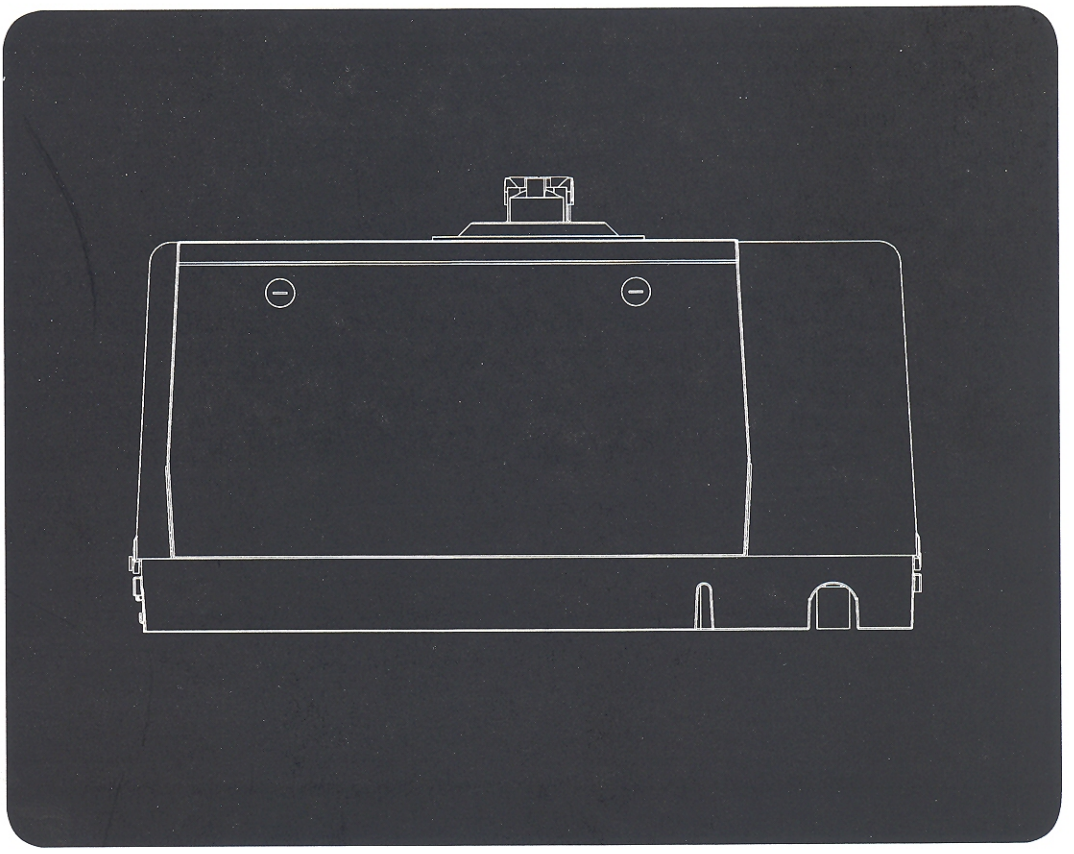
Onan

Commercial Mobile Power

Installation Manual

Models

HGJAD, HGJAE, HGJAF



Printed in U.S.A.

983-0601 11-2001

⚠ WARNING: ⚠

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

⚠ WARNING ⚠

Do not use this genset on a boat
Such use may violate U. S. Coast Guard regulations and can result in severe personal injury or death from fire, electrocution, or carbon monoxide poisoning

Table of Contents

Safety Precautions

Thoroughly read the OPERATOR'S MANUAL before operating the genset. Safe operation and top performance can be obtained only when equipment is operated and maintained properly.

The following symbols in this manual alert you to potential hazards to the operator, service person and equipment.

⚠ DANGER ***alerts you to an immediate hazard which will result in severe personal injury or death.***

⚠ WARNING ***alerts you to a hazard or unsafe practice which can result in severe personal injury or death.***

⚠ CAUTION ***alerts you to a hazard or unsafe practice which can result in personal injury or equipment damage.***

Electricity, fuel, exhaust, moving parts and batteries present hazards which can result in severe personal injury or death.

GENERAL PRECAUTIONS

- Keep children away from the genset.
- Do not use evaporative starting fluids. They are highly explosive.
- To prevent accidental or remote starting while working on the genset, disconnect the negative (–) battery cable at the battery.
- Keep the genset and its compartment clean. Excess oil and oily rags can catch fire. Dirt and gear stowed in the compartment can restrict cooling air.
- Make sure all fasteners are secure and torqued properly.
- Do not work on the genset when mentally or physically fatigued or after consuming alcohol or drugs.
- You must be trained and experienced to make adjustments while the genset is running—hot, moving or electrically live parts can cause severe personal injury or death.
- Used engine oil has been identified by some state and federal agencies as causing cancer or reproductive toxicity. Do not ingest, inhale, or contact used oil or its vapors.
- Benzene and lead in some gasolines have been identified by some state and federal agencies as causing cancer or reproductive toxicity. Do not to ingest, inhale or contact gasoline or its vapors.
- Keep multi-class ABC fire extinguishers handy. Class A fires involve ordinary combustible materials such as wood and cloth; Class B fires, combustible and flammable liquid fuels and gaseous fuels; Class C fires, live electrical equipment. (ref. NFPA No. 10)
- Genset installation and operation must comply with all applicable local, state and federal codes and regulations.

GENERATOR VOLTAGE IS DEADLY!

- Generator electrical output connections must be made by a trained and experienced electrician in accordance with applicable codes.
- The genset must not be connected to shore power or to any other source of electrical power. Back-feed to shore power can cause electric shock resulting in severe personal injury or death and damage to equipment. An approved switching device must be used to prevent interconnections.
- 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.

ENGINE EXHAUST IS DEADLY!

- Learn the symptoms of carbon monoxide poisoning in this manual and never sleep in the vehicle while the genset is running unless the vehicle is equipped with a working carbon monoxide detector.
- The exhaust system must be installed in accordance with the genset Installation Manual. Engine cooling air must not be used for heating the working or living space or compartment.
- Inspect for exhaust leaks at every startup and after every eight hours of running.
- Make sure there is ample fresh air when operating the genset in a confined area.

FUEL IS FLAMMABLE AND EXPLOSIVE

- 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 switches and all other sources of ignition well away.
- 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 under hoods and inside housings and buildings. LPG sinks when released and can accumulate inside housings and basements and other below-grade spaces. Prevent leaks and the accumulation of gas.

BATTERY GAS IS EXPLOSIVE

- Wear safety glasses.
- Do not smoke.
- To reduce arcing when disconnecting or reconnecting battery cables, always disconnect the negative (–) battery cable first and reconnect it last.

MOVING PARTS CAN CAUSE SEVERE PERSONAL INJURY OR DEATH

- Do not wear loose clothing or jewelry near moving parts such as PTO shafts, fans, belts and pulleys.
- Keep hands away from moving parts.
- Keep guards in place over fans, belts, pulleys, and other moving parts.

HYDRAULIC FLUID UNDER PRESSURE CAN CAUSE SEVERE PERSONAL INJURY

- Always shut down the engine that drives the hydraulic pump before loosening or tightening fittings.
- The high pressure spray from a leak or fitting in a hydraulic line can penetrate the skin, leading to possible blood poisoning. Wear safety glasses. Do not delay getting proper medical attention if exposed to spray.

Introduction

ABOUT THIS MANUAL

This manual is a guide for the installation of the HGJAD, HGJAE and HGJAF Series of generator sets (gensets). Proper installation is essential for safe, reliable and quiet operation. Read through this manual before starting the installation. Leave this manual with the Operator's Manual and other vehicle manuals.

This manual addresses the following aspects of installation:

- Location, Mounting and Enclosure
- Exhaust Connections
- Fuel Connections
- Electrical Connections
- Startup

See the Operator's Manual for operation and maintenance and the Service Manual for service.

Note: Manuals are updated from time-to-time to reflect changes in the equipment and its specifications. For this reason, only the copy of the installation manual supplied with the genset should be used as a guide for the installation.

INSTALLATION CODES AND STANDARDS FOR SAFETY

The vehicle builder bears sole responsibility for the selection of the appropriate genset, for its proper installation and for obtaining approvals from the authorities (if any) having jurisdiction over the installation. These gensets meet the basic requirements of the Standard for Safety for Engine Generator Sets for Recreational Vehicles, ANSI/RVIA EGS-1. They are suitable for installation in accordance with:

- ANSI A1192 (NFPA No. 1192)—Recreational Vehicles
- NFPA No. 70, Article 551—Recreational Vehicles and RV Parks
- NFPA No. 58—Liquefied Petroleum Gas Code
- CSA Electrical Bulletin 946—Requirements for Internal Combustion Engine-Driven Electric Generators for Use in Recreational Vehicles

Federal, State and local codes, such as the California Administrative Code—Title 25 (RV installation), might also be applicable. Installation codes and recommendations may change over time and vary between countries, states and municipalities. Obtain the standards in Table 1 for reference.

TABLE 1. REFERENCE CODES AND STANDARDS

Code of Federal Regulations, Title 49: Chapter III and Chapter V	Superintendent of Documents P. O. Box 371954 Pittsburgh, PA 15250-7954
NFPA Nos. 58, 70, 1192	National Fire Protection Association 470 Atlantic Avenue Boston, MA 02210
ANSI A119.2 ANSI/RVIA-EGS-1	Recreational Vehicle Industry Association 14650 Lee Road Chantily, VA 22021
California Administrative Code—Title 25, Chapter 3	State of California Documents Section P.O. Box 1015 North Highlands, CA 95660
CAN/CSA-Z240 Recreational Vehicles Bulletin 946	Canadian Standards Association Housing and Construction Materials Section 178 Rexdale Blvd. Rexdale, Ontario, Canada M9W 1R3

OUTLINE DRAWINGS

See OUTLINE DRAWING (Page 27 or 28) for installation details: mounting bolt hole locations, connection points (fuel, battery, remote control, AC output and exhaust), sizes and types of fittings, inlet and outlet air openings, weight and overall dimensions, etc. See your Onan dealer for large-scale copies of the drawings and for full-size floor templates for floor opening cutouts.

⚠WARNING ***Improper installation can result in severe personal injury, death and equipment damage. The installer must be trained and experienced in the installation of electrical, mechanical, fuel and exhaust equipment.***

LIFTING AND HANDLING GENSET

⚠ CAUTION ***The underside of the genset can be damaged by protruding objects — Always rest the genset on a flat surface that has been cleared off — Always extend the lifting arms of a forklift beyond the base of the genset to prevent them from protruding into the underside cover.***

Figure 1 illustrates the four lift-hook slots for genset lifting. A lifting rig must spread the hook straps such that they do not crush or bend parts such as the control box, air filter and fuel lines while lifting. See *Specifications* (Page 23) regarding the weight of the genset and make provisions accordingly for safe handling.

⚠ CAUTION ***Avoid tipping the front (service side) down while handling the genset. Otherwise, engine oil could drain into and soak the air filter and cause hard starting and poor operation unless the filter is replaced.***

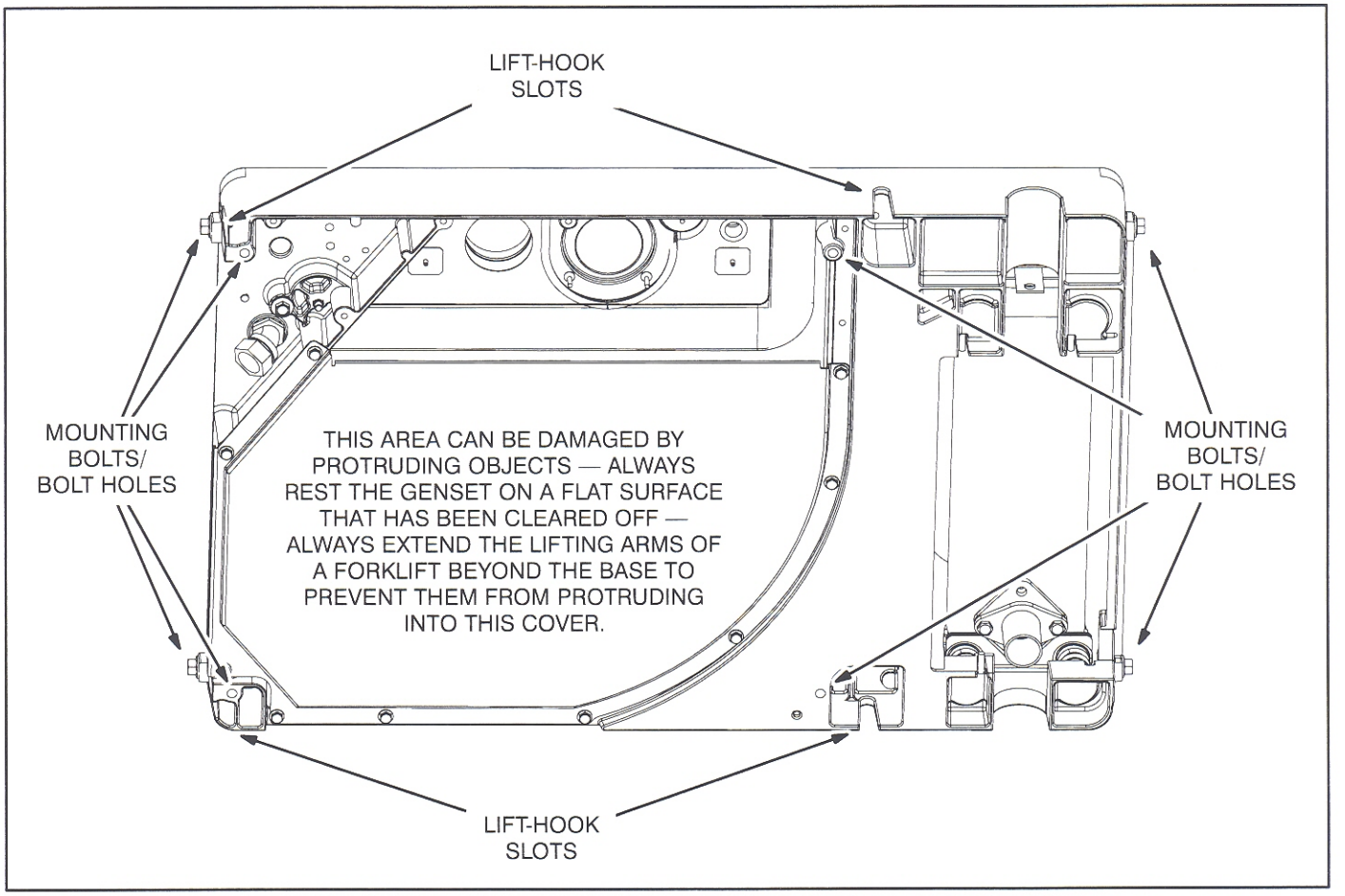


FIGURE 1. GENSET LIFT-HOOK SLOTS—MOUNTING BOLT HOLES—AREA THAT CAN BE DAMAGED

Location, Mounting and Enclosure

The location, mounting and enclosure of a genset must be such that mounting is secure, engine exhaust and fuel vapors are prevented from entering the vehicle, rain and road debris are prevented from entering the genset, and ready access is afforded for operating the genset and performing periodic maintenance. Figure 2 shows typical genset locations.

