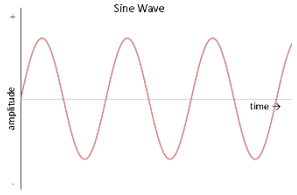
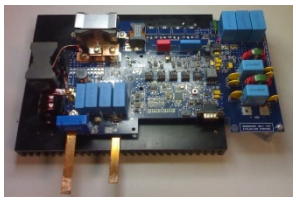
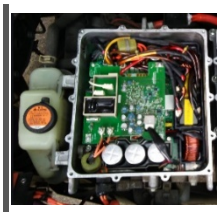
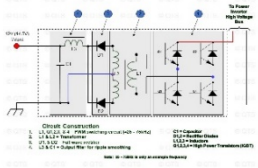
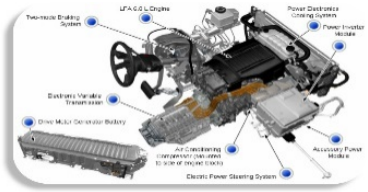
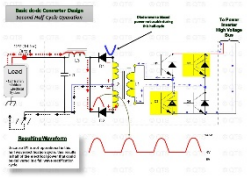
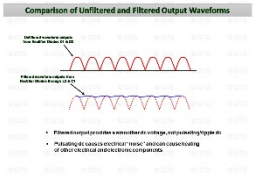
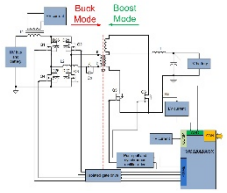
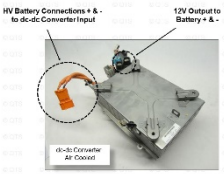
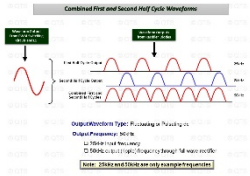
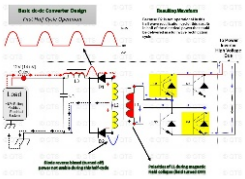
Vehicle Electrification System Standards

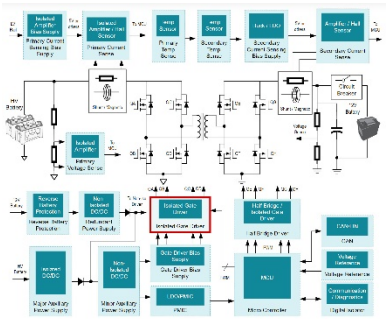
VIII. DC – DC Converters Systems

VIII.a Acronyms and Definitions

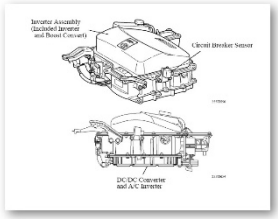
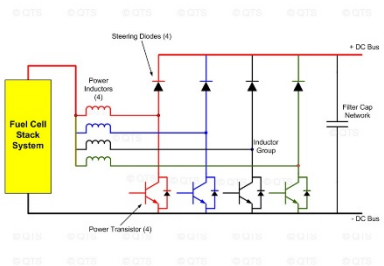
Image	Name	Acronym	Definition
	Alternating Current	AC	A type of electrical current in which, the direction of the flow of electrons switches back and forth at specified intervals or cycles. The cycles per second (Hz) can be variable or fixed.
	Amp (Current) Clamp		
	Automotive BEV/FCEV/HEV/PHEV DC-DC Converter	DC-DC; APM	A Direct-Current to Direct Current (DC-DC) converter is an electronic circuit or electromechanical device that converts a source of

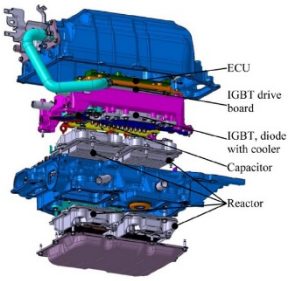










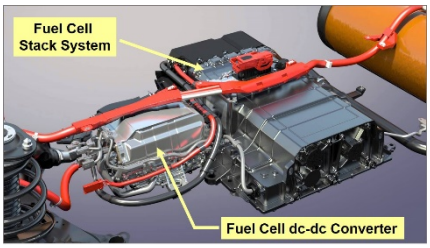

direct current (DC) from one voltage level to another (higher to lower or lower to higher voltage). It is a type of electric power converter. Power levels range from very low (small batteries) to very high (high-voltage power transmission). A DC-DC converter can also be known as an Accessory Power Supply (APM)

