

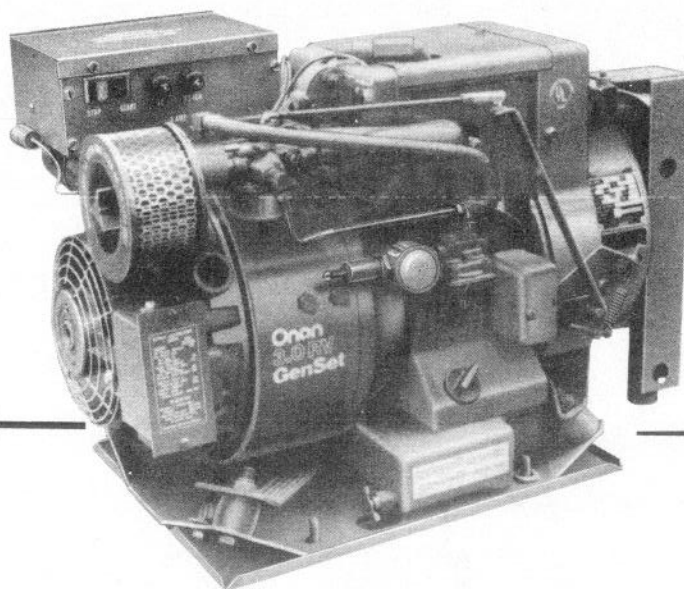
Onan

Installation Guide

3.0 kW

**AJ
GenSet**

RV Electric Generating Set



Safety Precautions

⚠ DANGER

This symbol warns of immediate hazards which will result in severe personal injury or death.

⚠ WARNING

This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

⚠ CAUTION

This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

Fuels, electrical equipment, batteries, exhaust gases and moving parts present potential hazards that could result in serious, personal injury. Take care in following these recommended procedures.

Do not work on this equipment when mentally or physically fatigued.

- **Use Extreme Caution Near Fuel. A constant potential explosive or fire hazard exists.**

Do not fill fuel tank near unit with engine running. Do not smoke or use open flame near the unit or the fuel tank.

Be sure all fuel supplies have a positive shutoff valve.

Use a non-metallic, non-conductive, flexible section of fuel line between the generator set and stationary fuel line in vehicle.

LPG: The propane fuel supply lines **MUST** comply with all requirements of NFPA 501C Section 3-5, paragraphs 1.1 and 1.2 as well as Canadian Gas Association Bulletin B149.2-78. The installer must review and comply with all applicable codes regarding fuel tanks, supply lines, and pressure testing complete system for leaks after installation is complete and **PRIOR** to initial operation of the generator set.

Have a fire extinguisher nearby. Be sure extinguisher is properly maintained and be familiar with its proper use. Extinguishers rated ABC by the NFPA are appropriate for all applications. Consult the local fire department for the correct type of extinguisher for various applications.

- **Guard Against Electric Shock**

Remove electric power before removing protective shields or touching electrical equipment. Use rubber insulative mats placed on dry wood platforms over floors that are metal or concrete when around electrical equipment. Do not wear damp clothing (particularly wet shoes) or allow skin surfaces to be damp when handling electrical equipment.

Jewelry is a good conductor of electricity and should be removed when working on electrical equipment.

DO NOT CONNECT GENERATOR SET DIRECTLY TO ANY BUILDING ELECTRICAL SYSTEM. Hazardous voltages can flow from the generator set into the utility line. This creates a potential for electrocution or property damage. Connect only through an approved device and after building main switch is open. Consult an electrician in regard to emergency power use.

Use extreme caution when working on electrical components. High voltages cause injury or death.

Follow all state and local electrical codes. Have all electrical installations performed by a qualified licensed electrician.

- **Do Not Smoke While Servicing Batteries**

Batteries emit a highly-explosive gas that can be ignited by electrical arcing or by smoking.

- **Exhaust Gases Are Toxic**

Never sleep in the vehicle with the generator set running unless the vehicle is equipped with an operating carbon monoxide detector.

Provide an adequate exhaust system to properly expel discharged gases. Check exhaust system regularly for leaks. Ensure that exhaust manifolds are secure and not warped.

Be sure the unit is well ventilated.

- **Keep the Unit and Surrounding Area Clean**

Remove all oil deposits. Remove all unnecessary grease and oil from the unit. Accumulated grease and oil can cause overheating and subsequent engine damage and may present a potential fire hazard.

When cleaning generator set, provide cover or other protection so that cleaning and rinse water, and other contaminants are not allowed into the generator, air cleaner, control box, fuel solenoid, or electrical connectors. Generator set operation and internal components can be adversely affected.

Do **NOT** clean the generator set while unit is operating. This can result in personal injury or product or property damage.

Do **NOT** use high pressure air, water, or steam for cleaning generator set and compartment. Dirt and other foreign matter can be forced into generator, engine and control housings. Generator set operation and internal components can be adversely affected.

Do **NOT** use high strength solvents. They can damage electrical connectors.

Do **NOT** store anything in the generator compartment such as oil or gas cans, oily rags, chains, wooden blocks, portable propane cylinders, etc. A fire could result or the generator set operation (cooling, noise and vibration) may be adversely affected. Keep the compartment floor clean and dry.

- **Protect Against Moving Parts**

Avoid moving parts of the unit. Loose jackets, shirts or sleeves should not be permitted because of the danger of becoming caught in moving parts.

Make sure all nuts and bolts are secure. Keep power shields and guards in position.

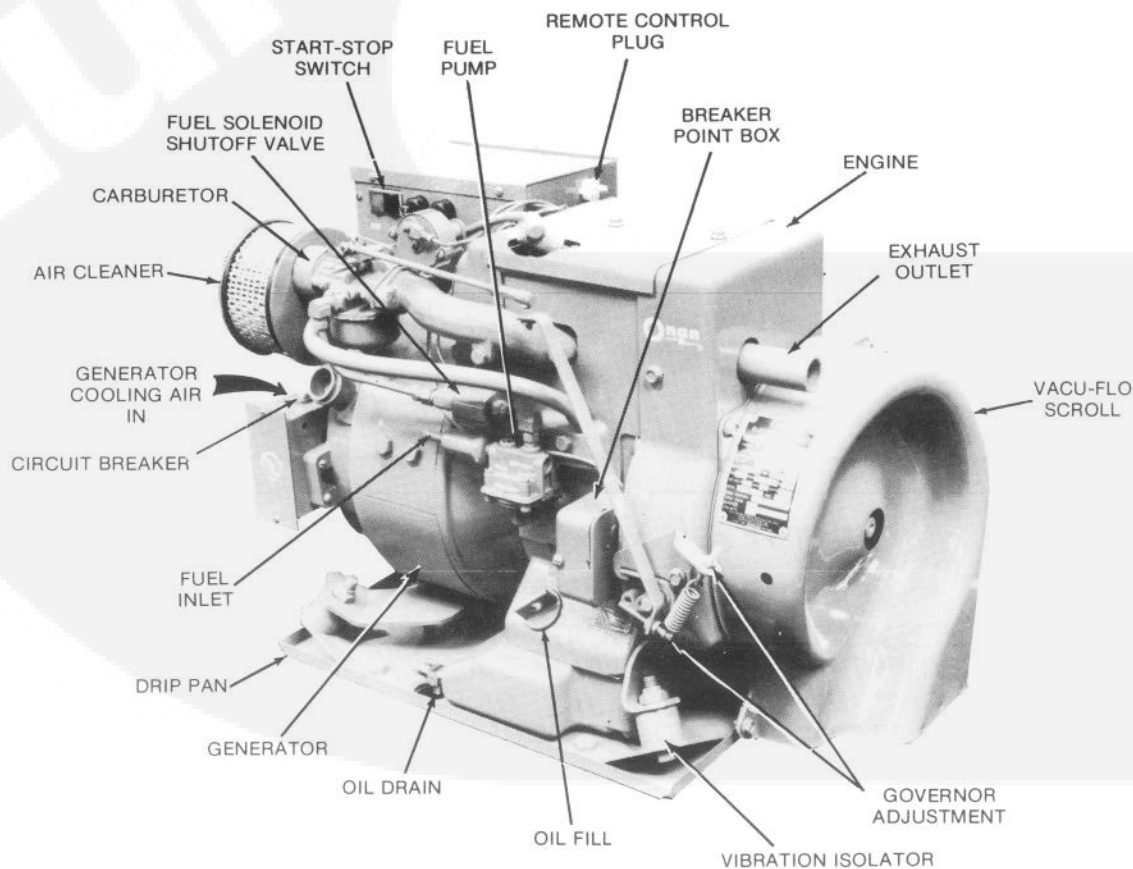
If adjustments *must* be made while the unit is running, use extreme caution around hot manifolds, moving parts, etc.

