COMPUTERIZED REMOTE HARMONIC MONITORING LOW VOLTAGE HARMONIC MEASUREMENT SYSTEM

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ABSTRACT

This project is concern to the design, development and upgrade the present system of a computerized remote harmonic monitoring low voltage harmonic measurement system. A prototype was tested in the laboratory with yield satisfactory performance. The proposed system consist of a low cost high performance data acquisition PCL-1800 data acquisition card plugged to a personal computer (PC) which act as a data acquisition unit and a remote monitoring unit. The remote monitoring unit and data acquisition unit communicates through modem. The system software was developed in Visual Basic, which exploit fully windows capability giving flexible, fast and easy application.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Harmonic distortion on power system and within customer facilities is a growing concern. The increasing application of power electronic equipment resulting in the generation of harmonic current components, combined with changing system characteristics, is resulting in higher distortion levels throughout the system. Harmonic distortion problems include equipment overheating, motor failures, capacitor fuse blowing, accessing neutral currents within building, and inaccurate power metering.

Power electronics load control the flow of power by drawing current only during certain interval of the 50 Hz period. Thus, the current drawn by the load is no longer sinusoidal and appears chopped. The sinusoidal current can interact with system impedance to give rise to voltage distortion and in some cases, resonance. [5]

Unlike transient event such as lightning that last for a few microsecond, or voltage sags that last from a few millisecond to several cycle, harmonic are steady state periodic phenomena that produce continues distortion of voltage and current waveforms. These periodic nonsinusoidal waveform are described in term of their harmonics, whose magnitude and phase angle are computed using Fourier analysis.[1] The analysis permits a periodic distorted waveform to be decomposed into an infinite series containing dc, fundamental frequency(50 Hz), third harmonics(150 Hz), fifth harmonics(250 Hz), and so on.[4] The individual harmonics add up to reproduce the original waveform. Positive and negative half cycle of power system voltage and current tend to have identical waveshapes so that their Fourier series contains only odd harmonics. [10]