



Australian Government

AURETR112 Test and repair basic electrical circuits

Release: 1

AURETR112 Test and repair basic electrical circuits

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 inspect, test and repair basic electrical circuits in vehicle and machinery electrical systems. It involves preparing for the task, inspecting and testing the circuit, repairing the circuit, and completing workplace processes and documentation.

The unit applies to those who work in the automotive service and repair industry. The basic electrical circuits include those in agricultural machinery, heavy commercial vehicles, light vehicles, 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 test basic electrical circuit	1.1 Determine job requirements from workplace instructions 1.2 Identify required information for testing activity and select fault finding options according to workplace procedures 1.3 Identify hazards and environmental issues associated with test and repair activity, assess potential risks and implement control measures in line with workplace policies and procedures 1.4 Identify tools and equipment required for testing activity and establish serviceability according to workplace procedures
2. Test circuit	2.1 Inspect extent of failure or damage to basic electrical circuit

ELEMENT	PERFORMANCE CRITERIA
	according to workplace procedures 2.2 Test circuit according to workplace procedures and workplace health and safety requirements 2.3 Identify cause of fault through analysis of test results. 2.4 Confirm and report cause of fault according to workplace procedures
3. Repair circuit	3.1 Identify required information for repair activity 3.2 Analyse repair options and select procedure according to workplace procedures. 3.3 Identify tools and equipment required for repair activity and establish serviceability according to workplace procedures 3.4 Carry out repairs according to workplace and manufacturer procedures, manufacturer specifications, workplace health and safety and environmental requirements 3.5 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
Reading	Interprets text, symbols and wiring diagrams in information relating to basic electrical system testing and repair equipment from manufacturer specifications, and workplace instructions and procedures
Oral communication	Clarifies instructions
Numeracy	- Interprets vehicle electrical measurements and readings - Measures voltage, current and resistance - Uses basic mathematical operations, including addition,

SKILL	DESCRIPTION
	subtraction, multiplication and division, to calculate 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 tools and equipment

Unit Mapping Information

Supersedes and is equivalent AURETR012 Test and repair basic electrical circuits.

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 AURETR112 Test and repair basic electrical circuits

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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:

- test the following basic electrical circuits:
 - one short circuit across an electrical resistive load
 - one open circuit before or after an electrical resistive load
 - one high resistance circuit before or after an electrical resistive load
 - current flow across an electrical resistive load
 - voltage drop across an electrical resistive load
- test for continuity in a basic wiring harness and visually check terminals in the wiring harness for moisture ingress and corrosion
- carry out four different circuit repairs in which the work must involve:
 - crimping various terminal sizes
 - soldering wire gauges to terminals
 - applying heat shrink insulation to crimped or soldered joints
 - replacing male and female terminals in a connector housing
 - performing terminal retention checks to replaced terminals.

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 test and repair basic electrical circuits, including:
 - technical information, including:
 - circuit types
 - circuit diagrams
 - circuit symbols

- manufacturer specifications and procedures or equivalent documentation
- workplace procedures required to test and repair basic electrical circuits, 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 testing and repairing basic electrical circuits, including procedures for:
 - using specialised tools and equipment
 - selecting and using personal protective equipment (PPE)
 - identifying hazards and controlling risks associated with wearing jewellery while working around electrical systems
- environmental procedures relating to testing and repairing basic electrical circuits
- basic theory and principles of automotive electrical systems, including:
 - current
 - alternating current (AC)
 - direct current (DC)
 - voltage
 - resistance
 - power
 - Ohm's law
- identification and operation of the following electrical circuits:
 - series circuits
 - parallel circuits
 - series parallel circuits
- key features of basic electrical circuit components, including:
 - cable types, including:
 - cable sizes
 - current carrying capacity
 - circuit protection devices
 - switches
 - relays
 - automotive globes
- procedures for using and operating electrical test equipment, including:
 - digital multimeters

- test lights suitable for circuit testing, including resistive and light emitting diode (LED)
- test probes suitable for testing circuit continuity
- fused test lead
- common types of faults, including:
 - open circuits
 - high resistance circuits
 - short circuits
 - damaged insulation
 - frayed wires
 - burnt wiring
 - water and moisture ingress
 - connector damage
 - terminal damage
- testing procedures for electrical systems, including:
 - accessing electrical terminals and using test probes without damaging connectors, fuse holders or wiring
 - electrical measuring and testing procedures, including:
 - electrical resistance checks
 - open and short circuit tests
 - voltage drop tests
 - current flow tests
 - visual testing procedures, including:
 - component moisture ingress
 - connector damage
- repair procedures for electrical circuits, including:
 - wire soldering procedures
 - terminal crimping procedures
 - replacing male and female terminals in a connector housing
 - connector removal and replacement procedures
 - basic electrical components removal and replacement procedures
- post-repair testing procedures, including:
 - confirming that electrical system is operating to manufacturer specifications
 - confirming that no other problems are present as a result of the repair.

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 basic electrical circuits they have tested and repaired, 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 electrical system specifications
- vehicle or machinery with faults in the basic electrical circuits specified in the performance evidence
- electrical test equipment to test basic electrical circuits and components
- consumable materials relevant to repairing basic electrical circuits and components, including connectors, terminals, wire, electrical tape and heat shrink sleeving
- electrical repair tools, equipment and materials relating to basic electrical circuits and components.

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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