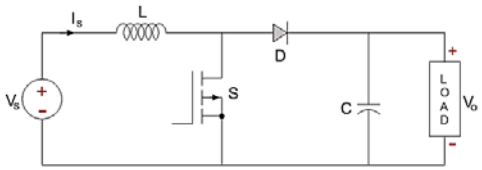
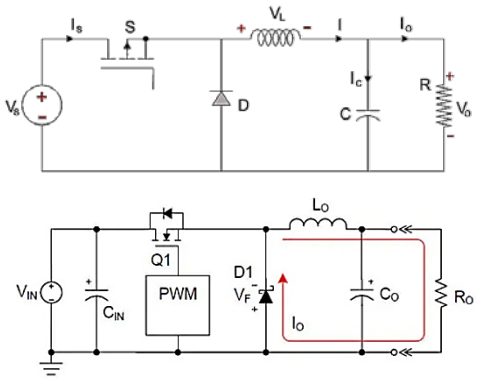
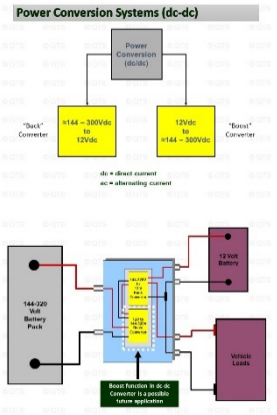
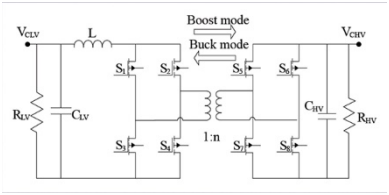
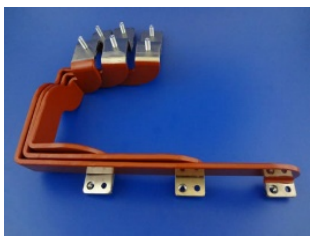


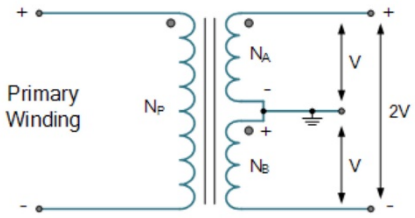
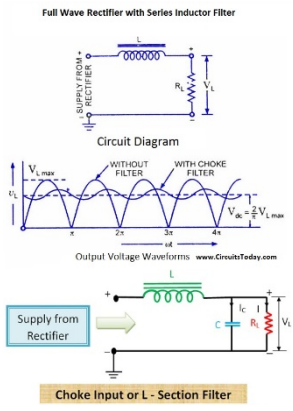
Boost Converter (DC-DC Converter for Fuel Cell)

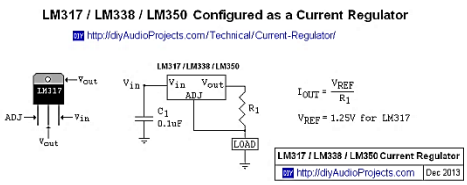
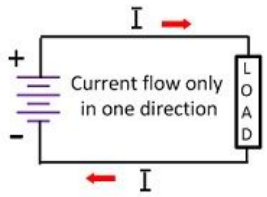
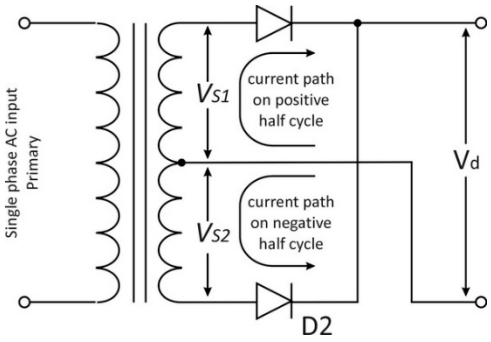
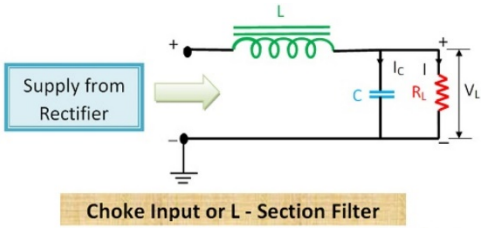



