

## 12 / 120-VOLT ELECTRICAL SYSTEM

The 120-volt AC system in your trailer is similar to that in your home. The system also charges the batteries through the converter/charger. 120-volt AC power is supplied to the load center from either the generator (if equipped) when “dry camping” or through the shore power cord when plugged into campground power.

### LOAD CENTER CIRCUIT BREAKERS

Circuit breakers for the 120-volt system are usually located under the refrigerator either combined in the converter/charger or on a separate panel. The location may vary depending on model and floorplan.

AC current from the power source or the generator is routed to the main circuit breakers in the distribution panel. The current is then distributed to the other circuits through individual circuit breakers. The circuit breakers open the circuits if the rated current is exceeded. Never substitute a circuit breaker with a higher value than the original breaker installed.

### MAIN CONVERTER/CHARGER

Your trailer is supplied with a converter. The converter converts 120-volt AC current to 12-volt DC. It provides DC power to operate the DC electrical system and charge the batteries.

Power is supplied whenever the trailer is connected to shore power or the generator is running. Some converters include a cooling fan that will come on when certain temperatures are reached. You may occasionally hear this fan running if outdoor temperatures are high or the DC load is high.



### CAUTION

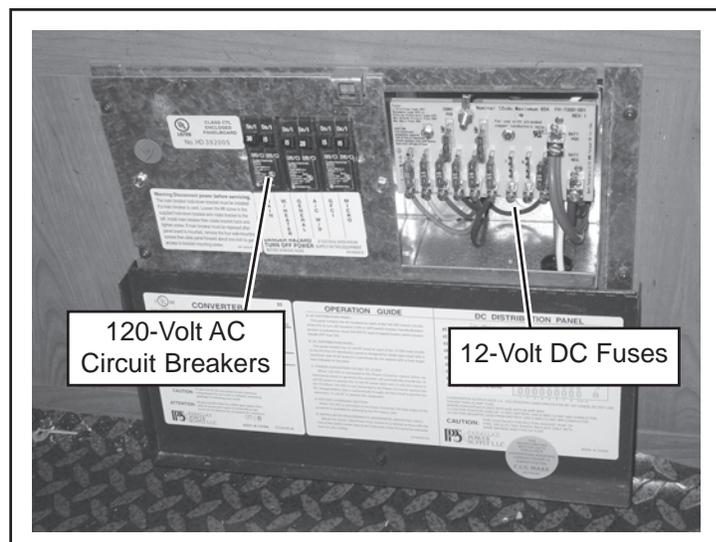
**When packing the trailer, be sure to leave clearance around the converter for adequate ventilation.**

### NOTICE

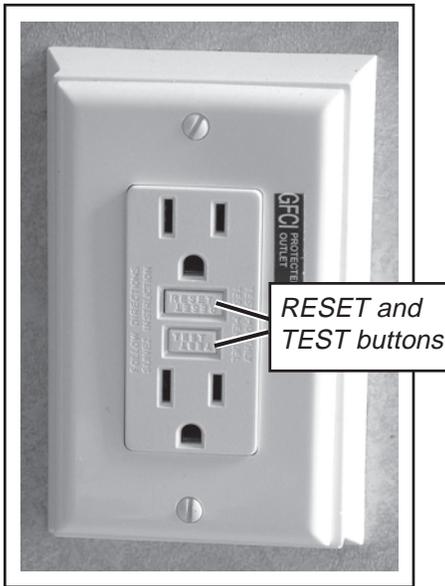
**Always turn off the main circuit breakers before plugging into the site receptacle. If the power conductors (“hot” legs) make contact before the neutral, unbalanced voltage can damage electronic devices connected to the electrical system.**



*Main AC Circuit Breaker Panel  
(Location varies with model)*



*Converter/Charger (Layout varies depending on model)*



Ground Fault Circuit Interrupter Outlet (GFCI)

