



Australian Government

AURETR2013 Inspect and service charging systems

Release 1

AURETR2013 Inspect and service charging systems

Modification History

Release	Comment
Release 1	New unit of competency

Unit Descriptor

Unit descriptor	<p>This unit describes the performance outcomes required to inspect and service charging systems fitted in light and heavy vehicle, mining, construction, agricultural, motorcycle, outdoor power equipment and marine environments.</p> <p>The unit involves testing charging systems, identifying likely faults and potential causes, inspecting abnormal operation, servicing complete assemblies or components of a vehicle's charging system, and carrying out basic charging system test procedures.</p> <p>It also involves identifying and confirming work requirements, preparing for work, and completing work finalisation processes, including clean-up and documentation.</p> <p>Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.</p>
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Application of the Unit

Application of the unit	<p>Work applies to charging systems fitted in light and heavy vehicle, mining, construction, agricultural, motorcycle, outdoor power equipment and marine environments.</p> <p>Work requires individuals to demonstrate some judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.</p>
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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 to test vehicle charging system	1.1. Workplace instructions are used to determine job requirements 1.2. Workplace health and safety (WHS) requirements are observed and applied throughout the work 1.3. Procedures and information are sourced and interpreted 1.4. Tools and equipment are identified for effective inspection and servicing methods
2. Test vehicle charging system	2.1. Charging systems are tested to isolate faults according to workplace procedures and without causing damage to components or systems as a result of inappropriate testing procedures 2.2. Faults are identified from test results and causes of faults are determined 2.3. Diagnosis findings are reported according to workplace procedures, including recommendations for necessary repairs or adjustments
3. Service vehicle charging system	3.1. Service options are analysed and those most appropriate are selected 3.2. Appropriate tools, techniques and materials are selected and prepared 3.3. Service adjustments are carried out according to workplace procedures and manufacturer and component supplier specifications without causing damage to components or systems 3.4. Post-service testing is carried out according to workplace procedures
4. Prepare vehicle for delivery to customer	4.1. Final inspection is made to ensure work is to workplace expectations 4.2. Vehicle is cleaned to workplace expectations and presented ready for use 4.3. Service schedule documentation is completed according to workplace procedures
5. Clean up work area and maintain equipment	5.1. Material that can be reused is collected and stored according to workplace sustainability practices 5.2. Waste and scrap are removed according to workplace practices 5.3. Tools, equipment and work area are cleaned and inspected according to workplace procedures 5.4. Tools and equipment are maintained according to workplace

ELEMENT	PERFORMANCE CRITERIA
	procedures 5.5.Faulty equipment is identified, tagged and isolated 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 inspecting and servicing vehicle charging systems
- learning skills to identify sources of information, assistance and expert knowledge to expand own 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
 - document work performed during inspection and servicing operations
- numeracy skills to:
 - test, measure and analyse test equipment results compared to desired system performance
- problem-solving skills to:
 - seek information and assistance as required to solve problems
 - refer problems outside area of responsibility to appropriate person and suggest possible fault causes and problem solutions
- self-management skills to:
 - select and use appropriate equipment, materials, processes and procedures
 - follow workplace documentation, such as codes of practice and operating procedures
- technology skills to:
 - operate basic automotive test equipment
 - use tools and equipment relating to servicing charging systems
 - use technology to collect, analyse and provide information

Required knowledge

- WHS regulations, requirements, equipment, material and personal safety requirements when working with vehicle while either on a hoist, trolley jack or safety stand, including:
 - codes of practice
 - personal protection needs when working on vehicles in an automotive workshop
- application, purpose and operation of charging systems
- principal types of vehicle charging systems
- techniques for reading and interpreting automotive technical information, graphic symbols and wiring diagrams

REQUIRED SKILLS AND KNOWLEDGE

- methods of sourcing information relevant to inspecting and servicing charging systems
- inspection procedures, including:
 - servicing procedures for charging systems, including accessing and interpreting service information
 - analysis of system operation using electrical test equipment
 - visual, aural and functional assessments, including:
 - component damage and wear
 - component corrosion
- servicing procedures, including:
 - component identification and electrical testing procedures
 - component and associated system adjustment

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
- complete preparatory activity in a systematic manner
- inspect and service a range of charging systems
- conduct inspection and service procedures according to workplace, manufacturer and component supplier requirements
- present vehicle in a condition that complies with workplace requirements
- complete workplace and equipment documents
- clean up work area and maintain equipment to workplace standards.

