

Formulas and Examples for 12 & 24 Volt DC Systems

This "Rule of Thumb" is intended as a general guide for estimating the DC amps required to operate a DC to AC inverter. Since the calculations yield approximate values, an appropriate safety factor should be considered when designing and specifying system components, such as wire size and length.

12 Volt DC Systems

Formula: 12 volt inverters require approximately one (1) amp of DC input for each 10 watts of AC output.

Example: How many DC amps will a Vanner 12 volt inverter require to operate three 500 watt quartz lights, or a 1500 watt electric heater?

Answer:

- 1) Total watts = 1500
- 2) $1500 \text{ watts} / 10 \text{ (from formula)} = 150 \text{ amps}$
 This is the DC current the inverter will use to operate the 1500 watt load. Note - if this 150 amps is drawn from the battery for one hour, 150 amp hours (AH) of battery power will be used. To support 150 amp hours of battery power, 300 amp hours of battery capacity is required.

24 Volt DC Systems

Formula: 24 volt inverters require approximately one (1) amp of DC input for each 20 watts of AC output.

Example: How many DC amps will a Vanner 24 volt inverter require to operate three 500 watt quartz lights, or a 1500 watt electric heater?

Answer:

- 1) Total watts = 1500
- 2) $1500 \text{ watts} / 20 \text{ (from formula)} = 75 \text{ amps}$
 This is the DC current the inverter will use to operate the 1500 watt load. Note - if this 75 amps is drawn from the battery for one hour, 75 amp hours (AH) of battery power will be used. To support 75 amp hours of battery power, 150 amp hours of battery capacity is required.

Average Wattage Ratings of Products Operated from Vanner Inverters

Typical Product	Wattage	
	Min	Max
Air Conditioning, 9000 Btu	1100	2200
Air Conditioning, 13,500 Btu	1800	3500
Air Conditioning, 16,000 Btu	2200	4500
Blender	200	800
Broiler	1200	1800
Carving Knife		95
Can Opener	100	150
Clock		2
Clothes Dryer		4900
Clothes Washer	525	5000
Coffee Maker	500	1500
Corn Popper		575
Curling Iron		40

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Estimating Power Requirements

Inverter Wattage Rating Chart

Average Wattage Ratings of Products Operated from Vanner Inverters

Typical Product	Wattage	
	Min	Max
Deep Fryer		1200
Dehumidifier		650
Dishwasher	900	1200
Disposal	450	1500
Drill	250	1500
Electric Air Cleaner		50
Electric Blanket	100	250
Electric Knife		100
Engine Heater		750
Fan - Window		200
Furnace Fan		400
Flood Lights	300	2000
Freezer	450	800
Frying Pan	1000	1500
Grinder	1000	1500
Hair Dryer	500	1500
Hair Rollers		350
Heating Pad		60
Hot Plate	125	1500
Hot Water Dispenser	500	1400
Humidifier		200
Ice Cube Maker	250	300
Impact Wrench		900
Iron	625	1200

Induction Motors		
Motors	Starting Watts	Running Watts
1/4 HP	750-1500	700
1/2 HP	1500-3000	1175
1 HP	3000-6000	1950
2 HP	4000-8000	2900

Typical Product	Wattage	
	Min	Max
Knife Sharpener		40
Makeup Mirror		20
Microwave Oven	800	1600
Mixer	80	150
Personal Computer	150	350
Pipe Threader		1500
Plastic Pipe Electro Fusion	1400	3900
Radio		25
Range		12200
Refrigerator	300	1625
Shaver	30	75
Slow Cooker		200
Space Heater		1500
Stereo System	50	400
TV - Black & White	50	100
TV - Color	75	200
Toaster	1000	1400
Trash Compactor	400	800
VCR	35	75
Vacuum Cleaner - Home	400	900
Vacuum Cleaner - Shop	840	1380
Water Heater		4500
Water Pump		1000

Notes:

1. The electrical power consumed by an electrical device is measured in watts. This information is essential to proper inverter selection. Wattage may be found on the appliance nameplate or by multiplying the AC voltage (120 volts) by the running current (amps).
2. The wattage required to start certain motor driven loads could be 3 to 10 times their normal running wattage. The starting watts for a motor are obtained by multiplying the locked rotor current by the AC voltage.
3. Induction Motor running watts obtained from the National Electric Code Handbook. The above power ratings should only be used as a guide.

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