



**Australian Government**

# **AURETR3032 Repair electrical systems**

**Release 1**

## AURETR3032 Repair electrical systems

### Modification History

Release	Comment
Release 1	Replaces AURE318866A Repair electrical systems Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

### Unit Descriptor

Unit descriptor	<p>This unit covers the competence to carry out repairs to vehicle/equipment electrical systems, including accessories, wipers, electric windows, lighting, turning indicators, hazard lights, door locks and fan blowers.</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>
-----------------	---

### Application of the Unit

Application of the unit	<p>The unit includes identification and confirmation of work requirement, preparation for work, testing of systems and identification of faults/causes, repair and retesting of electrical systems and completion of work finalisation processes, including clean-up and documentation.</p> <p>For minor electrical repairs see AURETR2012 Test and repair basic electrical circuits.</p> <p>For repairs to electrical marine systems see AURRTE3005 Diagnose and repair marine electrical systems and components.</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>
-------------------------	---

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

<b>Employability skills</b>	This unit contains employability skills.
-----------------------------	--

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	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.
---	--

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. Work instructions are used to determine job requirements, including method, process and equipment 1.2. Job specifications are read and interpreted 1.3. WHS requirements, including personal safety needs, are observed throughout the work 1.4. Equipment and tooling are identified and checked for safe and effective operation 1.5. Procedures are determined to minimise task time
2. Test systems/ components and identify faults	2.1. Correct information is accessed and interpreted from manufacturer/component supplier specifications 2.2. Tests are carried out to determine faults using tooling and techniques 2.3. Systems/components are tested without causing damage to component or system 2.4. Faults are identified and preferred repair action determined 2.5. Tests are carried out according to industry regulations/ guidelines, WHS, legislation and enterprise procedures/policies
3. Repair electrical systems	3.1. Correct information is accessed and interpreted from manufacturer/component supplier specifications 3.2. Repairs, component replacement and adjustments are carried out using tooling, techniques and materials 3.3. Repairs to electrical systems are completed without causing damage to component or system 3.4. Retests are carried out to ensure correct and safe electrical system operation 3.5. Repairs and retests are carried out according to industry regulations/guidelines, WHS, legislation and enterprise procedures/policies 3.6. Workplace and equipment documents are completed in accordance with site requirements
4. Clean up work area and maintain equipment	4.1. Material that can be reused is collected and stored 4.2. Waste and scrap is removed following workplace procedures 4.3. Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures 4.4. Unserviceable equipment is tagged and faults identified in accordance with workplace requirements

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
	4.5.Operator maintenance is completed in accordance with manufacturer/component supplier specifications and site procedures 4.6.Tooling and equipment is maintained in accordance with workplace procedures

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- collect, organise and understand information related to work orders, plans and safety procedures for circuit and component testing, and major repairs/component replacement
- technical literacy and communication skills sufficient to interpret and apply common industry terminology, and interpret technical information and specifications
- research and interpretive skills to locate, interpret and apply operational and safety information
- communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems
- plain English literacy and communication skills in relation to dealing with others involved in the work
- questioning and active listening skills, for example when obtaining information of electrical circuit/component testing, servicing and replacement procedures
- plan and organise activities, including preparation and layout of worksite and obtaining of equipment and material to avoid backtracking or workflow interruptions
- work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity
- use mathematical ideas and techniques to correctly complete tests and measurements to determine electrical circuit/component major repair/replacement requirements
- use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material
- manipulative and dexterity skills to perform electrical testing, and repair/replacement procedures
- problem-solving skills for a range of procedural issues
- use workplace technology related to the repair of electrical systems, including use of specialist tooling and equipment, measuring equipment, computerised technology and communication devices and the reporting/documenting of results

#### Required knowledge

A working knowledge of:

- WHS regulations/requirements, equipment, material and personal safety requirements
- operation of electrical system/components relevant to application
- motor principles/magnetism
- types and layout of service/repair manuals (hard copy and electronic)
- procedures for the repair/replacement of electrical systems/components
- testing and diagnosis procedures of electrical system/component faults
- wiring repair procedures
- work organisation and planning processes

<b>REQUIRED SKILLS AND KNOWLEDGE</b>
--------------------------------------

- |  |
|--|
| <ul style="list-style-type: none"><li>• enterprise quality processes</li></ul> |
|--|

