

SOLAR ENERGY BASED DC MIXER WITHOUT USING BATTERY

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ABSTRACT

In domestic appliances, we use AC mixer in all the houses, and it consumes more power. But what to do when the electricity in your house is off? So a question came to our mind, if we make a DC mixer that will run on solar energy without using batteries, and we have made a mixer that you can afford. And also it's consume less power. The solar based DC mixer is to solar panel output supply provided to the direct supply by using boost converter and bridge converter circuit. You may not need an AC power supply in this mixer, but we thought that if you need a DC solar mixer at night, so we have tried to run it on AC supply using AC TO DC output adapter. And even if the electricity line goes off at night, there is no need to take the tension because we also have a battery power supply connection. It can take you anywhere because it is solar powered so you can take it anywhere but there is one that you have to take with you solar panel, but no problem because that is the only feature. We can use solar panels for the rest of the work. Just like we can charge the battery for example, we can use the rest of the equipment running on DC. So this is our DC Solar Mixer Project.

Keywords: - Solar Panel, RS 775 Dc Motor, Boost Converter Module, Full Wave Bridge

Converter with C Filter, Capacitor 2200uf 50V, Diode, 24v 3 Amp Adapter, Mixer Regulator.

I. INTRODUCTION

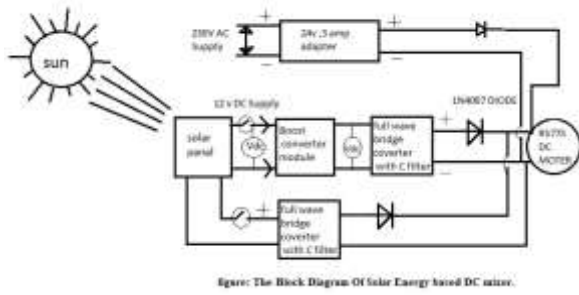
Energy efficient appliances are widely used due to scarce energy resources. We use electrical appliances that require Direct Current (DC) while supply from the grid is Alternating Current (AC).

Mixer is one such appliance commonly used by households, restaurants, and roadside juice vendors for mixing ingredients. DC-based appliances require far lesser wattage than AC based appliances to deliver the same output.

In home appliances, the universal motor, the induction motor or brushed DC motor is used. However, DC-based mixer is available in the market today but solar based grinders are not available. As part of its technology innovation, we are develop, pilot-test, and demonstrate a mixer using solar energy.

II. METHODOLOGY

The Solar Energy Based DC Mixer Consist Of Following Component – RS775 DC Motor, Xl6009 Boost Converter, Bridge Converter Circuit, Solar Panel, 1N4007 Diode, 24v 3 Amp Adapter .



1: RS775 DC MOTOR



The 775 model of DC motor represents a certain size of the motor body outer frame. This size is standard for all 775 motors. The number 775 is the Size ID of motor universally accepted. Its casing is made of rustproof material mainly steel with some protective coatings, with few plastic parts. It is a high torque high power device for mid to high-power applications. This motor is heavy duty DC motor. Operating voltage is 6 to 36 v and rated voltage is 12v, no load current is 2.5 amps and the speed at 12v ~4100rpm and at 24v 8400rpm.

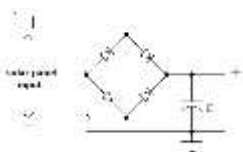
2: Boost converter module



XL6009 module is a non-isolated step-up boost voltage converter featuring adjustable output voltage, high efficiency. It converts input voltage of 5-32V DC to an output voltage of 4-38V DC. Built-4A efficient MOSFET switches enable efficiency up to 94%; (LM2577 current is 3A) High switching frequency 400KHz, can use a small-capacity filter capacitors that can achieve very good results, the ripple smaller and smaller. (LM2577 frequency only 50 KHz).

3: Bridge Converter Circuit

1: The output Direct Current (DC) of the bridge rectifier contains small ripples. These small ripples can be reduced if we use the filter at the output. The filter converts the pulsating Direct Current (DC) into pure Direct Current (DC).



2: The bridge rectifier is made up of four diodes namely D1, D2, D3 and D4. The input signal is applied across the two terminals A and B while the DC output is obtained across the load resistor RL connected between the terminals C and D. The pulsating DC output other filter normally used in the bridge rectifier is a capacitor filter. The capacitor filter is connected across the load resistor RL .obtained across the load resistor RL contains small ripples. To reduce these ripples, we use a capacitor 2200uf, 50v as a filter at the output.

4: solar panel

A photovoltaic system employs solar modules, each comprising a number of solar cells, which generate electrical power. PV installations may be ground-mounted, rooftop-mounted, wall-mounted or floating.

