



Australian Government

MEA228 Test and troubleshoot aircraft instrument systems and components

Release: 2

MEA228 Test and troubleshoot aircraft instrument systems and components

Modification History

Release 2. Equivalent to MEA228 Test and troubleshoot aircraft instrument systems and components with amended unit name in Assessment Conditions.

Application

This unit of competency 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 on both fixed and rotary wing aircraft. Work may be performed individually or as part of a team.

The unit is part of the Avionic Certificate IV (Aircraft Maintenance Stream) training pathway.

The unit is used in workplaces that operate under the airworthiness regulatory systems of the Australian Defence Force (ADF) and the Civil Aviation safety Authority (CASA).

Where a 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

MEA224	Inspect aircraft instrument systems and components
MEA226	Inspect aircraft electronic systems and components

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.
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 while observing all relevant work health and safety (WHS) requirements 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 to line replacement level 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

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.

Instrument or display systems include:

- 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) and flight data recorders (FDRs)

- Engine instruments – engine speed, pressure, temperature, performance, vibration and torque
- Instrument navigation systems – inertial navigation system (INS), inertial reference system (IRS), compasses and attitude and heading reference system (AHRS)
- Miscellaneous – pressure, fuel quantity, fuel flow, position, voltage, frequency, current and power
- Display systems – electronic flight instrument system (EFIS), engine indicating and crew alerting system (EICAS), flight management computer system (FMCS), electronic central aircraft monitor system (ECAM) and head-up display (HUD) (where applicable to the enterprise)
- Integrated modular avionics (where applicable to the enterprise)
- Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

Procedures and requirements include:

Unit Mapping Information

Release 2. Equivalent to MEA228 Test and troubleshoot aircraft 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 MEA228 Test and troubleshoot aircraft 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 must include:

- using 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, and attaching hardware (including cabling/harnesses) for the systems listed in Range of Conditions
- 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
- effectively using maintenance documentation and relevant fault diagnosis guides in the troubleshooting process
- applying standard procedures
- observing all relevant WHS procedures.

It is essential that system testing procedures, cleanliness requirements and safety precautions applicable to the instrument 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 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 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:

- 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 of Conditions

- the operating principles of the systems listed in the Range of Conditions 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
- maintenance requirements and troubleshooting procedures
- WHS procedures relating to instrument and display systems and components
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures, including software management control.

Assessment Conditions

- 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.
- 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 this unit of competency are being achieved under routine supervision on a system and on at least one (1) major system component of each of the following groups:
 - flight instruments – pitot/static systems, ASIs, machmeters, air data systems and instruments, VSIs, altimeters, altitude alerting and reporting, turn and bank, DGs, AHs, angle of attack, stall warning/avoidance, GPWS and FDRs
 - engine Instruments – engine speed, pressure, temperature, performance, vibration and torque
 - instrument navigation systems – INS, IRS, compasses and AHRS
 - miscellaneous – pressure, fuel quantity, fuel flow, position, voltage, frequency, current and power
 - display systems – EFIS, EICAS, FMCS, ECAM and HUD (may be omitted if not applicable to the enterprise)
 - integrated modular avionics (may be omitted if not applicable to the enterprise).

- 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.
- Individuals being assessed who have already attained MEA213 Inspect, test and troubleshoot advanced aircraft instrument systems and components, will have covered a significant proportion of the Performance Criteria for Elements 1, 2 and 3 and will have covered many of the Range of Conditions variables. The Log of Industrial Experience and Achievement records relating to MEA213 Inspect, test and troubleshoot advanced aircraft instrument systems and components, may be accepted as also meeting the evidence requirements for this unit in the applicable areas.
- The relationship between MEA213 Inspect, test and troubleshoot advanced aircraft instrument systems and components and MEA212 Inspect, test and troubleshoot basic aircraft instrument systems and components, may also be taken into account where MEA212 Inspect, test and troubleshoot basic aircraft instrument systems and components has been attained, but not MEA213 Inspect, test and troubleshoot advanced aircraft instrument systems and components. Advice in MEA212 Inspect, test and troubleshoot basic aircraft instrument systems and components regarding the coverage of MEA275 Maintain basic light aircraft instrument systems and components, may also be taken into consideration where applicable.

Links

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