



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **AURE319166B Repair charging systems**

**Release: 1**

## AURE319166B Repair charging systems

### Modification History

Not Applicable

### Unit Descriptor

<b>Unit descriptor</b>	<p>This unit of competency describes the skills and knowledge required to test and repair charging systems appropriate to vehicles, plant and equipment, motorcycles, outdoor power equipment and/or marine vessels.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.</p>
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit applies to individuals who undertake testing and identification of faults/causes in charging systems, repair and retesting of charging systems.</p>
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### Licensing/Regulatory Information

Refer to Unit Descriptor

### Pre-Requisites

<b>Prerequisite units</b>		

## Employability Skills Information

<b>Employability skills</b>	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. 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 work	1.1. Determine job requirements, including method, processes and equipment 1.2. Read and interpret job specifications 1.3. Access and interpret correct information from manufacturer/component supplier specifications 1.4. Identify equipment and tooling and check for safe and effective operation 1.5. Determine procedures to minimise task time
2. Test systems/ components and identify faults	2.1. Observe occupational health and safety (OHS) requirements, including personal safety needs, throughout the work 2.2. Carry out tests to determine faults using appropriate tooling and techniques 2.3. Complete tests without causing damage to component or system 2.4. Identify faults and determine preferred repair action 2.5. Complete tests according to industry regulations/ guidelines, OHS, legislation, and enterprise procedures and policies
3. Repair charging systems and/or associated components	3.1. Carry out repairs, component replacement and adjustments to manufacturer/component supplier specifications 3.2. Select and use appropriate tooling, techniques and materials 3.3. Repair charging systems without causing damage to component or system 3.4. Perform retests to ensure correct and safe charging system operation, according to industry regulations/ guidelines, OHS, legislation, and enterprise procedures and policies 3.5. Complete workplace and equipment documents in accordance with site requirements
4. Clean up work area and maintain equipment	4.1. Collect and store material that can be reused 4.2. Remove waste and scrap following workplace procedures 4.3. Clean equipment and work area and inspect for serviceable condition in accordance with workplace procedures 4.4. Tag unserviceable equipment and identify faults in

ELEMENT	PERFORMANCE CRITERIA
	<p>accordance with workplace requirements</p> <p>4.5. Complete operator maintenance in accordance with manufacturer/component supplier specifications and site procedures</p> <p>4.6. Maintain and store tooling and equipment in accordance with workplace procedures</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

Required skills include:

- technical skills to the level required to use workplace technology and tools related to the repair of charging systems, including the use of specialist tooling and equipment, measuring equipment, computerised technology and communication devices
- communication skills to the level required to confirm work requirements and specifications, to communicate effectively regarding work requirements with supervisor, other workers and customers, to apply common industry terminology, to report work outcomes and problems, and to relate to people from a range of social, cultural and ethnic backgrounds and of varying physical and mental abilities
- literacy skills to the level required to understand information related to work orders, and to locate, interpret and apply manufacturer/component supplier technical information and specifications for circuit and component testing and major repairs/component replacement, workplace policies and safety procedures
- numeracy skills to the level required to correctly calculate time, complete tests and measurements to determine electrical circuit/component major repair/replacement requirements, calculate material requirements and establish quality checks
- problem-solving skills to the level required to plan and organise activities and establish safe and effective work processes which anticipate and/or resolve problems and downtime, and to systematically develop solutions to avoid or minimise reworking and avoid wastage
- team skills to the level required to work effectively and cooperatively with others to optimise workflow and productivity
- organisational skills to the level required to plan and organise activities, including preparation and layout of worksite, and obtaining equipment and materials to avoid backtracking or workflow interruptions

**REQUIRED SKILLS AND KNOWLEDGE****Required knowledge**

Required knowledge includes:

- OHS regulations/requirement, equipment, material and personal safety requirements
- charging system principles of operation
- construction and operation of charging systems relevant to application
- types and layout of service/repair manuals (hard copy and electronic)
- testing and fault identification procedures
- adjustment procedures of systems/components
- repair/removal and replacement procedures
- selection, checking and use of tooling and equipment
- manufacturer and/or component supplier specifications
- applicable commonwealth, state or territory legislation, regulations, standards and codes of practice, including OHS and environment, relevant to testing and repairing charging systems
- organisational policies and procedures, including quality requirements, reporting and recording procedures, and work organisation and planning processes, related to testing and repairing charging systems

## 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

Assessors must be satisfied that the candidate can competently and consistently:

- observe safety procedures and requirements
- communicate effectively with others involved in or affected by the work
- select methods and techniques appropriate to the circumstances
- complete preparatory activity in a systematic manner
- test charging systems/components
- accurately diagnose and determine faults
- repair charging systems to manufacturer/ component supplier requirements
- post-repair test charging systems to manufacturer/component supplier requirements
- complete workplace and equipment documents.

#### Context of, and specific resources for assessment

- The application of competency is to be assessed in the workplace or a simulated environment that reflects as far as possible the actual working environment.
- Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints.
- Assessment is to comply with relevant regulatory requirements, including specified Australian standards.
- Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
- The following resources should be made available:
  - a range of charging systems and components relevant to the application
  - materials relevant to testing and repairing of charging systems
  - equipment, hand and power tooling appropriate to

<b>EVIDENCE GUIDE</b>	
	testing repairing of charging systems <ul style="list-style-type: none"> <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 this Training Package.</li> <li>• Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of Required Skills and Knowledge.</li> <li>• Assessment methods must be by direct observation of tasks and include questioning on Required Skills and Knowledge to ensure its correct interpretation and application.</li> <li>• Assessment may be applied under project-related conditions (real or simulated) and require evidence of process.</li> <li>• Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.</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>
<b>Guidance information for assessment</b>	Assessment processes and techniques must be culturally sensitive and appropriate to the language and literacy capacity of the candidate and the work being performed.