1. Review *Exhaust Connections, Fuel Connections* and *Electrical Connections* before deciding where to locate the genset.

   ⚠WARNING ***A weak supporting structure can lead to severe personal injury or death if the genset falls from the vehicle. Design the structure carefully, follow applicable mounting kit instructions and torque mounting bolts properly.***

2. The genset support structure must be able to resist the dynamic weight of the genset: cyclical vertical forces of ± 3 g and cyclical horizontal forces of ± 1 g. See *Specifications* (Page 23) for the weight of the specific model being installed. Secure the genset with four 3/8 inch thread-forming bolts in the ends or bottom of the base (Figure 1). Torque the bolts to 35 lb-ft.

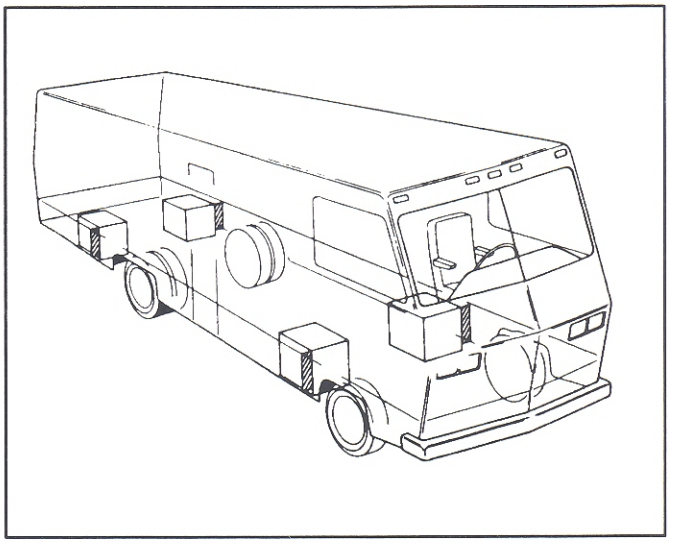


FIGURE 2. TYPICAL COACH LOCATIONS

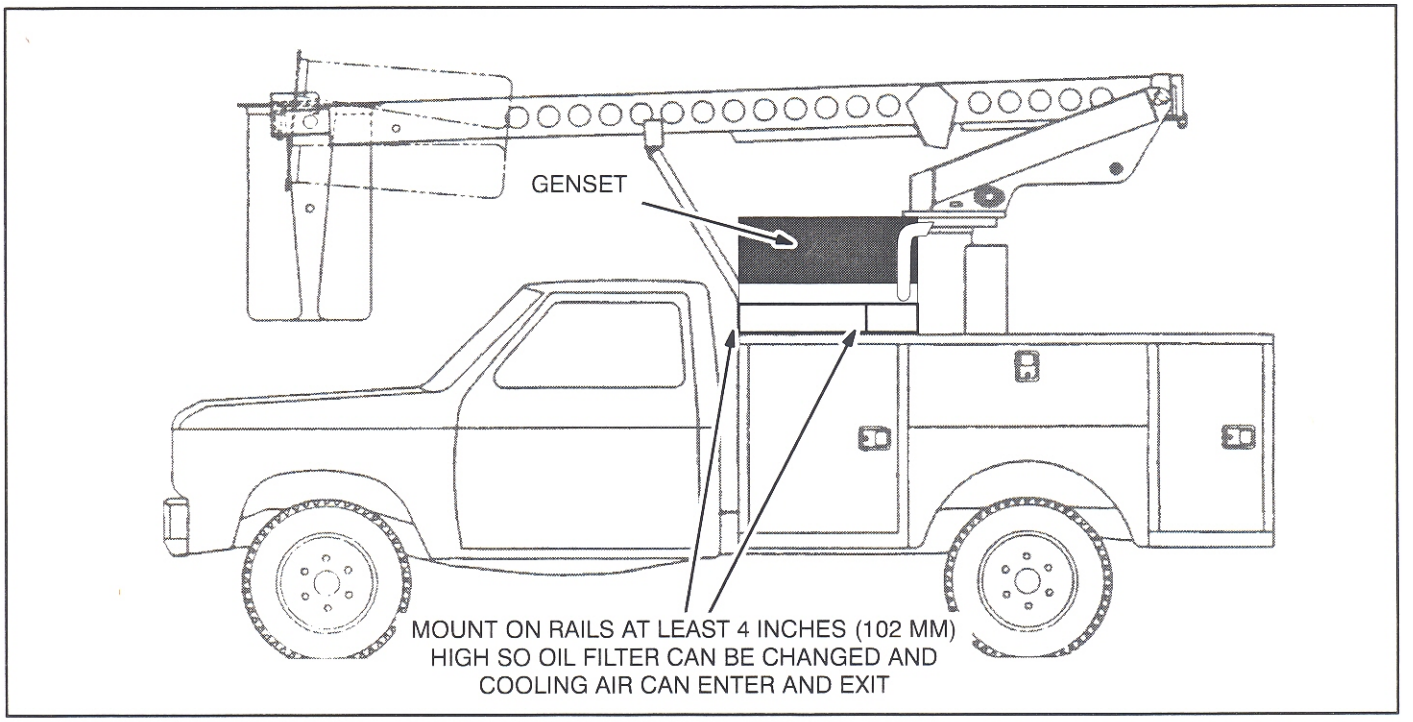


FIGURE 3. TYPICAL TRUCK APPLICATION

⚠WARNING ***EXHAUST GAS AND FIRE ARE DEADLY! — Install a vapor-tight and fire-resistive barrier of approved materials between the genset and the vehicle interior — Do not duct genset cooling air into the vehicle for heating.***

3. **Below-Floor Mounting** – Below-floor mounting kits are available from Onan. Carefully follow the instructions in the kit. Reinforce a plywood or particle board floor with steel to resist the dynamic weight of the genset (Item 2). Do not mount the genset within the approach or departure angles of the vehicle or below the axle line (Figure 7, Page 10). Install a vapor-tight, fire-resistive barrier above the genset equivalent to 26 gauge galvanized steel and seal around all openings, such as bolt holes, through the barrier.

   HGJAF Series Gensets: Line a combustible floor and any side walls around the genset with 1/4 to 1/2 inch (6.4 to 12.7 mm) thick, 4 lb/ft^3 (0.0167 kg/m^3) density fiberglass insulation having aluminum foil facing at least 0.001 inch (0.025 mm) thick. Secure the insulation every 12 inches (304 mm) to the compartment and door with mechanical fasteners and washers as least 1 inch (25 mm) in diameter.

4. **Above-Floor, Compartment Mounting** – Construct a vapor-tight, fire-resistive compartment equivalent to 26 gauge galvanized steel to isolate the genset from the vehicle interior. Do not duct genset cooling air, which can include exhaust gases, into the vehicle for heating.

   HGJAF Series Gensets: Line the back, top, sides and door, *but not the floor*, of the compartment with 1/4 to 1/2 inch (6.4 to 12.7 mm) thick, 4 lb/ft^3 (0.0167 kg/m^3) density fiberglass insulation having aluminum foil facing at least 0.001 inch (0.025 mm) thick. Secure the insulation every 12 inches (304 mm) to the compartment and door with mechanical fasteners and washers as least 1 inch (25 mm) in diameter.

5. **Other Mounting Arrangements** – A cooling system test (Page 26) must be conducted to determine that cooling air is not being restricted or recirculating back into the air inlet.

6. When mounting the genset on a floor, the floor must not block off any portion of the genset cooling (ventilating) air inlet or outlet openings or service access opening. See your Onan dealer for a full-size floor template to help accurately locate the floor cutouts.

7. Access must be provided for draining engine oil and changing the oil filter. At least 4 inches (102 mm) is required to remove the filter from the genset. A remote oil filter kit is available.

8. The space below the genset must be unobstructed for at least 6 inches (152 mm) and open on at least three sides to prevent restriction of genset cooling air.

9. Shield the air inlet and outlet openings in the bottom of the genset from debris thrown up by the vehicle tires.

10. Make sure the genset clears the ground by at least 12 inches (305 mm) to reduce the amount of dust pulled in by the cooling fan.

11. Provide ready access for starting and stopping the genset and performing all periodic maintenance procedures.

12. The genset must not share a compartment or ventilation with sources of flammable vapors, such as batteries and fuel tanks. A genset can ignite flammable vapors.

13. A genset that does not have an integral enclosure must be shielded from rain and road splash.

14. See *Specifications* (Page 23) and the outline drawing (Page 27 or 28) for the minimum inside dimensions of a genset compartment. If the compartment has thermal or acoustic insulation, increase the minimum compartment dimensions by the thicknesses of the insulation. The minimum clearance required between the genset and the compartment or its insulation on any side or top is 1/2 inch (12.7 mm).

15. Acoustic and thermal insulation and adhesive should be Classified as "Self-Extinguishing" for use at not less than 200°F (90°C). Do not line the bottom of the compartment with insulation, which absorbs spilled fuel and oil.

Exhaust Connections

The genset exhaust system must be gas-tight and designed to prevent entry of exhaust gases into the vehicle interior.

⚠WARNING ***EXHAUST GAS IS DEADLY! Keep exhaust gases from entering the vehicle — Do not terminate the exhaust tail pipe underneath the vehicle or closer than 6 inches (153 mm) to openings into the vehicle — Route the exhaust system such that it is protected from damage — Use approved materials only.***

⚠CAUTION ***Unauthorized modifications or replacement of fuel, exhaust, air intake or speed control system components that affect engine emissions are prohibited by law in the State of California.***

MUFFLER—SERIES HGJAD / HGJAE

The muffler is mounted inside the genset enclosure. It has a USDA (Forest Service) spark arrestor and meets RVIA EGS-1 construction requirements.

A genset without a properly installed and maintained spark arresting exhaust system can cause a brush or forest fire, and is illegal on federal lands. Liability for damage, injury and warranty expense due to the modification of the exhaust system or to use of unapproved parts is the responsibility of the person performing the modification or installing the unapproved parts.

The muffler has a short adapter bolted to its outlet flange (Figure 4). Clamp the tail pipe to the adapter. See TAIL PIPE in this section regarding materials, clamps, support, routing and termination.

Alternatively, a tail pipe with elbow and flange can be bolted to the muffler flange to run straight out the tunnel in the front or the back of the genset base. See OUTLINE DRAWING (Page 27) for muffler flange dimensions. *Make sure to use a suitable flange gasket.* If the tail pipe runs out the front, secure it with a hanger to the bracket that hangs down from the muffler assembly (Figure 4). *Do not route the tail pipe this way when the genset is mounted on a combustible floor.*

See TAIL PIPE in this section regarding materials, clamps, support, routing and termination.

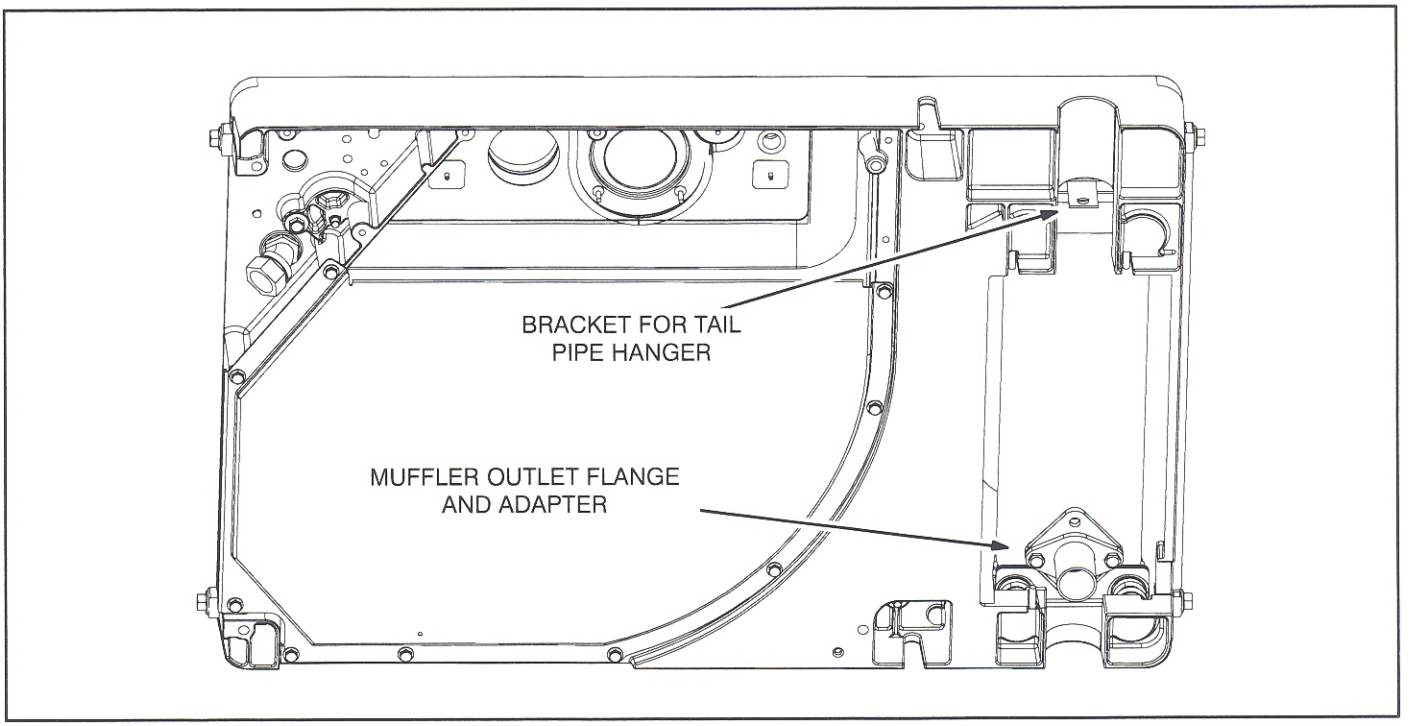


FIGURE 4. OUTLET FLANGE AND ADAPTER ON MODELS WITH INTERNALLY MOUNTED MUFFLERS

MUFFLER—SERIES HGJAF

Figure 5 illustrates the exhaust outlet flange where the exhaust system is connected to the genset, and a side-mount muffler available from Onan.

The muffler must have a USDA (Forest Service) spark arrestor, meet RVIA EGS-1 requirements, be constructed of aluminized steel or material of equivalent corrosion resistance and be of welded or crimped construction. The spark arrestor may be integral to the muffler or an add-on.

A genset without a properly installed and maintained spark arresting exhaust system can cause a brush or forest fire, and is illegal on federal lands. Liability for damage, injury and warranty expense due to modification of the exhaust system or to use of unapproved parts is the responsibility of the person performing the modification or installing the unapproved parts.

