

Perkins 4-108

Engine # ED1004(GU)!
593603K

KOHLER GENERATORS

52355

MODEL 12.5 CCOPY61

SPEC 961007C

12.5 RV INSTALLATION GUIDE

Injector #s BKB40505224 BA
DES 5352104

part# 0920113

Part No. 4-108 Engine # E D 1004 (2) 1
Kohler

KOHLER GENERATORS

152 RV
INSTALLATION GUIDE

152 RV INSTALLATION GUIDE

For more information
see page 10

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Introduction

The Kohler RV Generator Set model covered in this guidebook has been listed by Nationwide Consumer Testing Institute, Inc. for use in recreational vehicles. To continue to meet the prescribed standards, each generator set must be properly installed and maintained. Use this publication as a guide when installing a generator set in the recreational vehicle. Then refer to the Owner's Manual for specific service instructions. In addition, make sure the installation complies with: (1) Article 551, ANSI C1/NFPA No. 70-1981, National Electric Code, and (2)

ANSI A119.2/NFPA No. 501C-1977 Standard for Recreational Vehicles, Part III, Installation of Electric Systems. Use the addresses given below for reference.

National Fire Protection Code
 Batterymarch Park
 Quincy, MA 02269

American National Standards
 1430 Broadway
 New York, NY 10018

General

This publication covers the Kohler RV Generator Set Models 12.5RCCOPY67-RV and 12.5CCOPY61-RV. Follow the instructions for the specific model to insure proper installation.

The controller has a terminal strip for connecting the wiring harness to the start-stop switch located remote from the set, usually on the dashboard inside the vehicle. All Kohler RV Sets are mounted on a steel drip pan type mounting tray for quick installation to the frame of the vehicle. After the set is attached to the frame, all that's usually required to get it operational is to connect fuel line, remote switch, load leads, battery terminals, exhaust system, and add oil as needed to the crankcase to bring the level up to the Full mark. Some general specifications are listed below.

Generator sets feature Perkins 4.108 diesel engine, rotating field Alternating Current generator and Relay Controllers. Each generator direct-connects to the engine for permanent alignment. Each Controller includes a START-STOP switch for test operating the set at the controller.

Specifications	Model	
	12.5CCOPY61-RV	12.5RCCOPY67-RV
Weight (approximate)	926	980
Length — Overall	45-3/16	43
Width — Overall	27-3/16	43
Height — Overall	29-11/16	28
Air Requirements — Total	3000 CFM	3000 CFM
Fuel Inlet Connection Size	1/4 In. I.D.	1/4 In. I.D.
Fuel Consumption at Rated Load (Gallon per Hr.)	1.16 GAL/HR	1.16 GAL/HR.
Battery Voltage	12	12
Battery Amp Hr. Minimum	120	120
Battery Ground	NEG	NEG.
Battery Cranking Current	350	350
Battery Charging Current	8	8

*actual tab
 12 gals.
 per 24 hrs*

Safety Precautions

Safety is built into every engine driven generator; however, like any other electro-mechanical device it can present serious threat to life and limb if imprudently operated and maintained. Remember that the best safeguards against accidents are to keep ever mindful of the potential dangers and to always use good common sense. In the interest of safety, some general precautions are presented below — keep these in mind!

WARNING

LETHAL EXHAUST GAS! An engine discharges deadly carbon monoxide as part of the exhaust when operating. Carbon monoxide is particularly dangerous in that it is an odorless, tasteless, and nonirritating gas, but be ever mindful that it can cause death if inhaled for even a short period of time. Have only thoroughly qualified specialists install and replace exhaust system components and have the system inspected frequently. Be careful when parking your coach to avoid obstructing the exhaust outlet. The exhaust gases must discharge freely, otherwise carbon monoxide may deflect under and into the vehicle or enter through open doors, windows, or vents. Also make sure that your exhaust cannot be discharged toward neighboring RV's, campers, or any occupied building. Be especially watchful for exhaust accumulation under calm, windless conditions.

WARNING

DANGEROUS FUEL! There may be a tendency to forget that diesel fuel is highly explosive in a vapor state. Never store fuel inside your coach or in any occupied area. Store it only in approved clearly marked containers and in a well ventilated area away from spark producing equipment and out of the reach of children. Keep fuel lines and connections tight and in good condition — don't replace flexible fuel lines with rigid lines. Flexible sections are used to avoid breakage due to vibration.

