Australian Government

MEA203C Remove and install advanced aircraft electrical system components

Release 3

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

MEA203C Remove and install advanced aircraft electrical system components

Modification History

Release 3 - Emphasis on regulations regarding ozone depleting substances added in Skills and Knowledge, and in Range Statement. Revised wording regarding licensing - Equivalent
Release 2 - 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 AME training pathway, and of the Mechanical Aircraft Maintenance Engineer licensing pathway. It covers the competencies required for the removal and installation of electrical system components of the more advanced types of both fixed and rotary wing aircraft that have both AC and DC electrical systems. 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 maintenance documentation/publications in the removal and installation of advanced aircraft electrical AC and DC system components.

Applications include fixed and rotary wing aircraft that have both AC and DC electrical systems.

Licensing/Regulatory Information

See descriptor.

Pre-Requisites

MEA201B	Remove and install miscellaneous aircraft electrical hardware/components

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. Remove AC and DC aircraft electrical system components	1.1. System is rendered safe and prepared in accordance with the applicable maintenance manual and isolation tags are fitted where necessary to ensure personnel safety 1.2. ***Electrical component*** removal is carried out in accordance with the applicable maintenance manual 1.3. Required maintenance documentation is completed and processed in accordance with standard enterprise procedures 1.4. Removed components are tagged and packaged in accordance with specified procedures
2. Install AC and DC aircraft electrical system components	2.1. Electrical components to be installed are checked to confirm correct part numbers, modification status, serviceability and shelf life 2.2. Physical installation of electrical components is performed in accordance with the applicable maintenance manual, ensuring appropriate adjustment/alignment with mechanical interface is carried out 2.3. System is reinstated to correct operational condition in preparation for testing, as necessary 2.4. Required maintenance documentation is completed and processed in accordance with standard enterprise procedures

Required Skills and Knowledge

Required skills

Look for evidence that confirms skills in:

- identifying/locating:
  - DC power regulation, distribution and control systems and components, i.e. regulators and bus bars
  - AC power regulation, distribution and control systems and components, i.e. generator control units
  - various types of inverters and transformer rectifier units
  - gas turbine and piston engine ignition and starting systems and components
  - batteries (lead acid and nickel cadmium) and associated mounting equipment including related anti-vibration aids and battery temperature monitoring systems
  - flight control servo actuating devices, i.e. AC and DC electro-mechanical, electro-pneumatic, electro-hydraulic, duplex servomotors, power control units and trim control devices
  - electrical components of aircraft systems, such as air cycle air conditioning, anti-icing and de-icing, landing gear, anti-skid, flight control, master and central warning, fuel storage and distribution, external and internal lighting, fire warning and extinguishing and engine/propeller control
- correctly connecting:
  - DC generators
  - star or delta alternators to star and delta loads
  - starter generators
  - AC motors
  - polyphase motors
- observing regulations governing the handling and custody of fire extinguishers containing ozone depleting substances (ODS) or synthetic greenhouse gas (SGG) extinguishing agents (e.g. BCF)
- applying relevant OHS practices

Required knowledge

Look for evidence that confirms knowledge of:

- component attachment methods
- connection of hardware and plugs
- relevant OHS practices
- the use of approved maintenance documentation and aircraft publications relating to AC and DC electrical systems
- properties of permanent magnets
- precautions for the care and storage of permanent magnets
- bonding of aircraft components and lightning protection
- general construction, operating characteristics and applications for aircraft:

  - generators
  - alternators
  - AC and DC motors
  - transformer rectifier units
  - rotary and static inverters
  - batteries
  - linear and rotary actuators
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures including environmental protection regulatory requirements relating to fire extinguishers containing ODS or SGG extinguishing agents (e.g. BCF)

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 remove and install components of advanced DC and AC electrical systems while observing all relevant safety precautions.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that 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. Evidence of transferability of skills and knowledge related to removal and installation is essential. This is to be demonstrated by application across a range of aircraft major electrical system components encompassing electrical with mechanical interface, installations that require alignment and/or adjustment, mechanical or electrical. An understanding of the attachment methods, connection of hardware, and the need for adjustment or rigging and system operation as they relate to the work must be demonstrated 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 at least one component from each of Groups 1 to 6 and on three components from Group 7, as listed in the Range Statement. This shall be established via 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 work environment, using tools and equipment specified in maintenance manuals. It is also expected that general-purpose tools, test and ground support equipment found in most routine situations would be used where appropriate.

Method of assessment	
Guidance information for assessment	Individuals being assessed who have already attained MEA202C Remove and install basic aircraft electrical system components, will have covered a significant amount of the skill and knowledge requirements for this unit plus part of the Performance Criteria for Elements 1 and 2 and associated Range Statement items. Log of Industrial Experience and Achievement records relating to MEA202C Remove and install basic aircraft electrical system components may be accepted as also meeting the evidence requirements for this unit in the applicable areas. Guidance information in MEA202C Remove and install basic aircraft electrical system components, regarding MEA274A Maintain basic light aircraft electrical systems and components, should also be taken into consideration and the attainment of MEA277A Maintain twin engine aircraft electrical systems and components, would significantly increase the extent of coverage of Range Statement variables. Log of Experience and Achievement records relating to MEA274A Maintain basic light aircraft electrical systems and components and MEA277A Maintain twin engine aircraft electrical systems and components may also be accepted as meeting the evidence requirements for this unit in the applicable areas.

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 system components	Electrical components include: 1. DC and AC power generation and distribution system components, including generators and related multi-sourced DC power generation, starter generators alternators and regulation, control and distribution system components 2. Transformer rectifier units and/or 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 (depending on enterprise requirements) 6. External/internal lights 7. Electrical components of specific electrical systems, such as air cycle air conditioning, combustion heaters, 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 (including BCF extinguishers where applicable to enterprise) and engine/propeller control
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

Not applicable.

Co-requisite units

Not applicable