We recommend that you contact an Onan dealer for spark arresting mufflers that meet RVIA and USDA requirements. Side-mount and bottom-mount muffler kits are available from Onan, with front or back exhaust outlets. The kits include a USDA (Forest Service) spark screen for mounting in the end of the tail pipe.

Follow the instructions in the Onan kit when mounting the muffler. *Make sure to install the flange gasket.* Clamp the tail pipe to the muffler outlet. See TAIL PIPE in this section regarding materials, clamps, support, routing and termination. If the kit has a spark screen, install it in accordance with the instructions in the kit.

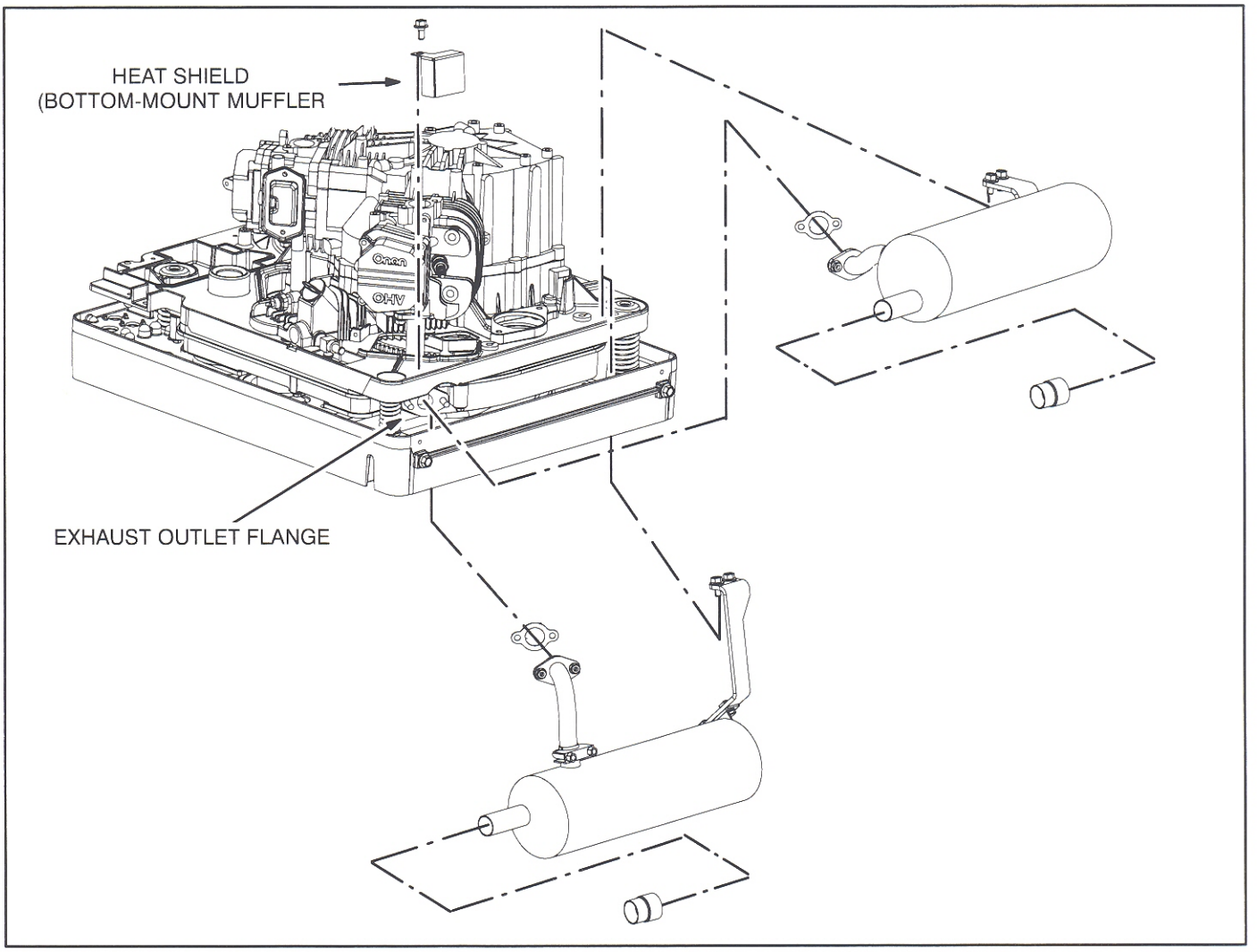


FIGURE 5. SIDE-MOUNT AND BOTTOM-MOUNT MUFFLER KITS

TAIL PIPE

1. Use 16-gauge (0.065 inch thick) 1-3/8 inch O. D. aluminized steel tubing or material of equivalent heat and corrosion resistance for the tail pipe. Do not use flexible pipe, which is neither gas tight nor durable. Clamp the tail pipe to the muffler outlet with a U-bolt muffler clamp (available from Onan). Support a tail pipe longer than 1-1/2 feet (457 mm) near its end and at intervals of 3 feet (900 mm) or less. Use automotive-type tail pipe hangers (available from Onan). Do not attach the hangers to combustible material such as wood.
2. Use U-bolt muffler clamps (available from Onan) to connect sections of tail pipe. Overlapping pipe should be slotted (Figure 6).
3. Do not route the tail pipe near fuel lines or fuel tanks.
4. Do not route the muffler or tail pipe closer than 3 inches (76 mm) to combustible material (wood, felt, cotton, organic fibers, etc.) unless shielded. The temperature rise (above ambient) on adjacent combustible material must not exceed 117°F (65°C).
5. Do not route the exhaust tail pipe underneath the oil drain or cooling air inlet.

   ⚠WARNING ***A hot exhaust tail pipe can ignite oil drain spills causing severe personal injury or death. Do not route the exhaust tail pipe underneath the oil drain.***

6. To keep the tail pipe from being damaged, do not route it such that it protrudes into the approach or departure angles of the vehicle or below the axle clearance line (Figure 7).
7. Do not terminate the tail pipe underneath the vehicle. Extend it a minimum of 1 inch (25 mm) beyond the perimeter of the vehicle (Figure 8). *Support the end of the tail pipe such that it cannot be pushed in and up under the skirt of the vehicle.*

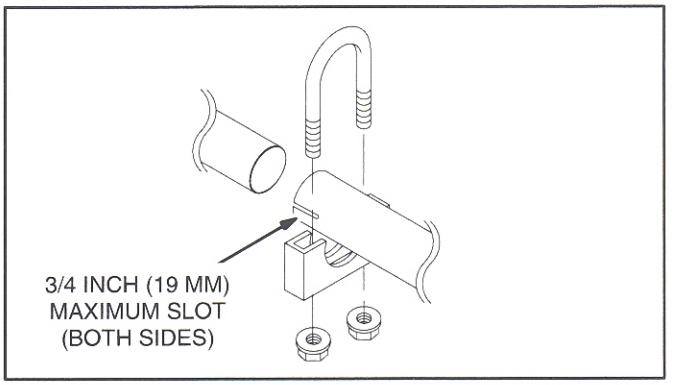


FIGURE 6. EXHAUST TAIL PIPE CONNECTIONS

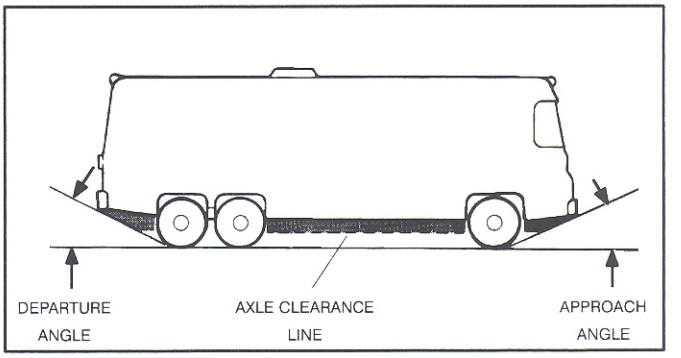


FIGURE 7. VEHICLE CLEARANCES

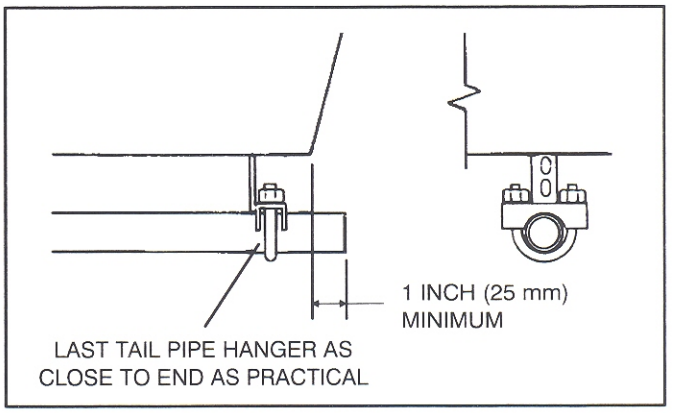


FIGURE 8. TERMINATING THE EXHAUST TAIL PIPE

8. Do not terminate the tail pipe such that it is closer than 6 inches (153 mm) to any opening, such as a door, window, vent or unsealed compartment, into the vehicle interior (Figure 9).

9. To keep rain out, terminate a vertical tailpipe (Figure 10) with a rain cap or bend that points towards the rear of the vehicle. Provide guards as necessary to prevent accidental contact with the hot tailpipe during normal use of the vehicle.

10. Unless the muffler has an integral spark arrestor, install a spark screen or other kind of approved add-on device to comply with regulations for vehicles driven on federal lands.

11. Make sure a tail pipe deflector will not cause excessive back pressure or interfere with removing a spark arresting screen, if so equipped.

⚠ CAUTION ***Excessive back pressure can cause engine damage.***

12. Do not interconnect genset and vehicle engine exhaust systems.

⚠ CAUTION ***Interconnecting engine exhaust systems will lead to migration of exhaust condensate and soot into the idle engine, causing damage.***

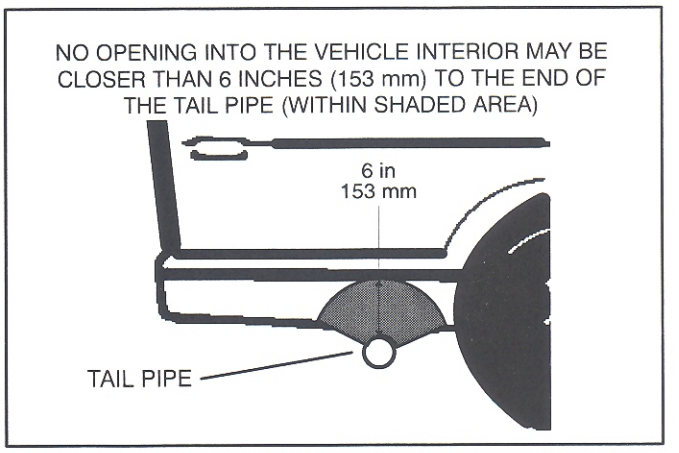


FIGURE 9. MINIMUM DISTANCES TO OPENINGS

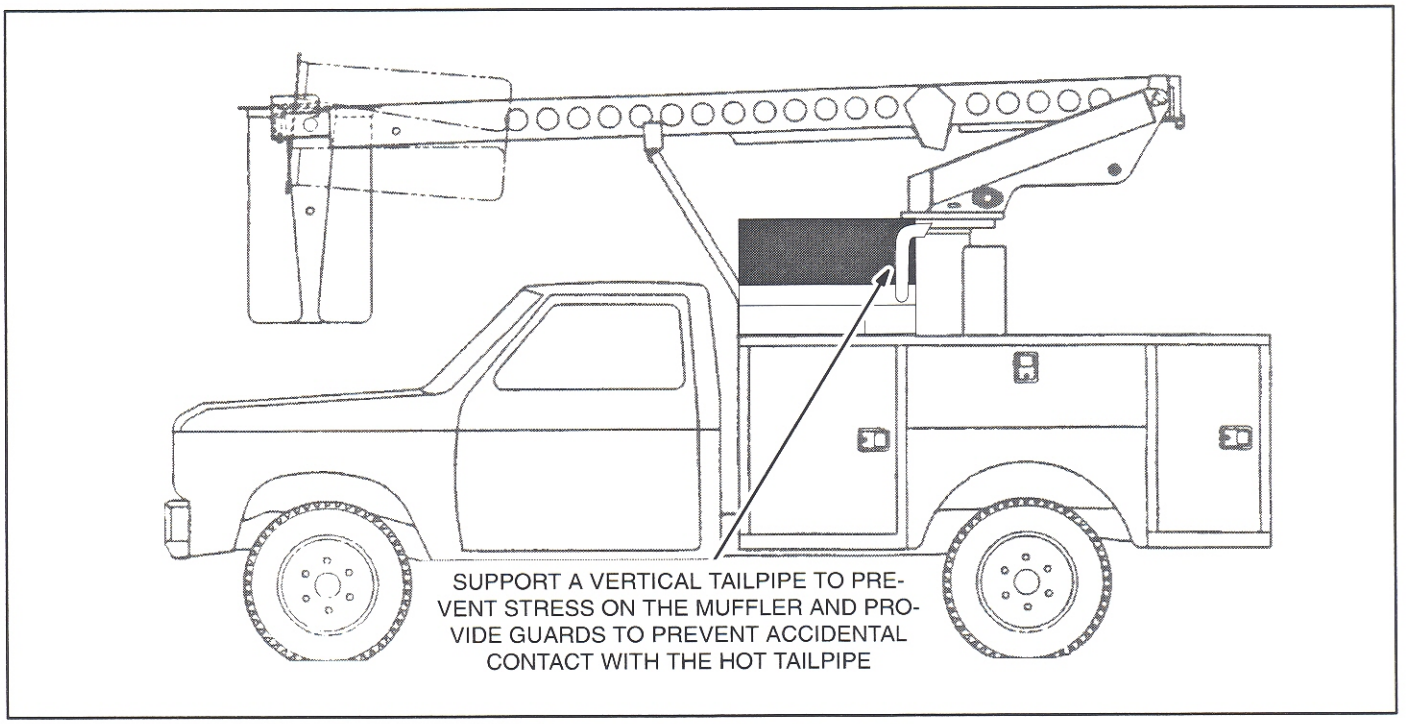


FIGURE 10. VERTICAL TAILPIPE

Fuel Connections

See the Operator's Manual for recommended fuels and *Specifications* (Page 23) for fuel consumption.

⚠WARNING ***Gasoline and LPG are flammable and explosive and can cause severe personal injury or death — Do not smoke — Keep flames, sparks, pilot lights, switches, arc-producing equipment and all other ignition sources away from fuel, fuel components and areas sharing ventilation — Keep an ABC fire extinguisher handy.***

⚠CAUTION ***Unauthorized modifications or replacement of fuel, exhaust, air intake or speed control system components that affect engine emissions are prohibited by law in the State of California.***

GASOLINE—SERIES HGJAD

These models have electronic fuel injection. Figure 11 illustrates the fuel fittings and Figure 12 the remote pump connector. Remote fuel pump kits adapted for use with particular vehicle makes and models are available and must be used with this genset. Carefully follow the instructions in the kit.

