



Australian Government

Department of Education, Employment and Workplace Relations

MEA277A Maintain twin engine aircraft electrical systems and components

Revision Number: 2

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Modification History

Minor formatting and editorial changes made.

Unit Descriptor

This unit of competency is part of the Avionic Certificate IV (Aircraft Maintenance Stream) training pathway. It covers the competencies additional to those of MEA202C Remove and install basic aircraft electrical system components and MEA210C Inspect, test and troubleshoot basic aircraft electrical systems and components that are required for the maintenance of the electrical systems of twin piston engine aircraft. Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the applicable 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 extends the competencies developed in units MEA202C Remove and install basic aircraft electrical system components and MEA210C Inspect, test and troubleshoot basic aircraft electrical systems and components to include the maintenance of additional electrical systems found in twin engine aircraft. Applications include twin piston engine fixed wing aircraft.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable

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.

Elements and Performance Criteria

1. Inspect twin engine aircraft electrical systems and components
 - 1.1. Relevant maintenance documentation and modification status, including sy where relevant, are used to identify specific inspection requirements
 - 1.2. Isolation tags are checked and aircraft configured for safe system inspection accordance with the applicable maintenance manual
 - 1.3. **DC electrical system** is visually or physically checked for external signs of accordance with applicable maintenance manual
 - 1.4. Defects are correctly identified and reported
2. Test/adjust twin engine aircraft electrical systems
 - 2.1. Aircraft and system are prepared in accordance with applicable maintenance application of power/system operation
 - 2.2. Electrical system is functionally tested, in accordance with maintenance m of serviceability or malfunction
 - 2.3. System calibration or adjustments are performed in accordance with maint appropriate
3. Troubleshoot twin engine aircraft electrical systems
 - 3.1. Available information from maintenance documentation and inspection an where necessary, to assist in fault determination
 - 3.2. Maintenance manual fault diagnosis guides and logic processes are used to accurate **troubleshooting**
 - 3.3. Specialist advice is obtained, where required, to assist with the troubleshoo
 - 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
 - 3.5. Rectification requirements are determined
4. Remove and install twin engine aircraft electrical system components
 - 4.1. System is rendered safe and prepared in accordance with the applicable ma and isolation tags are fitted, where necessary, to ensure personnel safety
 - 4.2. **Electrical component** removal is carried out in accordance with the applic manual
 - 4.3. Required maintenance documentation is completed and processed in accor enterprise procedures
 - 4.4. Removed components are tagged and packaged in accordance with specific
 - 4.5. Electrical components to be installed are checked to confirm correct part n modification status, serviceability and shelf life
 - 4.6. Physical installation of electrical components is performed in accordance v maintenance manual, ensuring appropriate adjustment/alignment with mecl carried out
 - 4.7. System is reinstated to correct operational condition in preparation for testi
 - 4.8. Required maintenance documentation is completed and processed in accor enterprise procedures

Required Skills and Knowledge

Required skills

Look for evidence that confirms skills in:

- applying relevant OHS practices
- using approved maintenance documentation and aircraft publications relating to twin engine aircraft electrical systems
- identifying/locating:
 - DC multi-generator power generation, regulation, distribution and control systems and components, i.e. regulators and bus bars
 - electrical propeller control systems and components, such as feathering and synchronising systems
 - batteries in dual battery installations and associated mounting equipment, including related anti-vibration aids
 - fire warning and extinguishing systems and components
 - identification of halogen (e.g. BCF) fire-extinguishers
 - combustion heating systems
 - equipment cooling and ventilation
 - fuel storage and distribution system electrical components
 - master and central warning systems
- correctly connecting DC generators and alternator/rectifier generators in multi-generator systems and paralleling generator output
- recognising system and component defects/external damage, correct installation, connection of plugs, terminations, attaching hardware (including cabling/harnesses) and security in the above systems and system components
- 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

Required knowledge

Look for evidence that confirms knowledge of:

- system testing procedures and paralleling of generator output
- the basic layout (block diagram level), function and operation of:
 - DC multi-generator and alternator/rectifier generator regulation and distribution systems and components
 - electrical propeller control systems, such as feathering and synchronising systems and system components
 - dual battery systems and associated mounting equipment, including related anti-vibration aids
 - fire warning and extinguishing systems and system components, including regulatory

- requirements relating to halogen (e.g. BCF) fire-extinguishers
- combustion heating systems and system components
- equipment cooling and ventilation systems and system components
- fuel storage and distribution systems and system components
- master and central warning systems and system components
- maintenance requirements and troubleshooting procedures for the above electrical systems
- 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.

<p>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to inspect, test and troubleshoot the DC electrical systems and components of twin piston engine aircraft and remove and install components, including looms, cables and connection hardware, while observing all relevant safety precautions.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>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 twin piston engine aircraft DC 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, as well as work practices associated with electrostatic sensitive devices. Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice is critical.</p> <p>Evidence of transferability of skills and knowledge related to inspection, testing and troubleshooting and component removal and installation 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.</p> <p>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 8 and on at least one major component/LRU in each case (Groups 2, 4, 5 and/or 8 may be omitted if they are not applicable to the enterprise). For Group 3, competency may be</p>

	<p>demonstrated through the performance of a battery check. Component removal and installation competencies are to be demonstrated on at least one component from each of Groups 9 to 16 (Groups 10, 12, 13 and/or 16 may be omitted if they are not applicable to the enterprise). This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide.</p>
Context of and specific resources for assessment	<p>Competency should be assessed in the work environment or simulated work environment using tools and equipment specified in maintenance documentation. It is also expected that general purpose tools and test equipment found in most routine situations would be used where appropriate.</p>
Method of assessment	
Guidance information for assessment	

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>	
Note	Range statements listed below are numbered to facilitate specification of the assessment requirements included in the Evidence Guide
DC electrical systems	<p>DC electrical systems may include:</p> <ol style="list-style-type: none"> 1. DC multi-generator and alternator/rectifier generator regulation and distribution systems and components 2. Electrical propeller control systems, such as feathering systems (where applicable to the enterprise) 3. Batteries in dual battery installations and associated mounting equipment, including related anti-vibration aids 4. Fire warning and extinguishing systems, including handling of halogen fire extinguishers (where applicable to the enterprise) 5. Combustion heating systems (where applicable to enterprise) 6. Equipment cooling and ventilation 7. Fuel storage and distribution systems 8. Master and central warning systems (where applicable to enterprise)
Troubleshooting	Troubleshooting involves the use of fault-finding charts or similar, to line replacement level
Electrical components	<p>Electrical components include:</p> <ol style="list-style-type: none"> 9. Components of multi-generator regulation and distribution systems 10. Electrical propeller control system components (where applicable to the enterprise) 11. Batteries in dual battery installations and associated mounting equipment, including related anti-vibration aids 12. Fire warning and extinguishing system components (where applicable to the enterprise) 13. Combustion heaters and associated components (where applicable to enterprise) 14. Equipment cooling and ventilation components 15. Fuel storage and distribution system electrical components 16. Master and central warning system components

	(where applicable to enterprise)
Application	Application of this unit may relate to: <ul style="list-style-type: none">• scheduled or unscheduled maintenance• individual or team-related activities
Procedures and requirements	Refer to industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

Unit Sector(s)

Aviation maintenance

Competency field

Co-requisite units

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