**NOTE:**

**If bath, galley, or exterior outlets don't work, check the bath GFCI. Reset it if necessary. If it continues to trip, have the electrical system checked by a qualified electrician.**

**GROUND FAULT CIRCUIT INTERRUPTER (GFCI)**

The receptacles in the bathroom, galley and exterior are protected by the GFCI. This device provides ground fault protection from potential electrical shock hazards of line to ground electric faults and electrical leakage shocks possible when using appliances in damp areas. The GFCI disconnects the circuit (and other outlets on the same circuit) whenever a ground fault is detected, limiting your exposure time to the shock hazard caused by current leakage to ground. The GFCI device does not prevent electric shock, nor does it protect a person who comes into contact with both "hot" and neutral sides of the circuit. It does not protect against electrical circuit overloads.

Test the GFCI breaker each month while operating on 120-volt AC power. To test the GFCI:

1. Press the **TEST** button on the GFCI outlet. The **RESET** button should pop out indicating that the protected circuit has been disconnected.
2. If the **RESET** button does not pop out when the **TEST** button is pressed, ground fault protection on the protected circuit has been lost. Do not use the outlet or other outlets on the same circuit. Have the trailer electrical system checked by your dealer or a qualified electrician. Do not use the system until the problem has been corrected.
3. Press the **RESET** button to reset the GFCI and restore power to the protected circuit.

**POWER "SHORE" CORD**

Your trailer is equipped with a heavy duty power cord to connect to an external 120-volt 30- or 50-amp (depending on model) rated AC service. The cord and plug are a molded, weatherproof assembly. The cord provides a correct ground connection to the site service. Do not alter or cut the cord in any way. Do not remove the ground pin from the plug, or defeat the ground circuit in the trailer. If you have to use an adapter to plug into an electrical service, make sure the ground is maintained through the adapter. Never use a two-conductor extension cord, or any cord that does not assure correct and adequate ground continuity. Never plug the 120-volt cord into an ungrounded receptacle.

Depending on model, the power cord is either wired permanently to the trailer electrical system, or is removable. Removable cords attach to the trailer inlet with a twistlock connector and locking ring. When attaching the cord to the trailer, be sure to align the pins correctly before locking the cord in place. The locking ring provides extra strain relief and a weather-resistant seal.

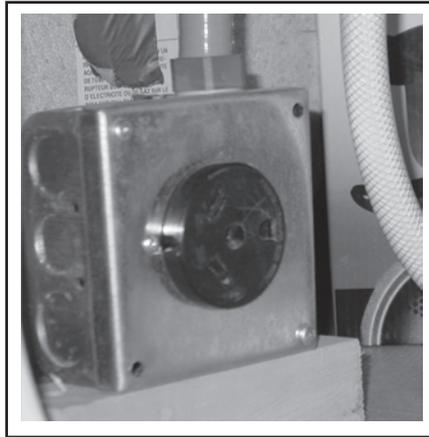
When connecting the cord to the service, push the plug straight into the receptacle until it seats completely. On models equipped with a generator but without auto-transfer switching in the converter, the power cord must be plugged into the generator outlet when using the generator for AC power. Plug the cord into the generator outlet before starting the generator on these models.



*Twistlock Shore Cord Inlet (30-amp shown; 50-amp is similar.)*



*Shore Cord (Typical)*



*Generator Outlet (Location varies depending on model)*

## ELECTRICAL HOOKUP

Before connecting to the electrical supply, check the supply rating. Be sure it is 110-volt to 125-volt single phase AC for 30-amp service or 2-phase 220 to 240-volt AC (two 110 to 120-volt legs) for 50-amp service.

### CONNECTING TO SHORE POWER

1. Be sure the site power source breakers are OFF (both legs on 50-amp service).
2. If the site power source breakers are not accessible, turn OFF the main breakers inside the trailer.
3. Insert the plug of the cord into the site source receptacle, seating the connector squarely and completely.
4. Turn site source breakers ON.
5. Turn trailer main breakers ON.

