



Australian Government

AURETH011 Depower and reinitialise hybrid electric vehicles

Release: 1

AURETH011 Depower and reinitialise hybrid electric vehicles

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to depower and reinitialise hybrid electric vehicles (HEVs) and plug-in hybrid electric vehicles (PHEVs). It involves ensuring that the vehicle high voltage (HV) rechargeable energy storage system (RESS) is isolated before commencing any service or repair work. It also involves calibrating vehicle systems that may need resetting once the energy storage system is reinitialised. Importance is placed in the unit on applying RESS and separated extra low voltage (SELV) electrical safety procedures.

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

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.
1. Prepare to depower and reinitialise HEV and PHEV	1.1 Job requirements are determined from workplace instructions 1.2 Workplace procedures and manufacturer specifications are accessed and interpreted

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.
	1.3 Hazards associated with the work are identified and risks are managed according to <i>safety requirements</i> and AS 5732 Electric vehicle operations - Maintenance and repair 1.4 <i>Tools and equipment</i> are selected and checked for serviceability 1.5 Vehicle is identified with warning tags or sign to indicate potential hazards
2. Deactivate vehicle RESS	2.1 SELV supply is located and disconnected according to manufacturer specifications 2.2 RESS service plug or manual service disconnect is located and removed to depower vehicle HV RESS according to manufacturer specifications 2.3 Vehicle is stabilised and checked for zero residual voltage according to manufacturer procedures 2.4 RESS service plug or manual service disconnect is secured and retained to prevent refitting by third party
3. Reinitialise vehicle RESS	3.1 SELV and RESS service plug or manual service disconnect are reconnected in the correct order and vehicle is reactivated 3.2 Diagnostic and testing equipment is used to check and recalibrate subsystems affected by depower process as required 3.3 RESS and vehicle subsystems are checked for correct operation 3.4 Post-reactivation faults are reported according to workplace procedures
4. Complete work processes	4.1 Final inspection is made to ensure work is to workplace expectations and vehicle is presented ready for use 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

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 appropriate sources of information efficiently.
Reading skills to:	interpret text, symbols and diagrams in depowering and reinitialising information in manufacturer specifications, and workplace instructions 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:	- listen to workplace instructions and ask questions to clarify job requirements - participate in verbal exchanges when depowering and reinitialising HEVs and PHEVs.
Numeracy skills to:	- match electrical components and part identification numbers to workplace instructions, vehicle and component part lists, and manufacturer specifications - interpret vehicle electrical measurements and readings on digital and analogue gauges - interpret measurements of residual voltage and high voltages relating to HEVs and PHEVs.
Planning and organising skills to:	plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.
Problem solving skills to:	identify faults in reinitialising process that need to be reported.
Technology skills to:	use specialised 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.

<i>Safety requirements</i> 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 HEV and PHEV electrical systems - wearing jewellery while working around high electrical currents
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	• determining appropriate procedures for 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 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 RESS electrical supply • stabilising vehicle electrical system.
<i>Tools and equipment</i> must include:	• those specified in the specific vehicle service maintenance procedures, 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.

Unit Mapping Information

Equivalent to AURETH4011 Deactivate and reinitialise power supply in hybrid electric vehicles

Links

Companion Volume implementation guides are found in VETNet -

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

Assessment Requirements for AURETH011 Depower and reinitialise hybrid electric vehicles

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Performance Evidence

Before competency can be determined, individuals must demonstrate they can perform the following according to the standard defined in the unit's elements, performance criteria, range of conditions and foundation skills:

- safely depower the rechargeable energy storage system (RESS) and separated extra low voltage (SELV) of two different hybrid electric vehicles (HEVs) or plug-in hybrid electric vehicles (PHEVs), and stabilise the vehicles ensuring that no residual high voltage (HV) is measured
- safely reinitialise each HEV's or PHEV's RESS and SELV system and confirm correct vehicle operation.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to depowering and reinitialising the RESS in HEVs or PHEVs, including procedures for:
 - identifying hazards and controlling risks associated with:
 - working with high voltages on HEV and PHEV electrical systems
 - wearing jewellery while working around high electrical currents
 - determining appropriate procedures for 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 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 RESS electrical supply
- stabilising vehicle electrical system
- requirements of AS 5732 Electric vehicle operations - Maintenance and repair
- operating principles of RESS and SELV electrical systems relevant to a range of HEVs and PHEVs
- application, purpose and operation of a range of vehicle RESS depowering and repowering methods.

Assessment Conditions

Assessors must satisfy NVR/AQTF assessor requirements.

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 HEVs or PHEVs that they have depowered and reinitialised, 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, including electrical safety gloves with 1000 volt rating and Australian standards rated HV insulating mat
- manufacturer specifications and service procedures for the HEVs or PHEVs being depowered and reinitialised
- AS 5732 Electric vehicle operations - Maintenance and repair
- two different operational HEVs or PHEVs 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) specifications
 - scan tool
- tools, equipment and materials appropriate for depowering and reinitialising RESS in HEVs and PHEVs.

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