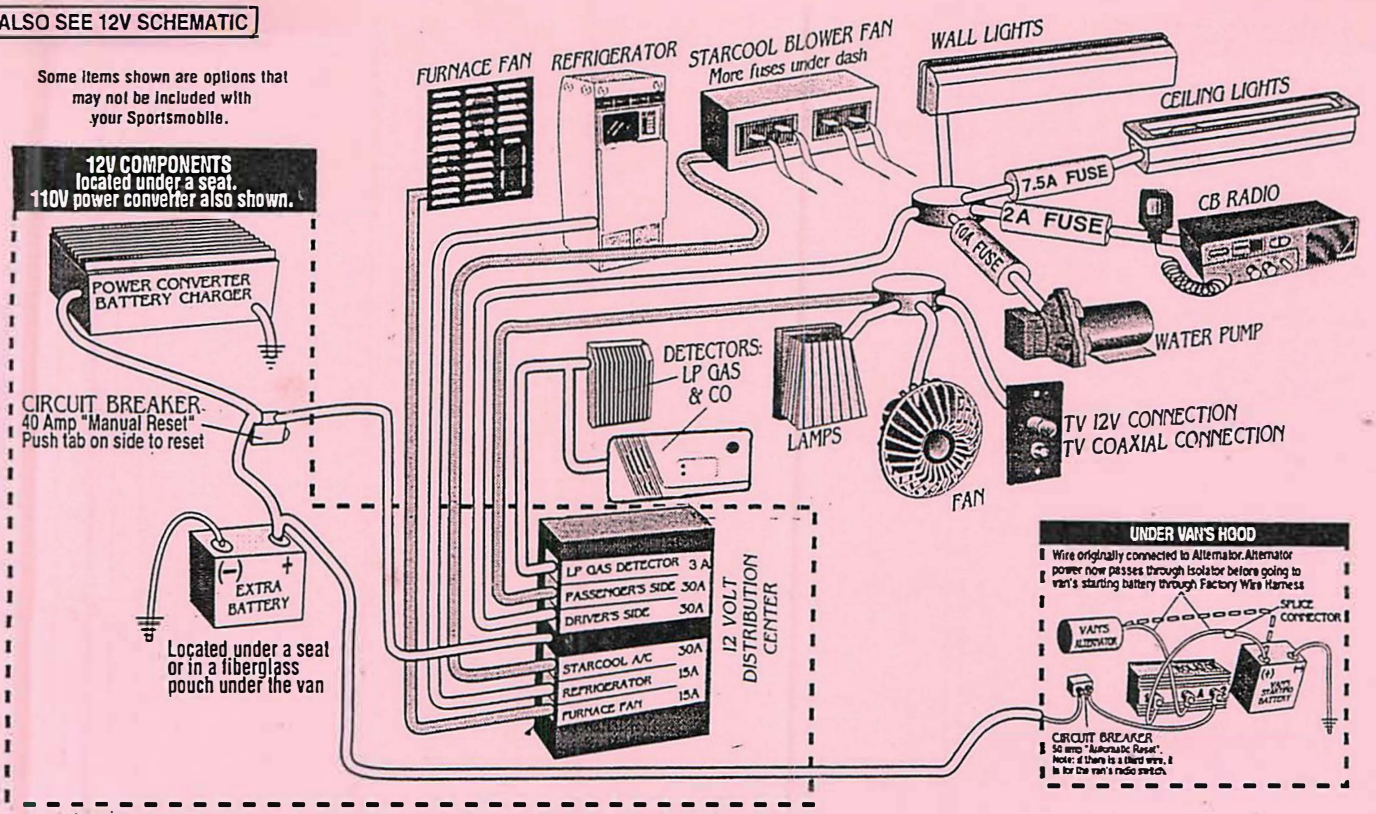
ALSO SEE 12V SCHEMATIC



ELECTRICAL SYSTEM, 12V

1. The 12 system supplies 12V power to all 12V items when driving or parked.
2. For typical 12V amps usage, please see the "Typical Electrical Requirements" sheet.
3. The only item that continuously draws power form the Extra Battery is the Propane/Smoke Detector, and C.O. Detector. They draw a total of 9 amps per 24 hours.
4. See your van operators manual for the van's 12V system.

12V FUSES & CIRCUIT BREAKER LOCATIONS

1. See "12V Distribution Center" drawing above and separate "12V Schematic" sheet. Other 12V fuse locations:
   .Ceiling Lights - At front upper opening of top, drivers side
   .CB - In Overhead Cab Module
   .Water Pump - Next to pump
   .Starcool Air Conditioner - Under dash, also see StarCool information sheets.
2. If new fuse blows when installed, have wiring checked for a short, or check appliance ground. If new fuse is installed and appliance does not operate, check that the ground wire is properly installed.
3. A Manual/Reset circuit Breaker, 40 amp, is located by the 12V fuse block. To reset - depress small plunger on side of breaker. If it continues to "trip", have a technician check for a short circuit.

ISOLATOR

1. The isolator prevents your van's starting battery from being discharged when you are parked. The only Sportsmobile item that is wired into the van's starting battery, is the cab ceiling dome light.

POWER CONVERTER/BATTERY CHARGER

1. The Todd Engineering Power Converter/Battery Charger includes some unique features. It will safely "turbo-charge" your Extra Battery in several hours, while others will trickle charge over a couple of days. It also produces less heat when a heavy 12V load is present.
2. The Converter/Charger provides 12V power to the Extra Battery and 12V lights, fan, water pump, etc. when 110V power is present.
3. The converter, when supplying large amounts of power will become warm. This is a normal occurrence. It is important that the area around the converter be left open, for adequate ventilation.

EXTRA BATTERY, THERMOIL 1427 - INFO

1. The Extra Battery will supply 12V power to all 12V accessories, while driving or parked.
2. The 115 amp Battery supplied is a deep cycle, heavy duty, Battery. It is specifically designed for continuous use in deep cycle applications. It can be recharged hundreds of times.
3. When your van engine is running both the van's starting battery and Sportsmobile's Extra Battery will be charged by the van's alternator. The larger the alternator, the faster the batteries will be charged.
4. To charge your Battery - start your van's engine so the van's alternator will charge the Battery. Plug into a hookup, or start your Generator, so the Battery Charger, built into your Power converter will charge it.
5. When 110V power is supplied to the van, the Extra Battery will only have power drawn from it if the total 12V power usage exceeds the 12V power supplied by the converter.
6. Features of the Thermoil Battery: A longevity increase of 20% to 40%, no corrosion, no toxic odor, recharging of accumulators is 25% faster. Resistance to very cold or hot weather is due to the oil. North American warranty program.
7. Warning - Do not "fast charge" Battery with an "outside" battery charger while electric Refrigerator is turned on.

FOR EXTRA BATTERY ACCESS: IF THE BATTERY IS UNDER A GAUCHO OR SOFA.

1. Two wing nuts secure the seat cushion to the seat frame.
2. For access, open door under seat. Reach through door, up under front left corner of cushion. Unscrew wing nut. Repeat right side.
3. Lift up seat cushion and slide out. See photographs showing Battery.

EXTRA BATTERY MAINTENANCE

1. The water level of the Extra Battery will need to be checked once or twice a year, depending on usage and climate.
2. Do not let water level drop below level of plates. Use distilled water, preferably.
3. If you or a service person takes a specific gravity reading of the Thermoil Battery, simply plunge the Hydrometer below the 1/2 inch of oil layer and extract acid. Should you remove oil out of the battery, gently pour it back in and rinse your hydrometer. Make sure the fluid level is at the top and start the operation again.

EXTRA BATTERY PERFORMANCE

1. The amp-hour value of a battery refers to the number of amps a battery will deliver over a specified period of time before the battery has discharged to a useless level - 10.5 volts.
2. Ambient temperature has a strong effect on battery performance. The "performance" of the 115 amp Thermoil is rated at around 80 degrees F. At higher temperatures the Battery has a greater capacity. At lower ambient temperature the amp hour performance is lower. However, at higher temperatures the refrigerator will cycle more often, using more amps. At lower temperatures the cycle time will be less.