- **General**

Do not work on this equipment when mentally or physically fatigued, or after consuming any alcohol or drug that makes the operation of equipment unsafe.

TABLE OF CONTENTS

TITLE	PAGE
INTRODUCTION	2
GENERAL SPECIFICATIONS	3
PRE-START CHECKS	4
COMPARTMENT SIZE AND LOCATION	6
VENTILATION AND ACOUSTICS	7
FUEL SYSTEM	9
EXHAUST SYSTEM	10
ELECTRICAL LOADS AND CONNECTIONS	11
BATTERIES	13
REMOTE ACCESSORIES	14



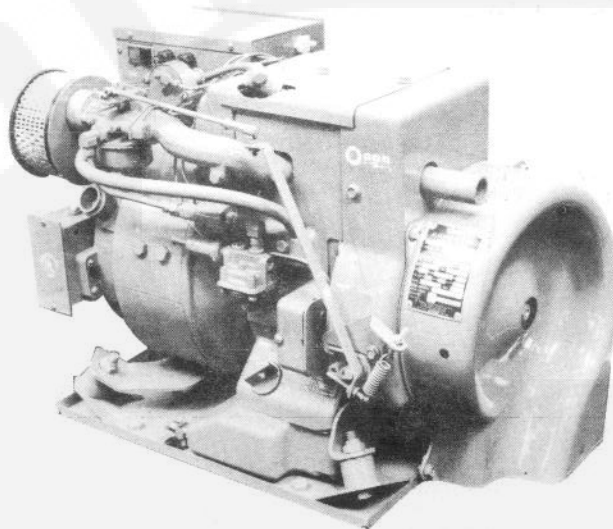
TYPICAL AJ FOR RECREATIONAL VEHICLES

INTRODUCTION

This manual covers detailed installation procedures for the UL Listed/CSA Certified Onan model 3.0 AJ-1R recreational vehicle electric generating sets. Each Onan RV electric generating set MUST be installed properly if it is to operate reliably, quietly and most important safely, even though the set itself meets or exceeds all Listing Requirements. Being Listed and Certified means this electric generating set meets or exceeds all requirements of ANSI/NFPA 501C-1977 Chapter 4 (Electrical Systems) and Chapter 5 (Fire and Life Safety) and ANSI A198.1 as well as UL Subject 1248 and CSA Electrical Bulletin #946.

All Motor Home installations MUST comply with these specifications as well as Article S51, ANSI C1-1975/NFPA No. 70-1978 of the National Electrical Code. The Motor Home Manufacturer and/or the generator set installer MUST comply with above codes and any local codes which pertain to the generator set installation.

This manual provides detailed installation guidelines for this Onan model ONLY. For operation and maintenance procedures, refer to the individual Operator's manual which accompanies each set. The Operator's manual is #924-0122.



WARNING

*TO PREVENT FIRE OR ACCIDENT HAZARD . . .
THIS UNIT MUST BE INSTALLED ACCORDING
TO THE MANUFACTURER'S DETAILED IN-
STALLATION PROCEDURES OBSERVING ALL
MINIMUM CLEARANCES.*

*TO AVOID POSSIBLE PERSONAL INJURY OR
EQUIPMENT DAMAGE, ANY INSTALLATION
AND ALL SERVICE MUST BE PERFORMED BY
QUALIFIED PERSONNEL.*

GENERAL SPECIFICATIONS

ENGINE

Onan 4-cycle, single cylinder, L-head vertical design, air cooled gasoline fuel engine rated 5.6bhp at 3600 rpm. Remote start, negative ground, 12-volt motorized alternator cranking.

ALTERNATOR

Onan built two-pole, revolving armature permanently aligned to engine. Generator produces 120 volts, 25 amps., 60 HZ single phase AC output.

CONTROL

Side mounted control featuring, fixed rate battery charging and Start Stop controls with remote start capability.

RV ELECTRIC GENERATING SET

Some general specifications are listed below for reference purposes.

SPECIFICATIONS

Height	15.5 in. (394 mm)
Weight	160 lbs. (73 kg)
Length	23.19 in. (589 mm)
Width	12 in. (305 mm)
Air Requirements	
Total (CFM)	325 (9.2 m ³ /min.)
Fuel Inlet Connection	
Size	1/4 Barb
Battery Voltage	12 Volts
Battery AMP-HR	
Minimum	92 (331.20 kC)
Battery Ground	Negative
RPM (at rated load 60 Hz)	3600

NOTE: Metric values are shown in parentheses.

PRE-START CHECKS

This RV generator set is complete as received except for exhaust components and any other optional accessory items which are shipped loose with each set for installation later. After the initial installation is completed the following steps are necessary before actually starting the generator set for the first time.

1. Install the exhaust system.
2. Add oil to the engine.
3. Connect fuel line to engine from fuel supply tank.
4. Connect electrical leads to load circuits.
5. Connect the start-stop remote switches (if used).
6. Connect battery leads between set and battery. Connect ground lead last.

Vehicle chassis (frame) ground and the battery and generator set ground should all be electrically connected to be at 0 ground potential. All Onan units are designed for negative ground application.

FUEL SYSTEM

With set running, check for leaks. Raw fuel will cause fumes which could EXPLODE. Check around carburetor and fuel pump inlets. Make sure fuel lines are not rubbing against anything which could cause breakage.

ELECTRICAL

AC Output

AC leads (M1, M2,) terminate in generator set's junction box. These wires should be connected to distribution box with multistrand wire enclosed in a flexible conduit. Check all wires (to and from the generator set) for fraying and loose connections. For information on load connections refer to ELECTRICAL LOADS AND CONNECTIONS section following.

