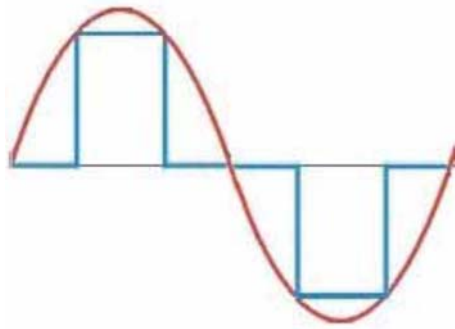


PURE SINE WAVE vs MODIFIED SINE WAVE INVERTERS



True Sine Wave in Red (same as Utility i.e. Eskom)

Modified Sine Wave in Blue

Both photovoltaic modules and batteries use direct current (DC) power. We need an inverter to change the direct current to alternating current (AC) in order to utilize the power being generated in a home. In order to maximize energy output, it is important to select an inverter with the following characteristics:

1. High efficiency
2. Low standby losses
3. High surge capacity
4. Low harmonic distortion

One way of classifying inverters is to distinguish the AC output waveforms - these are *pure sine wave* and *modified sine wave*.

All grid tied inverters are pure sine (true sine) inverters, hence the grid, by nature, is a pure sine wave electricity source. The importance of pure sine wave or modified sine wave inverters may be apparent especially for off grid applications such as RV, boat or cabins. Off grid inverters are used for connecting a battery source or a solar PV system to an AC load such as a home appliance, a laptop charger, a TV.

Pure sine wave inverters are used to operate sensitive electronic devices that require high quality waveform with little harmonic distortion. In addition, they have high surge capacity which means they are able to exceed their rated wattage for a limited time. This enables power motors to start easily which can draw up to seven times their rated wattage during startup. Virtually any electronic device will operate with the output from a pure sine wave inverter.

Modified sine wave inverters (modified square wave or step wave) approximate a pure sine waveform. Modified sine wave inverters are designed to satisfy the efficiency requirements of the photovoltaic system while being less expensive than pure sine waveform inverters. These inverters are capable of operating a wide variety of loads; electronic and household items including but not limited to TV, VCR, and satellite receiver, computers, and printers.

Application

Some electronic devices may pick up inverter noise while operating with modified sine waveform. Using fluorescent lighting can be problematic when using modified sine wave inverters. Most of the equipment on the market is designed for use with sine waves. Some appliances, such as microwaves, drills, clocks or speed motors will not produce full output if they don't use sine wave current, moreover they may damage the equipment. Some loads, such as light dimmers will not work without sine wave at all.

It's safe to say any electronic device that requires sensitive calibration can only be used with pure sine wave inverters. For many electronic devices that don't require sensitive calibration, modified sine wave inverters are a more cost-effective option. Despite the drawbacks associated with modified sine wave inverters, they are the most commonly used inverters on the market. <http://www.civicsolar.com/resource/pure-sine-vs-modified-sine-wave-inverters>