HOW TO CONSERVE BATTERY POWER

1. **Refrigerator**- First, open the door as seldom as you can as the cold air "falls" out. It will also help to keep the Refrigerator full. If only partially full, you can wad up newspaper to fill the void. This way when you do open the door little cold air will be lost. Also keep the thermostat set as low as you can.
2. **Lights**- Use a lot of amps. Use them frugally. Florescent lights use less amps and also burn cooler. You can also save amps by using candles at times. Of course candles do not require any amps and can add a romantic touch for the evening dinner.
3. **Detectors** - The 2 detectors pull .4 amps per hour or 9.6 amps in 24 hours. If you are not going to be in your Sportsmobile for an extended period of time, you can pull the 5 amp fuse from the 12V Distribution Panel. **Warning** - replace the fuse as soon as you re-enter the Sportsmobile.
4. **TV/VCR** - will use 6 amps per hour when being used on 12 volt power. The TV can use up to .2 amps per hour even when it is turned "off". Unplug TV to eliminate this extra power drain.
5. **Water Pump** - Draws 4 amps when running. When connected to city water turn pump off.
6. **Radio** - If the van radio is rewired to the Extra Battery, it will use about 3 amps an hour when switched is on.

EXTRA BATTERY-HOW LONG TO CHARGE?

That's a hard question to answer. There are many variables.

DRIVING - CHARGING WITH THE "VAN'S ALTERNATOR"

1. The van's *alternator has* a maximum output of 120 to 130 amps per hour. The van's ignition and fuel system will use roughly 35 amps per hour. If you have the van's A/C, headlights, radio and windshield wipers on, you will be using about another 55 amps an hour, or a total of approximately 90. Keep in mind the alternator has to keep both the van's starting battery and the Extra Battery charged.

2. The Starcool A/C blower on low will use 20 amps per hour (24 amps on high). If you have other items on such as the Refrigerator, Lights, Detectors, etc., you could be using an additional 10 amps or so.

3. The above van and Sportsmobile amp use total would be 120 amps per hour (90 + 30 = 120). This would leave only 0 to 10 amps an hour to charge your Extra Battery. If your 115 amp Extra Battery was discharged down to 25 amps, (this is about as low as the battery can be discharged) this would leave about 90 amps to fully charge the battery (115 - 25 = 90). If your alternator has 10 amps of power left, it would take about 9 hours of driving to fully charge your battery (90 ÷10 = 9).

4. The above is a "rough" approximate charging time. As we stated in the beginning, there are a lot of variables to consider. Actually, it could take only 6 or 7 hours instead of the 9 hours.

5. On the other hand, if you are driving with only the van's ignition and fuel system drawing amps from the van's starting battery, you could charge the Battery in around two hours or so.

6. If you drive your Sportsmobile every day for only 30 minutes or so, and you leave your Refrigerator on, we suggest you connect the 110V power when you are home, every other day or so. This will assure that the Extra Battery will be kept fully charged. Prior to going on a trip, we suggest you start with a fully charged Battery.

WHILE PARKED - AND CONNECTED TO "110V POWER"

1. Again, there are many variables.

2. The Power Converter/Battery Charger has a maximum of 30 amps per hour, 45 amps if you have the optional Starcool Air Conditioner.

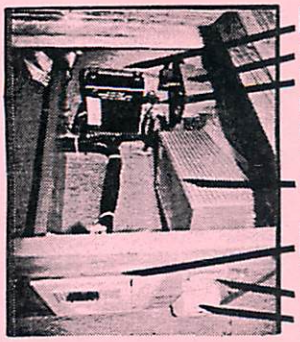
3. All of the Converter/Charger output power could be used if you have the (1) Starcool A/C on high, and other items on, such as a number of Lights, TV, Fan, etc. It could well take 8 hours or so to fully charge the Extra Battery. If you did not have the A/C on, it could be around 3 or 4 hours.

   (1) The Starcool compressor will be running on 110V. The Starcool condenser and blower fans will be on 12V.

AT A CAMPSITE WITHOUT 110V HOOKUPS, YOUR EXTRA BATTERY IS GETTING LOW AND YOU WANT TO STAY ANOTHER NIGHT?

1. Idle your van's engine 30 minutes or so - without the A/C or Lights on, or take a 30 minute drive. This should charge the Extra Battery enough to be able to operate your Refrigerator over night.

PHOTOGRAPHS SHOWING THE 12V & 110V ELECTRICAL DISTRIBUTION CENTERS



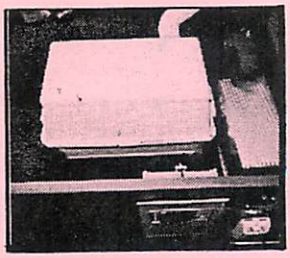
12V ELECTRICAL CENTER - Under Dinette
GFI PROTECTOR - Test - push, Reset - push
MASTER CIRCUIT BREAKER (12V) - To reset push small tab on side of breaker. This small breaker may be located close to or inside the 12V electrical center.
POWER CONVERTER/BATT. CHARGER

110V DISTRIBUTION CENTER - In seat front
110V CIRCUIT BREAKER PANEL
VENTILATION VENT
PROPANE DETECTOR

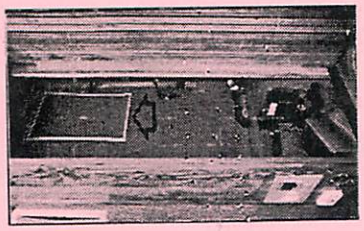
12V DISTRIBUTION CENTER
Shown open for fuse access

12V CENTER - Under Gaucho
MASTER CIRCUIT BREAKER (12V) -To reset-push tab in side of breaker. This small breaker may be located close to or inside the 12V distribution center.
GFI PROTECTOR
110V DISTRIBUTION CENTER
Located in seat front (see above.)

Note-If there is no 12V power for lights or other 12V items, depress small tab in the side of the Main Circuit Breaker.



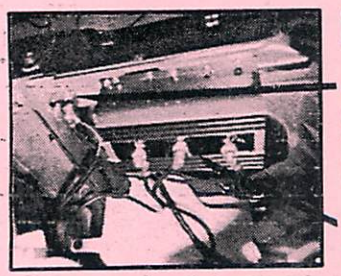
EXTRA BATTERY
For access to the battery remove the 4 screws that hold the top half of the battery case to the bottom half. You can pull the top up for access. Sometimes the battery is located in a minimum *clearance space*. It may be necessary to pull the vent hose from the side of the case before you can pull the top case half up. You can do this by removing the vent plate outside the van, 2 screws. You will then be able to pull the vent hose out, which will uncouple it from the case vent flange.
Warning: Be certain box is sealed after top is replaced



EXTRA BATTERY
Located under van floor. For access, unsnap carpet, remove 4 screws that hold lid on top of fiberglass pouch
WARNING: Be certain lid is completely sealed after lid is replaced.

Battery is shown under a Dinette seat, however, the Battery is often located elsewhere.

PHOTOGRAPHS SHOWING THE ISOLATOR & CIRCUIT BREAKER UNDER VAN'S HOOD



FORD VANS

CIRCUIT BREAKER (12V)-Automatic reset, 50 Amp. If there is a third wire it is for the alarm. This breaker protects wiring between isolator and extra battery

ISOLATOR-Prevents 12V drain from the vans starting battery.

DODGE/CHEVY/GMC

CIRCUIT BREAKER (12V)-Automatic reset, 50 Amp. If there is a third wire it is for the alarm. This breaker protects wiring between isolator and extra battery
ISOLATOR-Located under van's starting battery. Isolator prevents 12V drain from the vans starting battery.

RADIO - POWER SELECTOR SWITCH

GENERAL

The purpose of the selector switch is to allow you to have the radio operating while parked and the ignition "off". By being able to switch back to the original power source, you will not have to turn the radio "off" each time you turn your ignition "off".

OPERATION

The selector switch allows the radio to receive power from either the van starting battery or the Extra Battery.

SGW - RADIO DOES NOT OPERATE

1. If radio does not operate, check fuses and connections by the factory fuse block. Check for 12 volt power to fuse.
2. If fuse is blown, replace only with same size.
3. If new fuse blows, have system checked by qualified technician.