Use stainless steel stepless ear clamps to connect the fuel lines to the genset (Figure 13). Onan P/N 0503-1951-13, Oetiker P/N 16700013 or equivalent are ***required***.

⚠WARNING ***Gasoline leaks can lead to fire or explosion. Do not use lesser grade fuel line hose than in the kit (SAE J30R9).***

Route the supply and return lines side-by-side along bulkheads and frame members such that they are protected, *and at or above the top of the fuel tank to reduce siphoning if a line breaks or a hose comes off.* The entire length of a fuel line must be visible for inspection and accessible for replacement.

Support fuel lines to restrain movement and prevent chaffing or contact with sharp edges, electrical wiring and hot exhaust parts.

⚠WARNING ***Electric arcs can ignite gasoline leading to severe personal injury or death. Do not run wiring and fuel lines together.***

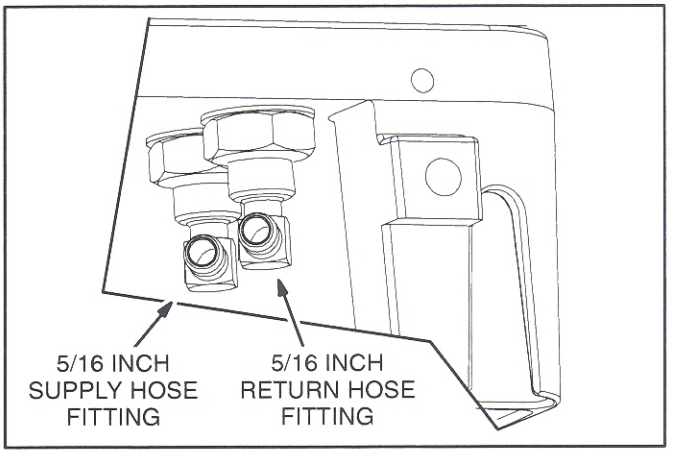


FIGURE 11. FUEL FITTINGS—LEFT END OF BASE

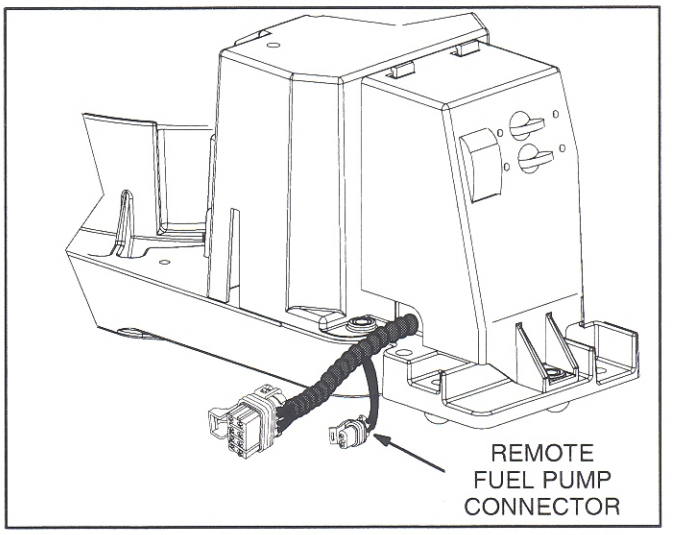


FIGURE 12. REMOTE FUEL PUMP CONNECTOR

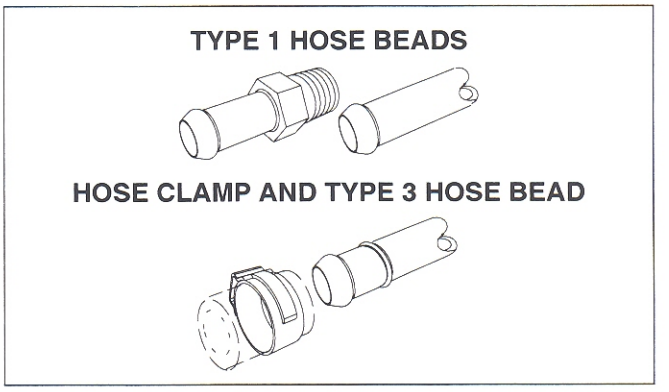


FIGURE 13. DOUBLE-FLARE SAE J1231 HOSE BEADS AND STEPLESS EAR CLAMP

GASOLINE—SERIES HGJAE / HGJAF

General Considerations

These models are equipped with carburetors. Figure 14 illustrates the fuel fitting.

Onan recommends a separate fuel pickup tube or a separate fuel tank for the genset. The genset must never be connected to the **fuel supply line** of the vehicle engine—either to a high-pressure system (pump in tank), which can overpressurize the genset fuel system, or to a vacuum system (pump on engine), which can cause the genset to starve for fuel. Some vehicle chassis manufacturers allow connections to the **fuel return line** on high pressure fuel systems. Contact the vehicle chassis manufacturer for approval. Fuel line pressure at the point where the genset is connected must not exceed 1-1/2 psi under any condition.

⚠WARNING ***Excessive fuel pressure can flood the genset causing a fire. Genset fuel supply line pressure must not exceed 1-1/2 psi under any condition.***

The maximum fuel pump lift is 36 inches (914 mm).

The genset fuel pickup should be terminated higher in the supply tank than the propulsion engine pickup to keep from running the vehicle out of fuel.

Do not change or remove the fuel fill tube, fill limiter vent, vapor canister, vapor lines, filler cap or any other part of the fuel system without the express approval of the vehicle chassis manufacturer. Modifications must conform with applicable sections of the Code of Federal Regulations, Title 49, and other standards.

Fuel Line Materials

- ***Tubing:*** Use 1/4 inch O. D. (± 0.003 inch) welded and drawn Type 304L stainless or AISI 1008–1010 low carbon steel tubing of 0.028 inch minimum wall thickness. The tubing must meet requirements for 150 psi operating pressure (Ref. ASTM A 539–99) and have corrosion resistance equal to or better than hot-dipped zinc galvanization.
- ***Hose Beads:*** Use suitable tooling to form tubing ends into SAE J1231 Type 1 or Type 3 double-flare hose beads (Figure 13)—*recommended* for all tubing and fittings for fuel return.
- ***Flexible Hose:*** Use 1/4 in I. D. SAE J30R7 or better hose.
- ***Hose Clamps:*** Use stainless steel stepless ear clamps (Figure 13). Onan P/N 0503-1951-11, Oetiker P/N 16700011 or equivalent are *recommended.*

Routing Fuel Lines

Route the fuel line along bulkheads and frame members such that it is protected, *and at or above the top of the fuel tank to reduce siphoning if a line breaks or a hose comes off.* The entire length of a fuel line must be visible for inspection and accessible for replacement.

Support fuel lines to restrain movement and prevent chaffing or contact with sharp edges, electrical wiring and hot exhaust parts.

⚠WARNING ***Electric arcs can ignite gasoline leading to severe personal injury or death. Do not run wiring and fuel lines together.***

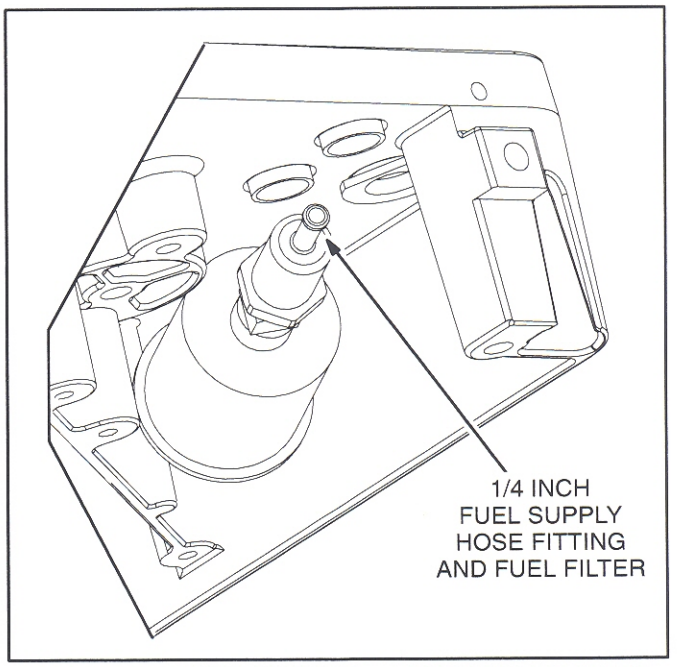


FIGURE 14. FUEL FITTING—LEFT END OF BASE

LPG SUPPLY (VAPOR WITHDRAWAL)

Use the Standard for the Storage and Handling of Liquified Petroleum Gases (NFPA No. 58) as a guide for the installation of the LPG fuel system. Figure 15 illustrates the fuel fitting and regulator vent screen.*

⚠WARNING ***LPG is flammable and explosive and can cause asphyxiation. NFPA 58, Section 1.6 requires all persons handling LPG to be trained in proper handling and operating procedures.***

The genset must be connected to the vapor withdrawal fitting on the LPG tank. The tank must have a manual shutoff valve and 2-stage pressure regulator. Adjust the regulator to deliver 9–13 inches (229–330 mm) Water Column (WC) pressure at the genset.

⚠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 qualified personnel.***

Use approved fuel line materials of 3/8-inch I. D. for runs up to 3 feet (0.9 m) and 1/2-inch I. D. for runs up to 15 feet (4.6 m).

Do not connect the genset fuel supply line to any appliance fuel supply line. The genset can draw fuel away from other appliances and cause a flame out. To prevent the possibility of flameout, the fuel supply system must be designed to deliver sufficient fuel for normal operation of the genset and other appliances at the expected temperature conditions. It may be necessary to use a separate fuel tank for the genset if sufficient fuel cannot be supplied with a single tank system.

⚠WARNING ***The flameout of an unvented LPG appliance can lead to explosive accumulations of gas inside the vehicle and the danger of severe personal injury or death. Do not connect the genset fuel supply line to any vehicle appliance supply line.***

Gas lines must be routed away from hot exhaust parts and electrical wiring, be supported and protected to prevent chaffing, kinking and pinching and be accessible throughout for inspection and replacement.

⚠WARNING ***Electric arcs can ignite LPG leading to severe personal injury or death. Do not run wiring and fuel lines together.***

Upon completing the installation, fill the LPG tank and test every joint and fitting in the LPG supply system using an approved method, such as soap bubbles.

⚠WARNING ***Testing for gas leaks with a flame can cause a fire or explosion that could lead to severe personal injury or death. Use approved methods only.***

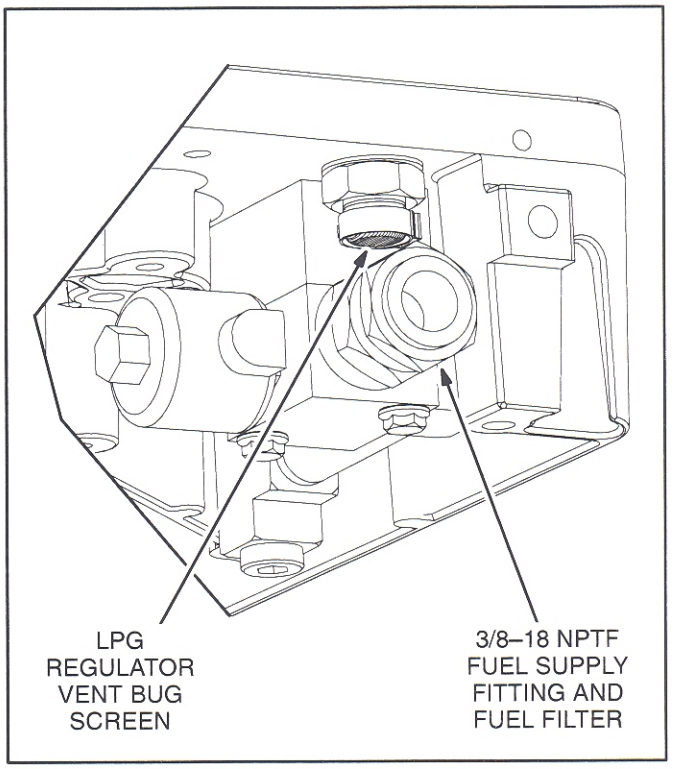


FIGURE 15. FUEL FITTING—LEFT END OF BASE

* – The genset fuel regulator is vented to this location to prevent variations in compartment air pressure from affecting fueling and to vent LPG outside the genset compartment if the regulator diaphragm develops a leak.

Electrical Connections

Do not connect the battery cables to the battery until *Installation Review and Startup* (Page 25) to prevent accidental starting during installation.

⚠WARNING ***Accidental starting of the genset can cause severe personal injury or death. Do not connect the starting battery until Installation Review and Startup (Page 25).***

Also, when so equipped, the genset must not be started before the hydraulic pump has been connected to the hydraulic system and filled with oil.

⚠CAUTION ***Running the genset without oil in the hydraulic pump will destroy the pump.***

GENERATOR CONNECTIONS

The genset is equipped with circuit breakers and 36 inch (1 m) long, 12 AWG leads for AC power output, which exit through a rain-tight 1/2 inch trade size conduit connector. See Figure 16 for the connection diagrams and the location of the conduit connector. For internal genset wiring see Page 29 or 30.

These gensets are not reconnectable for voltages other than stated on the nameplate.

If the generator leads are replaced, their ampacity must be equal to or greater than the ampere rating marked on the genset circuit breakers. (Unless 125° C rated wiring is available, heavier gauge wiring may be required to obtain the required ampacity).

Wiring Methods

Follow the National Electrical Code, especially noting the following:

1. Have a qualified electrician supervise and inspect the installation of all AC wiring.
2. Install vibration-proof switches and controls that won't open and close circuits when the vehicle is in motion.
3. Provide ground fault circuit interrupters (GFCIs)for all convenience power receptacles.
4. Route AC wiring, remote control wiring and fuel lines separately.
5. Seal all conduit openings into the vehicle interior to keep out exhaust gas. Apply silicone rubber or equivalent sealant inside and outside each conduit connector. (Flexible conduit is not vapor-tight and will allow exhaust gas to enter along the wires if not sealed.)

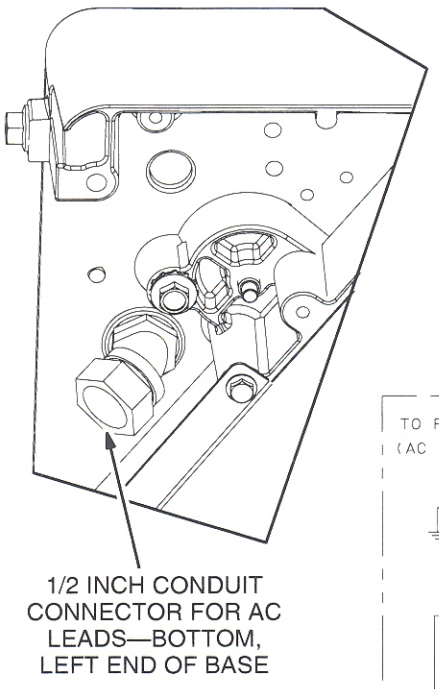
   ⚠WARNING ***EXHAUST GAS IS DEADLY! Seal all wiring openings into the vehicle interior to keep out exhaust gas.***
6. Bond the genset and all connected AC and DC equipment and controls to a common grounding point in accordance with applicable codes.

