

Why spend more money on a small generator ?

The assumption:

A common assumption (and why not) is that a small portable generator (or even a small marine diesel generator) produce a pure sine wave the same as the mains, and that any kit which runs off the mains will run without any problem from the small gen set as long as we stay within the power ratings of the product and the generator. this is a common assumption and there is no warning on the sales literature to warn anyone to the contrary.

The facts .

The simple fact that a large company like Honda who would be one of the largest small generator companies in the world, turned round one day and basically said, look guys these small gen sets are not very good and that there are many problem with them, so we have now invented a small generator which produces a pure sine wave via a built in inverter to fix all these problems and by the way its about 4 times the cost. This in its self must indicate that there were major problems with small generators.

Voltage and frequency fluctuations

The problem is simply cost. a standard generator has a mechanical governor which cannot possibly move fast enough to regulate voltage and frequency, as electric moves at the speed of light but the mechanical governor in real affective terms works about 6 mths behind the requirement for a response by the engine. this results in wild voltage and frequency fluctuations on start up and on load changes (these fluctuations can be as much as 60 volts which would results in the destruction of electronic equipment). However with an inverter generator the frequency and voltage of the generator is not controlled by a mechanical governor , instead it is being controlled via the extra electronics package in the inverter generator , which will work at the speed of light which is the same speed as the electric being produced , thus ensuring a more stable voltage and frequency.

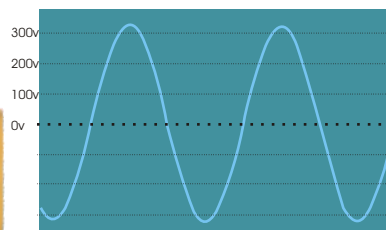
Wave form distortion:

There are 2 main loads which a generator is exposed to , a resistive load

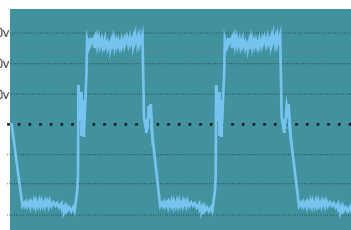
(such as a standard light bulb or a kettle. and a inductive load, such as a battery charger or micro wave, flourescent lights, computers, etc. A resistive load does not really effect a generator as it uses all the power offered to it under the wave form. however a inductive load which would have a large power factor tries to bend and deform the wave form. in the real world the power companies have large capacitance banks all over the country connected to the mains to help rectify this problem, however on small generators this solution is not available, the only way to fix this problem is to remove the output wave from direct contact with the generator then this allows you to artificially distort the waveform to ensure the output stays as a true sine wave. you can see below with the Sterling and the Honda that with an inductive load the output wave form remains as a sine wave where as with the lower cost B&Q model the wave form is distorted from a sine wave to a square wave.

So what does all this technical jargon mean in real life ?

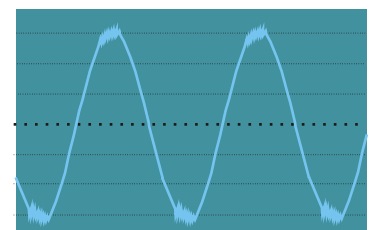
Things have to move with the times, low cost gen sets are fine for your building site, cutting the hedge at the bottom of the garden and general day to day stuff, however if you enjoy boating or camping then you need to be looking at the latest technology to ensure you can run things such as a battery charger, computers, tv . These products require a stable voltage so as not to blow up the internal capacitors, they require a stable frequency so as not to over speed or under speed motors or transformers and so over heat them, and a stable sine wave to ensure that a sine wave is maintained and presented to a product which requires the full peak of a sine wave (330 v) to work, such as any product which has a internal voltage dropper of some form will require this peak voltage or close to it. as you can see from the drawings example 1 and example 2. example 1 is a pure sine wave, called 230 volts (however the 230 v refers to a thing called the R.M.S. voltage or root mean squared) the actual peak voltage as you can see is about 330 volts. however with example 2 you can see the actual peak voltage is about 280 volts, this is down about 50 volts, this will effect any electronic product. example 3 is the wave from the digital controlled inverter generators such as the Honda and Sterling unit, one can see the pure sine wave is held with a little distortion only on the peaks



example 1

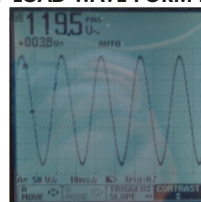


example 2

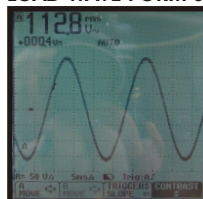


example 3

OFF LOAD WAVE FORM HONDA



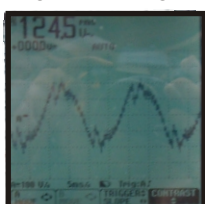
OFF LOAD WAVE FORM STERLING



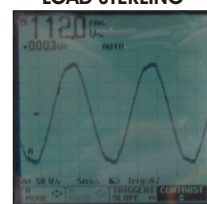
700 WATT INDUCTIVE LOAD HONDA



OFF LOAD WAVE FORM B&Q



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