TYPICAL ELECTRICAL REQUIREMENTS - 12 & 110 VOLT

NOTE: In an effort to simplify basic understanding of your electrical system, we use the phrase "Amps Per Hour". Although this phrase is not technically complete, we feel it helps in understanding how your electrical system works.

12 & 110V	12V AMPS/HR	110V AMPS/HR	RUNNING WATTS	REMARKS
(1) Refrig. A - 2CF (2-way)	3.5	.4	48	
" B - 4CF "	4	.4	48	
" C - 2CF (3-way)	8	9	96/1080	
" D - 4CF "	11	13	132/1560	
TV - TYPICAL MODEL, 9"	(6) 6	.6	70	(6) TV can use .2 amp per hour even when switched "OFF." Unplug TV to eliminate drain.
110V				
(1) A/C STARCOOL (ON HIGH)	(8) 24	(7) 16.2	1,944	(7) 110volt amps are used only when
(WITH GENERATOR OPTION)	(8) 24	(7) 13.2	1,584	Van Engine is not running.
				(8) For 12V Blower Fan and Condenser Fan
MICROWAVE		8	1,000	
(1) WATER HEATER, 110V		12.5	1,500	
HAIR DRYER		3-4	350-500	
ELECTRIC BLANKET		.5-1.5	50-200	
ELECTRIC DRILL		2-6	250-750	
ELECTRIC STOVE (per element)		3-8	350-1,000	
ELECTRIC FRYING PAN		8-7	1,000-1,350	
COMPUTER		.5	30-50	
POWER CONVERTER		0-4	0-500	Depending on 12 volt load
12V				
(1) WATER PUMP	4		48	
LIGHT, HI/LO - (ea. bulb)	1.5		18	There are 3 bulbs in this light. 3x1.5=4.5 amps/hr.
LIGHT, SWIVEL - (one bulb)	1.5		18	
FLOURESCENT - (2 bulb)	1.9		16	
FAN	1.7		21	
ATTIC FAN - On Low	1.9		23	
Medium	2.3		28	
High	3		36	
RADIO, DASH	3		36	
L.P. DETECTOR	.2		2.4	
C.O. DETECTOR	.2		2.4	

(1) These items will cycle on and off as power is required.
GENERATOR, ONAN 2.8K - Provides 2,800 watts of power. The Starcool A/C uses 1,584 watts. This will leave 1,216 watts for other 110V items. A microwave requires1000 watts, for 600 watts cooking power.
POWER CONVERTER, 30 A - When you have 110V hookup the Converter will supply up to 30 amps of 12V power. A 45 amp Converter will supply up to 45 amps of 12V power.

NOTES

GENERAL - If you should experience a problem with your Extra Battery or 12 Volt System, the following will help you trace it down. At some point you may not feel comfortable in taking the next step in locating the problem. We suggest you then have an RV service center take over or one of the Sportsmobile plants.

A. PROBLEM: LIGHTS ARE DIM - "WHEN" CONNECTED TO A 110 HOOK UP

__Verify 110 volt power is present.
__Check that circuit breakers are "on".
__Check reset button on GFI outlet. Push to test. Push to reset.

If above okay-proceed to "C".

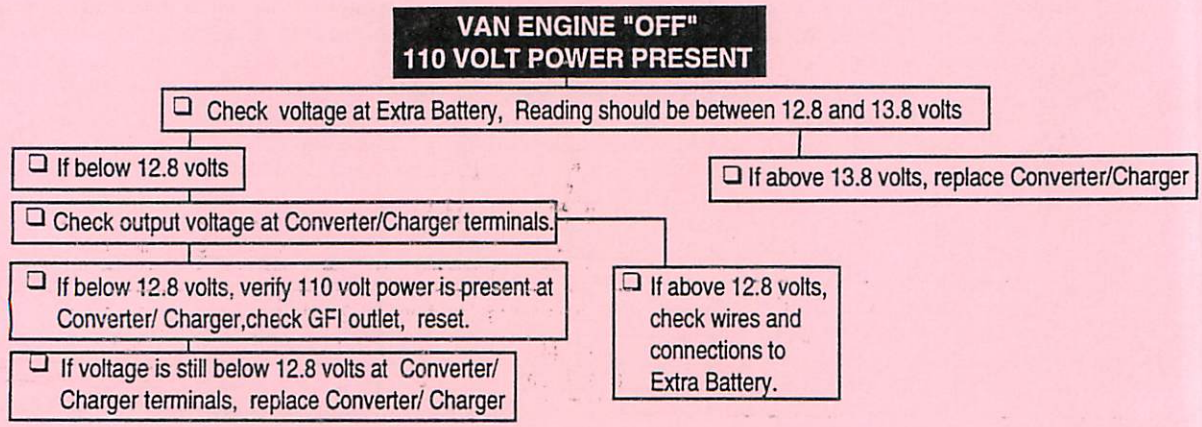
B. PROBLEM: EXTRA BATTERY DOES NOT SUPPLY POWER LONG ENOUGH - WHEN "NOT" CONNECTED TO A 110V HOOK UP.

__Check water level in Battery. See the Extra Battery sheet for access and other information.

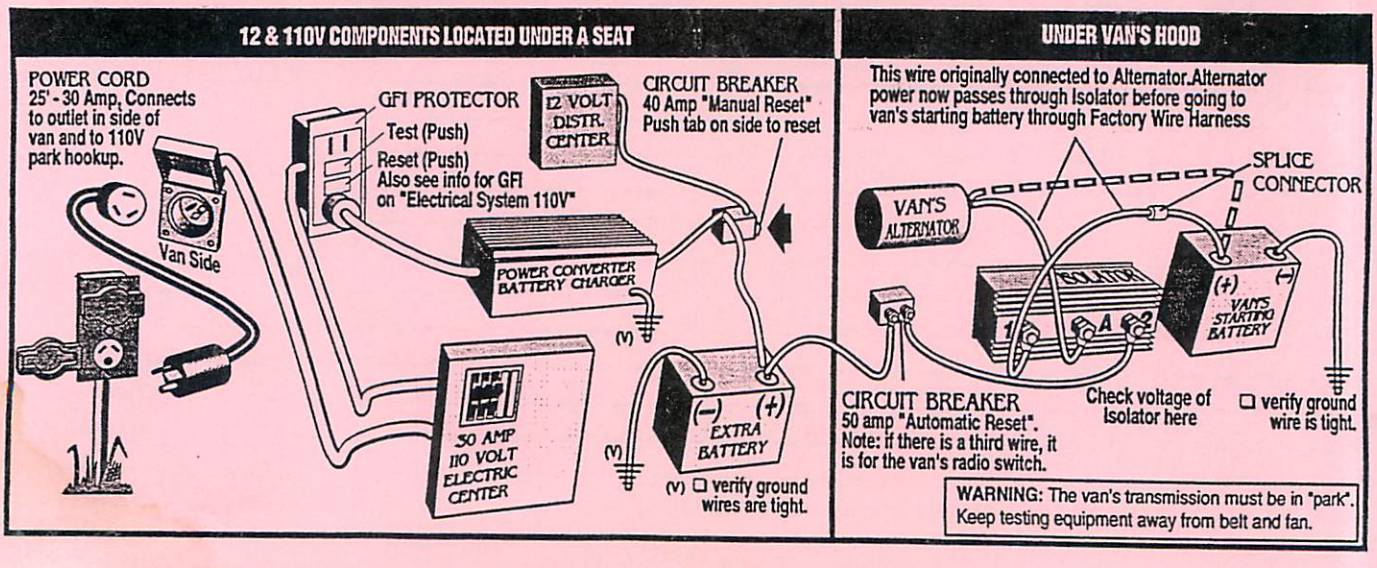
If above okay-proceed to "D".

C. POWER CONVERTER/BATT. CHARGER OKAY?

__With Sportsmobile connected to 110 volt hook-up and van engine "not running". Pointer on VOLT-I-CATOR should be in "A" or "B" range.
__ See illustration 1 below. Also see 12V Schematic sheet.



If above okay-proceed to "D" next page.

