
**AUTOMOTIVE ELECTRICAL AND
ELECTRONICS**
**Demonstrate knowledge of, and
interpret, complex automotive wiring
diagrams and circuitry**

level:	5
credit:	6
final date for comment:	December 2008
expiry date:	December 2009
sub-field:	Motor Industry
purpose:	People credited with this unit standard are able to analyse and review types and features of complex automotive wiring diagrams, and interpret complex automotive wiring diagrams and circuitry.
entry information:	Prerequisite: Unit 898, <i>Identify an automotive wiring diagram and translate information to a motor vehicle circuit</i> , or demonstrate equivalent knowledge and skills.
accreditation option:	Evaluation of documentation and visit by NZQA and industry.
moderation option:	A centrally established and directed national moderation system has been set up by the NZ Motor Industry Training Organisation.
special notes:	1 For the purpose of this standard, <i>complex automotive wiring diagrams, circuits, and systems</i> are defined as a number of interacting electrical and electronic circuits an/or systems in diagrammatic form that may or may not be interrelated. Complex diagrams will show internal circuits of electrical and electronic components.

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- 2 Reference to *suitable test equipment* means industry approved test equipment that is recognised within the industry as being the most suited to complete the task to a professional and competent manner with due regard to safe working practices and the integrity of the system.

Elements and Performance Criteria

element 1

Analyse and review types and features of complex automotive wiring diagrams.

performance criteria

- 1.1 Analysis identifies the information that a complex wiring diagram provides as a diagnostic guide.
- Range: includes but is not limited to – relationships of circuits to one another, what type of test to perform, what type of signals to expect, how a particular system is designed to work.
- 1.2 Analysis identifies methods used by manufacturers to simplify complex diagrams.
- Range: includes but is not limited to – symbols, colour code markers to represent different circuit conditions, dividing diagrams into manageable sections, common grounds, service manual contents pages and descriptions, block diagrams, centralised test points.
- 1.3 Analysis identifies sources of diagrams used for complex circuits.
- Range: includes but is not limited to – workshop manuals, CDs and/or DVDs, on-line diagnostic systems and/or services.

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- 1.4 The features of system circuit diagrams that improve the interpretation of complex systems are described and reviewed according to the vehicle manufacturers' manual instructions.
- Range: includes but is not limited to – graphic symbols, colour coded and/or shading, special notes, junction blocks, relay blocks, component identification, pin number identification, harness-to-harness connectors, switch bus bars, shielding, splice points, power and ground distribution.
- 1.5 System outlines of complex circuit diagrams are reviewed in terms of a diagnostic resource tool.
- Range: includes but is not limited to – operation of circuits, maps path of current flow for each mode of operation.
- 1.6 Analysis identifies the use of manufacturer's service hints as an aid to the interpretation of complex circuit diagrams.
- Range: service hints include but are not limited to – providing pin voltages and/or component resistance values.

element 2

Interpret complex automotive wiring diagrams and circuitry.

performance criteria

- 2.1 The wiring diagram for a particular automotive application is identified as matching the manufacturer's specifications.
- 2.2 A circuit is traced from a complex wiring diagram that isolates particular given electrical faults and their causes.
- Range: given faults include but are not limited to – resistance in a multi-pole switch, internal malfunctioning of an electronic component, intermittent open ground point shared with other circuits.

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- 2.3 Operations of components are explained with reference to internal component wiring diagrams.
- Range: components include but are not limited to – Electronic Control Modules (ECMs), sensors, electronic actuators.
- 2.4 Locations of components within a vehicle and/or machine are identified by reference to wiring diagram information.
- 2.5 The test procedure and suitable test equipment to trace faults in complex circuits are identified by reference to wiring diagram information and comply with the manufacturer's specifications.

Comments on this unit standard

Please contact the NZ Motor Industry Training Organisation jlane@mito.org.nz if you wish to suggest changes to the content of this unit standard.

Please Note

Providers must be accredited by the Qualifications Authority or a delegated inter-institutional body before they can register credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be accredited by the Qualifications Authority before they can register credits from assessment against unit standards.

Accredited providers and Industry Training Organisations assessing against unit standards must engage with the moderation system that applies to those standards.

Accreditation requirements and an outline of the moderation system that applies to this standard are outlined in the Accreditation and Moderation Action Plan (AMAP). The AMAP also includes useful information about special requirements for providers wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

This unit standard is covered by AMAP 0014 which can be accessed at <http://www.nzqa.govt.nz/site/framework/search.html>.