Mission Critical Facilities

Power Factor and Harmonics -

Effects on UPS systems

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1. INTRODUCTION

This report was written in response to financial institution's request for a clearer understanding of the UPS systems' capacities operating at their various sites.

The report covers basic electrical principles, power factor concepts, static UPS theory and switch-mode power supplies. These concepts and definitions are then used to help explain the current situation present at this client's sites.

2. EXECUTIVE SUMMARY

Leading power factor of the load has been identified as the main problem that affects the kVA/ kW capacity of static UPS systems. Leading power factor is a characteristic of the power supplies of IT Servers, PC. The reasons and theory are covered extensively within the report.

Effectively the installation will not be able to supply the design load, as it was not designed to feed leading power factor load. The change in load characteristics can be attributed to a major European Directive, which requires all electrical equipment to be power factor corrected.

There are several options that are available that would help tackle this current situation for both new installations and existing installations as well.

3. OBJECTIVES

The constant upgrading of IT Server equipment impacts the electrical operation of the distribution network. The objective of this report is to provide an explanation starting from basic theory and covering all aspects that lead to reduced operational capacity of static UPS.

The aim of this report is to provide a definitive guide detailing the reasons for the current power systems behaviour at the client's various sites. This assumes a certain degree of knowledge of electrical engineering, although most of the basics are covered and will be referenced several times throughout the entire report.