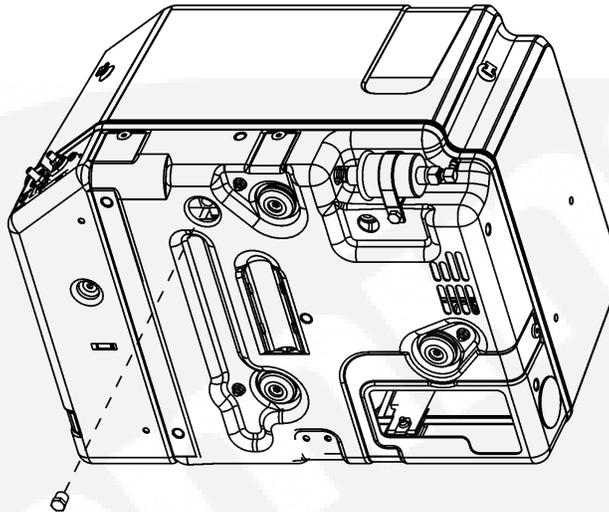
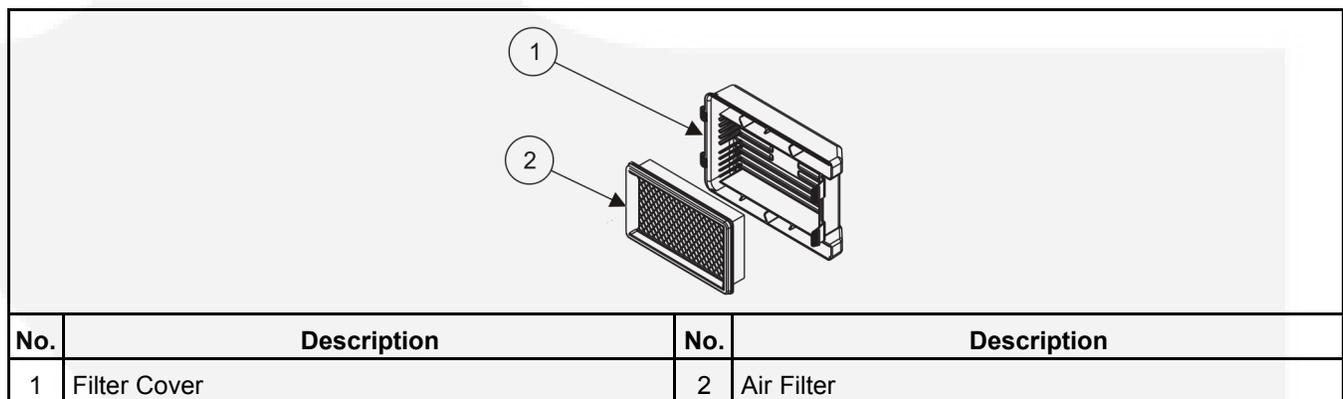


FIGURE 9. OIL DRAIN PLUG

4.4 Replacing the Air Filter Element

Refer to Table 4 for scheduled air filter element replacement. Under dusty operating conditions, inspect and change more often. To change the air filter element, unlatch the filter cover from the base and slide out the cover and filter together. Install a new filter into the cover and slide the cover back into position, ensuring that the two tabs at the rear of the cover are inserted into slots in the base and the latch is engaged.

FIGURE 10. AIR FILTER ELEMENT



No.	Description	No.	Description
1	Filter Cover	2	Air Filter

4.5 Replacing the Spark Plug

Refer to Table 4 for scheduled spark plug replacement. (The genset has one spark plug.) The spark plug must be in good condition for proper engine starting and performance. A spark plug that fouls frequently or has heavy soot deposits indicates that the engine needs service. See *Troubleshooting*.

- Spark Plug gap: 0.6-0.7mm (0.024-0.028")

- Spark plug replacement part: NGK BR6HS

Always thread the spark plug in by hand until it seats, to prevent crossthreading, and then torque to 13 lbs-ft (17 N-m). If you don't have a torque wrench, turn the spark plug an additional 1/4 turn, if being reused, or 3/8 to 1/2 turns if new.