WARNING

HIGH VOLTAGE! Remember that the function of a generator set is to produce electricity and that wher-

ever electricity is present, there is the potential danger of electrocution. Take the same precautions with electrical appliances in your coach that you would observe in your home. Keep away from electrical circuits and wiring while the set is running and have electrical service performed only by qualified electricians. Make sure unqualified persons, especially children, cannot gain access to your set — keep the compartment door locked or securely latched at all times. Never touch electrical leads or appliances with wet hands or when standing in water or on wet ground as the chance of electrocution is especially prevalent under such conditions.

WARNING

DANGEROUS BATTERY GASES! The gases generated by a battery being charged are highly explosive. Do not smoke or permit flame or spark to occur near a battery at any time, particularly when it is being charged. Any compartment containing batteries should be well ventilated to prevent accumulation of explosive gases. To avoid sparks, do not disturb battery charger connections while battery is being charged and always turn charger off before disconnecting. Turn automotive test equipment off when connecting or removing battery clips. When removing or reconnecting battery cables, make sure ignition switch and all accessories are turned off.

WARNING

FIRE HAZARD! Keep the compartment and generator set clean and free of debris to minimize chances of fire. Also remember that hot exhaust gases and exhaust system parts could start grass fires. Keep away from hot engine and generator parts to avoid burning yourself.

WARNING

BATTERY ACID! Handle starting batteries carefully as they are filled with acid which can eat through clothing, burn skin and even cause blindness. Never operate the generator set without a battery in the system or damage to regulator and controller will result.

Installation Factors

When planning the installation, the following factors must be considered.

- ELECTRICAL LOAD:** Does the set selected have adequate capacity to handle the load?
- COMPARTMENT SIZE:** Will there be sufficient room around the set to maintain minimum clearances?
- AIR REQUIREMENTS:** Are the compartment air inlets sized to allow adequate circulation of air for cooling and combustion?

- FUEL SYSTEM:** Is the system properly designed to prevent fuel starvation of either the main engine or generator set engine?
- ELECTRICAL CONNECTIONS:** Can all systems, battery, load, and remote switch be connected to be compatible with the vehicle system?
- EXHAUST SYSTEM:** Will the system meet all safety requirements after installation?

Each of these installation considerations is covered in detail on the following pages.

Electrical Load

While the electrical load of the vehicle should have been calculated prior to purchase of the generator set, you may want to recheck the load before installing the set to make sure that the capacity is ample to meet demands without possible overloading.

speed. Reserve capacity must be allowed for in-rush demands plus other loads which could be on the line as the motor starts.

Lighting

The lighting load is usually easiest to calculate. In most cases, simply add the wattage of each lamp to be operated off the generator set. Note that in many applications, not all of the lights or lamps are in the generator set AC circuit — some are DC powered by the 12-volt battery in the vehicle. Make sure the total includes only lights actually on the generator set AC circuit. The lighting load is usually not too heavy in mobile installations; however, it must be accurately calculated to prevent overloading which could occur, for example, if all lights happened to be on when the air conditioner or other motor load starts up.

Air conditioning units are perhaps the most common type of motor load for generator sets in recreational vehicles. The starting characteristics of the different makes of air conditioners vary greatly — one particular 12,000 BTU unit has, for example, lower starting requirements than a 10,000 BTU unit of another make. When only one unit is involved, there is usually no starting problem, provided of course, that the lighting and appliance loads are not too high when the unit is started.

Motors

When figuring generator set capacity requirements for installation involving motor loads, do not overlook the high current demanded by the motor during start-up. The “in-rush” or starting current may be 2-3 times higher than that required when the motor reaches normal operating

The trend seems to be toward larger capacity air conditioners and the use of more than one unit in larger vehicles. Simultaneous starting of two units can present problems if the generator capacity is marginal. Because of the variation in starting characteristics of the various makes of air conditioners, no definite statements are made in this publication regarding multiple-motor starting capabilities of the mobile generator sets covered. Delayed starting or use of “easy starting” devices on air conditioner units should be considered whenever simultaneous starting of more than one motor is involved. Use the following chart as a guide when selecting generator set capacity requirements — contact Kohler Co. for specific information regarding simultaneous starting of two or more motors.

Model	Wattage	Will Operate Air-Conditioner(s) of Size Indicated	“Power to Spare” for Lighting, Appliances, Tools
12.5CCOPY61	12,000	Three, 13,500 BTU	6,000 Watts
12.5CCOPY67	10,300*		4,300 Watts

*adjusted for radiator fan motor.

