

# Microgrid Connected Inverter

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**Abstract**— The high energy demand and the constant depletion of the fossil fuels lead us to shift our focus to renewable energy sources which are not only the future unlimited source of energy ,it is also eco-friendly and viable for the environment. This paper focuses on the design of solar inverter which is required to run AC loads which is mostly used as consumable purpose. The micro-grid contains distributed energy sources, loads, and control devices. An solar panel, battery, buck booster and inverter are the main micro grid sources in this paper. The inverter is a real in-house developed.

**Keywords**— Inverter, 8051 Microcontroller, TLP250

## I. INTRODUCTION

An inverter is basically a converter that converts the DC-AC power at desired output voltage and frequency. The AC output voltage is both fixed or variable voltage and frequency. Conversion is carried out by controlled turn on and turn off devices. IGBT is used for this purpose. The voltage from the solar is obtained and it is boosted to 48V using the buck-booster, this is stored in the battery and given as input to the inverter.

Matlab/Simulink is employed to investigate the performance of these energy sources and inverters.

## METHODOLOGY

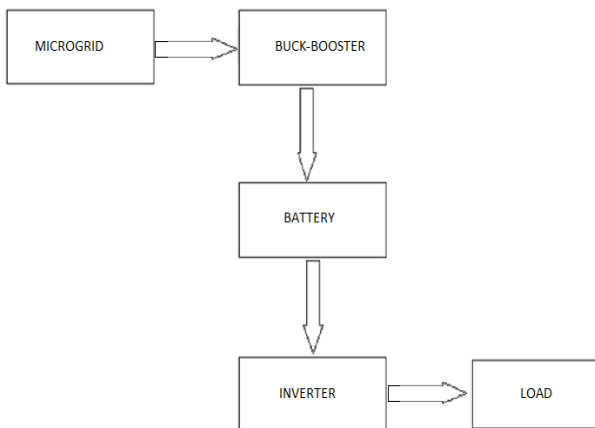


Fig.1.Block Diagram of inverter

An inverter is used to produce an interrupted 220V AC or 110V AC (depending on the line voltage) supply to the device connected as the load at the output socket. The inverter gives constant AC voltage at its output socket when the mains AC power supply is not available.

## II. MATLAB SIMULATION

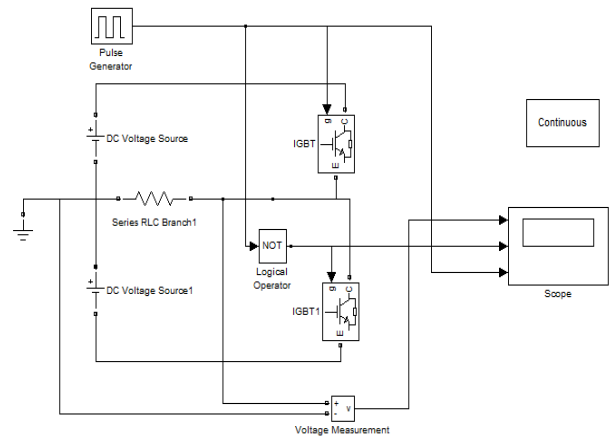


Fig.2.Circuit diagram of IGBT switching

MATLAB simulation is done to observe the performance of inverter. The objective of this circuit is to get the square wave of 24V(P-P) of 1KHz frequency. For this two DC sources and IGBT is used to drive the circuit.

## III. TESTING PHASE

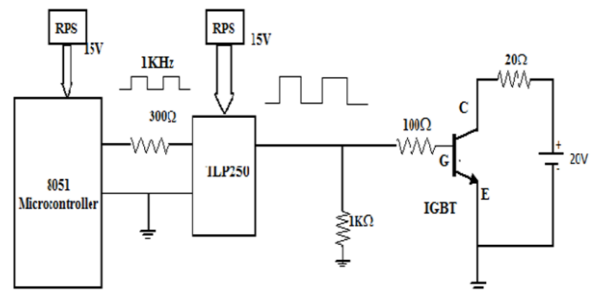


Fig.3.Circuit Diagram of Inverter

### i) Generating of square wave of 1 kHz

8051 microcontroller of 40pin IC is programmed using the C language in RIDE software and square wave generated is observed in the CRO, and output is of amplitude 5V, 1KHz.Microcontroller development board is used for these operations.

ii) Generating of square wave from TLP250

**Pin Configuration (top view)**

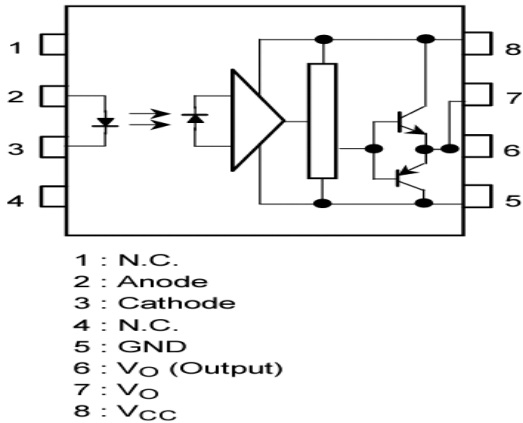


Fig.4.Pin Digaram of TLP250

Microcontroller output is given to the pin number 1 of TLP250 and supply of 15V is given from the RPS. The ground of the microcontroller and TLP250 is made separate. 8051 microcontroller is optocoupled with TLP250. The output of of the TLP250 is observed in the CRO and output obtained is of amplitude 15V.

**IV. RESULTS**

- Square wave of amplitude 24V is obtained from the MATLAB simulation.
- Square of 1 KHz and 5V is obtained from the 8051 microcontroller.
- Square wave of amlitude 15V and frequency of 1KHz is obtained from TLP250.

**CONCLUSIONS AND FUTURE PLANS**

Hardware implementation of the inverter circuit is done by using the components.

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