Title	**Demonstrate knowledge of electric motors and alternators**		
Level	**4**	**Credits**	**5**

Purpose	People credited with this unit standard are able to demonstrate knowledge of: – DC motors; – three-phase alternators and induction motors; and – single-phase AC induction motors.

Classification	Electrical Engineering > Core Electrical

Available grade	Achieved

Guidance Information

1 Unit standard or equivalent prior knowledge and skills recommended:
Unit 32626, *Demonstrate knowledge of capacitors, inductors, and electronics in the electrical trade*.

2 Reference
AS/NZS 3000 (version as cited in the Electricity (Safety) Regulations), *Electrical Installations (known as the Australian/New Zealand Wiring Rules)*;
or any current subsequent amendments and replacements.

3 Definitions
AC – alternating current.
DC – direct current.

4 This unit standard can be used together with other relevant unit standards, additional learning and workplace training to meet the requirements of the Electrical Workers Registration Board (EWRB) core competencies, available at https://www.ewrb.govt.nz.

5 Where needed, sketches and drawings may be used to aid explanations.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of DC motors.

Performance criteria

1.1 Identify the key components of a DC motor.

Range three components;
may include but is not limited to – stator, rotor, magnets, windings, commutator, controller, case, bearings.

1.2 Describe how the components of a DC motor fit together.

1.3 Explain the operating principles of a DC motor.

Outcome 2

Demonstrate knowledge of three-phase alternators and induction motors.

Performance criteria

2.1 Identify the key components of a three-phase alternator and an induction motor.

Range three components;
may include but is not limited to – stator, rotor, windings, sliprings, brushes, bearings, fan, foot, case, end shields.

2.2 Describe how the components of a three-phase alternator and an induction motor fit together.

2.3 Explain the operating principles of a three-phase alternator and an induction motor.

2.4 Describe star and delta motor connections.

2.5 Explain phase sequence and how to reverse a three-phase induction motor.

Outcome 3

Demonstrate knowledge of single-phase AC induction motors.

Performance criteria

3.1 Identify the key components of a single-phase induction motor.

Range three components;
may include but is not limited to – stator, rotor, windings, centrifugal switch, capacitor, bearings, fan, foot, case, end shields.

3.2 Describe how the components of a single-phase induction motor fit together.

3.3 Explain the operating principles of a common single-phase induction motor.

3.4 Compare single phase induction motors.

Range two each of – advantages, disadvantages, applications; may include but is not limited to – split phase motor, capacitor start motor, permanently split capacitor motor, capacitor start capacitor run motor.

3.5 Explain how to connect and reverse a single-phase motor.

Planned review date	31 December 2026

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	24 March 2022	N/A

Consent and Moderation Requirements (CMR) reference	0003

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

Comments on this unit standard

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council at qualifications@waihanga.nz if you wish to suggest changes to the content of this unit standard.