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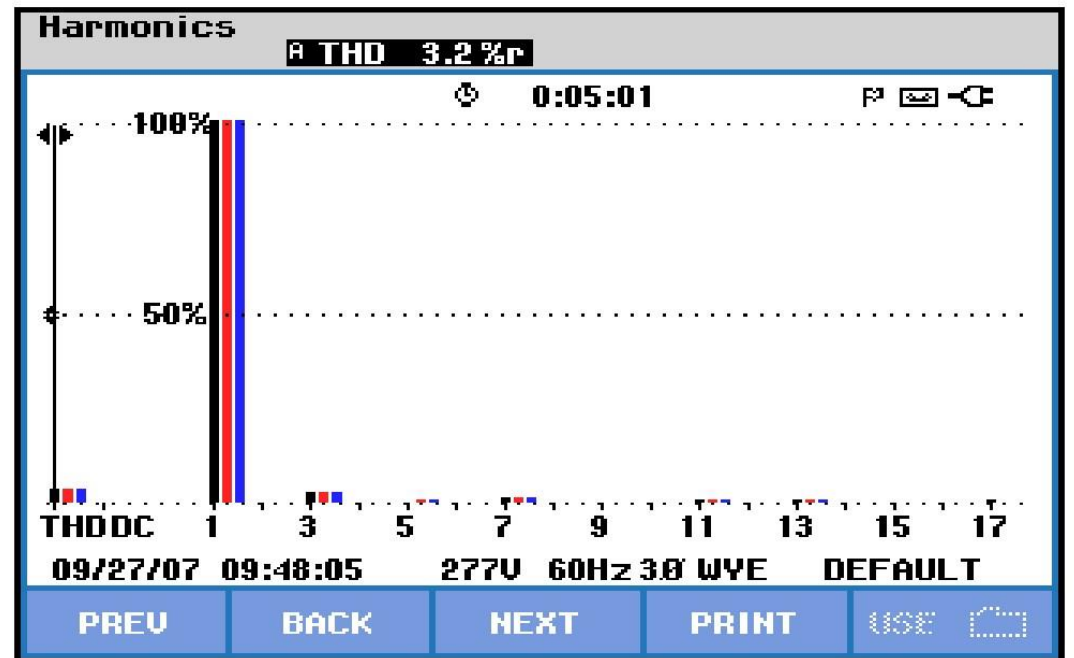
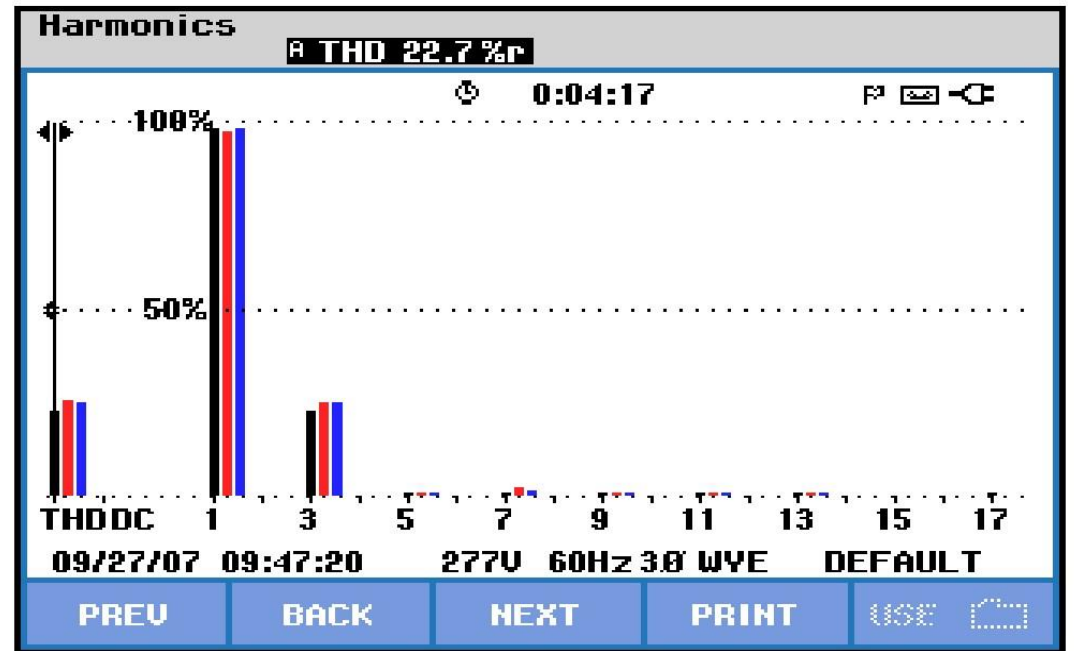
www.phaseback.com

