

Understanding Difference Between Surge Protectors and Dirty Electricity Filters

By

Palma Engineering

Robert Palma, Midwest Research Corp.
Gregory Palma, Noble Electronics, Inc.

Copyright License

Individuals and organizations are granted a copyright license for this document if the individuals or organizations, including all employees and associates of those organizations, hereinafter called Licensees, comply with all of the following 4 requirements: 1] Licensees will not change or allow to be changed, any and all of the document title, the exact and complete document content, the attributed authors and their respective organizations of the document, the images within the document, footnotes of the document, and all referenced papers, works and Internet addresses given in this document, 2] The Licensees will only post, circulate, publish or otherwise disseminate this document in its entirety, 3] If the Licensees wish to post, circulate, publish or otherwise disseminate this document, the Licensees will only refer-to this document with the title and authors that are contained within this document, 4] The Licensees may only post, circulate, publish or otherwise disseminate this document if the purpose of said dissemination is to assist human beings to reduce the Electromagnetic fields that they are exposed-to.

Introduction

Dirty Electricity

Dirty Electricity (DE) is an unwanted energy, riding on top of, a 50 Hz or 60 Hz utility power line voltage. DE is typically recurring at some frequency in the range of;
1 KHz to 1 MHz (or higher).

DE will typically have a voltage range of;
1 V_{peak} to 10 V_{peak} (sometimes higher).
NOTE; 10 V_{peak} is a severe case.

DE comes from a wide variety of sources. See the documents;
Dirty Electricity In Off-Grid Applications
Dirty Electricity With Regards To Utility Metering Devices

Power Line Transients

Power line transients come from a wide range of sources. Typically it is the result on some appliance or device either turning-ON or turning-OFF.

A very common source of power line transients comes from electric motors turning on or turning off.

Power line transients do not typically have a recurring frequency. Example; think of a refrigerator or heating system. The on and off cycling is more random than periodic.

Nevertheless, there will be a "frequency range" of the energy within these randomly triggered transients.

A reasonable range is;
1 KHz to 100 MHz.

Power line transients will typically have a voltage range of;
300 V_{peak} to 1000 V_{peak}.
NOTE; 1000 V_{peak} is a severe case, but it is also fairly common.

Filters

Filtering devices come in 2 basic topologies;

--- **Parallel devices** that electrically load the power line to provide DE reduction.
--- **In Line devices** that actually carry the 50 Hz or 60 Hz power and provide DE reduction.

Parallel devices are simple to apply. They are simply plugged into the power circuit at a convenient outlet and they provide reduction of DE.

Parallel devices will typically reduce DE by 6-to-1, up to 20-to-1. The reduction is highly dependant upon the other devices connected to the circuit and the line impedance of the 50/60Hz circuit.

In Line devices must be connected to actually carry all of the 50/60 Hz power that they are intended to filter.

They will typically reduce DE by 500-to-1 up to 2000-to-1.

Important Distinction Between Dissipative and Non-Dissipative Parallel Devices

There are currently 3 manufacturers who provide Parallel devices that are simple capacitors. These products attempt to "short circuit" the DE. These filtering devices will provide an indication of "working" because the DE voltage has been reduced, and this will thereby reduce the Electric field that results from said DE voltage.

These filtering devices, by their "short circuit" effect also increase the DE current and thereby increase the DE Magnetic field. Many Bau Biologists do not think that this is a good approach.

The PxDNA and RxDNA-V2 products (Noble Electronics, Inc. the 4th manufacturer) are parallel devices but they place a resistive load on the AC line which captures the DE and turns it into heat. This is the ideal behavior of a parallel device.

Surge Protection Devices

These devices detect high voltage transients and near-instantaneously, provide a near-short-circuit on the AC line to reduce that transient.

These devices are typically implemented by the MOVs (metal oxide varistors) or Transorbs (back to back zener diodes).

Surge Protection Device Trigger

It is very important to understand that surge protection devices require a high voltage to trigger them into the so-called short-circuit state.

Example;

For a typical 120 VRMS (170 volt peak voltage), a surge protection device would be set to turn on at 300 volts.