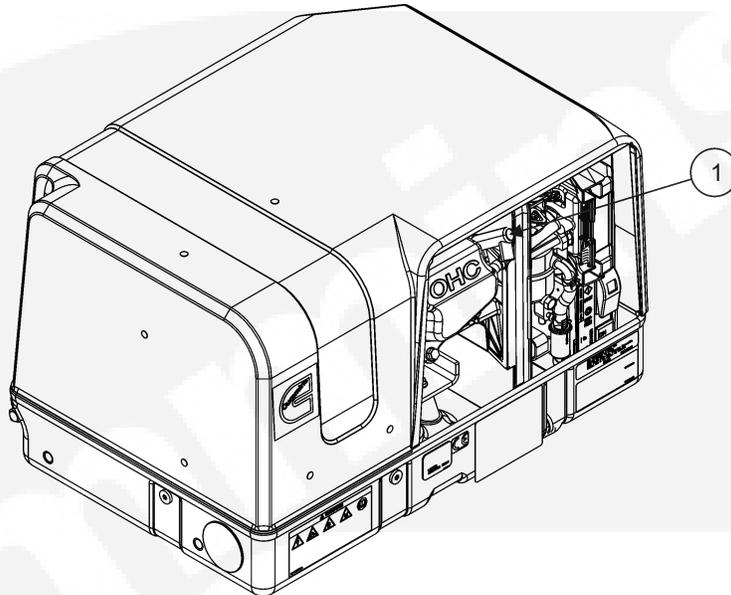


FIGURE 11. SPARK PLUG

4.6 Cleaning the Spark Arrestor

Refer to Table 4 for scheduled cleaning of the spark arrestor muffler (which meets U.S. Forest Service requirements). Cleaning is required for maximum genset performance.

- Spark plug gap — 0.6-0.7mm (0.024 - 0.028 inches)
- Spark plug replacement part — NGK BR6HS



WARNING: A hot muffler can cause severe burns. Let the muffler cool down before removing the spark arrestor screen.

The spark arrestor screen is mounted inside the muffler outlet. Clean as follows:

1. Remove the 2 bolts that secure the tailpipe to the muffler (inside the genset housing) and move the tailpipe aside.
2. Turn the spark arrestor tube flange slightly clockwise and pull to remove from the muffler.
3. Inspect the screen inside for damage and clogging. Replace if damaged.
4. Lightly tap the spark arrestor and remove any remaining deposits with a wire brush. Use a commercial solvent to loosen hard deposits. (Carefully follow the solvent manufacturer's instructions and safety precautions.)
5. Reinstall the spark arrestor and tailpipe, making sure that the two gaskets are installed correctly.

