



Australian Government

Department of Education, Employment and Workplace Relations

MEA281A Maintain light aircraft AC powered instrument systems and components

Revision Number: 2

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Modification History

Minor formatting and editorial changes made.

Unit Descriptor

This unit of competency is part of the Avionic Certificate IV (Aircraft Maintenance Stream) training pathway. It covers the competencies required for the maintenance of AC powered instrument systems of both fixed and rotary wing light aircraft. 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 test equipment to inspect, test and troubleshoot AC powered aircraft instrument systems, including the power supply, and to remove and install components.

Applications include light fixed wing and rotary wing aircraft with piston or turbine engines.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEA246C	Fabricate and/or repair aircraft electrical components or parts
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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 light aircraft AC instrument systems, power supplies and components | 1.1. Relevant maintenance documentation and modification status, including system 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. AC instrument system and AC power supply components are visually or physically inspected for external signs of defects in accordance with applicable maintenance manual
1.4. Defects are correctly identified and reported |
| 2. Test/adjust light aircraft AC instrument systems, power supplies and components | 2.1. Aircraft and system are prepared in accordance with applicable maintenance manual for application of power/system operation
2.2. Instrument system and AC power supply is functionally tested in accordance with applicable maintenance manual for evidence of serviceability or malfunction
2.3. System calibration or adjustments are performed in accordance with maintenance manual where appropriate |
| 3. Troubleshoot light aircraft AC instrument systems, power supplies and components | 3.1. Available information from maintenance documentation, inspection and test results are used, where necessary, to assist in fault determination
3.2. Maintenance manual fault diagnosis guides and logic processes are used to identify faults and accurate troubleshooting
3.3. Specialist advice is obtained, where required, to assist with the troubleshooting
3.4. Instrument system or power supply faults are located and the causes of the faults are identified and correctly recorded in maintenance documentation, where required in accordance with standard enterprise procedures
3.5. Rectification requirements are determined |
| 4. Remove and install light aircraft AC instrument system, and power supply 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. Instrument or power supply component removal is carried out in accordance with applicable maintenance manual
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 specific requirements
4.5. Instrument or power supply components to be installed are checked to confirm correct part numbers, modification status, serviceability and shelf life
4.6. Physical installation of instrument or power supply components is performed in accordance with the applicable maintenance manual and regulatory requirements, ensuring correct adjustment/alignment is carried out
4.7. System is reinstated to correct operational condition in preparation for testing
4.8. 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:

- using approved maintenance documentation and aircraft publications relating to AC instrument systems and related AC power supplies
- locating and identifying AC powered instrument system components, including:
 - AH, DG, AHRS, servo and encoding altimeters
 - engine system temperature, speed, oil pressure, torque and manifold pressure
 - auxiliary systems, including vacuum, fuel storage quantities and fuel flow
 - remote reading gyro compasses
- locating and identifying AC instrument power supply system components, including:
 - inverters
 - transformer/rectifier units
 - voltage and frequency indication
- correctly handling and observing maintenance precautions for gyroscopes and gimbals
- recognising system and component defects/external damage, correct installation, connection of plugs, terminations, attaching hardware (including cabling/harnesses) and security in AC powered instruments and related power supply, including:
 - flight instruments
 - remote reading gyro compasses
 - piston engine and gas turbine engine indication systems (indicators and transmitters/sensors)
 - fuel quantity and flow indication systems (indicators, probes and transmitters)
 - transmitter/indicator measuring instrument systems (pressure, temperature and vacuum)
 - AC power supply, including inverters and transformer/rectifier units
- applying logic processes, taking and interpreting system 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
- applying OHS requirements relevant to instrument and electrical system maintenance

Required knowledge

Look for evidence that confirms knowledge of:

- component attachment methods
- connection of hardware and plugs
- handling precautions for electrostatic sensitive devices
- relevant OHS practices
- AC theory:
 - calculations and measurement in AC circuits

- inductors and inductive reactance
- transformer operation
- capacitors and capacitive reactance
- LCR circuits and resonance
- passive filters
- power relationship in reactive circuits
- the basic layout (block diagram level), function and operation of AC powered:
 - flight instruments
 - remote reading gyro compasses
 - piston engine and gas turbine engine indication systems (indicators and transmitters/sensors)
 - fuel quantity and flow indication systems (indicators, probes and transmitters)
 - transmitter/indicator measuring instrument systems (pressure, temperature, vacuum)
 - AC power supply including AC generators, inverters and transformer/rectifier units
- the operating principles of the above systems and associated with:
 - atmospheric conditions - properties and effects on aircraft instruments and systems
 - pressure and temperature sensing elements and their use in aircraft instrument systems
 - gyroscopes and their use in aircraft instrument systems
 - electrical fundamentals
- relevant maintenance documentation and maintenance publications
- maintenance requirements and troubleshooting 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 AC powered instrument systems and related power supplies, and remove and install components 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) and component removal and installation associated with aircraft instrument 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 AC powered aircraft instrument systems, AC power supplies 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 major system component/LRU from each of Groups 1 to 5 listed 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 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.
Method of assessment	
Guidance information for assessment	

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
AC instrument systems and AC power supply components	AC instrument system and AC power supply components may include: 1. DG, AH, AHRS and components, servo and encoding altimeters, remote reading gyro compasses and components 2. Piston engine and gas turbine engine indication system components 3. Fuel quantity indication and flow indication systems and components 4. Transmitter/indicator measuring instrument systems (pressure, temperature, vacuum) and components 5. Inverters and transformer/rectifier units
Troubleshooting	Troubleshooting involves the use of test sets, downloaded maintenance data and fault-finding charts or similar, to line replacement level
Application	Application of this unit may relate to: • scheduled or unscheduled maintenance • 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