The Knowledge Network

ELECTROMAGNETIC COMPATIBILITY & FUNCTIONAL SAFETY

Annex B - Electricity Distribution

A Factfile provided by The Institution of Engineering and Technology
www.theiet.org/factfiles

Annex B

EMC and functional safety considerations for building services and electricity distribution

Abstract

Where safety-related electrical, electronic, or programmable electronic equipment or systems are powered from the mains supply, they should be suitably resistant to the mains-borne EM disturbances they could reasonably foreseeably be exposed to. This annex discusses:

- What EM disturbances can electrical equipment (apparatus) expect on its mains supplies?
- What typical effects are produced by these EM disturbances?
- What can be done to prevent safety problems arising as a result of poor compatibility with mains-borne EM disturbances?

Mains voltage dips, dropouts, and interruptions are identified as the least well controlled EM disturbances, that also give the greatest cause for concern.

Contents

Annex B1 The impact of international and European standards upon power quality……..…B1 1-17

Annex B2 Achieving quality and reliability of supply in modern buildings……...….B2 1-22

General introduction

This annex consists of two papers originally written by ERA staff for the '*Quality and Security of Supply in Electrical Networks 1999*', and '*Optimising Building Services: Making Business Sense 1999'*, conferences respectively, intended for Electrical Supply Managers and Facilities Managers but relevant to equipment manufacturers and suppliers.

Annex B1 describes the typical disturbances covered by EMC Directive harmonised standards, and by standards relevant to the mains supply. These include frequency, transient overvoltages, harmonic voltages and voltage dips. A summary table is included, and the differences between the types of standards are highlighted. The summaries are a useful reference for manufacturers unsure of what mains-borne EM disturbances their apparatus might be exposed to.

Annex B1 also considers the effect of standards on equipment, concluding that the EMC Directive's harmonised standards provide a useful framework for improving perception of power quality, but that equipment complying with these standards might not be immune enough to function correctly under many of the foreseeable EM disturbances, especially dips, dropouts, and interruptions.

Annex B2 considers the foreseeable effects that mains-borne EM disturbances can have on a number of types of apparatus. The EM disturbances created by typical building loads are also considered. It goes on to describe some of the safety implications of incorrectly specified equipment, and to provide example solutions for some cases.

Annex B2 concludes by providing a general approach to identifying and resolving power quality problems for both new and existing equipment. Only by continual monitoring of his mains power 'quality' can the operator ensure that his systems are operating with the desired levels of safety.