Appliances

Generator sets in recreational vehicles are often used to furnish AC for appliances such as TV, stereo, electric water heaters, etc. With the exception of the resistance type loads such as the water heater, requirements for appliances are usually low. Such loads must not, however, be overlooked when figuring total requirements. Reserve capacity should be available for anticipated appliance

loads to avoid overloading of a set. The average power requirements of some common electrical appliances are given in the chart following.

Kilowatt Derating

Kilowatt ratings decrease 3-1/2% for each 1,000 feet (305 meters) above sea level, and 1% for each 10° F. (5.5° C) above 60° F. (16° C).

Electrical Appliance	Rating (Watts)	Electrical Appliance	Rating (Watts)
Air Conditioner	See Motors	Heater, Space	750 - 1500
Blanket	50 - 250	Heater, Water	1500
Blender	600	Pan, Frying	1200
Broiler	1350	Percolator, Coffee	650
Hair Dryer	500	Radio	50 - 100
Fan, Air Circulating	25 - 100	Television	300 - 750
Fan/Heater	270	Toaster	750 - 1200

Compartment Size

When planning compartment size requirements, allow the **minimum** clearances for cooling of the generator set as shown in chart following. NOTE: Since the sets are flexibly mounted, the minimum clearances will assure that the sides of the compartment and the set will not rub while the set is in operation or while the vehicle is in transit.

Minimum Clearance Requirements	
Front, Side, Top	1-1/2"
Rear	1-1/2"

