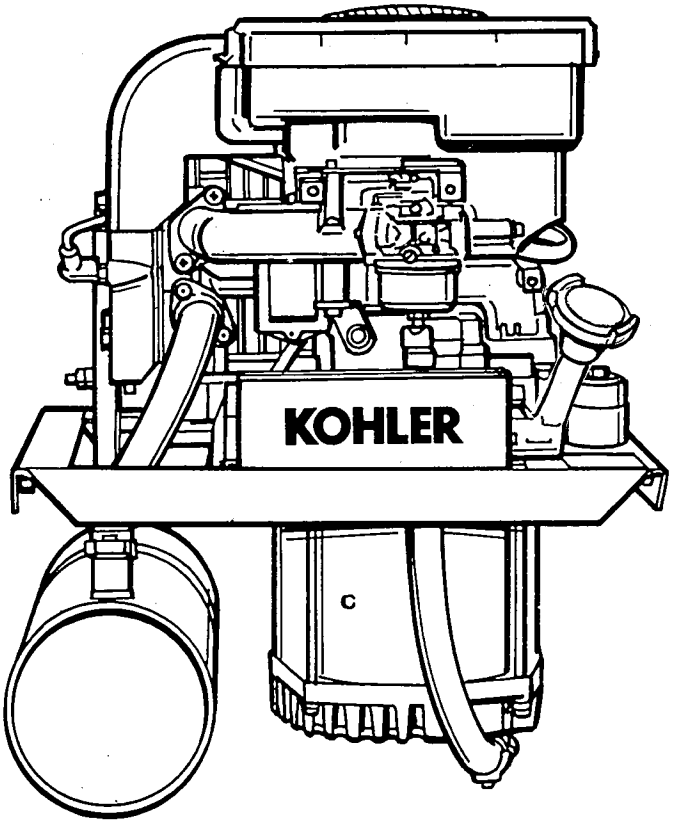
RV GENERATOR SERVICE MANUAL

MODELS:
2CM
2.5CM
2.5CMZ



KOHLER GENERATORS

TP-5148

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Safety Precautions and Instructions

A Generator Set, like any other electro-mechanical device can pose potential dangers to life and limb if improperly maintained or imprudently operated. The best safeguards against accident are to be ever mindful of the potential dangers and to always use good common sense. In the interest of safety, some general precautions relating to operating of a Generator set follow. Keep these in mind. This manual contains several types of safety precautions which are explained below.

⚠ DANGER

Danger is used to indicate the presence of a hazard which *will* cause *severe* personal injury, death, or substantial property damage if the warning is ignored.

⚠ WARNING

Warning is used to indicate the presence of a hazard which *can* cause *severe* personal injury, death, or substantial property damage if the warning is ignored.

⚠ CAUTION

Caution is used to indicate the presence of a hazard which *will* or *can* cause *minor* personal injury or property damage if the warning is ignored.

NOTE

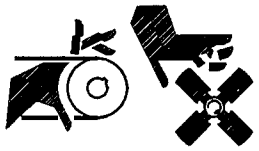
Note is used to notify people of installation, operation, or maintenance information which is important but not hazard-related.

⚠ CAUTION

FIRE HAZARD! Be careful when parking your RV to prevent grass fires started by hot exhaust gases and exhaust system. Keep away from hot engine and generator parts to avoid burning yourself.

FIRE HAZARD! Keep the compartment and generator clean and free of debris and combustible material to minimize chances of fire. Do not locate electrical wiring, fuel lines, or combustible material above the exhaust muffler. If sub-flooring exists beneath the set, an opening must be provided to allow fuel and/or oil that may leak from the system to drain out of the compartment. Make sure this opening is kept clear at all times.

⚠ WARNING

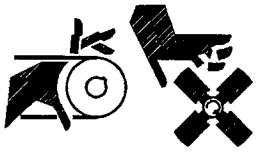


MOVING PARTS! Do not open generator set compartment door when unit is running, except for servicing by qualified technicians. Keep hands, feet, and clothing away from belts and related pulleys when unit is running. Replace guards, covers, and screens (if used) before operating generator set.

⚠ DANGER

EXPLOSIVE 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. Avoid contacting terminals with tools, etc., to prevent burns and to prevent sparks that could cause an explosion. Remove wristwatch, rings, and any other jewelry before handling battery. Any compartment containing batteries must 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 battery connections. 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.

EXPLOSIVE 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 must be well ventilated to prevent accumulation of explosive gases. Do not mount battery in generator compartment.



⚠ CAUTION

UNINTENTIONAL STARTING! To prevent accidental starting when checking choke operation, remove spark plug lead(s) at spark plug(s).

⚠ WARNING

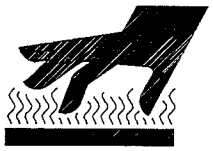
UNIT STARTS WITHOUT NOTICE! To prevent accidental starting on units with a remote start/stop switch, always disconnect battery (remove negative lead first and reconnect it last) to disable generator set before working on any equipment connected to generator.

⚠ WARNING

EXCESSIVE NOISE! Never operate without adequate muffler or with faulty exhaust system--exposure to excessive noise is not only tiring but can lead to impairment of hearing.

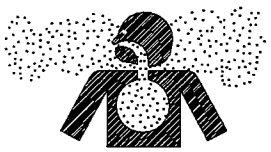
⚠ CAUTION

EXPLOSION! Use generator sets specified for RV use in RV installations only.



⚠ CAUTION

HOT PIPING! An engine gets hot while running and exhaust system components get extremely hot. Do not work on generator set until unit is allowed to cool.



⚠ DANGER

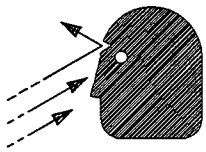
CARBON MONOXIDE! A gasoline/gas-engine discharges deadly carbon monoxide as part of the exhaust when operating. Carbon monoxide is particularly dangerous in that it is an odorless, tasteless, and nonirritating gas, but be ever mindful that it can cause death if inhaled for even a short period of time. Have only qualified technicians 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.

CARBON MONOXIDE! When mounting the remote switch with choke cable, make sure the panel is air tight to prevent exhaust fumes from entering the coach. Carbon monoxide poisoning can result.

CARBON MONOXIDE! When installing exhaust system, position tail pipe end so that discharged exhaust gases may not be drawn into vehicle interior through windows, doors, air conditioners, etc. Do not use flexible tail piping as this type could crack or break and allow lethal exhaust fumes to enter the vehicle.

⚠ CAUTION

BACKFIRE! A sudden backfire can cause serious burns. Keep hands and face away from carburetor when the air cleaner is removed.



⚠ CAUTION

LOOSE COMPONENTS! When turning rotor for breaker point adjustment do not rotate thru bolt/crankshaft counterclockwise. Doing so can loosen thru bolt and result in serious injury when unit is running.

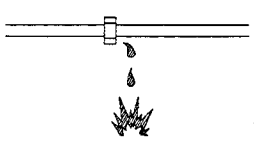
LOOSE COMPONENTS! When checking crankshaft end play, do not rotate crankshaft counterclockwise. Doing so can loosen nut and result in serious personal injury from nut, grass screen, or flywheel flying off engine while unit is running.

⚠ CAUTION

ELECTRICAL SHOCK! When flashing the generator set, 120 Volts AC will be present at the alligator clips when push button is pressed. Use caution when handling, or possible electric shock could result.

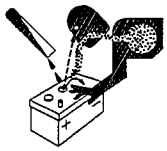
ELECTRICAL SHOCK! Battery can cause electrical burns and shocks. Exercise reasonable care when working near the battery to avoid electrical connections through tools. Remove wristwatch, rings, and any other jewelry.

ELECTRICAL SHOCK! When handling/testing the capacitor, high voltage may be present. Use caution when handling the capacitor; possible electrical shock can result. Discharge capacitor by shorting terminals together.



⚠ CAUTION

EXPLOSION! Fuel leakage can cause an explosion. To prevent fuel leakage, the fuel system must be checked for leakage using a soap-water solution. Do not use solutions that contain ammonia or chlorine, for soap will not bubble for an accurate leakage test.



⚠ WARNING

DANGEROUS ACID! Avoid contact with battery electrolyte. It contains acid which can eat holes in clothing, burn skin, and cause permanent damage to eyes. Always wear splash-proof safety goggles when working around the battery. If battery electrolyte is splashed in the eyes or on skin, immediately flush the affected area for 15 minutes with large quantities of clean water. In the case of eye contact, seek immediate medical aid. Never add acid to a battery once the battery has been placed in service. Doing so may result in dangerous spattering of electrolyte.

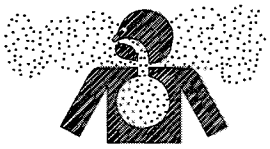
⚠ DANGER

HIGH VOLTAGE! Remember that the function of a generator set is to produce electricity and that whenever 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 technicians. Make sure unqualified persons, especially children, cannot gain access to your set--keep the compartment door locked and securely latched at all times. Be sure that generator is properly grounded. Never touch electrical leads or appliances with wet hands, when standing in water, or on wet ground as the chance of electrocution is especially prevalent under such conditions.

⚠ DANGER

FIRE HAZARD! A sudden flash fire can cause serious burns. To avoid the possibility of a flash fire, do not smoke or permit flame or spark to occur near carburetor, fuel line, fuel filter, fuel pump, or other potential sources of spilled fuel or fuel vapors.

FIRE HAZARD! When removing fuel line or carburetor, use a proper container to catch all fuel. Do not smoke or permit flame or spark to occur near carburetor, fuel line, fuel pump, or other potential sources of spilled fuel or fuel vapors.



⚠ DANGER

HAZARDOUS FUMES! When installing exhaust system, position tail pipe end so that discharged exhaust gases may not be drawn into vehicle interior through windows, doors, air conditioners, etc. Do not use flexible tail piping as this type could crack or break and allow lethal exhaust fumes to enter the vehicle.

NOTE

MARINE APPLICATION! RV generator sets do not comply with United States Coast Guard (U.S.C.G.) requirements and must not be used for marine applications. Use only generator sets specified for marine use in marine installations. U.S.C.G. Regulation 33CFR183 requires a generator set to be "ignition protected" when used in a gasoline-fueled environment.

⚠ DANGER

DANGEROUS FUELS! Use extreme caution when handling, storing, and using fuels--all fuels are highly explosive in a vapor state. Store fuel in a well ventilated area away from spark producing equipment and out of the reach of children. Never add fuel to the tank while the engine is running to prevent spilled fuel from igniting on contact with hot parts or from ignition spark. 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. Should any fuel leakage, fuel accumulation, or electrical sparks be noted, DO NOT OPERATE GENERATOR SET. Have systems repaired by qualified technicians before resuming generator operation. Additional precautions must be taken when using the following fuels:

Gasoline--Store gasoline only in approved red containers clearly marked GASOLINE. Don't store gasoline in any occupied building.

Propane (LP)--Adequate ventilation is mandatory. Propane is heavier than air; install gas detectors low in room. Inspect detectors often.

⚠ DANGER

ELECTROCUTION! Your RV generator set must not be used to "backfeed" by connecting it to building/campground electrical circuits. Doing so can cause serious injury or death to utility personnel working on utility transmission lines and may also seriously injure persons in your household. Unauthorized connection may be unlawful in some states and/or localities. A transfer switch must be installed in the RV to prevent interconnection of generator and outside source of power.

NOTE

PRESSURIZATION! After all LP-Gas connections have been completed, the entire system shall be test pressurized to 6-8 ounces (10-14 inches water column).

Warning Decals

Safety decals are affixed to the generator set in prominent places to advise the operator or service technician of potentially hazardous situations. The decals are reproduced here to improve operator recognition and thereby increase decal effectiveness. For a further explanation of decal warning, reference preceding safety precautions. Before operating or servicing the generator set, be sure you understand the message of these decals. Replace missing or damaged decals.

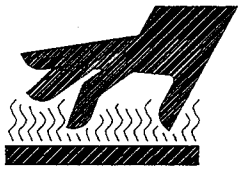
⚠ WARNING

carbon monoxide.
Can cause severe nausea, fainting, or death.

Completlely seal off compartment to maintain vapor tightness to living space.
See operator's manual for complete installation instructions.

239796

⚠ CAUTION



Hot engine and exhaust system.
Can cause severe burns.

Do not work on generator set until unit is allowed to cool.

249809

⚠ WARNING

Fire or accident hazard.
Can cause severe injury or death.

Install unit only in accordance with manufacturer's detailed installation instructions.

239773

⚠ WARNING

Hazardous voltage
Backfeed to utility system can cause electrocution or property damage.

Do not connect to any building electrical system without connecting through an approved device and after building main switch is open.
See operator's manual.

239771

Section 1
INTRODUCTION AND SPECIFICATIONS

Introduction

This manual covers the operation, maintenance, troubleshooting, disassembly/reassembly, and wiring diagrams for the 2kW and 2.5kW RV generator sets. Read through this manual, then carefully follow all recommendations and safety precautions to keep your generator set functioning properly and to avoid any serious bodily injury. Refer to Figure 1-1 for generator components.

NOTE

The difference in output wattage of the generator sets is due to a change in carburetors. 2.5kW was available after Serial No. 164665.

Specifications

ENGINE

Engine ..... Tecumseh TVM 140, four cycle, air-cooled
Bore x Stroke ..... 2-5/8″ x 2-1/2″ (66.7 mm x 63.5 mm)
Displacement ..... 13.53 cu. in. (221.75 cc)
Horsepower 6.0
RPM @ 60 Hz. 3600
Lube Oil Capacity ..... 1.25 quarts (1.18 L)
Battery Recommendation ..... 12 Volt, 55 Amp. Hr.
Ignition System ..... Breaker Point (Serial No. 159482 and earlier)
Electronic (after Serial No. 159482)
Spark Plug Type ..... Champion RJ-8 or RJ-17LM
Spark Plug Size ..... 14 mm
Spark Plug Gap ..... 0.030″ (.76 mm)
Fuel Type ..... Unleaded Regular Gasoline
Electric Fuel Pump ..... 12 Volt, 1.75 psi (12.1 kPa)
Fuel Consumption

Load	25%	50%	75%	100%
2kW — Gasoline	0.28	0.38	0.48	0.56
gph (Lph)	(1.1)	(1.4)	(1.8)	(2.1)
2kW — LPG*	0.29	0.34	0.41	0.51
gph (Lph)	(1.1)	(1.3)	(1.6)	(1.9)
2.5kW — Gasoline	0.28	0.34	0.43	0.49
gph (Lph)	(1.1)	(1.3)	(1.6)	(1.9)
2.5kW — LPG*	0.35	0.40	0.49	0.60
gph (Lph)	(1.3)	(1.5)	(1.9)	(2.3)

*One gallon of LP fuel will produce approximately 0.4 cubic feet (0.012 m³) of propane vapor per hour in ambient temperature down to 0°F (-18°C).

GENERATOR

	2kW	2.5kW
Rated kW, 60 Hz.	2	2.5
Rated Voltage	120 V., 1Ø, 2W	120 V., 1Ø, 2W
Rated Amperes	16.7	20.8
Circuit Breaker	20 Amp.	25 Amp.

DERATION: Kilowatt ratings decrease 3-1/2% for each 1000 feet (305 metres) above sea level and 1% for each 10° F (5.5° C) above 60° F (16° C).

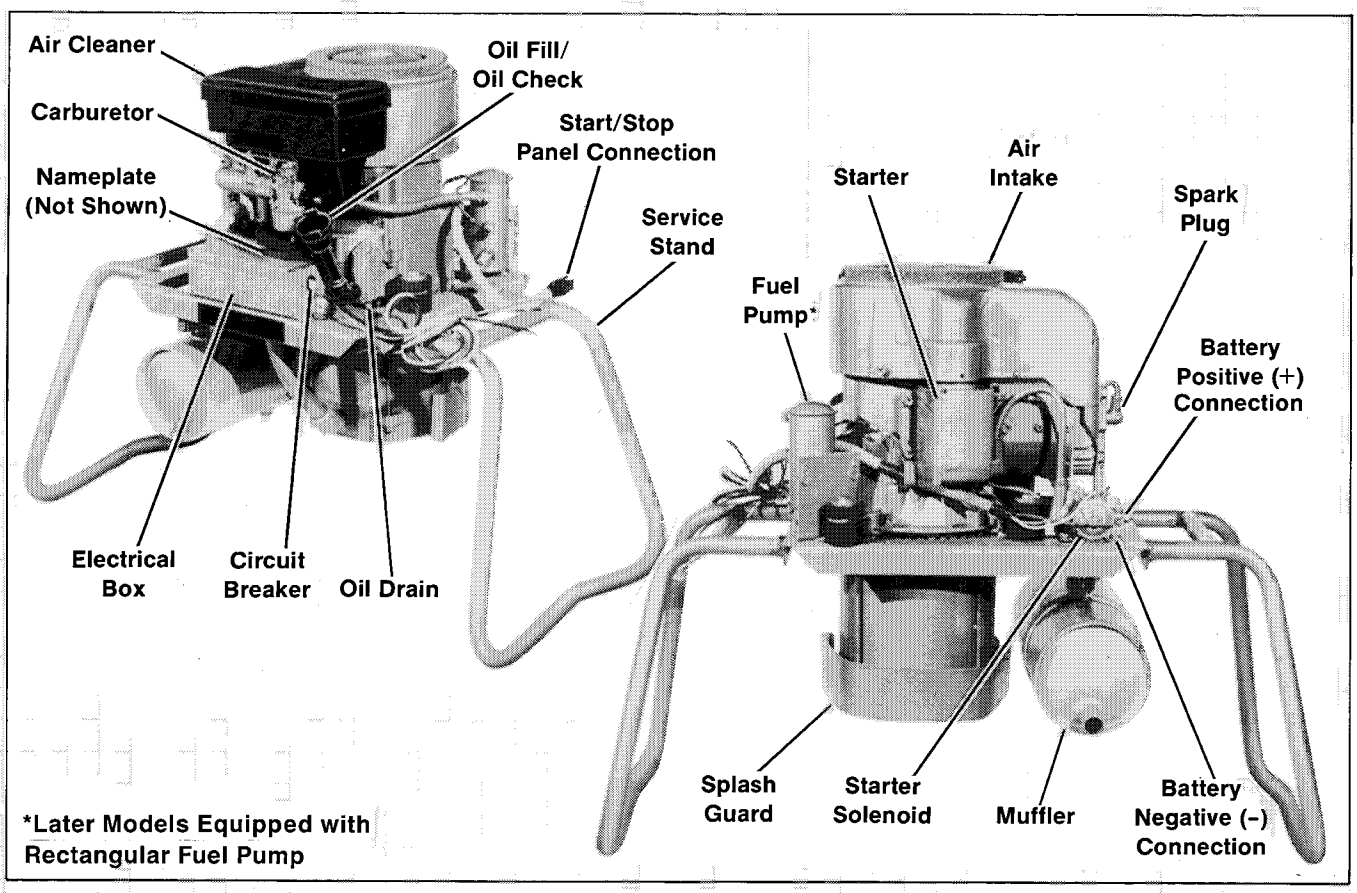


Figure 1-1. Service Views

Section 2
OPERATION

Prestart Check

Oil Level: Should be at or near full mark.

