



Australian Government

MEM27018 Test, diagnose and rectify mobile and stationary plant external monitoring and control systems

Release: 1

MEM27018 Test, diagnose and rectify mobile and stationary plant external monitoring and control systems

Modification History

Release 1: New unit

Application

This unit of competency defines the skills and knowledge required to test, diagnose and rectify the systems used on stationary and mobile plant for functions that require communication to and from an external source. It covers installation, service and maintenance, diagnostics and troubleshooting of the on-board components of the communication, reporting and control systems.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Band: B

Unit Weight: 4

Pre-requisite Unit

MEM09002	Interpret technical drawing
MEM11011	Undertake manual handling
MEM12023	Perform engineering measurements
MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information
MEM16008	Interact with computing technology
MEM18001	Use hand tools
MEM18002	Use power tools/hand held operations
MEM18055	Dismantle, replace and assemble engineering components
MEM27006	Diagnose and rectify batteries, low voltage sensors and circuits
MEM27016	Diagnose and maintain electronic controlling systems on mobile and stationary plant
MEM27023	Diagnose and rectify fieldbus circuits in mobile and stationary plant

and equipment

Competency Field

Fixed and Mobile Plant

Elements and Performance Criteria

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
1	Determine job requirements	1.1	Follow standard operating procedures (SOPs)
		1.2	Comply with work health and safety (WHS) requirements at all times
		1.3	Use appropriate personal protective equipment (PPE) in accordance with SOPs
		1.4	Identify job requirements from specifications, drawings, job sheets or work instructions
2	Locate and identify features and purpose of external communication systems	2.1	Determine on-board methods of communication and data exchange with external source
		2.2	Locate on-board electronic control module (ECMs) associated with external monitoring and control systems
		2.3	Identify other external monitoring and control system hardware and components
3	Test external monitoring and control system	3.1	Ensure equipment is parked with engine off or in specified safe mode for testing
		3.2	Check for damage to externally located antennae, sensors and other system components
		3.3	Review previous records
		3.4	Identify location of service ports and other test locations and connect laptop or test equipment

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
	3.5 Run specified test procedure or program to access data on system and plant performance 3.6 Identify faults and determine if related to on-board component or ECM fault 3.7 Analyse information from tests and test equipment and identify faults 3.8 Trace on-board faults to root cause 3.9 Report off-board faults in system according to SOP's
4 Rectify on-board faults	4.1 Repair or rectify faulty system components 4.2 Adjust program settings to workplace and manufacturer specifications for program related faults 4.3 Report continued program faults according to workplace procedures 4.4 Adjust, recalibrate or replace faulty sensors, aerials and antennae
5 Re-test system and document work	5.1 Re-test equipment external monitoring and control system to ensure compliance with specifications and workplace needs 5.2 Undertake any required final adjustments 5.3 Document work undertaken in accordance with procedures

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

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.

The systems and equipment covered by this unit are found in stationary and mobile plant used in one or more of the following:

- mining
- agriculture
- forestry
- construction
- transport industries

External monitoring and control systems include one (1) or more of the following:

- integrated original equipment manufacturer (OEM) management and monitoring systems
- bolt on systems
- remote control and guidance systems, including on and off site remote control systems
- single equipment system telemetry and monitoring systems
- multi-mode systems allowing choice of operator control, semi-autonomous and fully autonomous control
- load and yield management and monitoring
- equipment condition monitoring and reporting systems
- safety related systems, including proximity awareness and collision avoidance systems

Communication and data exchange method includes one or more of the following:

- satellite
- Wi-Fi
- cellular
- radio
- global positioning system (GPS)
- laser

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Hardware and components include one (1) or more of the following

- on-board electronic control modules (ECMs)
- connectors
- memory and communication interfaces
- ethernet connectors
- broadband transmitter/receiver (could be built into other hardware e.g. a PC)
- radio frequency (RF) transmitter/receiver
- laser transmitter/receiver
- GPS receiver
- satellite dish/aerial
- displays, buzzers and signal lamps
- operator switches and controls
- antennae
- fieldbus cables and connectors to other on-board systems and ECMs
- sensors
- radar
- cameras
- service ports
- power input
- service ports to allow for laptops and other test instrumentation to be connected (e.g. USB, serial and connecting cables)

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.

External communication systems can be related to single equipment system which include one (1) or more of the following:

- engine
- tyres
- load monitoring and reporting

Unit Mapping Information

No equivalent unit.

Links

Companion Volume implementation guides are found in VETNet -
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM27018 Test, diagnose and rectify mobile and stationary plant external monitoring and control systems

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting information on external monitoring and control systems from multiple sources, including manufacturers' specifications, drawings, information provided by equipment operators, log books and job records and obtaining and accessing other relevant data manually or by electronic means on mobile plant and equipment performance
- identifying hazards associated with mobile plant and equipment and implementing appropriate risk control measures and procedures before undertaking testing procedures
- establishing correct connection of test equipment to on-board access points
- running of diagnostic programs and other tests to system manufacturer specifications
- interpreting test results for equipment condition and faults
- undertaking root cause analysis to identify cause of faults
- rectifying faults using appropriate rectification strategy, including repair, replacement, changing program settings or referral to engineering, technical or other personnel
- undertaking calculations and numerical operations associated with advanced equipment testing and diagnostics on mobile plant and equipment
- documenting all findings and outcomes in accordance with SOPs.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- equipment system components and locations for:
 - acquisition of engine and other equipment systems real time operational data
 - data logging features, where fitted, for:
 - event list
 - system snapshot
 - trend and cumulative data

- data transmission and reception to on-board and external sensors and electronic control modules
- system power
- fieldbus data Links to other on board systems and electronic control modules (ECMs)
- system login procedures for operation and maintenance access levels
- on-board access points for test equipment
- correct fixing/mounting procedures for sensors, transmitters and receivers, antennae, aerials and satellite dishes
- procedures for running diagnostic programs and tests at equipment and component level
- sources of information available to assist in fault finding
- uses and parameters of information management systems
- required rectification for equipment faults
- practices and procedures in root cause analysis
- equipment performance specifications
- documentation requirements.

Assessment Conditions

- Assessors must:
 - have vocational competency in testing, diagnosing and rectifying mobile and stationary plant external monitoring and control systems at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

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