



Australian Government

MEA294 Inspect, test and troubleshoot advanced aircraft electrical systems and components

Release: 1

MEA294 Inspect, test and troubleshoot advanced aircraft electrical systems and components

Modification History

Release 1. Equivalent to MEA211 Inspect, test and troubleshoot advanced aircraft electrical systems and components. Revised as a result of changed prerequisites. Unit codes updated.

Application

This unit of competency describes the skills and knowledge required to inspect, test and troubleshoot advanced aircraft electrical systems and components. It involves the application of hand skills and the use of system and component knowledge and applicable maintenance publications and test equipment when working with the systems and components of fixed and rotary wing aircraft that have advanced electrical systems, during scheduled and unscheduled maintenance. Work may be performed individually or as part of a team.

The unit is part of the Mechanical Aircraft Maintenance Engineer licensing pathway. It is used in workplaces that operate under the airworthiness regulatory systems of the Australian Defence Force (ADF) and the Civil Aviation Safety Authority (CASA).

This unit forms part of the CASA requirement for maintenance certification licences under Civil Aviation Safety Regulation (CASR) Part 66. Where a CASA licensing outcome is sought, users must refer to the licensing provisions in the MEA Aeroskills Companion Volume Implementation Guide.

Pre-requisite Unit

MEA203	Remove and install advanced aircraft electrical system components
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Competency Field

Aviation maintenance

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1. Inspect advanced aircraft electrical

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Use required maintenance documentation and modification status, including system defect reports where relevant, to

ELEMENTS

PERFORMANCE CRITERIA

systems and components	identify specific inspection requirements
	1.2 Check isolation tags and configure aircraft for safe system inspection and operation according to applicable maintenance manual
	1.3 Visually or physically check electrical systems for external signs of defects according to applicable maintenance manual while observing work health and safety (WHS) requirements
	1.4 Correctly identify and report defects using organisational reporting processes
2. Test and adjust advanced aircraft electrical systems	2.1 Prepare aircraft and system according to applicable maintenance manual for the application of power and system operation
	2.2 Functionally test electrical system according to maintenance manual for evidence of serviceability and malfunction
	2.3 Calibrate or adjust system according to maintenance manual, as appropriate
3. Troubleshoot advanced aircraft electrical systems	3.1 Use available information from maintenance documentation and inspection and test results to assist in fault determination
	3.2 Use maintenance manual fault diagnosis guides and logic processes to ensure efficient and accurate <i>troubleshooting to line replacement level</i>
	3.3 Obtain specialist advice, where required, to assist with troubleshooting process
	3.4 Locate system faults and clearly identify and correctly record causes of faults in maintenance documentation, where required, according to standard organisational procedures
	3.5 Determine rectification requirements according to maintenance requirements

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Unit Mapping Information

Release 1. Equivalent to MEA211 Inspect, test and troubleshoot advanced 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 MEA294 Inspect, test and troubleshoot advanced aircraft electrical systems and components

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Performance Evidence

There must be evidence the candidate has completed the tasks outlined in the elements and performance criteria of this unit, which must include the ability to demonstrate to the satisfaction of the workplace assessor that the elements and performance criteria are being achieved under routine supervision in order to:

- identify system and component defects and external damage, correct installation, connection of plugs, terminations, attaching hardware (including cabling/harnesses) and security in at least one item from each of:
 - DC and AC power generation systems, including regulation, distribution, and control system components
 - transformer rectifier units and rotary and static inverters
 - battery installations, including battery temperature monitoring systems
 - gas turbine or piston engine ignition and starting systems, which may be omitted if not applicable to the organisation
 - motors and actuators
 - internal and external lighting systems, including controls
 - electrical components specific to systems, such as air cycle air conditioning, combustion heating, equipment cooling, anti-icing and de-icing, landing gear, anti-skid, flight control, master and central warning, fuel storage and distribution, fire warning and extinguishing, and engine propeller control.