Air Inlets: Must be clear and unobstructed.

Compartment: Interior must be clean.

Air Cleaner: Must be clean and properly installed.

Air Shrouding: Must be tight and in proper position.

Exhaust: Tail pipe must be clear, muffler and piping tight and in good condition.

Electrical: All connections, including battery, must be tight.

Rocker-Switch Start Model Type III (Newer)

TO START

Pull choke knob out to closed position, see Figure 2-1. Place rocker switch to "START" position and hold until engine is running but no more than ten seconds. When the switch is in the "START" position the "ON" light will go on indicating battery voltage availability to the electric fuel pump. When switch is released from the "START" position it will automatically return to the "RUN" position. If the generator set is running, the "ON" light will remain illuminated; otherwise, the light will go off indicating the engine failed to start. Normally the engine will start within five seconds. As the engine warms up, push choke knob in.

NOTE

Do not crank engine continuously for more than ten seconds at a time. A 60 second cool-down period must be allowed between cranking attempts if the engine does not start. If the unit fails to start after three attempts have problem corrected by an authorized technician. Failure to follow these guidelines may result in burn-out of the starter motor from overheating.

NOTE

Do not attempt to start the generator set while the unit is running. Teeth on the flywheel and starter will clash and could result in damage to the starter or flywheel.

NOTE

When starting LP gas units, do not use choke when outside temperature is greater than 30° F (1° C). When temperature is 30° F (1° C) or below, choke for three seconds after starting and then open choke.

NOTE

To indicate generator set output, a low wattage night light can be used as a generator "ON" light. Plug night light into any AC outlet in the motor home and leave in the "ON" position.

TO STOP

Whenever possible, allow a brief cooling off period by running the set at low or no load for a few minutes prior to shutdown. To stop, place rocker-switch in "OFF" position.

Rocker-Switch Start Model Type II (Early)

TO START

Pull choke out to closed position, refer to Figure 2-1. Place rocker-switch to "ON" position briefly to allow fuel pressure to build. The "ON" light will go on indicating battery voltage availability. See Rocker-Switch Start Model Type III for additional "CAUTIONS" and "NOTES."

NOTE

Leaving the rocker-switch in the "ON" position and with the generator set not running will allow the fuel pump to be energized causing battery drain.

Move the rocker-switch to the "START" position and hold until the engine is running but not more than ten seconds. Normally, the engine will start within five seconds, release the switch and wait a few seconds before moving back to "START" position. As the engine warms up, push choke knob in.

Figure 2-1. Start/Stop Panel (Rocker-Switch Start Model)

TO STOP

Whenever possible, allow a brief cooling off period by running the set at low or no load for a few minutes prior to shutdown. To stop, place rocker-switch in "OFF" position.

Key Start Model Type I (Discontinued)

TO START

Pull choke out to closed position, refer to Figure 2-2. Turn key to "ON" position briefly to allow fuel pressure to build and then turn key to "START" position. As engine warms push choke in. See Rocker-Switch Start Model Type III for additional "CAUTIONS" and "NOTES."

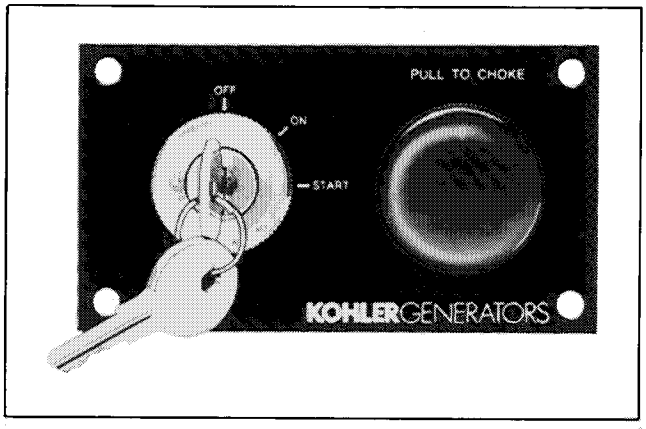


Figure 2-2. Start/Stop Panel (Key Start Model)

NOTE

Leaving the rocker-switch in the "ON" position and with the generator set not running will allow the fuel pump to be energized causing battery drain.

TO STOP

Whenever possible, allow a brief cooling period by running the set at low or no load for a few minutes prior to shutdown. To stop, turn key to "OFF" position.

Section 3
SCHEDULED MAINTENANCE & SERVICE

Scheduled Maintenance

Scheduled maintenance is "preventive maintenance". Major repair can be avoided by correcting problems when they are small. When performing maintenance, always look for signs of potential trouble, such as loose connections or dirty components. When running the set, listen for any unusual noises. Follow all safety precautions listed in front of this manual.

Refer to Table 3-1 for scheduled maintenance requirements. Perform each function at the indicated interval. For maintenance work on engine components, refer to the Tecumseh engine service manual.

Service Stand

A servicing stand, kit number PA-228102 (Gold) or PA-228208 (Beige), is available for your generator set. The stand is assembled to your generator set as shown in Figure 3-1. The stand and mounting hardware are included with the kit.

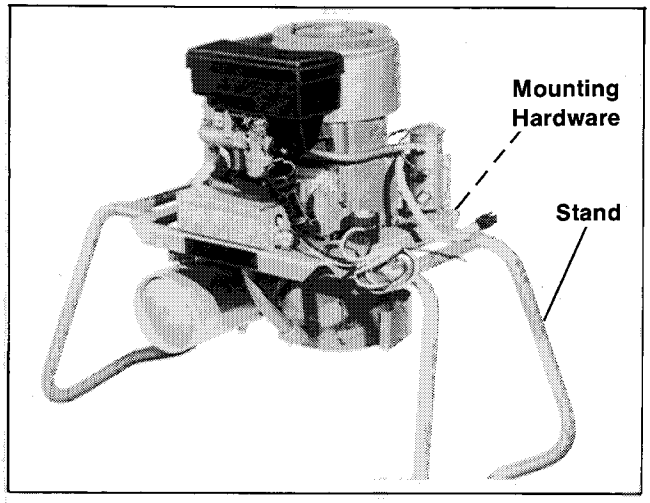


Figure 3-1. Service Stand

Lubrication

OIL CHECK

Check the oil in the crankcase daily or before each startup to ensure the level is in the safe range. DO NOT operate the set if the level is below the "ADD" mark. To bring the level from the "ADD" mark to full, add approx. .75 quart (.71 litres).

1. Make sure unit is on a flat, level surface.
2. Wipe area around oil cap to prevent dirt or particles from entering the oil fill tube.
3. Unscrew oil cap and wipe dipstick clean. See Figure 3-2.
4. Reinsert dipstick into oil fill tube. Dipstick must be fully seated and tightened into oil fill tube when checking oil level. Remove dipstick to check oil level.

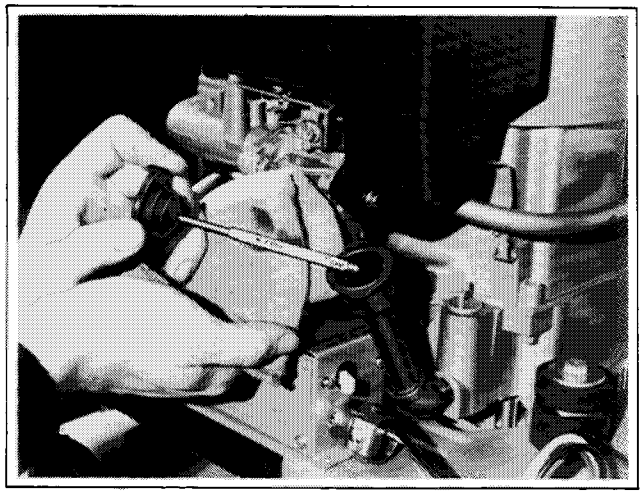


Figure 3-2. Oil Check

Daily	Every 25 Hours	Every 50 Hours	Every 100 Hours	Every 200 Hours	Service Schedule
•					Check oil level
•					Keep cooling air inlets and outlets clean
•					Remove loose dirt from compartment
	•				Change lube oil
	•				Service air cleaner
		•			Check generator set battery electrolyte level (if equipped)
			•		Service spark plug
			•		Retighten electrical connections
			•		Check mounting bolts and vibro mounts
			•		Service fuel filter element
				•	"Tune-up" at Authorized Service Dealer (points, plug, decarbonize engine, lap valves)

Table 3-1. Scheduled Maintenance

5. Add oil until level is above the "ADD" mark and below the "FULL" mark.
6. To add oil, a funnel is recommended to prevent oil spills, see Figure 3-3.

Figure 3-3. Oil Fill

OIL CHANGE

Change the oil after the first two (2) hours of operation and at 25 hour intervals thereafter. Change more frequently if operating under dirty, dusty conditions. If possible drain oil while hot. To drain, remove oil drain plug with a 3/8 in. (8 point) hex socket wrench. Oil drain plug is located underneath mounting tray. Figure 3-4. Place a container underneath drain plug to catch draining oil. Replace plug after oil has completely drained. Oil capacity is 1.25 quarts (1.18 liters). Refer to Oil Selection chart following for correct oil type.

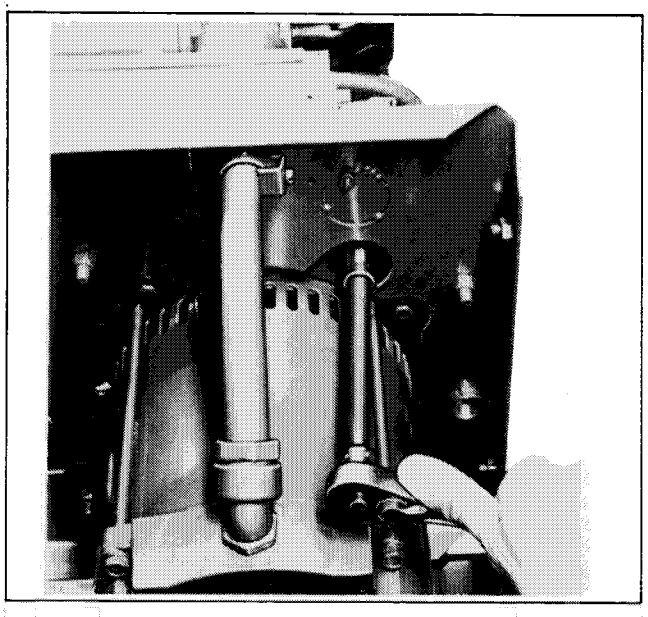


Figure 3-4. Oil Drain Location

OIL SELECTION

USE A CLEAN, HIGH QUALITY, DETERGENT OIL. Be sure original container is marked with engine service classification SC, SD, SE, or SF.

DO NOT USE SAE10W40 OIL.

Refer to the Oil Selection Chart for proper oil types; use of lighter weight oil, other than recommended, will cause increased oil consumption.

Oil Selection Chart

Air Temperature	Oil Viscosity
Above 32° F (0° C)	SAE 30 (SAE 10W30 is an acceptable substitute)
Below 32° F (0° C)	SAE 5W20 or 5W30 (SAE10W is an acceptable substitute)

Air Cleaner

Your engine is equipped with a foam-type air filter. Every 25 hours remove the element and clean. Clean more frequently if using under extremely dirty, dusty conditions. Use the following procedure to service the air cleaner.

NOTE

If generator is equipped with optional air duct kit, remove baffle panel (secured with wing nuts) to access air cleaner.

1. Unsnap air cleaner cover. Figure 3-5.
2. Remove filter. Wash filter in a water and DETERGENT solution.
3. Wrap in a clean cloth and squeeze dry (don't twist). Then apply liberal amounts of SAE 30W oil to filter. Work oil well into filter and then squeeze out excess oil.
4. Reinstall element, making sure it fits properly. Snap air cleaner cover back in place.

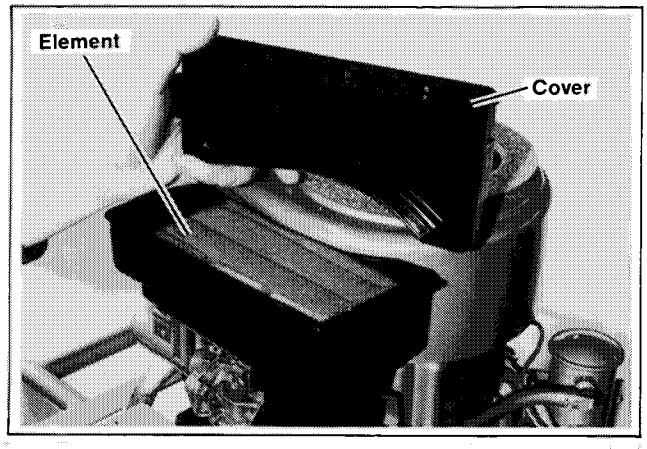


Figure 3-5. Air Cleaner Service

Spark Plug

Every 100 hours remove the spark plug and check its condition. Good operating conditions are indicated when the plug has a light coating of gray or tan deposit. A dead white, blistered coat could indicate overheating. A black (carbon) coating may indicate an "overrich" fuel mixture caused by a clogged air cleaner or improper carburetor adjustment. Do not sandblast, wire brush, scrape, or otherwise service a plug in poor condition—best results are obtained with a new plug.

To service, remove plug as shown in Figure 3-6. Spark plug gap is 0.030" (.76 mm). Figure 3-7. For replacement plugs use Champion RJ-8 or RJ-17LM. A Champion RJ-17LM resistor plug is required for Canadian radio frequency interference regulations.

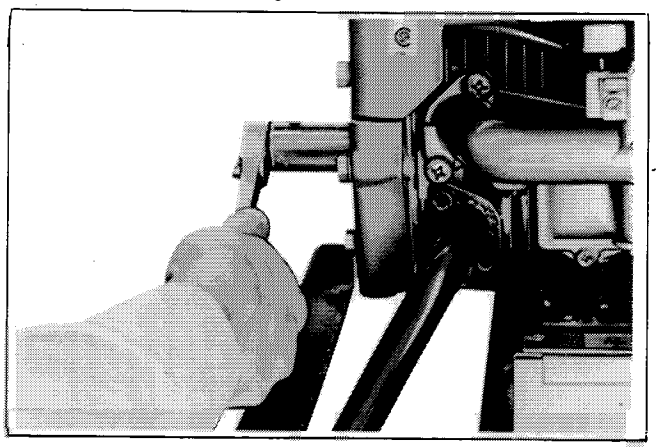


Figure 3-6. Spark Plug Removal

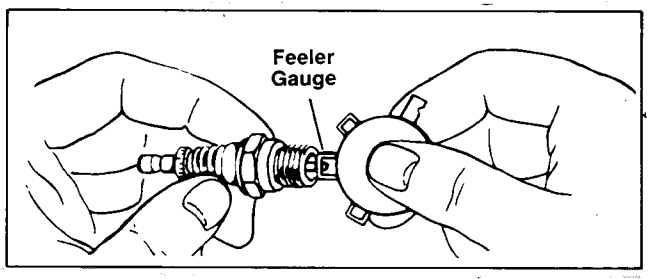


Figure 3-7. Gapping Spark Plug

Fuel Specifications

GASOLINE

For best results, use only clean, fresh, regular grade unleaded gasoline with a pump sticker octane rating of 87 or higher in the U.S.A. In countries using the Research rating method, it should be 90 octane minimum.

Unleaded gasoline is recommended since it leaves less combustion chamber deposits. Regular grade leaded gasoline may also be used; however, be aware that the combustion chamber and cylinder head will require more frequent service.

Use fresh gasoline to ensure it is blended for the season, and to reduce the possibility of gum deposits forming which could clog the fuel system. Do not use gasoline left over from the previous season. Gasohol containing no more than 10% ethanol can be used if unleaded fuel is unavailable.

Never use gasoline containing METHANOL, gasohol containing more than 10% ethanol, gasoline additives, premium gasoline, or white gas because engine/fuel system damage could result.

Do not add oil to the gasoline.

LP GAS

After all the LP connections have been completed, the entire system shall be pressurized to not less than 7 inches nor more than 11 inches water column, and the connections tested for leakage with soapy water or bubble solution. Do not use solutions that contain ammonia or chlorine for soap will not bubble for an accurate leakage test.

Before starting the generator set, check the (secondary) gas regulator inlet pressure using an ounce pressure gauge or manometer. Pressure should be 4-6 ounces or 7-11 inches water column, adjust pressure on primary gas regulator.

⚠ CAUTION

EXPLOSION! Fuel leakage can cause an explosion. To prevent fuel leakage, the fuel system must be checked for leakage using a soap-water solution. Do not use solutions that contain ammonia or chlorine, for soap will not bubble for an accurate leakage test.

