



Australian Government

AURETD011 Diagnose and repair electronically controlled steering systems

Release: 1

AURETD011 Diagnose and repair electronically controlled steering systems

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the skills and knowledge 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.

This unit applies to those working within the automotive electrical service and repair industry. The 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.

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.
1. Diagnose electronically controlled steering system	1.1 Identify job requirements from workplace instructions 1.2 Obtain and interpret diagnostic information in order to identify diagnostic options required for the job 1.3 Identify hazards and environmental issues, assess potential risks, and implement control measures in line with workplace policies 1.4 Identify diagnostic tools and equipment required for the job and examine for serviceability 1.5 Perform diagnostic tests according to workplace procedures and

	workplace health and safety requirements 1.6 Examine diagnostic test results to identify causes of faults, report findings and make recommendations for necessary repairs or adjustments according to workplace procedures
2. Repair and test electronically controlled steering system	2.1 Obtain and interpret repair information in order to identify repair options required for the job 2.2 Identify repair tools, equipment and materials for the job and examine for serviceability 2.3 Carry out repairs or component replacements and adjustments according to workplace procedures, manufacturer specifications, workplace health and safety and environmental requirements 2.4 Carry out post-repair testing according to workplace procedures, workplace health and safety and environmental requirements to confirm fault rectification and repair any issues identified
3. Complete work processes	3.1 Carry out final inspection to ensure work meets workplace expectations and vehicle or machinery is ready for use 3.2 Clear work area and dispose of waste or recycle materials according to workplace procedures 3.3 Examine and store tools and equipment, ensuring faulty electrical equipment is identified, tagged and isolated according to workplace procedures 3.4 Complete documentation 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 relevant sources of electronically controlled steering systems information efficiently
Reading skills to:	read and interpret information from workplace procedures and documentation when seeking electronically controlled steering systems specifications 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 - make repair recommendations
Numeracy skills to:	use basic mathematical operations, including addition and

	subtraction - calculate deviations from manufacturer specifications - match electronically controlled steering system components and part identification numbers to workplace instructions, vehicle and component part lists, and manufacturer specifications - measure voltage, current and resistance - interpret vehicle or machinery electrical measurements and readings
Planning and organising skills to:	- plan own work requirements - prioritise actions to achieve required outcomes - ensure tasks are completed within workplace timeframes
Technology skills to:	- use specialised equipment, including multimeters - use diagnostic scan tools

Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
AURETD011 Diagnose and repair electronically controlled steering systems (Release 1)	AURETD001 Diagnose and repair electronically controlled steering systems (Release 1)	Wording changes to ensure compliance with Standards for Training Packages. Combination of performance elements to create three performance criteria. Removal of references to OHS requirements. Removal of range of conditions. Explicit reference to the use of diagnostic scan tools in foundation skills. Addition of minor elements to knowledge evidence. Addition of assessor requirements.	Equivalent

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 AURETD011 Diagnose and repair electronically controlled steering systems

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Performance Evidence

The candidate must demonstrate they can perform the following according to the standards defined in the elements, performance criteria and foundation skills of this unit.

The candidate must demonstrate a diagnosis and repair of electronically controlled steering systems that safely follows workplace procedures to meet required outcomes. This includes:

- diagnosis and repair of a fault within two of the following electronically controlled steering systems of two different vehicles or machinery:
 - 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
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Knowledge Evidence

The candidate must demonstrate the following knowledge:

Key policies and procedures relating to the diagnosis, testing and repair of electronically controlled steering systems, including:

- how to locate and interpret manufacturers specifications or equivalent documentation and workplace procedures for the diagnosis and repair of electronically controlled steering systems
- the following workplace health and safety requirements for diagnosis and repair of electronically controlled steering systems:
 - procedures for using specialised tools and equipment
 - knowledge of the required personal protective equipment (PPE)
 - procedures for identifying hazards and controlling risks associated with working with high pressure and high temperature steering systems

- environmental requirements for diagnosis, testing and repair of electronically controlled steering systems
- the following 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
- the following electrical systems testing procedures:
 - accessing electrical terminals
 - using test probes without damaging connectors, fuse holders or wiring
 - undertaking resistance tests
 - undertaking voltage drop tests
 - testing open circuits
 - testing short circuits
 - checking shorts to signal, power circuits and grounds
- the following repair procedures for electronically controlled steering systems:
 - removing and replacing electronically controlled steering system components
- the following post-repair testing procedures for electronically controlled steering systems:
 - DTC clearing procedures
 - static and dynamic performance tests of steering systems
- workplace housekeeping and documentation procedures

Electronically controlled power steering systems information, including:

- the operating principles of:
 - adaptive steering topography, inputs and outputs
 - typical vehicle or machinery systems equipped with adaptive steering systems
- the purpose and operation of:
 - adaptive steering control modules
 - control sensors and actuators
 - actuators, including pulse width modulated (PWM)
- the purpose and operation of the following steering control module functions:
 - control of hydraulic fluid settings
 - pressure control valve settings
 - power steering pump operation
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Assessment Conditions

The assessment must:

- include access to:
 - an automotive repair workplace or simulated workplace that reflects workplace conditions - where simulation is used, it must reflect real working conditions by modelling industry operating conditions and contingencies, as well as, using suitable facilities, equipment and resources
 - repair orders and workplace instructions relating to diagnose and repair activity
 - workplace procedures relating to diagnose and repair activity
 - manufacturer electronically controlled steering systems specifications and procedures or equivalent documentation to complete diagnose and repair activity
 - two different vehicles or machinery with faults in the electronically controlled steering system components specified in the performance evidence
 - diagnostic equipment for electronically controlled steering systems, including:
 - multimeter
 - scan tool
 - tools, equipment and materials required for repairing electronically controlled steering systems of vehicle and machinery
- be demonstrated in the workplace or in a simulated environment that reflects workplace conditions
- be conducted in a safe environment
- be assessed in compliance with relevant policies, procedures, processes and operational manuals directly related to the industry sector for which it is being assessed
- confirm consistent performance can be applied in a range of relevant workplace circumstances

Assessor requirements

Assessors of this unit must:

- satisfy the assessor requirements in applicable vocational education and training legislation, frameworks and/or standards
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