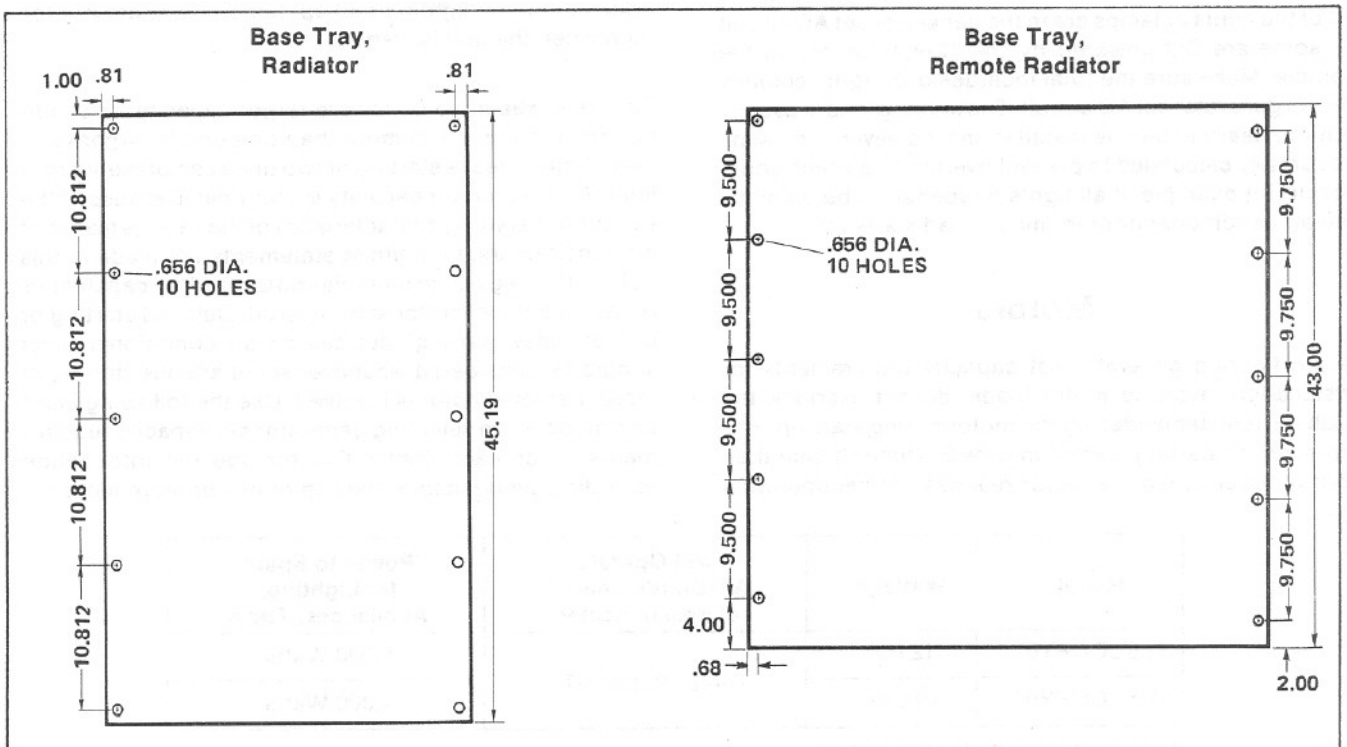


Figure 1. Base Tray Dimensions

The thickness of insulating and sound deadening material used to line the compartment must be taken into consideration when planning clearances. If necessary, enlarge the compartment so minimum clearance requirements are maintained. The generator set must be securely fastened to avoid unwanted movement from vibration and road shock. On a typical installation, the mounting tray is supported on the ends by angle iron and has a full door for service access. The same number of bolts as mounting holes in the tray must be used to secure the tray to the support structure. See Figure 1.

When designing the compartment, allow sufficient room for the set to be easily removed when major service is required. Slide-tray installation is recommended. Also keep in mind that the compartment door must have air intake openings having a free area of equal to or greater than that specified. Air requirements are described more fully in the following.

CAUTION

A special tray and opening are provided in the mounting tray of each set as a safety feature to allow any fuel or oil that might possibly leak out of the system to drain out of the compartment — make sure this opening is not blocked in any way when the set is installed. If sub-flooring is used, cut a corresponding hole in the sub-flooring for this drain opening.

Make sure that the compartment is vapor tight and completely sealed off from the inside of the vehicle to prevent exhaust or other fumes from entering the vehicle. Line the compartment with a good sound deadening material. The material selected must be highly resistant to fire. A recently introduced 3-layer foam material does a very efficient job of absorbing sound. This type material is easily cut to size with a scissors and can be quickly installed using special fire retarding adhesive which bonds the material to almost any surface that is clean and dry. Other materials, such as fiberglass insulation or asbestos with heat barrier, have also been used successfully in mobile installations. When selecting and installing sound deadening material, follow the **manufacturer's** recommendations and instructions.

Air Requirements

Each engine is equipped with a high temperature cutout which will automatically shut down the set in the event operating temperatures climb too high. To prevent automatic shut-down, make sure the compartment openings are large enough to allow adequate circulation of cooling air. The minimum **free air** opening in the compartment

door is shown in Figure 2. Remember, louvers, screens and protective decorative grill work definitely restrict the amount of air available. Even a simple, relatively open mesh screen will restrict air flow as much as 30%. The intake opening must be increased to compensate for such restrictions. Locate opening in front of radiator.

