

DESIGN - CONSTRUCTION AND TESTING  
OF A MICROPROCESSOR CONTROLLED  
THREE-PHASE VARIABLE FREQUENCY  
POWER TRANSISTOR INVERTER

Project report Submitted  
by

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A B S T R A C T

This project deals with the design, construction and testing of a three-phase Variable Frequency Power Inverter controlled by a microprocessor.

The inverter was designed to have 24V d.c. input and 415V 50HZ output with a power of 500W.

Therefore to satisfy this requirement, a transformer of 500VA power rating with 24V primary and 240V/phase secondary was used.

The switching elements used were power transistors (2N3055 and PNP3055) and information concerning these transistors can be seen in APPENDIX 4.

The conduction angle of the power transistors can be  $120^{\circ}$  or  $180^{\circ}$  but in the desing of this project the  $180^{\circ}$  was used which gives better output waveforms.

The control signals were generated by a Z80-MICROPROFESSOR.

The constructed power inverter was tested with both resistive and inductive loads and found to operate successfully.

The chapters discussed in this project were: Inverters in general, Thyristor and Transistor Inverters and their applications, the Z80-MICROPROFESSOR, the Design of the three-phase Variable Frequency Power Inverter as well as the circuit explanation, Calculations and Control Program Explanation.

Furthermore a chapter was needed for the testing and the results, also another chapter to discuss the operation of the circuit and ways to protect it and another chapter to refer to the further improvement of the three-phase power transistor inverter.

Finally this project is completed with personal conclusions.

**NOTE** : On Appendices useful information are available about the constructional details of the circuit, heat and power design, phototransistor opto-isolators power transistors and the electrical specifications of Z80 - PIO.

# C O N T E N T S

PAGE

ACKNOWLEDGEMENTS

ABSTRACT

CHAPTER 1	INVERTERS	1
1.1	Introduction	
1.2	Thyristor Inverter	
1.3	Transistor Inverters	
1.4	Application of Inverters	
1.4.1	Introduction	
1.4.2	Induction Motor Speed Control	
1.4.3	Slip Recovery Systems	
1.4.4	Uninterruptible Power Supplies (UPS)	
CHAPTER 2	THE Z80-MICROPROCESSOR	11
2.1	Introduction	
2.2	Interfacing peripherals Input and Output devices	
2.3	Z80 Parallel input/output device (PIO)	
2.4	Control Word	
CHAPTER 3	THE DESIGN OF A MICROPROCESSOR CONTROLLED THREE-PHASE VARIABLE FREQUENCY POWER TRANSISTOR INVERTER	17
3.1	Circuit explanation	
3.2	The design of the current limiting resistors	
3.3	Control program explanation	
3.4	Program flowchart	
3.5	Control program	
CHAPTER 4	CALIBRATION AND TESTING OF THE THREE PHASE INVERTER	28
4.1	Introduction	
4.2	Calibration	

4.3 Testing

CHAPTER 5	CIRCUIT IDEAS AND MORE APPLICATIONS OF THREE-PHASE INVERTERS	31
5.1	Introduction	
5.2	Protection of the inverter circuit	
5.3	Inverters and photovoltaics	
5.3.1	General	
5.3.2	What is photovoltaics?	
5.3.3	Where is photovoltaics applied?	
5.3.4	Advantages	
CHAPTER 6	A FURTHER IMPROVEMENT ON THE THREE-PHASE POWER TRANSISTOR INVERTER	35
6.a	How to achieve the further improvement	
6.b	Variable frequency operation	
6.c	Voltage and frequency control	
6.d	PWM Inverter	
6.e	Conclusions	
SUMMARY		44
REFERENCES		45
APPENDICES		46
1.	CONSTRUCTIONAL DETAILS	46
1.1	Introduction	
1.2	The photographic method for producing pcb's	
1.3	Components needing mounting on heat sinks	
2.	HEAT AND POWER DESIGN	49
3.	PHOTOTRANSISTOR OPTO-ISOLATORS	55
4.	THE BFY52, 2N3055 AND BD132 TRANSISTORS	58
5.	THE Z80-PIO ELECTRICAL SPECIFICATIONS	61