

Harmonic Neutralizer

Magna-Power Electronics Harmonic Neutralizers eliminate families of harmonic components by multiplying the number of input phases with specially wound magnetic components. These transformers, in combination with equally loaded, high-power DC power supplies, offer a cost-effective solution to maintaining power quality at acceptable levels. Harmonic Neutralizers are packaged in cabinetry designed to be integrated with multiple MT Series VI installations.

Why Neutralize Harmonics?

Input current harmonics are a by-product of nearly all power supplies. Power can only be delivered to the load if the frequency and phase of the voltage and current match. For a three phase power supply using a three phase input rectifier, the input current has a theoretical spectrum of $6n \pm 1$ where n is an integer incrementing from 1; this is known as a 6-pulse waveform. This means that a power supply with a three phase input rectifier will produce input currents at 1, 5, 7, 11, 13, 17, 19 ... times the fundamental frequency. The theoretical magnitude decays as the reciprocal of the harmonic component. The 5th and 7th harmonic components have magnitudes of 20% and 14% of the fundamental component, respectively.

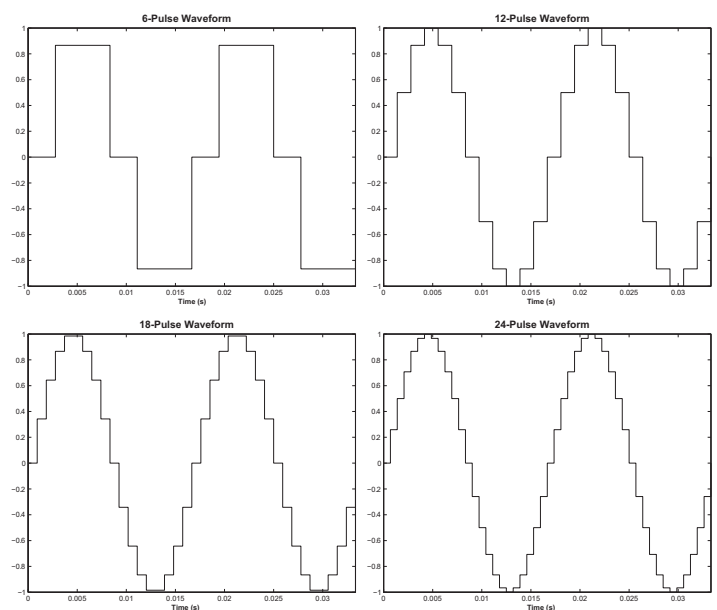
Harmonics currents in power systems can find unusual paths and can cause problems if the magnitude is significant and there are loads sensitive to harmonic frequencies. For example, lighting ballasts have series connected capacitors and inductors which can be excited by harmonic currents. IEEE has introduced standard, IEEE 519, which defines recommended limits. Implementing this standard requires a knowledge of the power system and other loads producing harmonics. Unfortunately, the standard can allow the same power supply to possibly exceed limits in one application and not in another. In the same respect, a power supply may or may not cause a harmonic related problem with or without meeting IEEE 519. The best solution to minimize the risk of a harmonic problem is to eliminate the harmonic current at the source.

Models and Ratings

Model	Power Modules	Power (kW)	Pulse No.	Weight (lbs)	Size (H" x W" x D")
HN200-12	2 x 100 kW	200	12	935	62.5 x 24 x 31.5
HN300-12	2 x 150 kW	300	12	1602	62.5 x 24 x 31.5
HN400-12	4 x 100 kW	400	12	1670	62.5 x 24 x 31.5
HN450-18	3 x 150 kW	450	18	1982	62.5 x 24 x 31.5
HN500-24	2 x 250 kW	500	24	3003	62.5 x 24 x 31.5
HN600-12	4 x 150 kW	600	12	3003	62.5 x 24 x 31.5
HN1000-48	4 x 250 kW	1000	48	9012	62.5 x 72 x 31.5

AC Harmonic Waveforms

The following figures are representative of expected AC current waveforms for the various pulses available from Magna-Power Electronics power supplies. As standard, models 2 kW through 150 kW produce 6-pulse waveforms, while 250 kW models produce 12-pulse waveforms. Magna-Power Electronics Harmonic Neutralizers suppress families of harmonics by increasing the number of power phases. It can be used when multiple power supplies are used in series or parallel and are equally loaded. Harmonic Neutralizers can produce 12-pulse, 18-pulse, 24-pulse, or 48-pulse waveforms which have harmonic current components on the order of $12n \pm 1$, $18n \pm 1$, $24n \pm 1$, or $48n \pm 1$, respectively. The following figures show the theoretical difference for waveforms with a different number of pulses. Harmonic Neutralizers are protected with appropriate sized primary-side circuit breakers.



Size Diagrams