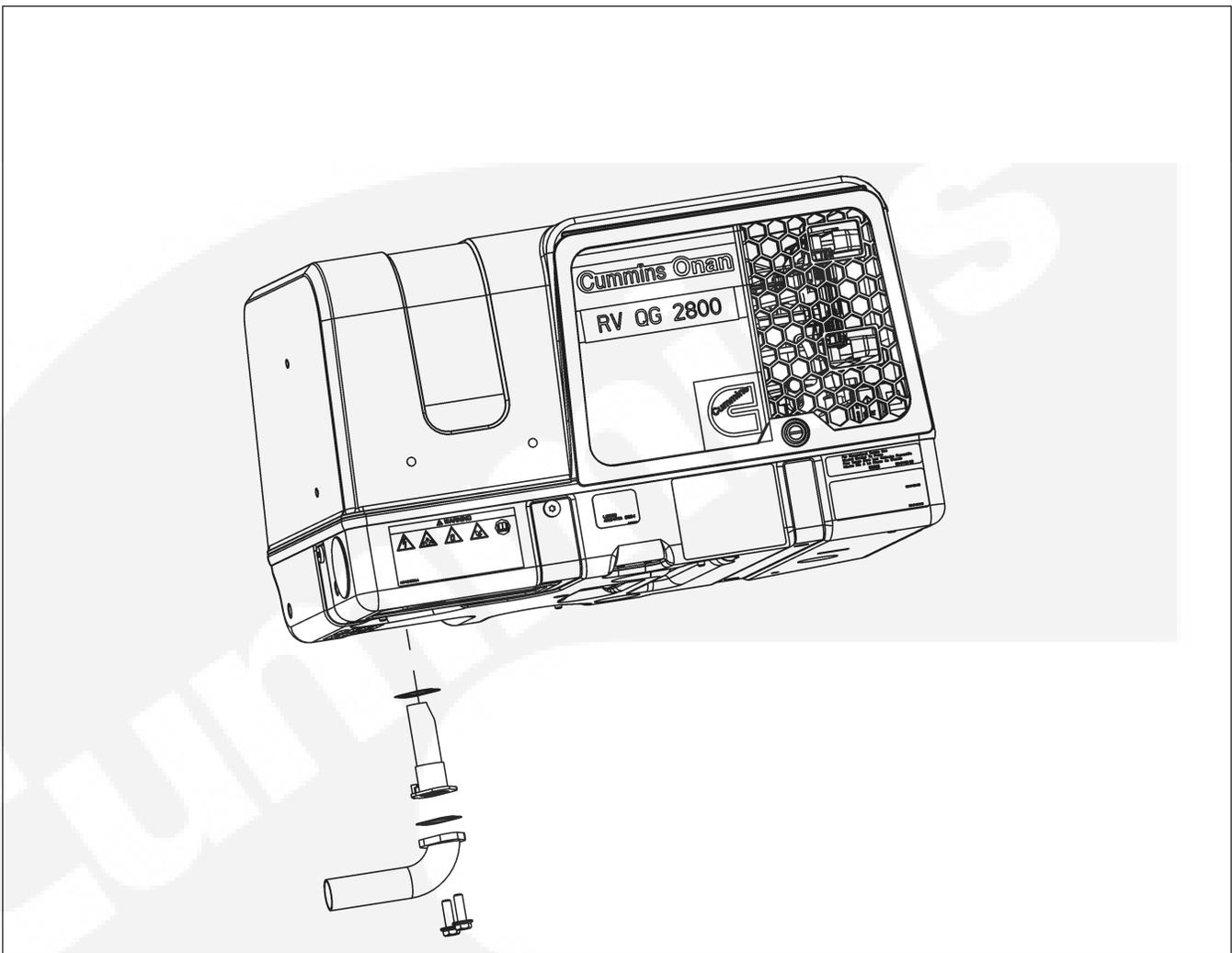


FIGURE 12. SPARK ARRESTOR

4.7 Replacing the Fuel Filter

Refer to Table 4 for scheduled replacement of the fuel filter (gasoline models only).

Take care to spill as little fuel as possible when disconnecting the filter from the fuel line. Let the engine cool down before disconnecting the fuel line so that it cannot ignite any fuel that is spilled. The filter is removable by loosening the hose clamps shown.



WARNING: *Gasoline is highly flammable and can cause severe personal injury or death-- Let the engine cool and close any fuel line shutoff valve before disconnecting the fuel line from the filter--Do not smoke or turn electrical switches ON or OFF where fuel fumes, tanks or equipment are present or in areas sharing ventilation. Keep flame, sparks, pilot lights, arc-producing equipment and switches and all other sources of ignition well away. Keep a type ABC fire extinguisher in the vehicle.*

