A Review ON Dc TO Dc Converter FOR Electric Vehicle

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Abstract- *This paper deals with review for designing DC-DC converter for electric vehicle. This study is associated with various areas. The review on different types of dc-dc converter. The developed system will be tested by making a prototype for the same.*

Keywords- DC to DC Converter (DC-DC), Auxillary Loads, Electric Vehicles, Isolation.

I. INTRODUCTION

DC-DC converter is required in electric vehicle. Converter is interfaced between battery and auxillary loads in electric vehicle. These converters are classified as isolated and non-isolated converters. Classification of DC-DC converter is as shown bellow :

II. NON-ISOLATED DC-DC CONVERTER

Non-isolated dc-dc converter features a dc path between its input and output. Non-isolated dc-dc converter are classified as follows :

2.1 Buck Converter

A buck converter (step-down converter) is a DC-to-DC power converter which steps down voltage (while stepping up current) from its input (supply) to its output (load). Typically containing a minimum of two semiconductors (a diode and a transistor, although modern buck converters frequently replace the diode with a second transistor used for synchronous rectification) and at least one energy storage element, a capacitor, inductor, or together. To reduce voltage ripple, filters made from capacitors (sometimes together with inductors) are normally added to such a converter's output (load-side filter) and input (supply-side filter). Buck converters are often highly efficient (often above 90%), making them useful for tasks like converting a computer's main (bulk) supply voltage (often 12 V) right down to lower voltages needed by USB, DRAM and therefore the CPU.

2.2 Boost Converter

A boost converter (step-up converter) is a DC-to-DC power converter that steps up voltage (while stepping down current) from its input (supply) to its output (load). Typically containing a minimum of two semiconductors (a diode and a transistor) and a minimum of one energy storage element: a capacitor, inductor, or together. To reduce voltage ripple, filters made from capacitors (sometimes together with inductors) are normally added to such a converter's output (load-side filter) and input (supply-side filter).

2.3 Buck-Boost Converter

The buck–boost converter is a form of DC-to-DC converter that has an output voltage magnitude that's either greater than or less than the input voltage magnitude. Two different topologies are called buck–boost converter. Both of them can produce range of output voltages, starting from much larger (in absolute magnitude) than the input voltage, right down to almost zero.

III. ISOLATED DC-DC CONVERTER

Isolation describes the electrical separation between the input and output of a dc-dc converter. An isolated dc-dc converter uses a transformer to eliminate the dc path between its input and output. Isolated dc-dc converter are classified as follows :

3.1 Flyback Converter

The flyback converter is used in both AC/DC and DC/DC conversion with galvanic isolation between the input and any outputs. The flyback converter is a buck-boost converter with the inductor split to make a transformer, in order that the voltage ratios are multiplied with a further advantage of isolation.

3.2 Forward Converter

The forward converter is a DC/DC converter that uses a transformer to increase or decrease the output voltage (depending on the transformer ratio) and supply galvanic isolation for the load. With multiple output windings, it's

possible to supply both higher and lower voltage outputs simultaneously.

3.3 Push-Pull Converter

A push–pull converter is a form of DC-to-DC converter, a switching converter that uses a transformer to vary the voltage of a DC power supply. The distinguishing feature of a push-pull converter is that the transformer primary is provided with current from the input line by pairs of transistors during a symmetrical push-pull circuit. The transistors are alternately switched on and off, periodically reversing current within the transformer.

3.4 Half-Bridge Converter

A half-bridge converter is a form of DC-DC converter that, like flyback and forward converters, can supply an output voltage either higher or less than the input voltage and provide electrical isolation via a transformer. Although more complex than a flyback or forward converter, the half-bridge converter design can yield higher output power (potentially up to 500W) and use parts that are smaller and less expensive.

3.5 Full-Bridge Converter

Bridge Converter is a DC to DC converter topology (configuration) employing four active switching components in a very bridge configuration across power transformer. ... A full bridge converter is one among the commonly used configurations that provide isolation additionally to stepping up or down the input voltage.

IV. LITERATURE REVIEW

The authors Bor-Ren Lin, Huann-Keng Chiang and Kao-Cheng Chen [1], in their paper titled, "Analysis, designed implementation ofan active clamp flyback converter" presented detailed circuit operation, mathematical analysis, and example of the active clamp flybackconverter. The auxiliary switch and clamp capacitor are utilized within the flyback converter to recycle the energy stored within the transformer leakage so on to reduce the spike voltage at the transformer primary side.

The authors Shijia Yang, Zhaoming Qian, Qian Ouyang [2], in their paper titled, "An Improved Active-clamp ZVS Forward Converter Circuit" presented an improved active-clamp ZVS forward converter topology.The authors NasrudinAbd. Rahim and Mohamad Fathi Bin Mohamad Elias [3], in their paper titled, "Design and Implementation of Push Pull Dc Dc Power Converter" presented the planning and implementation of push pull dc dc power converter.

The authors V. Sivachidambaranathan and S. S. Dash [4], in their paper titled, "Simulation of Half Bridge Series Resonant PFC DC to DC Converter" presented the simulation of Half Bridge Series Resonant Power Factor Correction (PFC) .The authors E. Baghaz1,S. Bounouar and R. Bendaoud [5] , in their paper titled, "Study and of a Full Bridge DC / DC Power Converter" presented a converter DC/DC for power applications is developed: charger for photovoltaic system, vehicle charger, helicopter power supply. It consists of a Full-Bridge DC/DC converter.

V. CONCLUSION

The study covers wide area of various topologies of DC-DC converters. The contribution altogether these areas is significant . The system developed with the mixture of of these area finds to be with automotive grade quality.

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