

CHAPTER I

INTRODUCTION



1.1 General

The persistent and increasing effort on the part of the electrical machine manufacturing industries to preserve the best possible performance of their products has directed special attention towards the using of electronic circuits with the machines. A number of techniques have been used in designing the circuits, and many of this new developed techniques have preserved for the manufacturers themselves. Likewise an automatic voltage regulator for alternator, the designing technology has been kept by the producer.

In Thailand, many Government Departements and Industries that use electric generating sets have still to purchase the automatic voltage regulator for their generating sets from abroad with a dear price.

Consequently, there should be a research and study in the designing and construction of an automatic voltage regulator for alternator which posses high quality but economical price in Thailand. The consequence is the country saving of foreign currency and more-
over the technology will be more well known which shall give the usefulness to the local alternator manufacturing industries.

1.2 Objective and Scope of the Research

The work in this thesis is to design and construction of a solid state automatic voltage regulator for use with conventional alternators of rating between 10 to 25 kilowatts. Generally the voltage regulators for the alternators in the range considered need a $\pm 2.5\%$ voltage - regulation. Consequently, a voltage regulator of voltage regulation of $\pm 2.5\%$ will be chosen for this work and the design aims to meets the following requirements:-

Voltage Regulation : Within $\pm 2.5\%$ from no-load to full load and over a range of power factor from 1.0 to 0.8 lagging.

Regulator Output : 25 - 85 VDC at 10 amperes maximum continuous.

Minimum Range of Voltage Adjustment at No-load, 50 Hz : $\pm 10\%$

The sequence of this work may be summarized as follows :-

- (a) Study of the theoretical background of the automatic voltage regulator for use with alternator.
- (b) Study of the method of design and construction of the voltage regulator for alternator.
- (c) Design and construction of a prototype of the regulator.
- (d) Test of the performances of the regulator that had been constructed.

1.3 Outline of the Thesis

The outlines of this thesis may be summarized as follows :

- 1.3.1 The theoretical background is introduced in Chapter II.
- 1.3.2 A design of regulator system is worked out in Chapter III.
- 1.3.3 A step by step design of the circuits of each block in the regulator system presented in Chapter III are described in Chapter IV.
- 1.3.4 A prototype construction is illustrated in Chapter V.
- 1.3.5 Testing method and results are presented in Chapter VI.
- 1.3.6 Conclusion and discussions are summarized in Chapter VII.
- 1.3.7 Related data and informations are also given in appendices.