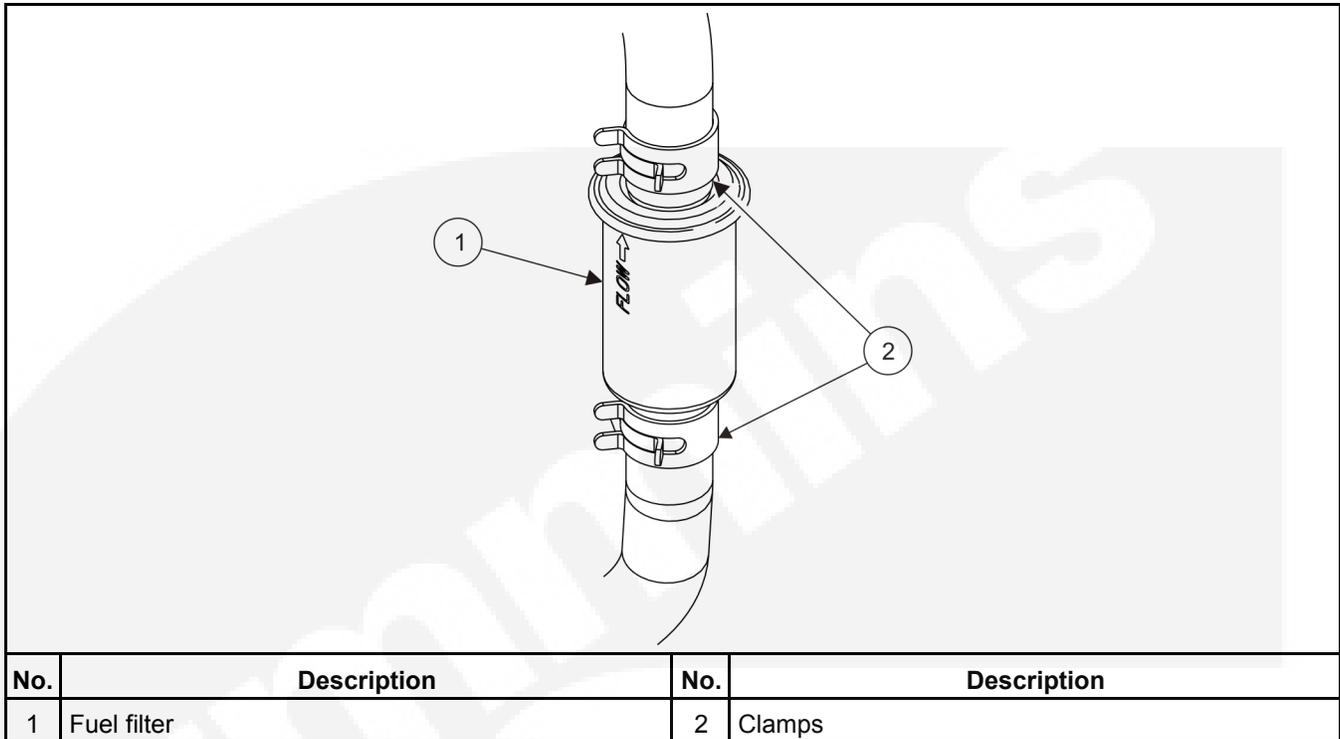


FIGURE 13. FUEL FILTER

4.8 Maintaining Battery and Battery Connections



WARNING: Arcing at battery terminals or light switch or other equipment or flames and sparks can ignite battery gas causing severe personal injury—Ventilate battery area before working on or near battery—Wear safety glasses—Do not smoke—Switch trouble light ON / OFF away from battery—Do not disconnect battery cables while genset is running or vehicle battery charging system is on—Always disconnect negative (-) cable first and reconnect it last.

Refer to Table 4 for scheduled battery maintenance, referring to the battery manufacturer's instructions. Have the battery charging system serviced if DC system voltage is consistently low or high. Always:

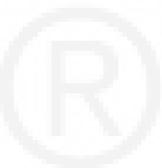
1. Keep the battery case and terminals clean and dry and the terminals tight.
2. Remove battery cables with a battery terminal puller.
3. Make sure which terminal is positive (+) and which is negative (-) before making battery connections, always removing the negative (-) cable first and reconnecting it last to reduce arcing.



NOTE: RV house batteries are typically used for starting the genset.



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5 Troubleshooting



WARNING: *Hot engine parts can cause severe burns. Always allow the engine time to cool before performing any maintenance or service.*

Table 5 lists the Fault Codes in numerical order along with step-by-step corrective action. If you fail to resolve the problem after taking the corrective actions suggested, contact an authorized Onan dealer. See *How to Obtain Service*.

First note the following:

- Maintaining engine oil level, keeping battery connections clean and tight, watching the fuel gauge, not overloading the genset, etc. will prevent most shutdowns.
- When the genset and vehicle engine share a common fuel tank the fuel pickup tubes are usually arranged so that the genset will run out of fuel first. Marking the genset empty point on the fuel gauge will make it easier to tell when to stop the genset before running it out of fuel.

