



Australian Government

MEA210 Inspect, test and troubleshoot basic aircraft electrical systems and components

Release: 2

MEA210 Inspect, test and troubleshoot basic aircraft electrical systems and components

Modification History

Release 2. Equivalent to MEA210 Inspect, test and troubleshoot basic aircraft electrical systems and components with amended prerequisite name.

Application

This unit of competency requires application of hand skills and the use of system/component knowledge and applicable test equipment to inspect, test and troubleshoot direct current (DC) aircraft electrical systems and components of fixed and rotary wing aircraft that have only DC electrical systems, during scheduled or unscheduled maintenance. Work may be performed individually or as part of a team.

The unit is part of the Avionic Certificate IV (Aircraft Maintenance Stream) training pathway.

The unit is used in workplaces that operate under the airworthiness regulatory systems of the Australian Defence Force (ADF) and the Civil Aviation safety Authority (CASA).

Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the chosen maintenance certification licence under Civil Aviation Safety Regulation (CASR) Part 66, in accordance with the licensing provisions in the Companion Volume Implementation Guide.

Pre-requisite Unit

MEA202	Remove and install basic aircraft electrical system components
MEA246	Fabricate and/or repair aircraft electrical hardware or parts

Competency Field

Aviation maintenance

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Inspect DC aircraft electrical systems and	1.1 Relevant maintenance documentation and modification status, including system defect reports where relevant,

components	are used to identify specific inspection requirements
	1.2 Isolation tags are checked and aircraft configured for safe system inspection and operation in accordance with the applicable maintenance manual
	1.3 DC electrical system is visually or physically checked for external signs of defects in accordance with applicable maintenance manual while observing all relevant work health and safety (WHS) requirements
	1.4 Defects are correctly identified and reported
2. Test/adjust DC aircraft electrical systems	2.1 Aircraft and system are prepared in accordance with applicable maintenance manual for the application of power/system operation
	2.2 Electrical system is functionally tested in accordance with maintenance manual for evidence of serviceability or malfunction
	2.3 System calibration or adjustments are performed in accordance with maintenance manual, as appropriate
3. Troubleshoot DC aircraft electrical systems	3.1 Available information from maintenance documentation and inspection and test results is used, where necessary, to assist in fault determination
	3.2 Maintenance manual fault diagnosis guides and logic processes are used to ensure efficient and accurate troubleshooting to line replacement level
	3.3 Specialist advice is obtained, where required, to assist with the troubleshooting process
	3.4 System faults are located and the causes of the faults are clearly identified and correctly recorded in maintenance documentation, where required and in accordance with standard enterprise procedures
	3.5 Rectification requirements are determined

Foundation Skills

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.

DC electrical systems/components include:

- DC generators and alternator/rectifier generators, and components of related single generator regulation and distribution systems
- Piston engine ignition and starting system components
- Specific components of DC electrical systems, such as flaps and landing gear, including related motors and actuators
- Gas turbine engine igniter and starting systems and components (where applicable to the enterprise)
- Aircraft lighting
- Aircraft main batteries
- Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

Procedures and requirements include:

Unit Mapping Information

Release 2. Equivalent to MEA210 Inspect, test and troubleshoot basic aircraft electrical systems and components.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ce216c9c-04d5-4b3b-9bcf-4e81d0950371>

Assessment Requirements for MEA210 Inspect, test and troubleshoot basic aircraft electrical systems and components

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Performance Evidence

Evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria under the specified conditions of assessment, and must include:

- 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 (where applicable to the enterprise):
 - 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, and 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 WHS practices, including those relating to gas turbine engine high energy ignition units.

It is essential that system testing procedures, cleanliness requirements and safety precautions applicable to the electrical system being maintained are fully observed, understood and complied with. Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice across a range of inspection, testing and troubleshooting applications (including the timely involvement of supervisors or other trades) 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 of Conditions.

Knowledge Evidence

Evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include 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 WHS 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 WHS practices
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures.

Assessment Conditions

- 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.
- 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.
- The following conditions of assessment represent the requirements of the Regulators (ADF and CASA) and maintenance stakeholders and must be rigorously observed.
- A person cannot be assessed as competent until it can be demonstrated to the satisfaction of the workplace assessor that the relevant elements and performance criteria of the unit of competency are being achieved under routine supervision on electrical looms, cables and connection hardware, and on each system in the range of conditions and on at least one (1) major component/line replaceable unit (LRU) in each case, as follows:
 - DC generators and alternator/rectifier generators, and components of related single generator regulation and distribution systems
 - piston engine ignition and starting system components
 - specific components of DC electrical systems, such as flaps and landing gear, including related motors and actuators
 - gas turbine engine igniter and starting systems and components (may be omitted if not applicable to the enterprise)
 - aircraft lighting
 - aircraft main batteries (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 (for details refer to the Companion Volume Assessment Guidelines).
- Assessors must satisfy the requirements of the National Vocational Education and Training Regulator (Australian Skills Quality Authority, or its successors).
- Where the unit is to be used for CASA licensing purposes the Assessor must also meet the criteria specified in the CASR Part 147 Manual of Standards.

- Individuals being assessed who have already attained MEA274 Maintain basic light aircraft electrical systems and components will have satisfied the requirements of this unit with regard to common range of conditions variables. The Log of Industrial Experience and Achievement records relating to MEA274 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.

Links

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