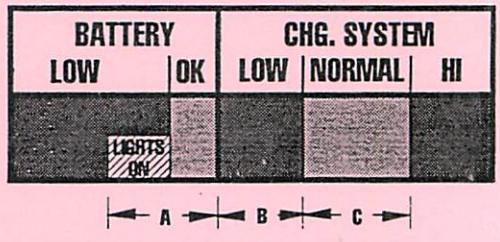


D. EXTRA BATTERY OKAY? One of the following tests will tell.

- LOAD TEST - A qualified service center or Sportsmobile can perform this test to determine if the Battery has a bad cell and needs to be replaced.
- HYDROMETER - Simply plunge the Hydrometer below the 1/2 inch oil layer and extract acid. Should you remove oil out of the battery, gently pour it back in and rinse your hydrometer. Make sure the fluid level is at the top and start the operation again. A hydrometer will tell you if a cell is bad and the Extra Battery needs to be replaced.
- VOLT-I-CATOR - WITH ENGINE "not running" and a 12V light on, pointeR will be in range "A" if Extra battery is okay. This test will give an "indication" if battery is okay. If the pointer is in the red, do not replace the battery until you verify the Battery is bad by testing it with a Load Test or Hydrometer.

If Battery okay-proceed to "E".

VOLT-I-CATOR, Plug into a 12V outlet



E. CHARGING SYSTEM OKAY? You can check it with the VOLT-I-CATOR.

- When van engine "is running" pointer should be in range "C". If it is not, increase the idle speed (RPM) and recheck. If the pointer is still not in range "C" - proceed to "F" below.

F. CIRCUIT BREAKER , ISOLATOR, VANS ALTERNATOR/REGULATOR (12V CHARGING SYSTEM) OKAY?

A voltmeter is required for this test, (available at auto parts and Radio Shack stores). Follow the instructions included with the voltmeter.

VAN ENGINE "RUNNING"

Using the voltmeter - check the voltage at both the Extra Battery and the van's Starting Battery, the reading should be between 12.8 and 15.2 volts

- ❑ If Batteries are below 12.8 volts, Idle van engine at a higher RPM and recheck voltage. If the voltage is still below 12.8 volts, batteries are not getting a full charge. Proceed with next check.
  - ❑ Check 50 amp Circuit Breaker, if both terminals do not have the same voltage, replace Circuit Breaker.
    - ❑ Check voltage at center terminal "A" of Battery Isolator, if voltage is more than 3 volts higher than terminal "1" of Battery Isolator, replace Isolator.
- ❑ If both Batteries are above 15.2 volts, have a qualified technician check van's Alternator / Regulator.
- ❑ If Extra Battery voltage is more than 2 volts higher than van Starting Battery.
  - ❑ Check factory wires and connections
  - ❑ Check for corrosion at van's Starting Battery.
  - ❑ Replace Isolator.

REFRIGERATOR, 12/110V NORCOLD

GENERAL

1. Unlike gas refrigerators, a 2-way (12/110v) refrigerator does not have to be level to operate efficiently. Parking a vehicle level can often be an inconvenience, and this is a must for 3-way (12/110v & gas) refrigerators. 2-way refrigerators also get cold faster, and no outside venting is required.
2. For complete operation and warranty information, please see Norcold's literature.

OPERATION

1. Turn "on-off" switch to "on", set thermostat dial to desired setting.
2. The interior temperature drops as the dial position is changed from "1" to "5". Interior temperatures can be regulated freely within the range of 45 degrees to 32 degrees F. in the food compartment. To switch off your refrigerator, turn "on-off" switch to "off". For efficient operation, regulate the temperature according to the types of food stored.
3. When not in use, the refrigerator should be emptied, cleaned and dried, and the door left ajar.
4. To defrost, turn switch to "off". When frost is melted, wipe the compartment plates with a soft, dry cloth. You can also set the dial to "1" before you retire for the night. The frost will be gone the next morning.

YOUR NORCOLD REFRIGERATOR AUTOMATICALLY SWITCHES

1. WHEN YOUR VAN ENGINE IS "RUNNING' - your van's alternator will be charging your van's starting battery and your Extra Battery. Your refrigerator will be running on 12v power (if you have the refrigerator turned on).
2. WHEN YOU TURN YOUR VAN ENGINE "OFF" - the isolator switch included with the Extra Battery will cause your refrigerator to draw power from the "Extra Battery" only.
3. IF YOU HAVE AN OUTSIDE "110V HOOK-up" (at home, campsite, etc.) - and you plug your 110V cord into this service, your refrigerator will operate on 110 volt power. Your refrigerator will automatically switch back to 12V power from your extra battery when you unplug your 110v cord.
4. OVERCOOLING DRAINS YOUR BATTERY - in order to avoid an excessive drain of your battery, it is advisable to keep the thermostat setting at the #3 setting when ambient temperatures are in the 70 to 90 F. range. When frozen food is stored in the freezing compartment, advisable thermostat setting is the #5 setting at the same temperature conditions.

WARNING

1. Never employ an outside "quick charger" to your battery unless the refrigerator has been turned "off". If you do not do this, extensive damage to your refrigerator may result.

ATTIC FAN

OPERATION INSTRUCTIONS

1. Open dome approx. 3" or more (fan has a built in safety switch that will not allow motor to operate unless dome is open).
2. Turn 3-speed knob to desired performance lever (3-Low, 2-Medium, 1-High, 0-Off).
3. Open a window or door for airflow.
4. Source of airflow is determined by the windows opened. For best results open 1 window the greatest distance from your fan.
5. NOTE - never place Lindeen or like cover over fan. Greatly restricted airflow & increased sound levels will occur.`

WHEN EQUIPPED WITH "REVERSE" SWITCH

1. Turn fan motor off by;
   A. Setting 3-speed switch to "O" off.
   B. Closing Dome
   C. Selecting center position on IN/OUT rocker switch.
2. Wait for fan blade to stop.
3. Select "IN" position, brings air from the roof area into your coach (pressurizes inside).
4. Or select "OUT" position, brings air in through any or all openings in coach and exhausts through the roof.
5. Turn fan motor ON.

WHEN EQUIPPED WITH "THERMOSTAT":

1. Follow "Operating Instructions" 1 thru 4.
2. Select desired temperature or comfort level on thermostat. Fan motor will now start & stop automatically as interior temperatures. change.

WATER PUMP

GENERAL

1. Your water system is a "demand" type system. When the pump switch is "on" the pump will pressurize the water lines and remain in a "stand by" mode until a faucet is opened. At that time, the pump will begin pumping water. The pump will stop when the faucet is closed.

TO OPERATE

1. Make sure the water tank has plenty of water in it.
2. Turn the switch "on". The pump may operate momentarily.
3. If the pump continues to operate, open a faucet and let excess air escape, then close. If the pump still continues to operate, check the water tank fill valve, located next to the water tank, and make sure its turned "off".
4. If the pump still continues to operate turn it off and have the water system checked.

WHEN YOU ARE CONNECTED TO CITY WATER

1. Turn water pump switch "off". The city water will pressurize the water lines.
2. Failure to turn switch "off" will allow the pump to take water from the tank even though you are connected to city water.

SGW (SOMETHING GONE WRONG)

LOOSE PUMP HEAD

1. Any or all of the following problems can be caused by loose pump head screws.

MOTOR DOES NOT OPERATE

1. Is the battery charge too low? Are the wires disconnected? Is the switch in the "on" position? Is the fuse good? Is the pump frozen? If so, place a lamp bulb near the pump to thaw.

PUMP RUNS BUT WATER DOES NOT APPEAR

1. Is there water in the tank? Is air leaking into the inlet hose or fittings? Is the inlet line clogged. To check, remove the outlet hose and try again. If water flows the problem is further on in the system.

MOTOR RUNS BUT WATER SPUTTERS

1. Indicates air getting into the lines. Check hose and clamps on the input side of the pump. Restart and allow air to clear from the lines.

PUMP CYCLES (RAPID ON/OFF)

1. Cycling of the pump is normal if the flow of water is restricted to less than the flow capacity of the pump. For example, a faucet partially opened. Under these conditions the pump will cycle on and off in a rhythmic interval.

