



Australian Government

AURETH4011 Deactivate and reinitialise power supply in hybrid electric vehicles

Release 2

AURETH4011 Deactivate and reinitialise power supply in hybrid electric vehicles

Modification History

Release	Comment
Release 2	Replaces AURETH4011 Deactivate and reinitialise power supply in hybrid electric vehicles (Release 1) Reference to OHS legislation replaced with new WHS legislation

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes required to isolate the low voltage (LV) and high voltage (HV) electrical power supply of hybrid electric vehicles (HEVs). It involves calibrating systems that require re-setting once the power supply and system are re-energised. Importance is placed on the application of HV safety procedures. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.
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Application of the Unit

Application of the unit	Work applies to HEVs that have particular requirements for deactivating and reinitialising electrical circuits and equipment, including resetting electrical or electronic HV and LV sub-systems and components. It involves working with HV alternating current (AC) and direct current (DC) automotive electrical components.
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Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for repair operations	1.1. Procedures and information relevant to the task are sourced and work requirements confirmed 1.2. Workplace health and safety (WHS) requirements and appropriate precautions are identified and applied 1.3. Methods for the specific work requirement are selected and prepared for 1.4. Tools and testing equipment necessary to conduct the work are assembled 1.5. Technical and/or calibration requirements for deactivating and reinitialising the power supply are established
2. Deactivate power supply	2.1. Information relevant for deactivation is followed 2.2. Procedure to deactivate vehicle at main control is followed to commence deactivation process 2.3. HV power supply connection is located and isolated according to manufacturer instructions, taking appropriate precautions to prevent electric shock to self and others 2.4. LV power supply is located and disconnected according to manufacturer instructions and vehicle and workplace safety procedures 2.5. Vehicle is stabilised and checked for residual voltage in system 2.6. HV power supply connection is secured and retained to prevent re-fit by third party 2.7. Vehicle is identified with warning tags or sign to indicate potential hazards
3. Reinitialise power supply	3.1. Information for reinitialising procedure is accessed and followed 3.2. LV and HV power supplies are reconnected and activated 3.3. Technical and/or calibration requirements are established for reinitialising the power supply 3.4. Diagnostic and testing equipment is used to check and recalibrate sub-systems affected by deactivation process 3.5. Main power supply and sub-systems are checked for correct operation upon reactivation 3.6. Workplace requirements are followed to report

ELEMENT	PERFORMANCE CRITERIA
	and record subsequent faults with the reinitialising process

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- technical skills to:
 - use workplace technology relating to the deactivating and reinitialising of LV and HV power supplies and components in HEVs
 - use specialist tools and equipment
 - use computerised measuring and diagnostic equipment
 - report and record actions
- communication skills to:
 - confirm work requirements and specifications
 - communicate effectively regarding work requirements with supervisor, other workers and customers
 - report work outcomes and problems
- literacy skills to interpret technical information and specifications
- numeracy skills to complete tests and measurements to determine correct operation
- problem-solving skills to:
 - interpret test results
 - identify repair options
- self-management skills to:
 - manage risks and hazards associated with LV and HV HEV electrical systems and components
 - optimise workflow and productivity

Required knowledge

- components of LV and HV HEVs and their functions
- relevant WHS requirements relating to:
 - safe work practices
 - electrical safety
- principles of electricity, including AC and DC
- applicable commonwealth, state or territory legislation, regulations, standards and codes of practice and environmental regulations relating to deactivating and reinitialising HEV power supplies in the automotive workplace
- vehicle-specific electrical requirements
- workplace policies and procedures, including quality, recording and reporting procedures relating to deactivating and reinitialising HEV power supplies in the automotive workplace

Evidence Guide

Evidence Guide	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to workplace operations and satisfy all of the requirements of the performance criteria and required skills and knowledge. A person who demonstrates competency in this unit must be able to: • comply with WHS requirements and safe work practices • ensure electrical and mechanical integrity of components and system is maintained when performing tests • check that the deactivation and reinitialisation process is followed and applied according to manufacturer specifications • complete relevant documentation for diagnosed faults encountered when deactivating and reinitialising the HEV power supply.
Context of, and specific resources for assessment	Competency is to be assessed in the workplace or a simulated workplace environment that accurately reflects performance in a real workplace setting. Assessment is to occur: • using standard workplace practices and procedures • following safety requirements • applying environmental constraints. Assessment is to comply with relevant: • regulatory requirements • Australian standards • industry codes of practice. Competency is to be assessed using an HEV that uses HV and LV AC/DC electrical systems. Where simulation is used, an operational HEV must be included in the simulation. The following resources must be made available for the

Evidence Guide	
	assessment of this unit: • appropriate PPE • an HEV • manufacturer specifications for the HEV • testing equipment • full range of essential tools and equipment • workplace documentation.
Method of assessment	Assessment must satisfy the endorsed Assessment Guidelines of this Training Package. Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with the application of required skills and knowledge. Assessment methods must be by direct observation of tasks and include questioning on required skills and knowledge to ensure correct interpretation and application. Competence in this unit may be assessed in conjunction with other units which together form part of a holistic work role. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate the needs of diverse clients. Assessment processes and techniques must be culturally sensitive and appropriate to the language, literacy and numeracy capacity of the candidate and the work being performed.

Range Statement

Range Statement	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
<i>Procedures and information</i> may include:	• Australian standards • diagrams and sketches • engineer design specifications and instructions • industry codes of practice • original equipment manufacturer (OEM) specifications • verbal, written and graphical instructions issued by authorised internal and external persons • workplace specifications and requirements.
<i>WHS requirements</i> may include:	• eliminating of hazardous materials and substances • first aid equipment • following emergency procedures • hazard and risk control • material safety data sheets (MSDS) • personal protective equipment (PPE) and clothing • safety equipment • techniques for manual handling, including shifting, lifting and carrying.
<i>Appropriate precautions</i> may include:	• analysing task to define risk • applying electrical safety precautions, such as: • “one hand rule” • live system warning tags or signs • isolating the LV and HV battery electrical supply • stabilising the vehicle electrical circuits • using PPE, such as: • electrical safety gloves 1000V • HV insulating mats (Australian standards rated).
<i>Testing equipment</i> may include:	• AC/DC current clamp • battery management system (BMS) diagnostic equipment • diagnostic scanner or computer interface device • insulated hand tools

Range Statement	
	• multimeter CAT 3 1000V • oscilloscope • thermal imaging equipment or non-contact thermometer.
Sub-systems may include:	• air conditioning control system • anti-lock braking system (ABS) and traction control system (TCS) • automatic power windows • automatic transmission • auxiliary cooling system for the internal combustion engine (ICE) and HV system • driver information warning display • electric power steering (EPS) • electronic brake control system • electronic stability control • headlight aiming control system • ICE control management system • multi-function display units, including sat-nav systems • tyre pressure warning system (TPWS).
Workplace requirements may include:	• industry codes of practice • manufacturer specifications • quality policies and procedures • safe work procedures • sustainability, environment, equal opportunity and anti-discrimination policies and procedures • workplace recording and reporting procedures.

Unit Sector(s)

Competency field	Electrical
Sector	Technical – Hybrid and Battery Electric Vehicle

Custom Content Section

Not applicable.