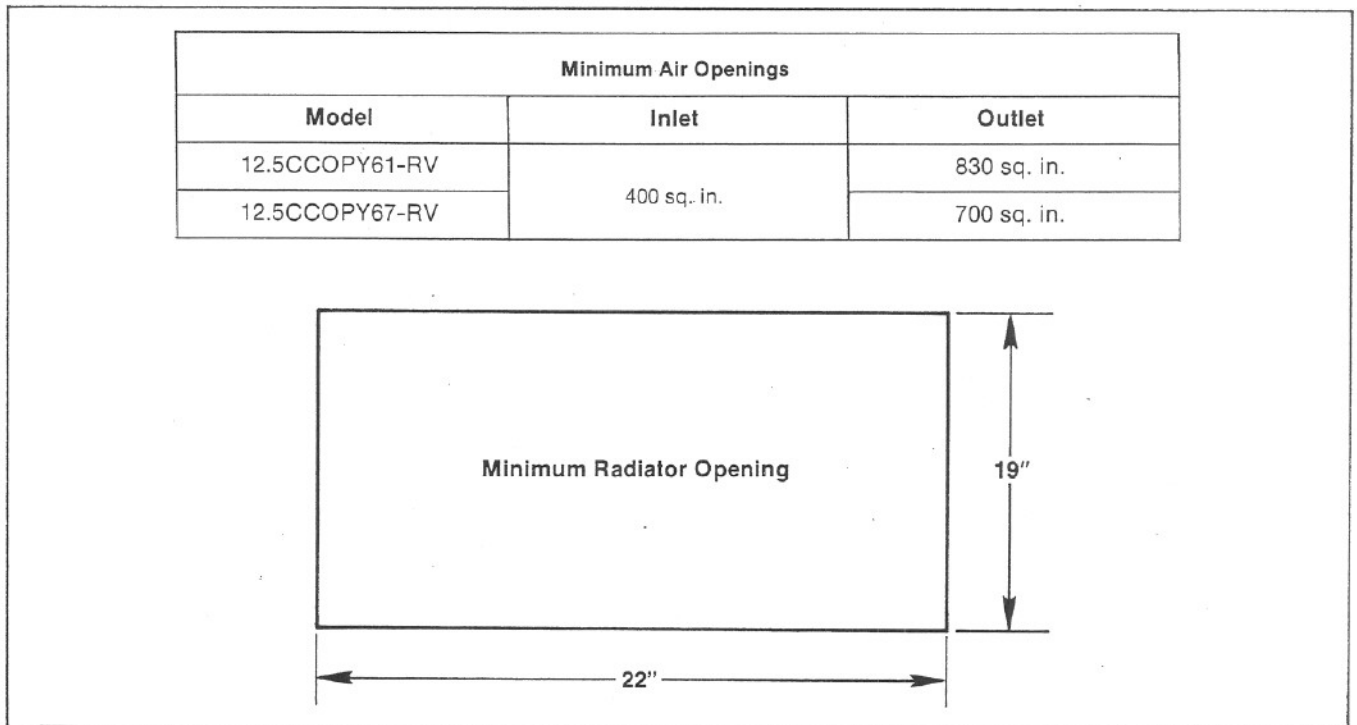


Figure 2. Compartment Door Air Opening

Fuel System

RECOMMENDED FUEL: A.S.T.M./D.975-66T-Nos. 1-D and 2-D. The diesel fuel system for the generator set must be designed to operate independent of the system for vehicle engine if both engines are to be operated at the same time. The best way to do this is to have separate fuel tanks; however, this is usually impractical because of space restrictions. In most installations, both engines operate off a common tank with a two dip tube arrangement as shown in Figure 3. This prevents the smaller engine from being starved of fuel by the larger engine.

A simple tee fitting is sometimes used to provide fuel for both engines off a common tank; however, this usually prohibits simultaneous operation. There is also the possibility that operation of either engine could completely drain the fuel line of the other engine, thus making starting difficult if not impossible. The tee arrangement should be avoided or used only as a last resort.

Care must be taken when routing the fuel line from the main tank to the generator set. The fuel line must be of adequate size to handle the flow of fuel (see "Specifications") and withstand road shock and year round climate conditions. If steel tubing is used, it should be 1/8" I.P. (minimum) and an 8" (minimum) flexible line is required to allow free movement of the generator set. Make sure the

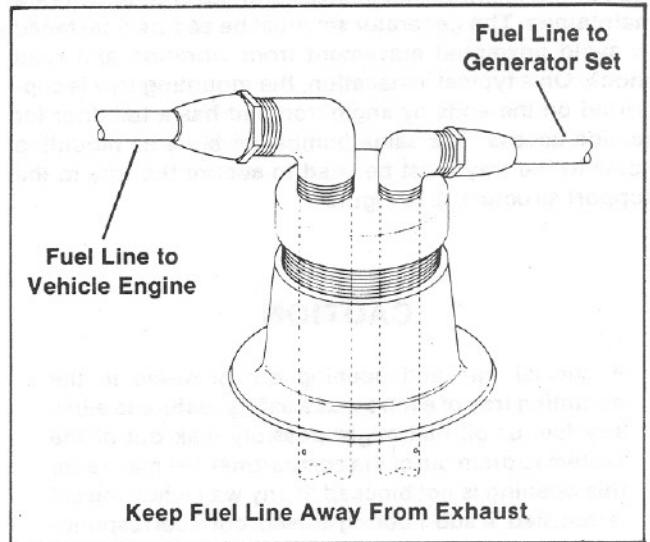


Figure 3. Two Dip Tubes in Fuel Tank

fuel line is taut and does not wear or rub on the generator set. Locate the fuel line at least 6" to 12" from any exhaust parts. Do not connect the fuel line with any sharp bends as this will restrict fuel flow.

Exhaust Systems

Because the required length varies with most installations, a tail pipe is not furnished. A tail pipe must, however, be installed to direct the exhaust gases beyond the perimeter of the vehicle. Use a tail pipe with gradual bend (not 90°) to avoid excessive back pressure, and face tail pipe away from normal air stream.

