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ADVANCED VEHICLE Training Group NW

Summer Training Event

5-Day Vehicle Electrification Technology Series

August 14th – 17th, 2017

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Group Northwest

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ADVANCED VEHICLE Training Group NW

Summer Training Event

5-Day Vehicle Electrification Technology Multi-Course Series

Electric Drive Vehicle Safety Systems

Hybrid, Plug-In Hybrid, Battery Electric Vehicle, and Fuel Cell Vehicle Safety Systems provide a critical function in ensuring the vehicle operator and service technicians remain safe when operating or servicing the vehicle. This course will cover the operation and servicing of the manual disconnect, low voltage Interlock Circuits, dc and ac Isolation Fault systems, and Active and Passive high voltage Bus Discharging circuits. The vehicle safety systems can routinely cause a loss of vehicle propulsion when they sense out of parameter input values. This course will use Scan Tool information, DVOM, high voltage electrical gloves (Class 0 / 1000V), and miscellaneous basic tools to analyze, test, and how to repair these safety systems.

Electric Transmissions (MGUs)

This course will provide the technician information and skill tools to address MGU testing and service requirements using a variety of diagnostic tools and methods. Hybrid, Plug-In, and Electric Vehicle Motor-Generator Units (MGU) are at the heart of the modern vehicle propulsion system. It is essential for technicians to be familiar with 1, 2, and 3 MGU system layouts, how MGU operation impacts customer complaints, vehicle performance, and the associated diagnostic codes. Using scan tool information, on-board special functions tests, and specialized off-board testing tools and methods are critical to help the technician identify failure modes, ensure proper vehicle performance and resolve customer complaints associated with the MGU, and help technicians properly service the vehicle.

Nickel Metal Hydride (NiMH) Battery Systems

NiMH chemistry is currently the predominant battery technology used in hybrid electric vehicles. This course will prepare the technician to diagnose and resolve battery pack issues that result in poor fuel economy and other driveability concerns. The operation of the battery cells, modules and internal components within the battery pack, along with known failure modes will be taught. Students will learn to apply advanced diagnostic techniques including specific vehicle drive cycles and scan tool data to determine power and energy performance of individual battery modules.

3-Phase Power Inverter Systems

This course will provide the technician information and skill tools to address Power Inverter service requirements. Hybrid, Plug-In, and Electric Vehicle Motor-Generator Units (MGU) are controlled by the Power Inverter and its associated controller software. The Power Inverter serves as the control for the system MGU and can serve as the main distribution point of the high voltage system. It is critical the Power Inverter failure modes, testing, and internal/external component servicing are understood by technicians to determine how the failure is associated with customer complaints, vehicle performance, and the associated diagnostic codes. Using Scan Tool information, on-board special functions tests, and specialized off-board testing tools and methods will be included as part of this course – and are critical to ensure proper vehicle performance and resolve customer complaints associated with the Power Inverter.

Electric Drive Vehicle Regen and Braking Systems: Operation and Diagnostics

Regenerative Braking Systems used in Hybrid, Plug-In Hybrid Battery Electric Vehicles, and Fuel Cell Vehicles are an essential function to increase vehicle efficiency for the purposes of enhancing fuel economy and/or vehicle operational range. These systems also function in vehicle Hill Hold Assist and Creep Aid Control. Series or Parallel Regenerative braking systems can capture more than 30% of the energy lost in traditional vehicle braking through the use of brake emulators, braking control modules, and unique software controls. This course will provide the technician a solid fundamental background in how regenerative braking systems function and how these systems operate when combined with the base braking system. Diagnostics and servicing of braking systems will be covered including vehicles with special service concerns.

Electric A/C and Heating Systems

The speed in which a Plug-In Hybrid Vehicles (PHEV) or Battery Electric Vehicle (BEV) can be charged are dictated by the level of charging being used – Level 1, 2 or 3. Technicians will need to understand the differences between these charging levels, how charging times are effected, and what off-board and vehicle on-board equipment is necessary to perform each charging level. This course will define the 3 levels of charging and how the various vehicle systems are designed to charge at these levels and instruct technicians in how to use each level as part of vehicle servicing. This course will also provide information to prepare technicians and shop owners in how to plan for charging system installation and how to select a charger.