



Australian Government

AURTTR101 Diagnose complex faults in engine management systems

Release: 1

AURTTR101 Diagnose complex faults in engine management systems

Modification History

Release	Comments
Release 1	This version first released with AUR Automotive Retail, Service and Repair Training Package Version 6.0

Application

This unit describes the skills and knowledge required to diagnose complex faults in engine management systems and identifying the repair action necessary to restore system performance. The systems used vary based on the work context. It involves confirming the existence of a fault, developing a diagnostic testing strategy, diagnosing the cause of the fault, reporting conclusions and making repair recommendations. Complex faults are outside the normal scope of a technician's diagnosis and repair work. They include intermittent faults, multi-system faults, faults introduced as a result of system repairs, and indirect faults caused by the influence of external systems, requiring the application of complex diagnostic processes to resolve.

The unit applies to those who work in the automotive service and repair industry. The engine management systems include those in vehicles from all sectors of the industry.

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

Unit Sector

Mechanical Miscellaneous Technical – Electrical and Electronics

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Identify and confirm the work requirement	1.1 Identify job requirements from workplace instructions 1.2 Confirm nature of fault according to workplace procedures 1.3 Identify hazards and environmental issues associated with diagnose and repair activity, assess potential risks and implement control measures in line with workplace policies

ELEMENT	PERFORMANCE CRITERIA
	and procedures
2. Prepare to diagnose complex faults	2.1 Identify required information for diagnosis activity 2.2 Analyse diagnostic options and develop testing strategy, including, diagnostic method sequence, tests and testing processes 2.3 Identify tools and equipment required for testing strategy and establish serviceability according to workplace procedures
3. Apply diagnostic procedures	3.1 Implement diagnostic tests set out in testing strategy according to manufacturer and workplace procedures, and workplace health and safety requirements 3.2 Verify and report diagnostic findings using reliable alternative process according to manufacturer specifications and workplace procedures 3.3 Develop and report recommendations for necessary repairs according to workplace procedures 3.4 Communicate findings to workplace supervisor and customer and confirm next steps
4. Complete work processes	4.1 Conduct final inspection according to workplace procedures and confirm vehicle is ready for repair process or return to customer 4.2 Clear work area and dispose of or recycle materials according to workplace procedures 4.3 Complete documentation according to workplace procedures.

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

SKILL	DESCRIPTION
Learning	• Locates required sources of information efficiently • Develops own approach to a task, including steps to confirm findings • Applies diagnostic skills to different vehicles or machinery
Reading	• Identifies, organises and interprets technical information from manufacturer and workshop literature when seeking

SKILL	DESCRIPTION
	engine management system specifications and procedures
Oral communication	• Clarifies instructions • Gains information from customers and supervisors
Numeracy	• Measures engine management system components and uses mathematical operations, to calculate tolerances and deviations from manufacturer specifications • Uses electrical measuring equipment and interpret units, such as amperes, ohms, and volts
Planning and organising	• Plans own work requirements • Prioritises and sequences actions to achieve required outcomes • Ensures tasks are completed within workplace timeframes
Technology	• Uses measuring equipment • Uses specialised diagnostic equipment

Unit Mapping Information

Supersedes and is equivalent to AURTTR001 Diagnose complex faults in engine management systems.

Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

Assessment Requirements for AURTTR101 Diagnose complex faults in engine management systems

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Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- diagnose a complex fault in three different engine management systems in which the work for at least two of the systems must involve a different complex fault from the following:
 - an intermittent fault
 - a fault that affects more than one system
 - a fault introduced as a result of a system repair
 - an indirect fault caused by the influence of external systems
- develop a testing strategy to diagnose the causes of the complex faults in the above systems.

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- methods to locate and interpret information required to diagnose and repair complex faults in engine management systems, including:
 - engine management system manufacturer specifications
 - information from customers and supervisors
- workplace procedures required to diagnose and repair complex faults in engine management systems, including:
 - establishing the serviceability of tools and equipment
 - documentation procedures
 - housekeeping procedures, including:
 - examination of tools and equipment
 - storage of equipment
 - identification, tagging and isolation of faulty equipment
 - safe disposal of materials

- recycling procedures
- workplace health and safety (WHS) requirements relating to diagnosing complex faults in engine management systems, including procedures for:
 - working with high pressure petrol fuel systems
 - working on vehicle high voltage ignition systems
 - identifying hazards and controlling risks associated with wearing jewellery while working around high current wiring systems
- environmental requirements relating to engine management systems
- types of complex faults relating to engine management systems, including:
 - intermittent
 - multi-system
 - introduced as a result of system repair
 - indirect, caused by the influence of external systems
- key features of engine management systems, including:
 - injectors
 - air flow meters
 - temperature sensors
 - pressure sensors
 - throttle position sensors
- testing procedures for engine management systems, including procedures for:
 - dynamic and static testing of vehicle or machinery
 - component failure analysis
- types and key features of diagnostic testing equipment required to diagnose complex faults in engine management systems, including:
 - scan tools
 - oscilloscopes
- procedures for accessing and interpreting scan tool system data, including:
 - diagnostic trouble codes (DTCs), including:
 - conditions that set the DTCs
 - conditions for running DTCs
 - live data
 - freeze frame data
 - waveforms.

Assessment Conditions

Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.

Assessment must include direct observation of tasks.

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the engine management systems that they have worked on, e.g. repair orders.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- automotive repair workplace or simulated workplace
- workplace instructions
- manufacturer engine management system specifications
- three different vehicles or machinery with complex faults in their engine management systems
- engine management system diagnostic equipment, including scan tools and oscilloscopes
- tools, equipment and materials appropriate for diagnosing complex faults in engine management systems.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

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