Australian Government

Department of Education, Employment and Workplace Relations

MEA228C Test and troubleshoot aircraft instrument systems and components

Revision Number: 1

MEA228C Test and troubleshoot aircraft instrument systems and components

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit is part of the Avionic AME Certificate IV training pathways. It covers the competencies required to test and troubleshoot aircraft instrument and display systems and components. Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the B2 Aircraft Maintenance Engineer licence under CASR Part 66, in accordance with the licensing provisions in Section 3, Assessment Guidelines.

Application of the Unit

Application of the unit	This unit requires application of hand skills, standard trade practices and systems knowledge in the testing and troubleshooting of aircraft instrument and display systems and components during both scheduled and unscheduled maintenance. Applications include instrument and display systems and components fitted to both fixed and rotary wing aircraft.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Prerequisite units		

Employability Skills Information

Employability skills	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

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for troubleshooting	1.1. Relevant maintenance documentation and modification status, including system defect/ service difficulty reports where relevant, are interpreted to identify an unserviceability.
2. Test/adjust instrument and display systems.	2.1. The aircraft and systems are correctly prepared, in accordance with specified procedures, for the application of power and system operation. 2.2. ***Instrument or display system*** is functionally tested, in accordance with specified procedures, for evidence of serviceability or malfunction. 2.3. System calibration or adjustments are performed in accordance with specified procedures.
3. Troubleshoot instrument and display systems.	3.1. Available information from maintenance documentation and 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***. 3.3. Specialist advice is obtained, where required, to assist with the troubleshooting process. 3.4. Instrument or display system faults are located and the causes of the faults are clearly identified and correctly recorded in maintenance documentation, where required. 3.5. Fault rectification requirements are determined to assist in planning the repair or adjustment.

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:

- Use of hand skills, tools and test equipment in the testing, adjustment and troubleshooting of instrument and display systems
- Recognition of system and component defects/external damage, correct installation, connection of plugs, terminations, attaching hardware (including cabling/harnesses) for the systems listed in Range Statement
- Interpreting the information presented on instrument and display systems
- Applying logic processes and using appropriate wiring diagrams and manuals to isolate instrument and display system malfunctions
- Performing system functional tests and checks to isolate system faults and assess post-maintenance serviceability
- The effective use of maintenance documentation and relevant fault diagnosis guides in the troubleshooting process
- Application of standard procedures
- Observance of all relevant occupational health and safety (OHS) procedures

Required knowledge

Look for evidence that confirms knowledge of:

- Standard trade practices relating to tool and test equipment usage and installation/securing of system components
- The basic layout (block diagram level) of the systems listed in the Range Statement
- The operating principles of the systems listed in the Range Statement and associated with the properties and effects of atmospheric conditions on aircraft instruments and systems, pressure and temperature sensing elements and their use in aircraft instruments, gyroscopes and their use in aircraft instrument and reference systems, electrical fundamentals and display screen generation
- The various methods of navigation and how they are used by both conventional and electronic navigational instruments and systems
- OHS procedures relating to instrument and display systems and components
- Relevant maintenance manuals
- Relevant regulatory requirements and standard procedures, including software management control

Evidence Guide

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 test and troubleshoot a range of instrument and display systems and components that is representative of the scope of the listed variables in accordance with relevant maintenance manual instructions while applying all relevant OHS procedures and standard processes. Coverage of display systems is required only where applicable to the enterprise.
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 instrument and display systems and their 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 may be demonstrated through application across a range of aircraft instrument and display systems (where display systems are applicable to the enterprise) 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 this Unit of Competency are being achieved under routine supervision on a system and on at least one major system component of each Group 1 to 6 (Groups 5 and 6 may be

EVIDENCE GUIDE	
	omitted if not applicable to the enterprise), as 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 .
Context of and specific resources for assessment	Competency should be assessed in the work environment or simulated work environment, using procedures, tools and equipment specified in maintenance documentation. It is also expected that general purpose tools, test and ground support equipment found in most routine situations would be used where appropriate. The level of troubleshooting is limited in its application to the use of fault diagnosis guides or other similar information to enable troubleshooting to line replaceable item level
Method of assessment	
Guidance information for assessment	

Range Statement

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.
Instrument or display systems	*Instrument or display systems may include*: 1. Flight instruments - pitot/static systems, airspeed indicators (ASIs) machmeters, air data systems and instruments, vertical speed indicators (VSIs), altimeters, altitude alerting and reporting, turn and bank, directional gyros (DGs), artificial horizons (AHs), angle of attack, stall warning/avoidance, ground proximity warning system (GPWS), flight data recorders (FDRs 2. Engine Instruments - engine speed, pressure, temperature, performance, vibration, torque 3. Instrument navigation systems - inertial navigation systems (INS), inertial reference systems, compasses, attitude heading reference system (AHRS) 4. Miscellaneous - pressure, fuel quantity, fuel flow, position, voltage, frequency, current, power 5. Display systems - electronic flight instrument systems (EFIS), engine indicating and crew alerting systems (EICAS), flight management computer systems (FMCS), electronic centralised aircraft monitor (ECAM), head-up display (HUD) 6. Integrated modular avionics
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

RANGE STATEMENT	
	manufacturers, regulatory authorities or the enterprise

Unit Sector(s)

Unit sector	

Competency field

Competency field	Aviation maintenance

Co-requisite units

Co-requisite units		
	MEA224B	Inspect aircraft instrument systems and components
	MEA226C	Inspect aircraft electronic systems and components