ABNORMAL CYCLING

1. If the pump cycles on and off when all faucets are closed, something is wrong. Most likely there is a leak somewhere. Check faucets for dripping, especially the toilet valve if you have a Marine Toilet.
2. Correct any leak no matter how small. Also check the city water input.
3. If no leak can be detected, shut off the pump. Remove the output line. Insert a cap or plug in the open end. You can make a plug from a barb fitting with a cap tightly screwed on the threads.
4. If the fitting is threaded, use a cap or plug. Either way-there must be no leak. Turn the pump switch on. The pump should come on, run a few seconds and shut off. If the pump remains off, the problem is not the pump. The problem is in the system.
5. If, however, the pump goes on and off there may be a problem in the pump. There may be an internal pump leak which allows water to escape form the high pressure area back into the low pressure inlet area causing the pump to cycle. This may be caused by a valve held open by a foreign particle or by a crack in the casting.

PUMP DOES NOT SHUT OFF

1. The wall switch may be used for temporary control of the pump. A low battery may be the cause. Voltage should be 10.5 volts or more to the pump. If the motor runs but the pump does not switch off, there may be air in the lines or a valve problem.
2. Try valve replacement kit #94-232-00. If the motor draws current but does not run, it may hum. It may be a switch problem. Try switch replacement kit #94-230.

DETECTORS

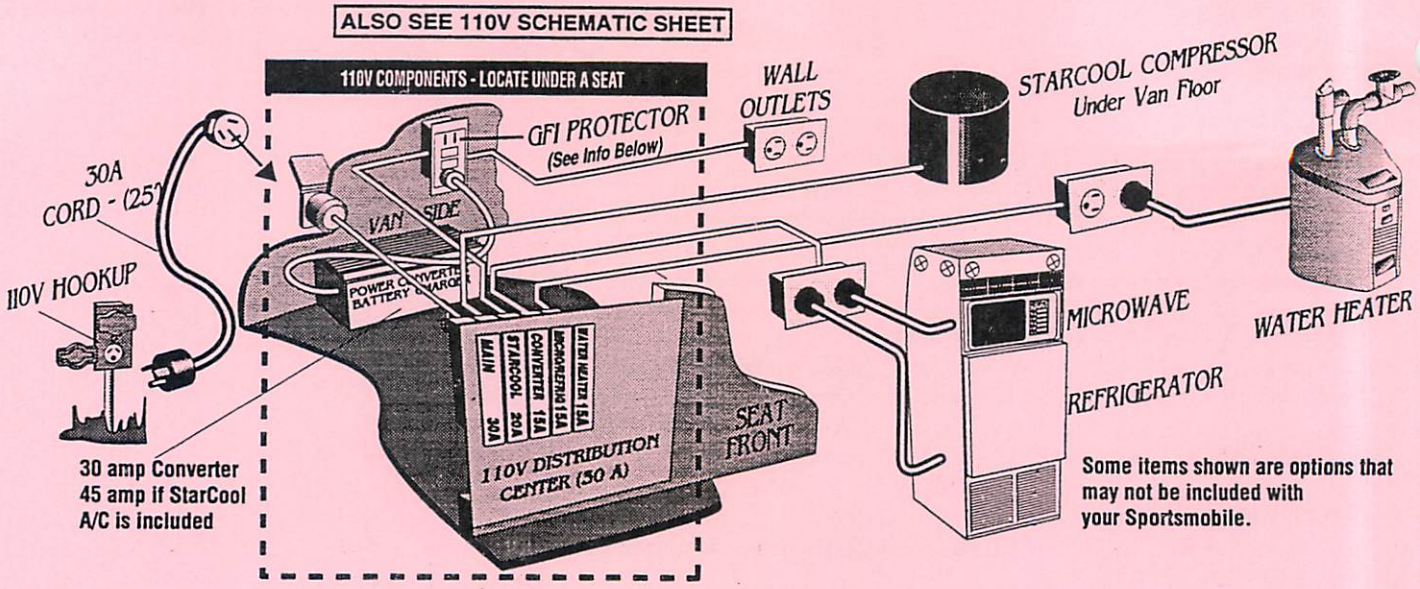
DETECTORS - The 2 detectors listed below pull .4 amps per hour or 9.6 amps in 24 hours. If you are not going to be in your Sportsmobile for an extended period of time, you can pull the 5 amp fuses from the 12V Distribution Panel so your Extra Battery will not be totally discharged. Please see the Electrical System - 12V sheet for fuse location.
Warning - Replace the fuses as soon as you re-enter the Sportsmobile.

DETECTOR, GAS, PROPANE, Model GS 2-

1. Audible detector with red flashing light.
2. **Warning:** See manufacturers literature for complete information.

DETECTOR, CARBON MONOXIDE - Please see Manufactures Literature

1. Audible detector with red flashing light.
2. Alarm will "beep" intermittently and red light will flash if Extra Battery becomes discharged.
3. **Warning:** See manufacturers literature for complete information.



HOW TO CONNECT TO PARK'S 110V HOOKUP:

1. Flip main 30A 110V breaker off if in your Sportsmobile.
2. Connect your 30A power cord to the park 110V hookup, and to the van. Check that park 110V hookup breaker is on.
3. Flip main, 30A 110V breaker on in your Sportsmobile. Note - if you are operating from a generator, wait 5 minutes before you flip the main breaker on.
4. You now have 110V service to your 110V appliances and wall outlets.
5. If you use the power cord adapter, your available power will be reduced from 30A to 15A. This adapter permits you to connect to a 15A park hookup. The use of the A/C or appliances may be restricted.
6. To reset a tripped circuit breaker, flip it off, then back on.

INVERTER

1. If you have this option, you must turn it on to supply power to the Extra Battery. The red light will flash slowly.

GFI PROTECTOR

1. To protect you from line to ground electric hazards, a GFI Interrupting Receptacle has been installed. It protects wall outlets that are exposed. The concealed wall outlets for such items as the Microwave and Refrigerator are not GFI protected.
2. If the power at one of these 110V wall outlets fails, without affecting the circuit breaker serving that outlet, push the "reset" button to restore power. See above drawing.
3. If the GFI Interrupter cannot be reset, disconnect the appliance connected to it and then reset. Repair any defective appliance before further use. If the receptacle will not reset when there are no appliances connected to it, have a qualified electrician check the GFI outlet.
4. The GFI Interrupter must be tested at least once every month. 110 volt power must be present to properly test.
   A. Push "test" button. The "reset" button should pop up 1/16 inch minimum, from flush position, which indicates that power to the protected circuit has been discontinued and it is okay.
   B. If the "RESET" button does not pop up when the test button is pushed, a loss of ground fault protection is indicated. It is not OKAY. DO NOT USE. Call a qualified electrician.
   C. To restore power after testing, push the "reset" button.
5. This ground fault circuit interrupting receptacle is designed to help protect people from the hazards of line to ground electrical faults. It does not prevent electric shock, but limits the shock time. This protection is afforded to people using tools or appliances operating from the receptacle.
6. Outside Sportsmobile 110V outlet - this option includes it's own GFI interrupter.

APPLIANCES

1. ALL 110 volt appliances are protected by circuit breakers.
2. To reset a tripped circuit breaker, flip the breaker off, then on.
3. It is possible to trip the 30 amp main breaker if all the appliances are operating simultaneously. If this occurs, simply turn off any of the appliances you do not need, and reset the main breaker.
4. If individual circuit breakers trip, reset. If the breaker continues to trip, have a qualified electrician check the appliance or breaker.

WARNINGS, FOR YOUR SAFETY...

1. Your electrical system of 110 volts AC or 12 volts DC has been designed and installed in accordance with the safety requirements of ANSI Standard A119.2 and the National Electrical Code.
2. Only qualified electrical technicians should attempt to make any changes or additions to your electrical system, and then using only approved materials and components and employing approved methods of installation.
3. *An approved power* supply cord has been supplied with the vehicle. Always use this cord for hook-up to 110 volt source. Note that the cord has a three pin plug which provides proper grounding through the third (round) pin. Grounding is your personal protection from electrical shock. Do not use any adapter, cheater, or extension cord that will break the continuity of the grounding circuit connected to that third pin. NEVER remove the grounding pin for convenience of being able to connect to a non-grounding (2-prong) receptacle.
4. Never operate your Sportsmobile with a "hot skin". If you can feel even a small shock from the vehicle while standing on the ground, you should immediately disconnect the Sportsmobile from power source and have an electrician locate the trouble.
5. Do not use two-wire cords.
6. Be sure to unplug your 110V power cord from the outside 110V hook-up and stow it before driving off.

