



**Australian Government**

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

# **MEM18037B Diagnose and rectify low voltage charging systems**

**Release: 1**

## **MEM18037B Diagnose and rectify low voltage charging systems**

### **Modification History**

Not Applicable

## Unit Descriptor

<b>Unit descriptor</b>	This unit covers assessing generator/alternator operation, and testing and repairing and/or replacing generators and alternators.
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## Application of the Unit

<b>Application of the unit</b>	<p>The unit applies to a wide variety of generators/alternators and both electro-mechanical and specialist electronic regulating apparatus, and the testing and rectification work associated with 12, 14, and 36 volt charging systems on vehicles, plant and stationary equipment.</p> <p>All work is carried out to legislative and regulatory requirements.</p> <p>If specialist electronic skills are required, appropriate competency units should be selected.</p> <p>This unit should not be selected with any of the following units: MEM18045B (Fault find/repair electrical equipment/components up to 250 volt single phase supply) or Unit MEM18046B (Fault find/repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c.).</p> <p>If soldering of wires is required, see Unit MEM05001B (Perform manual soldering/desoldering - electrical/electronic components).</p> <p><b>Band: A</b></p> <p><b>Unit Weight: 2</b></p>
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## Licensing/Regulatory Information

Not Applicable

## Pre-Requisites

Prerequisite units		
<b>Path 1</b>	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18030B	Diagnose and rectify low voltage electrical systems
	MEM18055B	Dismantle, replace and assemble engineering components

## 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. 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. Assess generator/alternator operation	1.1. Magnetism, induced voltage and electromagnetism principles are understood. 1.2. Alternating and direct current generating principles, voltage/current regulation methods, and diode/condenser types and action are understood. 1.3. Charging system performance is checked and variances from system specifications are accurately recorded.
2. Test and rectify generators/alternators	2.1. Generators/alternators are dismantled and assembled correctly. 2.2. Charging faults are determined to component level. 2.3. Testing is performed to determine shorts to ground, turn shorts and winding continuity etc. 2.4. Alternator/generator is tested for normal and maximum output. 2.5. Voltage and/or current regulators and cut-outs and relays are correctly tested and adjusted to specification. 2.6. Condition of power/exciter diodes is correctly determined. 2.7. All faulty components are replaced according to manufacturers' recommendations i.e.: brush gear, bearings, diodes, contacts, relays, etc. 2.8. Charging system is free of excessive voltage drops and connections are correctly soldered, tightened and insulated.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

Look for evidence that confirms skills in:

- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents

**REQUIRED SKILLS AND KNOWLEDGE**

- planning and sequencing operations
- checking task-related information
- checking for conformance to specification
- testing the charging system for correct operation
- recording variations from system specifications
- dismantling and reassembling given generators/alternators
- identifying charging faults in given generator/alternator systems
- conducting short circuit and winding continuity tests
- testing the given alternator/generator output for conformance to specification
- testing given voltage and current regulators, cut-outs and relays for correct operation and conformance to specifications
- determining the condition of given power/exciter diodes
- replacing faulty components
- checking the given generator/alternator charging system for excessive voltage drops
- undertaking calculations and numerical operations within the scope of this unit
- recording and reporting service activities

**Required knowledge**

Look for evidence that confirms knowledge of:

- the concepts of magnetism, electromagnetism and induced voltage
- the construction of generators
- the principles of operation of generators and alternators
- the methods of generating alternating and direct current for low voltage systems
- the methods of regulating voltage and current generated
- the function of diode and condenser types of regulator
- the tests that can be used to check the performance of the charging system
- the test procedures
- the hazards associated with testing the performance of the charging system, including housekeeping
- the charging system specifications
- the test equipment to be used in checking low voltage charging systems
- the procedures for recording charging system performance/variations from specifications
- the procedures for dismantling and reassembling generators/alternators
- the tools and equipment to be used in dismantling and reassembling generators/alternators
- the safety precautions and work procedures to be followed when working with generators/alternators
- the procedures and test equipment for identifying charging faults
- the procedures and test equipment for testing short circuits and winding continuity

**REQUIRED SKILLS AND KNOWLEDGE**

- the specifications of generator/alternator output
- the test equipment and procedures to be used to determine alternator/generator output
- the procedures for testing voltage and current regulators, cut-outs and relays
- the methods of adjusting voltage and current regulators, cut-outs and relays
- the operational specifications of voltage and current regulators, cut-outs and relays
- the test equipment to be used to check the operation of voltage and current regulators, cut-outs and relays
- the procedures for testing diodes and the test equipment to be used
- the precautions to be taken when testing diodes
- the components of generators/alternators that can be replaced
- the specifications of the faulty generator/alternator components
- the effect and causes of voltage drops on charging system operation/ performance
- the procedures for checking charging systems for excessive voltage drops
- the effect of loose, poorly soldered and/or inappropriate insulation on charging system operation
- the specifications of all circuit connections
- safe work practices and procedures

## 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>	
<p><b>Overview of assessment</b></p>	<p>A person who demonstrates competency in this unit must be able to diagnose and rectify low voltage charging systems. Competency in this unit cannot be claimed until all prerequisites have been satisfied.</p>
<p><b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b></p>	<p>Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.</p>
<p><b>Context of and specific resources for assessment</b></p>	<p>This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.</p> <p>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with diagnosing and rectifying low voltage charging systems, or other units requiring the exercise of the skills and knowledge covered by this unit.</p>
<p><b>Method of assessment</b></p>	<p>Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.</p>



**EVIDENCE GUIDE**

<b>Guidance information for assessment</b>	
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**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, if used 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.


**Unit Sector(s)**

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

<b>Co-requisite units</b>		

**Competency field**

<b>Competency field</b>	Maintenance and diagnostics
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