

---

## Vehicle Electrification System Standards

### XI. High Voltage Power Electronics Cooling Systems

---

## IX.d High Voltage Power Electronics Cooling Systems Diagnostics and Service

### Overview:

High Voltage Power Electronics Cooling Systems Diagnostic and Service

- Electric Coolant Pump
  - 2/3/4 Way Valve
  - Heat Exchanger (Radiator)
  - Cooling Fan
- 

### Description:

Diagnostics and service of the Power Electronics cooling system is vital in maintaining the performance of any electrified vehicle. Students will be able to service and diagnose these systems to ensure system performance and a long service life of the components that are connected to this cooling system.

---

### Outcome (Goal):

The Student will be able to identify and describe the components that comprise the Power Electronics cooling system, utilize a Scan Tool and identify PIDs/CPIDs to determine cooling system performance, and use specialized tools to service the system.

---

### Objective:

The Students will be able to:

---



1. Identify all components that comprise the Power Electronics Cooling system
  2. Trace the routing of all Power Electronics cooling system liquid or air cooling system
  3. Describe, by using a circuit diagram, the function of each Power Electronics cooling system component
  4. Describe, by using an electrical and liquid/air cooling circuit diagram, the function of each Power Electronics component
  5. Use a Scan Tool to determine the status and functionality of the Power Electronics cooling system.
- 

Task:

1. When provided service tools, Students will drain and refill the Power Electronics cooling system
  2. Using a live vehicle and Scan Tool, 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. Using a visual test, the Student will determine if there is minimal coolant circulation through a liquid Power Electronics cooling system
  4. Use an oscilloscope and DVOM on a live vehicle or simulator to acquire coolant pump waveforms and complete a worksheet for measuring cooling system controls
  5. Using an Amp-probe (clamp) and a Scan Tool (for commanding speeds via CPIDs) measure the current of the Power electronics coolant pump and radiator cooling fan (all speeds) and compare it to the specifications provided on a worksheet.
- 

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

**Ken Mays**

**NEVTEX**

541-383-7753

[kmays@cocc.edu](mailto:kmays@cocc.edu)



NSF / ATE Grant Award # 1700708

Northwest Engineering and Vehicle Technology Exchange (NEVTEX)

Advanced Vehicle Technician Standards Committee (AVTSC)