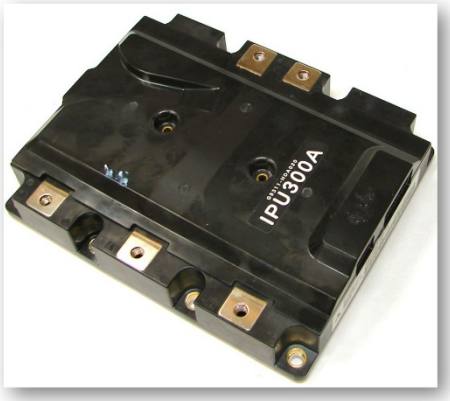


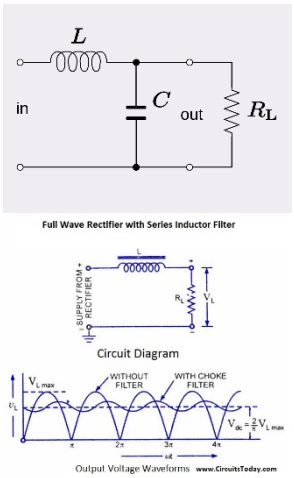
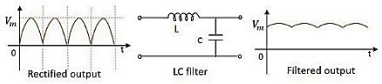
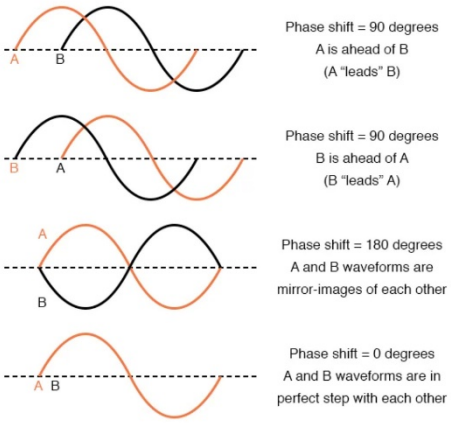


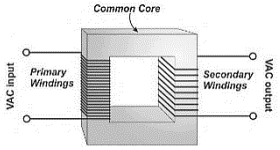
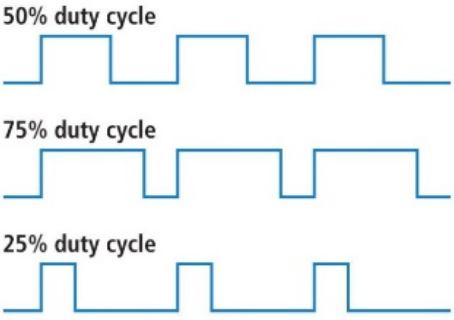
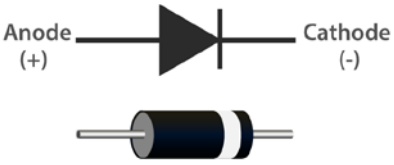
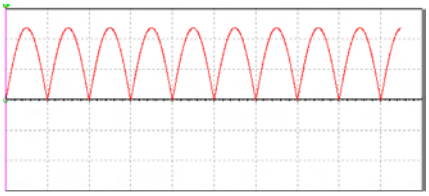
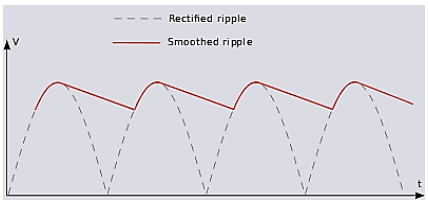
	Boost Converter (DC-DC Converter) 	DC-DC; APM	A DC-DC converter used in a Fuel Cell system is utilized to Boost the voltage from the Fuel Cell Stack before transferring it to the input of the electric propulsion system
	Buck Converter 		A buck converter is a DC-to-DC power converter which steps down voltage from its input to its output. It is a class of switched-mode power supply typically containing at least two semiconductors and at least one energy storage element, a capacitor, inductor, or the two in combination
	Buck-Boost Converter 		The buck–boost converter is a type of DC-to-DC converter that has an output voltage magnitude that is either greater than or less than the input voltage. It can increase or decrease its output voltage, irrespective of the input voltage that is supplied to it
	Bus Bar  		A copper or copper alloy bar, with a specified thickness and width that, is bent into a form that will serve as a medium to transfer electrical current from one device/circuit to another

