



Australian Government

AURETD001 Diagnose and repair electronically controlled steering systems

Release: 1

AURETD001 Diagnose and repair electronically controlled steering 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 electronically controlled steering systems. These systems include two-wire high and low speed (CAN-bus) and single wire low speed (LIN-bus) networked circuits in vehicle or machinery embedded network electronic control systems. It 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. Electronically controlled steering systems include those in agricultural machinery, heavy commercial vehicles, light vehicles, mobile plant machinery or motorcycles.

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

Competency Field

Electrical

Unit Sector

Technical - Steering and Suspension

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	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.
repair electronically controlled steering 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 electronically controlled steering 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 electronically controlled steering 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 according to manufacturer specifications and workplace procedures 3.4 Repairs and component replacements and adjustments are carried out according to manufacturer specifications, workplace procedures and 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 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 diagnostic and repair information 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 electronically controlled steering system 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 with high pressure and high temperature steering systems.
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Unit Mapping Information

Equivalent to AURETD3001 Service and repair electronically controlled steering 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 AURETD001 Diagnose and repair electronically controlled steering 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:

- diagnose and repair a fault in the electronically controlled steering systems of two different vehicles or machinery, including faults in two of the following:
 - steering wheel torque sensor circuit
 - steering wheel angle sensor circuit
 - wheel speed sensor circuit
 - ultrasonic position sensor self-parking system circuit
 - power steering motor control circuit
 - power steering hydraulic pump control circuit.

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 electronically controlled steering systems, including procedures for:
 - using specialised tools and equipment
 - using appropriate personal protective equipment (PPE)
 - identifying hazards and controlling risks associated with working with high pressure and high temperature steering systems
- electronically controlled power steering system principles, including:
 - adaptive steering topography, inputs and outputs
 - typical vehicle or machinery systems equipped with adaptive steering systems

- application, purpose and operation of electronically controlled steering systems and components, including:
 - adaptive steering control modules
 - control sensors and actuators
 - actuators, including pulse width modulated (PWM)
 - steering control module functions, including:
 - control of hydraulic fluid settings
 - pressure control valve settings
 - power steering pump operation
- diagnostic testing procedures for electronically controlled steering systems, including:
 - accessing and interpreting scan tool system data, including:
 - diagnostic trouble codes (DTCs)
 - live data
 - freeze frame 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
 - undertaking resistance and voltage drop tests
 - testing open and short circuits
 - testing shorts to signal, power circuits and grounds
- repair procedures for electronically controlled steering systems, including procedures for removing and replacing electronically controlled steering system components
- post-repair testing procedures for electronically controlled steering systems, including:
 - DTC clearing procedures
 - static and dynamic performance tests of steering 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 of competency includes third-party evidence, individuals must provide evidence that links them to the electronically controlled steering 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 specifications for electronically controlled steering systems
- two different vehicles or machinery with faults in the electronically controlled steering system components specified in the performance evidence
- diagnostic equipment for electronically steering controlled system, including:
 - multimeter
 - scan tool
- tools, equipment and materials appropriate for repairing the electronically controlled steering systems of vehicle and machinery.

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