Carburetor Adjustments

GASOLINE CARBURETOR ADJUSTMENTS

The main fuel adjustment screw is located on the bottom of the carburetor bowl (drip pan must be removed). Figure 3-8. Turn screw in until it bottoms lightly, then back out 1-1/4 turns. Minor adjustments may have to be made with the engine running at full load to achieve maximum power. The idle fuel adjustment is located in the front, center of the carburetor. Turn the needle in until it bottoms lightly. Back out 3/4 of a turn.

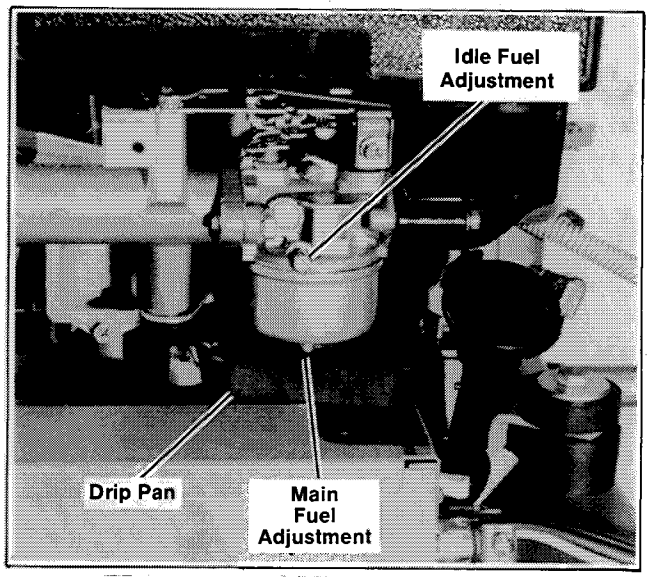


Figure 3-8. Gasoline Carburetor Adjustments

LP GAS CARBURETOR ADJUSTMENTS

The main fuel adjustment screw is located on the bottom of the carburetor bowl. Figure 3-9. Turn screw in until it bottoms lightly, then back out 1 full turn. Minor adjustments may have to be made with engine running at full load to achieve maximum power.

Open or close the idle fuel adjustment screw until smooth operation is obtained at no load (approximately 1-3 turns out from fully closed).

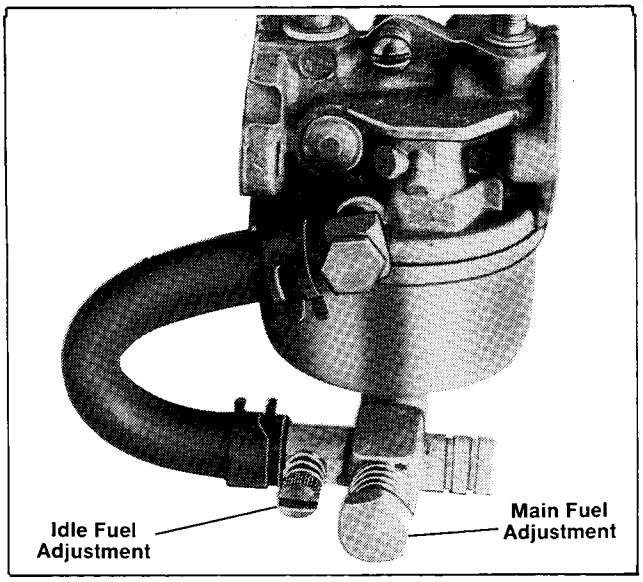
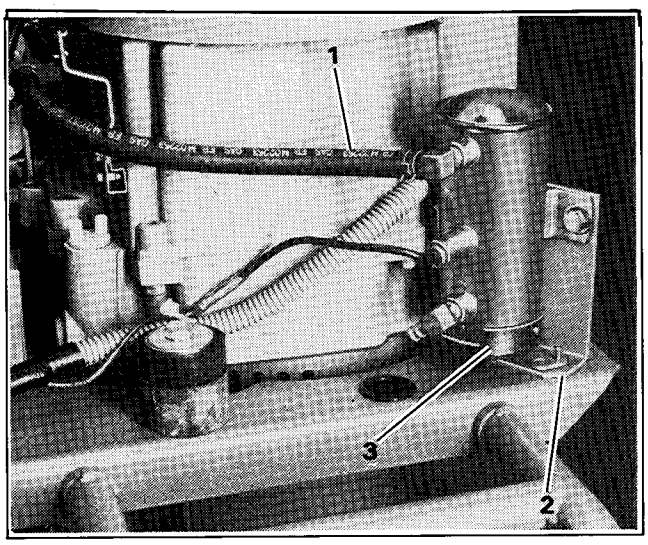


Figure 3-9. LP Gas Carburetor Adjustments

Fuel Filter Service

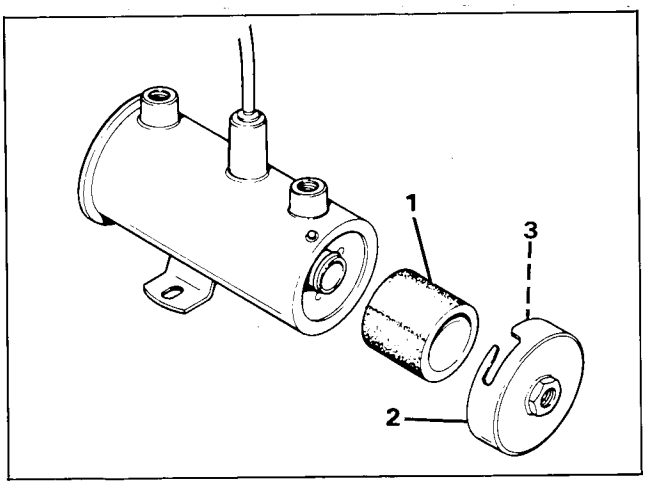
Before servicing the fuel filter, drain the fuel from the carburetor/fuel line. Early model generators were equipped with fuel pumps with built in fuel filters. See Figure 3-11. The internal filter on this type pump should be cleaned every 100 hours of operation. Remove the pump cover to remove the filter. Swish the filter in cleaning solvent to remove debris. Wipe the magnet and internal surfaces with a clean rag before reassembling.

Later model sets utilize an in-line type fuel filter connected to the fuel line. Replace the filter every 500 hours of running time or when rough operation indicates an engine tune-up may be necessary.



1. **Fuel Line**
2. **Fuel Pump Mounting Bracket**
3. **Fuel Pump Cover**

Figure 3-10. Round Fuel Pump Mounting



1. **Filter**
2. **Cover**
3. **Magnet**

Figure 3-11. Fuel Filter Service

Governor Adjustments

The governor speed adjustment tab is located behind the carburetor (Figure 3-12). Governor speed at no load should be set at 63.5 Hz (3810 rpm). To increase speed, bend the control bracket outward (to expand the governor spring). To decrease speed, bend the control bracket inward (to compress the governor spring).

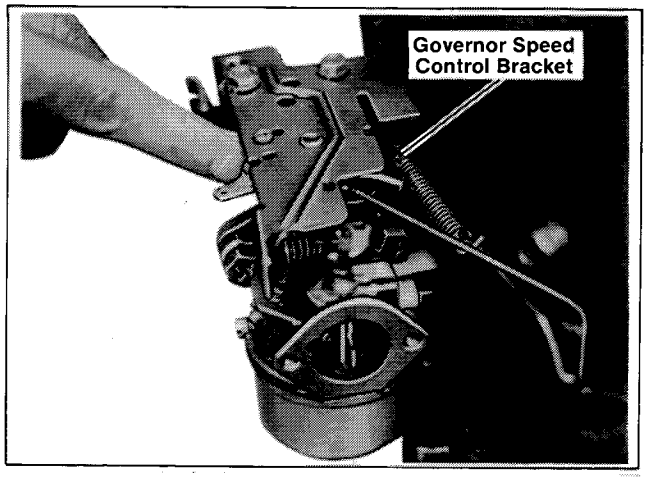


Figure 3-12. Governor Adjustment

Battery Service (If Equipped)

Check the electrolyte level in the battery at frequent intervals and add distilled water as needed. To avoid unintentional starting while you are working on the set, disconnect the negative battery cable. Use a 12-Volt battery with an Amp. hour rating of at least 55. A negative ground system is used. Make sure battery is properly connected and terminals are tight.

Fuse Replacement

There is one 5 Amp. fuse on the start panel. This fuse protects the primary starting circuit and the electric fuel pump or LP fuel solenoid. Refer to Figure 3-13 for fuse location. If this fuse "blows", the fuel pump, or LP fuel solenoid will be deenergized and the set will stop when starved of fuel. Replace the fuse. If it "blows" again, contact a Kohler Generator Service Dealer for assistance in locating and correcting the cause.

Wattage Requirements

If the rated capacity of your generator is exceeded, the circuit protector located on the generator electrical box will trip to protect generator against damage. This could be caused by a short in the AC circuit in your RV or simply by having too many appliances on at the same time, resulting in an overload condition. If the circuit protector trips, the set will continue running but there will be no AC output to the protected circuit. Before resetting the protector, turn off some of the appliances and lights inside the RV to bring the load down within the rated limits of the set. If this is done and the protector trips again after being reset, a short circuit is indicated. In this event, turn off the set and have a Kohler Generator Service Dealer locate and correct the cause of the short circuit.

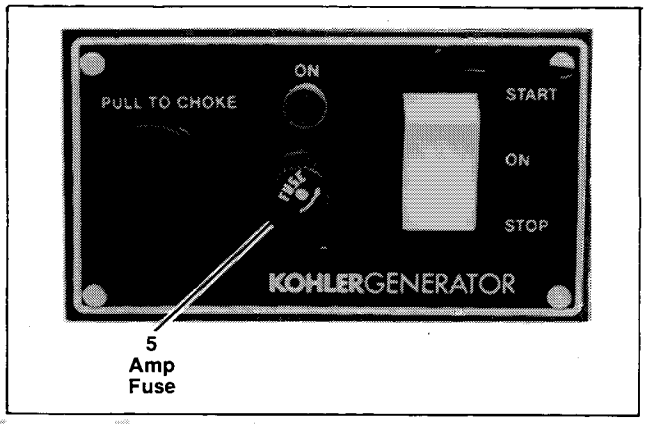


Figure 3-13. Fuse Replacement

NOTE

To reset the circuit protector in installations where the protector is barely visible, the ON position is where the handle is pointing outward.

The average wattage requirements of some common RV appliances and motor loads are listed in the following chart. Use these figures to calculate the total load on your set to avoid the inconvenience of having the circuit protector trip due to overload. The 2 kW generator set will operate one 11,000 BTU air conditioner with 500 Watts to spare. The 2.5 kW generator set will operate one 11,000 BTU air conditioner with 1000 Watts to spare or one 13,500 BTU air conditioner with 500 Watts to spare.

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

Section 4
TROUBLESHOOTING

General

When troubleshooting a generator set, always consider the simplest causes first. Narrow the problem down to a functional system, such as fuel or ignition. To operate efficiently, an engine must have sufficient fuel, a good ignition spark and good compression. All adjustments must be correct. For a generator to produce the required electricity, all parts must be clean, all connections tight and all components in working order. Follow all safety precautions listed in front of this manual.

Engine Troubleshooting

Refer to Figures 4-1, 4-2, or 4-3 for engine troubleshooting. To make engine repairs, refer to the Tecumseh engine service manual which covers the engine model. Always consider every possible cause of malfunction. Knowledge of four cycle engines and ignition systems can be applied.

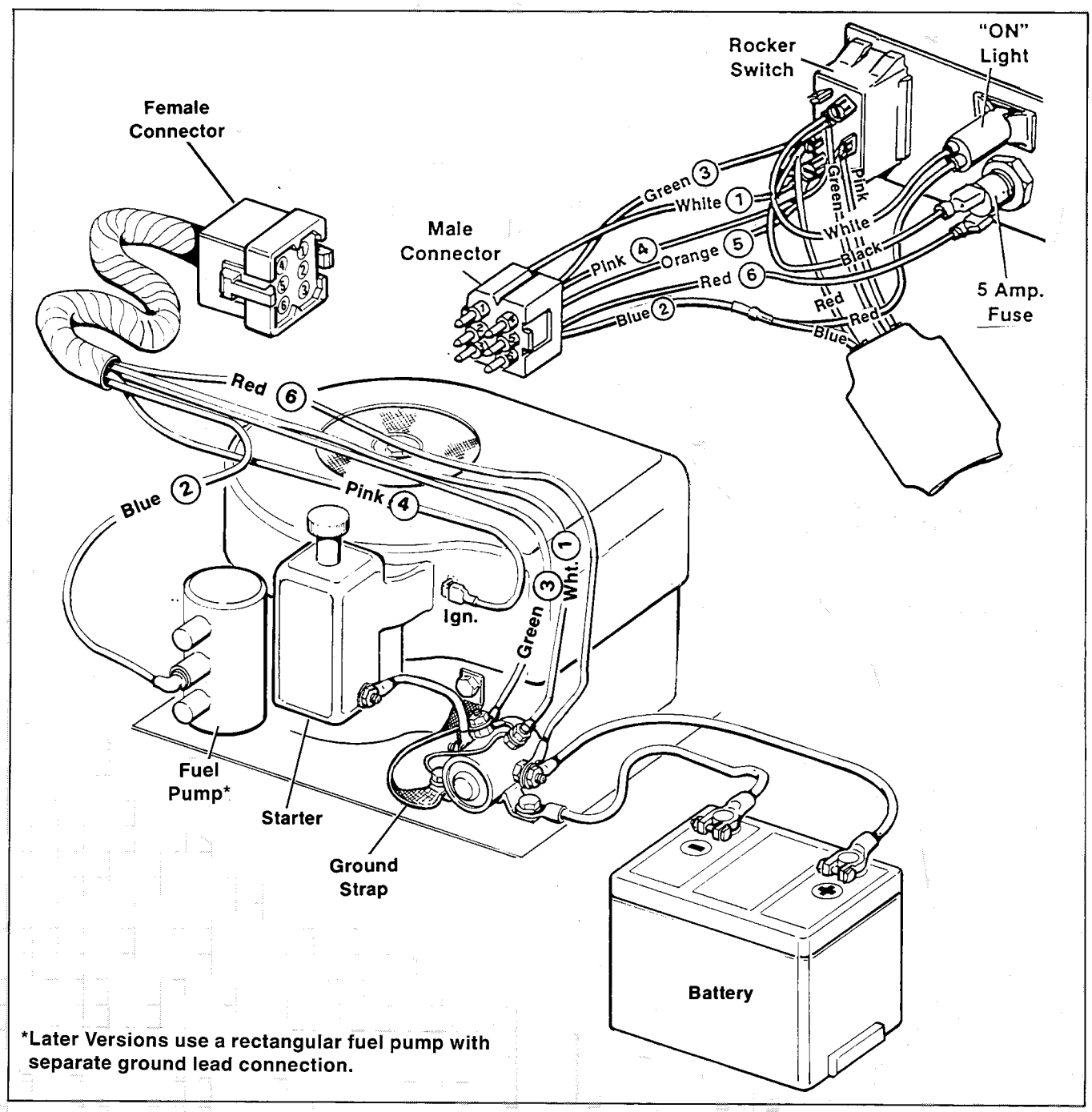


Figure 4-1. Engine Troubleshooting Rocker Switch Start Model (Type III)

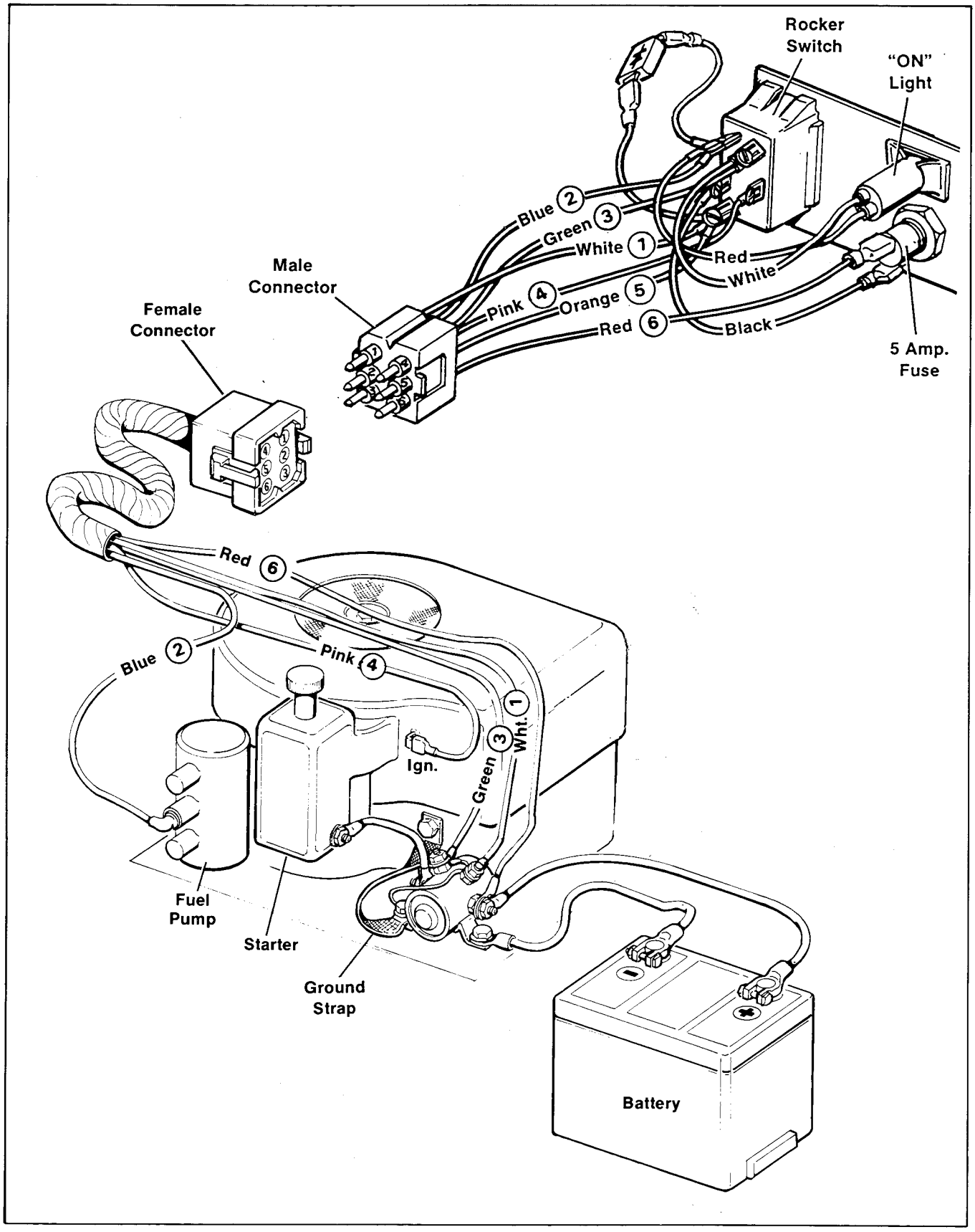


Figure 4-2. Engine Troubleshooting Rocker Switch Start Model (Type II)

