

WHY A SINEWAVE

LOAD	MODIFIED SINE	TRUE SINE	COMMENTS
TV	XX	XXX	Picture may be clearer with true sine
AUDIO EQUIPMENT	X	XXX	Some equipment may "buzz" with modified sine
COMPUTERS - LAPTOP - DESKTOP	XXX XX	XXX XXX	Monitors may be clearer with true sine
MICROWAVE OVENS	XX	XXX	May perform better with true sine
TABLE SAWS, AIR COMPRESSORS, ETC.	XX	XXX	May start quicker with true sine
POWER HAND TOOLS (e.g. DRILL)	XX	XXX	Variable speed models may work better with true sine
COFFEE MAKERS, TOASTERS - OVENS TOASTERS, HOT AIR POPCORN MACHINES, HAIR DRYERS	XXX	XXX	
BLENDERS, MIXERS, FOOD PROCESSORS, COFFEE GRINDERS	XX	XXX	Multi-speed units may work better with true sine
LASER PRINTERS	+	XXX	Most will not work with modified sine outputs
PHOTOCOPIERS	+	XXX	
DOT MATRIX/BUBBLE JET PRINTERS	XX	XXX	
FAX MACHINES	XX	XXX	
AIR CONDITIONERS	X	XXX	Units with large motors will start quicker with true sine
LIGHTING - INCANDESCENT	XXX	XXX	

LIGHTING - OTHER	XX	XXX	True sine gives better performance with HID, sodium, compact fluorescent and other specialty lamps and with lamp dimmers
RECHARGEABLE BATTERY OPERATED EQUIPMENT: - CHARGER TRANSFORMER BASED - CHARGER NON-TRANSFORMER BASED	XX +	XXX XXX	True sine may give more consistent (and shorter) recharge times Equipment that can be plugged directly into AC receptacles, or equipment with recharging bases that state high voltages are present at the terminals, should only be used with true sine
OXYGEN CONCENTRATORS	X	XXX	Some will only work with true sine
MOTORS WITH VARIABLE SPEED CONTROL	+	XXX	

+ Not recommended X Acceptable Performance XX Good Performance XXX Ideal Performance

To summarize:

Modified sine wave inverters provide acceptable to good performance with a wide variety of loads and, with some loads, performance is effectively indistinguishable from true sine wave inverters. The benefit of true sine wave inverters is they offer consistent performance, with all loads within their continuous and surge power ratings. They operate some loads that can't be operated by modified sine wave inverters.

Which to choose? It depends on your application and your budget.

If you plan to run only one or two low-cost loads in a non-critical application, then consider a modified sine wave inverter. Check to see if the application is indicated and marked for modified sine wave in the accompanying table.

If you plan to operate only one dedicated load, which you know, works well with a modified sine wave inverter, then there is no reason to switch to true sine wave.

If you must operate one or more of the loads, which are not suitable for modified sine wave, then a true sine wave inverter must be your choice.

So...what's the difference between the two waveforms?

A true sine wave voltage varies smoothly over a cycle from zero volts to a maximum positive value (peak voltage), back down through zero volts to a maximum negative value (peak voltage) and back to zero volts.

A modified sine wave voltage (also called quasi-sine wave or a trapezoidal wave) is an attempt to approximate the sine wave rectangular or trapezoidal pulses that are easier to generate efficiently with low cost inverter circuits.

Key measures of a sine wave voltage are:

- Peak voltage - V_{pk}
- rms (root mean square) voltage - V_{rms} - a calculated quantity equal to $0.707 V_{pk}$ of a pure sine wave voltage. The rms voltage is equivalent to the DC voltage required to deliver the same power to a resistive load, such as an incandescent light or toaster.
- Frequency - the number of cycles the AC voltage traverses in a second - measured in Hertz (Hz)
- Harmonic distortion - a measure of how much the actual wave shape deviates from a pure sine wave - measured in percent.

Advantages of a true sine wave are:

- No interference in audio or electronic equipment with lower-end power supplies. Equipment with higher quality internal power supplies is less sensitive to the sharp-rising edge of the modified sine wave.
- Significantly reduced in-rush current into capacitive loads and reduced stress on the output devices of the inverter, with the potential of lengthening equipment life.
- Motor loads should run cooler and quieter without the extra harmonic distortion generated by the modified sine wave.