In the course of the above work, the candidate must:

- prepare for work in line with safety and quality requirements and according to industry, regulatory and organisational requirements, procedures, and methods
- interpret inspection procedures and specifications (allowable limits) and apply them to the inspection, testing, and troubleshooting required in the above work, including seeking the timely involvement of specialist advice
- apply logic processes, taking and interpreting electrical measurements, using test equipment and appropriate wiring diagrams and manuals to isolate electrical system malfunctions in the above systems
- perform system functional tests and checks to isolate system faults and assess post-maintenance serviceability
- apply work health and safety (WHS) requirements applicable to the maintenance of aircraft electrical systems

- use approved maintenance documentation and aircraft publications relating to the electrical system being maintained
- comply with system testing procedures, cleanliness requirements and safety precautions applicable to electrical system being maintained, as well as with work practices associated with electrostatic sensitive devices
- complete and process maintenance documentation.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- industry standard procedures specified by manufacturers, regulatory authorities, and the organisation relating to the work described in the performance evidence
- maintenance manual requirements relating to:
 - checking isolation tags and configuring aircraft for safe system inspection and operation
 - visually and physically checking electrical systems for external signs of defects
 - preparing aircraft and system for the application of power and system operation
 - functionally testing electrical system for evidence of serviceability and malfunction
 - calibrating and adjusting system
 - fault diagnosis guides
- industry, regulatory, and organisational requirements, procedures and methods relating to the work described in the performance evidence, including:
 - WHS requirements applicable to maintaining aircraft electrical systems, including gas turbine engine high energy ignition units
 - electrical system maintenance requirements and troubleshooting
- basic layout (block diagram level), function and operation of the following systems:
 - DC and AC power multi-generator systems, including regulation, distribution and control
 - rotary and static inverters
 - battery installations, including temperature monitoring systems
 - gas turbine and piston engine ignition and starting systems
 - propeller systems
 - internal and external lighting systems, including controls
 - landing gear systems, including anti-skid
 - flight controls
 - fire warning and extinguishing
 - air cycle air conditioning and combustion heating systems
 - equipment cooling and ventilation
 - fuel storage and distribution
 - master and central warning
- basic principles and functions relating to the above systems and associated with:
 - basic DC and AC circuit theory

- DC generator characteristics
- alternator characteristics
- starter generator characteristics
- DC and AC motors
- rotary and static inverter operation
- sources of specialist advice on advanced aircraft electrical systems, including supervisors and other trades.

Assessment Conditions

The following conditions of assessment represent the requirements of the regulators (Australian Defence Force [ADF] and Civil Aviation Safety Authority [CASA]) and maintenance stakeholders, and must be rigorously observed.

- Competency must be assessed in the workplace or simulated workplace using tools and equipment specified in maintenance manuals. Where assessment occurs in a simulated workplace, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations encountered when inspecting, testing and troubleshooting advanced aircraft electrical systems and components. It is also expected that general and special purpose tools, and test and ground support equipment would be used as appropriate to the evidence requirements specified above.
- Candidate capability of providing the required performance and knowledge evidence must 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).
- Candidates being assessed who have already attained MEA210 *Inspect, test and troubleshoot basic aircraft electrical systems and components* will have covered inspection, testing and troubleshooting of DC power generation and DC systems and components. The Log of Industrial Experience and Achievement records relating to MEA210 *Inspect, test and troubleshoot basic aircraft electrical systems and components* may be accepted as also meeting the evidence requirements for this unit in the applicable areas.
- Advice in MEA210 *Inspect, test and troubleshoot basic aircraft electrical systems and components* regarding the coverage provided by MEA274 *Maintain basic light aircraft electrical systems and components* should also be taken into consideration if the individual has attained that unit rather than MEA210 *Inspect, test and troubleshoot basic aircraft electrical systems and components*.
- Assessors of this unit must satisfy the assessor requirements in applicable vocational education and training legislation, frameworks and/or standards.
- Where the unit is to be used for CASA licensing purposes the Assessor must meet the criteria specified in the Civil Aviation Safety Regulation (CASR) Part 147 Manual of Standards.

Links

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