CAUTION

Make sure exhaust system components are positioned well away from the drain opening in the bottom of the mounting tray. Also make sure the components are not blocking access to the oil drain plug.

WARNING

DO NOT use flexible tail piping as this type could crack or break and allow lethal exhaust fumes to enter the vehicle.

WARNING

Position tail pipe end so that discharged exhaust gases may not be drawn into vehicle interior through windows, doors, air conditioners, etc.

Electrical Connections

Battery, load lead and remote switch panel connections are needed to complete the installation. Make the battery connections only after the other connections have been made as this will prevent unintentional starting. Some specific details on each connection are stated in the following.

Battery and Connections

A separate 12-volt battery is recommended for the generator set. With a separate battery, cables can be kept short and the problem of excessive voltage drop through long cables can be eliminated. Battery charging is provided by a charging circuit built into each Kohler generator set. Refer to Figure 4, View A for cable connections — note that a grounding strap must be connected between the ground lug on rear mount and frame of the vehicle with this arrangement.

If the starting battery for the vehicle engine must also be used for starting the engine generator, the battery negative terminal must be grounded to the vehicle frame and heavy gauge (#4) ground strap must connect the ground lug on the generator to the vehicle frame as illustrated in Figure 4, View B. When using the vehicle battery, the battery charging circuit of the generator set may be disconnected if desired.

Electrical Connections

Electrical connections to the generator set are made at the controller. Refer to the wiring diagram for specific details — connections should be made only by qualified electricians. All wiring to the generator set shall be securely supported or harnessed to prevent abrasion. Additional support is required to prevent exposure to the exhaust system and drippage of fuel, oil or grease — at least 2" clearance must be provided between electrical wiring and hot exhaust parts. Also, wiring must not be located directly below or in close proximity to fuel system parts or

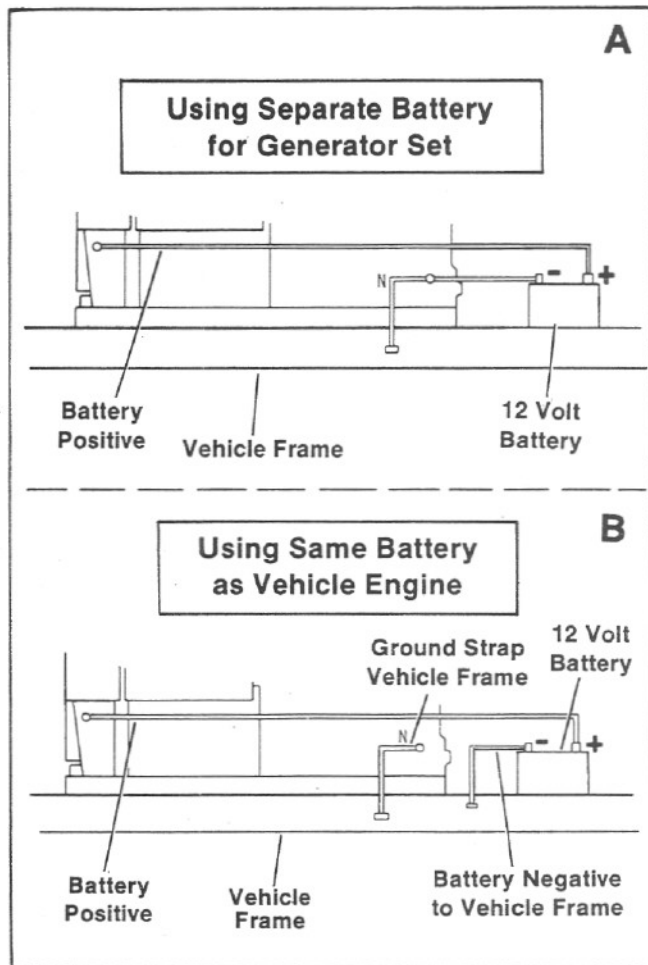


Figure 4. Battery Connection Details

oil fill tube. Some other points to consider when making AC load and battery connections are covered in the following.

NOTE

Wiring connections made at the time of installation should be accessible for inspection and servicing.

