

<b>Title</b>	<b>Diagnose complex faults in heavy vehicle or machine EMSs and reflect on diagnostic procedures</b>		
<b>Level</b>	<b>5</b>	<b>Credits</b>	<b>10</b>

<b>Purpose</b>	People credited with this unit standard are able to: explain heavy vehicle or machine engine management system (EMS) operation to enable complex fault diagnosis; diagnose the cause of complex faults in a heavy vehicle or machine EMS; and reflect on learning experience in response to diagnosing complex faults in a heavy vehicle or machine EMS.
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<b>Classification</b>	Motor Industry > Automotive Electrical and Electronics
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<b>Available grade</b>	Achieved
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### 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:  
Health and Safety at Work Act 2015.

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.

- 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 Waka Kotahi NZ Transport Agency website table [Vehicle classes | Waka Kotahi NZ Transport Agency \(nzta.govt.nz\)](https://www.nzta.govt.nz/vehicle-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.

**4 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.

EMS may include – fuel, induction, emission.

*Learning experience* involves a reflection on the overall process to form a holistic viewpoint. This may refer to one or more learning experiences.

*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.

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

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**Outcomes and performance criteria****Outcome 1**

Explain heavy vehicle or machine EMS operation to enable complex fault diagnosis.

**Performance criteria**

- 1.1 Comprehensive operation of the EMS to enable complex fault diagnosis is explained.

Range interaction between mechanical and electronic components.

**Outcome 2**

Diagnose the cause of complex faults in a heavy vehicle or machine EMS.

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 EMS fault is analysed.

Range operator description, diagnostic testing.

- 2.2 Cause of complex EMS fault is determined.

**Outcome 3**

Reflect on learning experience in response to diagnosing complex faults in a heavy vehicle or machine EMS.

**Performance criteria**

- 3.1 Experience of diagnosing complex faults in a heavy vehicle or machine EMS is reflected on and described in relation to the knowledge and analytical skills acquired.
- 3.2 Improvements to future diagnostic procedures are identified based on own reflection.

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<b>Planned review date</b>	31 December 2027
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**Status information and last date for assessment for superseded versions**

Process	Version	Date	Last Date for Assessment
Registration	1	26 January 2023	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	0014
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

**Comments on this unit standard**

Please contact Hanga-Aro-Rau Manufacturing, Engineering, and Logistics Workforce Development Council [qualifications@hangaarorau.nz](mailto:qualifications@hangaarorau.nz) if you wish to suggest changes to the content of this unit standard.