Battery Connections

Battery positive (+) connects to start solenoid. Battery negative (-) connects to location on rear of generator. Check terminals on set for clean and tight connections.

WARNING

Do not smoke while servicing batteries. Lead acid batteries give off explosive gases while being charged.

WARNING

EXHAUST GAS IS DEADLY!

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

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

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

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

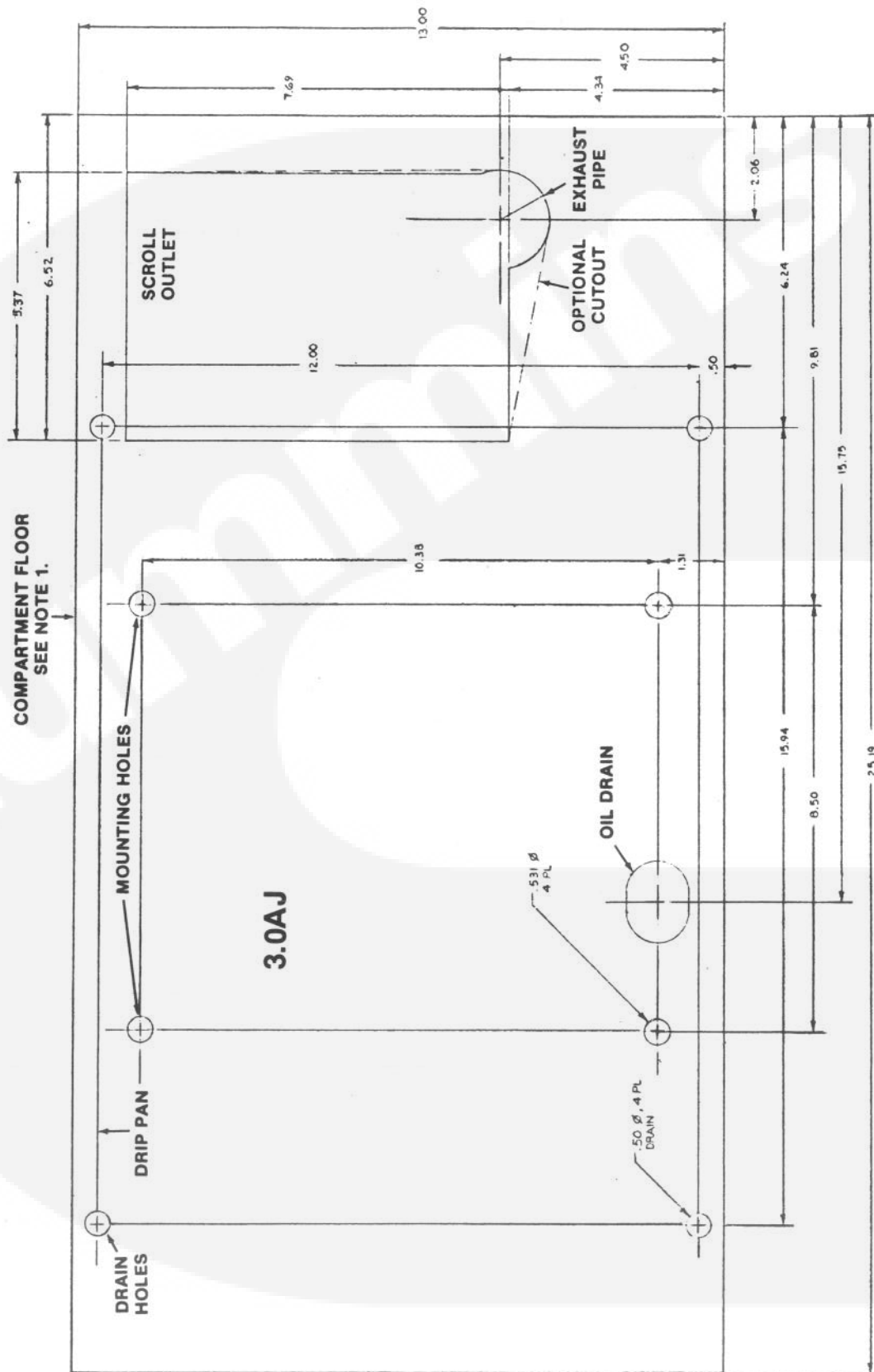


FIGURE 1. TYPICAL INSTALLATION COMPARTMENT SIZE AND MINIMUM DIMENSIONS

1. DIMENSIONING INCLUDES ONE INCH MINIMUM CLEARANCE ON EACH END AND 1/2 INCH MINIMUM CLEARANCE ON EACH SIDE REQUIRED BETWEEN SET AND INSULATION OR COMPARTMENT WALLS.
2. IF COMPARTMENT IS LARGER THAN MINIMUM SHOWN ALLOW EXTRA SPACE AT EXHAUST SHIELD AND OIL FILL SIDES.
3. ALLOW A MINIMUM OF 1/2 INCH CLEARANCE BETWEEN CONTROL BOX AND INSULATION OR COMPARTMENT CEILING. MINIMUM HEIGHT - 16 INCHES.

COMPARTMENT SIZE AND LOCATION

COMPARTMENT SIZE AND LOCATION

Compartment location is determined largely by:

1. Physical size.
2. Access opening.
3. Mounting support—most important of all.

Physical Size

The area in the vehicle for the electric generating set must be large enough for the compartment, with specified minimum clearance between the electric generating set and compartment walls or ceiling (and acoustical material, if used). See Figure 1.

ACCESS OPENING

Plan the location for an access opening large enough to permit set removal. Compartment door should be designed for easy removal or for easy access for operator or service personal.

MOUNTING SUPPORT

Because of compartment weight, the most desirable mounting location is between the main frame members of the recreational vehicle. However, this is seldom possible. Most common installations are on the side of the vehicle and most difficult to reinforce. One side of the compartment is fastened to the frame and the opposite side secured to the body. Compartment floor must be metal.

Channel, box or angle iron can be used for a compartment frame with a sheet metal cover.

COMPARTMENT

1. Compartment or installation area must be separated from living quarters by a vapor-tight wall.
2. Insulate the compartment with 26-gauge galvanized steel or a material of comparable strength, durability and fire resistance.

WARNING

Do not use flammable material directly above or around the electric generating set compartment. Heat transferred through the sheet metal compartment structure or other material can be HOT enough to discolor, char or ignite fiberboard, seat cushions, etc. Use of asbestos or other noncombustible temperature insulating material in high temperature areas may be necessary.

3. See Figure 1 for minimum clearances and compartment size.

4. DO NOT use absorbent sound proofing material on compartment floor. The floor should have minimal openings to reduce entrance of road dirt. Compartment floor must be so constructed as to prevent accumulation of oil, fuel or water in any corner. Drainage must be accomplished through the use of a 1/2" diameter hole near each corner or other suitable means.

WARNING

Be sure hole is not directly above muffler to prevent fire hazard.

Equip base with an oil drain hole to outside of compartment.

MOUNTING

Read the entire manual before mounting the generator set. Additional allowances should be made to allow easy access to the oil fill, drain and oil dip stick as well as the air cleaner element for service purposes.

