



Load start-up current concerning a UPS or Inverter System explained

Without going into highly technical details, it is not easy in to explain in laymen's terms, why sometimes, when you switch on some devices, lets say computers with a total load of 900 Watts and the inverter or UPS which is rated at 1000 Watts continuously, switches off for no apparent reason on overload. It will seem to you that the unit is faulty, which is not actually the case.

Sine wave Inverters and Pure Sine Wave UPS systems have some, but limited capabilities when it concerns inrush currents. The inverter or UPS will limit the output current very accurately to protect it self. That means the output voltage will drop to an unacceptable level and the unit will switch off if you overload the system.

For Example :

You want to run 3 standard computers with a power rating of 300 Watt each total of 900 Watts on an inverter which is rated at 1000 Watt. Theoretically a 1000 watt Inverter should be able to run a load of 900 Watt quiet easily.

Practically we encounter some problems.

For example a 1000Watt Cotek inverter has a total overload capability of 1.5 x its capacity. This would be $1.5 \times 1000W = 1500Watt$. Now each personal Computer normally runs at 300 watts but the startup or Inrush Current (which it is sometimes called) as per our list is about 3 x the nominal wattage. This would be 900 Watts. Now if you switch on the first computer with 900 Watts momentarily, no problem. If you now switch on the second computer with 900 Watts momentarily and have the first computer running now with 300 Watts which totaling 1200 Watts, no problem. Now if you switch on the third computer with 900 Watt momentarily, you will have :

1st computer 300 Watts+2nd Computer 300Watts = 600 Watts + 900Watts momentarily = 1500 Watts.

This is on the borderline of the Inverter's capability. As this overload capability is exactly electronically controlled and if the total startup current exceeds slightly the capability of the inverter, the inverter will protect itself and will current limit the output current, that means the output voltage will drop to an unacceptable value and will reset the other two computers which where already running and than returns to normal.

Conclusion :

Because of the high inrush current of the computers and the limited impedance of the inverters you should reduce the load. In this case you only can run 2 Computers safely on a 1000VA or 1 KVA pure Sine wave Inverter or ON - LINE UPS system.

This phenomenon is even more predominant if you are using "Square Wave" or "Modified Sine wave Inverters" which have basically **no** overload capability.

Therefore the "Modified Sine wave Inverter" or OFF-Line UPS systems are often overrated by at least two times to achieve similar results, with the same loading as Sine Wave inverters or Sine Wave UPS systems if you have to use highly inductive or capacitive loads.

When you size a back - up system, it is advisable to allow a 25 % spare capacity to cater partly for very often unknown excessive inrush currents but also to allow for a little expansion without immediately replacing the whole system with a larger one.

Therefore the user must make sure and to take this phenomenon into consideration when sizing a Back - up system.