Solution Profile

Harmonic Solution Guide

Power quality solutions for line side harmonic distortion in non-linear loads.

What are Harmonics?

Harmonics can be best described as the shape or characteristics of a voltage or current waveform relative to its fundamental frequency. But what does that mean? Well, the ideal power source for all power systems are smooth sinusoidal waves. These perfect sinewaves do not contain harmonics. When waveforms deviate from a sinewave shape they contain harmonics. These current harmonics distort the voltage waveform and create distortion in the power system which can cause many problems.

The Destructive Effects of Harmonic Distortion

A power system's ability to perform at optimal levels is compromised when harmonic distortion enters the system. It creates inefficiencies in equipment operations due to the increased need for power consumption. The increase of overall current required creates higher installation and utility costs, heating, and decreasing profitability.

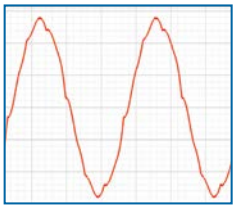
Power system problems that can occur without a harmonic filter:

- Increased installation and utility **cost**
- **Overheating** of components
- Equipment **malfunction**
- **Nuisance tripping** of circuit breakers
- **Inaccurate measurements** on sensors
- **Telecommunication interference**

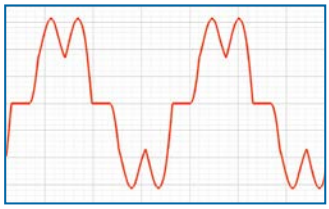
The Two Types of Loads

A power system can contain one or two different kinds of loads, a non-linear load or a linear load.

Linear Load



Non-Linear Load



Linear Loads

Linear Loads have a current waveform that is proportional to the amount of voltage applied. If the voltage doubles the current doubles as well, maintaining a near perfect sinewave, creating no harmonics. Examples of the types of linear loads are: incandescent lamps, heaters, and resistors.

Non-linear Loads

When current is not proportional to the voltage, the load is classified as non-linear. Non-linear loads are most associated with modern electronic equipment that often relies on line-operated switch mode power supplies. These loads create harmonic distortion that can have adverse effects on your equipment. Examples of non-linear loads include: Variable Frequency Drives (VFDs), arc furnaces, and other uninterrupted power supplies.

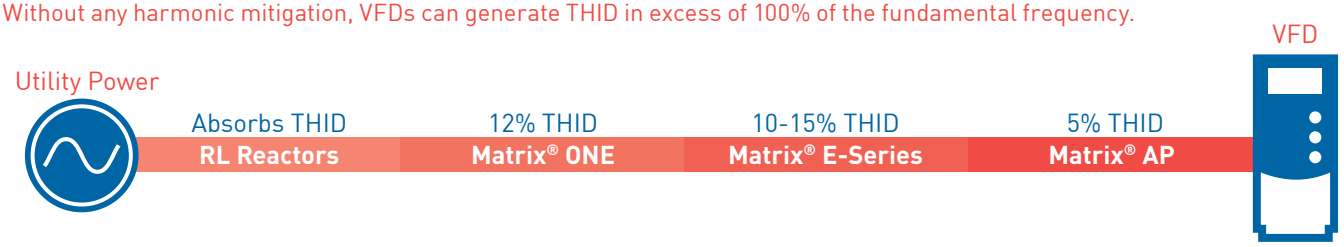
MTE
POWER QUALITY. SOLVED.
A STEEL PARTNERS COMPANY

Harmonic Mitigation is Essential for Long Equipment Life

MTE offers application engineered products designed for the performance you need.

Total Harmonic Distortion (THID%) Dependent on Application Used.

Without any harmonic mitigation, VFDs can generate THID in excess of 100% of the fundamental frequency.



RL reactors

RL reactors are unequalled in absorbing power line disturbances. They are built to withstand even the most severe power spikes. They reduce nuisance tripping, reduce harmonic distortion and minimize long lead effects.

Matrix® ONE

Matrix ONE single phase filters are optimized to work in remote and rural areas where three phase power is not available. Its patented design provides the harmonic mitigation you need to keep your equipment running longer.

Matrix® E-Series

Matrix E-Series delivers the performance you've come to expect out of a Matrix filter without being over engineered. It is an afforable solution to managing unwanted harmonic distortions - such as nuisance tripping of circuit breakers, inaccurate measurements on sensors, overheating of components, and system downtime - generated by Variable Frequency Drives (VFDs).

Matrix® AP

The Matrix AP is the most advanced filter on the market today. It features patented Adaptive Passive Technology that allows it to perform like no other filter – virtually eliminating distortion. The Matrix AP can adapt to varying loads, allowing you to meet IEEE-519 standards. It's the best in the industry.

DID YOU KNOW ? In 2014, IEEE-519 standard regulations were updated. To learn more about whether or not your business is meeting IEEE-519 standards, visit our site at **mtecorp.com** and look for the Matrix AP.

MTE Corporation
N83 W13330 Leon Road
Menomonee Falls WI 53051
(800) 455-4MTE • (262) 253-8200

MTE POWER QUALITY. SOLVED. A STEEL PARTNERS COMPANY

FORM: SP-005-E 06/21