When selecting a generator, size makes a difference.

The first thing you need to do is determine what size generator would work best for your particular requirements. When purchasing a generator, it's important that you select one that's capable of meeting your energy requirements.

- You must match the **rated output** of the generator to the maximum **anticipated power to be used**.

This section will assist you in estimating the power requirements so you can purchase the generator that will satisfy your needs.

- This includes using the accompanying worksheet to make a list of the tools and appliances you expect to operate, as well as the approximate power requirements for each device.

Once you have the list, you can estimate the highest demand that will be put on the generator under the "worst-case" conditions. With this figure, you can determine the appropriate model Yamaha generator for your particular needs.

WARNING: Electrocution, severe personal injury or death can occur: Do not connect any generator to any building's electrical system unless an isolation switch has been installed by a licensed electrician. Refer to your Generator Owner's Manual.

CAUTION: Property damage can occur: Do not connect any generator to any building's electrical system unless an isolation switch has been installed by a licensed electrician. Refer to your Generator Owner's Manual.

TAKE IT STEP-BY-STEP
Follow these steps when determining your energy needs:

1. Identify the wattage requirements for the tools and appliances that you want to power. The power requirement for the tool or appliance can be found on its identification plate or in the Owner's Manual. If the power requirement is given in amps, multiply the amps times volts to derive the required watts.

Amps x Volts = Watts

2. Add up the required watts of all the tools and appliances you expect to operate simultaneously.

3. The total watts derived in step 2 is the size generator you need. These three simple steps will "size" a generator.

The Additional Guidelines section explains the procedures to calculate and size for motor starting.

This chart lets you immediately add up all of the appliances you will most likely utilize:

GENERATOR WORKSHEET			
	RUNNING WATTAGE REQUIREMENTS	ADDITIONAL STARTING WATTAGE REQUIREMENTS	TOTALS
HEATING/COOLING:			
Furnace Fan, gas or fuel oil furnace			
1/8 horsepower	**300**	**500**	
1/6 horsepower	**500**	**750**	
1/4 horsepower	**600**	**1000**	
2/5 horsepower	**700**	**1400**	
3/5 horsepower	**875**	**2350**	
Central Air Conditioner			
10,000 BTU	**1500**	**2200**	
20,000 BTU	**2500**	**3300**	
24,000 BTU	**3800**	**4950**	
32,000 BTU	**5000**	**6500**	
40,000 BTU	**6000**	**6700**	
HEATING/COOLING:		**SUB-TOTAL:**	
Refrigerator, Average	**600**	**2200**	
Dish Washer - Cool Dry	**700**	**1400**	
Dish Washer - Hot Dry	**1450**	**1400**	
Clothes Dryer - Gas	**700**	**1800**	
Clothes Dryer - Electric	**5750**	**1800**	
Microwave Oven, 750W	**750**	**800**	
Washing Machine	**750**	**2300**	
Coffee Maker	**850**	**0**	
Toaster 2-slice	**1100**	**0**	
Toaster 4-slice	**1650**	**0**	
Electric Skillet	**1500**	**0**	
Electric Range 6-in. element	**1500**	**0**	
Electric Range 8-in. element	**2100**	**0**	
Freezer	**2500**	**2200**	
KITCHEN		**SUB-TOTAL:**	
BATHROOM			
Hair Dryer	**800 - 1700**	**0**	
Iron	**1200**	**0**	
BATHROOM		**SUB-TOTAL:**	
APPLIANCES			
Lights- Wattage	**Actual:**		
VCR	**50**	**0**	
Heating Pad	**65**	**0**	
Radio	**100**	**0**	
Television - Black & White	**100**	**0**	
Television - Color	**300**	**0**	
Dehumidifier	**400**	**0**	
Electric Blanket	**400**	**0**	
Garage Door Opener - 1/4HP	**550**	**1100**	
Garage Door Opener - 1/3HP	**725**	**1400**	
Well Pump - 1/3 hp	**750**	**1400**	
Well Pump - 1/2 hp	**1000**	**2100**	
Sump Pump - 1/3 hp	**800**	**1300**	
Sump Pump - 1/2 hp	**1050**	**2150**	
Vacuum Cleaner - Standard	**800**	**0**	
Vacuum Cleaner - Deluxe	**1100**	**0**	
APPLIANCES		**SUB-TOTAL:**	
COMMERCIAL PRODUCTS:			
1/4" Drill	**300**	**300**	
Jigsaw	**300**	**300**	
Electric Weed Trimmer	**500**	**500**	
Router	**1000**	**1000**	
Belt Sander	**1000**	**1000**	
Disc Sander	**1200**	**1200**	
Chain Saw	**1200**	**1200**	
Worm Drive Saw	**1560**	**3100**	
12" Concrete Cutter	**1800**	**3600**	
7 1/4" Circular Saw	**1500**	**3000**	
Disc Grinder	**2000**	**4000**	
Air Compressor, Average	**2000**	**4000**	
COMMERCIAL PRODUCTS:		**SUB-TOTAL:**	
		GRAND TOTAL	

ADDITIONAL GUIDELINES

CONVERTING AMPS OR HORSEPOWER INTO WATTS
If necessary, use these formulas:

Watts = Amps x Volts

Running Watts* = Horsepower x 932** (for motors)

Remember, this worksheet lists **average power requirements** — a particular manufacturer's device may use more or less than the listed wattage.

- Add a 10% correction factor to your totals to help overcome this uncertainty.

If your customer plans to operate devices that use electric motors, list **both** the **starting** and **running requirements** of each.

- **Starting requirements** of some devices maybe significantly higher than their **running requirements**. This **higher** demand must be considered when estimating your power needs. Some small, universal motors — which do not draw a heavy starting load (drills, small saws, blenders, etc.) — require very little extra current for starting.

When listing items that use motors, take them in the order of highest-to-lowest starting requirements, as shown in the example below. Motor A, for instance, has a **starting requirement** of 2,600 watts, so it's listed first, followed by Motor B at 1,300 watts, and Motor C at 1,000 watts.

MOTOR/ DEVICE	STARTING WATTS	RUNNING WATTS
Motor A	2,600	850
Motor B	1,300	600
Motor C	1,000	750

Once you have compiled an accurate list of what you will be operating, you can calculate the maximum power requirements. There are three different calculations you can make, depending upon the kinds of tools and appliances on the list, and their intended use:

- No electric motors.
- One motor running at a time.
- More than one motor running at a time.

NO ELECTRIC MOTORS
If your list *does not* include any devices that use electric motors, simply add the power **(running)** requirements of all the items on your list to obtain the maximum power needed.

- For example, if you intend to use only an electric skillet, a 100-watt light and a heating pad (as shown below), the maximum power requirement would be 1,655 watts. In this case, a generator like the EF2800i, that can produce 2,500 watts **rated** output, is recommended.

DEVICE	WATTS
Electric Skillet	1,500
Light	100
Heating Pad	65
Total:	**1,665**

NOTE: The EF1600's **rated** output is 1,400 watts, so its output would be too low to handle this load on a continuous basis.

Footnotes:
*Running Watts is the amount of power a motor consumes once it has started to run at normal speed.
**932 is the factor used to convert motor horsepower ratings to needed electrical energy. It takes into account normal losses in utilizing that power.