



**Australian Government**

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

# **MEA210C Inspect, test and troubleshoot basic aircraft electrical systems and components**

**Release: 2**

## **MEA210C Inspect, test and troubleshoot basic aircraft electrical systems and components**

### **Modification History**

Minor formatting and editorial changes made. Additional assessment advice provided in the Evidence Guide.

### **Unit Descriptor**

This unit of competency is part of the Avionic Certificate IV AME training pathway. It covers the competencies required to inspect, test and troubleshoot DC electrical systems and components fitted to types of fixed and rotary wing aircraft that have only DC electrical systems. The unit is used in workplaces that operate under the airworthiness regulatory systems of the ADF and CASA.

Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the chosen Aircraft Maintenance Engineer Licence under CASR Part 66, in accordance with the licensing provisions in Section 3, Assessment Guidelines.

### **Application of the Unit**

This unit requires application of hand skills and the use of system/component knowledge and applicable test equipment to inspect, test and troubleshoot DC aircraft electrical systems and components.

Applications include fixed and rotary wing aircraft that have only DC electrical systems.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

MEA202C	Remove and install basic aircraft electrical system components
MEA246C	Fabricate and/or repair aircraft electrical components or parts

## Employability Skills Information

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 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

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|---|--|
| <p>1. Inspect DC aircraft electrical systems and components</p> | <p>1.1.Relevant maintenance documentation and modification status, including sy where relevant, are used to identify specific inspection requirements</p> <p>1.2.Isolation tags are checked and aircraft configured for safe system inspection accordance with the applicable maintenance manual</p> <p>1.3.<b><i>DC electrical system</i></b> is visually or physically checked for external signs of accordance with applicable maintenance manual</p> <p>1.4.Defects are correctly identified and reported</p>  |
| <p>2. Test/adjust DC aircraft electrical systems</p>            | <p>2.1.Aircraft and system are prepared in accordance with applicable maintenance application of power/system operation</p> <p>2.2.Electrical system is functionally tested, in accordance with maintenance m of serviceability or malfunction</p> <p>2.3.System calibration or adjustments are performed in accordance with maint appropriate</p>   |
| <p>3. Troubleshoot DC aircraft electrical systems</p>           | <p>3.1.Available information from maintenance documentation and inspection an used, where necessary, to assist in fault determination</p> <p>3.2.Maintenance manual fault diagnosis guides and logic processes are used to and accurate <b><i>troubleshooting</i></b></p> <p>3.3.Specialist advice is obtained, where required, to assist with the troubleshoo</p> <p>3.4.System faults are located and the causes of the faults are clearly identified recorded in maintenance documentation, where required and in accordance enterprise procedures</p> <p>3.5.Rectification requirements are determined</p> |

## Required Skills and Knowledge

### Required skills

Look for evidence that confirms skills in:

- recognition of system and component defects/external damage, correct installation, connection of plugs, terminations, attaching hardware (including cabling/harnesses) and security in:
  - DC power generation systems, including regulation, distribution and control
  - battery installations
  - piston engine ignition and starting systems and components:
    - magnetos or coils
    - starter motors
    - ignition switches/start switches
    - ignition harnesses
    - low tension wiring
    - spark plugs
    - auxiliary starting devices
  - gas turbine engine ignition and starting systems:
    - starter motors and starter/generators
    - high energy ignition units
    - control units
    - switches
  - batteries and associated mounting equipment, including related anti-vibration aids
  - motors and actuators in DC electrical systems
  - internal/external lighting systems, including controls
  - flap systems
  - landing gear systems
- applying logic processes, taking and interpreting electrical measurements, using test equipment and appropriate wiring diagrams and manuals to isolate malfunctions in the above systems
- performing system functional tests and checks to isolate system faults and assess post maintenance serviceability
- applying relevant OHS practices, including those relating to gas turbine engine high energy ignition units

### Required knowledge

Look for evidence that confirms knowledge of:

- DC circuit theory
- electrical system maintenance requirements and troubleshooting procedures
- the basic layout (block diagram level), function and operation of:
  - single generator DC power generation and distribution systems and components,

including:

- DC generators
- alternator/rectifier generators
- starter/generators
- voltage regulators
- circuit protection devices
- bus bars
- piston engine ignition and starting systems and components, including:
  - magnetos or coils
  - starter motors
  - ignition switches/start switches
  - ignition harnesses
  - low tension wiring
  - spark plugs
  - auxiliary starting devices
- gas turbine igniter and starting systems and components, including specific OHS precautions:
  - starter motors and starter/generators
  - high energy ignition units
  - control units
  - switches
- landing gear and flap systems and components, including:
  - motors
  - actuators
  - selector switches
  - micro switches
- internal and external lighting systems and components
- batteries and associated mounting equipment including related anti-vibration aids
- relevant OHS practices
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures

## 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

A person who demonstrates competency in this unit must be able to inspect, test and troubleshoot basic DC electrical systems and components, including looms, cables and connection hardware, while observing all relevant safety precautions.

### Critical aspects for assessment and evidence required to demonstrate competency in this unit

The underlying skills inherent in this unit should be transferable across a range of inspection, testing and troubleshooting applications (including the timely involvement of supervisors or other trades) associated with aircraft electrical systems and components. It is essential that system testing procedures, cleanliness requirements and safety precautions applicable to the system being maintained are fully observed, understood and complied with. Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice is critical.

Evidence of transferability of skills and knowledge related to inspection, testing and troubleshooting is essential. This is to be demonstrated through application across a range of aircraft electrical systems and components listed in the Range Statement. The application of testing procedures should clearly indicate knowledge of system operation, the relationship of individual components and the links with other systems (if applicable) within the limits of the aircraft/system fault finding guide before undertaking any action. The work plan should take account of applicable safety and quality requirements in accordance with the industry and regulatory standards.

A person cannot be assessed as competent until it can be demonstrated to the satisfaction of the workplace assessor that the relevant elements of the Unit of Competency are being achieved under routine supervision on electrical looms, cables and connection hardware, and on each system in Range Statement Groups 1 to 5 (Group 4 may be omitted if not applicable to the enterprise) and on at least one major component/LRU in each case. For Group 6, competency may be demonstrated through the performance of a battery check. This shall be established via the records in the Log of Industrial Experience and Achievement or,

	where appropriate, an equivalent Industry Evidence Guide.
<b>Context of and specific resources for assessment</b>	Competency should be assessed in the workplace or simulated workplace using tools and equipment specified in the maintenance manuals. It is also expected that general and special purpose tools, test and ground support equipment would be used where appropriate.
<b>Method of assessment</b>	
<b>Guidance information for assessment</b>	Individuals being assessed who have already attained MEA274A Maintain basic light aircraft electrical systems and components, will have satisfied the requirements of this unit with regard to common Range Statement variables. Log of Industrial Experience and Achievement records relating to MEA274A Maintain basic light aircraft electrical systems and components, may be accepted as also meeting the evidence requirements for this unit in the applicable common areas.

## Range Statement

<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. 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.</p>	
<b>Note</b>	Range statements listed below are numbered to facilitate specification of the assessment requirements included in the Evidence Guide
<b>DC electrical systems</b>	<p>DC electrical systems may include:</p> <ol style="list-style-type: none"> <li>1. DC generators, and alternator/rectifier generators, and components of related single generator regulation and distribution systems</li> <li>2. Piston engine ignition and starting system components</li> <li>3. Specific components of DC electrical systems such as flaps and landing gear, including related motors and actuators</li> <li>4. Gas turbine engine igniter and starting systems and components</li> <li>5. Aircraft lighting</li> <li>6. Aircraft main batteries</li> </ol>
<b>Troubleshooting</b>	Troubleshooting involves the use of fault-finding charts or similar, to line replacement level
<b>Application</b>	<p>Application of this unit may relate to:</p> <ul style="list-style-type: none"> <li>• scheduled or unscheduled maintenance activities</li> <li>• individual or team-related activities</li> </ul>
<b>Procedures and requirements</b>	Refer to industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

## Unit Sector(s)

Aviation maintenance



## **Competency field**

## **Co-requisite units**

Not applicable