



Australian Government

AURETB001 Diagnose and repair electric braking systems

Release: 1

AURETB001 Diagnose and repair electric braking systems

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to diagnose and repair faults in the electric braking systems of vehicle or machinery. These systems are single wire (non CAN-bus) circuits and include electric braking systems in light vehicles and machinery fitted with electric trailer braking controllers or trailers fitted with electric brakes. 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.

It applies to those working in an automotive service and repair industry. Electric braking systems include those in agricultural machinery, heavy commercial vehicles, light vehicles or mobile plant machinery.

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

Competency Field

Electrical

Unit Sector

Technical – Brakes

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 diagnose and repair electric braking	1.1 Job requirements are determined from workplace instructions

Elements Elements describe the essential outcomes.	Performance Criteria 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.
system	1.2 Diagnostic information is sourced and interpreted 1.3 Diagnostic options are analysed and those most appropriate to the circumstances are selected 1.4 Hazards associated with the work are identified and risks are managed 1.5 Diagnostic tools and equipment are selected and checked for serviceability
2. Diagnose electric braking system	2.1 Diagnostic tests are carried out according to workplace procedures and safety requirements 2.2 Faults are identified from diagnostic test results and causes of faults are determined 2.3 Diagnosis findings and recommendations for necessary repairs or adjustments are reported according to workplace procedures
3. Repair electric braking system	3.1 Repair information is sourced and interpreted 3.2 Repair options are analysed and those most appropriate to the circumstances are selected 3.3 Repair tools, equipment and materials are selected and checked 3.4 Repairs and component replacements and adjustments are carried out according to manufacturer specifications, workplace procedures, safety requirements, and without causing damage to components or systems 3.5 Post-repair testing is carried out according to workplace procedures to confirm fault rectification, and any further problems detected as having been introduced during the repair process are rectified
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:	identify and locate various sources of information efficiently.
Reading skills to:	interpret text, symbols and wiring diagrams in information relating to electrical system testing and repair equipment from manufacturer specifications and workplace instructions and procedures.
Writing skills to:	legibly and accurately fill out workplace documentation when reporting diagnostic findings, making repair recommendations, and recording parts and material used.
Oral communication skills to:	- clarify instructions - report diagnostic findings and make repair recommendations.
Numeracy skills to:	- match electrical components and part identification numbers to workplace instructions, vehicle and component part lists, and manufacturer specifications - interpret vehicle electrical measurements and readings - measure voltage, current and resistance and use basic mathematical operations, including addition and subtraction, 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 equipment, including multimeters and scan tools.

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 - using appropriate personal protective equipment (PPE) - identifying hazards and controlling risks associated with working on vehicle high voltage ignition systems, including standard
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	precautions such as not wearing jewellery while working around high current wiring systems.
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Unit Mapping Information

Equivalent to AURETB3001 Repair electric braking 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 AURETB001 Diagnose and repair electric braking systems

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Performance Evidence

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

- diagnose and repair a fault in the electrical non CAN-bus networked braking system of two different vehicles or machinery.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to diagnosing and repairing electric braking 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, including standard precautions including not wearing jewellery while working around high current wiring systems
- electrical principles, including:
 - current, voltage, resistance and power
 - series circuits
 - parallel circuits
 - series and parallel circuits
 - Ohm's law
 - Faraday's law
 - Kirchhoff's law
 - electromagnetic interference and radiation
- application, purpose and operation of electric braking systems and components, including:

- control systems, including:
 - electric over hydraulic
 - electric over vacuum
- circuit protection devices
- switches, relays and globes, including light emitting diodes (LEDs)
- cable types and sizes and current carrying capacity
- sensors (two and three-wire)
- actuators, including pulse width modulated (PWM)
- techniques for reading and interpreting technical information, including circuit types, diagrams and symbols
- diagnostic testing procedures for electric braking systems, including:
 - using diagnostic flow charts
 - testing electrical systems, including procedures for:
 - accessing electrical terminals and using test probes without damaging connectors, fuse holders or wiring
 - testing resistance and voltage drop
 - testing open and short circuits
 - checking shorts to signal, power circuits and grounds
 - visual, aural and functional assessments of electric braking system components, including:
 - component damage and wear
 - component or connector corrosion
 - component water or moisture ingress
- repair procedures for electric braking system circuits, including procedures for removing and replacing:
 - brake controllers
 - electric drum brakes
 - electric disc brakes
 - electric braking system wiring and connectors
- post-repair testing procedures, including static and dynamic performance tests of electric braking systems.

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 includes third-party evidence, individuals must provide evidence that links them to the electric braking 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 electric braking system specifications
- two different vehicles or machinery with electric braking system faults
- diagnostic equipment for electric braking systems, including:
 - multimeter
 - scan tool
- tools, equipment and materials appropriate for repairing vehicle and machinery electric braking systems.

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