



Australian Government

MEA281 Maintain light aircraft AC powered instrument systems and components

Release: 2

MEA281 Maintain light aircraft AC powered instrument systems and components

Modification History

Release 2. Equivalent to MEA281 Maintain light aircraft AC powered instrument systems and components with amended prerequisite unit name.

Application

This unit of competency requires application of hand skills and the use of system/component knowledge and applicable test equipment to inspect, test and troubleshoot alternating current (AC) powered aircraft instrument systems, including the power supply, and to remove and install components during scheduled or unscheduled maintenance. Work may be performed individually or as part of a team.

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

The unit is part of the small aircraft maintenance Certificate IV (Mechatronics) training pathway.

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 light aircraft AC instrument systems, power supplies and | 1.1 Relevant maintenance documentation and modification status, including system defect reports, where relevant, are used to identify specific inspection requirements |
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components

- 1.2 Isolation tags are checked and aircraft configured for safe system inspection and operation in accordance with the applicable maintenance manual
 - 1.3 AC instrument system and AC power supply components are 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 light aircraft AC instrument systems, power supplies and components
 - 2.1 Aircraft and system are prepared in accordance with applicable maintenance manual for the application of power/system operation
 - 2.2 Instrument system and AC power supply 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 light aircraft AC instrument systems, power supplies and components
 - 3.1 Available information from maintenance documentation, 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, using test sets, downloaded maintenance data and fault-finding charts or similar, to line replacement level
 - 3.3 Specialist advice is obtained, where required, to assist with the troubleshooting process
 - 3.4 Instrument system or power supply faults are located and the causes of the faults are clearly 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
 - 4.1 System is rendered safe and prepared in accordance with the applicable maintenance manual and isolation

instrument system, and power supply components

tags are fitted, where necessary, to ensure personnel safety

- 4.2 Instrument or power supply 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 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 appropriate adjustment/alignment 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.

- AC instrument systems and AC power supply**
- Directional gyro (DG), artificial horizon (AH), attitude heading and reference system (AHRS) and components, servo and encoding altimeters, and remote reading gyro

components include:

compasses and components

- Piston engine and gas turbine engine indication system components
- Fuel quantity indication and flow indication systems and components
- Transmitter/indicator measuring instrument systems (pressure, temperature and vacuum) and components
- Inverters and transformer/rectifier units
- Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

Procedures and requirements include:

Unit Mapping Information

Release 2. Equivalent to MEA281 Maintain light aircraft AC powered instrument 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 MEA281 Maintain light aircraft AC powered instrument 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 include:

- 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 WHS requirements relevant to instrument and electrical system maintenance.

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 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 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 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
- handling precautions for electrostatic sensitive devices
- relevant WHS 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 and 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.

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 applicable 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 a system and at least one (1) major system component/line replaceable unit (LRU) from each of the following groups:
 - DG, AH, AHRS and components, servo and encoding altimeters, remote reading gyro compasses and components
 - piston engine and gas turbine engine indication system components
 - fuel quantity indication and flow indication systems and components
 - transmitter/indicator measuring instrument systems (pressure, temperature, vacuum) and components
 - inverters and transformer/rectifier units.
- 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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