



Australian Government

AURETR007 Apply knowledge of automotive electrical circuits and wiring systems

Release: 1

AURETR007 Apply knowledge of automotive electrical circuits and wiring systems

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to apply knowledge of electrical principles during the testing and repair of basic electrical circuits in vehicles, vessels and machinery.

It applies to those working in the automotive service and repair industry. The electrical circuits and wiring systems include those in agricultural machinery, heavy commercial vehicles, light vehicles, vessels, mobile plant machinery, motorcycles 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. Identify relevant information of electrical	1.1 Components of circuit are identified during testing and repair activities

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.
circuit and wiring system construction and operation in work activities	1.2 Functions of circuit components are identified during testing and repair activities 1.3 Relationships between circuit components, including the effects of testing and repair activities on other electrical circuits, are identified during repair activities
2. Apply relevant information of electrical circuit and wiring system construction and operation in work activities	2.1 Knowledge of electrical circuit construction and operation is used during testing or repair activities to carry out work according to manufacturer specifications and workplace procedures 2.2 Basic electrical principles are used during fault finding procedures 2.3 Knowledge of basic testing procedures is used when using electrical test equipment
3. Evaluate knowledge of electrical circuit and wiring systems	3.1 Knowledge is regularly checked with colleagues and supervisor to ensure currency and accuracy 3.2 Knowledge is updated as required to complement own work role

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 a range of written technical information relating to automotive electrical circuits and wiring systems.
Numeracy skills to:	- interpret numbers and units relating to electrical circuits and wiring systems in automotive technical information - interpret electrical measurements of voltage, current and resistance relating to electrical circuits - interpret wiring gauge dimensional measurements - use basic mathematical operations and common electrical formulas to calculate voltage drop, resistance, current flow and electrical power.

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>Basic electrical principles</i> must include:	relationship between electrical current flow, pressure, resistance and power using Ohm's law.
<i>Basic testing procedures</i> must include:	- voltage drop - circuit resistance - circuit current flow.

Unit Mapping Information

Equivalent to AURETR2007 Demonstrate knowledge of automotive electrical circuits and wiring systems

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 AURETR007 Apply knowledge of automotive electrical circuits and wiring systems

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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 and performance criteria, range of conditions and foundation skills:

- apply knowledge of automotive electrical circuits and wiring systems during the testing and repair of the electrical systems of three different vehicles, vessels or machinery
- evaluate and expand knowledge of automotive electrical circuits and wiring systems, including demonstrating knowledge of one of the following:
 - a new automotive electrical or electronic testing procedure
 - a new automotive electrical or electronic repair procedure
 - a new item of automotive electrical or electronic technology.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- types and location of sources of technical information relating to automotive electrical systems, including:
 - workplace service information
 - automotive engine mechanical texts
 - vehicle workshop manuals
 - service bulletins
 - technical articles
 - automotive textbooks
- features of vehicle electrical circuits, including:
 - voltage source
 - current load devices
 - resistive devices

- circuit protection devices
- switching circuit devices
- series circuits
- parallel circuits
- series parallel circuits
- relationships between:
 - volts, amps and ohms in vehicle electrical circuits
 - current flow and required wire gauge to carry the current
 - voltage drop across resistive load and current flowing in the circuit
- common fault types found in vehicle electrical circuits, including:
 - open circuit to power, signal and ground
 - short circuit to power, signal and ground
 - high resistance to power, signal and ground
- types and construction of vehicle electrical wiring systems, including:
 - common multi-strand conductor
 - various wire gauges and insulation types
 - controller area network databus (CAN-bus) twisted pair wiring
 - audio speaker shielded wiring
- principles of electricity, including:
 - alternating current (AC)
 - direct current (DC)
 - Ohm's law
 - Watts law
 - Kirchhoff's voltage law
 - Kirchhoff's current law
- identification, location and function of major components of common automotive electrical systems:
 - engine electrical systems, including:
 - battery
 - ignition
 - charging
 - starting
 - vehicle body electrical systems, including:
 - exterior lighting
 - internal lighting
 - vehicle access
 - washer and wiper
 - vehicle entertainment
 - wiring harness and loom assembly.

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 knowledge of electrical circuits and wiring systems that they have applied, e.g. work 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:

- technical information relating to automotive electrical circuits and wiring systems
- automotive tools and electrical test equipment
- three different vehicles, vessels or machinery with functional electrical systems.

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