110V ADAPTER

1. The Std Equipment 30 amp to 15 amp Adapter is an approved 3 pin adapter that will permit you to plug into a standard household 15 amp type outlet. Note - some of the older parks only offer 15 amp hookups.
2. Due to certain electrical variables, a 15 amp outlet may not supply enough power to operate the Air Conditioner, Water Heater or Microwave. If any of the 110 volt appliances do not operate properly, turn the appliance off, as the 15 amp outlet is not adequate.

SGW (SOMETHING GONE WRONG) - NO 110V POWER INSIDE SPORTSMOBILE

1. First, check the 110V distribution panel - are circuit breakers in the "on" position?
2. Second, verify you have 110V power in your Sportsmobile. You can do this...
   A. If you have a Microwave option, the indicator light should be on.
   B. Check the reading on the 12V Gauge when plugged into a 12V outlet - the needle should be in "low or normal" charge range.
   C. Plug an appliance into a 110V wall outlet to see if it operates.

SGW - CIRCUIT BREAKERS, 110V

1. If Circuit Breakers continually "trip" off, check for an overloaded circuit, for instance, is a hair dryer and hot plate on at the same time? All 110V appliances and visible wall outlets are protected with circuit breakers.

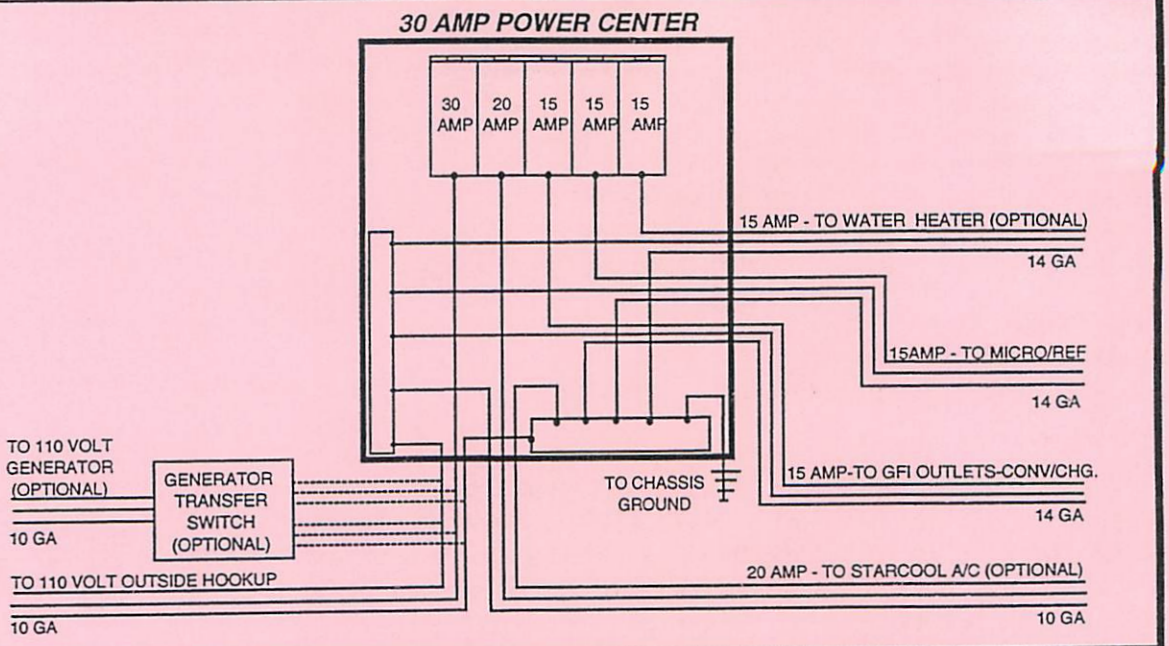
SGW - WALL OUTLETS, 110V

1. If no power at outlet, check power cord connections at van and hookup.
2. Verify the 110V circuit breakers are "ON".
3. Verify GFI outlet is not "tripped" off. (See "Electrical-110V" sheet for GFI information).
4. Contact a qualified technician.

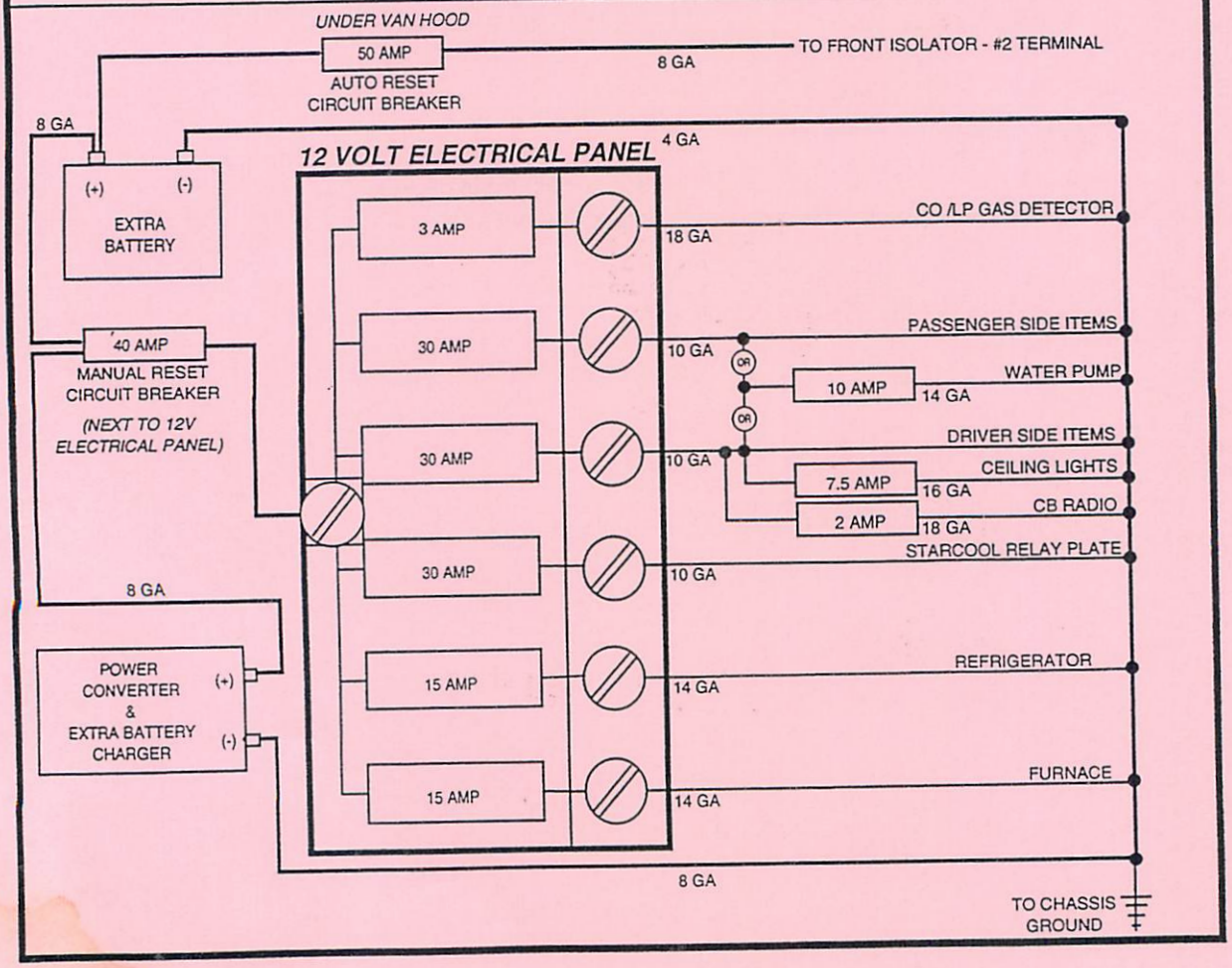
SGW - MICROWAVE

1. Verify 110 volt power is going to Microwave. (option)
2. If digital display on the Microwave is operating and the Microwave does not heat, the Microwave may be defective.

