

A system that includes 2400 watts of solar array is able to produce approximately 18 amps of AC power at 120 VAC. The output is most needed from 12:00 noon to 18:00 by the utility. If the **GRID USAGE TIMER** is set to a **START CHARGE TIME** of 18:00 and a **END CHARGE TIME** of 12:00 noon, the inverter will sell the battery from 12:00 noon to 18:00. The energy in the batteries will be used only if the solar array is not able to provide enough power to reach the 18 amps AC (determined by the **MAX SELL AMPS AC** setting under the **BATTERY SELLING MENU (17)** menu heading. The battery will assist the solar array to meet the 18 amps AC **MAX SELL AMPS AC** setting during the battery sell period. If the battery reaches the **SELL VOLTS DC** setting during the sell period, the AC output current will slowly taper down to the solar array's output level and the battery will not be further discharged. At 18:00, the battery will charge at the rate allowed by the **SET MAX CHARGE AMPS AC** (2 amps AC is the lowest setting allowed). The battery will be recharged only to the **FLOAT VOLTS DC** setting unless the **BULK CHARGE TRIGGER TIMER (15)** menu heading is used to trigger a bulk charge cycle.

This system offers the utility several advantages. The system can be relied on for a specific amount of output at a set time. The AC output of the system from 12 noon to 4 PM will not vary with the level of sunlight (after all, the AC loads on the grid do not suddenly drop when a cloud passes over). Only if it is extremely cloudy will the system not produce its rated output for the full time period - which would not be as important since the ambient temperature would not be as high.

This operating mode does not provide an individual system owner with many added values. The wear and tear on the batteries would be avoided and greater efficiency achieved if the standard sell mode was used.

BATTERY REQUIREMENTS

Batteries are required for utility inter-tie operation of this inverter. The batteries can, however, be small if the system does not provide back-up power in case of utility failure. Two thousand watt/hours is sufficient (100 amp/hours at 24 volts is 2400 watt hours). This can be achieved by using two "Group 27" sized batteries for a 24-volt system. This is a very common size for RV and boat applications. Since the batteries are not cycled excessively, sealed batteries may be used with good success.



CAUTION: If using gelled batteries, the battery charger must be set to the appropriate settings or battery damage will occur.

BATTERY REGULATION LEVEL - SELL MODE

In the **SELL** mode, the regulation level of the battery is determined by the charge cycle (**FLOAT** or **BULK**) and the settings of the **BULK CHARGE TRIGGER TIMER (15)** and the **GRID USAGE TIMER (18)**.

The **SET START CHARGE TIME** menu item setting under the **BULK CHARGE TRIGGER TIMER (15)** menu heading can be used to increase the battery charging regulation voltage to the **SET BULK VOLTS DC** setting. The battery voltage will be held near the **SET BULK VOLTS DC** menu item setting under the **BATTERY CHARGING (10)** menu heading for the adjustable **ABSORPTION TIME** period setting upon encountering this **BULK CHARGE TRIGGER TIMER** event or after a loss of AC power to the **AC HOT IN 1** input terminal.

The inverter will charge the battery to the **FLOAT VOLTS DC** setting at the **START CHARGE TIME** with the **GRID USAGE TIMER** enabled (the **START CHARGE TIME** beginning time is not equal to the **END CHARGE TIME**). This is indicated by the **FLOAT** LED indicator being on. After the **END CHARGE TIME**, the inverter turns off the battery charger and begins to "sell" power into the utility grid from the battery (or any other DC sources available and connected to the batteries) to the **SELL VOLTS DC** setting. The **FLOAT** LED indicator blinking indicates this. The current will be limited to a maximum level controlled by the **MAX SELL AMPS AC** menu item setting under the **BATTERY SELLING (17)** menu heading.

With the **GRID USAGE TIMER** disabled (the **SET START CHARGE TIME** beginning time is equal to the **SET END CHARGE TIME**) and the inverter in the **FLOAT** charge cycle, the inverter will use the utility grid (or any other DC sources available and connected to the batteries) to maintain the batteries to the **SET FLOAT VOLTS DC** setting. This is indicated by the **FLOAT** LED indicator being on.

OPERATION

UTILITY INTERACTIVE OPERATION WITH UTILITY BACKUP

The SW Series Inverter/Charger is capable of operating both as a utility interactive and a stand-alone inverter. This allows the system to normally sell the excess power to the utility and, once an outage has occurred, provide power to the AC loads from the battery.

