Environmental Potentials

Residential Protection using EP-HPF unit

EP-HPF is a residential home protection filter designed to protect the electronics in your home from both internal and external generated electrical noises. The following report shows the effectiveness of the EP-HPF filter when installed in a single-family house in Utah, USA.

Installation: EP-HPF is connected to the bottom 20A circuit breaker of a 150A load panel, as shown in the picture. The lead lengths of the EP-HPF unit are maintained at the shortest possible distance to attain effective surge and noise-suppressing capabilities.

Measuring Tool: ELSPEC G4500 meter is used to log the home data before and after installing the HPF unit.
Quick findings: The measured data clearly shows that, HPF units

1) Removed the transients
2) Reduced the electrical noise

Measurements and Analysis:

Figure 1 and 2 shows the log of current consumption before the after installing the HPF units respectfully. The results show that the inrush current reduced from 120A to 90A (18% reduction).

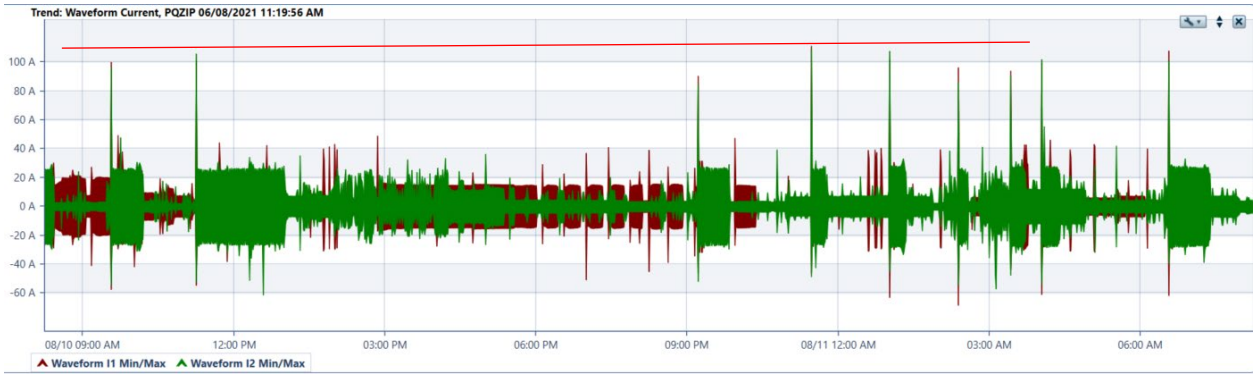

Figure 1: Current log of the main panel *before* installing HPF unit

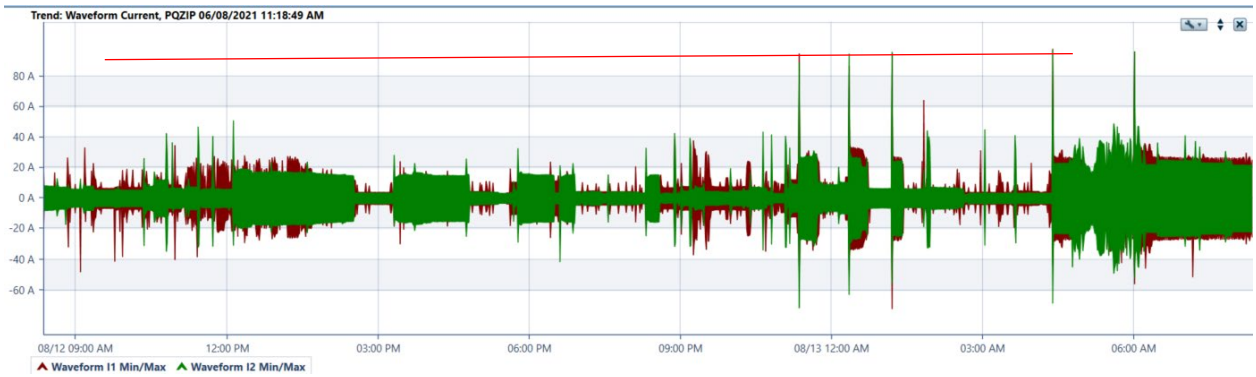

Figure 2: Current log of the main panel *after* installing HPF unit

High inrush currents often amplify in the system, resulting in transients that decrease sensitive electronics' life. By reducing the inrush currents by 18%, HPF units reduced the chances of load failure in the home, and also the longevity of the home appliances is further enhanced.