110V SCHEMATIC



12V SCHEMATIC



GENERAL

1. The 1500 watt heating element in your ISE water heater will recover approximately 8 1/2 gallons per hour through an 80 degree F. temperature rise. Temperature rise is the difference between the temperature of the cold water coming into the heater, and temperature leaving the heater. Consequently, it takes approximately twenty minutes to heat the tank contents when filled with cold water.
2. Tank volume 2.5 gal., Amps 12.5, Temperature range 110-170 degrees F., Operating pressure 150 PSI max.
3. **WARNING -** For more detailed safety and operating instructions, please see ISE's literature. Do not store flammable materials near water heater. Water temperature over 125 degrees can cause severe burns.
4. It is recommended to leave the water heater off until you need hot water.

OPERATION

1. Turn on water supply. Open hot water faucets to push air out of water heater.
2. Check that water flows through faucets, no leaks and no discharge from temperature and pressure relief valve.
3. To start the heating cycle, move switch to position ON.
4. The thermostat will automatically shut off the heating element when the selected operating temp. is reached.

WINTERIZING

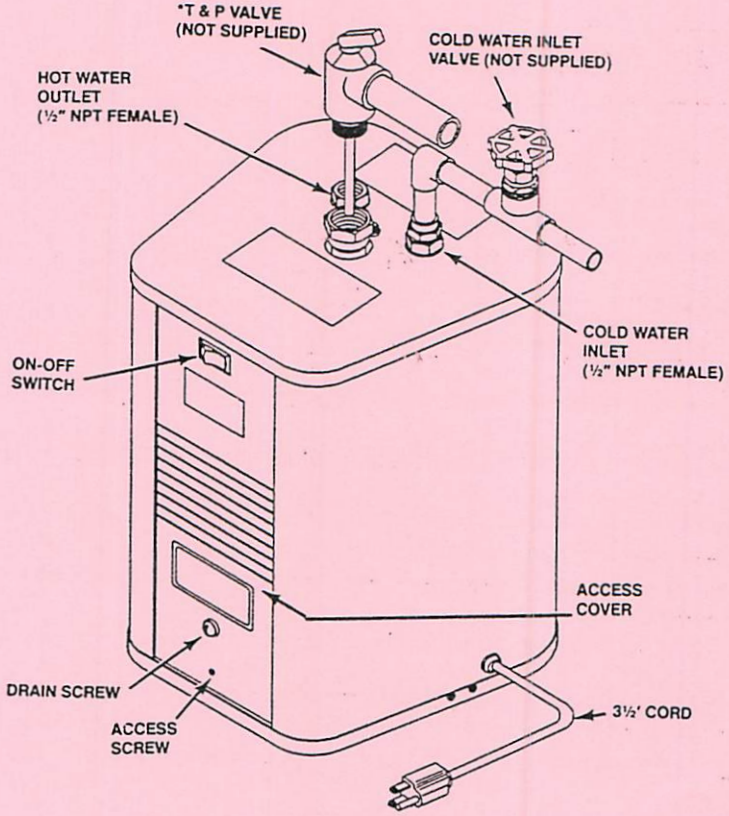
1. You can add potable anti-freeze to water supply.
2. You can also drain the heater with water pump off and no city water connected, open faucet controls, remove drain plug side of water heater, and use a container to catch the water.

MAINTENANCE

1. Do not attempt to repair water heater. Call you authorized dealer for service.
2. Drain yearly to remove sediment build-up.

SGW (SOMETHING GONE WRONG)

1. If hot water does not run out of faucet - check power supply connection. Be sure switch is on.
2. Check the circuit breaker for the heater. If the breaker has tripped, have the circuit checked by an electrician to determine if the circuit is overloaded, or if a short exists.



GENERATOR, ONAN 2.8 KW

SPORTSMOBILE HAS REWRITTEN THE MANUFACTURERS INSTRUCTIONS IN AN EFFORT TO MAKE THEM EASIER TO FOLLOW.

1. **WARNING - These sheets are to be considered only as supplements to the manufacturers literature not replacements. It is important that you read and understand all of the manufacturers literature before operating any of these items. Sometimes a supplier will change information and these sheets may not be current. Should there be any conflict with Sportsmobile sheets - follow the manufacturers instructions.**

ONANS OPERATOR'S MANUAL - PLEASE SEE FOR COMPLETE INFORMATION

PRE-START CHECKS - SEE ONANS WARNINGS ON THE BACK SIDE OF THIS SHEET BEFORE PROCEEDING

1. Before starting, open generator access panel/door and perform visual inspection of unit and exhaust system. Look for loose or damaged components and fasteners. Correct as necessary.
2. Confirm that vehicle is not parked in high grass or brush. DO NOT operate the generator if exhaust gases will not effectively expel away from vehicle.
3. Lubrication. Make sure the generator is level when checking the oil. Keep oil level to the 'full' mark on the dipstick. Do not overfill. Refer to ONAN's manual maintenance section for the proper procedures.

STARTING PROCEDURE

1. Depress the start/stop switch - hold until the lamp on the switch becomes steadily lit - indicating that the generator is operating. Do not let starter switch engage for more than 10 seconds - repeat.
   A. If you held the switch at the start position for ten seconds and the lamp does not become steadily lit - release the switch. Wait two minutes - try again. If the second attempt does not start the generator set - start the unit at the set control. Failure to start at remote control may indicate an open circuit in the remote wiring. Contact a RV dealer for assistance.
   B. After the generator is running - the automatic transfer switch will engage. After a delay of 40 seconds the generator should be warmed-up and maintain a constant RPM.
2. Your generator is equipped with an "automatic switch over device".
   A. Automatic switch over - Switch from power cord to generator simply by starting generator.
   B. Built-in delay - 40 second (nominal) delay prevents starting generator under load, which allows necessary engine warm-up before transfer.
3. You can now start applying a load. See the approximate power requirements of common appliances, (back side of this sheet).

FUEL CONSUMPTION: No load - 0./2 gph. Half load 0.3 gph. Full load 0.43 gph.

TO SHUT DOWN

1. Turn off all 110V items.
2. Allow generator to run 3 to 5 minutes to cool down. Failure to allow the generator to cool down may cause engine run-on or backfire.
3. Press Stop switch.

GENERATOR SHUT DOWN: The generator is designed to shut down (run out of gas) when the vehicle fuel level drops to approximately 1/4 tank. Add fuel to vehicle fuel tank to resume operation.

WARNINGS - ALSO SEE ONAN'S MANUAL:

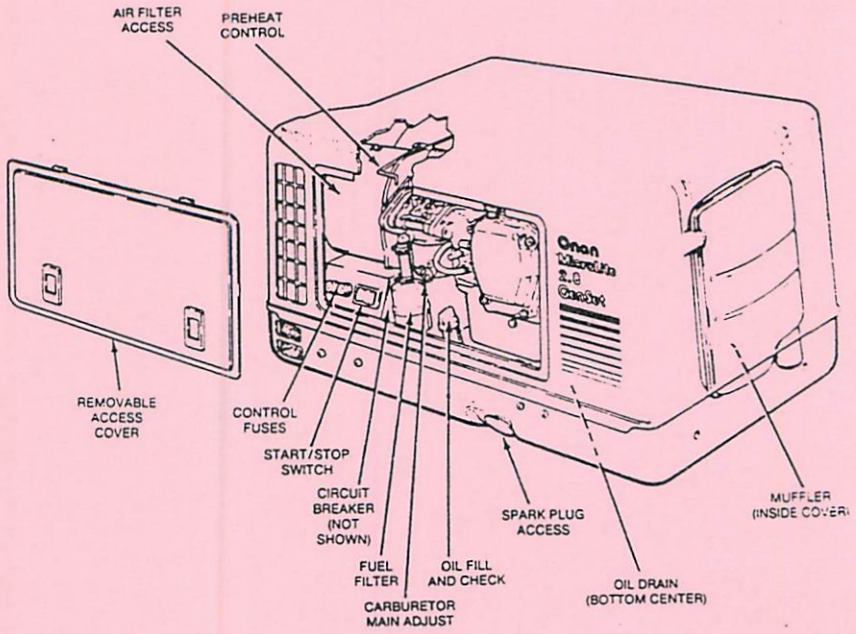
1. Never sleep in vehicle with the generator running unless the vehicle interior is equipped with an operating carbon monoxide detector.
2. Exhaust gas is hazardous and may cause injury or even death. Make sure all the exhaust components are operation-worthy and secure.
3. Fire can cause severe personal injury or death. Do not operate the generator when the vehicle is parked in high grass or brush.
4. Exhaust gases can cause severe personal injury or death. Never operate the generator set unless the exhaust system is clear of walls, snow banks, or any obstruction that can prevent exhaust gases from dissipating. Never operate any exhaust fan in the recreational vehicle when the generator set is running. It can cause exhaust gas to be drawn into the vehicle interior.
5. Hot oil can cause severe burns if spilled or splashed on skin. Keep fingers and hands clear when removing oil drain plug, and wear protective clothing.
6. Fuel presents the hazard of fire or explosion which can cause severe personal injury or death. Do not permit any flame, spark, pilot light, cigarette, or other ignition source near the fuel system. Keep a type ABC fire extinguisher nearby.
7. Contact with hot engine parts can cause severe burns. Use caution when access cover is removed to avoid contacting hot engine parts.