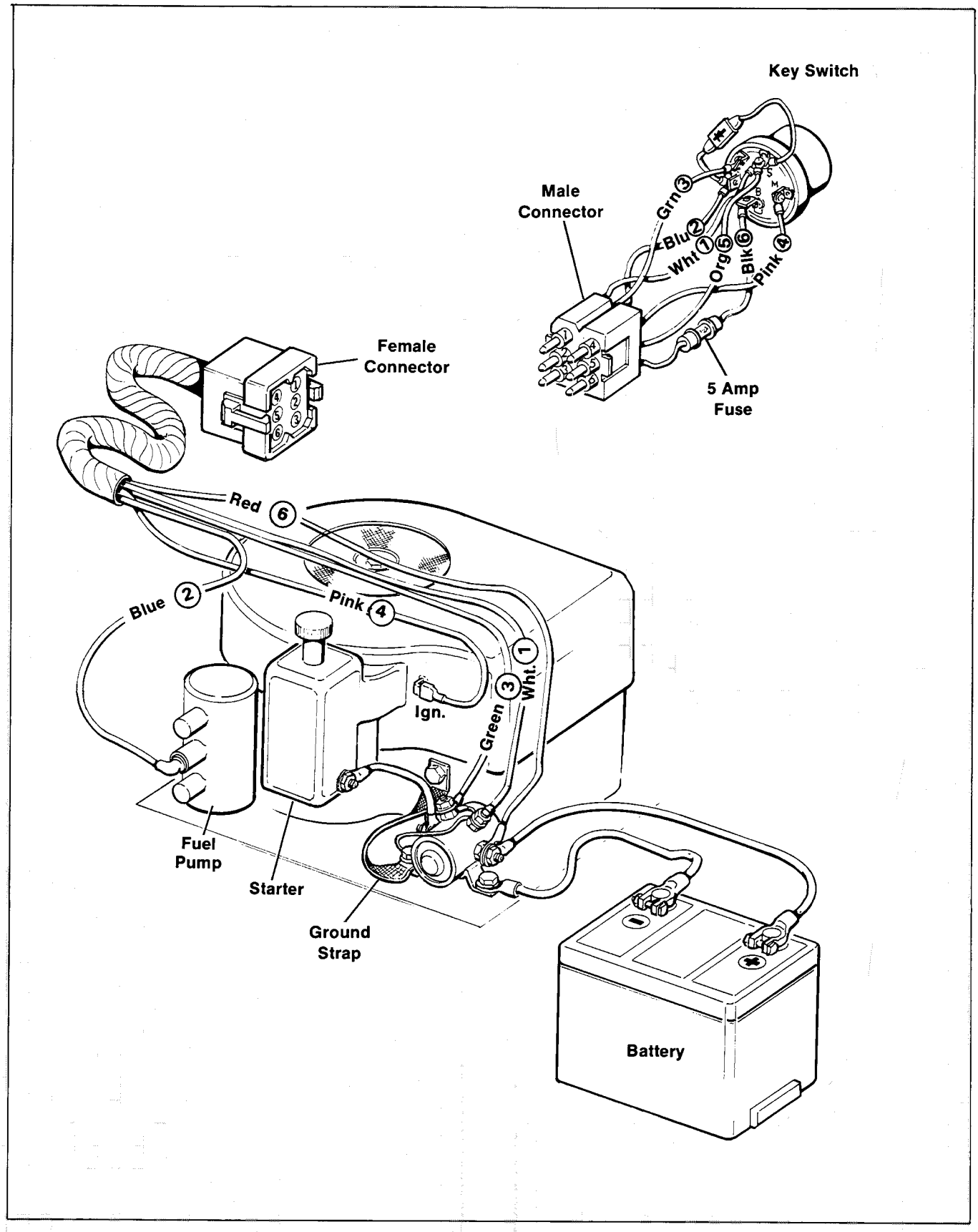


Figure 4-3. Engine Troubleshooting Key Switch Model (Type I)

ENGINE TROUBLESHOOTING CHART

Condition	Possible Cause	Check/Correction
Will Not Crank	1. Low battery.	1. Battery voltage must be at least 10 Volts measured at battery with start selector switch in "START" position.
	2. Loose or corroded battery leads or terminals.	2. Tighten or clean.
	3. Loose connections or open conductor from battery supply.	3. Separate harness connector and check for 12-13 Volts DC voltage between pins 3 and 6 (on female connector).
	4. Defective "C" cranking. (starter solenoid)	4. Separate harness connector and check for continuity between pins 1 and 3 (female connector). Check for readings of 18-20 ohms (R x 1 scale).
	5. Blown 5 Amp fuse.	5. Check panel mount fuse.
	6. Defective start switch.	6. See "Remote Start/Stop Switch."
	7. Defective starter motor.	7. If "C" cranking contactor energizes (audible click), but starter does not turn, remove battery supply and check starter terminal and ground strap; this should indicate very low resistance (ohmmeter on R x 1 scale).
	8. Out of fuel.	8. Replenish.
	9. Clogged fuel filter.	9. Clean.
	10. Engine flooded or over-choked.	10. Readjust choke setting.
Unit Cranks in "RUN" position	1. Start switch miswired.	1. Refer to wiring diagram, Section 6.
	2. Shorted switch diode.	2. With an ohmmeter, check for diode high resistance in one direction and low resistance in the opposite direction. Remote panel Types I and II.
	3. Reversed diode connection.	3. Visually check for correct diode polarity. Remote panel Types I and II.
Unit Cranks but Will Not Run	1. Start switch miswired.	1. Refer to wiring diagram, Section 6.
	2. Open diode (prevents current flow to fuel pump).	2. With an ohmmeter, check diode for high resistance in one direction and low resistance in the opposite direction. Remote panel Types I and II.
	3. Defective start switch (does not disconnect ground from engine magneto).	3. Separate harness connector and check for an open circuit between pins 3 and 4 (male connector) with the start selector switch in the "START" position. See "Remote Start/Stop Switch."
	4. Reversed battery connections. (Diode will prevent fuel pump from operating in "START" position.	4. Check battery connections. Fuel pump will be energized in "ON" position with remote panel Types I and II.
	5. Defective fuel pump.	5. Disconnect lead(s) to fuel pump and apply 12 Volts DC. If good, fuel pump will operate. (Round fuel pump must be mounted on set to provide ground.) See Safety Precautions section before proceeding.
	6. No fuel.	6. Check fuel supply. Check for restrictions from fuel tank to fuel pump; fuel pump to carburetor input; and restrictions in fuel lines, fittings and fuel pump filter.
	7. Faulty spark plug.	7. Clean, adjust or replace.
	8. Breaker points out of adjustment. (Early Models only.)	8. Refer to Tecumseh service manual.
	9. Defective or shorted condenser. (Early Models only.)	9. Refer to Tecumseh service manual.
	10. Ignition wiring or connections.	10. Repair or reconnect as necessary.
	11. Defective magneto.	11. Refer to Tecumseh service manual.
	12. Clogged air cleaner.	12. Clean.
	13. Defective fuel pump control circuit board.	13. See "Fuel Pump Control Circuit Board." Remote panel Type III only.

ENGINE TROUBLESHOOTING CHART (Continued)

Condition	Possible Cause	Check/Correction
Hard Starting	1. Stale or bad fuel. 2. Air cleaner clogged. 3. Faulty carburetor adjustments. 4. Faulty spark plug. 5. Weak magneto. 6. Incorrect breaker point gap. (Early Models only.) 7. Weak battery. 8. Low engine compression.	1. Replace. 2. Clean. 3. Correct. 4. Clean, adjust or replace. 5. Refer to Tecumseh service manual. 6. Refer to Tecumseh service manual. 7. Recharge. 8. Refer to Tecumseh service manual.
Stops Suddenly	1. Out of fuel. 2. Overheated. 3. Air cleaner clogged. 4. 5-Amp fuse blown. 5. Faulty spark plug. 6. Fuel pump not functioning properly. 7. Clogged fuel filter. 8. Low oil level. 9. Defective fuel pump control circuit board.	1. Replenish. 2. Check air flow, clogged intake screens or obstructions preventing air flow. 3. Clean. 4. Replace. 5. Clean, adjust or replace. 6. Check fuel pump wiring. Check for clogged fuel lines. 7. Clean filter. 8. Refer to Tecumseh service manual. 9. See "Fuel Pump Control Circuit Board." Remote panel Type III only.
Lacks Power	1. Air cleaner clogged. 2. Improper cooling. 3. Engine overloaded. 4. Bad or stale fuel. 5. Faulty spark plug. 6. Carburetor adjustments wrong. 7. Carbon build-up. 8. Defective condenser. (Early Models only.) 9. Low compression. 10. Governor adjustment wrong. 11. Misadjusted choke. 12. Lack of engine lubrication.	1. Clean. 2. Check air flow, clogged intake screens or obstructions preventing air flow. 3. Reduce load. 4. Replace fuel. 5. Clean, adjust or replace. 6. Correct. 7. Refer to Tecumseh service manual. 8. Refer to Tecumseh service manual. 9. Refer to Tecumseh service manual. 10. Readjust. 11. Readjust. 12. Refer to Tecumseh service manual.
Operates Erratically	1. Faulty spark plug. 2. Faulty condenser or points. (Early Models only.) 3. Faulty carburetor or governor adjustments.	1. Clean, adjust or replace. 2. Refer to Tecumseh service manual. 3. Readjust.
Overheats	1. Improper cooling. 2. Carburetor adjustment too lean. 3. Engine ignition timing wrong. 4. Wrong spark plug. 5. Low oil level. 6. Generator overloaded.	1. Check air flow, clogged intake screens or obstructions preventing air flow. 2. Readjust. 3. Refer to Tecumseh service manual. 4. Replace. 5. Replenish. 6. Reduce load.

ENGINE TROUBLESHOOTING CHART (Continued)

Condition	Possible Cause	Check/Correction
Electric Fuel Pump Continues to Run after Generator Set is Stopped	1. Defective fuel pump control circuit board.	1. See "Fuel Pump Control Circuit Board." Remote panel Type III only. (Remove fuse from remote panel to de-activate generator set.
Generator Set Shuts Down by Itself	1. Out of fuel. 2. Fuel line restriction. 3. Clogged fuel filter. 4. Engine overloaded. 5. Engine overheated. 6. Blown 5 Amp. fuse in engine wiring circuit.	1. Replenish. 2. Check fuel lines and tank. 3. Clean fuel filter. 4. Reduce electrical load. 5. Check air intake, cooling system, oil level, etc. 6. Replace fuse. If fuse blows again, check for short or failure in engine wiring.
Will Not Carry	1. Excessive load generator. 2. Governor not properly adjusted or defective (engine not operating at rated load. 3. Clogged fuel filter. 4. Improper type of fuel. 5. Water, dirt in fuel system. 6. Clogged air filter.	1. Reduce electrical load. 2. Check speed using tachometer of frequency meter. **NOTE:** Hz x 120 = rpm x no. of rotor poles. (Example: 60 x 120 = 3600 x 2.) 3. Clean fuel filter. 4. Use proper type of fuel. 5. Drain, flush, and fill the system. 6. Clean filter.
Unit is Noisy	1. Exhaust system leak. 2. Exhaust system not securely installed. 3. Broken or damaged vibro mounts. 4. Loose or vibrating sheet metal. 5. No installation clearance (unit hits coach). 6. No compartment sound installation. 7. Excessive vibration (engine/generator imbalance).	1. Check and replace as necessary. 2. Check for loose parts. 3. Check and replace as necessary. 4. Retighten screws. If necessary, add additional screws to secure. 5. Check clearances. 6. Install approved insulation. 7. Check rotor, crankshaft, etc. Disassembly of engine and/or generator may be necessary.

Generator Troubleshooting

Use the following chart to diagnose generator problems. Each of the major generator troubleshooting procedures are described more fully in the following paragraphs. Follow all safety precautions listed in front of this manual. Additional precautions are included with these troubleshooting procedures; do not neglect these precautions.

GENERATOR TROUBLESHOOTING CHART

Condition	Possible Cause	Check/Correction
No Generator Output Voltage	1. Line circuit breaker open or defective. 2. Circuit breaker tripping due to overload or defective RV wiring. 3. Open wiring, terminal, or pin in auxiliary winding/capacitor circuit (field flashing).	1. Check position of AC circuit breaker. Check AC voltage on generator side of circuit breaker. 2. Reduce load and reset circuit breaker. If breaker repeatedly trips, check RV wiring and appliances. 3. Check continuity.

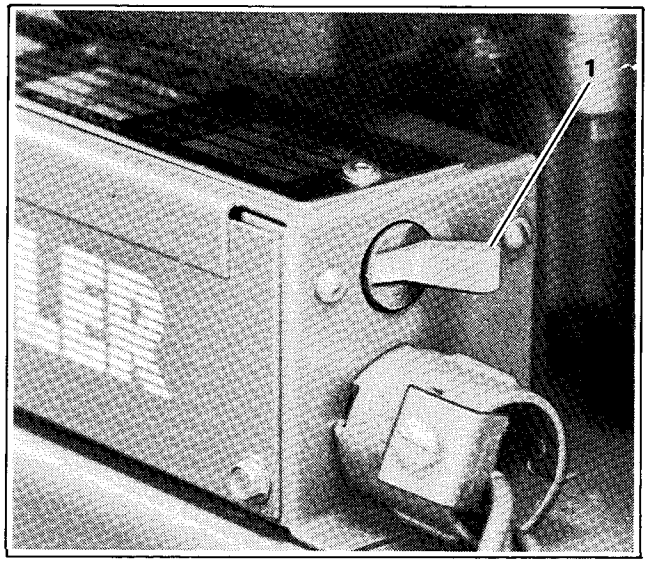
GENERATOR TROUBLESHOOTING CHART (Continued)

Condition	Possible Cause	Check/Correction
No Generator Output Voltage (continued)	4. Loss of residual magnetism in rotor. 5. Defective capacitor. 6. Defective rotor diode circuit board. 7. Defective rotor (open, grounded, or shorted windings). 8. Defective stator (open, grounded, or shorted windings).	4. Flash the (rotor) field. 5. Test and/or replace. 6. Test and/or replace. 7. Check continuity. 8. Check continuity.
High Generator Output Voltage	1. High engine rpm.	1. Check speed using tachometer or frequency meter. (adjust governor). **NOTE:** Hz x 120 = rpm x no. of rotor poles. (Example: 60 x 120 = 3600 x 2.)
Low Generator Output Voltage.	1. Low engine rpm.	1. Check speed using tachometer or frequency meter (adjust governor). **NOTE:** Hz x 120 = rpm x no. of rotor poles. (Example: 60 x 120 = 3600 x 2.)

CIRCUIT BREAKER

The line circuit breaker will trip to protect the generator if load exceeds maximum circuit breaker rating. Check the line circuit breaker and reset if necessary. Figure 4-4.

The breaker switch can also be used to disconnect the load from the generator by manually turning the breaker to the "OFF" position.

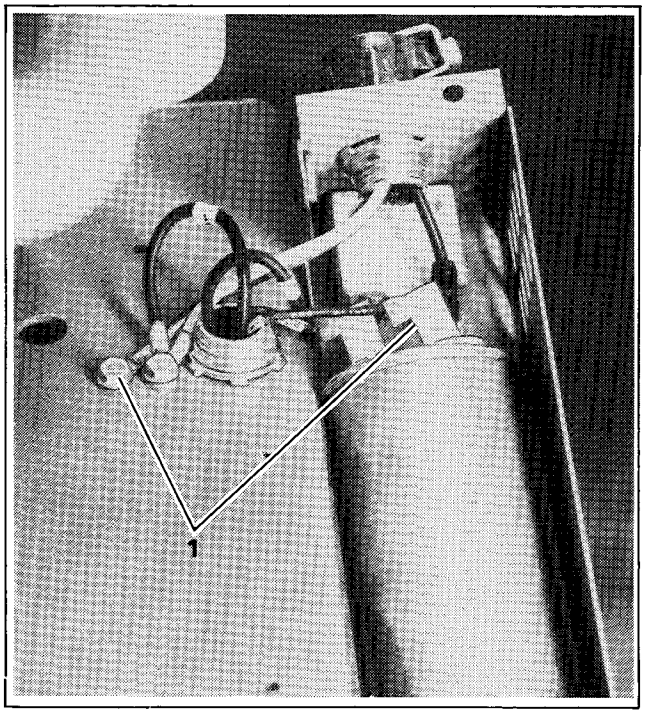


1. Circuit Breaker

Figure 4-4. Circuit Breaker Location

ELECTRICAL CONNECTIONS

Check for loose leads in the electrical box. Reconnect as necessary. Figure 4-5.