VIBRATION ISOLATORS

Rubber vibration isolators are furnished with all Onan recreational vehicle models.

CAUTION

Use only the vibration isolators provided with the electric generating set, as they are designed to support unit's weight.

1. Onan mounts are a "through bolt" type which prevent the set from breaking loose if they are damaged.
2. Vibration isolators of the type shown in Figure 2 are factory installed and should require no adjustment. If unit is removed mounts must be properly reinstalled. Allow 1/32" clearance between mounting hardware and mounting plate.

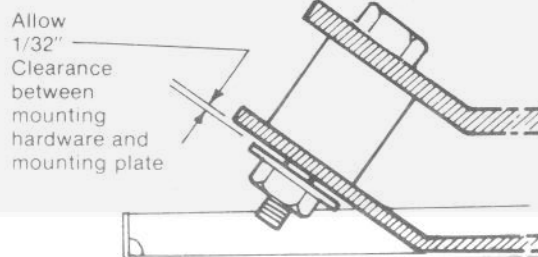


FIGURE 2. VIBRATION ISOLATORS

VENTILATION AND ACOUSTICS

The most important factors of ventilation for an air-cooled mobile electric generating set are sufficient incoming cooling air and exhausting heated air. Before considering the installation problems, knowledge of how an Onan unit cools itself is needed.

VACU-FLO COOLING

All Onan electric generating sets for recreational vehicles use Vacu-Flo cooling, a centrifugal fan in a scroll housing on the engine end (Figure 3).

1. It draws air from the generator end of the compartment through the generator and over the cooling surfaces of the engine, then discharges the heated air out through the Vacu-Flo discharge opening.
2. All standard sets for recreational vehicles have the Vacu-Flo scroll positioned downward. Be sure nothing obstructs or restricts discharged airflow.

WARNING

gases.

Never use discharged cooling air for heating since it can contain poisonous

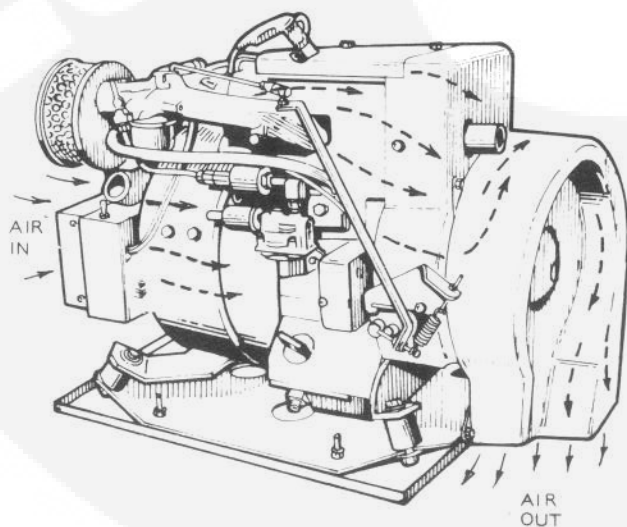


FIGURE 3. TYPICAL ONAN MOBILE COOLING SYSTEM

Allow for ducts or obstructions of airflow. Position of the air openings must permit airflow while the unit is running to purge the compartment of heated air. But on shutdown, the openings must allow for convection cooling of the compartment for heated air to escape.

AIR REQUIREMENTS

Cooling air requirements for Onan electric generating sets vary with type and size. Special equipment is needed to measure it. Since the discharge area can't be changed, air inlet opening is *critical!* The 3.0 KW AJ running at 3600 rpm requires a minimum free air inlet area of 50 square inches with no restrictions and the air discharge is 325 cubic feet per minute.

The Onan UL tested air cleaner element is specifically designed to meet the combustion air requirements of 3.0AJ. This element should be replaced each 100 hours of operation and more often in extremely dusty conditions.

RESTRICTED AIR OPENINGS

Sheet metal with louvers can be used over inlet areas. However, some provide only 60 percent free inlet area per square foot. Even the most efficient grille only provides about 90 percent free inlet area per square foot. The free inlet area of the material can be obtained from the manufacturer. Calculate the inlet area needed using the following information as a guide. See Figure 4.

Unrestricted air inlet requirements for this set is 50 square inches. The 50 square inches should be divided by the percent (%) of free air of the proposed louver to determine necessary surface area for this set.

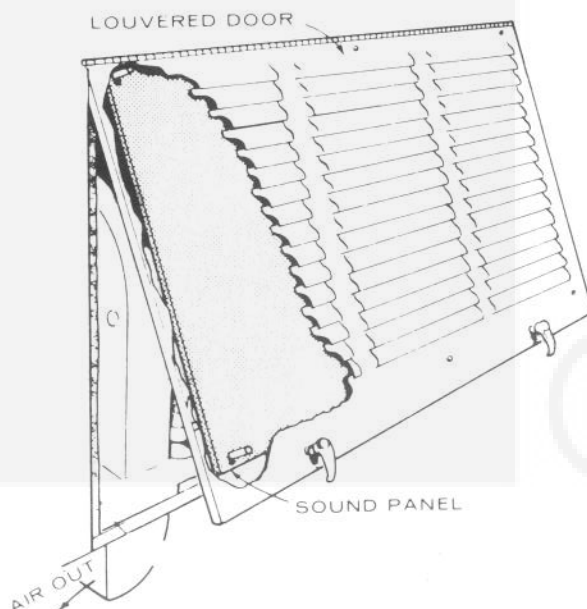


FIGURE 4. TYPICAL LOUVERED DOOR AIR INLET

COMPARTMENT ACOUSTICAL LINING

1. Be sure all joints and corners of the compartment are vapor tight to coach interior before lining with acoustical material.

Lining the compartment does little if opening, cracks, door and joints are not sealed. Also make sure compartment door edge is sealed to eliminate noise-air leaks around the door perimeter.

2. Cover the sound reflective surfaces, back, top and sides (not compartment base) with fiberglass or other noncombustible acoustical material. It should be no less than one inch thick and approximately two pounds per square foot in density. Be sure adhesive used is also noncombustible. Test acoustical material and adhesive for heat effects before using.

WARNING

Insulation must not reduce the minimum clearances as specified in Figure 1 to meet ANSI 198.1 AND CSA #946 temperature rise requirements for recreational vehicles.

3. Rather than using one single material of two pound per square foot density, a combination of materials can reduce noise even more. For example, a sheet of lead or viscoelastic material of one-half to one pound per square foot density and a layer of one inch acoustical material of two pound per square foot density, respectively, is far more superior.

4. To prevent line of sight noise, a sound panel (baffle) may be added behind louvered air inlet. The panel must be spaced to allow for minimum free air inlet of 50 square inches. See Figure 4.

WARNING

Separate installation area or compartment from living quarters by a vapor-tight wall to prevent entrance of noxious fumes to interior.

FUEL SYSTEM

RECOMMENDED FUEL

Use clean, fresh, unleaded or regular grade gasoline. Do not use highly leaded premium fuels. Using unleaded gasoline results in reduced valve and carbon cleanout maintenance.

If the use of unleaded gasoline is desired, use regular gasoline for the first 25 hours to allow the rings to seat well for best performance. Then use unleaded gasoline thereafter.

