



Australian Government

AURETD101 Diagnose and repair electronically controlled steering systems

Release: 1

AURETD101 Diagnose and repair electronically controlled steering 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 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 the embedded network electronic control system of a vehicle or machinery. 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 electronically controlled steering systems include those in agricultural machinery, heavy commercial vehicles, light vehicles, motorcycles or mobile plant machinery.

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

Unit Sector

Electrical Technical – Steering and Suspension

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 electronically controlled steering 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

ELEMENT	PERFORMANCE CRITERIA
	diagnose and repair activity, assess potential risks and implement control measures in line with workplace policies and procedures 1.5 Identify tools and equipment required for testing strategy and establish serviceability according to workplace procedures
2. Diagnose electronically controlled steering 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 electronically controlled steering 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

SKILL	DESCRIPTION
Reading	• Organises and interprets technical information from workplace procedures, manufacturer procedures and manufacturer specifications • Interprets text, symbols and wiring diagrams in information relating to electronically controlled steering 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 electronically controlled steering system components and part identification numbers to workplace instructions, vehicle, machinery and component part lists, and manufacturer specifications • Interprets vehicle electronically controlled steering 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 AURETD011 Diagnose and repair electronically controlled steering 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 AURETD101 Diagnose and repair electronically controlled steering 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 at least two of the following faults in electronically controlled steering system components 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.
- carry out a diagnostic test in the course of the above for at least one of the following faults:
 - high resistance in an input system
 - damaged circuits.

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:

- methods to locate and interpret information required to diagnose and repair electronically controlled steering systems, including:
 - information provided by customers and supervisors
 - manufacturer specifications and procedures or equivalent documentation
- workplace procedures required to diagnose and repair electronically controlled steering 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 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
- environmental requirements relating to diagnosing and repairing electronically controlled steering systems
- principles of electronically controlled steering systems and associated components, including:
 - adaptive steering topography, inputs and outputs
 - typical vehicle or machinery equipped with electronically controlled steering systems
- purpose and operation of electronically controlled steering systems and components, including:
 - adaptive steering control module
 - 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
 - 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
- repair procedures for electronically controlled steering systems, including procedures for removing and replacing system components
- post-repair testing procedures for electronically controlled steering 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 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.

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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