1. Wiring Connections

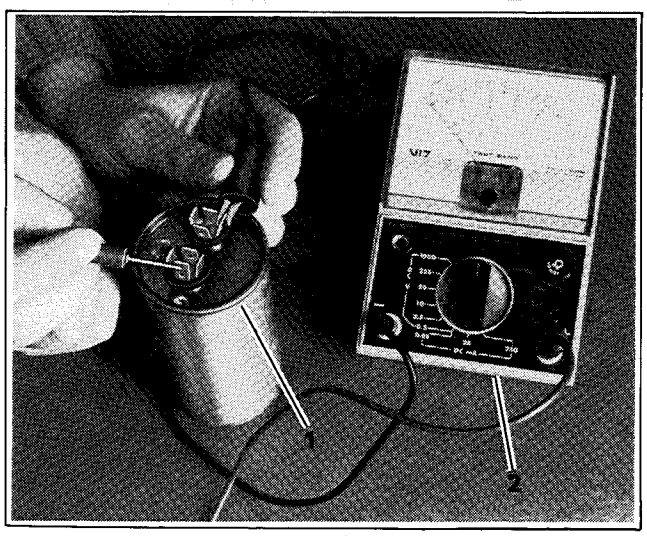
Figure 4-5. Electrical Connections

CAPACITOR

⚠ CAUTION

ELECTRICAL SHOCK! When testing the capacitor, high voltage may be present. Use caution when handling the capacitor; possible electrical shock can result.

Disconnect exciter winding leads 55 and 66 from capacitor. With an ohmmeter on the R x 1000 scale, check the capacitor for charging and discharging readings, Figure 4-6. Place the ohmmeter leads on the capacitor terminals, a meter deflection should be indicated; reverse the leads and check again for charging and discharging readings. Continuous continuity or no meter deflection indicates a shorted or open capacitor. No continuity should be indicated between the capacitor case and terminals.

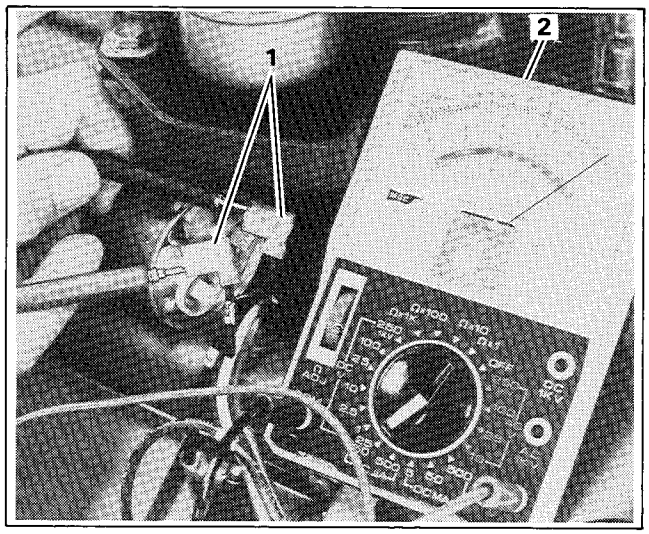


1. Capacitor
2. Meter

Figure 4-6. Capacitor Test

STATOR

With leads 55 and 66 removed from the capacitor, check for an open, shorted, or grounded winding. Using an ohmmeter, check for readings of approximately 1.5 ohms across leads 55 and 66, Figure 4-7. There should be no continuity between windings and stator frame.



1. Stator Leads
2. Meter

Figure 4-7. Stator Winding Test

Disconnect main stator leads 1 and 2 from their connection points. Using an ohmmeter, check for readings of less than 0.5 ohms across leads 1 and 2. There should be no continuity between windings and ground.

FIELD FLASHING

The residual magnetism held in the rotor is sufficient to produce 2-5 Volts AC output from the stator. If the generator has been disassembled or if it has been subjected to rough handling the rotor may have to be remagnetized ("flashed").

A flashing box can be assembled using the diagram in Figure 4-8. Components needed are a 120 Volt AC cord, pushbutton switch, fuse holder, 20 Amp fuse, and cord with alligator clips. Assemble in an insulated box.

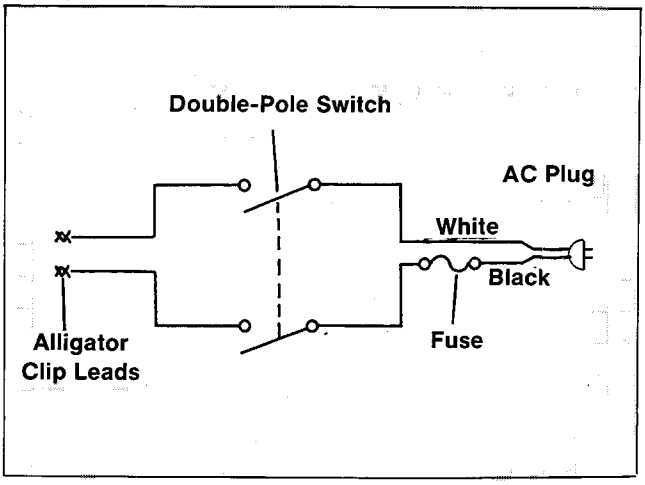


Figure 4-8. Flashing Box Assembly

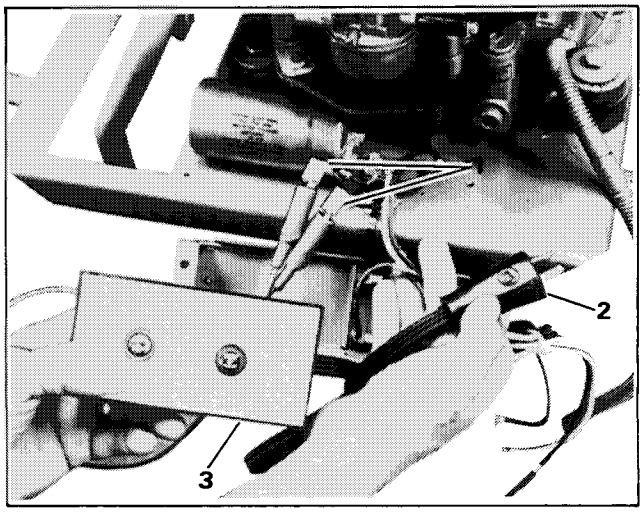
⚠ CAUTION

ELECTRICAL SHOCK! When flashing the generator set, 120 Volts AC will be present at the alligator clips when pushbutton is pressed. Use caution when handling, or possible electric shock could result.

Restoring magnetism to the rotor can be accomplished by momentarily (1 second) applying 120 Volts AC to the stator exciter windings (leads 55 and 66). This will induce a current flow in the rotor, restoring the needed residual magnetism. Figure 4-9.

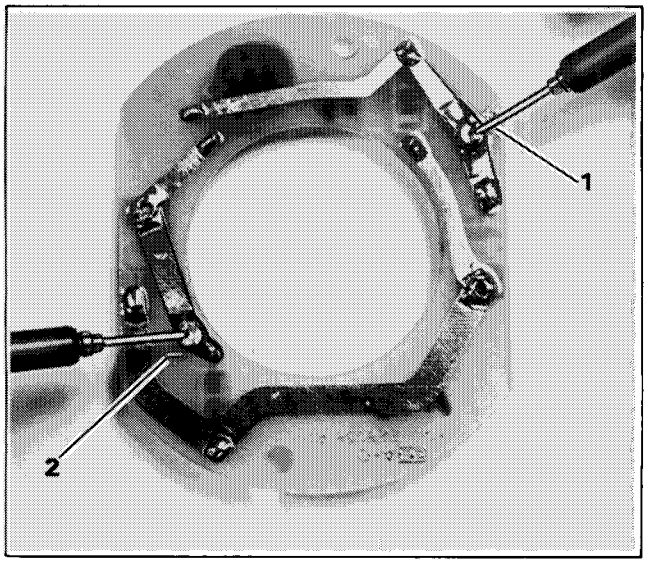
ROTOR AND ROTOR CIRCUIT BOARD

To test the rotor, the end bracket must be removed. Refer to the disassembly procedures in Section 6, Generator Disassembly/Reassembly. Using an ohmmeter (R x 1 scale), check for 3.5 ohms between the (+) and negative (-) terminals on the rotor circuit board, Figure 4-10. Good contact is necessary to get proper readings; remove the varnish before testing. A reading of 5 ohms or more indicates an open winding in the rotor. A resistance reading of 1 ohm or less indicates a defective circuit board or



1. **Clip Connections**
2. **AC Plug**
3. **Box (Insulated)**

Figure 4-9. Magnetizing ("Flashing") Rotor



1. **Positive Terminal**
2. **Negative Terminal**

Figure 4-10. Rotor Testing (Rotor Circuit Board)

shorted rotor. Rotor field leads must be unsoldered from the circuit board to determine a shorted rotor winding or a defective rotor circuit board. There should be no continuity between rotor windings and rotor shaft.

To check for open or shorted diodes on the rotor circuit board, a field lead positive (+) or negative (-) must be unsoldered from the circuit board. A high resistance value in one direction and low resistance in the reverse direction indicates a good circuit board. A high resistance value in both directions indicates open diodes. Low resistance values in both directions indicates shorted diodes.

FUEL PUMP CONTROL CIRCUIT BOARD

The fuel pump circuit board can be tested using the following procedure. While it can be checked when connected to the start/stop switch, it is recommended that the circuit board be disconnected from the panel. The following components are required to test the circuit board:

12-Volt Automotive Battery
5 Amp. Fuse and Fuse Holder
Momentary Push-Button SPST Switch
0-15 V.D.C. Voltmeter or 12 Volt Bulb and Socket
14 Ga. Wire and Alligator Clips

1. Remove four screws to access rear of remote start/stop switch.
2. Locate circuit board behind mounting panel. The circuit board has four leads connected to it and is covered with a piece of heat shrink tubing.
3. Disconnect red, pink, and green leads from switch by removing screws. Cut blue lead midway between circuit board and insulink. Strip lead ends and crimp-on fully insulated male and female push-on terminals. Connect male terminal to circuit board blue lead.
4. Connect fuel pump circuit board as shown in Figure 4-11. Make the final connection between 5 Amp. fuse lead and battery positive (+). If 5 Amp. fuse blows when final connection is made, circuit board is defective — replace.
   a. With the momentary switch open, the voltmeter should be at zero Volts (or lamp will be off).
   b. Close momentary switch and voltmeter should indicate 12 Volts (or lamp will illuminate).

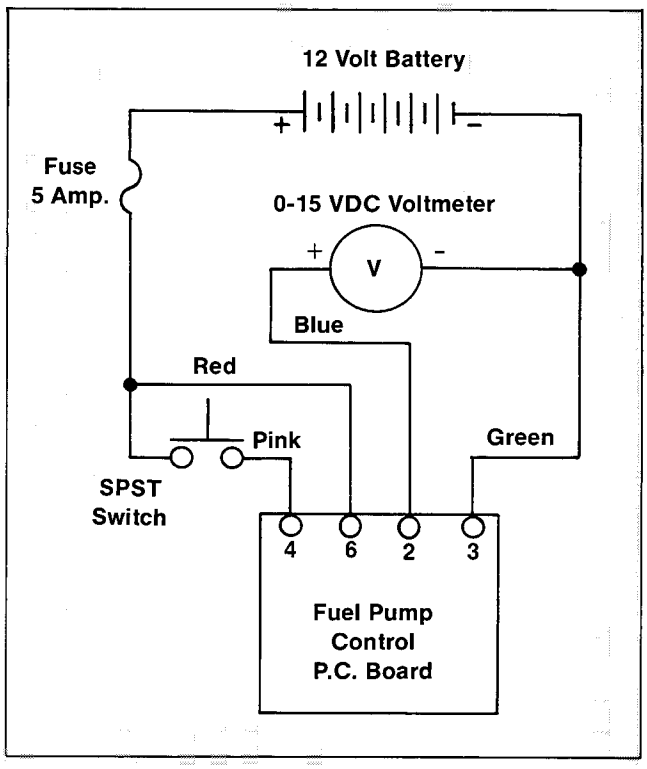


Figure 4-11. Fuel Pump Circuit Board Test

c. Release momentary switch and voltmeter should return to zero Volts (or lamp will go off).

5. If any of the checks in Step 4 are negative or if the fuse blows, the circuit board is defective — replace.
6. Disconnect fuse lead from battery positive (+).
7. Reconnect new circuit board to remote panel using appropriate wiring diagram.

NOTE

It will be necessary to add a male fully insulated push-on terminal to end of new circuit board blue lead.

REMOTE START/STOP SWITCH

The remote start/stop switch can be checked for proper function. Remove all leads connected to switch. Refer to Figure 4-12 for internal contacts at each switch position. Replace switch if checks prove negative. Switch terminals do not have marked identification. Figure 4-12 illustrates switch as viewed from terminal side.

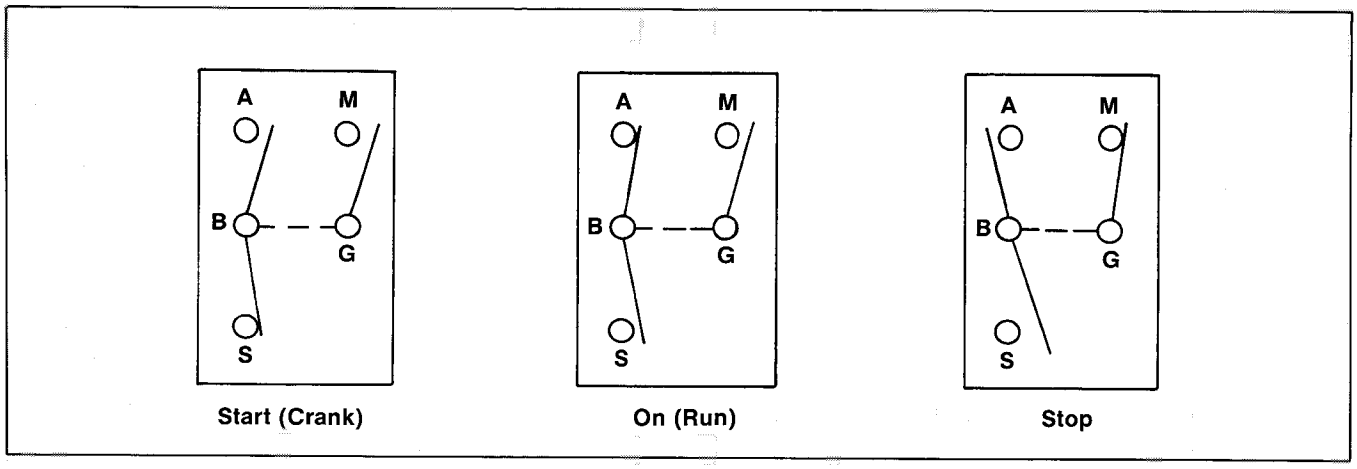


Figure 4-12. Start/Stop Panel Switch Internal Contacts (Terminal Side)

Section 5
DISASSEMBLY/REASSEMBLY

When disassembling or reassembling your generator set follow all safety precautions listed in front of this manual.

Disassembly

1. Drain all the oil and fuel from engine.
2. Loosen electrical box, and discharge capacitor by shorting terminals together. Disconnect stator leads from capacitor. Disconnect ground leads and fuel pump lead. Figure 5-1.
3. Set generator set upside down on engine end.

