



Australian Government

AURETH102 Inspect and maintain battery electric vehicles

Release: 1

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Modification History

Release	Comments
Release 1	This version first released with the Automotive Retail, Service and Repair Training Package Version 7.0. Supersedes and is equivalent to AURETH002 Service and maintain battery electric vehicles.

Application

This unit describes the skills and knowledge required to inspect and maintain battery electric vehicles (BEVs). It involves working with automotive electrical components, maintaining rechargeable energy storage systems (RESS), and performing basic tests on electric drive motors. Importance is placed in the unit on applying both high voltage (HV) rechargeable energy storage systems RESS and separated extra low voltage (SELV) electrical safety procedures.

It applies to individuals working in the automotive service and repair industry.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

AURETH101 Depower and reinitialise battery electric vehicles

Competency Field

Electrical

Unit Sector

Technical – Hybrid Vehicle and Battery Electric Vehicle

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1.Prepare to inspect and	1.1 Identify job requirements from workplace instructions

maintain BEV	1.2 Access and interpret workplace procedures and manufacturer specifications 1.3 Identify hazards associated with the work, assess potential risks and implement control measures in line with workplace policies and procedures 1.4 Identify tools and equipment required for inspecting activity and establishing serviceability according to workplace procedures
2.Test RESS and drive motor system operation	2.1 Use diagnostic equipment to retrieve system parameters and information 2.2 Test RESS and vehicle drive motor system for correct operation according to manufacturer specifications 2.3 Identify problems associated with performance of RESS or drive motor system according to workplace procedures
3.Deactivate vehicle RESS	3.1 Check vehicle is depowered according to manufacturer specifications and workplace procedures 3.2 Check vehicle is identified with warning tag or sign to indicate potential hazards 3.3 Locate SELV supply and disconnect according to manufacturer specifications 3.4 Locate and remove RESS service plug or manual service and disconnect to depower vehicle HV RESS according to manufacturer specifications 3.5 Stabilise vehicle and check for zero residual voltage according to manufacturer procedures 3.6 Secure RESS service plug or manual service disconnect to prevent refitting by third party
4.Check drive motor, electrical subsystems and associated components	4.1 Check electrical drive motor and electrical subsystem and confirm condition 4.2 Identify problems associated with performance of electrical drive motor, electrical subsystems and associated components 4.3 Report corrective action according to workplace procedures
5.Reinitialise vehicle RESS	5.1 Reconnect SELV and RESS service plug or manual service and disconnect in the correct order and reactivate vehicle 5.2 Carry out diagnostic tests and confirm correct recalibration of subsystems affected by depower process according to manufacturer specifications 5.3 Check RESS and vehicle subsystems for correct operation according to manufacture specifications 5.4 Report post-reactivation faults according to workplace

	procedures
6.Complete work processes	6.1 Conduct final inspection according to workplace procedures and confirm vehicle is ready for use 6.2 Clear work area and dispose of or recycle materials according to workplace procedures 6.3 Check tools and equipment are stored, and faulty equipment is identified, tagged and isolated according to workplace procedures 6.4 Complete documentation according to workplace procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

Skill	Description
Learning	Locates appropriate sources of information efficiently
Reading	Interprets text, symbols and diagrams in testing, servicing and maintenance information from manufacturer specifications, and workplace instructions and procedures
Writing	Legibly and accurately fills out workplace documentation
Oral	- Listens to workplace instructions and asks questions to clarify job requirements - Participates in verbal exchanges to report faults and inspect and maintenance findings, and makes required repair recommendations
Numeracy	Interprets measurements of residual voltage and high voltages relating to BEVs
Planning and organising	- Plans own work requirements - Prioritises actions to achieve required outcomes - Confirms tasks are completed within workplace timeframes
Technology	Uses specialised tools and equipment

Unit Mapping Information

Supersedes and is equivalent to AURETH002 Service and maintain battery electric vehicles.

Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

Assessment Requirements for AURETH102 Inspect and maintain battery electric vehicles

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Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- inspect and maintain at least two different battery electric vehicles (BEVs).

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- methods to locate and interpret information required to inspect and maintain battery electric vehicles, including:
 - Australian Standards (AS) 5732 Electric vehicle operations - Maintenance and repair
 - vehicle manufacturer specifications and procedures or equivalent documentation
- workplace procedures and policies required to inspect and maintain battery electric vehicles, including:
 - documentation procedures
 - housekeeping procedures, including those for:
 - examining and storing tools and equipment
 - identifying, tagging and isolating faulty equipment
 - disposing and recycling of excess materials
- work health and safety (WHS) relating to inspecting and maintaining BEVs, including procedures for:
 - identifying hazards and controlling risks associated with:
 - working with high voltages on BEV electrical systems
 - wearing jewellery while working around high electrical currents
 - minimising risk associated with hazards, including applying electrical safety precautions when:

- using personal protective equipment (PPE), including electrical safety gloves with 1000 volt rating and Australian standards rated high voltage (HV) insulating mat
- identifying and using firefighting equipment as appropriate
- using the 'one hand' rule
- following live system warning tags and signs
- depowering vehicle
- isolating HV rechargeable energy storage system (RESS) electrical supply
- stabilising vehicle electrical system
- key components of BEVs and their functions
- RESS battery construction, including:
 - battery internal resistance
 - battery types
 - terminal corrosion
 - terminal resistance
- key components of RESS theory, including:
 - cell failure theory
 - charging characteristics
 - open circuit cells
 - reverse polarisation
 - series cell configuration
 - strapping and layout
- battery charger characteristics and operation, including battery cooling system and refrigerant flow through RESS
- battery management system (BMS) theory
- power distribution unit (PDU) operation.

Assessment Conditions

Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.

Assessment must include direct observation of tasks.

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the BEVs that they have inspected and maintained e.g. repair orders.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- automotive repair workplace or simulated workplace
- PPE and safety equipment, including electrical safety gloves with 1000 volt rating and Australian standards rated HV insulating mat

- manufacturer specifications and inspection procedures for the BEVs being inspected and maintained
- AS 5732 Electric vehicle operations - Maintenance and repair
- two different BEVs as specified in the performance evidence
- electrical test equipment, including:
 - digital multimeter with Cat III 1000 volt rating
 - insulation tester
 - residual voltage tester, if specified in original equipment manufacturer (OEM) test requirements
 - scan tool
 - tools, equipment and materials appropriate for servicing and maintaining BEVs.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>