



Australian Government

Department of Education, Employment and Workplace Relations

MEA211C Inspect, test and troubleshoot advanced aircraft electrical systems and components

Release: 2

MEA211C Inspect, test and troubleshoot advanced aircraft electrical systems and components

Modification History

Minor formatting and editorial changes made. Additional assessment advice provided in the Evidence Guide.

Unit Descriptor

This unit of competency is part of the Avionic Certificate IV (Aircraft Maintenance Stream) training pathway and is also part of the Mechanical Aircraft Maintenance Engineer licensing pathway. It covers the competencies required to inspect, test and troubleshoot electrical systems and components fitted to the more advanced types of fixed and rotary wing aircraft. The unit is used in workplaces that operate under the airworthiness regulatory systems of the ADF and CASA.

Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the chosen 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 requires application of hand skills and the use of system/component knowledge and applicable maintenance publications and test equipment to inspect, test and troubleshoot advanced aircraft electrical systems and components. Applications include fixed and rotary wing aircraft that have advanced electrical systems.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEA203C	Remove and install advanced aircraft electrical system components
MEA246C	Fabricate and/or repair aircraft electrical components or parts

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.
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Elements and Performance Criteria

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| 1. Inspect advanced aircraft electrical systems and components | 1.1. Relevant maintenance documentation and modification status, including sy reports where relevant, are used to identify specific inspection requirements
1.2. Isolation tags are checked and aircraft configured for safe system inspection in accordance with the applicable maintenance manual
1.3. Electrical systems are visually or physically checked for external signs of damage in accordance with applicable maintenance manual
1.4. Defects are correctly identified and reported |
| 2. Test/adjust advanced aircraft electrical systems | 2.1. Aircraft and system are prepared in accordance with applicable maintenance manual for 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 appropriate |
| 3. Troubleshoot advanced aircraft electrical systems | 3.1. Available information from maintenance documentation and inspection and analysis is used, where necessary, to assist in fault determination
3.2. Maintenance manual fault diagnosis guides and logic processes are used to determine and accurate troubleshooting
3.3. Specialist advice is obtained, where required, to assist with the troubleshooting
3.4. System faults are located and the causes of the faults are clearly identified and recorded in maintenance documentation, where required, in accordance with enterprise procedures
3.5. Rectification requirements are determined |

Required Skills and Knowledge

Required skills

Look for evidence that confirms skills in:

- recognition of system and component defects/external damage, correct installation, connection of plugs, terminations, attaching hardware (including cabling/harnesses) and security in:
 - DC and AC power generation systems including regulation, distribution and control
 - inverters (rotary and static)
 - battery installations including temperature monitoring systems
 - gas turbine and piston engine ignition and starting systems
 - propeller systems
 - internal/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
- applying 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
- performing system functional tests and checks to isolate system faults and assess post maintenance serviceability
- applying OHS requirements applicable to the maintenance of aircraft electrical systems
- using approved maintenance documentation and aircraft publications relating to the electrical systems being maintained

Required knowledge

Look for evidence that confirms knowledge of:

- the basic layout (block diagram level), function and operation of the following systems:
 - DC and AC power multi-generator systems including regulation, distribution and control
 - inverters (rotary and static)
 - battery installations including temperature monitoring systems
 - gas turbine and piston engine ignition and starting systems
 - propeller systems
 - internal/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
- explaining basic principles/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
- OHS requirements applicable to the maintenance of aircraft electrical systems, including gas turbine engine high energy ignition units
- electrical system maintenance requirements and troubleshooting procedures
- 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.

Overview of assessment

A person who demonstrates competency in this unit must be able to inspect, test and troubleshoot DC and AC electrical systems and components, including looms, cables and connection hardware, while observing all relevant safety precautions.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

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 aircraft 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. Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice 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 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. 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 a system and at least one item from each of Groups 1 to 7 in the Range Statement. This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide.

Context of and specific resources for assessment

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.
Method of assessment	
Guidance information for assessment	Individuals being assessed who have already attained MEA210C 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. Log of Industrial Experience and Achievement records relating to MEA210C 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 MEA210C Inspect, test and troubleshoot basic aircraft electrical systems and components, regarding the coverage provided by MEA274A Maintain basic light aircraft electrical systems and components, should also be taken into consideration if the individual has attained that unit rather than MEA210C Inspect, test and troubleshoot basic aircraft electrical systems and components.

Range Statement

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.

Note	Range statements listed below are numbered to facilitate specification of the assessment requirements included in the Evidence Guide
Electrical systems and their components	Electrical systems and their components include: 1. DC and AC power generation and distribution systems and components, including generators, alternators, starter generators and related control, regulation and distribution system components 2. Transformer rectifier units and inverters 3. Batteries and related bus tie or interlock system components and battery temperature monitoring systems 4. Motors and actuators 5. Components of gas turbine and/or piston engine ignition and starting systems (where applicable to the enterprise) 6. External/internal lights 7. 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
Troubleshooting	Troubleshooting involves the use of fault-finding charts or similar, to line replacement level
Application	Application of this unit may relate to: • scheduled or unscheduled maintenance activities • 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

Not applicable