Specification of Competency Standards
for the Automotive
Unit of Competency

Functional Area - Vehicle Servicing

Title	Identify the structure and operating principles of the high-voltage systems of electric vehicle and the associated safety awareness
Code	111693L2
Range	This unit of competency is applicable in electrified vehicle service workshops. Practitioners should be able to identify the structure and operating principles of various types of electrified vehicles and associated components, explain their effects on safety and performance, and the associated safety awareness with reference to the instructions in the corresponding vehicle manufacturer's service manual and the relevant requirements on environmental protection, occupational safety and health.
Level	2
Credit	3 *(For Reference Only)*
Competency	**Performance Requirements** 1. Knowledge (The system layouts and operating principles of various electric vehicle systems, and safety awareness) • Differentiate amongst various types of electric vehicles, their layouts, features and operating concepts. • Acquainted with the structure and working principles of the high-voltage operating systems equipped on electric vehicles, the typical locations of their major components, including but not limited to the powertrain and controls, onboard charger (OBC), rechargeable energy storage system (REESS), and heating, ventilation and air conditioning (HVAC) system, as well as their effects on vehicle safety and performance. • Familiar with the potential risks and hazards associated with the operation and maintenance of electric vehicles, including the colour coding and protection of cables and harnesses, the associated safety awareness and preventive measures. • Understand the definitions of low-voltage and high-voltage electrical systems onboard. • Conversant with the functions and applications of special service tools and equipment, personal protection and first-aid equipment for electric vehicle system maintenance. • Identify the general maintenance procedures and criteria of various electric vehicle systems according to the instructions in the corresponding vehicle manufacturer's service manual and the requirements of occupational safety and health. • Understanding of the relevant legal requirements of road and vehicle safety, and environmental protection.

	2. Performance (Operating principles, safety awareness and maintenance of electric vehicle systems) • Identify the working principles of various electric vehicle types, their layouts, features and operating concepts, as well as related safety awareness. • Explicate the structure and working principles of the high-voltage operating systems onboard, including but not limited to the powertrain, OBC, REESS and HVAC system, as well as their effects on vehicle safety and performance, the colour coding and protection of cables, harnesses and connectors. • Identify the potential risks and hazards associated with the operation and maintenance of electric vehicles. • Correctly differentiate the voltage levels of various electrical operating systems. • Masterly apply effective personal protective and first-aid equipment, with reference to the instructions in the corresponding vehicle manufacturer's service manual and the legal requirements of occupational safety and health, road and vehicle safety, and environmental protection, for electric vehicle system maintenance. • Conduct the general maintenance procedures safely for the electrical operating systems of electric vehicles, including but not limited to, under-chassis systems, powertrain, OBC and HAVAC system, with the application of the correct special service tools and equipment, according to the instructions in the corresponding vehicle manufacturer's service manual and associated safety guidelines.
Assessment Criteria	The integrated outcome requirements of this unit of competency are that the practitioner being assessed shall prove that he/she is: • Capable of identifying various electric vehicle types, their layouts, features, operating concepts and associated safety awareness; • Capable of explicating the structure and working principles of high-voltage operating systems and components of electric vehicles, such as cables and connectors, powertrain, REESS, OBC, HVAC system, etc., and their effects on vehicle safety and performance; • Capable of differentiating the voltage levels of various operating systems to take appropriate protections for the maintenance work; and • Capable of applying correct special service tools and equipment, effective personal protective and first-aid equipment, and specific working criteria to conduct general maintenance procedures safely for the electrical operating systems onboard, such as the under-chassis systems, powertrain, OBC, HAVAC system, etc., according to the instructions in the corresponding vehicle manufacturer's service manual and associated safety guidelines.
Remark	The credit value of this unit of competency is set on the presumption that the practitioner concerned has already possessed basic knowledge of electric vehicles. The major ordinance involved in this unit of competency is as follows: • Relevant ordinances to the Road Traffic (Construction and Maintenance of vehicles) Regulations • Occupational Safety and Health