



Australian Government

AURETR3026 Remove, replace and program electrical and electronic units and assemblies

Release 1

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Modification History

Release	Comment
Release 1	<p>Replaces AURE218664A Remove and replace electrical/electronic units/assemblies</p> <p>Performance Criteria and Range Statement updated to reflect technologies</p>

Unit Descriptor

Unit descriptor	<p>This unit describes the performance outcomes required to remove and replace electrical units and assemblies, such as powertrain control modules (PCM), engine and body control modules, as well as other electronic control units that are an integral part of the vehicle's computer area network databus (CAN-bus) network, to facilitate body repair activities or similar.</p> <p>The unit involves identifying and confirming work requirements; preparing for work; and completing work finalisation processes, including clean-up and documentation.</p> <p>Assistance from a licensed person must be sought in relation to air conditioning and LPG/CNG/LNG systems and components, and in recommissioning systems.</p> <p>Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.</p>
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Application of the Unit

Application of the unit	<p>Work applies to electrical units and assemblies that are fitted in light and heavy vehicle, mining, construction, agricultural, motorcycle, outdoor power equipment and marine environments.</p> <p>Work requires individuals to demonstrate some judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.</p>
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

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

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

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	<p>1.1. Workplace instructions are used to determine job requirements</p> <p>1.2. Workplace health and safety (WHS) requirements are observed throughout the work</p> <p>1.3. Procedures and information are sourced and interpreted</p> <p>1.4. Tools and equipment are identified for effective removal, replacement and testing procedures</p>
2. Remove electrical and electronic units and assemblies	<p>2.1. Correct information is accessed and interpreted from manufacturer and component supplier specifications</p> <p>2.2. Electrical and electronic units and assemblies are removed using approved methods, tools and equipment</p> <p>2.3. Assistance from a licensed person is sought in relation to air conditioning and LPG/CNG/LNG systems and component removal</p> <p>2.4. Removal activities are carried out according to industry regulations and guidelines, workplace health and safety (WHS) legislation, and workplace policies and procedures</p> <p>2.5. Units and assemblies are handled and stored according to manufacturer and component supplier requirements</p>
3. Replace electrical and electronic units and assemblies	<p>3.1. Correct information is accessed and interpreted from manufacturer and component supplier specifications</p> <p>3.2. Electrical and electronic control units and assemblies are replaced using approved methods, tools and equipment</p> <p>3.3. Assistance from a licensed person is sought in relation to air conditioning and LPG/CNG/LNG systems and component replacement</p> <p>3.4. Replacement activities are carried out according to industry regulations and guidelines, WHS legislation and workplace policies and procedures</p>
4. Test and reprogram electrical and electronic units and assemblies	<p>4.1. Testing procedures on replaced electrical and electronic control unit and assemblies are carried out</p> <p>4.2. Options for diagnosing faults are identified and used, using appropriate tools and diagnostic techniques</p> <p>4.3. Checking and testing are achieved without causing damage to components or systems as a result of inappropriate testing procedures</p> <p>4.4. Faults are identified from test results and causes of faults are determined</p> <p>4.5. Diagnosis findings are reported according to workplace procedures, including recommendations for necessary</p>

ELEMENT	PERFORMANCE CRITERIA
	<p>repairs or adjustments</p> <p>4.6. <i>Reprogramming options</i> are analysed and those most appropriate are selected</p> <p>4.7. Component replacement and programming procedures are carried out according to workplace procedures and manufacturer and component supplier specifications</p> <p>4.8. <i>Post-repair testing</i> is conducted and results are documented according to workplace procedures and relevant legislation</p>
<p>5. Clean up work area and maintain equipment</p>	<p>5.1. Material that can be reused is collected and stored</p> <p>5.2. Waste and scrap are removed following workplace procedures</p> <p>5.3. Equipment and work area are cleaned and inspected for serviceable condition according to workplace procedures</p> <p>5.4. Faulty equipment is identified, tagged and isolated according to workplace procedures</p> <p>5.5. Operator maintenance is completed according to manufacturer and component supplier specifications and site procedures</p> <p>5.6. Tools and equipment are maintained according to workplace procedures</p>