PHASEBACK

HARMONIC SILENCER

PATENT NO. 7,923,867

For Low, Medium & High Voltage Systems





APPLICATIONS

- Industrial Controls & Automation Systems
- Power Stations & Plants
- Wastewater Treatment Facilities
- Oil & Gas Industry
- Onshore & Offshore Platforms
- Solar & Wind Systems
- Communications
- Chemical Companies
- Automotive
- Aerospace
- Work Boats & Cargo Vessels
- LED Surge Protection

OUR CLIENTS

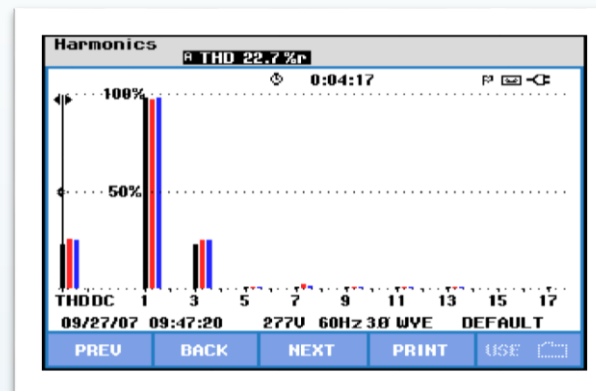
- US Coast Guard
- US Navy
- Automotive Companies
- Papermaking Industries
- Fertilizer Manufacturers
- Plastics Manufacturing
- Fireproofing Manufacturer
- Lighting Manufacturers
- Food & Agriculture Companies

HARMONIC SILENCING

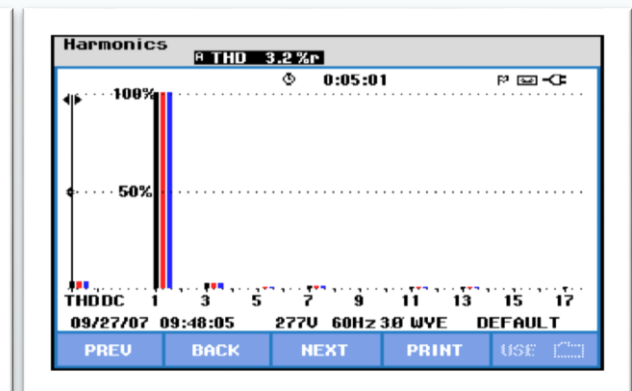
Phaseback Harmonic Silencer

The Harmonic Silencer is a filter for WYE power systems. It is self protected and runs in parallel with other loads allowing installation without shutting down running equipment. The Silencers design includes a continuous duty positive temperature coefficient system that is self regulating. Any facility powered from a WYE power transformer will benefit from multiple units as necessary to lower harmonics to a level enabling trouble free operation. Typically only one Silencer will be needed to protect all loads on an entire power circuit from the effects of line harmonics.