CAUTION

1. Operation of the generator set with the access cover removed can cause equipment damage. Generator set cooling air does does not circulate properly with the access cover removed.
2. Continuous generator set overloading can cause high operating temperatures that can damage the generator windings. Keep the load within the nameplate rating.

EXHAUST FANS - Never operate if you have a generator running as exhaust gases could be drawn inside the van.

Appliance or Tool	Approximate Running Wattage
Air conditioner	1400-2000
Battery Charger	Up to 800
Coffee Percolator	550-700
Converter	300-500
Electric Blanket	50-200
Electric Broom	200-500
Electric Drill	250-750
Electric Frying Pan	1000-1500
Electric Iron	500-1200
Electric Stove (Per Element)	350-1000
Electric Water Heater	1000-1500
Hair Dryer	800-1500
Microwave Oven	1000-1500
Radio	50-200
Refrigerator	600-1000
Space Heater	1000-1500
Television	200-600



CONTROL PANEL

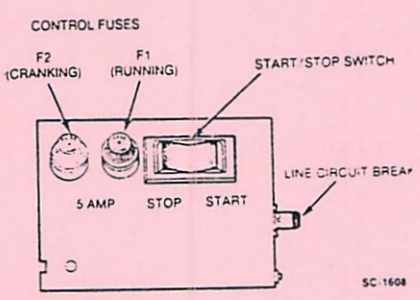
The following section describes the function and operation of the generator set controls. The generator set control panel and optional remote control panels are shown in Figures 3 and 4.

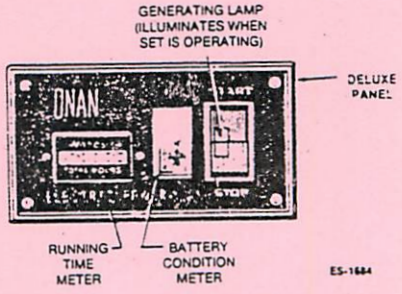
Control Components

Start/Stop Switch: Starts and stop the unit locally. The unit can also be operated from an optional remote control wired to the control panel.

Control Fuses: Provide protection for the control box wiring and remote wiring from short circuit or other overload. The cranking fuse provides protection while the generator set is running.

Line Circuit Breaker: Protects the generator from a short circuit or other overload.



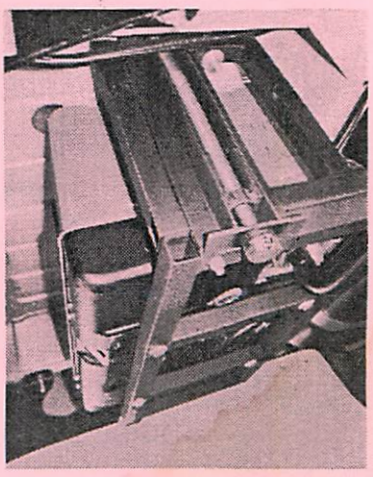


REMOTE CONTROL PANEL (OPTIONAL)

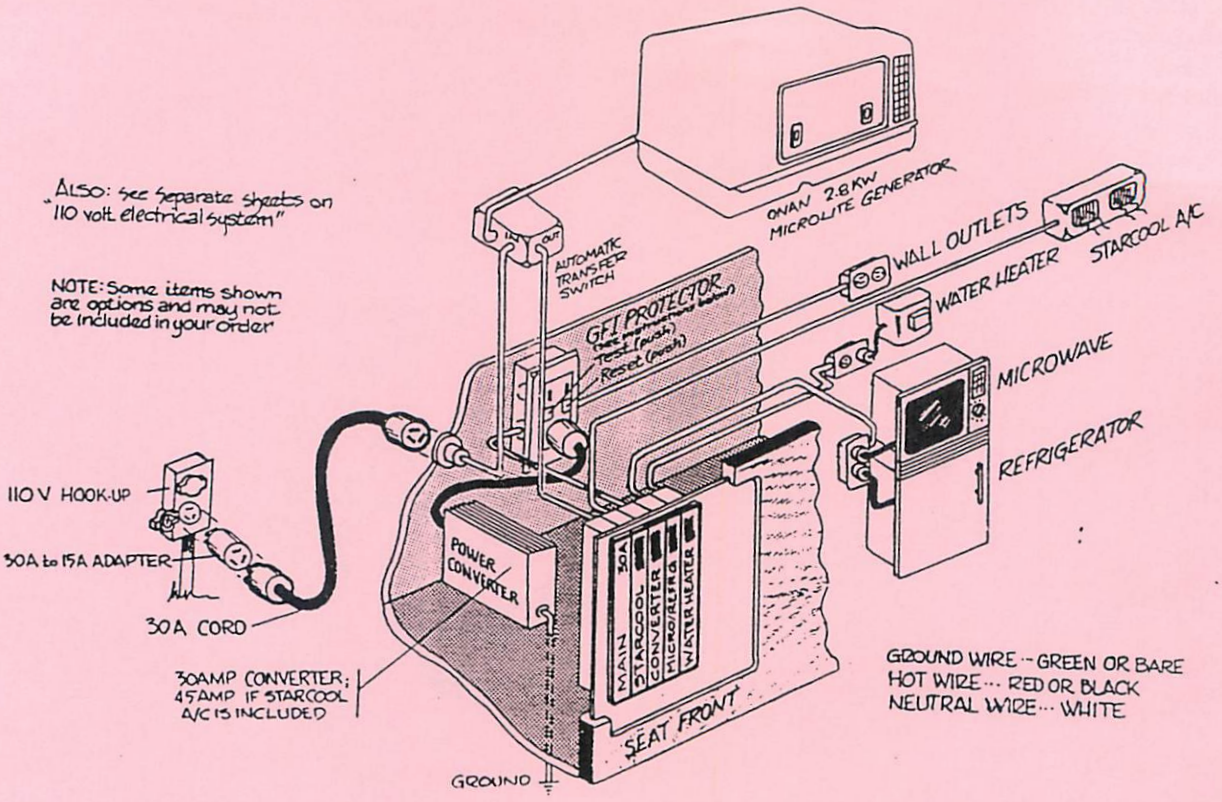
Optional remote controls are available for Onan recreational vehicle generator sets. The remote control allows operation of the generator set from inside a motor home.

GENERATOR UNDER VAN 'LIFT'

1. Operation - please see owners manual before lowering.
2. To lower - to change oil, fuel filter, spark plug or adjust carburetor.
   A. Tools required - 9/16" wrench, crank handle or 1 1/8" socket and ratchet, and WD-40 or similar lubricant.
   B. With WD-40 or similar lubricant, spray threaded shafts and nuts.
   C. Remove 4 - 3/8" nuts with 9/16" wrench.
   D. Verify exhaust hanger bracket will not interfere with lowering generator. Remove bracket if necessary.
   E. Using crank handle provided, or 1 1/8" socket and ratchet:
      Turn large nut on one side counter-clockwise until side lowers approx. one inch.
      Turn large nut on other side counter-clockwise until side lowers approx. two inches.
      Continue alternating sides until generator is low enough to service. One side should never be more than one inch lower than other side.
   F. Reverse lowering procedures to raise generator.



GENERATOR, WIRED INTO 110V SYSTEM



INVERTER, WIRED INTO 110V SYSTEM