Australian Government

AURETH014 Diagnose complex faults in hybrid and battery electric vehicle network management systems

Release: 1

AURETH014 Diagnose complex faults in hybrid and battery electric vehicle network management systems

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to diagnose complex faults in hybrid, plug-in hybrid and battery electric vehicle (HEV, PHEV and BEV) embedded network management systems and determine the repair action necessary to restore system performance. It involves confirming the existence of a fault, choosing the diagnostic procedure and tools, applying the diagnostic procedure, reporting conclusions and making repair recommendations. Importance is placed in the unit on applying electrical safety procedures when working on high voltage (HV) rechargeable energy storage systems (RESS).

Complex faults are outside the normal scope of a technician's diagnosis and repair work. They include intermittent faults, multi-system faults, faults introduced as a result of system repairs, and indirect faults caused by the influence of external systems, requiring the application of complex diagnostic processes to resolve.

It applies to those working in the automotive service and repair industry. The HEV, PHEV and BEV network management systems include those of light vehicles or heavy commercial vehicles.

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

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Elements and Performance Criteria

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 Nature and objective of diagnostic requirements are determined from workplace instructions 1.2 Existence of fault in HEV, PHEV or BEV network management system is confirmed from direct or indirect evidence 1.3 Hazards associated with the work are identified and risks are managed according to workplace procedures, ***safety requirements***, and requirements of AS 5732 Electric vehicle operations: Maintenance and repair
2. Prepare to carry out diagnosis	2.1 Manufacturer specifications and other technical information for network management system are accessed and interpreted 2.2 Diagnostic procedures and options are identified 2.3 Diagnostic method sequence, tests and testing processes are selected from the range of available options 2.4 Testing equipment is selected and prepared according to manufacturer specifications and workplace procedures 2.5 Tools, equipment and materials required to support the diagnostic process are identified, selected and prepared for use
3. Apply diagnostic procedures	3.1 Selected diagnostic process is followed and testing is carried out according to manufacturer specifications, workplace procedures and safety requirements 3.2 Diagnostic findings are verified, as required, by using reliable alternative or optional process according to manufacturer specifications and workplace procedures 3.3 Conclusions are drawn from findings and documented according to workplace procedures, including recommendations for necessary repairs 3.4 Conclusions are provided to appropriate personnel or customer to confirm further action to be taken
4. Complete work processes	4.1 Vehicle is presented ready to be repaired or returned to the customer 4.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected 4.3 Tools and equipment are checked and stored, and any faulty electrical equipment is identified, tagged and isolated according to workplace procedures 4.4 Workplace documentation is processed according to workplace procedures

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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:	• locate and evaluate appropriate sources of information efficiently • apply diagnostic skills to different vehicles.
Reading skills to:	• research, organise and interpret technical information from manufacturer and workshop literature when seeking HEV, PHEV and BEV network management system specifications and procedures.
Writing skills to:	• legibly and accurately fill out workplace documentation when reporting diagnostic findings, making repair recommendations, and recording parts and material used.
Oral communication skills to:	• clarify instructions, gain information from customers and supervisors, report diagnostic findings and make repair recommendations.
Numeracy skills to:	• measure network management system components and use basic mathematical operations, including addition and subtraction, to calculate tolerances and deviations from manufacturer specifications.
Planning and organising skills to:	• plan own work requirements and prioritise and sequence actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.
Technology skills to:	• use specialised diagnostic equipment, including digital multimeters and scan tools.

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

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	• 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 electrical systems
	• using personal protective equipment (PPE), including electrical safety gloves with 1000 volt rating and Australian standards rated HV insulating mat
	• identifying fire safety equipment
	• lifting and moving the RESS using safe manual handling techniques
	• using workplace first aid equipment.

Unit Mapping Information

Equivalent to AURETH4014 Diagnose complex faults in battery electric and hybrid electric vehicle systems

Links

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

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