SILENCER OFF



SILENCER ON



"For any electromagnetic device, a motor or transformer and even a wire for that matter, **the losses go up equal to the square of the harmonic number**. So if you have third harmonic current, the losses for that component of the current go up by a factor of nine. If you have a 9th harmonic current at the same current magnitude, the effective loss factor would be 81."

Richard Bingham, Director of Product Development at Dranitz-BMI in Edison, NJ.

Chairman of *NEPA 70B Recommended Practice for Electrical Equipment Maintenance*.

Transformers have losses that are very low to 60 Hz power; however, the losses are higher as the frequency of the current increases each harmonic is a multiple of the base frequency, 60 Hz in the US. So Delta transformers remove harmonics from the phase conductors, and they have losses that increase as the frequency of the current increases.



WHAT THE HARMONIC SILENCER DOES

HARMONIC REDUCTION & CANCELLATION

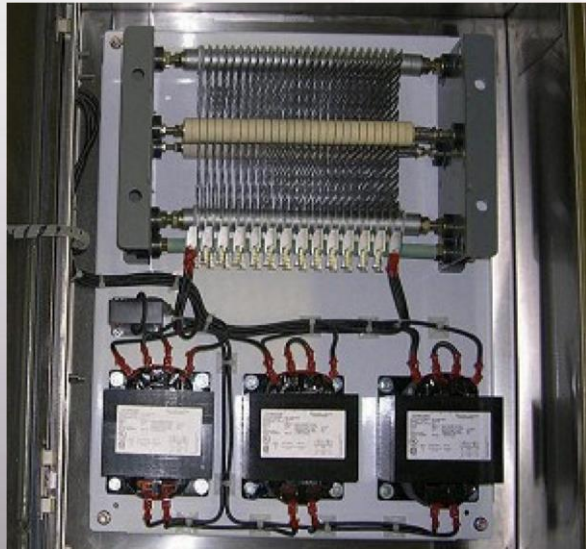
The Silencer is a harmonic reducing and surge suppression device based on a configuration of three power filters all designed to use little or no power when no noise energy is present. The Harmonic Silencer, like other Applied Energy LLC products, uses noise energy to cancel itself. The larger the noise the more the Silencer will react and apply a correction. The response time is not like other types of surge suppression. The Silencer reacts instantaneously limited only by the inductive charging rate. Solid state components are not used in the design. The Silencer differs from other types of suppression in other ways. There are no circuits converting high voltage spike to high current surges and the Silencer does not increase the magnitude of ground current in any machinery or facility circuit.

Beating Back the Noise

When harmonics are present on the line or during a surge which causes high frequency noise (harmonic current), two filters inductively coupled react for low order line harmonics and a 50% reduction in line harmonics occurs due to cancellation (Percentage of reduction will vary based on system operation). With the 120 degree phase shift from phase to phase in a three phase system, there is a cancellation effect on the odd harmonics.

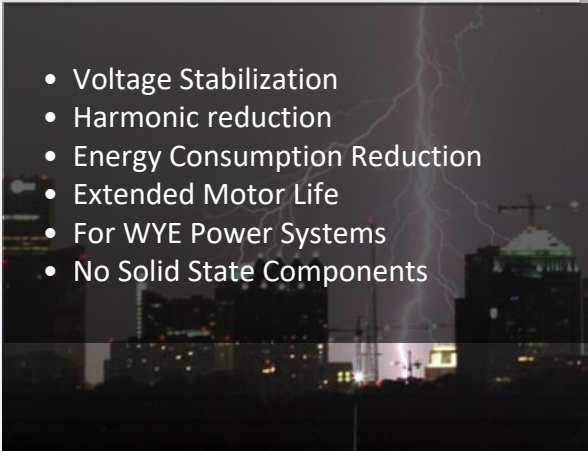
In the third filter circuit there is a high power factor filter for minimizing the magnitude of all harmonics including even, odd and triplen limiting all other harmonics, as well to a level low enough to prevent damage allowing trouble free operation.

