



Australian Government

AURETB101 Diagnose and repair electric braking systems

Release: 1

AURETB101 Diagnose and repair electric braking 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 electric braking systems. 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 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 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.

Unit Sector

Electrical Technical – Brakes

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 electric braking 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 electric braking 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 electric braking system	3.1 Identify required information for repair activity 3.2 Identify required repair 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 electric braking 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 electric braking system components and part identification numbers to workplace instructions, vehicle, machinery and component part lists, and manufacturer specifications - Interprets vehicle electric braking measurements and readings - Measures voltage, current and resistance and use 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 AURETB001 Diagnose and repair electric braking 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 AURETB101 Diagnose and repair electric braking 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 one of the following components in the electrical non CAN-bus networked braking system of at least two different vehicles or machinery:
 - brake controller
 - circuit protection device
 - switch, relay or globe
 - sensor
 - actuator.

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:

- techniques for reading and interpreting technical information, including circuit types, diagrams and symbols
- methods to locate and interpret information required to diagnose and repair electric braking systems, including:
 - information provided by customers and supervisors
 - manufacturer specifications and procedures or equivalent documentation
- workplace procedures required to diagnose and repair electric braking 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 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:
 - wearing jewellery while working around high current wiring systems
- environmental requirements relating to diagnosing and repairing electric braking systems
- electrical principles, including:
 - current, voltage, resistance and power
 - identification and operation of simple electrical circuits, including:
 - series circuits
 - parallel circuits
 - series parallel circuits
 - Ohm's law
 - Faraday's law
 - Kirchhoff's law
 - electromagnetic interference and radiation
- 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)
- diagnostic testing procedures for electric braking systems, including:
 - accessing and interpreting scan tool system data, including:
 - diagnostic trouble codes (DTCs)
 - live data
 - waveforms
 - using diagnostic flow charts
- testing electrical systems, including procedures for:
 - accessing electrical terminals and using test probes without damaging connectors, fuse holders or wiring
 - resistance and voltage drop tests
 - open and short circuit tests
 - 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 systems, including procedures for removing and replacing:
 - brake controllers
 - electric drum brakes
 - electric disc brakes
 - electric braking system wiring and connectors
- post-repair testing procedures for electric braking systems, including:
 - DTC clearing procedures
 - static and dynamic performance tests of steering system.

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 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 scan tool
- tools, equipment and materials appropriate for repairing vehicle and machinery electric braking systems.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

Links

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