The loads that will be provided with utility backup during outages must be isolated from the non-utility backed-up loads. This usually requires the addition of an AC load center sub panel for the output of the inverter.

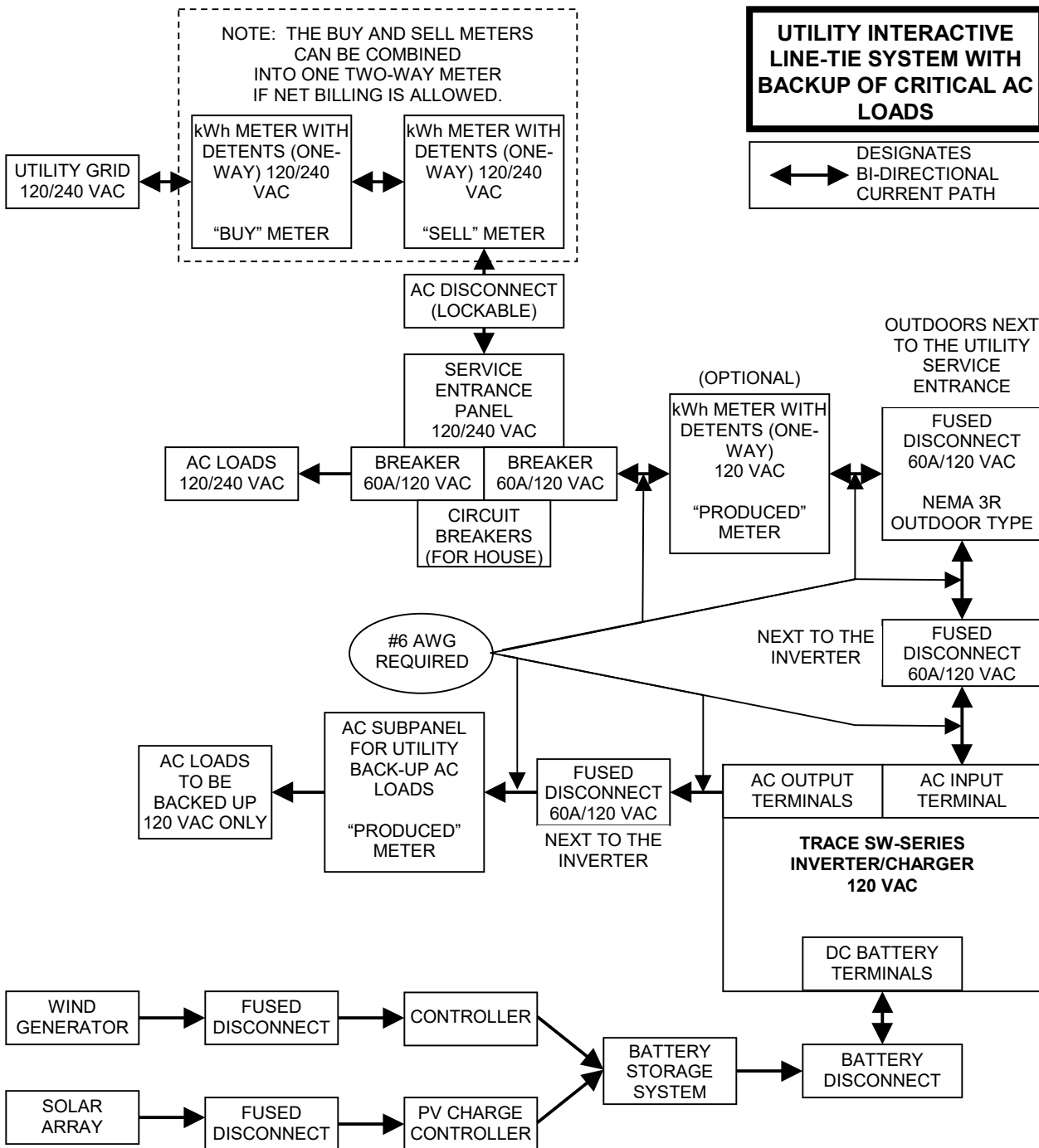


Figure 29, Utility Interactive Line-Tie System With Battery Backup Flow Diagram