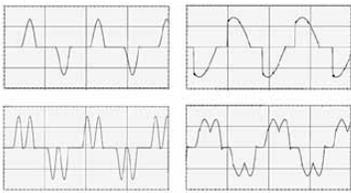


QL Guard III Harmonic Mitigating and QL Ultra Efficient HMT and K-Factor Transformers

Non-Linear Test Laboratory

Introduction

The rapid development and growth of computers and other electronic devices in recent years has resulted in extraordinary benefits in productivity, but such advancements have also resulted in a substantial increase in harmonic currents in power systems.



Harmonics are high frequency currents mixed with the normal 60 Hz current. In general, most electronic devices generate high harmonic currents, but some devices are more problematic such as fluorescent lamps,

ferroresonant regulators, saturated core transformers and reactors, welders, and arc furnaces.

Harmonics can cause overheated wires, reduced energy efficiency of transformers, malfunction of sensitive electronic devices such as PCs and PLCs, and random circuit breaker tripping.

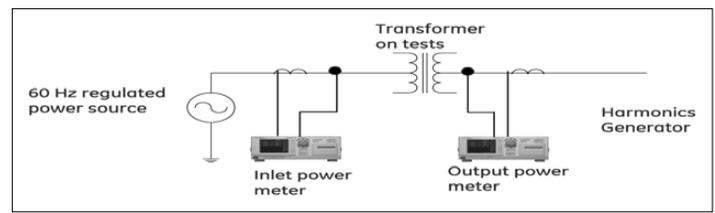
The Guard III harmonic mitigating transformer was developed by GE to help reduce harmonic content in electrical distribution systems.



GE Non-Linear test lab

To verify the performance, quality, and reliability of GE Guard III harmonic mitigating transformers, GE has developed a state-of-the-art non-linear test laboratory. The non-linear laboratory is located in GE's existing UL-Listed transformer test laboratory. The non-linear test laboratory has the capability to simulate large electronic loads such as computer centers or commercial office buildings where widespread use of electronic equipment and harmonics are common.

The main components of the test laboratory include a large power harmonics generator, high-precision current transducers, and two Model WT1600 Yokogawa power meters with built-in harmonic analysis capability. Shown below is a schematic diagram of the non-linear test laboratory.



GE Non-Linear Test Lab

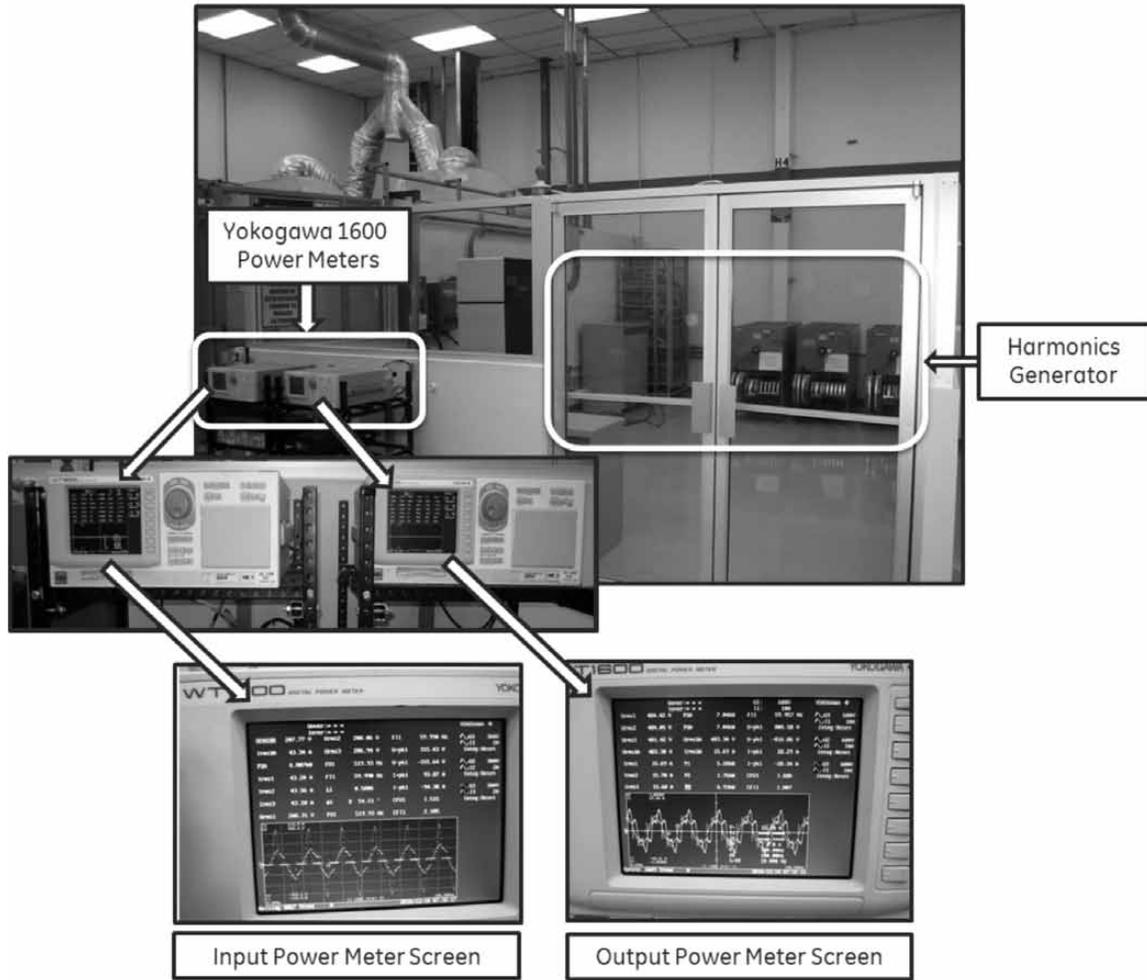
The laboratory has the capability to measure critical electronic parameters such as power, voltage, and current, and can measure the harmonic spectrum in voltage and current simultaneously, at both sides of the transformer. This capability allows the test engineer to verify two of the most important characteristics of Guard III transformers: **1) the capability to reduce the current harmonic distortion at the source side** and **2) the electrical efficiency of the transformer under non-linear conditions.**



Non-Linear Test Lab Showing Harmonic Generators



The photograph below shows a) harmonic generators and b) power meters with built-in harmonic analysis capability.



GE Energy
41 Woodford Avenue
Plainville, CT 06062
www.geindustrial.com/solar
© 2011 GE Company