**! WARNING**

Do not place flammable material or store any other materials in the generator compartment.

**! WARNING**

Do not modify the generator installation or exhaust in any way.



**To disconnect:**

1. Turn trailer main breakers OFF.

**OR**

Turn site source breakers OFF.

2. Pull the plug end of the cord straight out of the source receptable.

3. Coil and stow the shore power cord.

### GENERATOR (If Equipped)

The generator will provide 120-volt AC power when shore power is not available. It can be controlled both at the generator and from the remote START/STOP controls located inside the trailer. **IMPORTANT: BE SURE TO READ AND UNDERSTAND THE GENERATOR OPERATOR'S MANUAL BEFORE OPERATING THE GENERATOR.** Observe all operating instructions and warnings as well as all recommended maintenance schedules and procedures.

Depending on model, the output of the generator is connected to the trailer AC electrical system either automatically through a transfer switch in the converter when the generator is started, or by plugging the shore cord into the generator outlet. In either case, power is routed through the load center main breakers.

### GENERATOR CONTROL PANEL OPERATION

See the generator Operating Guide in your Owner's Package for complete operating and maintenance instructions. The generator control panel features:

**Hourmeter** - Indicates total generator operating time in hours and tenths of hours. Use the hourmeter with the generator maintenance schedule for periodic maintenance.

**Start/Stop switch** - To start the generator, press and hold at the **RUN** position. Release the switch when the engine starts (the **GEN RUN** lamp will come on). To stop the generator, hold the switch at the **STOP** position until the engine stops.

Every time before starting the generator:

- ▶ Check the fuel level in the fuel tank.
  - ▶ Check the oil level.
  - ▶ Check all fuel lines for fuel leaks.
  - ▶ Inspect generator for loose or damaged components and fasteners.
  - ▶ Correct any problems before operating the generator.
  - ▶ Inspect the generator exhaust system for damage or leaks. Be sure the exhaust pipe is clear of walls, snow banks or any obstruction that would prevent exhaust gases from dissipating.
  - ▶ Be sure the trailer is not parked in high grass or brush.
  - ▶ Set the main circuit breakers to OFF.
  - ▶ Connect the shore power cord to the generator and/or the shore power receptacle.
1. Press and hold the START/STOP switch in the START position at either control panel until the generator starts. Release the switch when the generator starts. Do not hold the switch in the START position for more than 10 seconds. The indicator light will remain on after the switch is released.
  2. If the generator does not start, release the switch. Wait two minutes and try again. If the second try does not start the generator, try starting using the START/STOP on the generator control panel. If the indicator light still does not light, there may be an open in the remote wiring. Contact a service center for assistance.
  3. Do not turn on the main breakers until the generator is running smoothly and is warmed up. Check that there are no fuel or exhaust leaks.
  4. Turn off the individual breakers, and set the main breakers ON. Turn on the individual circuit breakers one at a time to prevent generator overloading.
  5. To stop the generator, turn off the main breakers. Let the generator run three to five minutes to cool down. Press and hold the START/STOP switch to the STOP position until the generator stops completely and the indicator light goes out. If the switch is released before the generator stops and the light goes out, the generator will continue to run.

**NOTE:** The output from the generator may be interrupted if the main generator circuit breakers trip. These breakers are located on the main generator control panel. If there is no power when the generator is running, check and reset these breakers.