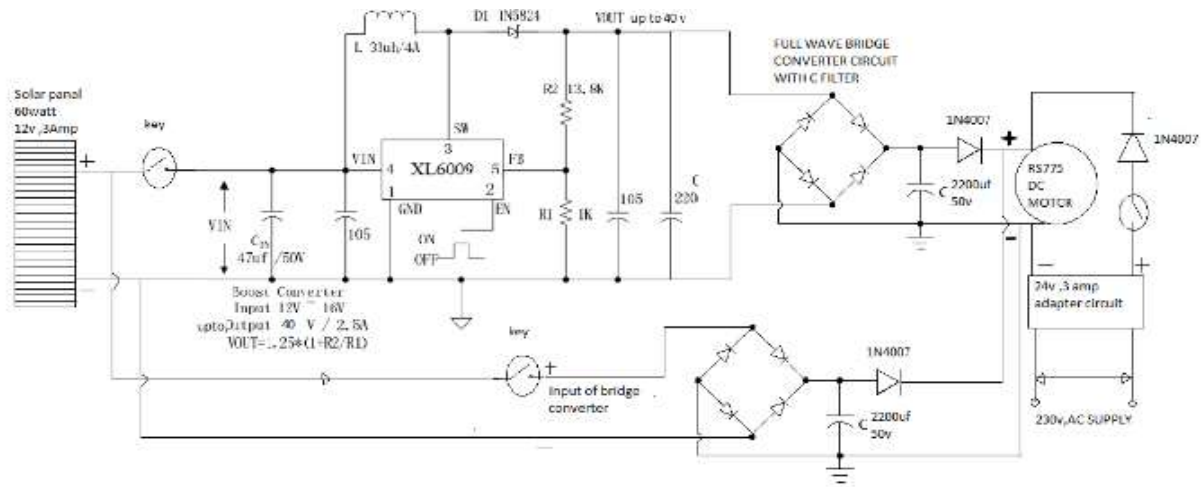
5: 1N4007 Diode

1N4007 is a rectifier diode, designed specifically for circuits that need to convert alternating current to direct current. And this is use for reverse polarity protection. A diode is a p-n junction which acts as open switch in reverse biasing and closed switch in forward biasing.

6: 24v 3amp Adapter

The adapter input voltage is 100-230V~1.6 Amp, frequency 50-60Hz of AC supply and the output of the adapter voltage is 24V, 3Amp pure DC Supply.

7: Circuit Diagram



III : Working

There are three different supply is provided to the mixer. First is supply passes to boost converter to bridge rectifier to the motor. The boost converter module is supply the step up the input voltage of solar panel is too transfer from bridge rectifier circuit to the motor.

Second is supply is provided to bridge rectifier with capacitor circuit to the motor. This is the direct supply of pulsating DC to rectified pure DC. This supply given to the motor.

Third one is AC supply is provided through the 24V, 3 amp adapter supply given to the motor. This supply for future purpose.

All the three different circuit output supply of positive wire connected to the motor and in between connected P N Junction diode in forward bias and is used for reverse polarity protection at that time of supply is fed from one circuit then this supply can't be forward by another circuit so that's way used 1N4007 P N Junction diode.

IV. RESULT AND DISCUSSION

1: Supply from output of boost converter

Sr.No	Parameter	No Load	With Load
1	Voltage	22.5 V	12v
2	Current	2.5 Amp	1.92amp
3	Power	56.25 W	23.04 W
4	Speed In Rpm	7800 Rpm	3700 Rpm

2: When output of solar panel is direct fed to bridge rectifier circuit

Sr.No	Parameter	No Load	With Load
1	Voltage	15.7 V	12.5 V

2	Current	2.5 Amp	2.2 Amp
3	Power	39.25 W	27.5 W
4	Speed In Rpm	8200 Rpm	4000 Rpm

3: When ac supply from adapter to motor:

Sr.No	Parameter	No Load	With Load
1	Voltage	24 V	21 V
2	Current	3 Amp	2.77 Amp
3	Power	72 W	58.77 W
4	Speed In Rpm	8400 Rpm	4100 Rpm

Note: It Is Dependent On Sunlight Energy at That Time of 12:30 Pm in Summer Seasons.

V. CONCLUSION

We are conclude that there are a lot of new and better appliances in the home appliances market, but people now know how to use free solar energy in their daily lives, and so in this time of inflation we have created these solar powered mixers. You can use and carry these tools anywhere anytime. This mixer is capable of grinding nuts, fruits and vegetables and can be used in home appliances. It also reduced cost and it is used for domestic application.



ACKNOWLEDGEMENT

With the feeling of gratitude and affection, we would like to thank our guide Prof. Dr. Dhiraj N. Katole, Department of Electrical engineering for his continuous support. We are really grateful that we got this great opportunity to propose this modal. We would also like to extend our gratitude towards the Department of electrical engineering. Finally we would specially want to thank all those who contributed in the project directly or indirectly and made this project successful one.

VI. REFERANCE

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