If regular gasoline is used continually, carbon and lead deposits must be removed from the cylinder heads as required because of engine power loss. Unleaded gasoline may be used safely after lead deposits have been removed.

WARNING

Leakage of gasoline in or around the compartment is a serious fire hazard. The ventilation system should provide a constant flow of air to expel any accumulation of fuel vapor while the vehicle is in transit. Compartments must be vapor tight to the interior to keep fumes from within the vehicle.

FUEL CONSUMPTION

It should be noted that under varying electrical loads, fuel consumption of engines for recreational vehicle generator sets varies accordingly. Average fuel consumption at rated 60 Hz load is 0.81 gallons per hour.

FUEL LINES AND FUEL FILTERS

Fuel Lines

1. Most electric generating set installations are designed to share the vehicle fuel supply tank with the vehicle engine. All connections to vehicle fuel system must be in accordance with chassis (vehicle) manufacturers' detailed installation instructions.
2. Install an approved flexible non-metallic and non-organic fuel line between the vehicle fuel system and the engine to absorb vibration.
3. Use of seamless steel tubing and flared connections are recommended for long runs between the fuel tank and the flexible connector to the generator set.
4. Run fuel lines at the top level of tank to a point as close to the engine as possible to reduce danger of fuel siphoning out of tank if the line should break.
5. Keep fuel lines away from hot engine or exhaust areas. This reduces chance of vapor lock.
6. Flexible line must be long enough to allow for 4" of set movement to prevent binding, stretching or breaking because of set movement.
7. Install lines so they are accessible and protected from damage.
8. Use metal straps without sharp edges to secure the fuel lines.
9. Do not run fuel line in conjunction with electrical wiring.

Operating the generator set from a tee in the main fuel line can cause erratic operation when vehicle is operated at highway speeds. The set's fuel pump has neither the capacity nor the power to overcome the draw of vehicle engine fuel pump.

FUEL FILTER

An inline fuel filter mounts on inlet side of fuel pump. Replace at least every 100 hours or when poor performance is suspected.

FUEL SAFETY VALVE

Evaporative control systems on late model motor homes require a positive fuel shutoff valve to prevent the generator set from flooding when not in use.

GASOLINE EVAPORATIVE CONTROL SYSTEMS

With the increasing emphasis on pollution controls, certain states are now requiring strict evaporative controls on vehicle gasoline supply systems. Manufacturers of RV chassis and vehicles in general have complied to new regulations for these areas by using special design gas tanks, filler tubes, filler gas caps and interconnecting vapor tubing from the vehicle gas tank through a special canister to the vehicle engine.

Because these systems are designed to operate in a critical pressure range, it is very important during connection of an electric generating set and building of the motor home, etc., the vehicle manufacturer's fuel supply design not be altered. The filler tube, fill limiter vent, canister, vapor lines and gas fill cap should not be changed, removed or replaced unless receiving recommendations and approval from the vehicle manufacturer. If not, serious vehicle engine and generator set operating conditions could result.

Always check the filler gas cap to make sure it has a pressure and vacuum relief valve. Also check to make sure it works.

If operating problems develop due to the fuel system, check the fill cap to make sure the vacuum and pressure relief valve is working properly.

EXHAUST SYSTEM

Plan each individual exhaust system carefully. A proper installation is not only gas tight, but usually quieter, too. Be sure to check all applicable recreational vehicle standards, local codes and regulations.

WARNING

Plan the exhaust system carefully. Exhaust gases are deadly!

CAUTION

Do not connect the electric generating set exhaust to the vehicle exhaust system. Water vapor from one engine can damage the other engine.

1. Where the exhaust system passes through the base or floor, leave adequate clearance as protection against exhaust pipe damage from vibration (Figure 6). The metal around the hole should be turned up or some type of collar used to prevent gas or oil from draining onto hot exhaust parts.
2. The exhaust system must be no closer than 1-1/2 inches from any combustible material, or be so located, insulated or shielded so it does not raise the temperature of any combustible material by more than 117°F (65°C) above the ambient air inlet temperature.

IMPORTANT: Certain states (particularly California) have state ordinances pertaining to the type and usage of exhaust muffler/spark arresters on internal combustion engines or engine driven equipment when used in a recreational vehicle such as electric generating sets. Be sure your installation meets all Federal, State and local codes pertaining to your unit. Failure to provide and maintain a spark arrester may be in violation of the law.

3. The exhaust system must extend a minimum of one inch beyond the perimeter of the vehicle. If

the generator set tailpipe is on the same side of the coach as the compartment, it should terminate aft of the air intake to prevent recirculation of exhaust fumes.

WARNING

Do not terminate poisonous carbon monoxide exhaust gas under vehicle. Direct exhaust gases away from window and door openings. Keep all openings above or to the rear of exhaust pipes closed when generator set is operating.

4. Do NOT mount the exhaust pipe directly below the gasoline filler spout.
5. Use automotive type tail pipe hangers for hanging the exhaust system from vehicle undercarriage.
6. Position the clean-out plug within 45° of an imaginary line drawn vertically through the muffler (See "Muffler - Front View", below).

CAUTION

If tail pipe deflector is used, be sure it is large enough to prevent excessive back pressure.

EXHAUST SPARK ARRESTERS

Exhaust spark arresters are necessary for SAFE OPERATION. All require periodic clean-out (every 50 to 100 operating hours) to maintain maximum efficiency. Some state and federal parks require them. To clean spark arrester remove pipe plug in bottom of muffler. Run set under load for 5 minutes. Replace plug.

WARNING

All exhaust shielding supplied with unit MUST be properly installed to prevent overheating of compartment walls or the possibility of fire.

