Power Factor Correcction Using LED Deriver Based Converter

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Abstract-

 There is a need to enhance the power nature of the matrix and the power factor suggested on the framework because of the nonlinear burdens associated with it. Another single stage bridgeless AC/DC control factor redress (PFC) topology to enhance the power factor and additionally the aggregate symphonious twisting (THD) of the utility framework is proposed in this exploration. By taking out the info connect in ordinary PFC converters, the control circuit is disentangled; the aggregate music twisting THD and power factor PF are progressed. The controller works in multi circle design as the external control circle ascertains the reference current through inventive separating and flag handling. Inward present circle produces PWM exchanging signals through the PI controller. Expository inference of the proposed converter is exhibited in detail. Execution of the proposed PFC topology is checked for model utilizing PSIM circuit reenactments. The test framework is created, and the test comes about concur with recreation comes about.

Keywords: Current control, Harmonic distortion, LEDs, Lighting, Power factor, Power supplies, Pulse with modulator power converter

INTRODUCTION

Power factor is characterized as the proportion of genuine energy to clear power and its esteem ranges from 0 to 1. At the point when the voltage and current waveforms are in stage, the power factor is said to be solidarity. A no adjusted power supply with an average power factor equivalent to 0.65 will draw roughly 1.5 times more prominent info current than a power factor redressed supply (pf = 0.99) for a similar yield stacking. Whenever voltage and current are in stage with each other in an AC circuit, the electrical vitality drawn from the mains is completely changed over into another type of vitality in the heaps and the power factor is solidarity. As the power factor drops, the framework turns out to be less productive. At the point when the power factor isn't equivalent to 1, the present waveform does not take after the voltage waveform. This outcomes in control misfortunes, as well as cause music that movement down the unbiased line and upset different gadgets associated with the line. The nearer the power factor is to solidarity, lesser the present music, since all the power is contained in the key recurrence. The gear associated with a power conveyance organize generally needs some sort of energy molding, ordinarily correction, which delivers a non-sinusoidal line current because of the nonlinear information trademark. Diode rectifiers change over AC input voltage into DC yield voltage in an uncontrolled way and are broadly utilized as a part of moderately low power hardware, for example, electronic gear and family unit machines. In both single and three-stage rectifiers, an extensive separating capacitor is associated over the rectifier yield to diminish the swell in the DC. As a result, the line current is non sinusoidal. In a large portion of these cases, the adequacy of odd sounds of the line current is significant as for the major. Line current music have various bothersome impacts on both the appropriation system and buyers. The nearness of nonlinear burdens prompts high music and results in poor power factor at the info side and furthermore poor
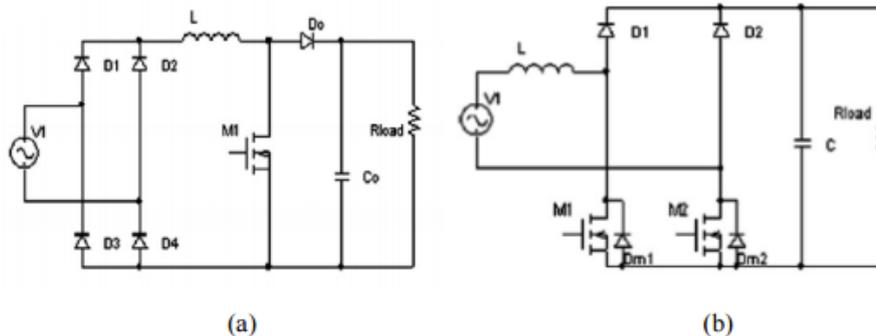
. Schematic diagram of (a) conventional Boost Power Factor Correction circuit, (b) Bridgeless Boost Power Factor Correction circuit

