

INVERTERS

A real common question is what is the function of an inverter and what will it do for me? There are several different models that do several different things. There are models that range from 130 watt up to 2500 watt.

An inverter takes 12 volt DC (direct current) and inverts it to a 120 volt AC (alternating current) to run 120 volt appliances and equipment in your RV. This is used when generator and shoreline power is not available.

The 130/300 watt inverter

This is one of the smaller inverters. Its function is to supply 120 volts AC to one or two smaller components, such as TV and VCR. This allows you to pull into a rest area and turn on your TV to catch the weather or lets other passengers watch a movie while traveling.

The 1000 watt to 2500 watt inverters

These models perform three different functions:

1. DC-AC power inverting
2. Automatic transfer switching between inverter power and incoming A/C power from either generator or shoreline power.
3. Automatic three-state battery charging plus manual battery equalizing.

Power inverter-Changing DC (direct current) to AC (alternating current).

Automatic power transfer

The internal switch allows the inverter/charger to be connected to an external A/C source and transfer the source power through to the loads. When disconnected the transfer switch allows automatic switching back to the inverter.

Battery charging part of the inverter

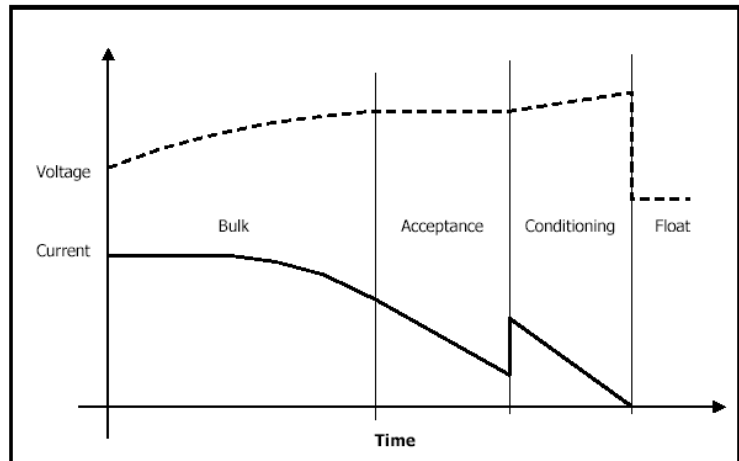
There are four battery charge states - three automatic and one manual.

Bulk Charge – This phase is engaged as soon as the charger is activated. Full charge rate is delivered to the battery bank until the charge voltage limit is reached.

Acceptance Charge – This follows the bulk charge stage. During this stage the battery voltage is held at a constant bulk charge voltage limited and the current gradually goes down.

Float Charge – Once the amount of charge is accomplished the acceptance stage is terminated and by either charge current going down or until time runs out. The float stage uses a lower voltage to maintain the battery level.

The manual stage is called **Equalizing Stage**. This stage can only be activated manually through the control panel. This should be done about once a month. This cycle is a timed cycle and will run for



BATTERY TEMPERATURE		WET CELL BATTERIES			SEALED BATTERIES		
°F	°C	ACCEPT (Volts)	FLOAT (Volts)	CONDITIONING (Volts)	ACCEPT (Volts)	FLOAT (Volts)	CONDITIONING (Volts)
78	25	14.6	13.2	14.9 to 15 max.	14.2	13.2	14.4 to 15 max.

BATTERY BANK SIZE (Amp-Hour)	WET CELL TYPE BATTERIES			SEALED TYPE BATTERIES		
	BULK (max.)	ACCEPT (max.)	CONDITIONING (max.)	BULK (max.)	ACCEPT (max.)	CONDITIONING (max.)
Less than 400	6-hrs.	2-hrs.	3-hrs.	6-hrs.	2-hrs.	3-hrs.
Greater than 400	8-hrs.	3-hrs.	6-hrs.	8-hrs.	3-hrs.	4-hrs.

eight hours. Equalizing should only be used after the batteries are fully charged. When you do this it will cause the batteries to gas. This keeps the batteries from building up sulfate on the plate. This will make your batteries last longer.