   ⚠WARNING ***Faulty grounding can lead to fire and electrocution, resulting in severe personal injury or death. Grounding must be in accordance with applicable codes.***

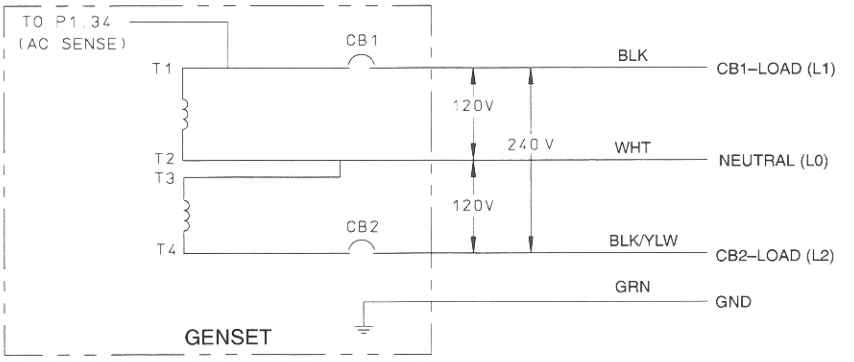
Connecting Shore Power

A vehicle with provisions for connecting shore power must have an approved device to keep the genset and utility from being interconnected.

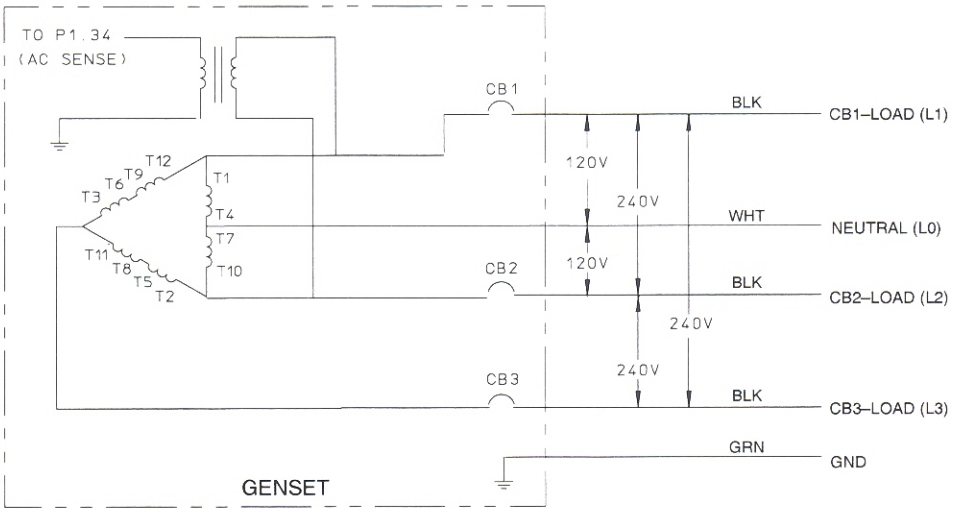
⚠WARNING ***Interconnecting the genset and shore power (or any other power source) can lead to electrocution of utility line workers, equipment damage and fire. Use an approved switching device to prevent interconnections.***



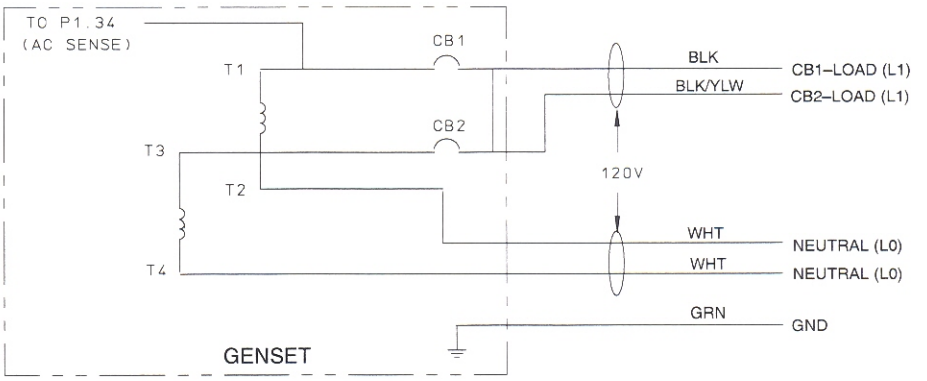
STANDARD 3-WIRE— 100/200V, 115/230V, 120/240V [1]



3-PHASE — 110/120V, 115/230V, 120/240V [1]



"2-WIRE" — 100-120V [1, 2]



1. These are not reconnectable generators.
2. Because generator windings T1-T2 and T3-T4 are in phase, the "neutral" conductors in the connected equipment, such as between a transfer switch and main distribution panel, must be sized to carry the sum of the currents.

FIGURE 16. CONNECTION DIAGRAMS AND AC LEAD OUTLET

REMOTE CONTROL CONNECTIONS

The genset has an 8-pin connector for remote control connections (Figure 17). (The 2-pin connector on Series HGJAD gensets is for a remote fuel pump. See *Fuel Connections*.) Wiring harnesses in several lengths are available separately for connections between the genset and a remote control panel. Page 29 or 30 is a diagram of the internal genset wiring.

Onan offers a variety of three remote control panels, as follows:

- Switch/status lamp (Figure 18).
- Switch/status lamp and hour meter (Figure19).
- Start/status lamp and DC voltmeter (Figure 20).

To make connections to a remote control panel:

1. Push the genset remote control connector through the entrance hole in the side of the genset housing and snap it together with the connector on the wiring harness from the remote panel.
2. Refer to Figure 21 to fabricate the remote control panel and/or wiring harness when not using the accessories available from Onan. Mark the remote control end of each lead to identify the connector pin number at the genset. Use insulated 18 AWG copper conductors for distances up to 30 feet (9 metres) and heavier gauge conductors for greater distances. Protect the wiring with full-length flexible sheathing.
3. A "continuous stop" switch located in the cab and/or boom bucket can be installed in the remote control circuit to prevent unauthorized operation of the genset by not allowing cranking (Figure 21).
4. Route control leads separately from AC power leads to reduce the possibility of erratic operation due to false induced signals.
5. Seal the opening where the leads enter the vehicle interior with silicone rubber or equivalent sealant to keep out exhaust gas.

WARNING ***EXHAUST GAS IS DEADLY! Seal all wiring openings into the vehicle interior to keep out exhaust gas.***

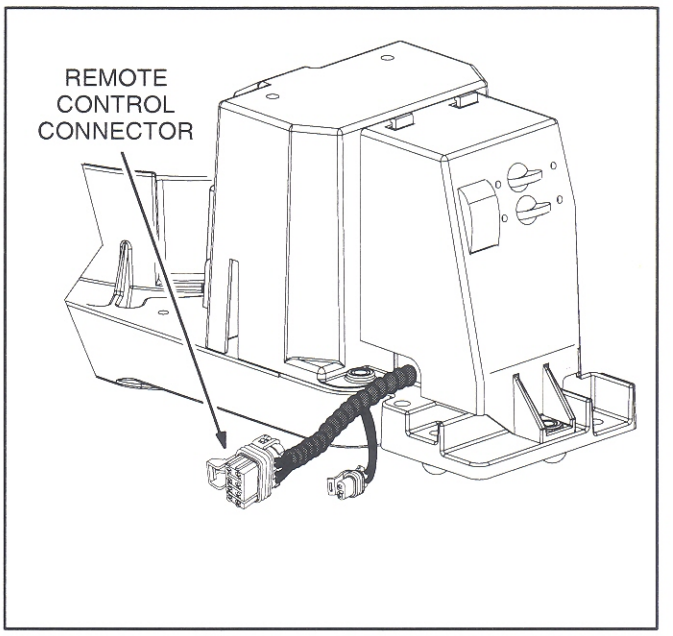


FIGURE 17. REMOTE CONTROL CONNECTOR

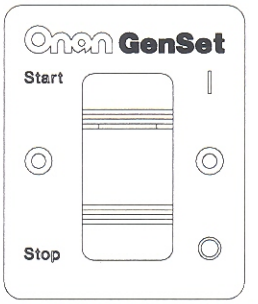


FIGURE 18. REMOTE SWITCH

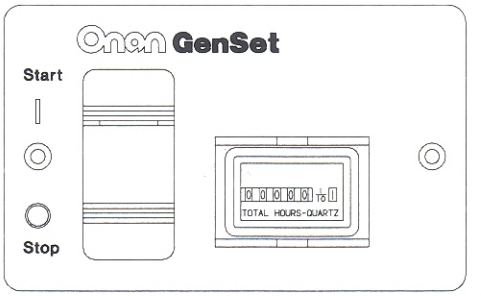


FIGURE 19. REMOTE SWITCH / HOUR METER

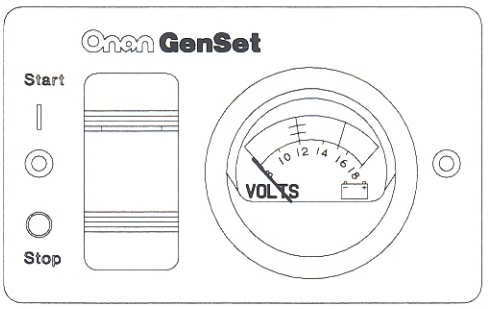


FIGURE 20. REMOTE SWITCH / DC VOLTMETER

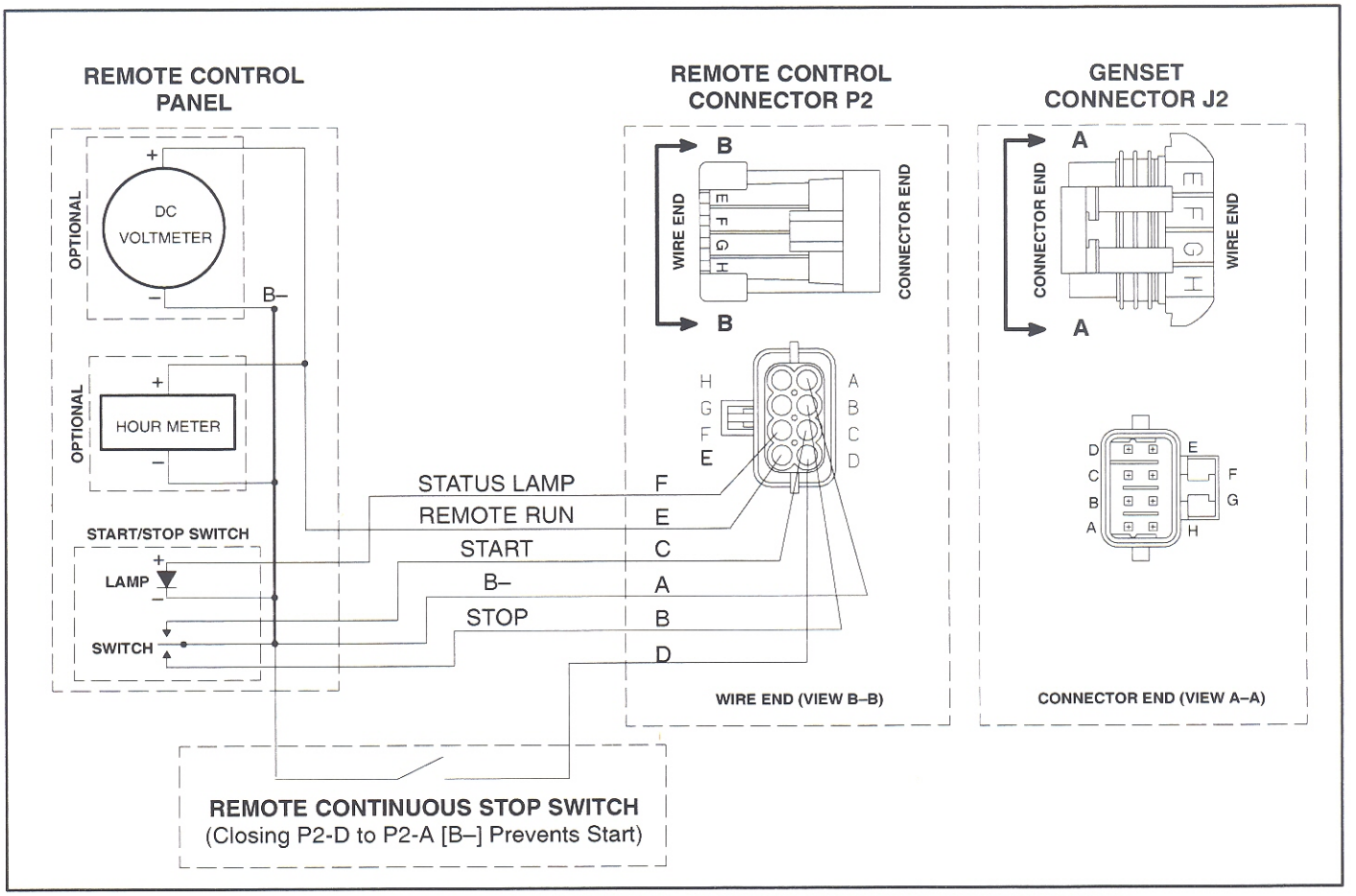


FIGURE 21. SCHEMATIC OF TYPICAL REMOTE CONTROL CONNECTIONS

BATTERY CONNECTIONS

The genset has a 12 VDC, negative-ground engine control and cranking system. See *Specifications* (Page 23) for the requirements for cranking batteries.

Do not connect the battery cables to the battery until *Installation Review and Startup* (Page 25) to prevent accidental starting during installation.

⚠WARNING ***Accidental starting of the genset can cause severe personal injury or death. Do not connect the starting battery until Installation Review and Startup (Page 25).***

Also, when so equipped, the genset must not be started before the hydraulic pump has been connected to the hydraulic system and filled with oil.

⚠ CAUTION ***Running the genset without oil in the hydraulic pump will destroy the pump.***

Battery Charging

The genset provides up to 10 amps of regulated battery charging current.

Battery Compartment

Batteries must be mounted in a compartment separate from that of the genset and away from spark-producing equipment. A compartment must have openings of at least 1.7 square inches (11 square centimetres) at the top and bottom for ventilation of battery gasses. It should be located such that spills and leaks will not drip acid on fuel lines, wiring and other equipment that could be damaged.

⚠WARNING ***Arcing can ignite the explosive hydrogen gas given off by the battery, causing severe personal injury. The battery compartment must be ventilated and must isolate the battery from spark-producing equipment.***

Battery Cables

Size battery cables according to Table 2. The current path between the genset and the negative (–) battery terminal must also be able to carry full cranking current without causing excessive voltage drop. It is highly recommended that a full-length cable be used to connect the genset to the negative (–) battery terminal (Figure 22). Note also that codes may require a bonding conductor between the genset and vehicle frame and between the battery and vehicle frame.