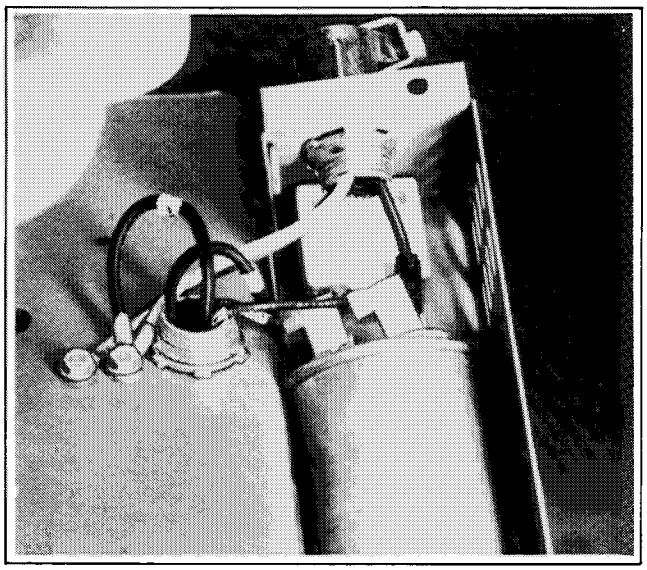
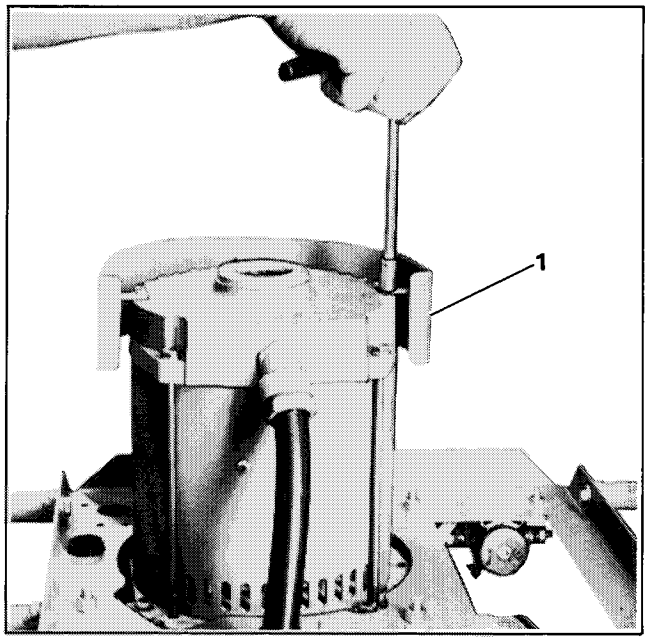


Figure 5-1. Electrical Box



1. Guard

Figure 5-2. Removing Splash Guard

4. Remove splash guard from generator end bracket. Figure 5-2.
5. Remove overbolts. Figure 5-3.

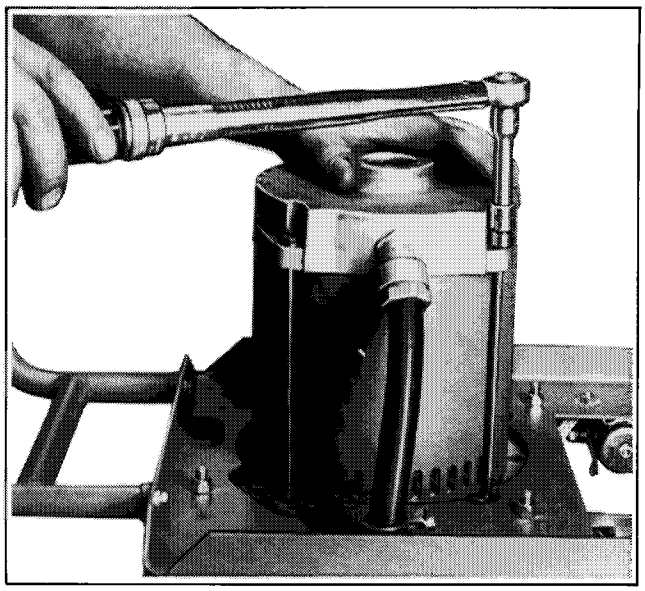


Figure 5-3. Removing Overbolts

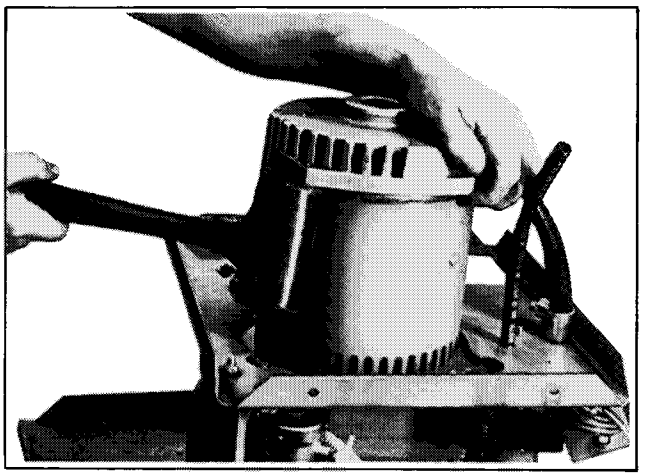


Figure 5-4. Bumping End Bracket

6. Bump end bracket loose. Figure 5-4. Pull leads through elbow.
7. Pull stator over rotor. Be careful not to damage rotor or stator while removing. Figure 5-5.

NOTE

Do not attempt to pry stator from engine base using a screwdriver or other sharp object. Damage can result from the sharp edge puncturing engine crankcase.

8. The rotor is held to the engine crankshaft by right-hand threads on the crankshaft and rotor shaft. To remove

Disassembly (continued)

rotor, place a wood block on a trailing edge of one rotor pole. Figure 5-6. One or two sharp, medium-force hammer blows to the wood block's end will free the rotor, allowing it to be turned off by hand.

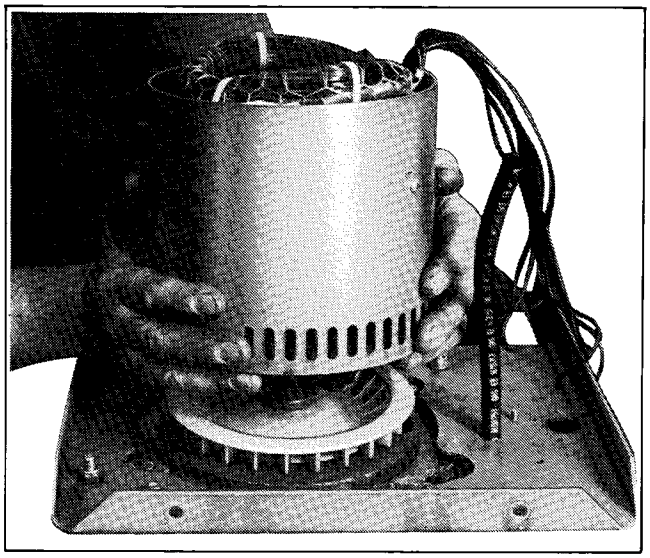
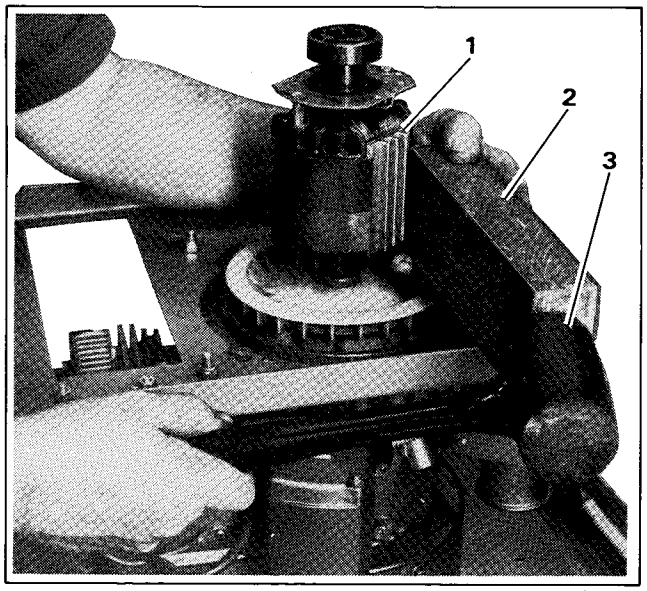


Figure 5-5. Removing Stator



1. **Rotor Pole**
2. **Wood Block**
3. **Rubber Mallet**

Figure 5-6. Removing Rotor

NOTE

ROTOR DAMAGE! Do not attempt to remove rotor by blocking engine cooling fan and turning rotor with any kind of wrench; damage to fan blades and rotor will result.

9. Remove fan.

Reassembly

1. Clean rotor shaft and crankshaft threads with compresed air. Install fan. Coat crankshaft threads with anti-seize compound. Figure 5-7. Thread rotor onto crankshaft, turning handtight. Final tighten by placing a wood block against the leading edge of one of the rotor poles and tightening with slight hammer blows.

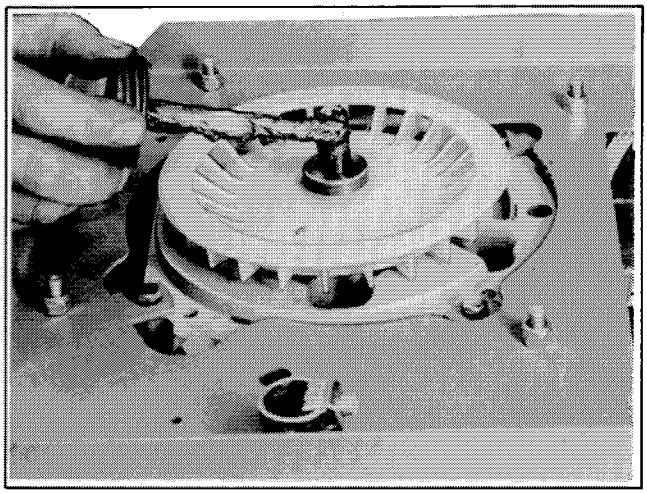
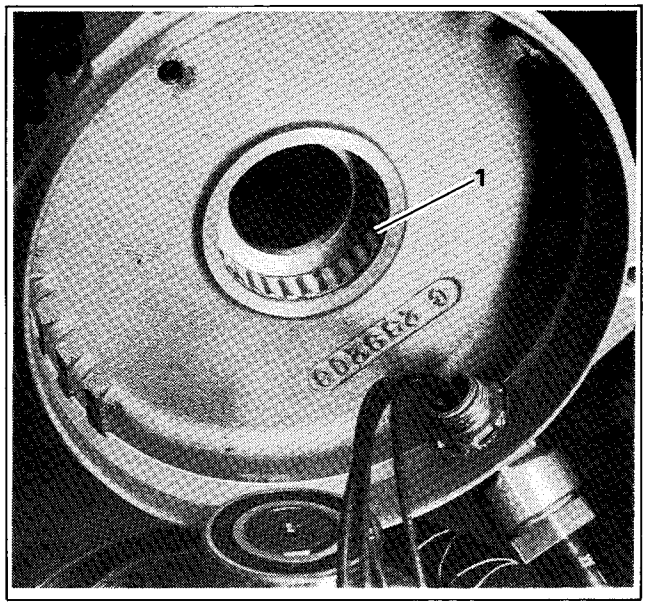


Figure 5-7. Applying Anti-Seize Compound

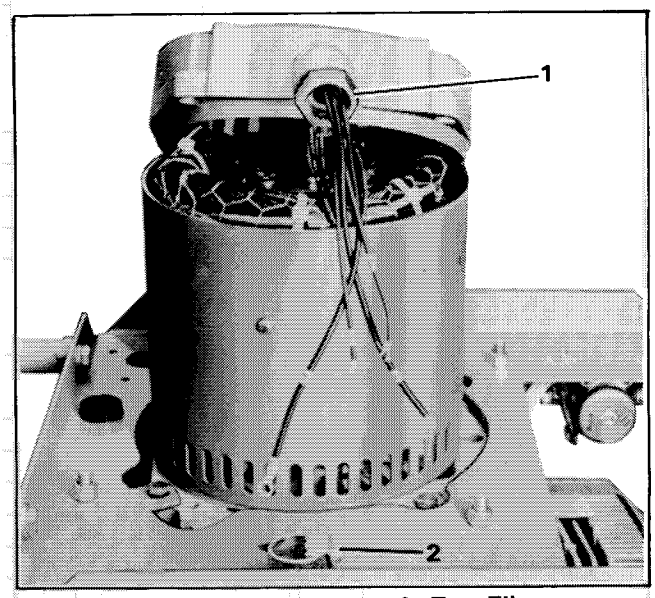
2. Position the stator over the rotor so the leads align with the elbow on the tray. Take care not to damage while assembling.
3. Install the tolerance ring in the end bracket. Pull the stator leads through the end bracket elbow. Figure 5-8.



1. **Tolerance Ring**

Figure 5-8. Tolerance Ring Positioning

4. Position the end bracket on the stator. Make sure leads are pulled through the end bracket electrical connector. Check to make sure stator leads, end bracket electrical connector, and connector on tray are aligned properly, see Figure 5-9.



1. Stator Leads **2. Tray Elbow**

Figure 5-9. Aligning Stator

5. Installing end bracket. To determine which procedure should be used, check rotor bearing end for a tapped hole. Newer style rotors have a tapped hole which allows the end bracket/tolerance ring to be drawn over the rotor bearing using a screw, plate, and washers.

   The following components are required when installing end bracket on rotor with tapped hole:

Qty.	Description
1	Screw, 3/8-16 x 1-1/2 in.
1	Steel Plate, 3 in. x 3 in. x 1/4 in. thickness (7/16 in. dia. hole in center of plate)
2-3	Flat Washer, 1-1/4 in. (O.D.) x 13/32 in. (I.D.). Combined thickness of washers must be 7/32 in. ± 1/32 in. Kohler Part No. X-25-38

   a. If rotor has a tapped hole in shaft, assemble plate and washers on screw and thread on rotor shaft. See Figure 5-10. Tighten screw to draw end bracket/tolerance ring onto rotor bearing. When tightened, end bracket lip should fit snugly in stator shell. Remove mounting screw from rotor shaft.

   b. If rotor does not have a tapped hole in shaft, use a rubber mallet to install end bracket/tolerance ring onto rotor bearing. When mounted, end bracket lip should fit snugly in stator shell.

6. Install overbolts and torque to 70 in. lbs. (7.9 Nm), see Figure 5-11. Stator shell must be tight against engine and end bracket.

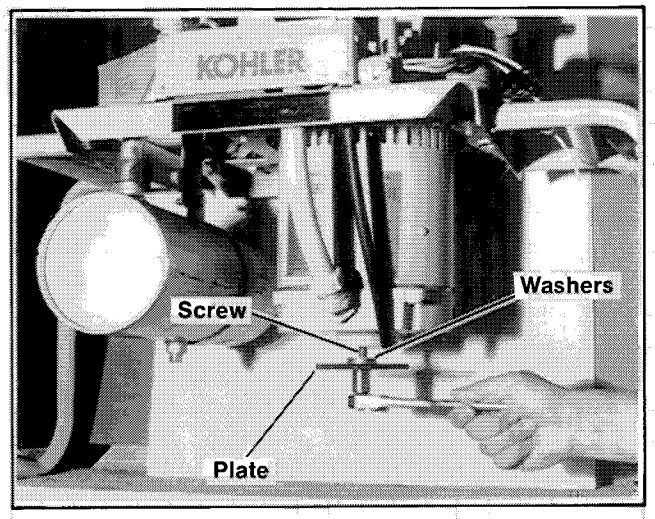


Figure 5-10. Installing End Bracket with Mounting Plate

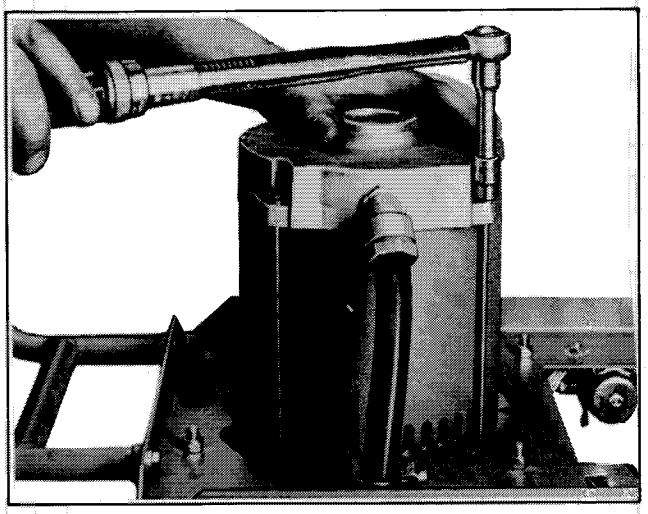


Figure 5-11. Tightening Overbolts

7. Mount splash guard to end bracket, see Figure 5-12.

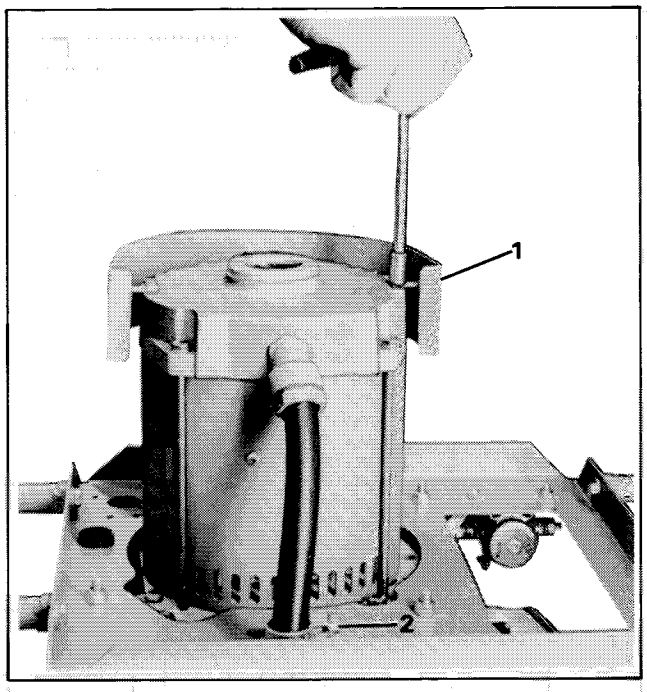
8. Tighten stator lead conduit connectors to end bracket and mounting tray.

9. Prior to start-up, the crankshaft end play (drag) must be checked. Use the following procedure:

NOTE

Failure to check crankshaft end play can cause premature engine wear or engine seizure.

   a. Disconnect spark plug lead and remove spark plug. Place a torque wrench on crankshaft nut and turn clockwise. The force required to turn engine should not exceed 40 in. lbs. (4.5 Nm). See Figure 5-13. If reading is 40 in. lbs. (4.5 Nm) or less, crankshaft play is correct — go to Step 10.



1. Splash Guard
2. Clamp

Figure 5-12. Mounting Splash Guard and Stator Lead Clamps

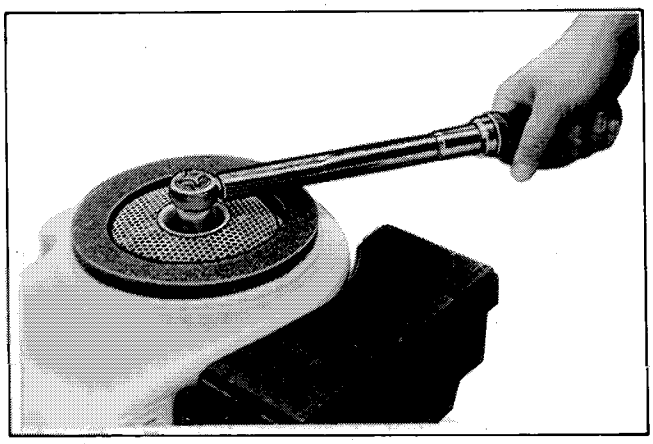
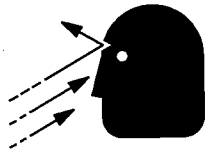


Figure 5-13. Checking Crankshaft End Play (Drag)



⚠ CAUTION

LOOSE COMPONENTS! When checking crankshaft end play, do not rotate crankshaft counterclockwise. Doing so can loosen nut and result in serious personal injury from nut, grass screen, or flywheel flying off engine while unit is running.

b. Lightly strike the end bracket with a rubber mallet, see Figure 5-14. Recheck drag using torque wrench. If reading is 40 in. lbs. (4.5 Nm) or less, crankshaft end play is correct — go to Step 10.