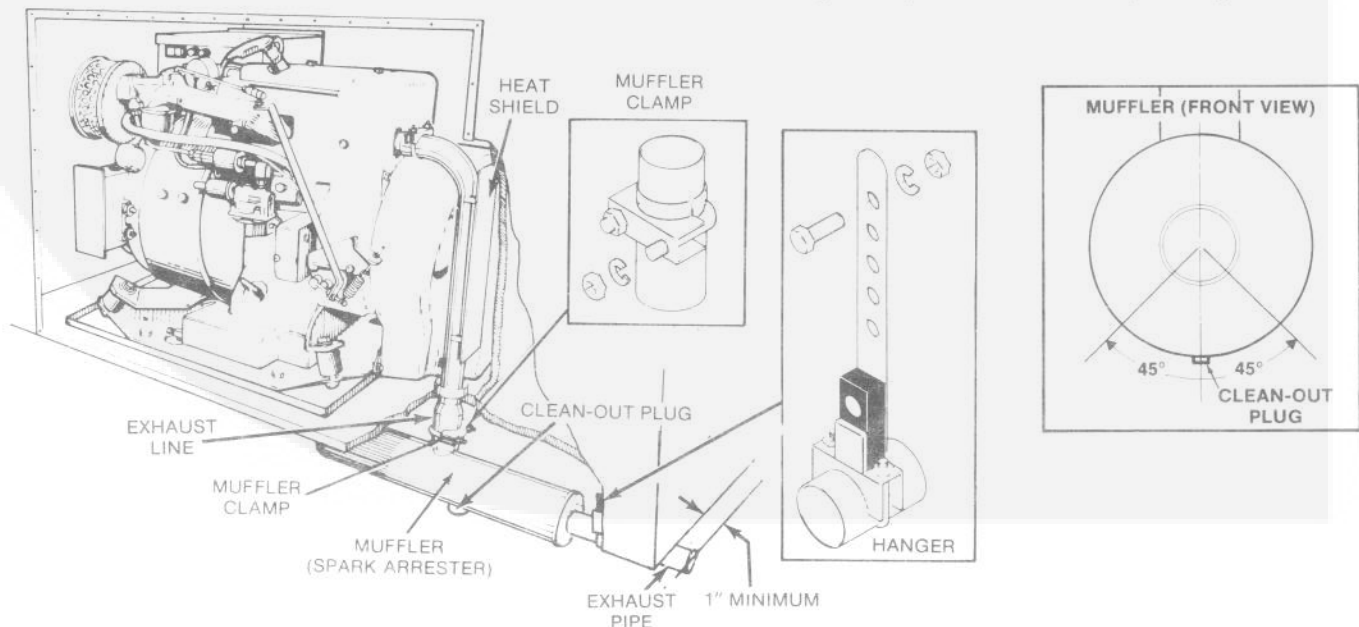


FIGURE 6. TYPICAL EXHAUST SYSTEM INSTALLATION

ELECTRICAL LOADS AND CONNECTIONS

All of the following description pertains to alternating current Onan electric generating sets for recreational vehicles.

1. All wiring must meet applicable local electrical codes. Have a qualified electrician install and inspect the wiring.
2. Wires must be adequate size, properly insulated and supported in an approved manner.
3. Mount switches and controls securely to prevent damage from vibration and road shocks. All switches must be vibration-proof to prevent accidental opening or closing while the vehicle is in motion.
4. Install an approved junction box for feeder conductors from the electric generating set. It must have a blank cover and be inside compartment (not on set).

WARNING To prevent noxious gases from entering vehicle interior, seal any openings made in the set's compartment for conduit, wiring, etc.

WIRE TYPES

Use multistrand wire which meets all applicable codes as feeder conductors, from electric generating set to compartment junction box. Many installers use multistrand wire throughout the vehicle to reduce the danger of breakage from vibration.

The conductors of the electric generating set shall have an ampacity not less than 115 percent of the nameplate current rating of the generator. Neutral conductors shall be the same size as the conductors of the outside legs.

Install generator load conductors in a flexible metallic conduit. Conduit must be connected either to the junction box on the compartment wall or to a panel board mounted on the outside of the compartment wall.

CAUTION Do not use solid metal conductors in compartment. They may develop metal fatigue from set movement and eventually break.

WARNING Because of fire hazard, do not tie electrical wiring to fuel line.

DISCONNECT SWITCH

The feeder conductors from the set compartment must terminate in a double-pole, double-throw positive off switch device for 120 volt operation before the vehicle distribution panel. This assures the outside power source cannot be connected simultaneously with the electric generating set. For 120/240 volt operation, a 3-pole, double-throw,

positive off, switching device must be used. Neutral must be switched.

WARNING Use only approved power supply assemblies. Never remove grounding pin from power supply assembly. Incorrect or no ground may cause the recreational vehicle to be electrically "hot."

STARTING CONTROLS

Remote control Onan electric generating sets are designated by an "R" in the model number and allow the operator to start the set inside the vehicle, etc. See operator's manual for more specific information.

LOAD CONNECTIONS

Generator set load wires M1, M2, terminate within the junction box. Connect and join wires within junction box in an approved manner. See Figure 7.

On motor homes which have provisions for using outside AC utility power (separate from the electric generating set) the neutral as well as the "Hot" lead MUST be completely isolated from the motor home when load or power is switched.

The operation of a typical transfer device is shown in Figure 8. In addition to the transfer device, an over current protection device (circuit breaker or fuse) shall be provided between the transfer device and the AC circuit in the motor home. The generator set field has inherent overload protection when any overload is applied; frequency will sag which causes output voltage to drop and in turn the generator set field drops to zero voltage. A ground fault circuit interrupter should be installed in the wiring system to protect all branch circuits.

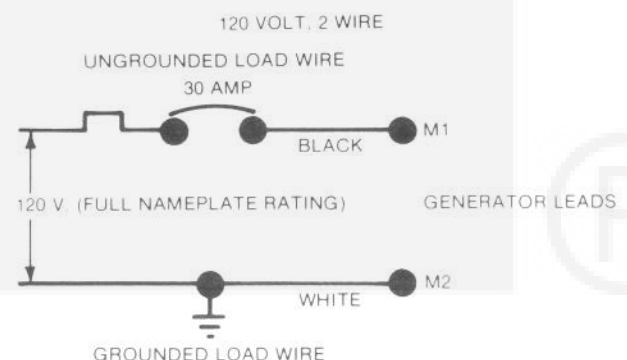
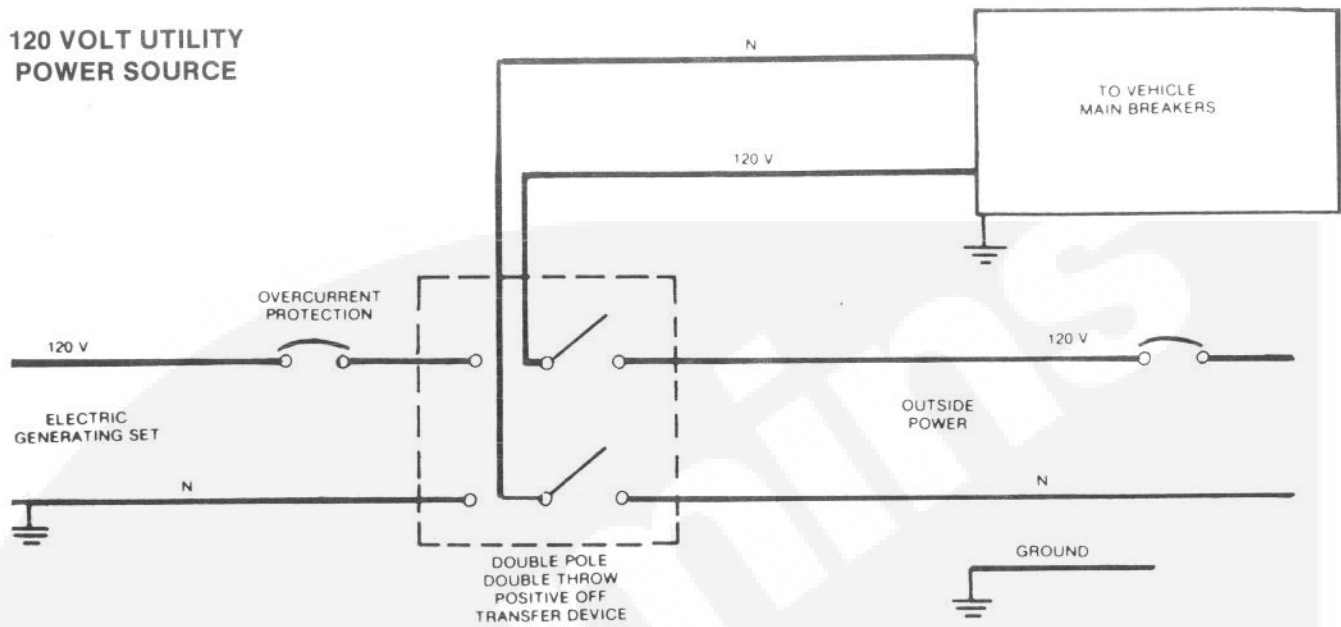


