



Australian Government

AURJTE104 Diagnose and repair motorcycle engine management systems

Release: 1

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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 and repair faults in the motorcycle engine management systems of motorcycles. The unit involves preparing for the task, selecting the correct diagnostic procedure, carrying out the diagnosis and the repair, performing post-repair testing, and completing workplace processes and documentation.

The unit applies to those working in the automotive service and repair industry. The electrical and electronic systems include those in motorcycles or all-terrain vehicles (ATVs).

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

Unit Sector

Mechanical Motorcycle Technical - Electrical and Electronic

Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Prepare to diagnose and repair engine management system	1.1 Identify job requirements from workplace instructions 1.2 Identify required information for diagnosis activity 1.3 Analyse diagnostic options and source testing strategy to identify cause of fault using workplace and manufacturer procedures 1.4 Identify hazards and environmental issues associated with diagnose and repair activity, assess potential risks and implement control measures in line with workplace policies and procedures 1.5 Identify tools and equipment required for testing strategy

ELEMENTS	PERFORMANCE CRITERIA
	and establish serviceability according to workplace procedures
2. Diagnose engine management system	2.1 Implement diagnostic tests set out in testing strategy according to manufacturer and workplace procedures, and workplace health and safety requirements 2.2 Identify cause of fault through analysis of diagnostic test results 2.3 Confirm and report cause of fault according to workplace procedures 2.4 Develop and report recommendations for necessary repairs according to workplace procedures
3. Repair engine management system	3.1 Identify required information for repair activity 3.2 Identify tools, equipment and materials required for repair activity and establish serviceability according to workplace procedures 3.3 Carry out repairs according to workplace and manufacturer procedures, manufacturer specifications, workplace health and safety and environmental requirements 3.4 Carry out post-repair testing according to workplace procedures, workplace health and safety and environmental requirements
4. Complete work processes	4.1 Conduct final inspection according to workplace procedures and confirm vehicle is ready for use 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 a sequenced plan for a specific task.
Reading	- Organises and interprets technical information from workplace procedures, manufacturer procedures and manufacturer specifications - Interprets text, symbols and wiring diagrams in information relating to electrical system testing and repair equipment

SKILL	DESCRIPTION
	from manufacturer specifications and workplace instructions and procedures.
Oral communication	• Clarifies instructions • Obtains information from customers and supervisors.
Numeracy	• Matches electrical components and part identification numbers to workplace instructions, vehicle, machinery and component part lists, and manufacturer specifications • Interprets vehicle electrical measurements and readings • Measures voltage, current and resistance and uses mathematical operations • Calculates deviations and tolerances from manufacturer specifications.
Planning and organising	• Plans own work requirements • Prioritises actions to achieve required outcomes • Ensures tasks are completed within workplace timeframes.
Technology	• Uses specialised diagnostic equipment.

Unit Mapping Information

New unit.

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 AURJTE104 Diagnose and repair motorcycle 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 and repair a fault in the engine management systems of at least three different motorcycles or all-terrain vehicles (ATVs), including:
 - faults in at least two system input sensors
 - faults in at least one system output actuator.

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 motorcycle engine management systems, including:
 - information provided by customer and supervisors
 - manufacturer specifications and procedures or equivalent documentation
- workplace procedures required to diagnose and repair motorcycle engine management systems, including:
 - establishing 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
 - disposal of excess materials
 - recycling procedures
- workplace health and safety (WHS) relating to diagnosing and repairing motorcycle engine management systems, including procedures for:
 - using specialised tools and equipment

- using appropriate personal protective equipment (PPE)
- identifying hazards and controlling risks associated with:
 - working on vehicle high voltage ignition systems
 - wearing jewellery while working around high current wiring systems
 - working with high pressure petrol fuel systems
- environmental requirements relating to diagnosing and repairing motorcycle engine management systems
- operating principles of motorcycle engine management systems and associated components, including:
 - combustion, including:
 - air-fuel ratios and chemistry of combustion
 - composition of petrol fuel, including octane rating
 - indirect and direct fuel injection
- purpose and operation of motorcycle engine management systems and components, including:
 - fuel system, including:
 - fuel filters
 - fuel pumps
 - fuel pressure regulators
 - fuel injectors
 - electronic control system, including the following system inputs:
 - throttle position sensors
 - coolant temperature sensors
 - oxygen sensors
 - intake air temperature sensors
 - crankshaft position sensors
 - camshaft position sensors
 - battery voltage
 - knock sensors
 - key features of electronic control units (ECUs), including:
 - long-term fuel trim (LTFT)
 - short-term fuel trim (STFT)
 - sensor reference voltages and sensor grounds
 - system outputs, including:
 - Pulse Air Injection Recirculation (PAIR) solenoid controls
 - injectors
 - fuel pump relays
 - engine cooling fans
 - throttle motor (drive by wire) controls
 - variable valve timing controls

- ignition systems and components, including:
 - spark plugs
 - ignition leads
 - ignition coils, including electromagnetic induction
 - ignition timing, including varying ignition timing according to engine load, speed and knock sensor input
 - dwell period
- diagnostic testing procedures for motorcycle engine management systems, including:
 - diagnostic flow charts
 - fuel system testing, including:
 - low pressure fuel system testing
 - high pressure fuel system testing
 - testing electrical systems, including procedures for:
 - accessing electrical terminals and using test probes without damaging connectors, fuse holders or wiring
 - injector testing
 - sensor testing
 - actuator testing
 - accessing and interpreting industry-relevant test equipment data, including:
 - diagnostic trouble codes (DTC)
 - live data
 - freeze frame data
- repair procedures for motorcycle engine management systems, including procedures for:
 - removing and replacing the following electrical or electronic components:
 - sensors
 - actuators, including fuel injectors and fuel pumps
 - adjusting and recalibrating components and associated systems
- post-repair testing procedures, including procedures for:
 - clearing fault codes
 - assessing engine performance
 - checking for electrical connector mating.

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 motorcycle 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 motorcycle engine management system specifications
- three different motorcycles or ATV's with faults in their engine management systems as specified in the performance evidence
- diagnostic equipment for motorcycle engine management systems
- tools, equipment and materials appropriate for repairing motorcycle 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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