Title	**Demonstrate knowledge of engine management systems**		
Level	**3**	**Credits**	**3**

Purpose	People credited with this unit standard are able to: describe engine management systems functions; and demonstrate knowledge of combining electronic ignition with engine management functions.

Classification	Motor Industry > Automotive Electrical and Electronics

Available grade	Achieved

Guidance Information

1 It is recommended that people hold credit for Unit 30574, *Demonstrate knowledge of ignition systems*; and Unit 24131, *Demonstrate knowledge of electronic components and their application in the automotive industry* before being assessed against this unit standard.

2 Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable service information, and company requirements and legislative requirements. This includes the knowledge and use of suitable tools and equipment.

3 Performance of the outcomes of this unit standard must comply with the following: Health and Safety at Work Act 2015.

4 Any new, amended or replacement Acts, regulations, standards, codes of practice, guidelines, or authority requirements or conditions affecting this unit standard will take precedence for assessment purposes, pending review of this unit standard.

5 Definitions
Company requirements refer to instructions to staff on policy and procedures that are available in the workplace. These requirements may include – company policies and procedures, work instructions, product quality specifications and legislative requirements.
Service information refers to technical information for a vehicle, machine, or product detailing operation; installation and servicing procedures; manufacturer instructions; technical terms and descriptions; and detailed illustrations.
Suitable tools and equipment means industry approved tools and equipment that are recognised within the industry as being the most suited to complete the task in a professional and competent manner with due regard to safe working practices.

Outcomes and performance criteria

Outcome 1

Describe engine management systems functions.

Performance criteria

1.1 Management control for various systems on an engine is described.

Range fuel injection, ignition firing and timing, idle speed, fuel supply, emission system, self-diagnostic test codes.

1.2 The conditions sensed by an engine management system are described.

Range crankshaft position, engine speed, manifold absolute pressure, manifold air temperature, engine coolant temperature, throttle position, exhaust gas oxygen content, system voltage, park neutral switch position, vehicle speed, air conditioning request, engine detonation, cranking signal, automatic transmission fluid temperature and clutch signal, power steering pressure.

1.3 The systems controlled from the electronic control module (ECM) are described.

Range fuel control, fuel injectors, electric fuel pump, direct fire ignition system, electronic spark timing, idle air control, automatic transmission torque converter clutch, air conditioning compressor clutch, radiator cooling fan, power steering control, diagnostic system, 4x4 systems, differential control.

Outcome 2

Demonstrate knowledge of combining electronic ignition with engine management functions.

Performance criteria

2.1 The role of the electronic ignition system as a section of the engine management system is explained.

Range description in block diagram form;
sensors, ECM, outputs.

2.2 Method of, and reasons for, spark advance in an engine management system are described.

Range description in block diagram form;
input signals, ECM, output signal.

2.3 Electronic knock control operation is described in relation to engine management systems.

Range knocking sensor, evaluation circuit, control circuit, ignition output, safety monitoring system.

2.4 Engine control function using Control Area Network (CAN) involving electronic ignition is described.

Range use of a single ECM, combining sensor functions, use of self-diagnostic test codes, minimising cables and connections.

Planned review date	31 December 2025

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	25 January 2008	31 December 2022
Review	2	25 March 2021	N/A

Consent and Moderation Requirements (CMR) reference	0014

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact MITO New Zealand Incorporated info@mito.org.nz if you wish to suggest changes to the content of this unit standard.