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 of this unit:

- workplace location or simulated workplace
- vehicles with charging faults
- equipment appropriate for the testing of charging systems

EVIDENCE GUIDE	
	<ul style="list-style-type: none"> • specifications and workplace instructions • tools appropriate for the inspection, servicing and adjustment of vehicle charging systems.
Method of assessment	<p>Assessment must satisfy the endorsed Assessment Guidelines of this Training Package.</p> <p>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.</p> <p>Assessment methods must be by direct observation of tasks and include questioning on required skills and knowledge to ensure correct interpretation and application.</p> <p>Competence in this unit may be assessed in conjunction with other units which together form part of a holistic work role.</p> <p>Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate the needs of diverse clients.</p> <p>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.</p>

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.

<i>Workplace instructions</i> may include:	<ul style="list-style-type: none"> • electronic or hard copy instructions • verbal instructions • written instructions.
<i>Job requirements</i> may include:	<ul style="list-style-type: none"> • charging system inspection and servicing methods, processes and equipment.
<i>Workplace health and safety requirements</i> may include:	<ul style="list-style-type: none"> • workplace first aid equipment • workplace safety policies and procedures • hazard control, including control of hazardous materials and toxic substances • personal protective clothing and equipment • use of fire-fighting equipment • safe handling of material • safe use of tools and equipment.
<i>Procedures and information</i> may include:	<ul style="list-style-type: none"> • vehicle service schedules and repair manuals relating to vehicle charging systems • safe work procedures relating to inspecting and servicing vehicle charging systems • verbal, written and graphical instructions • signage • work schedules, plans and specifications • work bulletins and memos • material safety data sheets • 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.
<i>Tools and equipment</i> may include:	<ul style="list-style-type: none"> • hand tools • vehicle lifting devices • power and air tools

RANGE STATEMENT	
	<ul style="list-style-type: none"> • electronic testing equipment, including: <ul style="list-style-type: none"> • multimeter • test light • load tester • inductive ammeter.
<i>Charging systems</i> may include:	<ul style="list-style-type: none"> • alternators: <ul style="list-style-type: none"> • electromagnetic • permanent magnets • generators • internal and external regulation • battery-sensed and machine sensing regulation • 6V,12V and 24V operation • dynastart and mechanical regulation • belt and direct drive, single and multiple belt drive and adjustable tensioning devices • single phase, half-wave rectified and full-wave rectified <ul style="list-style-type: none"> • solar systems, including: <ul style="list-style-type: none"> • single and ganged panels • internal and external regulation • battery sensed and machine sensing regulation • 6V, 12V and 24V operation • solid state controlled.
<i>Inappropriate testing procedures</i> may include:	<ul style="list-style-type: none"> • intrusive testing (which must not be performed as it is not a recommended test and repair method), which includes: <ul style="list-style-type: none"> • 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:	<ul style="list-style-type: none"> • component malfunction, including: <ul style="list-style-type: none"> • system not charging • alternator drive problems • regulator malfunction • noisy operation • seized mechanical components • worn mechanical components • overrunning clutch pulley faulty • control circuit faults • open or short circuits to power, ground and reference circuits

RANGE STATEMENT	
	<ul style="list-style-type: none"> • high circuit resistance • diagnosis trouble codes (DTC) being set.
<i>Service options</i> may include:	<ul style="list-style-type: none"> • inspection procedures • drive belt adjustment • diagnose and repair considerations and procedures.
<i>Post-service testing</i> may include:	<ul style="list-style-type: none"> • validating effectiveness of the inspection and servicing actions • confirming that inspection and service actions have been completed • confirming that further diagnosis findings are reported to responsible service personnel.
<i>Service schedule documentation</i> may include:	<ul style="list-style-type: none"> • vehicle service book • electronic or handwritten workplace records and invoices.

Unit Sector(s)

Competency field	Electrical
Unit sector	Technical – Electrical and Electronic

Custom Content Section

Not applicable.