Australian Government

Department of Education, Employment and Workplace Relations

AURE321171A Service and repair electronic spark ignition engine management systems

Release: 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

AURE321171A Service and repair electronic spark ignition engine management systems

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers the competence to service/repair electronic spark ignition engine management systems and associated components. Engine management systems are systems where the ECU incorporates control over both fuel injection and ignition systems.

Application of the Unit

Application of the unit	The unit includes identification and confirmation of work requirement, preparation for work, testing and diagnosis of faults, servicing, repair and retesting of systems and completion of work finalisation processes, including clean-up and documentation. Work requires individuals to demonstrate some judgement and problem-solving skills in managing own work activities and contributing to a productive team environment. Work is carried out in accordance with award provisions.

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. Work instructions are used to determine job requirements, including method, process and equipment 1.2. Job specifications are read and interpreted 1.3. OHS requirements, including personal safety needs, are observed throughout the work 1.4. Electronic system protection devices, processes and precautions are identified appropriate to application 1.5. Equipment and tooling are identified and checked for safe and effective operation 1.6. Procedures are determined to minimise task time
2. Test control system, diagnose faults and determine service/repair requirements	2.1. Correct information is accessed and interpreted from manufacturer/component supplier specifications 2.2. Tests are carried out according to manufacturer/component supplier recommended procedures using tooling, equipment and techniques 2.3. Testing is completed without causing damage to component or system 2.4. Test results are used to diagnose system/component faults 2.5. Service/repair requirements are determined 2.6. Testing is carried out according to industry regulations/ guidelines OHS and enterprise/procedures policies
3. Service/repair spark ignition engine management systems	3.1. Correct information is accessed and interpreted from manufacturer/component supplier specifications 3.2. Service/repair requirements are carried out according to manufacturer/component supplier recommended specifications and procedures 3.3. Service/repair is completed without causing damage to component or system 3.4. Electronic systems are tested and results are documented in accordance with workplace policies and procedures 3.5. Service, repair and retesting are carried out according to industry regulations/guidelines, OHS and enterprise/ procedures policies 3.6. Workplace and equipment documents are completed in accordance with site requirements
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

ELEMENT	PERFORMANCE CRITERIA
	for serviceable conditions in accordance with workplace procedures 4.4. Unserviceable equipment are tagged and faults identified in accordance with workplace procedures 4.5. Operator maintenance is completed in accordance with manufacturer/component supplier specifications and workplace procedures 4.6. Tooling is maintained in accordance with workplace procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- collect, organise and understand information related to work orders, plans and safety procedures for servicing and repairing electronic spark ignition engine management systems
- communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems
- plan and organise activities, including preparation and layout of worksite and obtaining of equipment and material to avoid backtracking or workflow interruptions
- work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity
- use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material
- use mathematical ideas and techniques to correctly calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks
- use workplace technology related to the service and repair of electronic spark ignition engine management systems, including the use of specialist tooling and equipment, measuring equipment, computerised technology and communication devices and the reporting/documenting of results

Required knowledge

A working knowledge of:

- OHS regulations/requirement, equipment, material and personal safety

REQUIRED SKILLS AND KNOWLEDGE
requirements • operating principles of electronic spark ignition engine management systems • construction and operation of electronic spark ignition systems • types and layout of service/repair manuals (hard copy and electronic) • relationship to other electronically controlled systems, including shared components (e.g. ECU, sensors) • testing, diagnosis and fault determination procedures • servicing/repairing, removal, replacement and adjustment procedures relevant to application • work organisation and planning processes • enterprise quality 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 • testing, inspecting and evaluating electronic spark ignition engine management systems/components • diagnosing and determining the repair/replacement requirements to rectify faults • servicing/repairing electronic spark ignition engine management systems to manufacturer/component supplier requirements • completing the work within agreed time • completing workplace and equipment documents.
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 • material relevant to the service and repair of electronic spark ignition engine management systems • equipment, hand and power tooling appropriate to the service and repair of electronic spark ignition engine management systems • activities covering mandatory task requirements

EVIDENCE GUIDE	
	• specifications and work instructions.

EVIDENCE GUIDE	
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of AUR05 Automotive Industry RS&R Training Package • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge • Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies • Assessment may be applied under project related conditions and require evidence of process • Assessment must confirm a reasonable inference that competence is able to be under the particular circumstance, and is able to be transferred to other circumstances • It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role
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.	
Electronic spark ignition engine management systems	Electronic spark ignition engine management systems may be fitted to light vehicles, motorcycles, vessels and outdoor power

RANGE STATEMENT	
	equipment. Engine management systems are those where the ECU incorporates control over fuel injection and ignition systems

RANGE STATEMENT	
Faults	Faults may include: • engine will not start, engine misfiring and poor engine performance
Fault finding methods	Fault finding methods are to include: • diagnosis and determining faults, pre- and post-repair testing of system and component operation, service and repair/replacement of system components, service and repair adjustments, removal, dismantling, reassembly and refitting, retrieval and assessment of electronic systems data, including fault codes, testing fuel pressure, cleaning injectors and cleaning air induction system
Critical precautions	Critical precautions include: • manufacturer/component supplier procedures which must be applied as poor working practices are likely to damage electronic system ECUs and/or other components
OHS requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: • protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, 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

RANGE STATEMENT	
Emergency procedures	Emergency procedures related to this unit are to include, but may not be 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 the acts, regulations and codes of practice
Tooling and equipment	Tooling and equipment may include: • hand tooling, testing equipment, including multimeters, exhaust gas analyser, vacuum gauge, pressure gauge, tachometer, multimeter, vehicle lifting equipment, power tooling, air tooling, specialist tooling for removal/adjustment, specialised system testers, oscilloscopes and scan tooling and LED test lights
Materials	Materials may include: • spare parts and cleaning material
Communications	Communications are to include, but are not limited to: • verbal and visual instructions and fault reporting and may include site specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions,

RANGE STATEMENT	
	signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to the service and repair of electronic spark ignition engine management systems • regulatory/legislative requirements pertaining to 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	Electrical

Co-requisite units

Co-requisite units		

Competency field

Competency field	