AN ON-LINE MICROCOMPUTER CONTROLLED STATIC VAR COMPENSATOR FOR POWER SYSTEM LABORATORY EXPERIMENTS

Thesis is presented to fulfil the requirement of Advanced Diploma in Electrical Enginearing of MARA Institute of Technology

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Abstract

The objective of this project is the development of the laboratory model of an on-line individual control scheme of Static Var Compensator controlled by using microcomputer. The compensator circuit comprises of three wye connected capacitors together three airgap type linear inductors along with two anti-parallel thyristor in each arm connected in delta. An on line individual control scheme of the Static Var Compensator (SVC) which is constructed by thyristor controlled reactor (TCR) and fixed capacitor (FC) is designed to correct the power factor and balance the three phase load line current. The value of real power and reactive power (P-Q) measured at each sampling instant by the transducer between any two phases at the load bus terminal. Feedback signals from the line voltage and transducers sent to microprocessor through ADC0816 converter.

A control circuit with simple hardware was designed to fire the thyristor whose delay angles were controlled by programmable interval timer 8253. The control circuit interface to the computer by using the prototype board data conversion circuit.

1.0 INTRODUCTION

1.1 General Aspect

The most important requirement of power system operation is to ensure that the system can be maintained at balanced condition. When the system is unbalanced condition, its will produces the negative sequence and zero sequence currents which will create and increase the ohmic losses in generator field windings and damper winding. Primarily, the system must have positive damping under normal operation and this damping must be sufficiently high to bring the power system back to stable operation after network faults. This stability can be partly achieved by installing dynamic load compensator into the system.

The importance roles of SVC in modern days, complex power of the laboratory SVC model to enable undergraduate power student be exposed to its functional operations in their study in power engineering subjects.

The on-line control system using the PC to control the SVC is used to balance the line currents and improve the system power factor. The compensation susceptence of each phase of the SVC is determined from feedback signals of three real power and reactive power (P-Q) transducer. By using the Q-Basic