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## Vehicle Electrification System Standards

### XI. High Voltage Power Electronics Cooling Systems

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## XI.c High Voltage Power Electronics Cooling Systems Operation

### Overview:

#### High Voltage Power Electronics Cooling Systems Operation

- Electric Coolant Pump
  - 2/3/4 Way Valve
  - Heat Exchanger (Radiator)
  - Cooling Fan
  - Cooling Fan Speed Controls
  - Cooling Ducting
  - HVAC Controller
  - Powertrain Control Module
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### Description:

Understanding the operation and functionality of the Power Electronics cooling system will provide the Student with the foundations of its diagnostics. By completing a study of the Power Electronics system operation, the Student will not only be capable of utilizing OEM service information for learning the system but, they will also learn to develop their own diagnostic processes which is the first step to becoming a competent diagnostician.

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Outcome (Goal):

The Students will be able to describe the operation of all power electronics cooling system components and explain how each component compliments the operation of the system. Being able to articulate the principles of operation for a system is the first step for the Student to analyze and create diagnostic processes.

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Objective:

The Students will be able to describe, explain, and demonstrate:

1. How the Cooling Fan and Coolant Pump circuits operate and controlled
  2. The inputs and outputs of the controller(s) that interface with Power Electronic cooling system
  3. Why the liquid or air cooling systems are constructed and routed to cool the Power Electronics Cooling system.
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Task:

1. When provided service tools and OEM service information, Students will drain and refill the Power Electronics cooling system
  2. Using a live vehicle and Scan Tool and OEM Service information, the Student will identify the proper controller and all PIDs and CPIDs associated with the Power Electronics cooling system, and complete a worksheet provided by the instructor
  3. The Student will draw an electrical and electronic diagram of the Cooling Fan and electric cooling pump circuits for a specified vehicle
  4. The Student will draw a schematic of liquid or air flow that cools the Power Electronics system for a specified vehicle.
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To comment or offer suggestions on this standard, contact Ken Mays:

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