



Australian Government

MEA277 Maintain twin engine aircraft electrical systems and components

Release: 1

MEA277 Maintain twin engine aircraft electrical systems and components

Modification History

Release 1 - New unit of competency

Application

This unit of competency extends the competencies developed in units MEA202 Remove and install basic aircraft electrical system components and MEA210 Inspect, test and troubleshoot basic aircraft electrical systems and components to include the maintenance of additional electrical systems found in twin piston engine fixed wing aircraft during scheduled or unscheduled maintenance. Work may be performed individually or as part of a team.

The unit is part of the small aircraft maintenance Certificate IV Mechatronics training pathway.

Where a Civil Aviation Safety Authority (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

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

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| 1. Inspect twin engine aircraft electrical systems and components | 1.1 Relevant maintenance documentation and modification status, including system defect reports, where relevant, are used to identify specific inspection requirements |
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- 1.2 Isolation tags are checked and aircraft configured for safe system inspection and operation in accordance with the applicable maintenance manual while observing all relevant work health and safety (WHS) requirements
 - 1.3 Direct current (DC) electrical system is visually or physically checked for external signs of defects in 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 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 twin engine 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
4. Remove and install twin engine aircraft electrical system components
 - 4.1 System is rendered safe and prepared in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure personnel safety
 - 4.2 Electrical component removal is carried out in accordance with the applicable maintenance manual while observing all relevant WHS requirements

- 4.3 Required maintenance documentation is completed and processed in accordance with standard enterprise procedures
- 4.4 Removed components are tagged and packaged in accordance with specified procedures
- 4.5 Electrical components to be installed are checked to confirm correct part numbers, modification status, serviceability and shelf life
- 4.6 Physical installation of electrical components is performed in accordance with the applicable maintenance manual, ensuring appropriate adjustment/alignment with mechanical interface is carried out
- 4.7 System is reinstated to correct operational condition in preparation for testing, as necessary
- 4.8 Required maintenance documentation is completed and processed in accordance with standard enterprise procedures

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 include:

- DC multi-generator and alternator/rectifier generator regulation and distribution systems and components
- Electrical propeller control systems, such as feathering systems (where applicable to the enterprise)
- Batteries in dual battery installations and associated mounting equipment, including related anti-vibration aids
- Fire warning and extinguishing systems, including handling of halogen fire extinguishers (where applicable)

	to the enterprise)
	• Combustion heating systems (where applicable to the enterprise) • Equipment cooling and ventilation • Fuel storage and distribution systems • Master and central warning systems (where applicable to the enterprise)
Electrical components include:	• Components of multi-generator regulation and distribution systems • Electrical propeller control system components (where applicable to the enterprise) • Batteries in dual battery installations and associated mounting equipment, including related anti-vibration aids • Fire warning and extinguishing system components (where applicable to the enterprise) • Combustion heaters and associated components (where applicable to the enterprise) • Equipment cooling and ventilation components • Fuel storage and distribution system electrical components • Master and central warning system components (where applicable to the enterprise)
Procedures and requirements include:	• Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

Unit Mapping Information

Release 1 – equivalent to MEA277A Maintain twin engine 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 MEA277 Maintain twin engine aircraft electrical systems and components

Modification History

Release 1 - New unit of competency

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:

- applying relevant WHS 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.

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 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 Assessment 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:

- 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 WHS practices
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures.

Assessment Conditions

- 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.
- 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 following system and on at least one (1) major component/line replaceable unit (LRU) in each case:
 - DC multi-generator and alternator/rectifier generator regulation and distribution systems and components
 - electrical propeller control systems, such as feathering systems (where applicable to the enterprise)
 - batteries in dual battery installations and associated mounting equipment, including related anti-vibration aids (competency may be demonstrated through the performance of a battery check)
 - fire warning and extinguishing systems, including handling of halogen fire extinguishers (where applicable to the enterprise)
 - combustion heating systems (where applicable to the enterprise)
 - equipment cooling and ventilation
 - fuel storage and distribution systems
 - master and central warning systems (where applicable to the enterprise).
- Component removal and installation competencies are to be demonstrated on at least one (1) component from each of the following groups:
 - components of multi-generator regulation and distribution systems
 - electrical propeller control system components (where applicable to the enterprise)
 - batteries in dual battery installations and associated mounting equipment, including related anti-vibration aids
 - fire warning and extinguishing system components (where applicable to the enterprise)
 - combustion heaters and associated components (where applicable to the enterprise)
 - equipment cooling and ventilation components
 - fuel storage and distribution system electrical components
 - master and central warning system components (where 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 (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.
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Links

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