5.1 Fault Codes

The genset controller provides extensive diagnostics by causing the status indicator light on the Control Switch to blink in a numeric code. Following a fault shutdown, the indicator light will repeatedly blink 3 blinks or 4 blinks at a time.

- **Three blinks** indicates a service fault. Press **Stop** once to cause the two-digit, second-level fault code to blink. (Pressing **Stop** again will stop the blinking.) The two-digit code consists of 1, 2, 3, or 4 blinks, a brief pause, and then 1 to 9 blinks. The first set of blinks represents the tens digit and the second set of blinks the units digit of the fault code number. For example, **Fault Code No. 36** appears as:

blink-blink-blink—*pause*—blink-blink-blink-blink-blink-blink—*long pause*—repeat

- **Four blinks** indicates that cranking exceeded 15 to 20 seconds without the engine starting.
- **Note:** Fault Code Nos. 3 and 4 are first level faults. Avoid interpreting them as second-level Fault Code Nos. 33 and 44, which have not been assigned as fault codes.

Restoring Fault Code Blinking - The fault code stops blinking after five minutes. Press **Stop** three times within five seconds to restore blinking. **Note that the last fault logged will blink, even after the condition that caused the shutdown has been corrected.**

TABLE 5. TROUBLESHOOTING



WARNING: *Some genset service procedures present hazards that can result in severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform genset service. See Safety Precautions.*

STATUS INDICATOR LIGHT DEAD
(Faulty connections, no battery voltage)



WARNING: *Some genset service procedures present hazards that can result in severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform genset service. See Safety Precautions.*

Corrective Action:

1. Try the genset Start Switch if the remote Start Switch does not work, and vice versa.
2. Clean and tighten the positive (+) and negative (-) battery cable connections at the battery, vehicle frame and genset.
3. Recharge or replace the battery. Refer to the battery manufacturer's recommendations.

STARTING BATTERIES RUN DOWN

(Marginal batteries, connections, or charging system or, parasitic loads)

Corrective Action:

1. Clean and tighten the positive (+) and negative (-) battery cable connections at the battery, vehicle frame and genset.
2. Recharge or replace the battery. Refer to the battery manufacturer's recommendations.
3. Have a battery charging system installed or serviced in the vehicle.

STARTER ENGAGES-DISENGAGES

(Cranking voltage dips below 6 volts—low battery charge, poor connections, long cables)

Corrective Action:

1. Have the vehicle propulsion engine running while trying to start the genset—the battery charging alternator may be able to maintain starting voltage high enough to get the genset started.
2. Clean and tighten the positive (+) and negative (-) battery cable connections at the battery, vehicle frame and genset.
3. Recharge or replace the battery. Refer to the battery manufacturer's recommendations.
4. Increase battery cable size or run parallel cables.

STATUS INDICATOR LIGHT GOES OUT WHILE CRANKING--NO START

(Internal short circuit caused automatic-reset circuit protective device to trip)

Corrective Action: Try starting again. See an authorized Onan dealer if the status indicator light flashes and then goes out again without the engine starting.

NO POWER—GENSET RUNNING, STATUS LIGHT ON

(Line circuit breaker OFF, or tripped due to short circuit or overload)

Corrective Action:

1. Turn on or reset the line circuit breaker on the genset.
2. Turn on or reset the line circuit breakers on the main distribution panel in the vehicle.

SERVICE CHECK FAULT—CODE NO. 3

(First-level fault code—Indicates fault with second-level fault code)

Corrective Action: Check the second-level fault code by pressing **STOP** once. The second-level fault code will have two-digits. The faults are listed in numerical order in this table.