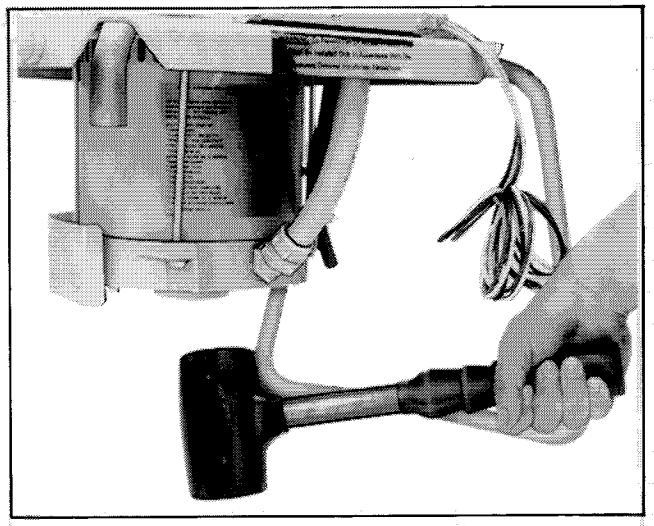


Figure 5-14. Tapping End Bracket

c. Place a socket over the crankshaft nut (to protect the threads) and strike with a rubber mallet, see Figure 5-15.

NOTE

If required force is greater than 40 in. lbs. (4.5 Nm), generator and engine must be disassembled and components checked for galling. Problem must be corrected before starting the generator set.

10. Install spark plug and torque to 18-23 ft. lbs. (24-31 Nm). Reconnect spark plug lead.
11. Reconnect stator leads per wiring diagram, see Section 6, Wiring Diagrams (TP-5148).
12. Remount the electrical box to the generator set tray.

NOTE

If rotor disassembly/reassembly took place, the rotor may require flashing, see Section 4, Loss of Rotor Residual Magnetism (TP-5148).

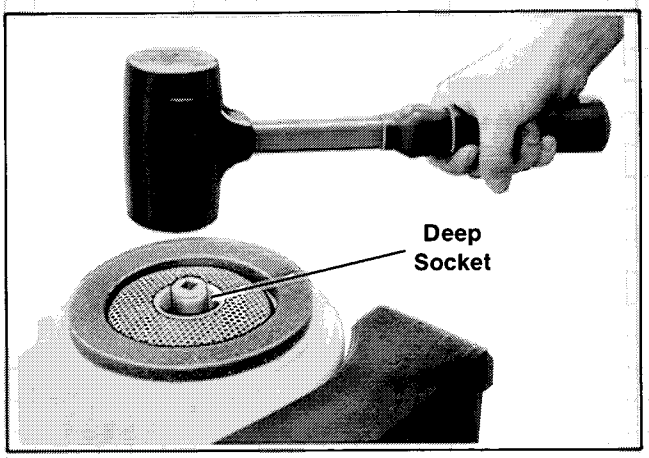
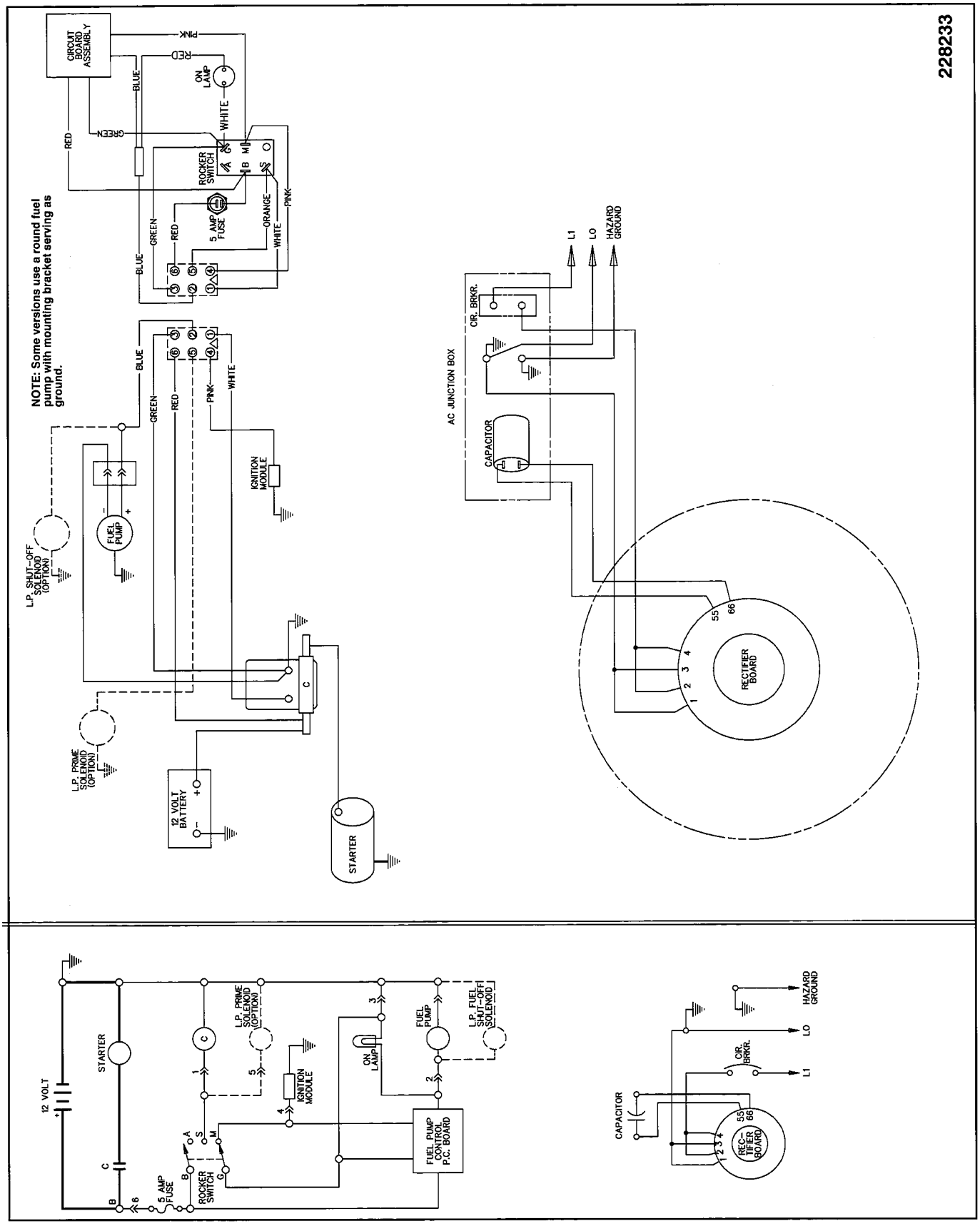
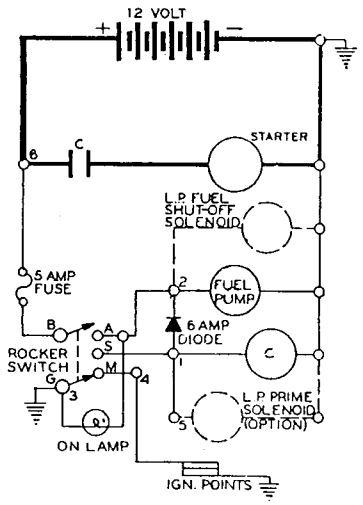


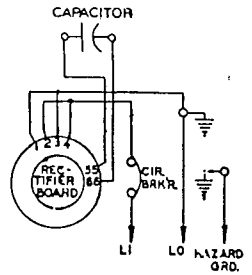
Figure 5-15. Striking Crankshaft Nut

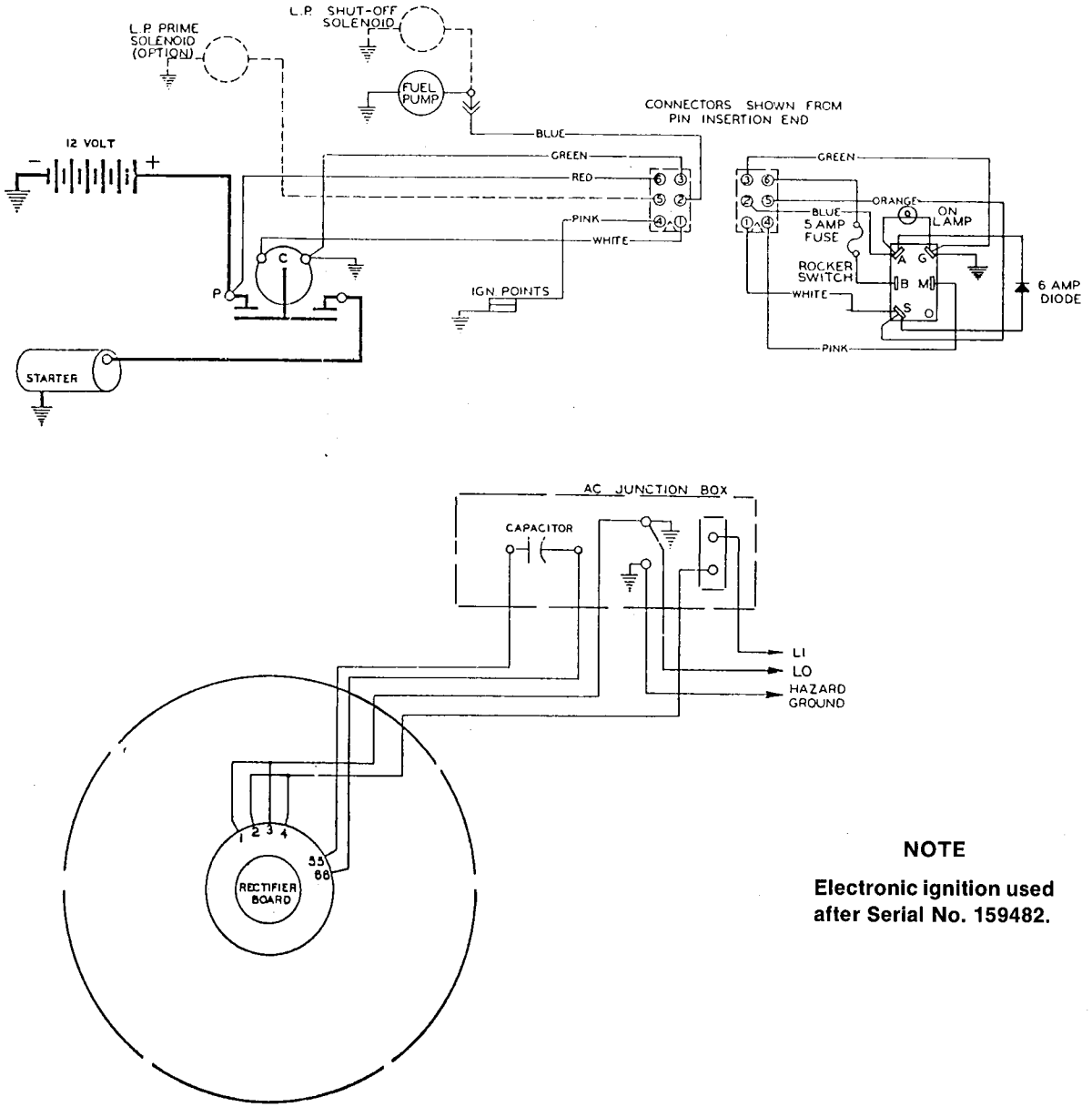
Section 6
WIRING DIAGRAMS



Wiring Diagram – Rocker Switch Start Model Type III (with Fuel Pump Control Board)





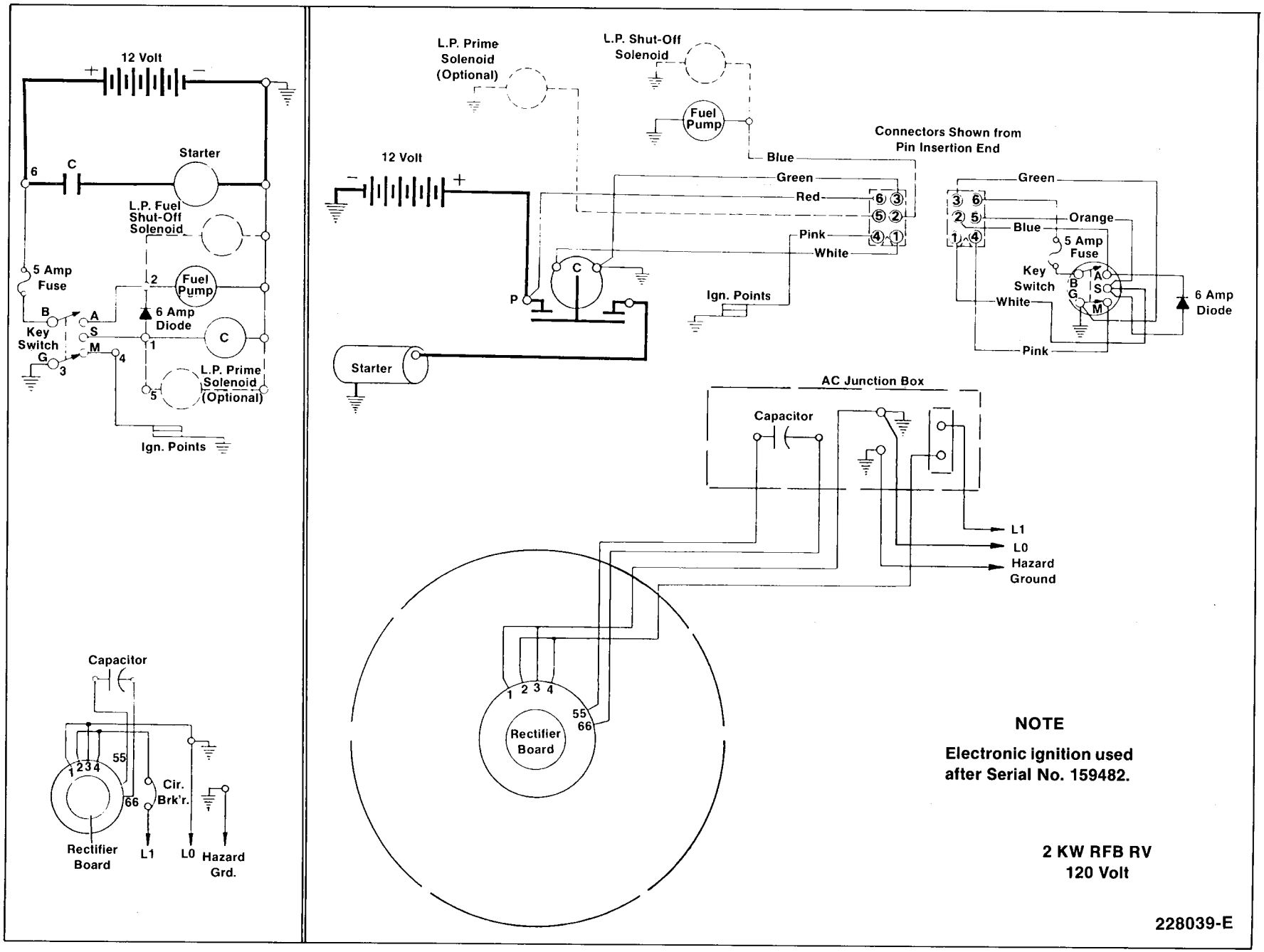


NOTE

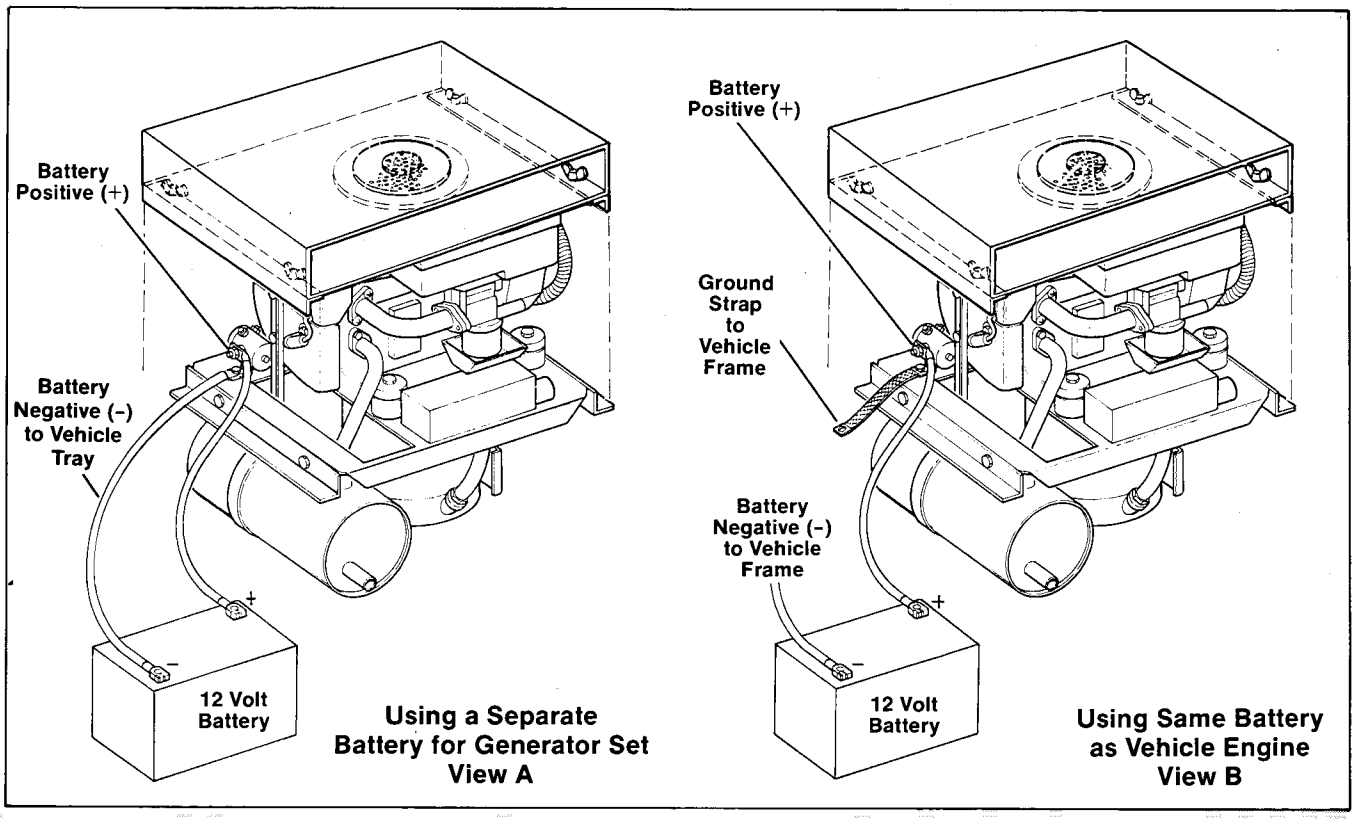
Electronic ignition used after Serial No. 159482.

