



Australian Government

AURETR3027 Install ancillary electronic control unit systems and components

Release 1

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Modification History

Release	Comment
Release 1	New unit of competency

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes required to install ancillary electrical equipment systems and components in electronic control units (ECUs). The unit may require service programming code to connect and interface components to the vehicle computer area network databus (CAN-bus) network. The unit includes identifying and confirming work requirements, preparing for work, and completing work finalisation processes, including clean-up and documentation. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.
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Application of the Unit

Application of the unit	Work applies to the installation and testing of ancillary electrical equipment systems and components in ECUs fitted in light and heavy vehicle, mining, construction, agricultural, motorcycle, outdoor power equipment and marine environments. Work requires individuals to demonstrate some judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. Workplace instructions are used to determine job requirements 1.2. Workplace health and safety (WHS) requirements are observed throughout the work 1.3. Procedures and information are sourced and interpreted 1.4. Installation options are analysed and those most appropriate to the circumstances are selected and prepared 1.5. Tools and equipment are identified for effective installation and testing procedures
2. Install and program ancillary electronic components	2.1. Basic ancillary electrical equipment is installed according to manufacturer and component supplier specifications 2.2. Programming code is sought from original equipment manufacturer (OEM) to enable installed equipment to communicate with vehicle electrical system 2.3. Testing is carried out using tools and diagnostic techniques without causing damage to components or systems as a result of inappropriate testing procedures 2.4. Faults are identified and preferred repair action is determined and carried out 2.5. Post-repair testing is carried out according to workplace procedures and relevant legislation
3. Prepare vehicle and equipment for delivery to customer	3.1. Final inspection is made to ensure work is to workplace expectations 3.2. Vehicle is cleaned to workplace expectations and presented ready for use 3.3. Workplace documentation is processed according to workplace procedures
4. Clean up work area and maintain equipment	4.1. Material that can be reused is collected and stored 4.2. Waste and scrap are removed following workplace procedures 4.3. Equipment and work area are cleaned and inspected for serviceable condition according to workplace procedures 4.4. Faulty equipment is identified, tagged and isolated according to workplace procedures 4.5. Operator maintenance is completed according to manufacturer and component supplier specifications and site procedures 4.6. Tools and equipment are maintained according to workplace procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to:
 - follow verbal and written instructions
 - clarify workplace instructions and determine job requirements
 - gain information from appropriate persons and assistance as required
- initiative and enterprise skills to:
 - apply learning when installing and programming various electronic ancillary systems and components
 - recognise a workplace problem or potential problem and take action
- learning skills to identify sources of information, assistance and expert knowledge to expand skills, knowledge and understanding
- literacy skills to:
 - read and follow information in written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
 - obtain and record measurements
 - document required repairs and parts
- numeracy skills to:
 - test, measure and analyse test equipment results compared to desired system performance
 - assess tolerances and apply accurate measurements and adjustments
- planning and organising skills to:
 - plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed on time
 - identify risk factors and take action to minimise them
- problem-solving skills to:
 - refer problems outside area of responsibility to appropriate person and suggest possible causes
 - seek information and assistance as required to solve problems
- self-management skills to:
 - select and use appropriate equipment, materials, processes and procedures
 - recognise limitations and seek timely advice
 - follow workplace documentation, such as codes of practice and operating procedures
- teamwork skills to apply knowledge of own role to complete activities efficiently to support team activities and tasks
- technical skills to use workplace technology and tools relating to installing, testing and service programming ancillary electronic systems, including:
 - specialist tools and equipment

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

- measuring equipment
- computerised technology
- technology skills to:
 - operate diagnostic and test equipment
 - operate service programming systems (SPS)
 - collect, analyse and provide information

Required knowledge

- WHS regulations, requirements, equipment, material and personal safety requirements, including:
 - individual state and territory legislation
 - codes of practice
 - personal protection needs
- procedures to install, program and test electronic ancillary component and systems
- wiring harness and loom fabrication techniques
- procedures for removing and replacing wiring harnesses and looms
- various types of wiring systems found in vehicles, including:
 - basic wiring
 - twisted pair
 - shielded wiring
 - CAN-bus networks
 - various OEM databus network configurations
- techniques for reading and interpreting technical information, wiring diagrams and graphic symbols
- diagnostic and testing procedures, including:
 - testing procedures for basic ancillary electrical installations, including:
 - following manufacturer and component suppliers' test procedures
 - following OEM service information
 - analysis of system operation using basic electrical test equipment and other industry-relevant test equipment
 - visual, aural and functional assessments, including:
 - component damage and wear
 - component corrosion
 - water and moisture ingress
- repair procedures, including:
 - component removal and replacement procedures
 - SPS procedures

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

- procedures for adjusting components and associated system

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competency in this unit must be relevant to workplace operations and satisfy all of the requirements of the performance criteria and required skills and knowledge.

