Australian Government

AURETH013 Analyse and evaluate electrical and electronic faults in HEV and BEV management systems

Release: 1

AURETH013 Analyse and evaluate electrical and electronic faults in HEV and BEV management systems

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to analyse and evaluate electrical and electronic faults in the embedded network management systems of hybrid, plug-in hybrid and battery electric vehicles (HEV, PHEV and BEV) in order to initiate action to sustain, vary or enhance performance. It involves identifying, evaluating, selecting, justifying and documenting the most appropriate rectification method or variation to the rectification method. The unit includes the analysis of multi-system and intermittent faults which may be caused by operating in adverse conditions. Importance is placed in the unit on applying electrical safety procedures when working on high voltage (HV) rechargeable energy storage systems (RESS).

It applies to those working in the automotive service and repair industry on HEV, PHEV or BEV embedded network management systems.

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

Competency Field

Electrical

Unit Sector

Technical - Hybrid Vehicle and Battery Electric Vehicle

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.

Elements Elements describe the essential outcomes.	**Performance Criteria** Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
1. Identify and confirm the work requirement	1.1 Objective of the analysis and evaluation is determined from workplace instructions 1.2 Specifications for HEV, PHEV or BEV management system are sourced and interpreted 1.3 System faults, deficiencies or discrepancies are identified and confirmed 1.4 Hazards associated with the work are identified, appropriate precautions are taken, and risks are managed according to workplace procedures, ***safety requirements***, and requirements of Australian Design Rules (ADRs) and AS 5732 Electric vehicle operations: Maintenance and repair
2. Prepare for analysis and evaluation	2.1 Evaluation criteria are developed or adopted to meet the objective of the analysis and evaluation 2.2 ***Analytical and evaluative methodology*** is developed or identified from technical information 2.3 Testing equipment is prepared according to manufacturer specifications and workplace procedures 2.4 Tools and materials required to support the diagnostic procedure are identified, selected, checked and prepared for use 2.5 HEV, PHEV or BEV management system and components are prepared for the diagnostic process
3. Carry out failure analysis	3.1 Selected analytical and evaluative methodology is followed according to manufacturer specifications and workplace procedures 3.2 Tests are carried out according to manufacturer specifications, workplace procedures, and safety and environmental requirements 3.3 Analytical and other diagnostic findings are verified, as required, by using reliable alternative or optional processes 3.4 Analytical findings and results are assessed against evaluation criteria 3.5 Valid conclusions are drawn from available evidence and documented according to workplace requirements
4. Make recommendations	4.1 Options for responding to the objective are determined from further research of technical support information 4.2 Rectification method is selected from an analysis of the options, operating conditions, requirements of ADRs and AS 5732 4.3 Report is prepared specifying analysis and evaluation process,

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	and detailing and justifying rectification method or variation to the rectification method
5. Complete work processes	5.1 Final inspection is made to ensure work is to workplace expectations 5.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected 5.3 Tools and equipment are checked and stored, and any faulty electrical equipment is identified, tagged and isolated according to workplace procedures 5.4 Workplace documentation is processed according to workplace procedures

Foundation Skills

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

Skills	Description
Learning skills to:	• apply learning and processes to different situations.
Reading skills to:	• research, organise and interpret technical information relating to HEV, PHEV and BEV management systems.
Writing skills to:	• legibly and accurately fill out workplace documentation when reporting failure analysis findings • document and complete reports.
Numeracy skills to:	• use mathematical ideas and techniques to complete measurements, calibrate testing equipment and present analytical results.
Planning and organising skills to:	• plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.
Technology skills to:	• use specialised HEV, PHEV and BEV management system diagnostic equipment.

Range of Conditions

This section specifies work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

Safety requirements must include:	• work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for:
	  • identifying hazards and controlling risks associated with:
	  • working with high voltages on vehicle electrical systems
	  • working with hazardous materials and toxic substances
	  • wearing jewellery while working around high electrical currents
	  • minimising risk, including:
	  • analysing task to define risk
	  • applying electrical safety precautions, including 'one hand' rule, live system warning tags and signs, depowering the vehicle, isolating the HV RESS electrical supply, and stabilising the vehicle HV electrical systems
	  • using personal protective equipment, including electrical safety gloves with 1000 volt rating and Australian standards rated HV insulating mat
	  • identifying fire safety equipment.

Analytical and evaluative methodology must include:	• diagnostic process, sequence, tests and testing equipment.

Unit Mapping Information

Equivalent to AURETH5013 Analyse and evaluate electrical and electronic faults in electric and hybrid vehicle systems

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1