If the vehicle frame is used as the path between the negative (–) battery terminal and the genset (Figure 23), all frame members in the path of battery cranking currents must have substantial crossections. The electrical resistance of riveted or bolted frame joints must also be carefully considered, especially if the joints will be exposed to corrosive conditions. A cable sized according to Table 2 must be used to connect the frame to the designated negative (–) terminal on the genset (Figure 23). ***The genset mounting bolts are not considered adequate means for bonding the genset to the vehicle frame, either for the purpose of carrying cranking currents or for complying with requirements for genset/system grounding.***

Route battery cables away from fuel lines and hot engine exhaust components. Battery cables should be accessible for inspection and replacement, protected from damage and secured to prevent chafing due to vibration.

⚠WARNING ***Routing battery cables with fuel lines can lead to fire and severe personal injury or death. Keep battery cables away from fuel lines.***

TABLE 2. BATTERY CABLE SIZES FOR TEMPERATURES DOWN TO –20° F (–29° C)

TOTAL CABLE LENGTH* FEET (METERS)	CABLE SIZE AWG
0 to 10 (0 to 3)	2**
11 to 15 (3 to 4.5)	0
16 to 20 (4.5 to 6)	000

* – Add the negative battery cable lengths with the positive battery cable lengths for the total.

** – A total length of up to 20 feet (6 meters) may be used in warmer climates or when battery capacity totals at least 1000 CCA (Cold Cranking Amps).

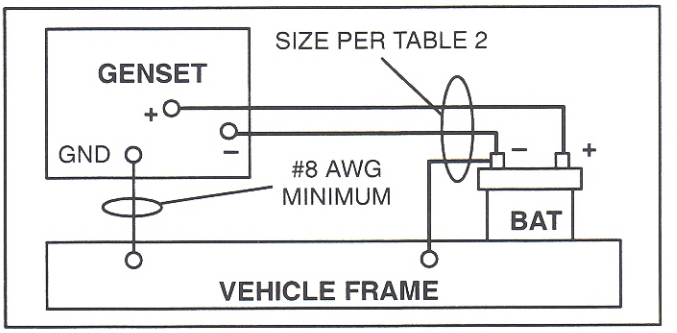


FIGURE 22. FULL-LENGTH CABLE FROM BATTERY NEGATIVE (–) TERMINAL

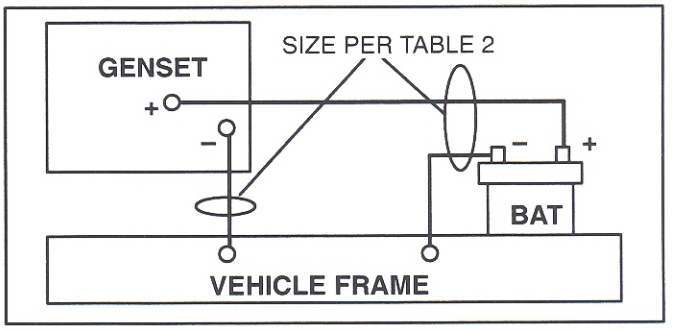


FIGURE 23. VEHICLE FRAME AS PATH FROM BATTERY NEGATIVE (–) TERMINAL

Battery Cable Connections at Genset

Terminate the battery cables with ring terminals sized for 5/16 inch screws and connect them to the genset as shown in Figures 24 and 25. Secure the insulating boot on the positive (+) terminal and tie it to the battery cable with the tie-wrap in the bag with the manuals.

Genset (Equipment) Grounding Screw

When required (see Figure 22) connect the genset grounding screw (Figure 24) to the vehicle frame with a No. 8 AWG or larger stranded cable having a ring terminal sized for a 3/8 inch screw.

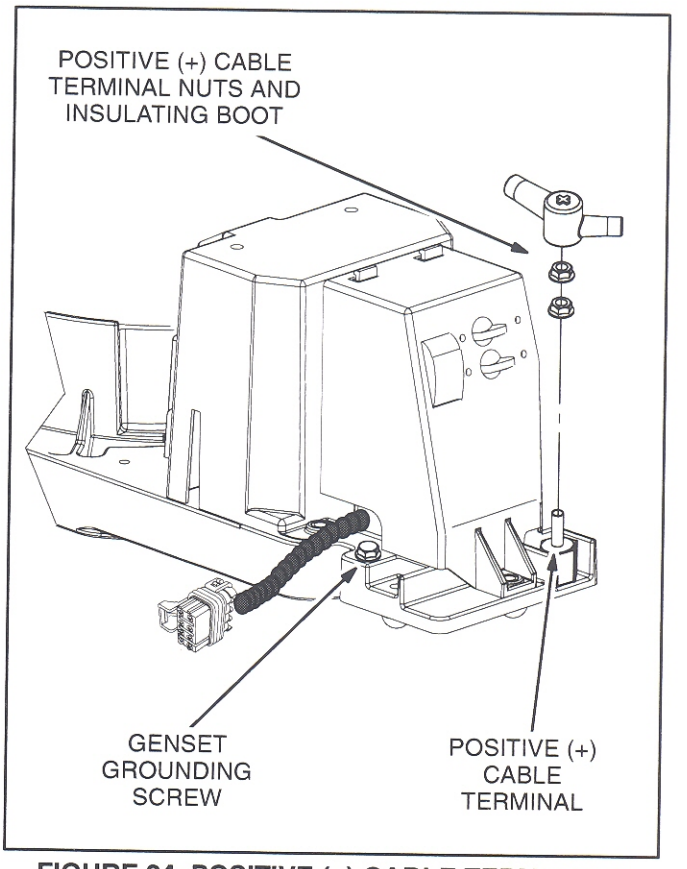


FIGURE 24. POSITIVE (+) CABLE TERMINAL & GENSET GROUNDING SCREW

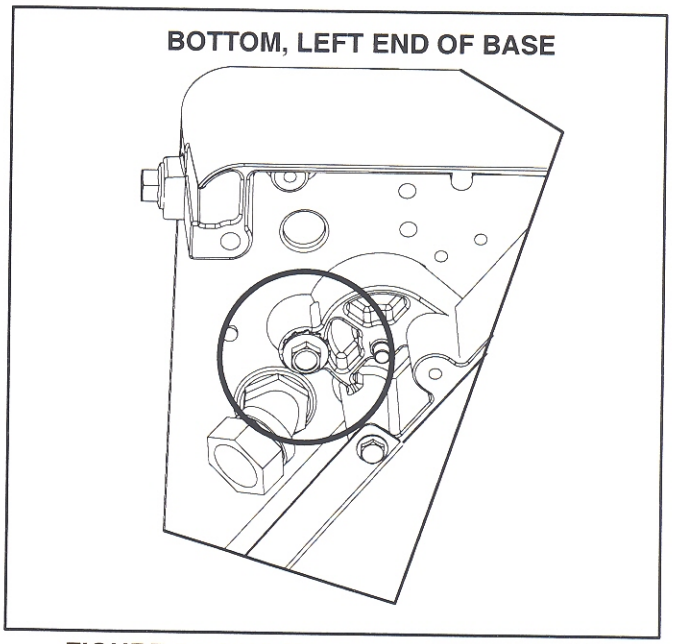


FIGURE 25. NEGATIVE (–) CABLE SCREW

Hydraulic Pump Connections

Figure 26 illustrates the hydraulic pump mounted atop the genset. See *Specifications* (Page 23) regarding hose fittings, fluid specifications and inlet conditions.

⚠ CAUTION ***Running the genset without oil in the hydraulic pump will destroy the pump.***

The genset must not be started before the hydraulic pump has been connected to the hydraulic system and filled with oil.

⚠ CAUTION ***The slightest amount of dirt in an hydraulic system can damage precisely machined internal components. Keep dirt out:***

Thoroughly clean the outside of a fitting or cap before disconnecting or removing it.

Keep all openings in components and hoses capped with proper JIC caps until just before making connections.

Thoroughly flush hoses before connecting.

Regularly replace the oil filter.

Never reuse hydraulic fluid that has been drained from a system.

When connecting hoses and starting up the system:

1. Consider that hoses shrink slightly in length and expand slightly in diameter under pressure.
2. There must be enough slack in the connected hoses to prevent strain due to movement of the pump.
3. Support, restrain and protect hydraulic hose as necessary to prevent chaffing.
4. Do not bend hose tighter than the hose manufacturer recommends.
5. Use wide-sweep 90-degree fittings.
6. Always use two wrenches when tightening hydraulic fittings.
7. Install an SAE Class 4 filter (10 micron) in the system.
8. The system oil reservoir should be above the pump and the hose from the pump should slope up to the reservoir.
9. To fill the pump, first fill the reservoir and crank the engine with the spark plug cables disconnected from the spark plugs to prevent the engine from starting. Replenish oil in the reservoir as necessary.
10. The installed system must not cause pump inlet conditions to exceed *Specifications*.

    ⚠ CAUTION ***Continuing to run or load a noisy pump can destroy it. Purge the air before continuing.***

11. The hydraulic system has air in it as long as there continues to be sharp metallic noise. While filling the system, run the genset only for a few seconds at a time until all air has been purged.

⚠WARNING ***The high pressure spray from a leak or fitting in a hydraulic line can penetrate the skin, leading to possible blood poisoning — Wear safety glasses — Shut down the genset before loosening or tightening fittings — Do not delay getting proper medical attention if exposed to high pressure oil spray.***

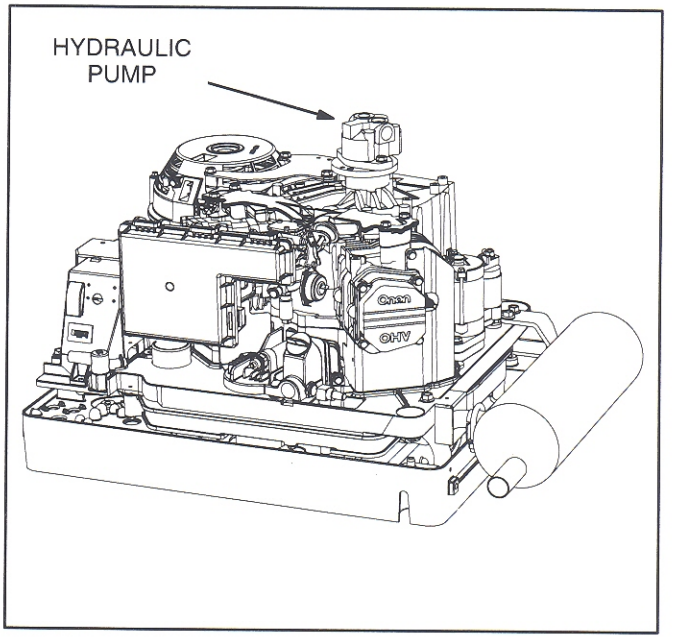


FIGURE 26. HYDRAULIC PUMP

Voltage Adjustments

Voltage is adjusted by means of the control switch. Rapidly pressing the switch to **START** 6 times *during the first minute after startup* puts the genset controller into *voltage set mode*. The *amber* status indicator lamp will begin blinking once every second to confirm voltage set mode. The *green* status indicator lamp will remain on. The controller resumes normal operating mode 20 seconds after the last adjustment.

Note: If a fault shutdown occurs or the control switch is pressed to STOP during voltage set mode, voltage adjustments will not be stored in controller memory.

To adjust voltage:

1. Make sure that proper fuel, exhaust and battery connections have been made and that the engine has the proper level of oil. See the Operator's Manual. Complete *Installation Review and Startup* (Page 25) as far as possible.

2. Disconnect all generator loads and connect accurate meters to measure AC volts and frequency.

   ⚠WARNING ***HAZARDOUS VOLTAGE! Touching uninsulated live parts inside the genset or connected equipment can result in severe personal injury or death. For your protection, stand on a dry wooden platform or rubber insulating mat, make sure your clothing and shoes are dry, remove jewelry from your hands and use tools with insulated handles.***

3. Start the genset and let voltage and frequency stabilize for 5 to 10 seconds.

4. Rapidly press the control switch to **START** 6 times within 10 seconds.

5. ***To adjust voltage up***, press the control switch to **START** and release quickly. Each time the switch is released, voltage will rise approximately 0.6 volt.

6. ***To adjust voltage down***, press the control switch to **START** and release in approximately 2 seconds. Each time the switch is released, voltage will drop approximately 0.6 volt.

