



Australian Government

AURTTA4021 Carry out diagnosis of complex system faults

Release 1

AURTTA4021 Carry out diagnosis of complex system faults

Modification History

Release	Comment
Release 1	<p>Replaces AURT466208A Carry out diagnosis of complex system faults</p> <p>Unit code updated to meet policy requirements</p> <p>Reference to OHS legislation replaced with new WHS legislation</p> <p>Licensing statement added to unit descriptor</p>

Unit Descriptor

Unit descriptor	<p>This unit covers the competence required to diagnose faults in systems integrating two or more automotive systems or incorporating three or more of mechanical, hydraulic, pneumatic, electrical or electronic media.</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>The unit includes identification and confirmation of the work requirement, preparation for work, diagnosis and identification of the causes of faults, establishment of the repair requirements and completion of work finalisation processes, including clean-up and documentation.</p> <p>The unit of competence should be contextualised to the qualification it is being applied.</p> <p>Work requires individuals to demonstrate discretion, 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 performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and 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 diagnostic procedure	1.1. Nature and scope of the work requirements are identified and confirmed. 1.2. WHS requirements, including individual State/Territory regulatory requirements and personal protection needs are observed throughout the work. 1.3. Technical and/or calibration requirements for testing and diagnosis are sourced and support equipment is identified and prepared.
2. Analyse reported faults	2.1. Information is gathered from all sources to provide a full overview of all faults and conditions under which they occur. 2.2. Function and operation of the system when operating correctly are identified. 2.3. Systematic fault-finding processes are used across relevant systems to determine the extent of the fault. 2.4. Additional technical sources are consulted to assist with analysis, if necessary. 2.5. Actual faults are distinguished from perceived faults.
3. Identify causes of faults	3.1. Diagnostic equipment and tests are selected to facilitate precise identification of faults and causes. 3.2. Tests are applied systematically and efficiently to gather precise data on system operation. 3.3. Appropriate use is made of technical information to compare gathered data with specifications. 3.4. Test results and gathered data are compared to system specifications and normal functions, and discrepancies are identified. 3.5. Source/cause of fault is isolated and confirmed.
4. Establish repair requirements	4.1. Viability of repair or replacement is assessed. 4.2. Appropriate repair procedures are identified and prescribed to meet customer service requirements. 4.3. Repair requirements are clearly and legibly documented and/or communicated to appropriate persons. 4.4. Repairs involving equipment/skills not held in the workshop are sourced from specialist workshops. 4.5. Customer is informed of the diagnosis and repair requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- apply research and interpretive skills sufficient to locate, interpret and apply manufacturer/component supplier procedures, workplace policies and procedures
- apply analytical skills required for identification and analysis of technical information
- apply plain English literacy and communication skills in relation to dealing with customers and team members
- apply questioning and active listening skills for example when obtaining information from customers
- apply oral communication skills sufficient to convey information and concepts to customers
- apply planning and organising skills to own work activities, including making good use of time and resources, sorting out priorities and monitoring own performance
- interact effectively with other persons both on a one-to-one basis and in groups, including understanding and responding to the needs of a customer and working effectively as a member of a team to achieve a shared goal
- the capacity to apply problem-solving strategies in purposeful ways, both in situations where the problem and desired solution are clearly evident and in situations requiring critical thinking and a creative approach to achieve an outcome
- use mathematical ideas and techniques to calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks
- use workplace technology related to the diagnosis of complex system faults, including the use of measuring equipment, computerised technology and electronics, communication devices and reporting/documenting of results

Required knowledge

A working knowledge of:

- WHS regulations/requirements, equipment, material and personal safety requirements
- function and operation of the appropriate complex automotive systems
- symptom and cause differentiation
- diagnostic procedures and problem-solving techniques
- test procedures and test instrument application
- documenting and reporting procedures
- repair procedures
- enterprise quality procedures
- work organisation and planning processes

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, 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

It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to respond to unusual circumstances in the critical aspects of:

- observing safety procedures and requirements
- communicating effectively with others involved in or affected by the work
- selecting methods and techniques appropriate to the circumstances
- completing preparatory activity in a systematic manner
- analysing faults in complex systems, identifying the cause(s) of faults and establishing repair requirements within an established timeframe for faults incorporating at least three of the following single systems: mechanical, hydraulic, pneumatic and electrical/electronic.

Context of, and specific resources for assessment

Application of competence is to be assessed in the workplace or simulated worksite.

Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints.

Assessment is to comply with regulatory requirements, including Australian Standards.

The following resources should be made available:

- workplace location or simulated workplace
- materials relevant to the diagnosis of complex system faults
- equipment, hand and power tooling appropriate to the diagnosis of complex system faults
- activities covering the mandatory task requirements
- specifications and work instructions.

Method of assessment

Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training

EVIDENCE GUIDE

	<p>Package.</p> <p>Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge.</p> <p>Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies.</p> <p>Assessment may be applied under project related conditions (real or simulated) and require evidence of process.</p> <p>Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.</p> <p>It is preferable assessment reflects a process rather than an event and occurs over a period of time to cover the varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other appropriate persons subject to agreed authentication arrangements.</p> <p>Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role</p>
Guidance information for assessment	

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, if used 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.

Complex systems

A complex system is defined as one which integrates two or more automotive systems, or

RANGE STATEMENT

	<p>incorporates three or more of mechanical, hydraulic, pneumatic, electrical or electronic media. Examples include hydraulically/electronically controlled automatic transmissions, anti-lock braking systems, engine management systems integrating ignition, fuel and transmission control systems.</p> <p>Workplace example:</p> <ul style="list-style-type: none"> Customer reports intermittent shifting into top gear on an electronically controlled automatic transmission. The customer is asked a number of questions about the conditions in which the problem occurs (e.g. frequency of the problem, speed, road conditions). A road test is conducted, and the technician detects intermittent speedometer operation. After testing of electrical connections, components and sensors, the intermittent speedometer operation is confirmed to be the problem. Repair requirements are determined to be securing the connections on the speedometer wiring.
Diagnostic methods	<p>Diagnostic methods are to include:</p> <ul style="list-style-type: none"> questioning of customer road testing hydraulic testing (e.g. performance testing of power steering systems) electrical testing (e.g. performance testing of engine starting systems) electronic testing (e.g. electronic interface diagnostic equipment) mechanical testing (e.g. compression testing on engines) chemical testing (e.g. testing of cooling systems) technical/service manuals component/equipment service history body measurements
WHS	<p>WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment,</p>

RANGE STATEMENT	
	use of tooling and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices
Safe operating procedures	Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and site visitors
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation
Environmental requirements	Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice
Tooling and equipment	Tooling and equipment may include testing equipment, meters, CRO, code readers, gauges, measuring equipment, gas analysers and sensors
Materials	Materials may include cleaning materials.
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault

RANGE STATEMENT

	reporting and may include site specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers
Information/documents	<p>Sources of information/documents may include:</p> <ul style="list-style-type: none"> • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to diagnosis of complex system faults • regulatory/legislative requirements pertaining to the automotive industry, including Australian design rules • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian standards

Unit Sector(s)

Unit sector	Mechanical Miscellaneous
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Co-requisite units

Not applicable.

Competency field

Competency field	Technical
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