The closer view of the inrush current on the main panel before installing HPF is shown in Figure 3. The high peak currents are clearly visible.

Figure 3: A closer look at the inrush currents *before* installing EP-HPF unit

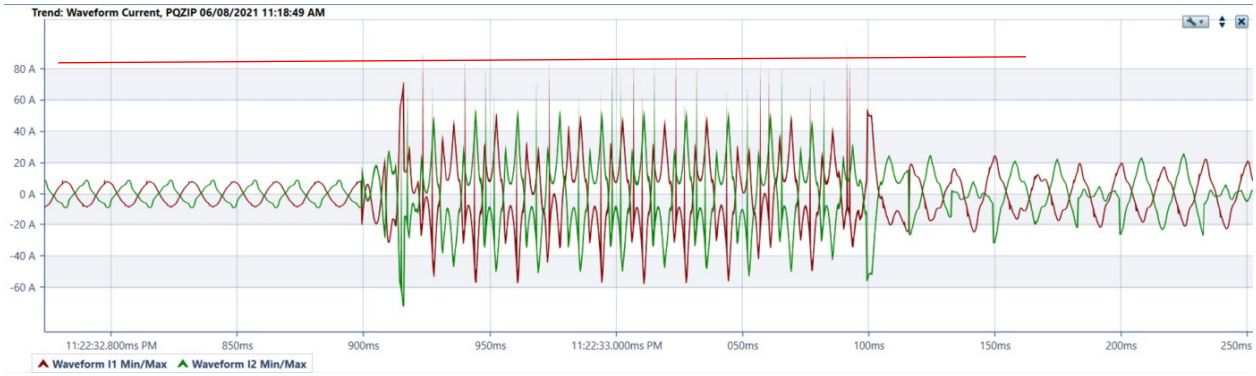

Figure 4: A closer look at the inrush currents *after* installing EP-HPF unit

Figure 5 and 6 shows the current waveform before and after installing the HPF units. After installing the EP-HPF unit, the waveform tends to be coming back to its sinusoidal nature, and the transients at the peak of the waveform are disappearing.