The Common Mis-Understanding That Surge Protection Devices Will Accomplish Reduction of DE

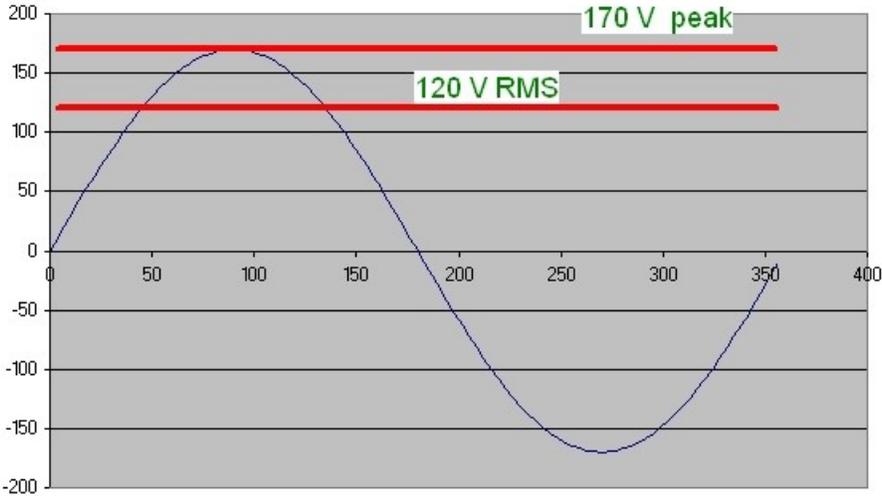
The frequency regime of the transients that surge protection devices reduce is very similar to the frequency regime of DE, and therefore one can think that a surge protection device will reduce DE.

It will not.

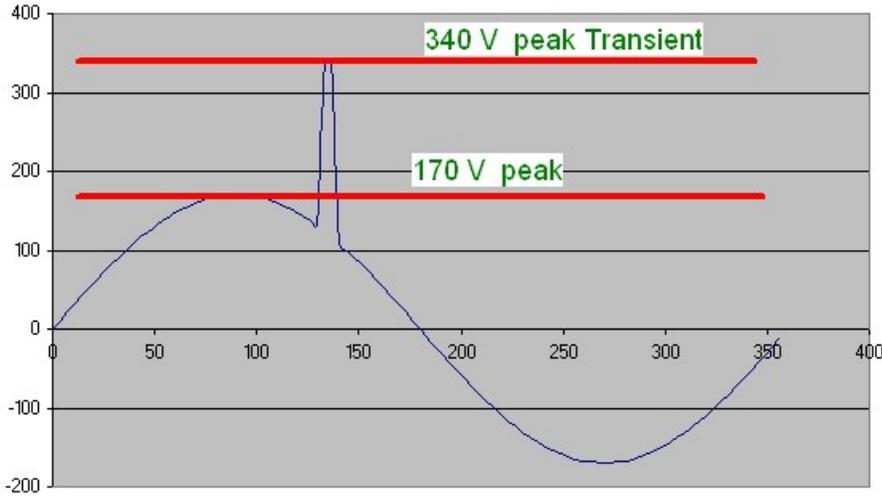
The DE will never trigger the surge protection device.

To reduce DE a filtering device is needed that "works at any voltage".

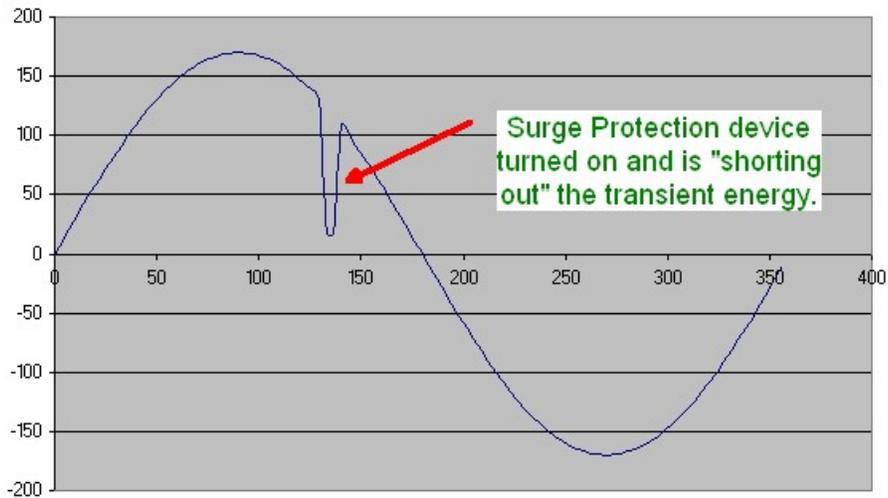
A Clean AC Sine Wave - Your Ideal Powerline Voltage



AC Sine Wave With Transient



AC Sine Wave With Transient Suppressed



AC Sine Wave With Severe Dirty Electricity

