Specification of Competency Standards
for the Automotive
Unit of Competency

Functional Area - Vehicle Servicing

Title	Removal, checking and replacement of the rechargeable energy storage system, charging and propulsion system of an electric motorcycle
Code	111706L3
Range	This unit of competency is applicable in motorcycle service workshops. Practitioners should be able to remove, check and replace the rechargeable energy storage system (REESS), onboard charger, propulsion system and associated components with the application of suitable gear safely, 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 conduct basic functionality tests on the system and provide work report upon completion of work.
Level	3
Credit	4 *(For Reference Only)*
Competency	**Performance Requirements** 1. Knowledge (Structure and operating principles of the high-voltage operating systems on various types of electric motorcycles) • Good understanding of the structure and operation of the REESS, onboard charging system, propulsion system and associated components of electric motorcycles, including external electricity charging control, high-voltage battery and its management system, electric power control and modulation units, meter and control consoles, traction motors, driving mechanisms, etc. • Master the principles of electric power charging, storage and management, high-voltage power control and modulation for the traction system, including the communication amongst control modules and various signals, such as the input, feedback and output. • Differentiation of the voltage levels of various electrical systems of electric motorcycles. • Master the function and application of personal protection equipment (PPE), service tools and equipment for electric motorcycle servicing. • 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, as well as the criteria for power reinstatement. • Demonstrate the removal, checking and replacement procedures of the REESS, onboard charging system and propulsion system, including but not limited to the high-voltage battery, electric power control and modulation units, traction motor and driving mechanism. • Demonstrate the coding and functionality testing procedures. • Understanding of the relevant legal requirements regarding road and vehicle safety, and environmental protection.

	2. Performance (Checking, rectification and replacement of the REESS, onboard charging and propulsion system of an electric motorcycle)
	• Correctly select and apply the PPE, service tools and equipment for electric motorcycle servicing.
	• Correctly identify the voltage levels of the component / cable / wiring harness of various electrical systems.
	• According to the instructions in the corresponding vehicle manufacturer's service manual and associated safety guidelines, with the application of proper personal protective equipment and special service tools, safely execute the correct power-down and reinstatement procedures for the high-voltage electrical system of an electric motorcycle equipped either type of battery pack, including the identification of the correct location of the breaker and intact components.
	• According to the instructions in the corresponding vehicle manufacturer's service manual and the requirements of occupational safety and health as well as that of environmental protection, safely process the checking, rectification and replacement of the fixed-type high-voltage battery pack and its management system, onboard charging system, propulsion system and associated components of electric motorcycles, including but not limited to the intactness of cable wires, serviceability of the high-voltage battery pack, onboard charger, electric power control and modulation units, traction motor and driving mechanism.
	• Renew and reinstall the rectified components, and conduct the coding procedures where necessary.
	• Conduct the basic functionality test and safety inspection after completion of work and provide work report focusing on:
	  ◦ Abnormalities
	  ◦ Measured data
	  ◦ Major decisions

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 logic of electric power charging control, traction power control and modulation, including various control signals, of an electric motorcycle; • Capable of identifying the voltage levels of the power system on electric motorcycles and applying suitable PPE and service tools for the removal and replacement procedures of the propulsion system and components; • Capable of conducting rectification, replacement and testing of the high-voltage electrical systems of electric motorcycles, including but not limited to high-voltage battery packs (fixed type), onboard charging and propulsion systems, according to the instructions in the corresponding vehicle manufacturer's service manual and the relevant requirements on environmental protection, occupational safety and health regulations, after system power-down is confirmed by the checking result of special service tools / authorised competent person; and • Capable of conducting basic functionality tests for the REESS, onboard charging system, propulsion system and associated components, and the coding procedures for the traction motor and fixed-type high-voltage battery pack, and providing work report upon completion of work.
Remark	The credit value of this unit of competency is set on the presumption that the practitioner concerned has already possessed good knowledge of the operation, working principles and maintenance of electrified vehicles. The practitioner concerned should be a recognised competent person in electrified vehicle servicing, such as a registered vehicle mechanic who has completed an electric motorcycle training course, or equivalent. The major ordinances involved in this unit of competency are as follows: • Relevant ordinances to the Road Traffic (Construction and Maintenance of Vehicles) Regulations • Occupational Safety and Health Ordinance