FIGURE 7. POWER REQUIREMENTS AND SINGLE PHASE "IR" VOLTAGE CODE GENERATOR CONNECTIONS

120 VOLT UTILITY POWER SOURCE



120/240 VOLT UTILITY POWER SOURCE

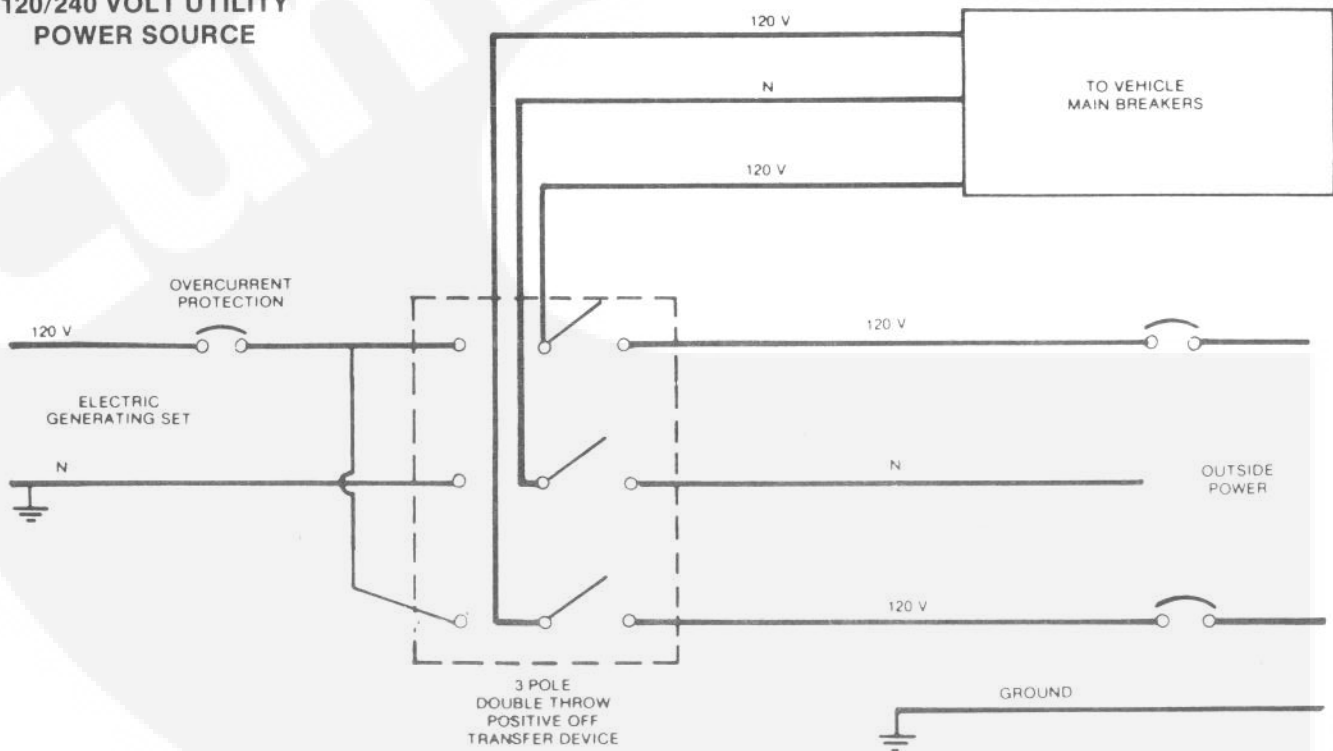


FIGURE 8. SCHEMATIC OF TRANSFER DEVICE AND OVERLOAD PROTECTION

BATTERIES

BATTERY CARE

To increase battery life, the operator can perform a number of routine checks and some preventive maintenance.

1. Keep the battery case clean and dry.
2. Make sure the battery cable connections are clean and tight. Use a terminal puller when removing cables for any reason.
3. Coat the battery terminals with a mineral grease or petroleum jelly to reduce corrosion and oxidation.
4. Identify each battery cable to be positive or negative before making any connection. Always connect the ground (negative) cable last.
5. Maintain the electrolyte level by adding water (drinking quality or better) as needed for filling to split level marker. (The water ingredient of the electrolyte evaporates, but the sulphuric acid ingredient remains. Therefore, add water, not electrolyte.)
6. Avoid overcharging when recharging. Stop the boost charge when the specific gravity is 1.260 and the electrolyte is 80°F (26.7°C).

Onan recommends using a separate battery for operation of the generator set in addition to the regular vehicle starting battery.

BATTERIES AND BATTERY CABLES

In order for the electric generating set to crank efficiently under various operating conditions, the battery and battery cables must be correctly chosen and installed. Before selecting a battery, be sure the installation area is compatible and properly designed. The compartment for the battery must provide:

1. Rigid mounting support.
2. A location where accidental acid spills or leaks won't damage set, battery cables, etc.
3. Provide a minimum of 1.7 square inches at top and 1.7 square inches at bottom of battery for ventilation purposes.
4. Battery cable entry points should be sealed (vapor tight) if they enter or pass through living area.

WARNING Mount the battery in a separate compartment from the set or any spark-producing device to prevent fire or explosion.

CAUTION Never disconnect the battery with either engine running and never crank both engines simultaneously.

BATTERY CABLES

For reliable starting, voltage drop from the battery terminals to the exciter cranking windings of the generator should not exceed 0.12 volts per 100 amperes of break-away current *while cranking*. Measure voltage at battery terminals and at start solenoid terminals *while cranking*. Disconnect spark plug wire during test. The battery cables in Table 1 will meet this condition if the grounding system is adequate. Connect the battery negative to ground with the same size cable as used for battery positive.

Be sure the frame connection (major frame member if possible) is sufficient to minimize resistance. Try to avoid a connection at a weld or mechanical joint.

For short distances, one negative battery cable can be used between set and battery rather than separate cables to chassis ground.

The break-away current is 225 amperes.

The charging current is 1 - 2 Amperes.

The 3.0AJ draws 40 amperes of cranking current.

For additional information on installation contact your Onan Service Representative or request *Technical Bulletin T-012* from Onan.

TABLE 1. RECOMMENDED BATTERY CABLES FOR RELIABLE COLD WEATHER STARTING

* CABLE LENGTH IN FEET (metres)	CABLE SIZE
0-10 (0-3)	2
11-15 (3-4.5)	0
16-20 (4.5-6)	000

* - Distance from battery to set.

WARNING Do not disconnect battery cables from battery while generator set is cranking or running; sparks may cause an explosion.