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- communication skills to:
 - follow verbal and written instructions
 - clarify workplace instructions and determine job requirements
 - gain information from appropriate persons and assistance as required
- initiative and enterprise skills to:
 - apply learning when replacing electronic units and assemblies in complex automotive electrical systems
 - recognise a workplace problem or potential problem and take action
- learning skills to identify sources of information, assistance and expert knowledge to expand skills, knowledge and understanding
- literacy skills to:
 - read and follow information in written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
 - obtain and record measurements
 - document required repairs and parts
- numeracy skills to:
 - test, measure and analyse test equipment results compared to desired system performance
 - assess tolerances and apply accurate measurements and adjustments
- planning and organising skills to:
 - plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed on time
 - identify risk factors and take action to minimise them
- problem-solving skills to:
 - refer problems outside area of responsibility to appropriate person and suggest possible causes
 - seek information and assistance as required to solve problems
- self-management skills to:
 - select and use appropriate equipment, materials, processes and procedures
 - recognise limitations and seek timely advice
 - follow workplace documentation, such as codes of practice and operating procedures
- teamwork skills to apply knowledge of own role to complete activities efficiently to support team activities and tasks
- technical skills to use workplace technology and tools relating to removing and replacing vehicle electrical and electronic units and assemblies, including:
 - specialist tools and equipment

REQUIRED SKILLS AND KNOWLEDGE

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

- electrical measuring equipment
- technology skills to:
 - operate a range of electrical and electronic diagnostic test equipment
 - use technology to collect, analyse and provide information

Required knowledge

- WHS regulations, requirements, equipment, material and personal safety requirements, including:
 - individual state and territory legislation
 - codes of practice
 - personal protection needs
- procedures for removing, replacing, testing and reprogramming electrical and electronic units and assemblies and post-repair testing
- wiring harness and loom fabrication techniques
- procedures for removing and replacing wiring harnesses and looms
- soldering procedures and techniques
- terminal crimping and connector repair techniques
- cable types and sizes and current carrying capacity
- various types of wiring systems found in vehicles, including:
 - basic wiring
 - twisted pair
 - shielded wiring
 - CAN-bus and databus networks
- techniques for reading and interpreting technical information, wiring diagrams and graphic symbols
- diagnostic and testing procedures, including:
 - analysis of system operation using electrical test equipment and other industry-relevant test equipment
 - visual, aural and functional assessments, including:
 - component damage and wear
 - component corrosion
 - water and moisture ingress
- repair procedures, including:
 - component removal and replacement procedures
 - component and associated system adjustment procedures

Evidence Guide

EVIDENCE GUIDE	
<p>The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.</p>	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>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.</p> <p>A person who demonstrates competency in this unit must be able to:</p> <ul style="list-style-type: none"> • observe safety procedures and requirements • select methods and techniques appropriate to the circumstances • complete preparatory activity in a systematic manner • remove and replace a minimum of four units and assemblies to workplace, manufacturer and component supplier requirements, including: <ul style="list-style-type: none"> • one supplementary restraint system module • one body control module • one engine or powertrain control module • complete final functional test to specification • present vehicle and equipment in a condition that complies with workplace requirements.
Context of, and specific resources for assessment	<p>Competency is to be assessed in the workplace or a simulated workplace environment that accurately reflects performance in a real workplace setting.</p> <p>Assessment is to occur:</p> <ul style="list-style-type: none"> • using standard workplace practices and procedures • following safety requirements • applying environmental constraints. <p>Assessment is to comply with relevant:</p> <ul style="list-style-type: none"> • regulatory requirements • Australian standards • industry codes of practice. <p>The following resources must be made available for the assessment of this unit:</p> <ul style="list-style-type: none"> • workplace location or simulated workplace