Power factor is portrayed as the extent of honest to goodness vitality to clear power and its regard ranges from 0 to 1. Exactly when the voltage and current waveforms are in organize, the power factor is said to be solidarity. A no balanced power supply with a normal power factor equal to 0.65 will draw about 1.5 times more conspicuous data current than a power factor reviewed supply (pf = 0.99) for a comparative yield stacking. At whatever point voltage and current are in organize with each other in an AC circuit, the electrical imperativeness drawn from the mains is totally changed over into another sort of essentialness in the piles and the power factor is solidarity. As the power factor drops, the structure ends up being less profitable. Right when the power factor isn't proportionate to 1, the present waveform does not take after the voltage waveform. This results in charge disasters, and cause music that development down the fair line and bombshell diverse contraptions related with the line. The closer the power factor is to solidarity, lesser the present music, since all the power is contained in the key repeat. The apparatus related with a power transport compose for the most part needs a type of vitality shaping, conventionally redress, which conveys a non-sinusoidal line current as a result of the nonlinear data trademark. Diode rectifiers change over AC input voltage into DC yield voltage in an uncontrolled way and are extensively used as a piece of decently low power equipment, for instance, electronic rigging and family machines. In both single and three-arrange rectifiers, a broad isolating capacitor is related over the rectifier respect reduce the swell in the DC. Thus, the line current is non sinusoidal. In a vast segment of these cases, the ampleness of odd hints of the line current is huge with respect to the major. Line current music have different irksome effects on both the allotment framework and purchasers. The closeness of nonlinear weights prompts high music and results in poor power factor at the data side and moreover poor power quality

LED DERIVER BASED CONVERTER

The LED DERIVER BASED is remains for Single Ended Primary Inductor Converter. Driven DERIVER BASED is a kind of DC-DC converter which is utilized as a part of numerous different applications like cell phone battery charger, electronic stabilizer, broadcast communications and Direct Current(DC) Power supplies and so forth, In this converter the electric potential at its yield to be more noteworthy than, not exactly, or equivalent to that of the supply voltage. The yield of the LED DERIVER BASED is controlled by fluctuating obligation cycle of the power switches like Metal-Oxide-Semiconductor Field-Effect Transistor (MOSFET), Insulated Gate Bipolar Transistor (IGBT), and Gate Turn off (GTO) and so forth. Fig. 1 Bridgeless LED DERIVER BASED converter circuit A LED DERIVER BASED is like the customary buck-help converter, it has one extra points of interest of having noninverted yield (the yield has an indistinguishable voltage extremity from the information). The LED DERIVER BASED is fit for working in either venture up or advance down mode and generally utilized as a part of battery worked types of gear.

The LED DERIVER BASED is trades the vitality between the capacitors and inductors with a specific end goal to change over starting with one voltage then onto the next. The arrangement capacitor is utilized to couple vitality from contribution to yield. At the point when the turn is killed the capacitor voltage tumbles to 0V. Driven DERIVER BASED converter is worked in two modes, Continuous Conduction Mode (CCM) and Discontinuous Conduction Mode (DCM). Driven DERIVER BASED is said to be in persistent conduction mode if the ebb and flow through the inductor never tumbles to zero. The DCM mode activity implies the inductor current tumbles to zero. Usually recognized by its utilization of two attractive windings. These windings can be twisted on a typical center. The LED DERIVER BASED have been intended to expand the Power Factor Correction (PFC), keeping in mind the end goal to accomplish the powerful factor. In Fig.1, a bridgeless LED DERIVER BASED converter is appeared. In Fig.1 the full extension diode is evacuated with the goal that the segment tally is diminished and it indicates high productivity because of the nonappearance of the full-connect diode. An extra twisting of the information inductor, a helper little inductor, and a capacitor, are incorporates into an assistant circuit; it is used to diminish the information current swell. The coupled inductors are regularly used to diminish the present swell.
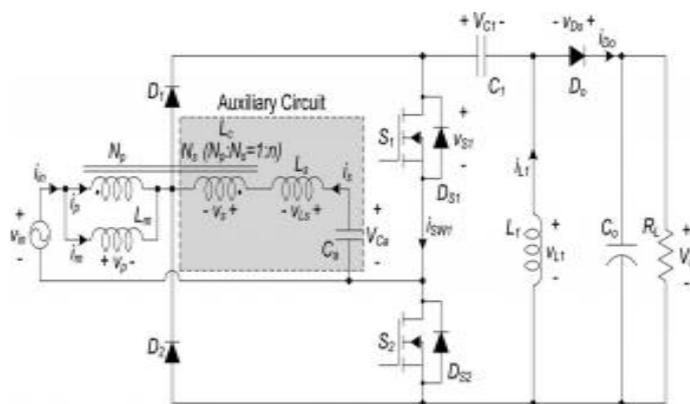
EXISTING SYSTEM