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>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.</p>	
<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of:</p> <ul style="list-style-type: none"> <li>• observing safety procedures and requirements</li> <li>• communicating effectively with others involved in or affected by the work</li> <li>• selecting methods and techniques appropriate to the circumstances</li> <li>• completing preparatory activity in a systematic manner</li> <li>• testing and identifying open circuits, short circuits and earthing faults in electrical systems</li> <li>• repairing/replacing electrical systems/components to site and manufacturer/component supplier requirements</li> <li>• completing workplace and equipment documents.</li> </ul>
<b>Context of, and specific resources for assessment</b>	<p>Application of competence is to be assessed in the workplace or simulated worksite.</p> <p>Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints.</p> <p>Assessment is to comply with regulatory requirements, including Australian Standards.</p> <p>The following resources should be made available:</p> <ul style="list-style-type: none"> <li>• workplace location or simulated workplace</li> <li>• material relevant to repairing electrical systems</li> <li>• equipment and hand and power tooling appropriate to repairing electrical systems</li> <li>• activities covering mandatory task requirements</li> <li>• specifications and work instructions.</li> </ul>
<b>Method of assessment</b>	<ul style="list-style-type: none"> <li>• Assessment must satisfy the endorsed Assessment Guidelines of the Automotive Industry RS&amp;R Training Package</li> <li>• Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge</li> <li>• Assessment must be by direct observation of tasks, with</li> </ul>



**EVIDENCE GUIDE**

	<p>questioning on underpinning knowledge and it must also reinforce the integration of key competencies</p> <ul style="list-style-type: none"><li>• Assessment may be applied under project related conditions and require evidence of process</li><li>• Assessment must confirm a reasonable inference that competence is able to be under the particular circumstance, and is able to be transferred to other circumstances</li><li>• It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements</li><li>• Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role</li></ul>
--	---

## 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.

<b>Electrical systems</b>	<p>Electrical systems may include:</p> <ul style="list-style-type: none"> <li>accessories, wipers, electric windows, door locks and fan blowers applicable to all equipment, including light, heavy, motorcycles, marine and outdoor power equipment</li> </ul>
<b>Faults</b>	<p>Faults are to include:</p> <ul style="list-style-type: none"> <li>electrical unit faults, wire repair/replacement, open circuits, short circuits and earthing</li> </ul>
<b>Systems</b>	<p>Systems include; electrical systems fitted to all vehicles including motorcycles, marine and outdoor power equipment applicable to electrical measurements</p>
<b>Repair methods</b>	<p>Repair methods include:</p> <ul style="list-style-type: none"> <li>fault finding using aural, visual and functional assessments for damage, corrosion, wear and electrical defects, reading/interpreting wiring diagrams, diagnosing and determining faults, soldering, crimping, repairing components and wiring, remove/replace components, and may include repairing 12/24 V electric motors</li> </ul>
<b>WHS requirements</b>	<p>WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include:</p> <ul style="list-style-type: none"> <li>protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances</li> </ul>
<b>Personal protective equipment</b>	<p>Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices</p>
<b>Safe operating procedures</b>	<p>Safe operating procedures are to include, but are not limited to:</p> <ul style="list-style-type: none"> <li>the conduct of operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to</li> </ul>

<b>RANGE STATEMENT</b>	
	others and site visitors
<b>Emergency procedures</b>	Emergency procedures are to include, but may not be limited to: <ul style="list-style-type: none"> <li>• emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation</li> </ul>
<b>Environmental requirements</b>	Environmental requirements are to include, but are not limited to: <ul style="list-style-type: none"> <li>• waste management, noise, dust and clean-up management</li> </ul>
<b>Quality requirements</b>	Quality requirements are to include, but are not limited to: <ul style="list-style-type: none"> <li>• regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures</li> </ul>
<b>Statutory/regulatory authorities</b>	Statutory/regulatory authorities may include Federal, State and local authorities administering acts, regulations and codes of practice
<b>Tooling and equipment</b>	Tooling and equipment may include: <ul style="list-style-type: none"> <li>• hand tooling, testing equipment, including multimeters, power tooling, air tooling, specialist tooling for removal/adjustment, manufacturer/component suppliers' diagnostic tooling, oscilloscopes and scan tooling</li> </ul>
<b>Materials</b>	Materials may include: <ul style="list-style-type: none"> <li>• spare parts, lubricants, fluids and cleaning material</li> </ul>
<b>Communications</b>	Communications are to include, but are not limited to: <ul style="list-style-type: none"> <li>• verbal and visual instructions and fault reporting and may include site specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers</li> </ul>
<b>Information/documents</b>	Sources of information/documents may include: <ul style="list-style-type: none"> <li>• verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches</li> <li>• safe work procedures related to the repair of electrical systems</li> <li>• regulatory/legislative requirements pertaining to automotive industry, including Australian Design Rules</li> <li>• engineer's design specifications and instructions</li> <li>• organisation work specifications and requirements</li> <li>• instructions issued by authorised enterprise or external persons</li> <li>• Australian Standards</li> </ul>

## Unit Sector(s)

<b>Unit sector</b>	Electrical
--------------------	------------

## Co-requisite units

Not applicable.

## Competency field

<b>Competency field</b>	Technical - Electrical and Electronic
-------------------------	---------------------------------------