An inverter is a good source of A/C power when used and maintained properly. Choose the size that will meet your needs. The size of the inverter also needs to be paired with the size and quantity of your house batteries.

Q. How often should I check the water level in my house batteries?

A. You should check the water level at least once a month, every two weeks if the inverter gets a lot of use.

Q. Can I leave my inverter on at all times?

A. Yes, you can leave it on all the time, but just make sure you turn off appliances and components when you are not using them to help save your batteries. It is best to shut it off when not using the inverter because there are items that run constantly when the inverter is on.

Q. How long will my batteries last when I use the inverter?

A. It all depends on how many things you are operating. When you are using your inverter you should try to run only what you need. Most refrigerators are run on the automatic mode. What

will happen if you run your refrigerator in the automatic mode is the refrigerator will select A/C from the inverter. This will run your batteries down faster. You should go to your refrigerator and select the LP mode when using the inverter. Refer to the appliance power usage chart below to see what your appliances will take. You also need to make sure that your batteries are fully charged before you use your inverter or the operation time will be short term.

Better Performance Chart based on one new battery and one 80 percent maximum discharge rate.

	Hours	Amps
Group 24		
Capacity 80 amp/hrs	14.4	5.0
	4.0	15.0
	2.1	25.0
Group 30		
Capacity 130 amp/hrs	21.0	5.0
	6.4	15.0
	3.4	25.0

Most coaches have either two or three batteries hooked together in a parallel series to increase total hours of availability at same amp rating.

Example of one night of inverter use: If you use your VCR and your TV for four hours with two incandescent lights on and pop one bag of popcorn during your move you will use the following amp/hrs:

TV	4 hours	40 amp/hrs
VCR	4 hours	20 amp/hrs
1 light	4 hours	40 amp/hrs
Microwave	5 minutes	12.5 amp/hrs
		112.5 amp/hrs

In this amount of time you would have used up the capacity of one of your house batteries. The example shown above does not include any 12 volt items that might be operating, such as water pump, vent fans, etc.

For more specifications on different models refer to the June 2002 Tip's article.

Appliance Amp Hour Usage

APPLIANCE	WATTAGE	RUN TIME/AMP HOUR CONSUMPTION							
		5 MIN.	20 MIN.	30 MIN.	1 HR.	2 HR.	4 HR.	8 HR.	24 HR.
13" TV	50	0.40	1.67	2.50	5	10	20	40	
19" TV	100	0.80	3.33	5	10	20	40	80	
VCR	50	0.40	1.67	2.50	5	10	20	40	
Satellite Receiver HDTV (No dish positioning)	70			3.5	7	14	28	56	
DVD Player	30			1.5	3	6	12	24	
Lamp incandescent	100	0.80	3.33	5	10	20	40	80	240
Lamp fluorescent	21	0.2	0.7	1.0	2.1	4.2	8.4	16.8	50
Blender	300	2.5	10	15					
Toaster	1000	8.3	33	50					
Computer laptop	70			3.5	7	14	28	56	
Computer desktop	250			12.5	25	50	100	200	
Curling iron	50	0.40	1.67	2.5					
Hair dryer	1000	8.3	33	50					
3/8" drill	400	3.3	13	20					
Coffee maker - brew	1000	8.3	33	50					
Coffee maker - warm	100	0.80	3.33	5	10	20			
Refrigerator 3 cu. ft.	150*				7.5	15	30	60	180
Refrigerator 14 cu. ft.	500*				25	50	100	200	600
Microwave - compact	750	6.25	25	37.5					
Microwave - full size	1500	12.5	50	75					
Vacuum cleaner	1100	9.2	37	55	110				

*Amp Hour calculations for refrigerators assume a 50% compressor duty cycle.

Notes:

1. The power ratings listed above should be used for reference only.
2. To find the correct power consumption or "wattage", multiply the AC voltage times the amps listed on the product nameplate. In some cases, the wattage is also listed on the nameplate.
3. Make sure your inverter is large enough to supply the appropriate wattage to loads.
4. Find out if the loads you are running are pure sine wave form sensitive.