The basic scheme of the peak current controller is shown in Fig.2, together with a typical input current waveform As we can see, the switch is turned on at constant frequency by a clock signal, and is turned off when the sum of the positive ramp of the inductor current (i.e. the switch current) and an external ramp (compensating ramp) reaches the sinusoidal current reference. This reference is usually obtained by multiplying a scaled replica of the rectified line voltage vg times the output of the voltage error amplifier, which sets the current reference amplitude. In this way, the reference signal is

naturally synchronized and always proportional to the line voltage, which is the condition to obtain unity power factor.
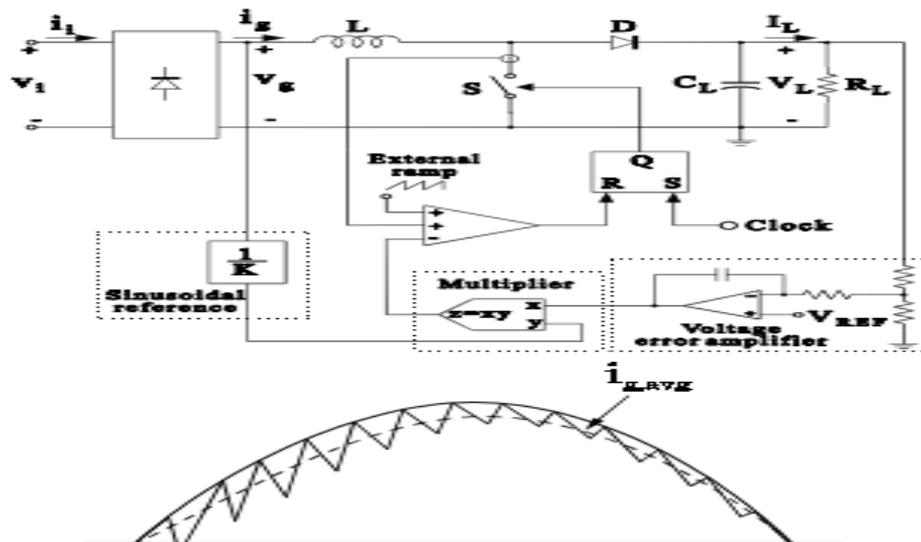
Peak current control system

the converter operates in Continuous Inductor Current Mode (CICM); this means that devices current stress as well as input filter requirements are reduced. Moreover, with continuous input current, the diodes of the bridge can be slow devices (they operate at line frequency). On the other hand, the hard turn-off of the freewheeling diode increases losses and switching noise, calling for a fast device. Advantages and disadvantages of the solution are summarized hereafter.

The input current distortion can be reduced by changing the current reference waveshape, for example introducing a dc offset, and/or by introducing a soft clamp. These provisions are discussed in [4] and [5]. In [6] it is shown that even with constant current reference, good input current waveforms can be achieved. Moreover, if the PFC is not intended for universal input operation, the duty-cycle can be kept below 50% so avoiding also the compensation ramp

