



Australian Government

MEM27010 Diagnose and rectify low voltage charging systems

Release: 1

MEM27010 Diagnose and rectify low voltage charging systems

Modification History

Release 1. Supersedes and is equivalent to MEM18037B Diagnose and rectify low voltage charging systems

Application

This unit of competency defines the skills and knowledge required to assess generator/alternator operation, and test and repair and/or replace generators and alternators.

It applies to the testing and rectification work associated with 12, 14, 36 and 48 volt charging systems on vehicles, mobile plant and stationary equipment.

Where specialist electronic skills are required appropriate units should also be selected.

Where soldering of wires/connections is required unit MEM05001 Perform manual soldering/desoldering - electrical/electronic components should also be selected.

Where an electrical wiring system is above 48 volts unit MEM18045 Fault find and repair electrical equipment/components up to 250 volts single phase supply or unit MEM18046 Fault find and repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c. should also be selected as appropriate.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Band: A

Unit Weight: 2

Pre-requisite Unit

MEM09002	Interpret technical drawing
MEM11011	Undertake manual handling
MEM12023	Perform engineering measurements
MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information
MEM18001	Use hand tools
MEM18002	Use power tools/hand held operations
MEM18055	Dismantle, replace and assemble engineering components
MEM27006	Diagnose and rectify batteries, low voltage sensors and circuits

Competency Field

Fixed and mobile plant

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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|---|---|-----|---|
| 1 | Determine job requirements | 1.1 | Follow standard operating procedures (SOPs) |
| | | 1.2 | Comply with work health and safety (WHS) requirements at all times |
| | | 1.3 | Use appropriate personal protective equipment (PPE) in accordance with SOPs |
| | | 1.4 | Identify job requirements from specifications, drawings, job sheets or work instructions |
| | | | |
| 2 | Assess generator/ alternator operation | 2.1 | Apply principles of magnetism, induced voltage and electromagnetism when assessing generator/alternator operation |
| | | 2.2 | Apply alternating and direct current generating principles, voltage/current regulation methods and types and action of diodes/condensers in generator/alternator operation to assess generator/alternator operation |
| | | 2.3 | Check charging system performance and record variances from system specifications |
| | | | |
| 3 | Test and rectify generators/ alternators | 3.1 | Dismantle and assemble generators/alternators to specifications |
| | | 3.2 | Determine charging faults to component level |
| | | 3.3 | Perform testing to determine shorts to ground, turn shorts and winding continuity |
| | | 3.4 | Test alternator/generator for normal and maximum output |

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 3.5 Test voltage and/or current regulators and cut-outs and relays and adjust to specification
- 3.6 Determine condition of power/exciter diodes
- 3.7 Replace all faulty components according to manufacturers' recommendations
- 3.8 Ensure charging system is free of excessive voltage drops and connections are soldered, tightened and insulated

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

- Faulty components include one (1) or more of the following:**
- brush gear
 - bearings
 - diodes
 - contacts
 - relays

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM18037B Diagnose and rectify low voltage charging systems

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM27010 Diagnose and rectify low voltage charging systems

Modification History

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting specifications, charts, lists, drawings and service documents to diagnose and rectify low voltage charging systems
- checking and testing the charging system for correct operation and conformance and recording any variations from system specifications
- dismantling/reassembling given generators and alternators using appropriate tooling, techniques and procedures and replacing faulty components
- identifying charging faults and conducting tests for short circuit and winding continuity tests
- undertaking calculations and numerical operations in diagnosing and rectifying low voltage charging systems
- testing current and voltage regulators, cut-outs and relays for correct operation and determining the condition of given power/exciter diodes to specifications
- testing the output of the generator/alternator for compliance to specifications, including the charging system for excessive voltage drops
- recording/reporting all service activities in accordance with SOPs.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- concepts of magnetism, electromagnetism and induced voltage
- construction and principles of operation of generators and alternators
- methods of generating alternating and direct current for low voltage systems
- methods of regulating voltage and current generated
- function of diode and condenser types of regulator
- tests and test procedures that can be used to check the performance of the charging system
- charging system specifications and procedures for recording charging system performance/variations from specifications

- procedures for:
 - dismantling and reassembling generators/alternators and tools and equipment to be used
 - identifying charging faults, testing short circuits and winding continuity and test equipment to be used
 - testing and methods of adjusting voltage and current regulators, cut-outs and relays
 - testing diodes with the appropriate test equipment and precautions to be taken
- specifications of generator/alternator output and test equipment and procedures to be used to determine alternator/generator output
- operational specifications and test equipment to be used to check the operation of voltage and current regulators, cut-outs and relays
- components of generators/alternators that can be replaced
- specifications of the faulty generator/alternator components
- effect and causes of voltage drops on charging system operation/ performance and procedures to be taken when checking for excessive voltage drops
- effect of loose, poorly soldered and/or inappropriate insulation on charging system operation
- parameters which determine repair or replacement
- specifications of all circuit connections.

Assessment Conditions

- Assessors must:
 - have vocational competency in diagnosing and rectifying low voltage charging systems at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

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