

Title	Demonstrate knowledge of hybrid electric and battery electric vehicles or machines		
Level	3	Credits	3

Purpose	People credited with this unit standard are able to, for hybrid electric vehicles or machines (HEV) and battery electric vehicles or machines (BEV), demonstrate knowledge of: safety requirements; energy storage systems and components; and drive systems and components.
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Classification	Motor Industry > Automotive Electrical and Electronics
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Available grade	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/or 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 Competency under this unit standard does not entitle the learner to legally perform prescribed electrical work. Any prescribed electrical work must be undertaken by a person who has been registered and licensed under the Electricity Act 1992. Prescribed electrical work is defined in [Schedule 1 of the Electricity \(Safety\) Regulations 2010](#).
- 4 Hybrid vehicles may include Plug in Hybrid Vehicles (PHEV), Fuel Cell Electric Vehicles (FCEV) and additional new hybrid technology.
- 5 Battery electric vehicles may include Range Extended Electric Vehicles (REEV) and additional new electric vehicle technology.
- 6 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.
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.

Service information may include – technical information for a vehicle, machine, or product detailing operation; installation and servicing procedures; manufacturer instructions; technical terms and descriptions; and detailed illustrations.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of safety requirements for HEVs and BEVs.

Performance criteria

- 1.1 Personal, equipment, and vehicle safety precautions when working on and around HEVs and BEVs are described.

Outcome 2

Demonstrate knowledge of HEV and BEV energy storage systems and components.

Performance criteria

- 2.1 Types of energy storage systems used in HEV and BEV are described.

- 2.2 Components of HEV and BEV energy storage systems are identified.

Range may include – charging cable, controllers, batteries, HEV fuel systems.

- 2.3 Features of HEV and BEV energy storage systems are described.

Range may include – fast charging and slow charging, temperature control, safing systems (service plug, open circuit relays, over heat protection).

Outcome 3

Demonstrate knowledge of HEV and BEV drive systems and components.

Performance criteria

- 3.1 Types of drive systems used in HEV and BEV are described.

- 3.2 Components of HEV and BEV drive systems are identified.

Range may include – electric traction motors or controllers, hybrid power units, transmissions.

3.3 Features of HEV and BEV drive systems are described.

Range may include – regenerative braking, full torque at low speeds, low noise, higher efficiency, reduced emissions, how and when the electric motor assists.

Planned review date	31 December 2022
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	26 October 2017	N/A

Consent and Moderation Requirements (CMR) reference	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 MITO New Zealand Incorporated info@mito.org.nz if you wish to suggest changes to the content of this unit standard.