



Australian Government

MEA274 Maintain basic light aircraft electrical systems and components

Release: 2

MEA274 Maintain basic light aircraft electrical systems and components

Modification History

Release 2. Equivalent to MEA274 Maintain basic light aircraft electrical systems and components with amended prerequisite unit name.

Application

This unit of competency requires application of hand skills and the use of maintenance documentation/publications in the maintenance of basic aircraft electrical systems and components involving inspection, limited testing and troubleshooting, and component removal and installation during scheduled or unscheduled maintenance. Work may be performed individually or as part of a team.

Applications include fixed wing aircraft with fixed undercarriage and basic rotary wing aircraft with skids or floats and no powered flight controls powered by either a normally aspirated piston engine or small gas turbine.

The unit is part of the small aircraft maintenance Certificate III and IV Mechatronics training pathways.

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

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.
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| 1. | Inspect basic aircraft electrical systems | 1.1 | Relevant maintenance documentation and modification status, including system defect reports where relevant, |
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	and 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	Direct current (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 basic 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 basic 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 basic 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.

- Applicable electrical systems include:**
- DC power generation, regulation and distribution systems
 - Piston engine and gas turbine engine ignition and starting systems (where applicable to the enterprise)
 - DC electrical systems, such as flaps, including related motors and actuators
 - Aircraft lighting
 - Aircraft main battery

Applicable electrical components include:

- DC generators, and alternator/rectifier generators, and components of related single generator regulation and distribution systems
- Motors
- Actuators
- Piston engine and gas turbine engine ignition and starting system components
- Aircraft batteries
- Aircraft lighting components, such as bulbs, lenses, switches and rheostats

Procedures and requirements include:

- Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

Unit Mapping Information

Release 2. Equivalent to MEA274 Maintain basic light 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 MEA274 Maintain basic light 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:

- applying relevant WHS practices, including those relating to gas turbine engine high energy ignition units
- using approved maintenance documentation and aircraft publications relating to DC electrical systems
- identifying/locating:
 - DC power generation, regulation, distribution and control systems and components:
 - generators and starter/generators
 - regulators
 - bus bars
 - circuit breakers and fuses
 - wiring
 - 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 basic DC electrical systems
- correctly connecting DC generators, alternator/rectifier generators and starter/generators

- recognising 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
 - gas turbine engine ignition and starting systems (where applicable to the enterprise)
 - internal/external lighting systems, including controls
 - motors and actuators in basic DC electrical 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.

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:

- component attachment methods
- connection of hardware and plugs
- DC electrical principles:
 - properties of permanent magnets
 - precautions for the care and storage of permanent magnets
 - properties of electromagnets
 - primary and secondary cells
 - aircraft battery types, construction, care and safety
 - resistor characteristics
 - fuses and circuit breakers
 - fundamental DC circuits
 - inductive circuits
 - capacitive circuits
 - basic fault-finding principles

- general construction, operating characteristics and applications for aircraft:
 - DC generators
 - alternator/rectifier generators
 - DC motors including starter motors
 - starter/generators
 - DC actuators (linear and rotary)
 - gas turbine high energy ignition system components and related safety precautions
 - lighting systems
- the basic layout (block diagram level), function and operation of the systems listed in the Range of Conditions
- electrical system maintenance requirements and troubleshooting procedures
- relevant WHS practices, including those relating to gas turbine engine high energy ignition units
- 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 of the following systems and on at least one (1) major component/line replaceable unit (LRU) in each case:
 - DC power generation, regulation and distribution systems
 - piston engine and gas turbine engine ignition and starting systems (gas turbine may be omitted where not applicable to the enterprise)
 - DC electrical systems, such as flaps, including related motors and actuators
 - aircraft lighting
 - aircraft main battery (competency may be demonstrated through the performance of a battery check).
- Component removal and installation competencies are to be demonstrated on at least one (1) component from each of:

- DC generators, and alternator/rectifier generators, and components of related single generator regulation and distribution systems
- motors
- actuators
- piston engine and gas turbine engine ignition and starting system components (gas turbine may be omitted where not applicable to the enterprise)
- aircraft batteries
- aircraft lighting components such as bulbs, lenses, switches and rheostats .
- 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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