PROPOSED SYSTEM

USING LED DERIVER BASED CONVERTER

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### PROPOSED BRIDGELESSLED DERIVER BASED PFC

CONVERTER

The customary LED DERIVER BASED PFC converter is appeared in Figure . The task of the circuit can be isolated in to two modes concerning the situation of the switches. At the point when the switch 1 Q exchanged on, yield diode D is turn around one-sided. The info inductor 1 L begins to charge, yield inductor 2 L and AC input capacitor 1 C makes a full circuit. Here, stack draws current from the yield capacitor 0 C . Amid this circumstance, the voltage of the information inductor will be same as the amended AC voltage Vac. Other than input capacitor's voltage and yield inductor's voltage are equivalent to Vac amid this method of activity. In the second mode, the turn is killed, diode is forward one-sided and 1 L , 1 C ,
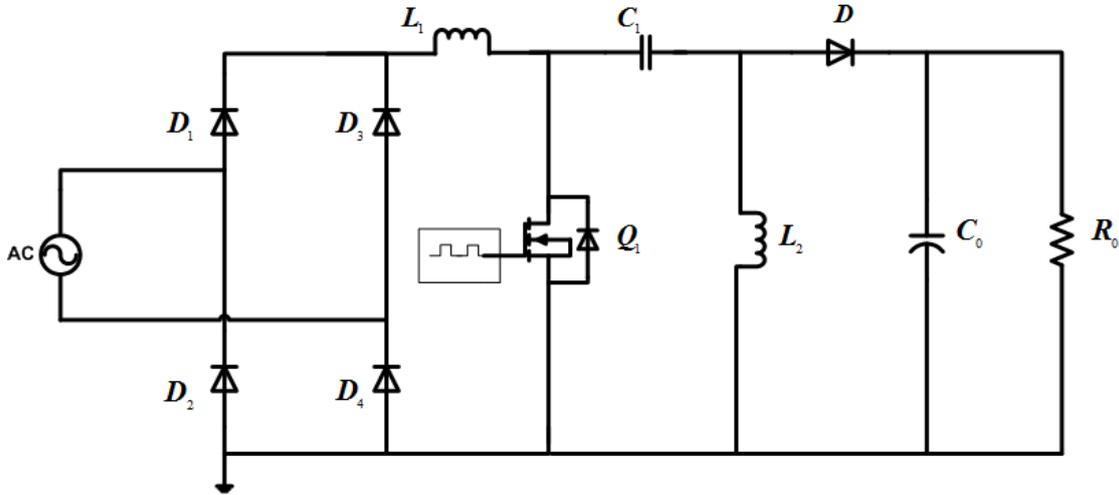
The heap is straightforwardly associated with the inductors amid this mode, which releases them amid the method of task. The proposed bridgeless LED DERIVER BASED PFC converter with three dynamic switches is appeared in Figure 2. At the point when 1 Q , 3 Q and 4 Q turn on, input inductor streams begins to increment