Custom Marine Products System Load Calculation Worksheet

Step1 Calculate your AC loads. If there are no AC loads, skip to **Step 2**.

Description of AC Loads Run by an inverter	**Watts**	X	**Hrs/Wk**	=	WH/Wk
		X		=	
		X		=	
		X		=	
		X		=	
		X		=	
		X		=	
		X		=	
		X		=	
line 1 -->			Total WH/Wk		

2. Multiply line 1 by 1.15 to correct for inverter loss and battery efficiency.
   Multiply by larger number if not using pure sine wave or using an older inverter.
   (Example: Heart 1800 HF modified sine wave inverter/charger. Use 1.25 for loss.)
3. Inverter DC input voltage; usually 12, 24 or 48 volts. This is DC system voltage.
4. Divide line 2 by line 3. This is total amp hours per week used by AC loads.

Step 2 Calculate your DC loads.

5. List all DC loads in the spaces below.

Description of DC Loads	**Watts**	X	**Hrs/Wk**	=	WH/Wk
		X		=	
		X		=	
		X		=	
		X		=	
		X		=	
		X		=	
		X		=	
		X		=	
line 5 -->			Total WH/Wk		

6. DC system voltage. Usually 12, 24 or 48 volts.
7. Total amp hours per week used by DC loads. Divide line 5 by line 6.
8. Total amp hours per week used by AC loads from line 4
9. Add lines 7 and 8. This is total amp hours per week used by all loads.
10. Divide line 9 by 7 days. This is total average amp hours per day.

Custom Marine Products Solar Module Worksheet

This worksheet helps you figure the total number of solar modules required for your system.

If you want year-round reliability, it's best to use the lowest of the figures or "smooth" the data. The peak amperage of the module you will be using can be found in the module specifications. You can also get close enough for this basic understanding if you divide the modules wattage by the peak power point voltage, usually (17 to 18.5).

Average sun hours per day in your area can be found on several internet sites.
Try http://www.bigfrogmountain.com/SunHoursPerDay.html

1. Total average amp hours per day from the System Loads Work Form, line 10.

2. Multiply line 1 by 1.2 to compensate for loss from battery charge/discharge.

3. Average sun hours per day in your area.

4. Divide line 2 by line 3. This is the total solar array amps required.

5. Optimum or peak amps of solar module used. See module specifications.

6. Total number of solar modules in parallel required. Divide line 4 by 5.

7. Round off to the next highest whole number.

8. Number of modules in each series string to provide DC Battery voltage:

DC Battery Voltage	# of Modules in Each Series String
12	1
24	2
48	4

9. Total number of solar modules required. Multiply line 7 by 8.

If the size and number of panels you have chosen falls short of your daily power needs this will give you a good idea of how long you will need to run your generator. You may also consider a wind generator in addition to solar to reduce your power shortfall. Please contact us if you have questions about our worksheets or our product specs.

Custom Marine Products Battery Size Calculator

1. Total average amp hours per day from the System Loads Worksheet, line 10.
2. Maximum number of continuous cloudy days expected in your area.
3. Multiply line 1 by line 2.
4. Divide line 3 by (maximum) 0.8 to maintain a 20% reserve after deep discharge period.
To prevent less than a maximum 80% discharge divide by a lesser number in #4 above.

If no special conditions below apply, skip lines 5 through 9 and proceed to line 10.

Special Condition #1: Heavy electrical load

5. Maximum amperage that will be drawn by the loads for 10 minutes or more.
6. Discharge rate of battery. If unknown, check with battery supplier.
7. Multiply line 5 by line 6.

Special condition #2: High Charge Current

8. Maximum output amperage of PV array or other battery charger.
9. Multiply line 8 by 10.0 hours.

10. Amp hours from line 4, 7, or 9, whichever is largest.
11. If you are using a lead-acid battery, select the multiplier below which corresponds to the battery's winter time average ambient temperature:

Battery Temperature	Multiplier
80°F/26.7°C	1.00
70°F/21.2°C	1.04
60°F/15.6°C	1.11
50°F/10.0°C	1.19
40°F/4.4°C	1.30
30°F/-1.1°C	1.40
20°F/-6.7°C	1.59

12. Multiply line 11 by line 10. This is your optimum battery size in amp-hours.
13. Amp-hours of battery chosen. (Example: **Fullriver 145/12 AGM** = 145Ah/20 hrs. and 131Ah/10 hrs. etc.)
(Note: The faster the discharge the less total reserve amp-hour capacity)
14. Divide line 12 by line 13. This is the total number of batteries in parallel required.
15. Round off to the next highest whole number.