Dhirajlal Gandhi College of Technology

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Non Isolated Low Cost Single Stage Buck-Boost AC to DC Converter

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***Abstract*—In the conventional AC-DC converters for buck-boost operation, there are two stages involved. In this method of conversion, at first the AC is rectified into DC by rectifier and then using chopper, DC is varied as per the requirement of the load in buck or boost mode. The main drawback in the double stage conversion is that, as the stages of conversion increases the losses also increase proportionally. Moreover, it also decreases the efficiency of the converter and increases the cost. To overcome all these drawbacks, the conversion is done using single stage of conversion. This is achieved by connecting anti parallel of two buck-boost converters. One is operated in positive half cycle whereas another one is designed to operate in the negative half cycle. Simulation of the proposed work is carried through MATLAB/SIMULINK environment and prototype hardware implementation is carried through microcontroller to verify the real time performance.**

Index Terms*—Buck-Boost Converter, AC-DC Converter, Single Stage and Non-Isolated.

I. INTRODUCTION

Power Electronics dealing with power conversion by use of solid state semiconductor devices. The field of power electronics used in many industrial and commercial products. In recent, power electronics are used electric power utilities. Generally, for the conversion of AC to DC with buck-boost mode, rectifier and chopper are used. Fig.1 shows such a conventional double stage converter.

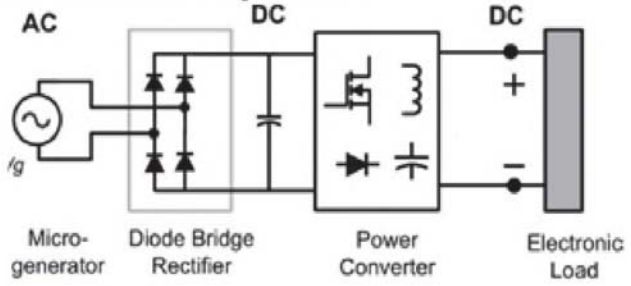

Fig.1 Two stage AC-DC buck-boost converter

In this method, a large capacitor will draw more peaky current in nature. High frequency transformer based isolated type switching regulators are also being used in many literatures [1-5]. Such types of switching regulators are more costly due to additional transformer and it provides isolated DC output. Also power electronics equipments are highly used in power conversion hence cost of the system also increases and efficiency will be decreased.

Alternating to Direct current conversion are used many utilities such as UPS, WECS, VFD, HVDC and FACTS etc. [6-12]. A schematic sketch of single stage buck-boost AC-DC conversion is shown in Fig.2 can be implemented [13-18] to overcome the drawbacks from double stage and to meet out the requirements of the applications.

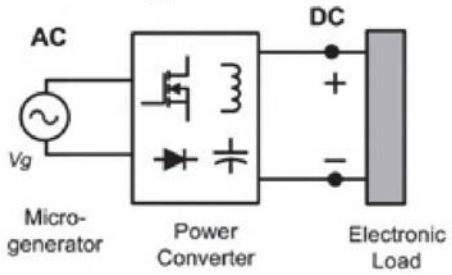

Fig.2 Single stage AC-DC buck-boost converter

The proposed low cost non isolated type single stage AC-DC converter in buck boost mode working with simulation and hardware implementation have been discussed in brief in the following chapters. So weight, space are reduced hence cost also reduced and efficiency is increased.

II. SINGLE STAGE CONVERSION

In the Fig.3 proposed circuit, the diode and MOSFET is connected in parallel with each other with AC source. MOSFET acts as a switch. The switch S1 is for the positive half cycle and the switch S2 is for the negative half cycle. The inductor L1 and diode D3 are connected on the other side for negative half cycle. Similarly, L2 and D4 are connected for the positive half cycle. During positive half cycle of input AC, switch S1 is operated, when it is closed, current flow through S1-L2-D2. Hence the inductor L2 stores the electromagnetic energy. When it is opened stored energy will discharge to load

PAPER ID: PC020

Design and Analysis of Step-up Fly-back Converter for Wind Energy Conversion System Application

R.Saravanan, Dr.S.Vijay Shankar, Dr.K.Suresh

This research paper presents a Step-up Fly-back Converter (SFC) with continuous mode of operation for wind energy application. A bulk capacitor acts as a source which is supplies the voltage to two transformers of turn's ratio 1:1. The main purpose of this converter is to obtain high reliability, high efficiency and more gain. Using this topology current stress on switches is reduced due to parallel operation. The parallel fly-back converter and boost converter dividing a common switch Q1; the input voltage VCB will be the parallel fly-back converter (PFC) is from the output of the boost converter. The operating modes of SFC have been presented. A 24V input, 50V and 50V outputs and 100W DC-DC isolated converter with 100 KHz of switching frequency is modeled using MAT-LAB Software and Simulation results have been presented.

PAPER ID: PC021

Intelligent three lane Traffic Light System using Raspberry Pi

H. Shree Kumar, Dr. A Jagedeeshwaran, Dr. A Jagedeeshwaran

The traffic congestion is one of the crucial problem in urban areas nowadays which has an inefficient traffic management system. The present traffic system has a major drawback of fixed countdown timer [1]. The traffic flow is not same for all the lanes that is one lane may have large number of vehicles and needs more green signal time while the other lane with less number of vehicles need less time [2]. The proposed system is a dynamic traffic light controller using raspberry pi which is based on number of vehicles. The signal timing of different lanes will be different based on number of vehicles in the respective lanes. The proposed system captures the image of first lane and process it to detect vehicles using Haar Cascade method. According to the number of vehicles detected, the timing of the green signal for the same lane is set and red signal for other respective lane. This process is followed by the next camera in the second lane and the process continuously circles depending upon the number of lanes. With the use of raspberry. pi, the system can be operated using multiple number wireless device with secure wireless network.

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