**IMPORTANT SPECIAL NOTE:**

*If you store your RV over the winter, or don't operate it often enough to refuel the gas tank every month, a fuel varnishing problem could develop in your generator engine and fuel system.*

*Fuel varnish is a gummy residue that clogs the generator carburetor and fuel pump and is caused by the deterioration of fuel. Depending on fuel quality and storage conditions, gasoline can deteriorate in as little as 30 days. As long as you refuel frequently with fresh gasoline, and exercise the unit regularly, fuel varnishing is less likely to occur. But if you leave the same gasoline in the tank for several months, you're very likely to have problems.*

*The only way to prevent fuel varnishing is to add a fuel preservative to the fuel (gasoline) tank and to run the generator.*

*For more information, see the Onan generator operating and maintenance manual.*


**DANGER**

**CARBON MONOXIDE IS POISONOUS AND CAN CAUSE UNCONSCIOUSNESS AND DEATH.**

Follow all instructions in this section as well as the ones outlined in the generator operator's manual.


**WARNING**

Do not under any circumstances operate the generator while you are sleeping. You would not be able to monitor outside conditions to assure that engine exhaust gases are being safely dissipated, and are not entering the trailer interior. You would not be alert to exhaust odors or the symptoms of carbon monoxide poisoning.

## GENERATOR OPERATING SAFETY PRECAUTIONS

The generator produces carbon monoxide while it is running. Carbon monoxide is a colorless, tasteless, odorless gas. **CARBON MONOXIDE IS DEADLY.** Before you start and use the generator, inspect the exhaust system. Do not use the generator if the exhaust system is damaged. Test the carbon monoxide detector every time you use the RV. To protect yourself from the effects of carbon monoxide poisoning, please read and understand the following precautions.

There are a number of symptoms of carbon monoxide poisoning:

<i>Dizziness</i>	<i>Intense headache</i>
<i>Throbbing in temples</i>	<i>Nausea</i>
<i>Vomiting</i>	<i>Muscular twitching</i>
<i>Weakness/sleepiness</i>	<i>Inability to think clearly</i>

If you or others (including pets) experience any of these symptoms, **get out into fresh air immediately.** Get medical attention if any of the symptoms persist. Turn the generator off and do not operate it until it has been inspected and repaired by a generator repair facility.

- ▶ **Review the safety precautions for fuel and exhaust fumes elsewhere in this manual.**
- ▶ **DO NOT operate the generator if exhaust gases cannot be discharged away from the trailer or other vehicles. Do not block the exhaust pipe. Do not park the trailer where the exhaust gases can accumulate either outside, underneath, or inside the trailer or other vehicles. Make sure exhaust gases are clear of walls, snow banks or any obstructions that can prevent exhaust gases from dissipating.**
- ▶ **DO NOT operate the generator while sleeping. You would not be aware of exhaust entering the trailer, or alert to symptoms of carbon monoxide poisoning.**
- ▶ **DO NOT operate the generator in an enclosed building or in a partly enclosed area such as a garage.**
- ▶ **DO NOT operate the generator when the trailer is parked in high grass or brush. Heat from the exhaust could cause a fire in dry conditions.**

- ▶ **DO NOT** operate the generator when parked in close proximity to vegetation, snow, buildings, vehicles, or any other object that could deflect the exhaust under or into the vehicle.
- ▶ **DO NOT** simultaneously operate the generator and a powered ventilator which could result in the entry of exhaust gas. When exhaust ventilators are used, open a window on the opposite side of the trailer upwind of exhaust gases to provide cross ventilation.
- ▶ When parked, position the vehicle so that the wind will carry the exhaust away from the vehicle. **DO NOT** open nearby windows, ventilators, or doors into the passenger compartment, especially those downwind, even part of the time.
- ▶ Never operate your tow vehicle or generator engine longer than necessary when parked.
- ▶ Do not fill the fuel tank while the generator is running. Fuel contact with the hot generator or exhaust is a fire hazard.
- ▶ Do not smoke or have an open flame near the generator or fuel tank.
- ▶ Never store anything in the generator compartment. Always keep the compartment clean and dry.
- ▶ Do not start the generator while a load is connected. Make sure the **MAIN** circuit breakers are **OFF** before starting.
- ▶ Disconnect the generator from the battery before performing any generator maintenance.
- ▶ **DO NOT** touch the generator while it is running, or immediately after turning it off. Heat from the generator can cause burns. Allow the generator to cool before attempting maintenance or service.