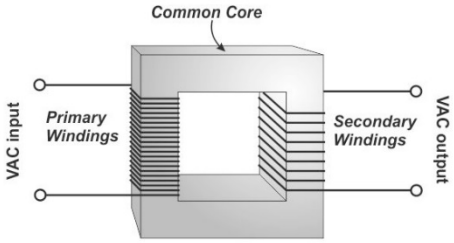
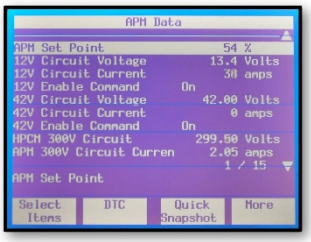
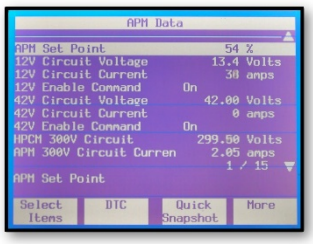
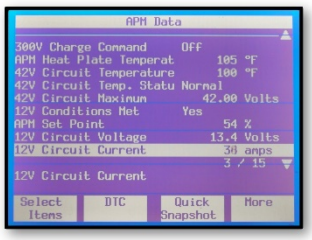
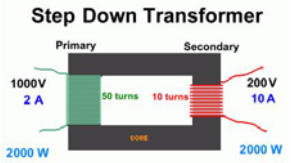
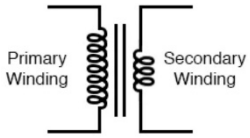
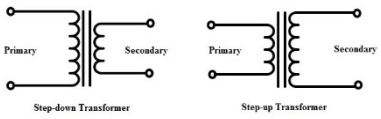
	Controller Area Network	CAN	A Controller Area Network (CAN) bus is a communication system made for vehicle intercommunication. This bus allows many microcontrollers and different types of devices to communicate with each other in real time and also without a host computer. A CAN bus, unlike Ethernet, does not require any addressing schemes, as the nodes of the network use unique identifiers. This provides the nodes with information regarding the priority and the urgency of the transmitted message.
	Center-Tapped Transformer 	CT Xformer	In electronics, a center tap (CT) is a contact made to a point halfway along a winding of a transformer. Unlike other transformers, this is a kind of transformer in which a wire is taken from the midpoint of the secondary coil and is used as a ground reference
	Choke 		In electronics, a choke is an inductor used to block higher-frequency while passing direct current (DC) and lower-frequencies of alternating current (AC) in an electrical circuit. ... The name comes from blocking—"choking"—high frequencies while passing low frequencies.

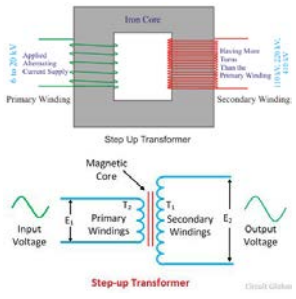
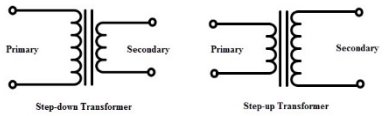
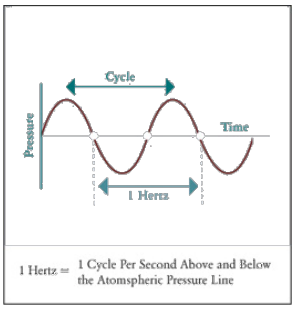
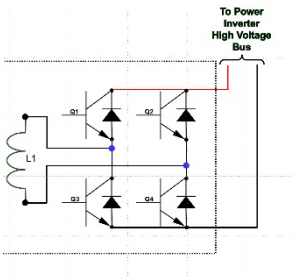
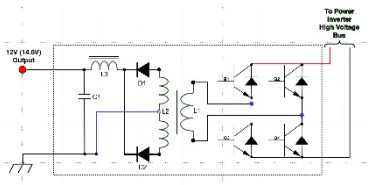
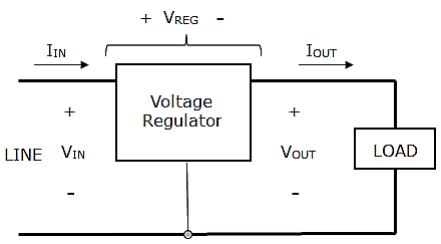
	Controller (DC-DC Converter)		A DC-DC Converter controller is an integrated circuit microcontroller that controls the output of the converter, to a commanded level, dictated by embedded Firmware
	Current Regulation		Current regulation control will perform constant adjustments while comparing it to the voltage in a circuit to ensure voltages are not affected while changes occur in load current
	Direct Current	DC	An electrical current which flows consistently in one direction. The current that flows in a flashlight or another battery powered appliance is direct current.
	Full Wave Rectifier		A full wave rectifier is an efficient mechanism for converting alternating current into direct current. A full wave rectifier is a device that converts an alternating signal, with positive and negative signal components, to one in which all parts of the signal are positive.
	Input Filter		An Input Filter will filter electrical signals to ensure a reduction of electrical noise that enters a component to system. This will reduce electrical losses, increase efficiencies, and enhance reliability of an electronic system