TABLE 2. MINIMUM 12 VOLT BATTERY SIZE*

Above 32° F (0° C)	Below 32° F (0° C)
360 Cold Cranking Amps (Approximately 70 Amp/Hr)	500 Cold Cranking Amps (Approximately 95 Amp/Hr)

*Larger capacity batteries may be required if battery is also used to power other coach accessories.

REMOTE ACCESSORIES

INSTALLING STANDARD OR DELUXE REMOTE START CONTROLS 300-0985 AND 300-0986

The standard control includes a start-stop switch and indicator lamp. The deluxe control contains these items plus a running time meter and a battery condition meter. Install as follows:

1. Select control location. Using Figure 9 or 10 as a guide, drill screw holes and cut hole to accommodate remote switch in dash panel.
2. Following national local electrical codes and using #18 or larger insulated wires of predetermined length, connect remote control to generator set. Ensure that leads from remote control connect to corresponding terminals on generator set. Refer to Figure 11 for wiring connections.

CAUTION Do not route DC wires for remote control through conduit containing AC load wiring. Induced voltages may cause erratic operation.

3. Insert remote control in hole cutout and secure with woodscrews supplied with switch.

WARNING

Seal all holes that might allow noxious gases to enter motor home.

CAUTION

Ensure that leads from remote switch connect with corresponding terminals on generator set.

For sets without remote connector plug, connect terminals 1, 2, and 3 to corresponding terminals on generator set terminal block. Connect terminal #5 (if used) to B+ (on terminal block) or to battery connection on start solenoid. This connection should be protected with a 5 amp fuse. Connect terminal #6 to positive terminal on ignition coil and protect with a 5 amp fuse.

4. When wiring is complete, check for proper operation by starting and stopping set at the set control and by the remote start switch.

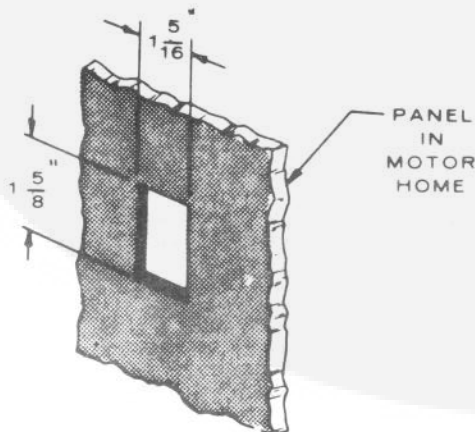


FIGURE 9. MOTOR HOME CUTOUT
FOR 300-0985 STANDARD
CONTROL PANEL

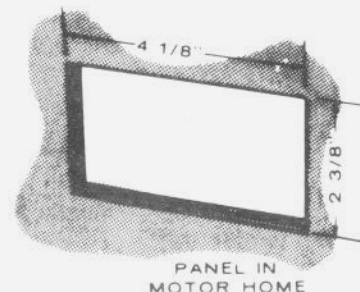


FIGURE 10. MOTOR HOME CUTOUT FOR
300-0986 DELUXE CONTROL
PANEL

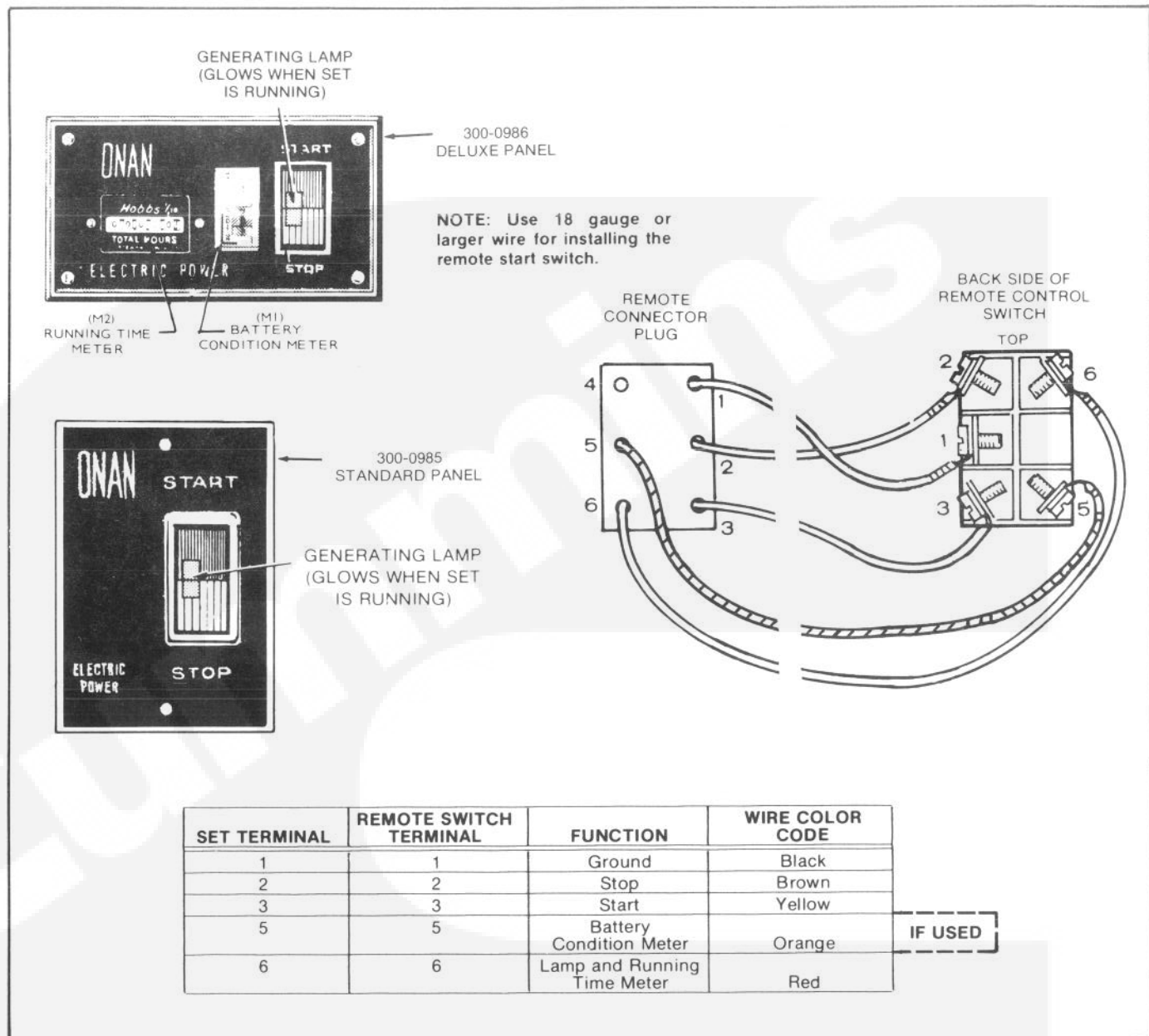


FIGURE 11. WIRING CONNECTIONS FOR 300-0985 AND 300-0986 REMOTE CONTROLS



Onan Corporation
1400 73rd Avenue N.E.
Minneapolis, Minnesota 55432

Telephone: (612) 574-5000
Telex: 275477
Cable ONAN