A person who demonstrates competency in this unit must be able to:

- observe safety procedures and requirements
- select methods and techniques appropriate to the circumstances
- complete preparatory activity in a systematic manner
- read and interpret vehicle wiring diagrams
- install electronic ancillary electrical components to specification
- apply programming code processes to enable communication between ancillary component and vehicle system
- test electrical wiring harness and looms to locate possible faults
- conduct installation according to workplace, manufacturer and component supplier requirements
- accurately interpret test results
- present vehicle and equipment in a condition that complies with workplace requirements.

Context of, and specific resources for assessment

Competency is to be assessed in the workplace or a simulated workplace environment that accurately reflects performance in a real workplace setting.

Assessment is to occur:

- using standard workplace practices and procedures
- following safety requirements
- applying environmental constraints.

Assessment is to comply with relevant:

- regulatory requirements
- Australian standards
- industry codes of practice.

The following resources must be made available for the assessment

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment

of this unit:

- workplace location or simulated workplace
- materials relevant to the installation of electronic ancillary electrical components that could be fitted to a range of vehicles relevant to the qualification being sought
- equipment, and hand and power tools appropriate to installing basic ancillary electrical components
- specifications and work instructions.

Method of assessment

Assessment must satisfy the endorsed Assessment Guidelines of this Training Package.

Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with the application of required skills and knowledge.

Assessment methods must be by direct observation of tasks and include questioning on required skills and knowledge to ensure correct interpretation and application.

Competence in this unit may be assessed in conjunction with other units which together form part of a holistic work role.

Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate the needs of diverse clients.

Assessment processes and techniques must be culturally sensitive and appropriate to the language, literacy and numeracy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Workplace instructions may include:	• electronic or hard copy instructions • verbal instructions • written instructions.
Job requirements may include:	• diagnosis and repair methods, processes and equipment.
Workplace health and safety requirements may include:	• personal protective clothing and equipment • hazards associated with high voltage ignition systems • safe use of tools and equipment • safe handling of material • use of fire-fighting equipment • workplace safety policies and procedures • workplace first aid equipment • hazard control, including control of hazardous materials and toxic substances.
Procedures and information may include:	• verbal, written and graphical instructions • signage • work schedules, plans and specifications • work bulletins and memos • material safety data sheets (MSDS) • diagrams and sketches • regulatory and legislative requirements relating to automotive industry • Australian Design Rules • engineer's design specifications and instructions • workplace work specifications and requirements • instructions issued by authorised workplace or external persons • Australian standards • vehicle service requirements and repair manuals.
Installation options may include:	• OEM and workplace instructions • equipment manufacturer and supplier instructions • aftermarket accessory instructions • SPS procedures and OEM intellectual property (IP) code • visual inspection and evaluation of components.

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<i>Tools and equipment</i> may include:	• hand tools • testing equipment, including multimeters and ohmmeters • insulation testers • crimping tools • soldering iron • heat-gun or blower • wire and cabling of various colours and sizes • heat shrink sleeving and flexible conduit • terminals and connectors • electrical tape.
<i>Electronic ancillary electrical equipment</i> may include:	• driver ignition immobiliser interlocks • security alarm and immobiliser systems • infotainment - audio systems • vehicle engine and powertrain performance enhancements • mobile phone interface kits • speed alert and traffic warning systems • integrated navigation systems.
<i>Programming code</i> may include:	• service programming system • OEM-specific code • ECU flash code or program.
<i>Inappropriate testing procedures</i> may include:	• intrusive testing (which must not be performed as it is not a recommended test and repair method), which includes: • back probing terminals and connectors and fuse holders with inappropriate test probes • probing terminal and connectors with inappropriate test probes • pushing sharp probes and objects into wiring insulation.
<i>Faults</i> may include:	• open circuits • short circuits • damaged insulation • frayed wires • connector damage • terminal damage • diagnosis trouble codes (DTC) being set.

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Repair options may include:

- pre- and post-repair testing
- identifying and testing components
- diagnosing and determining faults
- component repair procedures, including:
 - removal, replacement and adjustment procedures
 - dismantle, repair, re-assembly and adjustment procedures
- electrical measurements
- visual and functional assessments, including for damage and wear.

Post-repair testing may include:

- validating effectiveness of the repair action
- confirming that reported fault has been rectified
- confirming that no other faults are present as a result of the repair action.

Unit Sector(s)

Competency field	Electrical
Unit sector	Technical – Electrical and Electronic

Custom Content Section

Not applicable.