## Range Statement

<b>RANGE STATEMENT</b>	
<p>The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. 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.</p>	
<b>Charging systems</b>	Charging systems may include: <ul style="list-style-type: none"> <li>• alternators, electromagnetic and permanent magnet</li> <li>• generators</li> </ul>



<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• internal/external regulation</li> <li>• battery-sensed and non-battery-sensed regulation</li> <li>• 6 V, 12 V and 24 V operation</li> <li>• dynastart, solid state and mechanical regulation</li> <li>• belt and/or direct drive, single/multiple belt drive and adjustable tensioning devices</li> <li>• single phase, half wave rectified and full wave rectified</li> <li>• solar systems, including single and ganged panels, internal and external regulation, battery sensed and non-battery sensed, 6 V, 12 V and 24 V operation, and solid state controlled</li> </ul>
<b>Application</b>	<p>Charging systems may be fitted to:</p> <ul style="list-style-type: none"> <li>• light vehicles</li> <li>• plant and equipment</li> <li>• heavy commercial vehicles</li> <li>• outdoor power equipment</li> <li>• marine vessels</li> </ul>
<b>Faults</b>	<p>Faults may include:</p> <ul style="list-style-type: none"> <li>• system not charging</li> <li>• alternator drive problems</li> <li>• regulator malfunction</li> <li>• internal alternator faults, including open and short circuits and ground circuits</li> </ul>
<b>Repair and test methods</b>	<p>Repair and test methods may include:</p> <ul style="list-style-type: none"> <li>• reading/interpreting wiring diagrams</li> <li>• electrical measurements, diagnosis and determining faults</li> <li>• pre- and post-repair testing of system and component operation</li> <li>• ohms tests on components</li> <li>• amp tests on running units</li> <li>• removal and replacement</li> <li>• repair/replacement of system components</li> <li>• repair adjustments</li> </ul>
<b>Tooling and equipment</b>	<p>Tooling and equipment may include:</p> <ul style="list-style-type: none"> <li>• hand tooling</li> <li>• testing equipment, including multimeters,</li> </ul>

<b>RANGE STATEMENT</b>	
	voltmeters and ammeters <ul style="list-style-type: none"> <li>• power tooling and air tooling</li> <li>• electrical loading equipment</li> <li>• test benches</li> <li>• soldering equipment</li> <li>• induction ammeter</li> <li>• test light</li> <li>• single and ganged panels</li> <li>• CRO or oscilloscope</li> </ul>
<b>Materials</b>	Materials may include: <ul style="list-style-type: none"> <li>• spare parts</li> <li>• soldering consumables</li> <li>• cleaning material</li> </ul>
<b>Information and documents</b>	Information and 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 (MSDS), diagrams or sketches</li> <li>• safe work procedures related to testing and repairing charging systems</li> <li>• regulatory/legislative requirements pertaining to testing and repairing charging systems</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>
<b>OHS requirements</b>	OHS requirements are to be in accordance with applicable commonwealth, state or territory legislation and regulations, and organisational safety policies and procedures, and may include: <ul style="list-style-type: none"> <li>• personal protective equipment and clothing</li> <li>• safety equipment</li> <li>• first aid equipment</li> <li>• hazard and risk control</li> <li>• electrical safety</li> <li>• elimination of hazardous materials and substances</li> <li>• manual handling, including shifting, lifting and</li> </ul>

<b>RANGE STATEMENT</b>	
	<p>carrying</p> <ul style="list-style-type: none"> <li>• emergency procedures</li> </ul>
<b>Legislative requirements</b>	<p>Legislative requirements are to be in accordance with applicable commonwealth, state or territory legislation, regulations, certification requirements and codes of practice, and may include:</p> <ul style="list-style-type: none"> <li>• award and enterprise agreements</li> <li>• industrial relations</li> <li>• Australian standards</li> <li>• Australian Design Rules</li> <li>• confidentiality and privacy</li> <li>• OHS</li> <li>• the environment</li> <li>• equal opportunity</li> <li>• anti-discrimination</li> <li>• relevant industry codes of practice</li> <li>• duty of care</li> </ul>
<b>Environmental requirements</b>	<p>Environmental requirements may include:</p> <ul style="list-style-type: none"> <li>• waste management</li> <li>• pollution</li> <li>• noise</li> <li>• dust</li> <li>• clean-up management</li> </ul>
<b>Quality requirements</b>	<p>Quality requirements may include:</p> <ul style="list-style-type: none"> <li>• regulations, including Australian standards</li> <li>• internal organisational quality policies and procedures</li> <li>• enterprise operations and procedures</li> </ul>
<b>Organisational policies and procedures</b>	<p>Organisational policies and procedures may include:</p> <ul style="list-style-type: none"> <li>• quality policies and procedures, including Australian standards</li> <li>• OHS, sustainability, environment, equal opportunity and anti-discrimination</li> <li>• manufacturer specifications and industry codes of practice</li> <li>• safe work procedures</li> <li>• reporting and recording procedures</li> </ul>

**Unit Sector(s)**

<b>Unit sector</b>	Electrical
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**Co-requisite units**

<b>Co-requisite units</b>		

**Competency field**

<b>Competency field</b>	
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