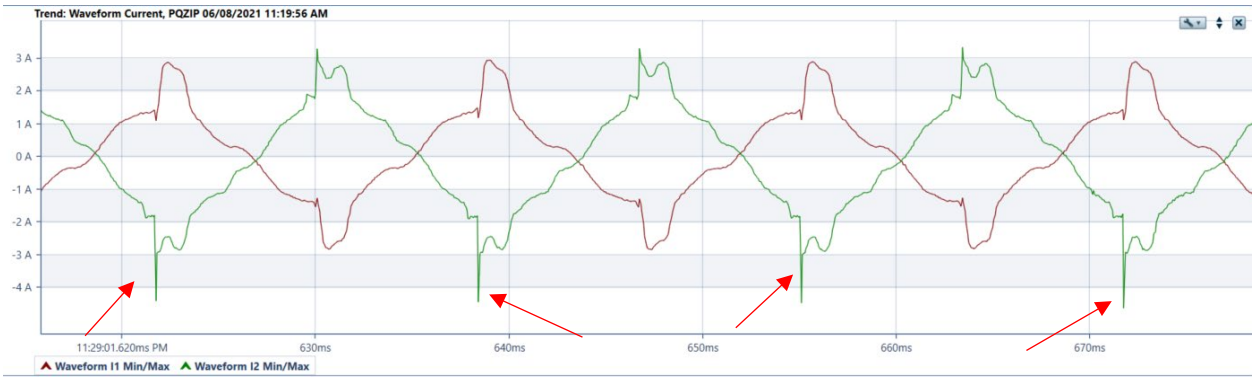

Figure 5: Current waveform *before* installing EP-HPF unit

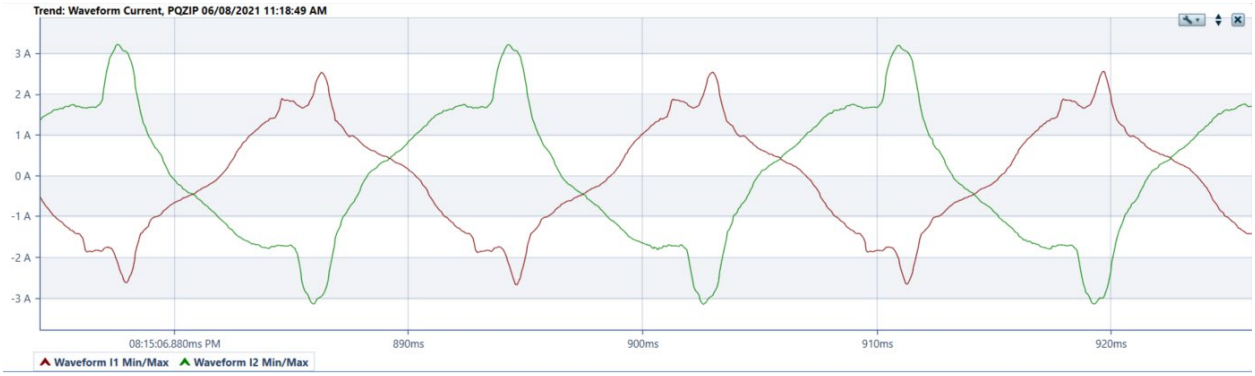

Figure 6: Current waveform *after* installing EP-HPF unit

Restoring the current waveform's sinusoidal nature is critical to maintaining a healthy electrical environment. The sine wave helps retain the high efficiency and high throughput of the electrical loads.

The following figures 7 and 8 show the high-frequency noise min/max on the voltage before and after installing

the HPF units. Figure 8 shows an apparent reduction in the min/max values of the high-frequency noise. Reducing high-frequency noise helps the electrical loads not behave erratically.

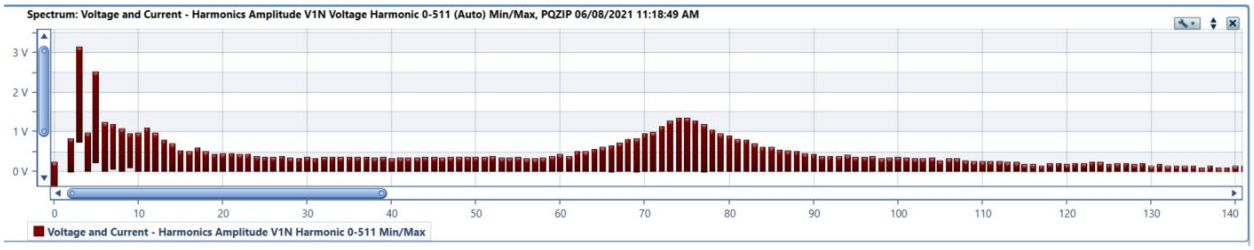

Figure 7: HF noise of the main panel *before* installing EP-HPF units.

Figure 8: HF noise of the main panel *after* installing EP-HPF units.

Summary of results:

Item	After installing HPF units	Advantages by adding HPF unit
Inrush Currents/Transients	Reduced (Fig 1,2,3,4)	1) Helps to reduce the resonance (amplification of noise) in the system 2) Decreases the chance of equipment failure 3) Increases the longevity of your home appliances
Waveform	Peaks reduced, sinusoidal nature restored (Fig 5,6)	1) Healthy power supply to the loads 2) Increased longevity of your appliances
HF noise	Reduced (Fig 7,8)	1) No more erratic behavior of the loads 2) No computer lock-ups 3) Increased longevity 4) Reduced energy consumption

EP-HPF features:

1- Can be installed up to 200A panels.

2- Is compatible with every electrical panel in the world

3- Combination of filter and SPD

4- Idle for apartments, townhouses, and single-family homes

Conclusion:

After installing the EP-HPF unit to the 7-year-old 150A electrical system in a single-family home, it is measured and found out that the inrush currents /transients and HF noise are significantly reduced; resulting in a much cleaner sinusoidal waveform. Feeding noise-free sinusoidal waveform to the electrical appliances helps the system grow healthy with fewer chances of failure. The other added advantages of feeding a system with a healthier signal are

1. Increased longevity of the electrical system
2. Low maintenance of the electrical loads such as HVAC, appliances, etc
3. Possible energy loss reduction.

An average home in the US has over $20,000 worth of electrical appliances that are subjected to damaging effects of surges and noise. The surges cause millions of dollars of damage to the electrical systems every year, with an average insurance claim of $5,869 per surge incident in 2013 for the US residential market. Although the amount is shown above only reflects in the instantaneously damaged electrical loads per incident, thousands of dollars of damage are “slowly causing” to the residential market. Do yourself and your home a huge favor by installing HPF units at the main panel – Your ROI is less than six months.