**NOTE:** During long periods of inoperation, or if the engine does not reach operating temperature, moisture can condense in the engine making starting difficult and causing damage to the engine. Operate the generator with a 50% capacity load for two hours once a month. A long exercise period that allows normal operating temperatures is preferable to short periods.


**WARNING**

Do not block the generator ventilating air inlets or outlets. Restricting ventilating air inlets or outlets can cause engine failure or fire from engine overheating.

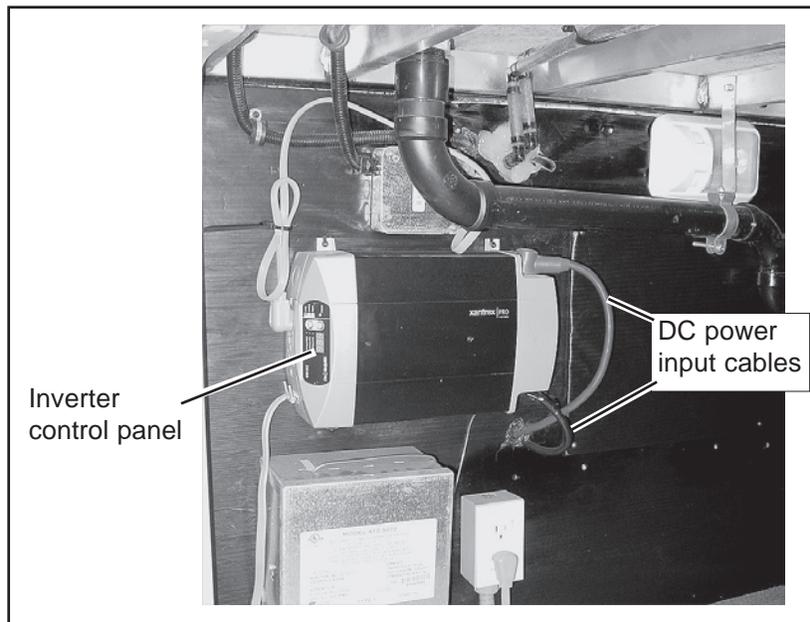
## GENERATOR MAINTENANCE

Details of service and maintenance are in the generator Operator's Guide in your Owner's Package.

## INVERTER (If Equipped)

The inverter uses 12-volt DC power to create 120-volt AC power for the main and bedroom TV outlets and one galley outlet. These outlets can be used when shore power is not available or when the generator (if equipped) cannot be operated. A built-in transfer switch automatically detects when generator or shore power status changes to ensure power is always available at these outlets. A detailed operating guide for the inverter is in your Owner's Package.

If operating on battery power only, the inverter will consume your available battery power. Your battery charging source will probably be your tow vehicle alternator if you are operating the inverter in a dry camping situation. To charge the trailer battery(s) from the tow vehicle alternator, you must connect the 7-way connector to the tow vehicle and run the tow vehicle



*Inverter (location varies depending on model)*

engine at high idle long enough to charge the battery(s).

The inverter is equipped with the following protection and alarm features:

**Low battery alarm** Alerts you if the battery has become discharged to 11.0 volts or lower.

**Low battery voltage shutdown** Shuts the inverter down automatically if the battery voltage drops below 10.5 volts to keep the battery from being completely discharged.

**High battery voltage shutdown** Shuts the inverter down automatically if the input voltage rises above 15.4 volts.

**Overload alarm** Alerts you if the loads connected to the inverter are close to the inverter's operating limits.

**Overload shutdown** Shuts the inverter down automatically if the loads connected to the inverter exceed the inverter's operating limits or if a short circuit is detected in the circuitry connected to the inverter's output.

**Over-temperature alarm** Alerts you if the inverter is running hot and is approaching the over-temperature shutdown level.