directly. The yield inductor voltage is equivalent to the voltage of 1 C which was equivalent information voltage before the switches are turned on. Along these lines, L2 I diminishes directly. This mode wraps up by killing 1 Q , 3 Q and 4 Q . By turning 1 Q , 3 Q and 4 Q off, D begins to direct. Information inductor current diminishes directly and L2 I increments straightly until the point that the diode current smothers. At the point when D kills, yield side is withdrawn from the info side, the current through the inductors freewheel at the information side. Working modes for Pr oposed LED DERIVER BASED PFC converter is given in Figure
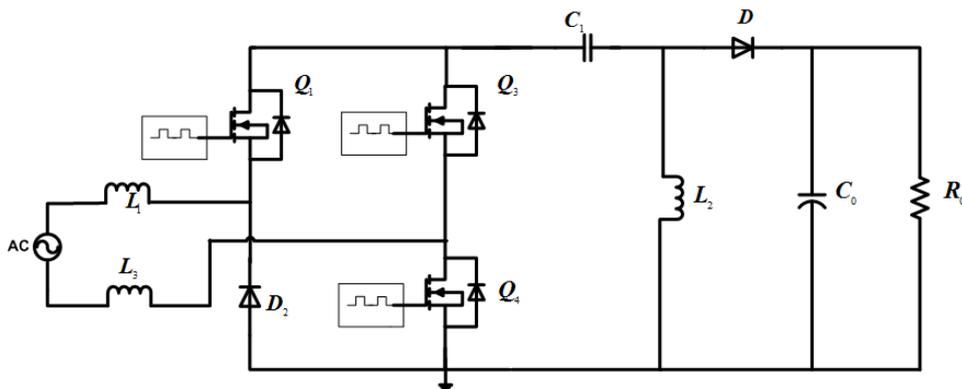
The multi loop control is proposed for the converter, outer voltage controller generating the reference current to regulate the DC voltage and the inner PI controller generating the gating signals as shown in Figure 4. The high frequency switching of the converter produces switching ripples on the DC voltage. Thus the measured DC voltage is processed through a band stop filter to eliminate the noise on the measurements.
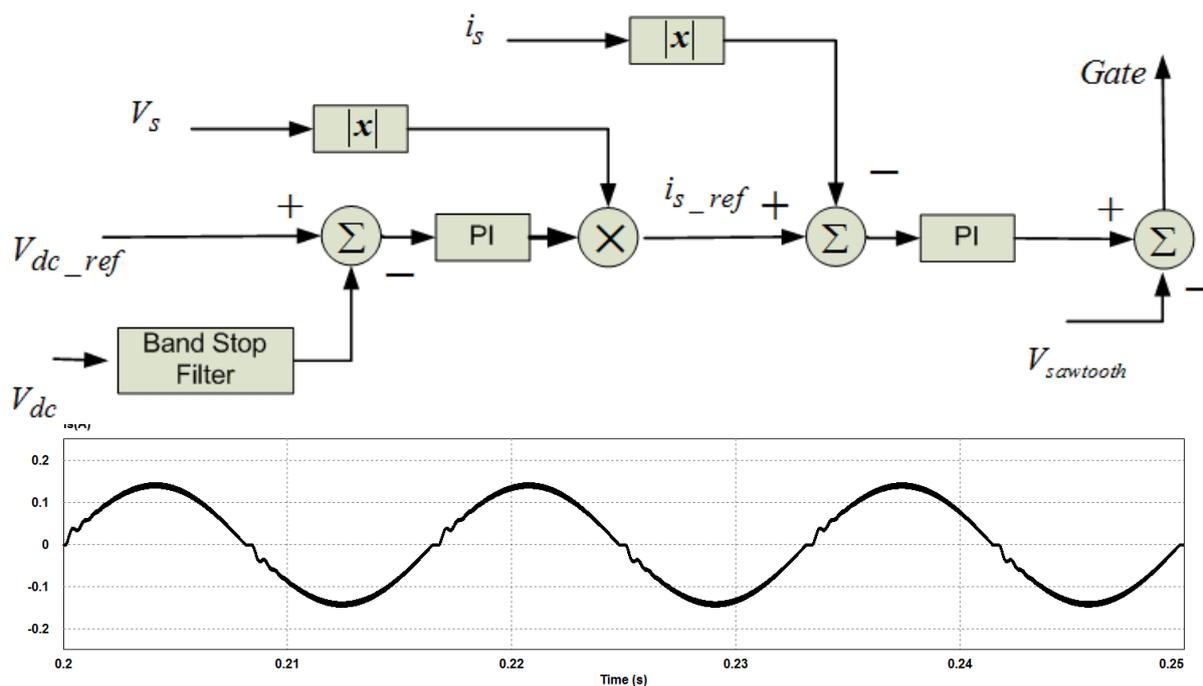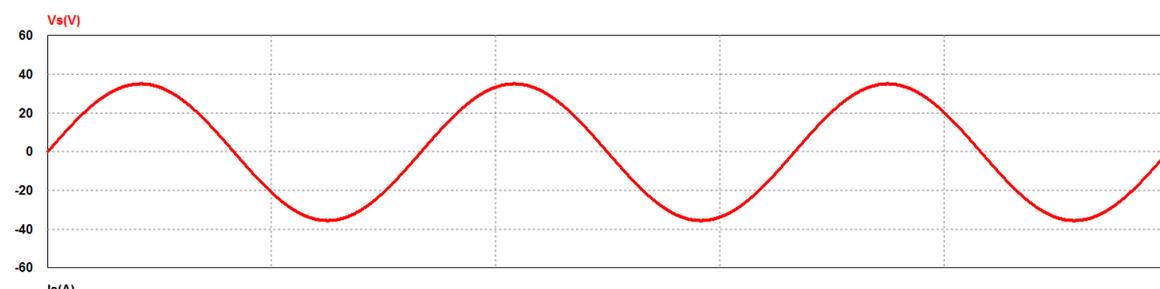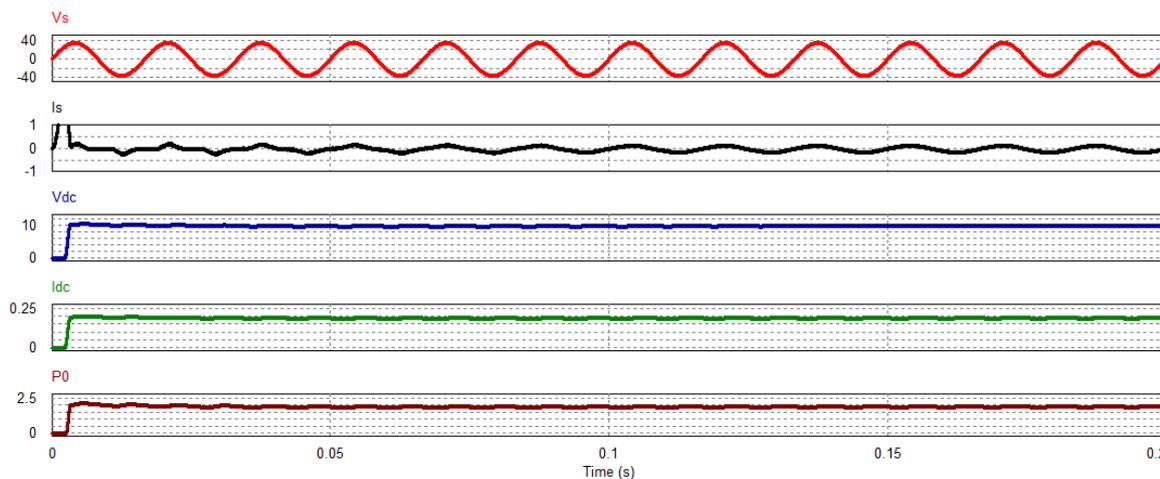
RESULTS

