



Australian Government

AURETR012 Test and repair basic electrical circuits

Release: 1

AURETR012 Test and repair basic electrical circuits

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes 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.

It applies to those working 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.

Competency Field

Electrical

Unit Sector

Technical - Electrical and Electronic

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
1. Prepare to test basic electrical circuit	1.1 Job requirements are determined according to workplace instructions 1.2 Testing procedures and information are accessed and interpreted 1.3 Fault finding options are analysed and those most appropriate to

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	the circumstances are selected 1.4 Hazards associated with the work are identified and risks are managed 1.5 Tools and electrical test equipment are selected and checked for serviceability
2. Test circuit	2.1 Basic electrical circuit is checked to establish extent of failure or damage 2.2 Circuit is tested according to manufacturer specifications, workplace procedures and safety requirements, and without causing damage to components or systems 2.3 Faults are identified from test results and causes of faults are determined 2.4 Findings are reported according to workplace procedures
3. Repair and check circuit	3.1 Repair procedures and information are accessed and interpreted 3.2 Repair options are analysed and most appropriate option is selected 3.3 Repair tools and materials are selected according to job requirements 3.4 Circuit components are repaired and adjusted according to manufacturer specifications, workplace procedures and safety requirements 3.5 Post-repair testing is carried out to confirm basic electrical circuit is operating correctly, any reported problems are resolved, and no other problems are present
4. Complete work processes	4.1 Final inspection is made to ensure work is to workplace expectations and vehicle or machinery is presented ready for use 4.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected 4.3 Tools and equipment are checked and stored and any faulty electrical equipment is identified, tagged and isolated according to workplace procedures 4.4 Workplace documentation is processed according to workplace procedures

Foundation Skills

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

Skills	Description
Learning skills to:	locate appropriate sources of information efficiently.
Reading skills to:	interpret text, symbols and wiring diagrams in information relating to basic electrical system testing and repair equipment from manufacturer specifications, and workplace instructions and procedures.
Writing skills to:	legibly and accurately fill out workplace documentation relating to testing and repairing basic electrical circuits.
Oral communication skills to:	clarify instructions.
Numeracy skills to:	- interpret vehicle electrical measurements and readings - measure voltage, current and resistance - use basic mathematical operations, including addition, subtraction, multiplication and division, to calculate deviations from manufacturer specifications.
Planning and organising skills to:	plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.
Technology skills to:	use specialised tools, such as test lights and multimeters.

Range of Conditions

This section specifies 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. Bold italicised wording, if used in the performance criteria, is detailed below.

<i>Safety requirements</i> must include:	- work health and safety (WHS) and occupational health and safety (OHS) requirements, 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.
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Unit Mapping Information

Equivalent to AURETR2012 Test and repair basic electrical circuits

Links

Companion Volume implementation guides are found in VETNet -

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

Assessment Requirements for AURETR012 Test and repair basic electrical circuits

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Performance Evidence

Before competency can be determined, individuals must demonstrate they can perform the following according to the standard defined in the unit's elements, performance criteria, range of conditions and foundation skills:

- test a basic electrical circuit, including:
 - 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 and 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 that include:
 - 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

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) 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

- electrical principles, including:
 - current, voltage, resistance and power
 - series circuits
 - parallel circuits
 - series parallel circuits
 - Ohm's law
- key features of basic electrical circuit components, including:
 - cable types and sizes and current carrying capacity
 - circuit protection devices
 - switches
 - relays
 - automotive globes
- techniques for reading and interpreting technical information, including circuit types, diagrams and symbols
- 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
 - procedures for checking, identifying and isolating faulty equipment
- 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

Assessors must satisfy NVR/AQTF assessor requirements.

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.

Links

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