**Over temperature shutdown** Shuts the inverter down automatically if its internal temperature rises above an acceptable level. These values and thresholds are set at the factory and cannot be adjusted.

## OPERATING PANEL CONTROLS

**On/Off button.** Press once to turn the inverter on or off.

**Three-digit LED display** shows status information and fault codes.

**Status LED** Indicates the mode of operation with a three-color LED.

**Utility** (green) indicates the inverter is in shore power mode, using utility power to operate loads connected to the inverter.

**Battery** (yellow) indicates the inverter is in inverter mode, using the battery to provide AC power.

**Fault** (red) indicates the inverter has shut down because of a fault.

**Select button.** When the inverter is in inverter mode, press the Select button to choose what appears in the three-digit LED display: Input Voltage, Input Current, or Output Power.

## OPERATING MODES

### SHORE POWER MODE

The inverter is in shore power mode when an AC source (a generator or shore power) is present to power the circuits connected to the inverter. The status LED glows green to indicate that the inverter is using shore (or generator) power. The inverter draws minimal power from the battery. Whether or not the on/off button is on, shore power will pass through the inverter. When the inverter is on, if the AC source drops to less than 90 VAC or is disconnected, the transfer switch automatically transfers the appliances to inverter power. The status LED glows yellow to indicate the inverter is using the battery to power the circuits.

### INVERTER MODE

The inverter is in inverter mode when it is using the battery (inverting DC to AC) to power the circuits connected to the inverter.

### TURNING THE INVERTER ON AND OFF

The **ON/OFF** button on the remote panel turns the inverter on and off.

***When the inverter is ON and shore power is present,*** the incoming shore power is passed to the output to power appliances connected to the inverter, and the inverter draws minimal power from the battery. The status LED glows green. If the shore power goes away, the transfer switch automatically transfers the appliances to inverter power. The status LED glows yellow to indicate the inverter is using the battery to power the appliances.

***When the inverter is turned OFF,*** the inverter is disabled. Incoming shore power is passed to the output to power the inverter circuits. If the shore power becomes disconnected (or the generator is stopped), the inverter circuits do not transfer to inverter power. Transfer to inverter power only occurs if the inverter is ON.

## PORTABLE GENERATOR (If Equipped)

Your RV may have been optionally equipped with a portable generator. Portable means that the generator is not rigidly and permanently attached and connected to the RV structure. This Owner's Guide Supplement discusses safety and operational information you need to know when operating the portable generator.

The portable generator will provide 120-volt AC and DC power for operating portable tools and appliances when shore power is not available. **IMPORTANT: BE SURE TO READ AND UNDERSTAND THE PORTABLE GENERATOR OWNER'S MANUAL BEFORE OPERATING THE PORTABLE GENERATOR.** Observe all operating instructions and warnings as well as all recommended maintenance schedules and procedures.

### PORTABLE GENERATOR OPERATING PRECAUTIONS

The generator produces carbon monoxide while it is running. Carbon monoxide is a colorless, tasteless, odorless gas. **CARBON MONOXIDE IS DEADLY.** Before you start and use the generator, inspect the fuel and exhaust systems. Do not use the generator if the fuel system is dripping fuel or the exhaust system appears damaged. Test the carbon monoxide detector every time you use the RV. To protect yourself from the effects of carbon monoxide poisoning, please read and understand the following precautions.

There are a number of symptoms of carbon monoxide poisoning:

<i>Dizziness</i>	<i>Intense headache</i>
<i>Throbbing in temples</i>	<i>Nausea</i>
<i>Vomiting</i>	<i>Muscular twitching</i>
<i>Weakness/sleepiness</i>	<i>Inability to think clearly</i>

If you or others (including pets) experience any of these symptoms, **stop the generator and move into fresh air immediately.** Get medical attention if any of the symptoms persist.