7. Normal operation will resume in 20 seconds after the last adjustment.

Specifications

	GASOLINE MODELS					
	7.0 HGJAD	**7.0 HGJAE**	**7.0 HGJAF**	**5.5 HGJAD**	**5.5 HGJAE**	**5.5 HGJAF**
GENERATOR: 2-Pole Revolving Field, 2-Bearing, Self-Excited, 1-Phase, Vertical Shaft, Capped Digital Voltage Regulation						
Power (1.0 PF)	7000 watts			5500 watts		
Frequency	60 Hertz			60 Hertz		
1-Ph, 4-Wire V/A	120 / 240 Volts, 29.2 Amps			120 / 240 Volts, 22.9 Amps		
1-Ph, 2-Wire V/A	120 Volts, 58.3 Amps			120 Volts, 45.8 Amps		
3-Ph V/A	120 / 240 Volts, 16.8 Amps			120 / 240 Volts, 12 Amps		
Speed	3600 rpm			3600 rpm		
FUEL CONSUMPTION:						
No load	0.43 gph (1.6 l/h)	0.43 gph (1.6 l/h)	0.43 gph (1.6 l/h)	0.34 gph (1.3 l/h)	0.35 gph (1.3 l/h)	0.35 gph (1.3 l/h)
Half load	0.70 gph (2.7 l/h)	0.73 gph (2.8 l/h)	0.73 gph (2.8 l/h)	0.58 gph (2.2 l/h)	0.60 gph (2.3 l/h)	0.60 gph (2.3 l/h)
Full load	1.13 gph (4.3 l/h)	1.22 gph (4.6 l/h)	1.22 gph (4.6 l/h)	0.89 gph (3.4 l/h)	0.95 gph (3.6 l/h)	0.95 gph (3.6 l/h)
ENGINE: Air-Cooled, 4-Cycle Spark-Ignited, OHV, 90° V Twin Cyl, Vertical Shaft						
Fueling Method	SFI[1]	Carburetor	Carburetor	SFI[1]	Carburetor	Carburetor
Governor	Digital	Mechanical	Mechanical	Digital	Mechanical	Mechanical
Speed	2880 rpm			2400 rpm		
Bore	3.15 in (80 mm)			3.15 in (80 mm)		
Stroke	2.56 in (65 mm)			2.56 in (65 mm)		
Displacement	39.8 in^3 (653 cc)			39.8 in^3 (653 cc)		
Comp. Ratio	8.0 : 1			8.0 : 1		
Oil Capacity	2.0 quart (1.8 l)			2.0 quart (1.8 l)		
Valve Lash (Cold)	0.004 in (0.10 mm), Intake & Exhaust			0.004 in (0.10 mm), Intake & Exhaust		
Spark Plug	18–25 lbs-ft (23–32 N-m)			18–25 lbs-ft (23–32 N-m)		
Ignition Timing	20° BTDC, non-adjustable magneto			20° BTDC, non-adjustable magneto		
Magneto Air Gap	0.012 in (0.3 mm)			0.012 in (0.3 mm)		
Spark Plug Gap	0.025 in (6-7 mm)			0.025 in (6-7 mm)		
HYDRAULIC PUMP:	Fixed-displacement gear pump—1.8 gpm @ 2500 psi			Fixed-displacement gear pump—1.6 gpm @ 2500 psi		
DC SYSTEM:						
Battery Voltage	12 volts			12 volts		
Battery Charging	10 amps regulated			10 amps regulated		
Min. Battery CCA	450 @ 0° F (–18° C)			450 @ 0° F (–18° C)		
INSTALLATION:						
Exhaust O. D.	1-1/4 in			1-1/4 in		
Max. Exhaust Back Pressure	–	–	35 in (889 mm) WC	–	–	35 in (889 mm) WC
Fuel Supply Connection	5/16 in. SAE J1231 Type 1	1/4 in. SAE J1231 Type 1	1/4 in. SAE J1231 Type 1	5/16 in. SAE J1231 Type 1	1/4 in. SAE J1231 Type 1	1/4 in. SAE J1231 Type 1
Fuel Return Connection	5/16 in. SAE J1231 Type 1	–	–	5/16 in. SAE J1231 Type 1	–	–
Hydraulic Fluid	Transmission or Petroleum-Based Hydraulic Fluid—Operating Viscosity: 80-1000 SSU—Maximum Start-Up Viscosity: 4000 SSU			Transmission or Petroleum-Based Hydraulic Fluid—Operating Viscosity: 80-1000 SSU—Maximum Start-Up Viscosity: 4000 SSU		
Hydraulic Pump Inlet Conditions	Not to exceed 5 in Hg Vacuum or 20 psi Pressure			Not to exceed 5 in Hg Vacuum or 20 psi Pressure		
Hydraulic Pump Connections Outlet Inlet	3/4-16 UNF-2B SAE 7/8-14 UNF-2B SAE			3/4-16 UNF-2B SAE 7/8-14 UNF-2B SAE		
Noise dB(A)[2]	66	67	75	66	67	75
Weight	290 lb (132 Kg)	290 lb (132 Kg)	239 lb (107 Kg)	279 lb (127 Kg)	279 lb (127 Kg)	228 lb (104 Kg)
Compartment (H x D x W)[3]	HGJAD/HGJAE: 17.2 in x 23.2 in x 34.6 in (438 mm x 589 mm x 879 mm) HGJAF: 16.5 in x 22.8 in x 27.9 in (420 mm x 579 mm x 709 mm)					

1. Sequential Multiport Fuel Injection
2. Measurements @ 10 ft (3 m) in a typical installation, under an 4 kW load.
3. With 1/2 in. clearances. See the Installation Manual for additional considerations when sizing the genset compartment.

	LPG MODELS			
	6.5 HGJAE	**6.5 HGJAF**	**5.5 HGJAE**	**5.5 HGJAF**
GENERATOR: 2-Pole Revolving Field, 2-Bearing, Self-Excited, 1-Phase, Vertical Shaft, Capped Digital Voltage Regulation				
Power (1.0 PF)	6500 watts		5500 watts	
Frequency	60 Hertz		60 Hertz	
1-Ph, 4-Wire V/A	120 / 240 Volts, 27 Amps		120 / 240 Volts, 22.9 Amps	
Speed	3600 rpm		3600 rpm	
FUEL CONSUMPTION:				
No load	2.2 lbs/h (1.0 kg/h)	2.2 lbs/h (1.0 kg/h)	1.8 lbs/h (0.8 kg/h)	1.8 lbs/h (0.8 kg/h)
Half load	3.9 lbs/h (1.8 kg/h)	3.9 lbs/h (1.8 kg/h)	3.3 lbs/h (1.5 kg/h)	3.3 lbs/h (1.5 kg/h)
Full load	5.3 lbs/h (2.4 kg/h)	5.3 lbs/h (2.4 kg/h)	4.6 lbs/h (2.1 kg/h)	4.6 lbs/h (2.1 kg/h)
ENGINE: Air-Cooled, 4-Cycle Spark-Ignited, OHV, 90° V Twin Cyl, Vertical Shaft				
Fueling Method	Air/Fuel Mixer		Air/Fuel Mixer	
Governor	Mechanical		Mechanical	
Speed	2880 rpm		2400 rpm	
Bore	3.15 in (80 mm)		3.15 in (80 mm)	
Stroke	2.56 in (65 mm)		2.56 in (65 mm)	
Displacement	39.8 in^3 (653 cc)		39.8 in^3 (653 cc)	
Comp. Ratio	8.0 : 1		8.0 : 1	
Oil Capacity	2.0 quart (1.8 l)		2.0 quart (1.8 l)	
Valve Lash (Cold)	0.004 in (0.10 mm), Intake & Exhaust		0.004 in (0.10 mm), Intake & Exhaust	
Spark Plug	18–25 lbs-ft (23–32 N-m)		18–25 lbs-ft (23–32 N-m)	
Ignition Timing	20° BTDC, non-adjustable magneto		20° BTDC, non-adjustable magneto	
Magneto Air Gap	0.012 in (0.3 mm)		0.012 in (0.3 mm)	
Spark Plug Gap	0.025 in (6-7 mm)		0.025 in (6-7 mm)	
HYDRAULIC PUMP:	Fixed-displacement gear pump—1.8 gpm @ 2500 psi		Fixed-displacement gear pump—1.6 gpm @ 2500 psi	
DC SYSTEM:				
Battery Voltage	12 volts		12 volts	
Battery Charging	10 amps regulated		10 amps regulated	
Min. Battery CCA	450 @ 0° F (–18° C)		450 @ 0° F (–18° C)	
INSTALLATION:				
Exhaust O. D.	1-1/4 in		1-1/4 in	
Max. Exhaust Back Pressure	–	35 in (889 mm) WC	–	35 in (889 mm) WC
LPG Vapor: Connection Pressure	3/8–18 NPTF 9-13 in (228-330 mm) WC		3/8–18 NPTF 9-13 in (228-330 mm) WC	
LPG Liquid: Connection Pressure	1/4–18 NPTF Tank Pressure		1/4–18 NPTF Tank Pressure	
Hydraulic Fluid	Transmission or Petroleum-Based Hydraulic Fluid—Operating Viscosity: 80-1000 SSU—Maximum Start-Up Viscosity: 4000 SSU		Transmission or Petroleum-Based Hydraulic Fluid—Operating Viscosity: 80-1000 SSU—Maximum Start-Up Viscosity: 4000 SSU	
Hydraulic Pump Inlet Conditions	Not to exceed 5 in Hg Vacuum or 20 psi Pressure		Not to exceed 5 in Hg Vacuum or 20 psi Pressure	
Hydraulic Pump Connections Outlet Inlet	3/4-16 UNF-2B SAE 7/8-14 UNF-2B SAE		3/4-16 UNF-2B SAE 7/8-14 UNF-2B SAE	
Noise dB(A)[1]	67	75	67	75
Weight	290 lb (132 Kg)	239 lb (107 Kg)	279 lb (127 Kg)	228 lb (104 Kg)
Compartment (H x D x W)[2]	HGJAD/HGJAE: 17.2 in x 23.2 in x 34.6 in (438 mm x 589 mm x 879 mm) HGJAF: 16.5 in x 22.8 in x 27.9 in (420 mm x 579 mm x 709 mm)			

1. Measurements @ 10 ft (3 m) in a typical installation, under an 4 kW load.
2. With 1/2 in. clearances. See the Installation Manual for additional considerations when sizing the genset compartment.

Installation Review and Startup

INSTALLATION REVIEW

Before starting the genset inspect the installation and check (√) each of the following questions if it can be answered "YES". If an item cannot be checked, provision must be made to satisfy the requirement.

[ ] Has the hydraulic pump, if so equipped, been connected and filled with oil (Step 9, Page 21)?

[ ] Has the COOLING SYSTEM TEST in this Section been conducted and have the temperature specifications been met?

[ ] Is the control panel on the genset easily accessible for starting and stopping the genset and resetting the circuit breaker?

[ ] Is there easy access for checking and adding engine oil, replacing the spark plugs and changing the air filter?

[ ] Is the genset securely bolted in place?

[ ] Are all specified clearances provided?

[ ] Are the air inlet and outlet openings free of obstructions?

[ ] Is there access for draining engine oil?

[ ] Are all tail pipe connections tight and all hangers and support straps secure?

[ ] Does the tail pipe terminate at least 1 inch (25 mm) beyond the perimeter of the vehicle and at least 6 inches (153 mm) away from any opening into the vehicle?

[ ] Is the genset located outside the vehicle interior or separated by approved vapor-tight and fire-resistive materials?

[ ] Are all openings into the vehicle, such as for AC wiring, sealed to keep out engine exhaust? Are AC conduit connectors sealed inside and outside?

[ ] Have all AC connections been inspected and approved?

[ ] Has a properly sized battery(ies) been installed in a ventilated compartment isolated from the genset?

[ ] Have properly sized battery cables been installed and secured at sufficient intervals to prevent chaffing and contact with sharp edges, fuel lines and hot exhaust parts?

[ ] ***Fuel Injected Models:*** Has the fuel pump been installed in accordance with the instructions in the kit? *Has a fuel return line been provided?*

[ ] Are all fuel connections tight?

[ ] Has the fuel line(s) been secured at sufficient intervals to prevent chaffing and contact with sharp edges, electrical wiring and hot exhaust parts?

STARTUP

⚠WARNING ***EXHAUST GAS IS DEADLY! Do not operate the genset when the vehicle is indoors or where exhaust can accumulate.***

When all the items on the Installation Review check list have been checked, connect the battery cables to the battery, positive (+) cable first.

⚠WARNING ***Batteries give off explosive gases that can cause severe personal injury — Do not smoke — Keep flames, sparks, pilot lights, switches, arc-producing equipment and all other ignition sources away.***

Read the Operator's Manual and perform the maintenance and pre-start checks instructed. *Check the oil level and fill as necessary.*

⚠WARNING ***Gasoline is flammable and explosive and can cause severe personal injury or death — Stop priming immediately if you smell gasoline or see fuel leaking and clean up spilled fuel and ventilate area before starting the genset or vehicle — Do not smoke — Keep flames, sparks, pilot lights, switches, arc-producing equipment and all other ignition sources away — Keep an ABC fire extinguisher handy.***

Gasoline Models: *Recheck all fuel connections for tightness* and then prime the fuel system by holding the control switch at **STOP/PRIME** while checking for fuel line leaks. Fix all leaks before starting the genset.

Start and operate the genset, following all the instructions and safety precautions in the Operator's Manual. Check for fuel and exhaust leaks and unusual noises while the genset is running under full and intermediate loads. Do not place the genset in service until all fuel and exhaust leaks have been fixed and operation is satisfactory.

COOLING SYSTEM TEST

The engine and generator cooling fans were designed to allow continuous full-load operation in ambient temperatures up to 40° C (104° F). Air recirculation or inlet or outlet restrictions can cause overheating and must be considered in each new application, other than those as represented in Figure 2 (Page 6).

A full-load cooling test must be conducted measuring ambient air, inlet air and engine oil temperatures. The application must be redesigned to reduce air recirculation and/or restrictions to air flow at inlet or outlet if the rise in engine oil or inlet air temperature exceeds the temperature specifications below.

Method

1. Complete a representative installation.
2. Park the vehicle at a location where the ambient air temperature will remain between 60° F and 100° F (16° C and 38° C) during the test.
3. Connect a load bank that can be adjusted to load the genset to full-load.
4. Measure temperatures with thermocouples not heavier than No. 24 AWG (0.21 mm^2).
   - A To measure oil temperature, obtain an extra engine oil dipstick to keep for testing. Drill a hole in the cap through which to pass the thermocouple leads and secure the bead to the tip of the dipstick.
   - B Measure inlet air temperature with one thermocouple secured in the center of the air inlet in the base of the genset.
   - C Measure ambient air temperature with a shielded thermocouple within 4 feet (1.2 meters) of the genset and at approximately the same height. Make sure the thermocouple will not be affected by warm air discharged from the genset or by sunlight. Use 2 inch diameter white PVC piping at least 6 inches long as a thermocouple shield.

⚠WARNING ***EXHAUST GAS IS DEADLY! Do not operate the genset when the vehicle is indoors or where exhaust can accumulate.***

5. Close all compartment doors and run the genset under full-load. Record temperatures at 15 minute intervals until they stabilize. Temperature is considered stable when there is no change in three consecutive readings. See Table 3 for an example of how the data can be arranged for recording and analysis.

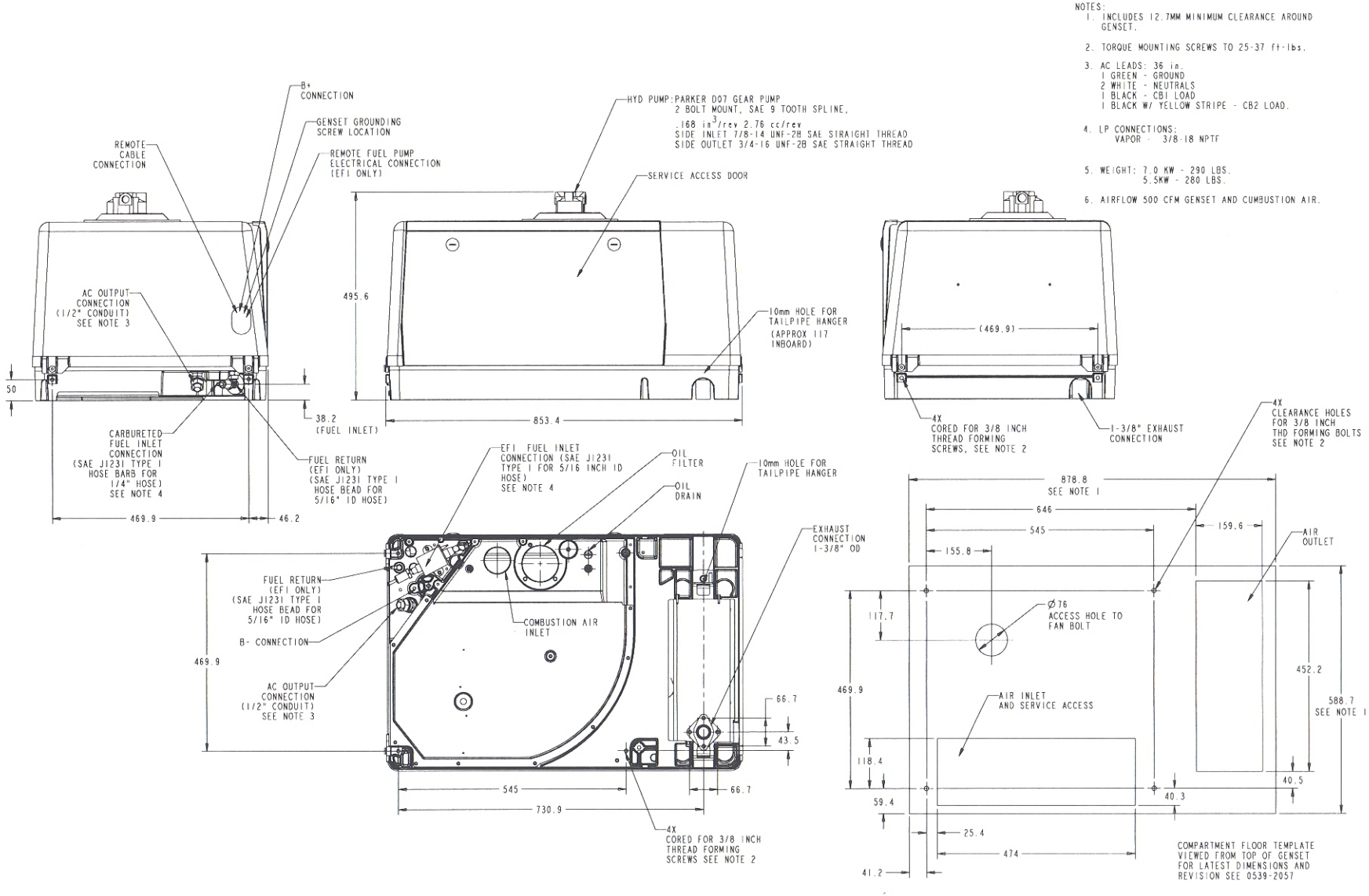
TABLE 3. TEMPERATURE DATA

THERMOCOUPLE LOCATION	TEMPERATURE C° (F°) Time Of Reading							
Ambient Air								
Inlet Air								
Engine Oil								