OVERCRANK FAULT—CODE NO. 4

(First-level fault code—Cranking exceeded 30 seconds without engine starting)



WARNING: *Some genset service procedures present hazards that can result in severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform genset service. See Safety Precautions.*

Corrective Action:

1. **Gasoline Models** -Check and fill the fuel tank, as necessary. (Note: The genset fuel pickup tube is probably higher up in the fuel tank than the vehicle engine pickup.)
2. Prime the engine fuel system by holding the control switch at **Stop/Prime** for 30 seconds.
3. **LPG Models** - Check and fill the LPG container, as necessary. *On cold days the LPG container may have to be kept at least half full to provide the rate of vaporization necessary to keep up with the genset fuel demand.*
4. Open any closed fuel valves.
5. Secure the spark plug lead on the spark plug.
6. Replace the spark plug.
7. Service the air cleaner.

OVERVOLTAGE FAULT—CODE NO. 12

(Controller unable to maintain rated voltage)

Corrective Action: See an authorized Onan dealer.

UNDERVOLTAGE FAULT—CODE NO. 13

(Controller unable to maintain rated voltage)

Corrective Action: Reduce the number of connected appliances, especially when air conditioners and battery chargers are running.

OVERFREQUENCY FAULT—CODE NO. 14

(Engine governor unable to maintain rated frequency)

Corrective Action: See an authorized Onan dealer.

UNDERFREQUENCY FAULT—CODE NO. 15

(Engine governor unable to maintain rated frequency)

Corrective Action: Reduce the number of connected appliances, especially when air conditioners and battery chargers are running.

VOLTAGE SENSE FAULT—CODE NO. 27

(Controller unable to sense output voltage)

Corrective Action: See an authorized Onan dealer.

HIGH BATTERY VOLTAGE FAULT—CODE NO. 29

(Voltage across battery system greater than 19 volts)

Corrective Action:

1. Check battery bank connections and reconnect if necessary so that the 12 volt batteries serving the genset are connected in parallel (12 volt) rather than in series (24 volt).
2. Select a lower battery boost charge rate.

LOW CRANKING SPEED FAULT—CODE NO. 32

(Cranking speed less than 180 rpm for more than 2 seconds)

Corrective Action:

1. Clean and tighten the positive (+) and negative (-) battery cable connections at the battery and at the genset.
2. Recharge or replace the battery. Refer to the battery manufacturer's recommendations.
3. Replace engine oil with oil of proper viscosity for ambient temperatures. (High oil viscosity can slow down cranking speed.)



WARNING: *Some genset service procedures present hazards that can result in severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform genset service. See Safety Precautions.*

CONTROL CARD FAILURE FAULT—CODE NO. 35

(Microprocessor EEPROM error during self-test)

Corrective Action: See an authorized Onan dealer.

ENGINE STOPPED FAULT—CODE NO. 36

(Engine stopped without command by controller)

Corrective Action:

1. **Gasoline Models** -Check and fill the fuel tank, as necessary. (Note: The genset fuel pickup tube is probably higher up in the fuel tank than the vehicle engine pickup.)
2. **LPG Models** - Check and fill the LPG container, as necessary. *On cold days the LPG container may have to be kept at least half full to provide the rate of vaporization necessary to keep up with the genset fuel demand.*
3. Secure the spark plug lead on the spark plug.
4. Replace the spark plug.
5. Service the air cleaner.
6. Check for mechanical damage.

INVALID GENSET CONFIGURATION FAULT—CODE NO. 37

(Genset configuration is preprogrammed at the factory)

Corrective Action: See an authorized Onan dealer.

OVERCURRENT FAULT—CODE NO. 38

(Low power factor loads)

Corrective Action:

1. Reduce the number of appliances running at the same time, especially those with high motor starting loads such as air conditioners.
2. Have air conditioners and other appliances checked for proper operation. (A locked compressor rotor can cause very low power factor.)

GENERATOR ROTOR FAULT—CODE NO. 41

(Controller unable to sense field or output voltage)

Corrective Action: See an authorized Onan dealer.

PROCESSOR FAULT—CODE NO. 42

(Microprocessor ROM error during self-test)

Corrective Action: See an authorized Onan dealer.

PROCESSOR FAULT—CODE NO. 43

(Microprocessor RAM error during self-test)

Corrective Action: See an authorized Onan dealer.

SPEED SENSE FAULT—CODE NO. 45

(Controller unable to sense quadrature frequency)

Corrective Action: See an authorized Onan dealer.