Typically only one Silencer will be needed to protect all loads on an entire power circuit from the effects of line harmonics.



BENEFITS

- Voltage Stabilization
- Harmonic reduction
- Energy Consumption Reduction
- Extended Motor Life
- For WYE Power Systems
- No Solid State Components



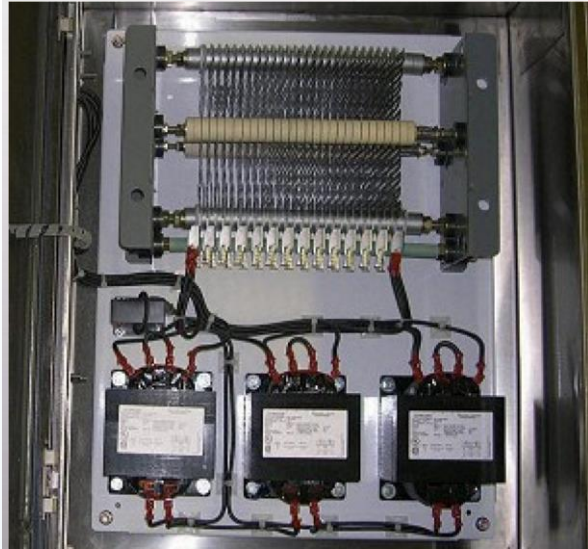


PHASEBACK HARMONIC SILENCER



EXTENDING MOTOR LIFE

The Silencer reduces harmonics extending the life of electrical loads. It is well established that a 10 degree C reduction in heat energy in electrical devices will double its life, this can be accomplished by a 5% reduction in harmonics. The Silencer provides reductions of harmonics and transient voltage spikes in the line of approximately 200 to 400% extending equipment life. This allows equipment to run production with less downtime and less maintenance dollars, so users will see the results directly on the bottom line.



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- Harmonic reduction
- Energy Consumption Reduction
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- No Solid State Components

CONNECTING THE SILENCER

The Harmonic Silencer **connects in parallel with other loads on the line**, unlike conventional harmonic filters that rely on series connections, such as line reactors connected in series with the power entering a drive, chokes connected in series with the power leaving a drive, or inductors designed into the drive for smoothing current surges.

Available in several sizes based on the line harmonic content.

Unit dimensions are based on size. Voltages tappable thru 600 Volts



CONTACT INFORMATION

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REQUEST A QUOTE

Harmonic Silencers are built to order, and are designed for your specific need. For a quote, go to our website and fill out our form, or call our offices to speak to an engineer about your issues.

HOW TO BUY

The Silencer is the only Harmonic Filter that can withstand the most powerful surges without damage to itself or anything it protects.

The laws of physics do not change, but our understanding of them does; Harmonic Silencer works on a fundamental electromagnetic principle that reacts at the speed of current flow, is shock proof, vibration proof and works in the harshest conditions.

The Silencer has a Lifetime Warranty and has proved itself in the market for the past 12 years. Used by industries, factories, and the military, Harmonic Silencer has saved millions of dollars worth of equipment, and has even saved lives.



On a recent renovation project, installing Applied Energy Equipment proved to be a significantly cost effective alternative to installing surge suppression devices on each of 58 electrical panels. Estimated cost avoidance \$100,000. In the restructuring of the company the installation was moved to a new location. The Applied Energy products were also moved eliminating the need to purchase new equipment adding to the savings. On this recent renovation project, installing one Phaseback and Silencer proved to be a significantly cost effective alternative to installing surge suppression or harmonic amp trap devices on each of 58 electrical panels. Estimated cost avoidance well over \$100,000.

The loads in this facility were fluorescent lighting and 1,000 computers and servers. After several years there were no damaged equipment from any internal or external sources of noise or lightning strikes. They have reported that there “was not even a blip on one computer screen”.

See more testimonials, case studies and whitepapers on our website

www.phaseback.com