
Vehicle Electrification System Standards

VIII. DC – DC Converters Systems

VIII.b Overview of DC-DC Converter Systems

Overview:

The Role of the DC-DC Converter

- Traditional Replacement of the Alternator/Generator with DC-DC Converter System
- DC-DC Converter Interfacing with the High Voltage Battery Pack
- DC-DC Converter Interfacing with other ancillary vehicle systems (e.g. 42V Power Steering, 300V Power Steering)

Description:

The Direct Current-to-Direct Current (DC-DC) Converter is a power electronics unit that replaces the traditional vehicle generator (alternator) to provide electrical power to 12V, 24V, or 42V (or higher) systems on an electrified vehicle system. The DC-DC Converter is a switching power supply system that receives an input from a high voltage and converts (reduces or bucks) the voltage to a lower voltage of the same type (i.e., higher dc voltage to a lower dc voltage). It can also convert a lower input voltage and increase (boost) the signal to a higher output voltage.

Outcome (Goal):

Students shall be able to:

1. Describe verbally and in written communications how DC-DC Converter and its circuits converts a high voltage (i.e., 60V - 800Vdc) input to a low voltage dc (i.e., 14.0V) output



2. Describe verbally and in written communications and a block diagram, how vehicle the DC-DC Converter and its circuits converts a low voltage (i.e., 14.0V) dc input to a high voltage (i.e., 60V - 800V) dc output..

Objective:

Students shall be able to:

1. Describe, with a working knowledge, how and where the DC-DC Converter is connected to high and low voltage systems, when provided a specific electrified vehicle
 2. Describe, with a working knowledge, the operation of a DC-DC Converter when connected to vehicle 12V electrical loads (i.e., 12V battery and other traditional electrical loads).
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Task:

Students will be able to:

1. Use a block diagram to describe, with a working knowledge, how the individual internal stages of the DC-DC Converter operate when in "Buck" and "Boost" modes
 2. Use associated acronyms and definitions when describing each of the aforementioned modes
 3. Use OEM vehicle service information, component supplier information, and vehicle electrification websites
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