Title	**Demonstrate knowledge of electrical faults, circuit protection, de-commissioning, and commissioning**		
Level	**3**	**Credits**	**6**

Purpose	People credited with this unit standard are able to demonstrate knowledge of: – electrical faults, their dangers, and electrical testing; – circuit protection; and – de-commissioning and commissioning of basic electrical fittings or electrical equipment.

Classification	Electrical Engineering > Core Electrical

Available grade	Achieved

Guidance Information

1 Definitions

AC – alternating current.
AFDD – arc fault detection device.
Basic electrical fittings or equipment – a circuit, electrical fitting, or electrical equipment that has a single type of function that can be de-commissioned simply by removing the electrical supply, and does not require more than foundation electrical knowledge to commission. Examples include a lighting or socket outlet circuit, a fixed wired appliance, fixed wired electrical plant, other non-complex electrical equipment.
Commissioning – for the purposes of this unit standard, refers to the safety testing, livening and functional testing of circuits and equipment ready to handover to the customer for use.
DC – direct current.
De-commissioning – for the purposes of this unit standard, refers to the removal of fittings and equipment (rather than replacement) and the necessary steps to make the resulting exposed energy supply system safe.
Large batteries – batteries such as used in PV and UPS systems.
PV – photovoltaic/solar.
RCD – residual current device.
UPS – uninterrupted power supply.

2 References
AS/NZS 3000 (version as cited in the Electricity (Safety) Regulations), *Electrical Installations (known as the Australian/New Zealand Wiring Rules)*;
AS/NZS 3760:2010, *In-service safety inspection and testing of electrical equipment*;
AS/NZS 4836:2011 *Safe working on or near low-voltage electrical installations and equipment*;
AS/NZS 5761:2011, *In-service safety inspection and testing - Second-hand equipment prior to sale*;
AS/NZS 5762:2011, *In-service safety inspection and testing - Repaired electrical equipment*;
and all subsequent amendments and replacements.

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

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 This unit standard applies to installations and equipment rated above extra-low voltage unless specifically stated.

6 Candidates are expected to locate and reference the relevant clauses in the electrical Standards relating to this unit standard.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of electrical faults, their dangers, and electrical testing.

Performance criteria

1.1 Describe basic electrical faults, their symptoms and causes.

Range two different faults;
may include but is not limited to – open circuits, overcurrent/overloads, short circuits, earth faults, earth leakage, arc faults, under/over voltage.

1.2 Explain the importance of secure, well-made cable terminations and connections.

1.3 Identify the correct test instruments to take electrical measurements and describe how to use them.

Range two test instruments;
test instruments may include but are not limited to – an ohmmeter, insulation resistance tester, voltmeter, ammeter, RCD tester; may include a multimeter set to the correct function;
electrical tests may include but are not limited to – conductor continuity, resistance, insulation resistance, voltage, current, RCD performance.

1.4 Explain the dangers associated with testing of solar installations.

Range increased dangers of DC over AC, dangers of continuous PV outputs in daylight, danger of stored energy in large batteries.

Outcome 2

Demonstrate knowledge of circuit protection.

Performance criteria

2.1 Describe terms applicable to circuit protection.

Range three terms;
may include but is not limited to – close excess current protection, coarse excess current protection, voltage rating, current rating, utilisation categories that replace fusing factors, breaking capacity and kA rating.

2.2 Describe the construction, operating principles, typical ratings and applications of common circuit protection devices.

Range may include but is not limited to – semi-enclosed rewirable fuse, HRC fuse, miniature circuit breaker, fusible link, RCD, AFDD;
evidence of three is required.

2.3 Describe the ratings, and applications of different types of commonly used RCDs.

Range three different RCDs;
may include but is not limited to – 10 MA, 30 MA, Type A.

Outcome 3

Demonstrate knowledge of de-commissioning and commissioning of basic electrical fittings or electrical equipment.

Range one electrical fitting or one piece of electrical equipment;
may include but is not limited to – lighting, socket outlets, fixed appliances.

Performance criteria

3.1 Describe the process for safe de-commissioning of electrical fittings or equipment.

3.2 Identify the testing required before livening circuits or putting appliances into service.

3.3 Describe the process for safe commissioning of electrical fittings or equipment.

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.