



Australian Government

Department of Education, Employment and Workplace Relations

MEA212C Inspect, test and troubleshoot basic aircraft instrument systems and components

Release: 1

MEA212C Inspect, test and troubleshoot basic aircraft instrument systems and components

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit is part of the Avionic Certificate IV AME training pathway. It covers the competencies required to inspect, test and troubleshoot instrument systems and components fitted to the more basic types of fixed and rotary wing 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.
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Application of the Unit

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 basic aircraft instrument systems and components. Applications include fixed and rotary wing aircraft that have basic instrument systems.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		
	MEA204C	Remove and install basic aircraft instrument system components
	MEA246C	Fabricate and/or repair aircraft

Prerequisite units	
	electrical components or parts

Employability Skills Information

Employability skills	This unit contains employability skills.
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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

ELEMENT	PERFORMANCE CRITERIA
<p>1. Inspect aircraft basic instrument systems and components.</p>	<p>1.1. Relevant maintenance documentation and modification status, including system defect reports where relevant, are used to identify specific inspection requirements.</p> <p>1.2. Isolation tags are checked and aircraft configured for safe system inspection and operation in accordance with the applicable maintenance manual.</p> <p>1.3. Instrument system components are visually or physically checked for external signs of defects in accordance with applicable maintenance manual.</p> <p>1.4. Defects are correctly identified and reported</p>
<p>2. Test/adjust aircraft basic instrument systems and components.</p>	<p>2.1. Aircraft and system are prepared in accordance with applicable maintenance manual for the application of power/system operation.</p> <p>2.2. Instrument system is functionally tested in accordance with maintenance manual for evidence of serviceability or malfunction.</p> <p>2.3. System calibration or adjustments are performed in accordance with maintenance manual, as appropriate.</p>
<p>3. Troubleshoot aircraft basic instrument systems and components.</p>	<p>3.1. Available information from maintenance documentation, inspection and test results is used, where necessary, to assist in fault determination.</p> <p>3.2. Maintenance manual fault diagnosis guides and logic processes are used to ensure efficient and accurate troubleshooting.</p> <p>3.3. Specialist advice is obtained, where required, to assist with the troubleshooting process.</p> <p>3.4. Instrument system 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.</p> <p>3.5. Determine rectification requirements.</p>

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

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:
 - flight instruments
 - pitot/static systems
 - direct reading compasses
 - piston engine indication systems
 - electrical systems indication
 - basic fuel quantity indication systems
 - pneumatic/vacuum indication systems.
- Applying logic processes, taking and interpreting system measurements, using test equipment and appropriate wiring diagrams and manuals to isolate instrument system malfunctions in the above systems
- Performing system functional tests and checks to isolate system faults and assess post maintenance serviceability
- Application of OHS requirements relevant to instrument system maintenance

Required knowledge

Look for evidence that confirms knowledge of:

- The basic layout (block diagram level), function and operation of:
 - flight systems including:
 - altitude (direct reading altimeters)
 - attitude including directional gyros and artificial horizons (both air and electrically driven), turn and slip and turn co-ordinator
 - airspeed
 - OAT
 - engine indication systems including:
 - direct reading temperature
 - direct reading pressure (e.g. oil pressure)
 - speed including mechanical and electric tachometers
 - manifold pressure/boost including aneroid, sylphon bellows and dual compartment types
 - auxiliary direct reading systems including:

REQUIRED SKILLS AND KNOWLEDGE

- electrical
- hydraulic pressure
- pneumatic pressure and vacuum
- basic fuel quantity indication
- Basic instrument system maintenance and testing requirements, and troubleshooting procedures
- OHS requirements relevant to instrument system maintenance
- 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 instruments
 - gyroscopes and their use in aircraft instrument systems
 - electrical fundamentals
- Direct reading compass installations and calibration
- Relevant maintenance manuals
- Relevant regulatory requirements and standard procedures

Evidence Guide

EVIDENCE GUIDE	
<p>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.</p>	
<p>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to inspect, test and troubleshoot basic instrument systems and components while observing all relevant safety precautions.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>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 basic 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.</p> <p>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 basic aircraft instrument systems and components listed in the Range Statement.</p> <p>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.</p> <p>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/ line replaceable unit (LRU) from each of Groups 1 to 8 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 .</p>

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	

Range Statement

RANGE STATEMENT	
<p>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.</p>	
Note	<p>Range statements listed below are numbered to facilitate specification of the assessment requirements included in the Evidence Guide.</p>
Instrument systems and components	<p><i>Instrument systems and components include:</i></p> <ol style="list-style-type: none"> 1. Pitot/static systems and components, Airspeed Indicators (ASIs), Vertical Speed Indicators (VSIs) and counter-pointer altimeters 2. Directional Gyros (DGs) and Artificial Horizons (AHs) (air and electrically driven) Turn and bank and slip/turn coordinators 3. Direct reading compasses 4. Piston engine indication system components (direct reading measuring instruments and temperature indication) 5. Electrical systems indication (voltage, current, power and frequency) 6. Basic fuel quantity indication systems and components 7. Pneumatic/vacuum indication components
Troubleshooting	<p><i>Troubleshooting</i> involves the use of fault finding charts or similar, to line replacement level.</p>
Application	<p>Application of this unit may relate to:</p> <ul style="list-style-type: none"> • Scheduled or unscheduled maintenance activities • Individual or team related activities
Procedures and requirements	<p>Refer to industry standard procedures specified by manufacturers, regulatory authorities or the enterprise</p>

Unit Sector(s)

Unit sector	
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Competency field

Competency field	Aviation maintenance
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Co-requisite units

Co-requisite units		