

THE ADDITIONAL PROTECTION SYSTEM OF THE  
THREE - PHASE BRIDGE PULSE WIDTH MODULATED INVERTER

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## ABSTRACT

The main objective of this project is to design and construct an additional fast respond and good selectivity protection system to protect a three-phase bridge inverter system against fault caused by overcurrent and high operating  $di/dt$  of the switching transistors.

This additional protection system is necessary so as to increase the protection capability of the inverter system to enable to withstand any fault that could result in damaging the circuits semiconductor components particularly due to the instantaneous surge of current occur during the transistor turn-on time and by short circuits in the system.

The main overcurrent protection of the inverter system is being provided by the crowbar protection circuits and a back-up protection by a semiconductor circuit breaker.

Series snubber is used to limit the operating  $di/dt$  of the transistors and thyristor to within its specified safe operating area.

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## 1. INTRODUCTION

### 1.1 General

This project is a continuation of the previous advanced diploma final project on three-phase bridge pulse width modulated inverter. However the inverter had some problems with regard to its operational capability. It was undertaken by a group of two power engineering students, Mohd Razib and Rusmadi under supervision of two lecturers, Encik Fadzil Saidon and Encik Maliki Omar. Their main objective was to design and construct an inverter for used to drive small induction motors and had its switching devices triggered by PWM generated by microprocessor programs.

The inverter switching operation were being performed by six Darlington power transistors. Transistors were favoured over thyristors as switching aids since it does not require the use of any commutation circuit. Further more transistors have the advantage of providing very good switching properties and ease of control by manipulating its base biasing; enabling a simple and reliable switching circuit to be designed and constructed.