SIMULATION RESULTS

The proposed single phase bridgeless LED DERIVER BASED topology is simulated by PSIM with the parameters based on the design provided In Figure presents the transient input voltage, input current, output voltage, output current and output power for the conventional bridgeless LED DERIVER

BASED PFC converter. Figure 6 presents the input voltage and input current for the conventional bridgeless LED DERIVER BASED PFC converter.

Figure presents the transient input voltage, input current, output voltage, output current and output power for the proposed bridgeless LED DERIVER BASED PFC converter. Figure 8 presents the input voltage and input current for the

proposed bridgeless LED DERIVER BASED PFC converter. It can be seen from the Figure 8 that input current is in phase with input voltage and is sinusoidal with low THD and high PF values. Output voltage is obtained at about 10V, with a 120 Hz low frequency ripple.

The simulation results of the PF and THD values for a conventional LED DERIVER BASED PFC converter . The proposed converter is able to reduce the THD 3.23% from 8.93% and improve the power factor to 0.998. The proposed topology provides much better THD and PF compared to conventional one.

CONCLUSION

In this paper, another single stage bridgeless LED DERIVER BASED PFC converter topology is proposed, dissected and confirmed with the recreations. Keeping in mind the end goal to enhance the power factor and in addition the THD of the utility network, the full extension diode in input is expelled. Through reenactment and trial examines the execution of the proposed LED DERIVER BASED converter topology are contrasted and the ordinary LED DERIVER BASED converter topology. The proposed converter can decrease the THD 2.83% from 5.72% and enhance the power factor to 0.998. It is discovered that the proposed bridgeless LED DERIVER BASED PFC converter topology gives much preferred execution over customary LED DERIVER BASED PFC converter. The topology is executed on a converter working from 25 V AC contribution to produce 10 V DC. The proposed converter topology is turned out to be great choice for single stage bridgeless LED DERIVER BASED PFC answer for bring down power types of gear particularly those requiring astounding information control

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