	Insulation Gate Bipolar Transistor	IGBT	Insulated Gate Bipolar Transistor is a power transistor that has characteristics of both MOSFET and bipolar junction transistors (BJTs). Introduced in the 1980s, the IGBT handles high current, a characteristic of BJTs, but enables fast switching with greater ease of control. IGBTs are found in home appliances, electric cars and digital stereo power amplifiers. Modules with multiple IGBTs can support very high voltage and amperage.
 	Load Tester		A load tester is comprised of system that will permit it to simulate a load on the low voltage electrical system (by the use of carbon discs) so the performance of a DC-DC Converter can be measured and analyzed to determine its overall state-of-health and capability.
	Oscilloscope		a device for viewing oscillations, as of electrical voltage or current, by a display on the screen of a cathode ray tube or by digital conversion

	Output Inductor Capacitor Filter 	LC	An LC circuit, also called a resonant circuit, tank circuit, or tuned circuit, is an electric circuit consisting of an inductor, represented by the letter L, and a capacitor, represented by the letter C, connected together
	Phase Angle (Phase Shift) 	ϕ; φ	Describes the phase shift between total voltage and total electric current. In the voltage triangle this matches the phase shift between total voltage and active voltage. For the resistance triangle the phase shift lies between the impedance and effective resistance vector. When voltage and current waveforms are superimposed Power Factor is Unity (perfect)
	Parameter Identification	PID	OBD-II PIDs (On-board diagnostics Parameter IDs) are codes used to request data from a vehicle, used as a diagnostic tool. ... All on-road vehicles and trucks sold in North America are required to support a subset of these codes, primarily for state mandated emissions inspections.

	Primary Transformer Winding		The primary winding is the coil that draws power from the source. The secondary winding is the coil that delivers the energy at the transformed or changed voltage to the load
	Pulse Width Modulation	PWM	Pulse-width modulation (PWM) is a modulation process or technique used in most control systems for encoding the amplitude of a signal right into a pulse width or duration of another signal, usually a carrier signal, for transmission. The purpose of PWM is to control the power that is supplied to various types of electrical devices, most especially to inertial loads such as AC/DC motors. PWM is also known as duty cycle
	Rectifier Diode	D	A diode allows current in only one direction. It can be used to “rectify” AC current into a DC current (i.e., an alternator operates with positive and ground or 0V negative to charge a 12V vehicle battery). Such a diode can also be used to prevent current from flowing in the “wrong” direction in a circuit.
 	Ripple Current		Ripple in electronics is the residual periodic variation of the DC voltage within a power supply which has been derived from an alternating current source. This ripple is due to incomplete suppression of

			the alternating waveform after rectification.
	Secondary Transformer Winding 		A secondary winding is the winding of a transformer that receives its energy by electromagnetic induction from the primary winding. A secondary winding is the winding of a transformer that receives its energy by electromagnetic induction from the primary winding.
	Serial Data Tool (DC-DC Converter PIDs)   		
	 	Step Down Transformer 		A transformer that decreases the voltage from primary to secondary (fewer secondary winding turns than primary winding turns) is called a step-down transformer.

	Step-Up Transformer 		A transformer that increases the voltage from primary to secondary (more secondary winding turns than primary winding turns) is called a step-up transformer.
	Switching Frequency (Hertz)	Hz	The SI unit of frequency, equal to one cycle per second.
	Totem Pole (Push-Pull) Driver 	The connection of four (or more) transistors that form a network to drive (power) the primary of a transformer primary winding. The transistors will be pulsed in pairs to alternately change the polarity on a primary winding that results in an alternating current output used to create an AC waveform that will be transferred an AC power waveform to the transformer secondary. The secondary waveform will eventually get rectified to DC for power lower voltage DC circuits and charging a lower voltage battery.	
	Voltage Regulation 	VR	Voltage regulation is a measure of change in the voltage magnitude between the component transmitting an electrical power signal and the device receiving it such as, a vehicle alternator/generator and 12V battery

To comment or offer suggestions on this standard, contact Ken Mays:

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