IGNITION FAULT—CODE NO. 47

(Controller unable to sense ignition)

Corrective Action: See an authorized Onan dealer.

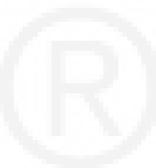
GENERATOR FIELD SENSE FAULT—CODE NO. 48

(Controller unable to sense field voltage)

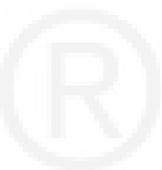


WARNING: *Some genset service procedures present hazards that can result in severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform genset service. See Safety Precautions.*

Corrective Action: See an authorized Onan dealer.



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6 Specifications

	GASOLINE MODELS			LPG MODELS	
	2.8HGJBB	2.3HGJBB	2.8HGJBB	2.5HGJBB	2.0HGJBB
GENERATOR: 2-Pole Revolving Field, Self-Excited, Electronically Regulated, 1-Phase, Direct Drive					
Power (W)	2800	2300	2800	2500	2000
Frequency (Hz)	60*	50	60*	60*	50
Voltage (Volts)	120	230	100	120	230
Current (Amps)	23.3	10	28	20.8	8.7
Breaker (Amps)	25	10	30	25	10
Speed (RPM)	3600	3000	3600	3600	3000
ENGINE: 1-Cylinder, 4-Cycle, Spark Ignited, OHC, Air-Cooled					
Bore mm (in)	67 (2.64)				
Stroke mm (in)	60 (2.36)				
Displacement mm (in)	217 (13.2)				
Compression Ratio	8.5:1				
Lube Oil Cap L (qt)	0.6 (0.63)				
Int Valve Clearance-Cold mm (in)	0.12-0.15 (0.0047-0.0059)				
Exh Valve Clearance-Cold mm (in)	0.12-0.15 (0.0047-0.0059)				
Spark Plug Gap mm (in)	0.6-0.7 (0.024-0.028)				
Ignition Timing	BTDC 23°				
Ignition Coil Gap mm (in)	0.3-0.7 (0.012-0.020)				
Compression kgf/cm ² (lbf/in ²)	3.9 (55.47) @ 500 rpm				
DC SYSTEM: 12 volts, 360 amps minimum CCA battery					
LPG Vapor Supply Pressure (Range)	n/a			9 to 13 inch (229 to 330 mm) W.C. (water column)	

	GASOLINE MODELS			LPG MODELS	
	2.8HGJBB	2.3HGJBB	2.8HGJBB	2.5HGJBB	2.0HGJBB
Fuel Consumption -No Load L/h (gal/h)	0.78 (0.20)	0.69 (0.18)	0.78 (0.20)	0.53 (1.17)	0.43 (0.94)
Fuel Consumption -50% Load L/h (gal/h)	1.32 (0.35)	1.18 (0.31)	1.32 (0.35)	0.76 (1.66)	0.60 (1.33)
Fuel Consumption -Full Load L/h (gal/h)	1.75 (0.46)	1.56 (0.41)	1.75 (0.46)	1.02 (2.25)	0.82 (1.80)
Sound Level (dBA @ 3m half load)	70				
Weight - dry lb (kg)	57 (125)				
Length mm (in)	560 (22.0)				
Width mm (in)	415 (16.3)				
Height mm (in)	325 (12.8)				
* 60 Hz models are listed by CSA and the US Testing Company					

7 Information for California Genset Users

This genset meets the requirements of California's Exhaust Emissions Standards as stated on the nameplate. Figure 1 illustrates where this information appears on the nameplate.

As a California user of this genset, please be aware that unauthorized modifications or replacement of fuel, exhaust, air intake, or speed control system components that affect engine emissions are prohibited. Unauthorized modification, removal or replacement of the genset label is prohibited.

You should carefully review Operator (Owner), Installation and other manuals and information you receive with your genset. If you are unsure that the installation, use, maintenance or service of your genset is authorized, you should seek assistance from an approved Onan dealer.

California genset users may use Table 6 as an aid in locating information related to the California Air Resources Board requirements for emissions control.



