Specification of Competency Standards
for the Automotive
Unit of Competency

Functional Area - Vehicle Servicing

Title	Execute the diagnostic and remedial procedures for the high-voltage systems of electric vehicles and the associated safety measures
Code	111738L3
Range	This unit of competency is applicable in electric vehicle service workshops. Practitioners should be able to master the diagnostic and remedial procedures of the high-voltage operating electric vehicle systems and implement the associated safety measures according to the instructions in the corresponding vehicle manufacturer's service manual and the relevant requirements on environmental protection, occupational safety and health regulations. They should also be able to provide written reports upon completion of work.
Level	3
Credit	7 *(For Reference Only)*
Competency	**Performance Requirements** 1. Knowledge (Structures and operating principles of various electric vehicle systems and associated risk management) • Identify the types of high-voltage batteries adopted by vehicles, their characteristics, handling procedures, and associated safety issues. • Conversant with the layout and operating principles of a rechargeable energy storage system (REESS), including major components and circuitry, its system protection and preventative measures for operational safety. • Accurately differentiate the voltage levels of the components and cables in REESS, powertrain, steering, heating, ventilation and air conditioning (HVAC) systems, the hazards and safety rules in handling of the high-voltage operating components onboard. • Good understanding of the functions and application of special service tools, including onboard diagnostic tester and insulation tester, personal protection and first-aid equipment for relevant tasks. • Master the principle of high-voltage system power down to isolate the electrical circuit connection between the high-voltage battery pack and the vehicle system components, and the criteria for power reinstatement. • Acquainted with the basic principle of whole-vehicle control logic of electric vehicles and the application of controller area network for signal transmission. • Identify the potential hazards and preventive measures associated with electric vehicle servicing according to the instructions in the corresponding vehicle manufacturer's service manual. • Understand risk assessment and the techniques for electric vehicle servicing. • Good understanding of the relevant legal requirements of occupational safety and health, road and vehicle safety, and environmental protection.
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 explaining the working principles of various high-voltage operating systems onboard, and the architecture of whole-vehicle logic control and applications of controller area network;

	• Capable of applying relevant personal protective equipment and first-aid equipment, special tools and diagnostic instruments for high-voltage operating system inspection and rectification / replacement, with reference to instructions in the corresponding vehicle manufacturer's service manual and safety rules; • Capable of identifying the voltage levels of operating systems, and checking the intactness of high-voltage connectors and cables linked among high-voltage systems / components; • Capable of isolating and reinstating the high-voltage electrical system of electric vehicles safely, as well as the effectiveness of the processes, according to the instructions in the electric vehicle manufacturer's service manual and the relevant requirements on environmental protection, occupational safety and health regulations; • Capable of executing the diagnostic procedures to locate the faulty functions that fail to reinstate the system circuit, and solving the problem accurately; • Capable of inspecting the normal operation and performance of various high-voltage operating systems and components onboard under isolated status, including but not limited to the powertrain, onboard charging unit, power distribution, modulation and conversion units, and HVAC systems, with reference to the instructions in the corresponding vehicle manufacturer's service manual and safety rules; • Capable of executing proper remedial actions to the faulty system / component identified in the inspection process for rehabilitating the normal operating conditions, with reference to the instructions in the corresponding vehicle manufacturer's service manual and the requirements of occupational safety and health, and environmental protection; • Capable of conducting safety and functional tests for the rectified items, and providing written reports upon completion of the remedial and inspection work; and • Capable of performing risk assessment and establishing the emergency rescue procedures for electric vehicle servicing, according to the instructions in the corresponding vehicle manufacturer's service manual and the requirements of occupational safety and health and environmental protection, and provide a written report upon the completion of risk assessment and emergency rescue procedure establishment.
Remark	The credits value of this unit of competency is set on the presumption that the practitioner concerned has already possessed good knowledge of high-voltage operating systems on the 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