- **Review the generator operating and safety precautions found in the portable generator operating manual.**



**CARBON MONOXIDE IS POISONOUS AND CAN CAUSE UNCONSCIOUSNESS AND DEATH.**

**Follow all instructions in this section as well as the ones outlined in the generator operator's manual.**



**Do not under any circumstances operate the generator while you are sleeping. You would not be able to monitor outside conditions to assure that engine exhaust gases are being safely dissipated, and are not entering the trailer interior. You would not be alert to exhaust odors or the symptoms of carbon monoxide poisoning.**



**Do not modify the generator exhaust system in any way.**



**Do not block the generator ventilating air inlets or outlets. Restricting ventilating air inlets or outlets can cause engine failure or fire from engine overheating.**

- ▶ **DO NOT** operate the generator if exhaust gases cannot be discharged away from the trailer or other vehicles. Do not block the exhaust pipe. Do not park the trailer where the exhaust gases can accumulate either outside, underneath, or inside the trailer or other vehicles. Make sure exhaust gases are clear of walls, snow banks or any obstructions that can prevent exhaust gases from dissipating.
- ▶ **DO NOT** operate the generator while sleeping. You would not be aware of exhaust entering the trailer, or alert to symptoms of carbon monoxide poisoning.
- ▶ **DO NOT** operate the generator in an enclosed building or in a partly enclosed area such as a garage.
- ▶ **DO NOT** operate the generator beneath the trailer or beneath an extended slideout room or under an extended awning.
- ▶ **DO NOT** operate the generator in high grass or brush. Heat from the exhaust could cause a fire in dry conditions.
- ▶ **DO NOT** operate the generator when parked in close proximity to vegetation, snow, buildings, vehicles, or any other object that could deflect the exhaust under or into the vehicle.
- ▶ **DO NOT** simultaneously operate the generator and a powered ventilator which could result in the entry of exhaust gas. When exhaust ventilators are used, open a window on the opposite side of the trailer upwind of exhaust gases to provide cross ventilation.
- ▶ Position the generator so that the wind will carry the exhaust away from the vehicle. **DO NOT** open nearby windows, ventilators, or doors into the passenger compartment, especially those downwind, even part of the time.
- ▶ Do not fill the fuel tank while the generator is running. Fuel contact with the hot generator or exhaust is a fire hazard.
- ▶ Do not smoke or have an open flame near the generator or fuel tank.

- ▶ **Do not start the generator while a load is connected. Make sure the MAIN circuit breakers are OFF before starting.**
- ▶ **DO NOT touch the generator while it is running, or immediately after turning it off. Heat from the generator can cause burns. Allow the generator to cool before attempting maintenance or service.**

## TRANSPORTING AND STORAGE

The portable generator can be transported or stored inside the trailer, or secured to the storage frame on the trailer tongue.

- ▶ **DO NOT OPERATE THE GENERATOR INSIDE THE TRAILER.**
- ▶ **DO NOT OPERATE THE GENERATOR WHILE IT IS POSITIONED ON THE STORAGE FRAME ON THE TRAILER TONGUE.** *The storage frame is designed for temporary storage of the generator while it is not running.*

If you transport or store the generator inside, secure it upright in its normal operating position, with the engine switch OFF. Be sure it cannot move while traveling. Allow the engine to cool well before turning the fuel cap vent lever counterclockwise to OFF.

If you transport or store it on the outside frame, be sure it is tightly secured. A weatherproof covering will help protect it from water or dirt.

### **WARNING**

**Do not operate the generator while it is positioned in the storage rack. Hot exhaust gases can cause overheating of the propane cylinders, may cause pressure relief venting of propane gas and cause a fire or explosion.**

### **WARNING**

**The portable generator weighs over 100 pounds. Attempting to lift or move the generator alone may cause serious injury. Lift or move the generator only if you and at least one other person capable of lifting the weight can assist you. Do not attempt to lift or move the generator alone.**