AC Load Connections

AC load lead L0 (or white) is always the neutral lead on Kohler generator sets — make sure the neutral of the AC circuit in the vehicle is connected to lead L0 (or white). If equipment ground type plugs and receptacles (3 pronged) are used in the vehicle, the green wire must be connected to the "U" shaped pin. On vehicles which also have provisions for using an outside AC power source, the neutral as well as the "hot" leads must be completely

isolated from the generator set when power is switched to the outside source. A three pole-double throw transfer switch, rated for the calculated load of the RV, must be used to transfer the load from one source to the other. The connection of a typical transfer switch is shown in Figure 5. A circuit interrupter with ground-fault protection must be installed in the wiring system to protect all branch circuits.

Route load leads thru flexible conduit and keep conduit away from the generator set specifically fuel and exhaust system components.

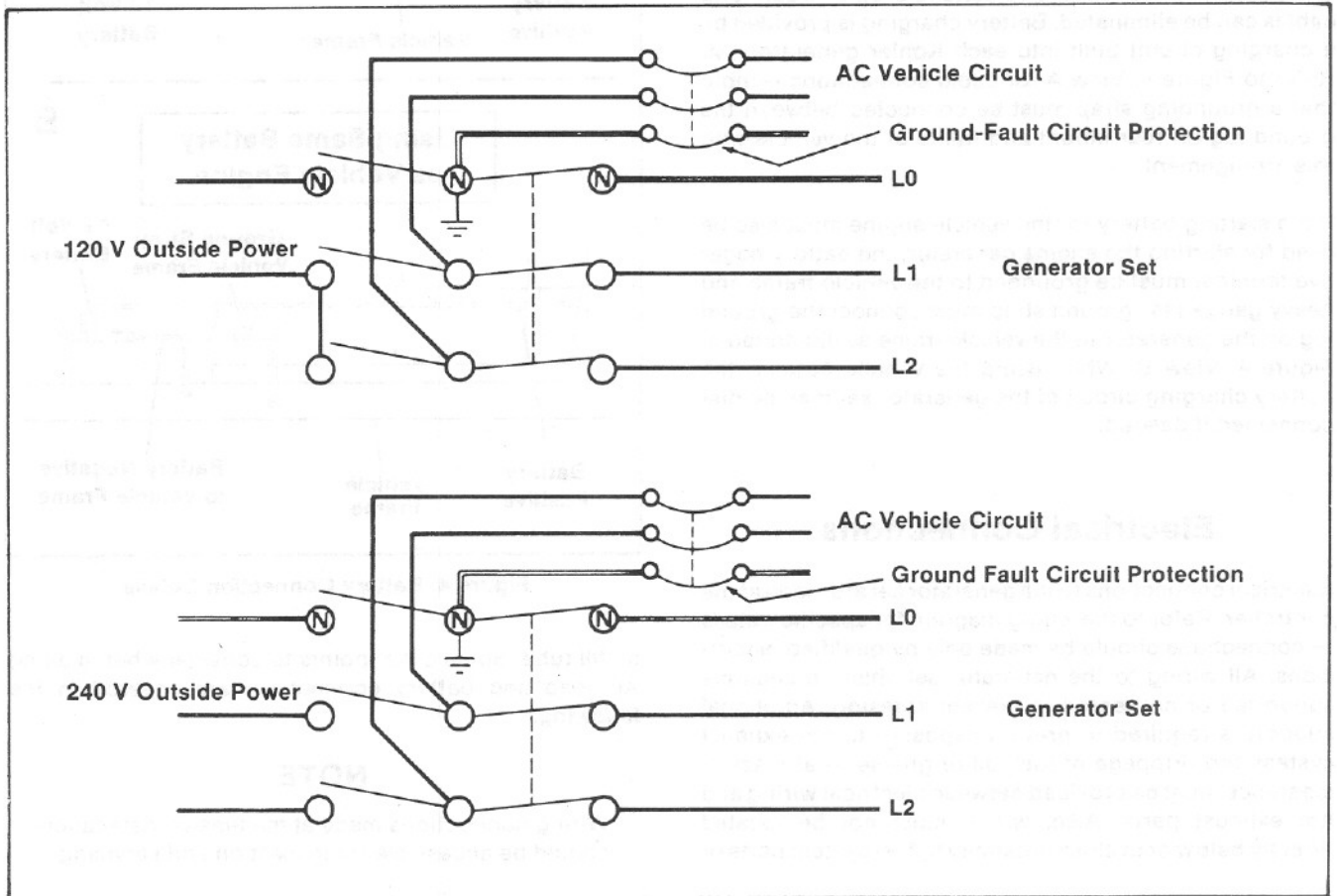
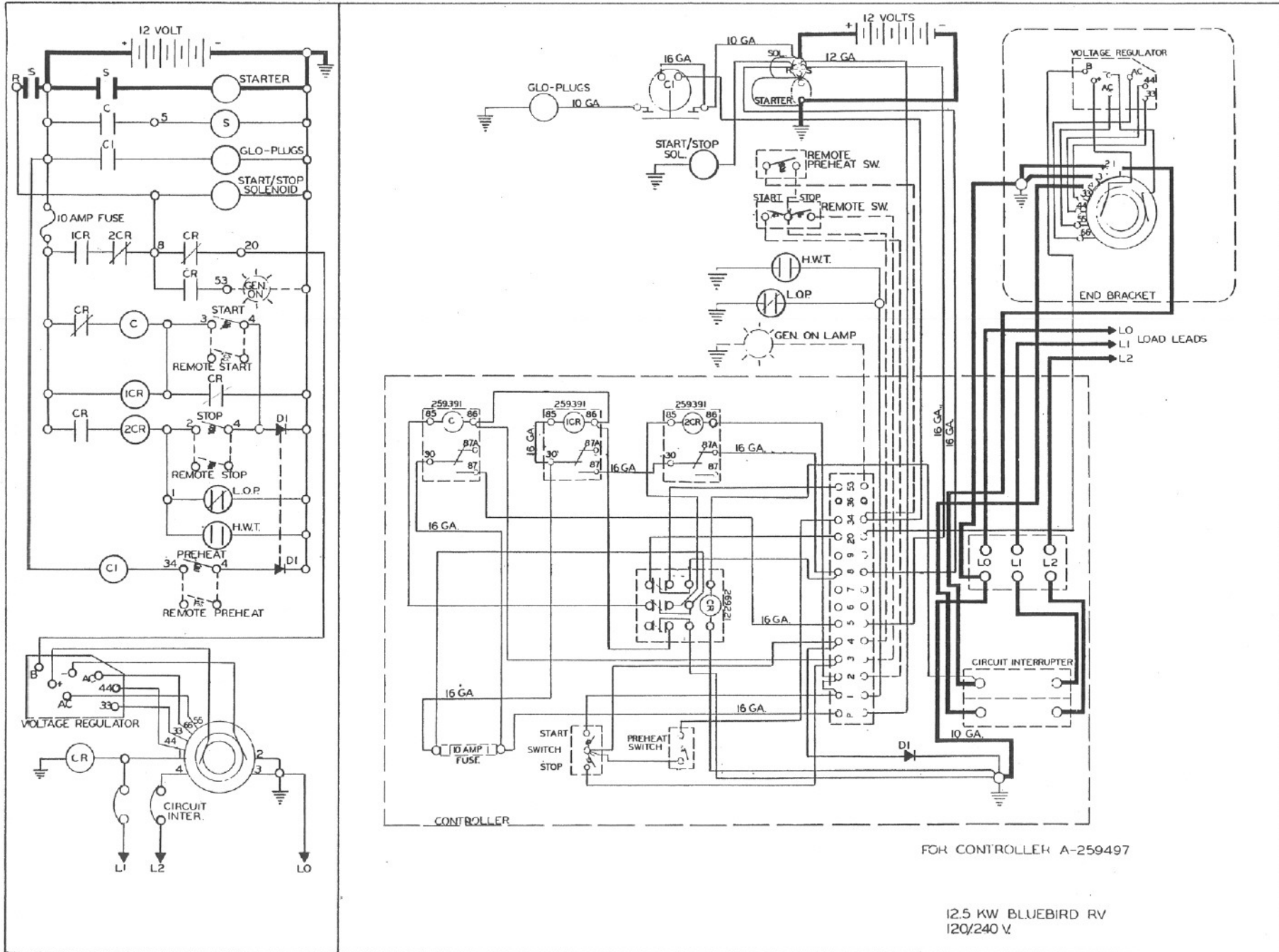


Figure 5. Transfer Switch Connection, 3-Wire AC Circuit

Figure 6. 12.5 RV, 120/240V with Radiator



FOR CONTROLLER A-259497

12.5 KW BLUEBIRD RV
120/240 V

LOP - LOW OIL PRESSURE
HWT - HIGH WATER TEMP

CR - 120 VOLT CONTROL RELAY
S - STARTER SOLENOID

Figure 7. 12.5 RV, 120/240V with Remote Radiator