Temperature Specifications

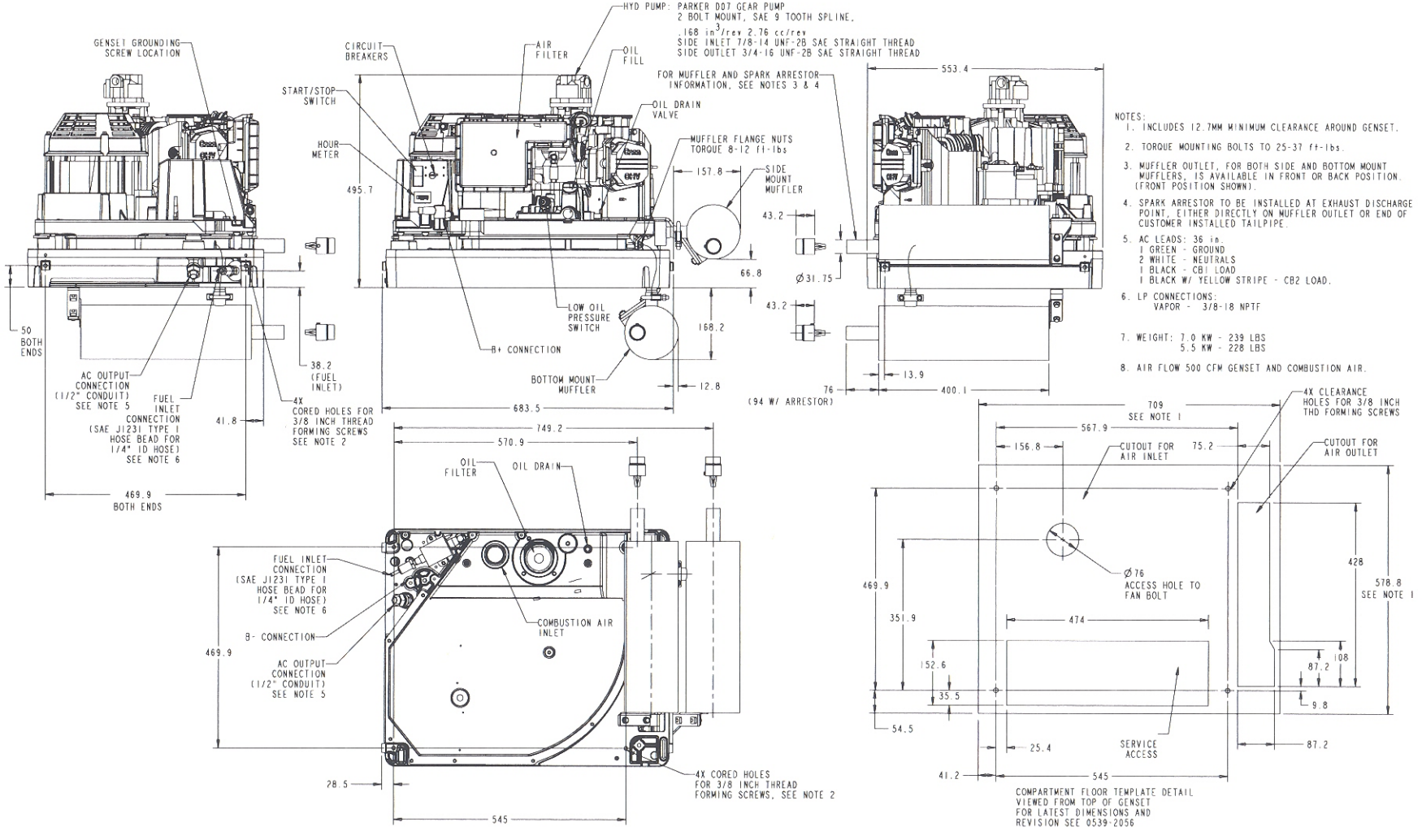
The rise in genset air inlet temperature over ambient air temperature must not exceed 25° F (15° C).

The rise in engine oil temperature over ambient air temperature must not exceed 190° F (88° C), nor exceed a maximum of 310° F (155° C).*



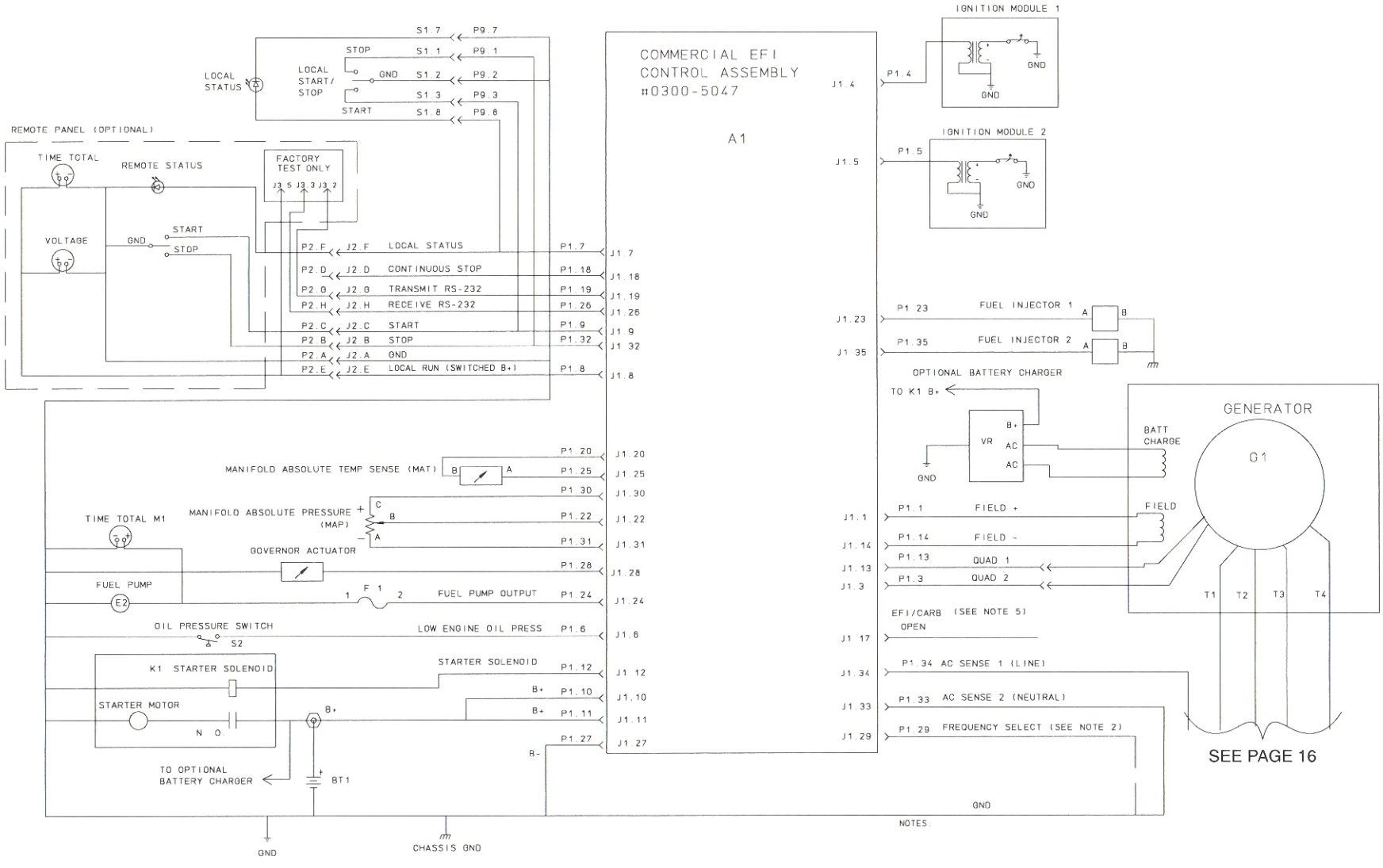
OUTLINE DRAWING—HGJAD / HGJAE

500-3449



OUTLINE DRAWING—HGJAF

500-3450



2. FOR 50 HZ OPERATION: CONNECT WIRE MARKED "FREQ SEL" TO GND CONNECTION ON HOUR METER M1.

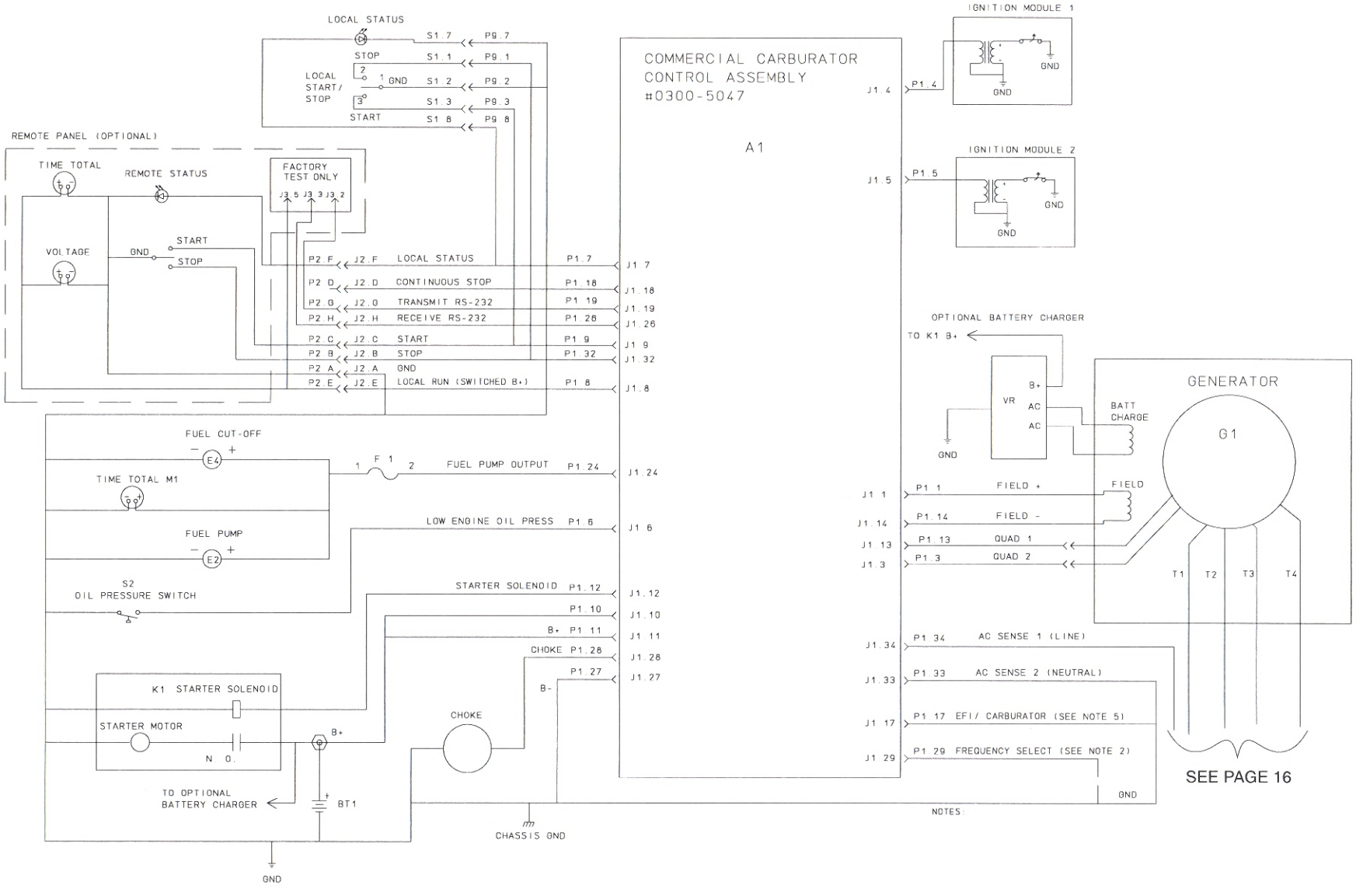
3. GROUND J2.D IN THE REMOTE CONNECTOR TO ACTIVATE "CONTINUOUS STOP

4. ENGINE RUN ONLY (ERO) IS ACTIVE WHEN THE SET IS RESTARTED WITHIN 1 MINUTE OF A BYPASSABLE GENERATOR FAULT.

5. P1-17 IS CONNECTED TO GND ON CARBURATED SETS AND LEFT OPEN ON EFI SETS.

WIRING DIAGRAM—HGJAD

611-1274



2. FOR 50 HZ OPERATION: CONNECT WIRE MARKED "FREQ SEL" TO GND CONNECTION ON HOUR METER M1.
3. GROUND J2.D IN THE REMOTE CONNECTOR TO ACTIVATE "CONTINUOUS STOP".
4. ENGINE RUN ONLY (ERO) IS ACTIVE WHEN THE SET IS RESTARTED WITHIN 1 MINUTE OF A BYPASSABLE GENERATOR FAULT.
5. P1-17 IS CONNECTED TO GND ON CARBURATED SETS AND LEFT OPEN ON EFI SETS.

WIRING DIAGRAM—HGJAE / HGJAF

611-1273

Onan

Cummins Power Generation
1400 73rd Avenue N.E.
Minneapolis, MN 55432
763-574-5000
Fax: 763-528-7229