228039-F

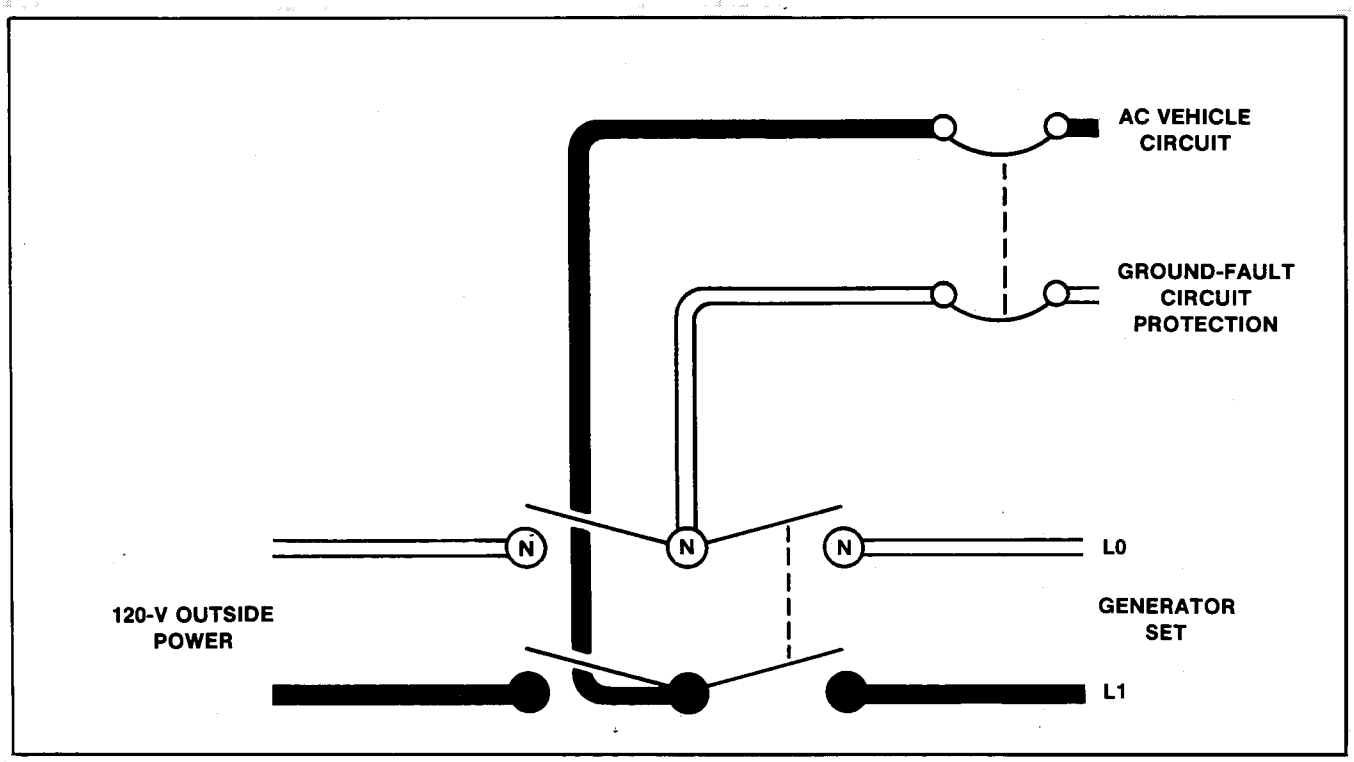
Wiring Diagram — Rocker Switch Start Model Type II



Wiring Diagram — Key Start Model Type I



Battery Connection Details



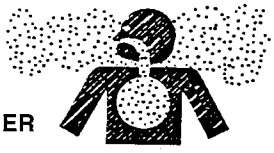
Transfer Switch Connection, 2-Wire AC Circuit

Appendix A
START/STOP PANEL MOUNTING

The start/stop panel is supplied with your generator set. Mount the panel inside of the motor home and as close to the generator set as possible.

Choke cable length is 72 in. (183 cm) (73 in., 185 cm including knob). The panel should be located so the choke cable will not make any sharp corners or bends within a 3 in. (76 mm) minimum radius. A 3-5/8 in. (9.2 cm) minimum recess is needed for start/stop panel installation.

To install, make a cutout for the panel as shown in Figure 7-1. Insert the start/stop panel into the cutout and mount with the four screws included. A hole must be made through the compartment wall for the choke cable. The cable must be sealed with a flexible sealant (silicone sealer) to make it air tight.



⚠ DANGER

CARBON MONOXIDE! When mounting the remote switch with choke cable, make sure the panel is air tight to prevent exhaust fumes from entering the coach. Carbon monoxide poisoning can result.

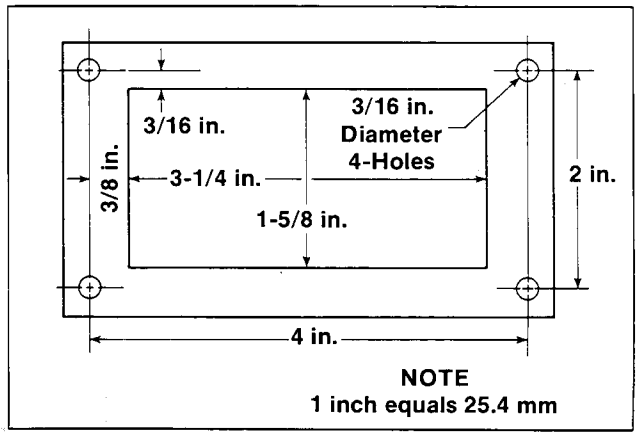


Figure 7-1. Start Panel Cutout Dimensions

To mount remote choke cable to carburetor choke lever, proceed as follows:

1. With remote panel mounted in coach, loosen screw on mounting clamp and slide cable under clamp. See Figure 7-2.
2. With knob on remote panel fully pushed in, cut cable leaving 1-1/4 in. (32 mm) beyond mounting clamp.
3. Remove cable from clamp and cut-off 1-1/4 in. (32 mm) of cable outer-casing. Be careful not to nick or bend cable rod.
4. Bend cable rod using dimensions shown in Figure 7-3. Install cable rod through hole in choke lever, slide cable under clamp, and tighten screw. Cable outer-casing should be about flush with end of mounting clamp.

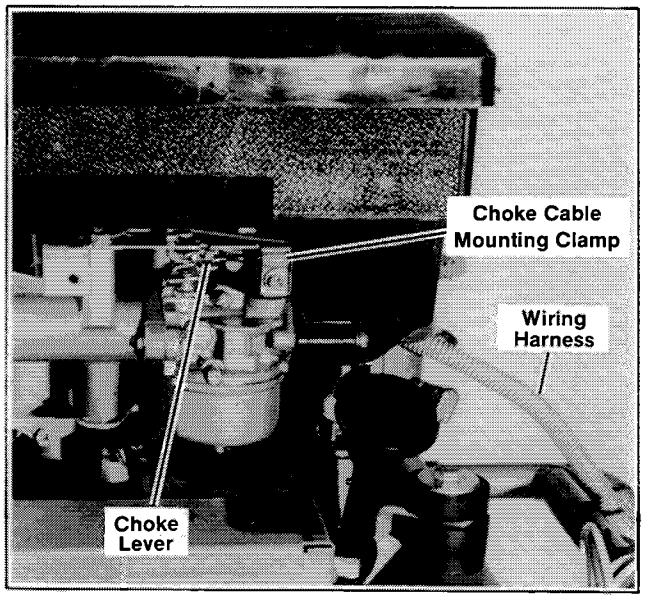


Figure 7-2. Start Panel Connections

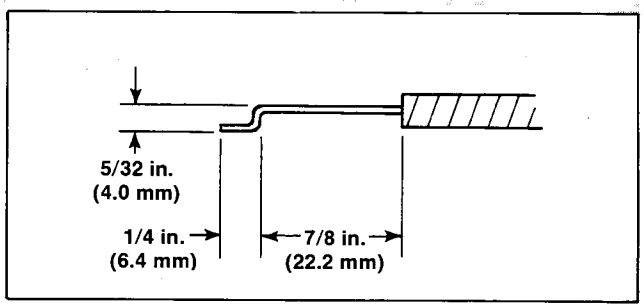


Figure 7-3. Cable Mounting Dimensions

5. Check for full travel of choke lever using choke knob. Adjust as necessary.
6. Connect remote start/stop panel connector to generator set wiring harness connector.

SPECIFICATION CHART

Generator

	2CM	2.5CM/2.5CMZ
Rated kW, 60 Hz	2	2.5
Rated Voltage	120 V., 1 Ø, 2 W.	
Rated Amperes — 120 Volt	16.7	20.8
Shaft rpm, 60 Hz	3600	
Rotor Resistance (in ohms)	3.5	
Stator Resistance (in ohms)		
1-2, 3-4	0.5	
55-66	1.5	
Overbolt Torque	70 in. lbs. (7.9 Nm)	
Crankshaft End Play (Drag) Test	40 in. lbs. (4.5 Nm) max.	
Generator Type	2-Pole, Rotating-Field	
Excitation Method	Brushless — Exciter Capacitor/Winding	
Circuit Breaker (Amperes)	20	25

Engine

Manufacturer	Tecumseh
Model	TVM140, four-cycle, air-cooled
No. of Cylinders	One
Bore x Stroke — In.	2-5/8 x 2-1/2
— (mm)	66.7 x 63.5
Displacement	13.53 cu. in. (221.75 cc)
Compression Ratio	6.69:1
Horsepower	6.0
RPM @ 60 Hz	3600
Lube Oil Capacity	3.0 U.S. Pints (1.4 L)
Battery Voltage	12
Battery Recommendation	55 Amp. Hr.
Spark Plug Type (Champion)	RJ-8 or RJ-17LM
Spark Plug Size	14 mm
Spark Plug Gap	0.030 in. (0.76 mm)
Plug Tightening Torque	18-23 ft. lbs. (24-31 Nm)
Ignition System	Breaker Points (Serial No. 159482 and earlier) Electronic (after Serial No. 159482)
Breaker Point Gap (Early Models only)	0.020 in. (0.508 mm)
Timing Dimension (B.T.D.C.)	0.080 in. (2.03 mm)
Valve Clearance (Cold)	0.010 in. (0.254 mm)
Carburetor Main Adj. (Preliminary Turns Out)	1-1/4
Carburetor Idle Adj. (Preliminary Turns Out)	3/4
Electric Fuel Pump	12 Volt, 1.75 psi (12.1 kPa)
Fuel Type	Unleaded Regular Gasoline

Installation

Weight (without muffler) ..... 89.0 lbs. (40.3 kg)
(with muffler) ..... 96.5 lbs. (43.8 kg)
Length — overall ..... 15-3/4 in. (400 mm)
Width — overall ..... 14 in. (356 mm)
Height — overall ..... 19-3/4 in. (502 mm)

Weight and Dimensions

Load	25%	50%	75%	100%
2kW — Gasoline	0.28	0.38	0.48	0.56
gph (Lph)	(1.1)	(1.4)	(1.8)	(2.1)
2kW — LPG	0.29	0.34	0.41	0.51
gph (Lph)	(1.1)	(1.3)	(1.6)	(1.9)
2.5kW — Gasoline	0.28	0.34	0.43	0.49
gph (Lph)	(1.1)	(1.3)	(1.6)	(1.9)
2.5kW — LPG	0.35	0.40	0.49	0.60
gph (Lph)	(1.3)	(1.5)	(1.9)	(2.3)

Fuel Inlet Connection Size —
Gasoline ..... 1/4 I.D. (6.3 mm)

Fuel Consumption and Fuel Inlet Size

Side ..... 2 in. (50.8 mm) on spark plug side
1 in. (25.4 mm) on opposite side
Top ..... 1/4 in. + air duct (see air requirements)
Rear ..... 1 in. (25.4 mm)

Minimum Clearance Requirements

Distance Between Generator Set and Battery	At 0° F (-18° C)	Cable Size (AWG) at 32° F (0° C)	At 75° F (24° C)
40 Feet (12.2 m)	00	0	1
30 Feet (9.1 m)	0	1	2
25 Feet (7.6 m)	1	2	4
20 Feet (6.1 m)	2	2	6
15 Feet (4.6 m)	2	4	6
10 Feet (3.0 m)	4	6	8
5 Feet (1.5 m)	6	6	8
2.5 Feet (0.8 m)	8	8	8

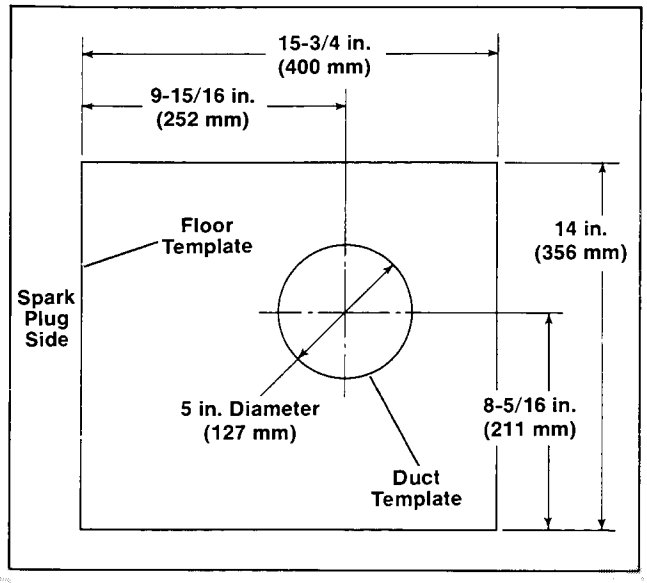
Battery Cable Size Chart

Motor Requirements	1/4 HP	1/3 HP	1/2 HP	3/4 HP
Starting (In-Rush)	750	1000	1500	2000
Running Watts	350	400	600	750

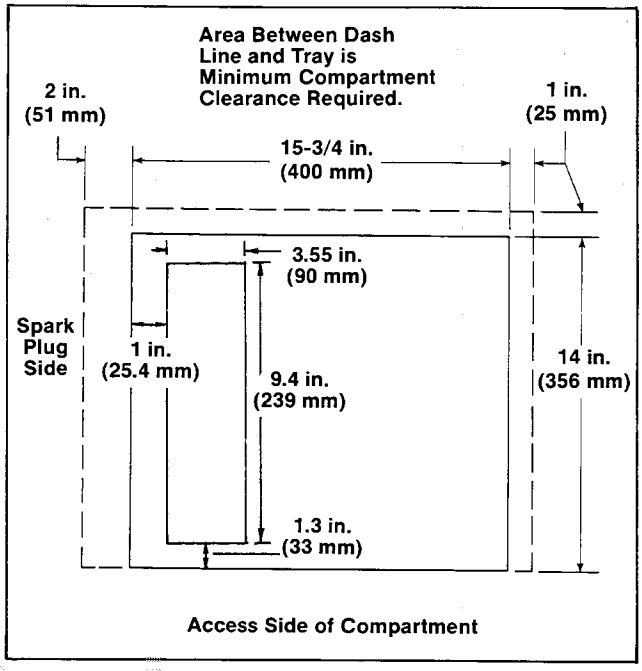
Motor Requirements

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

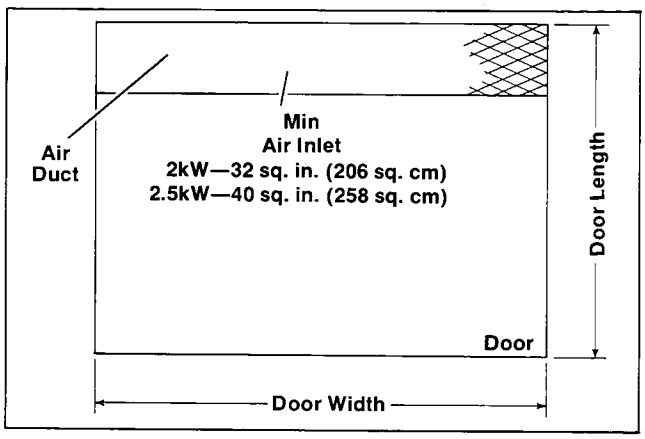
Appliance Requirements



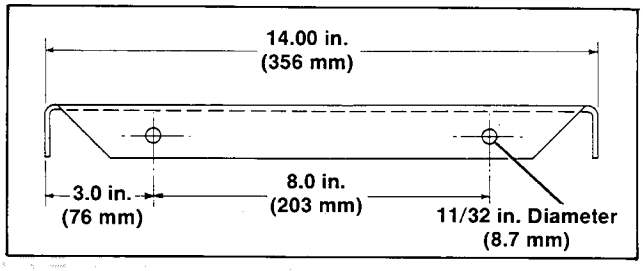
Air Duct Dimensions



Floor Dimensions



Air Requirements and Compartment Door Details



Tray Mounting Hole Dimensions

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