



Australian Government

AURETR132 Diagnose and repair automotive electrical systems

Release: 1

AURETR132 Diagnose and repair automotive electrical 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 and repair automotive electrical systems. The systems used vary based on the work context. The unit involves preparing for the task, sourcing a diagnostic testing strategy, diagnosing the cause of the fault, carrying out the repair, performing post-repair testing, and completing workplace processes and documentation.

The unit applies to those who work in the automotive service and repair industry. The automotive electrical systems include those in agricultural machinery, heavy commercial vehicles, light vehicles, marine vessels, motorcycles, mobile plant machinery, or outdoor power equipment.

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

Unit Sector

Electrical 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. Prepare to diagnose and repair automotive electrical 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

ELEMENT	PERFORMANCE CRITERIA
	and procedures 1.5 Identify tools and equipment required for testing strategy and establish serviceability according to workplace procedures
2. Diagnose automotive electrical 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 automotive electrical 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

SKILL	DESCRIPTION
	- manufacturer specifications - Interprets text, symbols and wiring diagrams in information relating to electrical system testing and repair equipment from manufacturer specifications and workplace instructions and procedures
Oral communication	- Clarifies instructions - Obtains information from customers and supervisors
Numeracy	- Matches alternator types 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 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

Supersedes and is equivalent to AURETR032 Diagnose and repair automotive electrical 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 AURETR132 Diagnose and repair automotive electrical 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 at least three of the following electrical system single wire (non CAN-bus) circuits:
 - entry-exit locking systems with electric motor control circuit
 - power windows circuit
 - interior or exterior lighting circuit
 - turning indicator circuit
 - brake light circuit
 - hazard warning light circuit
 - electrical drive motor circuit
- carry out at least four of the following electrical connector repairs to a vehicle or machinery wiring harness:
 - crimp two different terminal types and sizes
 - remove two faulty connectors from the back of different terminals
 - solder two different wire gauges to electrical terminals
 - apply heat shrink insulation to two different crimped or soldered joints
 - check terminal retention on two different female terminals and connectors
- carry out a diagnostic test in the course of the above for at least one of the following faults:
 - high resistance in an input system
 - damaged connectors or wiring
 - shorted or worn system components.

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 automotive electrical systems, including:
 - information provided by customers and supervisors
 - manufacturer specifications and procedures or equivalent documentation
- workplace procedures required to diagnose and repair automotive electrical 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) requirements relating to diagnosing and repairing automotive electrical systems, including procedures for:
 - using specialised tools and equipment
 - using appropriate personal protective equipment (PPE)
 - identifying hazards and controlling risks associated with:
 - working on high voltage ignition systems
 - wearing jewellery while working around high current wiring systems
- operating principles of automotive electrical systems and associated components, including:
 - current, voltage, resistance and power
 - series circuits
 - parallel circuits
 - series and parallel circuits
 - Ohm's law
 - Faraday's law
 - Kirchhoff's law
 - magnetism and direct current (DC) motor operation
 - electromagnetic interference and radiation
 - cable types and sizes and current carrying capacity
 - circuit protection devices
- purpose and operation of automotive electrical systems and components, including:
 - wiper motors
 - electric windows
 - electric door locks
 - fan motors
 - horns

- lighting
- radio aerials
- diagnostic testing procedures for automotive electrical systems, including:
 - visual, aural and functional assessments of electrical system components, including:
 - component damage and wear
 - component or connector corrosion
 - component water or moisture ingress
 - common faults in electrical circuits, including:
 - open circuits
 - high resistance circuits
 - short circuits
 - damaged insulation
 - frayed wires
 - burnt wiring
 - water and moisture ingress
 - connector damage
 - terminal damage
 - using diagnostic flow charts
 - testing electrical systems, including procedures for:
 - accessing electrical terminals and using test probes without damaging connectors, fuse holders or wiring
 - checking resistance, current flow and voltage drop of system circuits
 - procedures for using:
 - digital multimeters
 - test lights and probes
 - oscilloscopes
- repair procedures for automotive electrical systems, including:
 - selecting and soldering wires
 - selecting and crimping terminals
 - removing and replacing connectors
 - removing and replacing electrical systems and their components
- post-repair testing procedures for automotive electrical systems, including:
 - checking for electrical connector mating
 - checking circuit current flow
 - static and dynamic performance tests of automotive electrical systems.

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 electrical 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 automotive electrical system specifications
- three different vehicles or machinery with electrical system faults
- diagnostic equipment for electrical systems, including multimeter
- tools, equipment and materials appropriate for repairing automotive electrical systems, including:
 - automotive wiring
 - heat shrink
 - soldering iron.

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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