WARNING: *The engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.*

TABLE 6. EMISSIONS CONTROL INFORMATION

Genset Warranty Information	The California emissions control warranty statement is located in the same packet of information as this manual when the genset is shipped from the factory.
Engine Valve Lash	See <i>Specifications</i> .
Engine Ignition Timing	See <i>Specifications</i> .
Engine Fuel Requirements	Gasoline Models: The engine is certified to operate on unleaded gasoline. See Fuel Recommendations. LPG Models: The engine is certified to operate on LPG. See Fuel Recommendations.
Engine Lubricating Oil Requirements	See ENGINE OIL RECOMMENDATIONS.
Engine Fuel Mixture Settings	These genset engines have precision-manufactured carburetors which are not adjustable.
Engine Adjustments	None.
Engine Emission Control System	The engine emissions control system consists of inherent engine design.

Air Index

To show compliance with California emission regulations, a hangtag has been provided displaying the Air Index level and durability period of this engine.

The Air Index level defines how clean an engine's exhaust is over a period of time. A bar graph scaled from "0" (most clean) to "10" (least clean) is used to show an engine's Air Index level. A lower Air Index level represents cleaner exhaust from an engine.

The period of time (in hours) that the Air Index level is measured is known as the durability period. Depending on the size of the engine, a selection of time periods can be used to measure the Air Index level (see below).

TABLE 7. AIR INDEX - DESCRIPTIVE TERMS

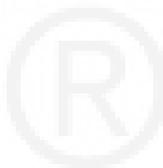
Descriptive Term	Applicable to Emissions Durability Period
Moderate	50 hours (engine from 0-80 cc)
	125 hours (engine greater than 80 cc)
Intermediate	125 hours (engine from 0-80 cc)
	250 hours (engine greater than 80 cc)
Extended	300 hours (engine from 0-80 cc)
	500 hours (engine greater than 80 cc)
	1000 hours (225 cc and greater)
This hangtag must remain on this engine or piece of equipment, and only be removed by the ultimate purchaser before operation.	



NOTE: Federal Emissions Component Defect Warranty and California Emissions Control Warranty are applicable to only those engines/generators compiled with EPA (Environmental Protection Agency) and CARB (California Air Resources Board) emission regulations in the U.S.A.



NOTE: To the engines/generators exported to and used in the countries other than the U.S.A., warranty service shall be performed by the distributor in each country in accordance with the standard Robin engine/generator warranty policy as applicable.



8 How to Obtain Service

When you need service, parts, or product literature (such as the Service Manual) for your genset, contact the nearest authorized distributor. Onan has factory-trained representatives to handle your needs for genset parts and service.

Call 1-800-888-ONAN to contact the nearest Cummins/Onan or Onan-only distributor in the United States or Canada. (This automated service utilizes touch-tone phones only). Select OPTION 1 (press 1) to be automatically connected to the distributor nearest to you.

If you are unable to contact a distributor using the automated service, consult the Yellow Pages. Typically, our distributors are listed under:

GENERATORS - ELECTRIC,
ENGINES - GASOLINE OR DIESEL, or
RECREATIONAL VEHICLES - EQUIPMENT,
PARTS AND SERVICE.

If you are outside North America, call Onan Corporation at 1-763-574-5000 from 7:30 AM to 4:00 PM, Central Standard Time, Monday through Friday, or fax 1-763-528-7229.

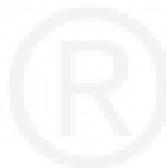
Before calling for service, have the following information available:

1. *The complete genset model number and serial number. See Model Identification (Page 4).*
2. *The date of purchase.*
3. *The nature of the problem. See Troubleshooting.*

If you have difficulty in arranging service or resolving a problem, please contact the Service Manager at the nearest Cummins/Onan distributor for assistance.

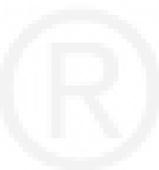


WARNING: Improper service or replacement of parts can result in severe personal injury, death, and/or equipment damage. Service personnel must be trained and experienced in performing electrical and/or mechanical service.



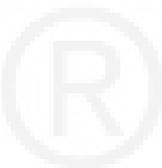


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