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	<ul style="list-style-type: none"> • material relevant to removing and replacing electrical and electronic units and assemblies • equipment, and hand and power tools appropriate to removing and replacing electrical and electronic units and assemblies • specifications and work instructions.
<p>Method of assessment</p>	<p>Assessment must satisfy the endorsed Assessment Guidelines of this Training Package.</p> <p>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.</p> <p>Assessment methods must be by direct observation of tasks and include questioning on required skills and knowledge to ensure correct interpretation and application.</p> <p>Competence in this unit may be assessed in conjunction with other units which together form part of a holistic work role.</p> <p>Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate the needs of diverse clients.</p> <p>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.</p>

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>Workplace instructions</i> may include:	<ul style="list-style-type: none"> • electronic or hard copy instructions • verbal instructions • written instructions.
<i>Job requirements</i> may include:	<ul style="list-style-type: none"> • effective unit and assembly removal and replacement techniques • reprogramming procedures to enable replaced unit and assembly to communicate with vehicle CAN-bus systems • diagnosis and repair methods, processes and equipment.
<i>Workplace health and safety requirements</i> may include:	<ul style="list-style-type: none"> • personal protective clothing and equipment • hazards associated with high voltage ignition systems • safe use of tools and equipment • safe handling of material • use of fire-fighting equipment • workplace safety policies and procedures • workplace first aid equipment • hazard control, including control of hazardous materials and toxic substances.
<i>Procedures and information</i> may include:	<ul style="list-style-type: none"> • verbal, written and graphical instructions • signage • work schedules, plans and specifications • work bulletins and memos • material safety data sheets (MSDS) • diagrams and sketches • regulatory and legislative requirements relating to automotive industry • Australian Design Rules • engineer's design specifications and instructions • workplace work specifications and requirements • instructions issued by authorised workplace or external persons • Australian standards • vehicle service requirements and repair manuals.
<i>Tools and equipment</i> may include:	<ul style="list-style-type: none"> • hand tools • testing equipment, including multimeters and ohmmeters • heat-gun or blower

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	<ul style="list-style-type: none"> • heat shrink sleeving and flexible conduit • terminals and connectors • electrical tape.
<i>Electrical and electronic units and assemblies</i> may include:	<ul style="list-style-type: none"> • electrical and electronic units and assemblies integral to the vehicle's CAN-bus network, including: <ul style="list-style-type: none"> • engine control unit (ECU) • engine control module (ECM) • powertrain control module (PCM) • body control module (BCM) • supplementary restraint systems (SRS).
<i>Options for diagnosing faults</i> may include:	<ul style="list-style-type: none"> • continuity testing • insulation testing • isolation and repair to located faults • replacement of blown fuses or circuit breakers • replacement of damaged connectors or terminals • visual inspection and evaluation of components.
<i>Inappropriate testing procedures</i> may include:	<ul style="list-style-type: none"> • intrusive testing (which must not be performed as it is not a recommended test and repair method), which includes: <ul style="list-style-type: none"> • back probing terminals and connectors and fuse holders with inappropriate test probes • probing terminal and connectors with inappropriate test probes • pushing sharp probes and objects into wiring insulation.
<i>Faults</i> may include:	<ul style="list-style-type: none"> • open circuits • short circuits • high resistance circuits • damaged insulation • frayed wires • burnt wiring • water and moisture ingress • connector damage • terminal damage • diagnosis trouble codes (DTC) being set.
<i>Reprogramming options</i>	<ul style="list-style-type: none"> • service programming system (SPS)

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may include:	<ul style="list-style-type: none"> • manufacturer programming code and relearn procedures • original equipment manufacturer (OEM) specific programming code.
<i>Post-repair testing</i> may include:	<ul style="list-style-type: none"> • validating effectiveness of the replacement or repair action • confirming that reported fault has been rectified • confirming that no other faults are present as a result of the replacement and the reprogram or repair action.

Unit Sector(s)

Competency field	Electrical
Unit sector	Technical – Electrical and Electronic

Custom Content Section

Not applicable.