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| Title | **Explain and determine the cause of complex faults in heavy vehicle or machine engine management systems and reflect on own diagnostic procedures** |
| Level | **5** | **Credits** | **15** |

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| Purpose | People credited with this unit standard are able to explain heavy vehicle or machine engine management system operation to help determine complex fault diagnosis, determine the cause of, and repair, complex faults in a heavy vehicle or machine engine management system and demonstrate knowledge of own learning experience in response to diagnosing complex faults in a heavy vehicle or machine engine management system. |

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| Classification | Motor Industry > Automotive Electrical and Electronics |

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| Available grade | Achieved |

**Guidance information**

1. 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 and legislative requirements. This includes the knowledge and use of suitable tools and equipment.
2. Legislation, regulations and industry standards relevant to this unit standard include but are not limited to the current version of the Health and Safety at Work Act 2015; and any subsequent amendments and replacements.
3. 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.

*Heavy vehicle* refers to a motor vehicle that is of Class MD3, MD4, ME, NB, NC, TC or TD; or has a gross vehicle mass that exceeds 3500 kg and is not of a class specified in the Table of vehicle classes as listed from Land Transport New Zealand website <http://www.landtransport.govt.nz/publications/infosheets/infosheet-1-10.html#classes>.

*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.

1. Range

Complex faults may include faults within multiple systems, intermittent faults, faults caused indirectly by the effect of external systems or caused through system repairs. Fault diagnosis would require applying a complex investigative diagnostic process to rectify them.

Engine management systems may include – fuel, induction, emission.

Machines may include – forklifts, earth moving equipment, grader equipment, loaders, dozers, tractors, agricultural equipment, dump trucks, prime movers; electric machines including – forklift, walk-behind pallet, ride-on pallet, reach truck, order picker, counterbalance truck, turret truck.

1. It is recommended that people hold credit for Unit 31048*, Diagnose and repair engine management system faults,* before being assessed against this unit standard*.*

**Outcomes and performance criteria**

**Outcome 1**

Explain heavy vehicle or machine engine management system operation to help determine complex fault diagnosis.

**Performance criteria**

* 1. Comprehensive operation of the engine management system, to help determine complex fault diagnosis, is explained.

Range interaction of mechanical and electronic components.

**Outcome 2**

Determine the cause of, and repair, complex faults in a heavy vehicle or machine engine management system.

Range evidence of at least one fault in three different systems, each on a different vehicle or machine is required.

**Performance criteria**

2.1 Complex engine management system fault is analysed and determined.

 Range operator description, diagnostic testing, diagnostic test results.

2.2 Engine management system fault is repaired.

2.3 Repair method is reported.

 Range report must include – final system test, testing of any related systems.

**Outcome 3**

Demonstrate knowledge of own learning experience in response to diagnosing complex faults in a heavy vehicle or machine engine management system.

**Performance criteria**

3.1 Own experience diagnosing complex faults in a heavy vehicle or machine engine management system are reflected on and described in relation to knowledge and analytical skills acquired.

3.2 Improvements to own future diagnostic procedures are identified based on own reflection.

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| 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 |  | N/A |

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| 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.