

Title	Demonstrate knowledge of switchboard circuits		
Level	4	Credits	4

Purpose	<p>This unit standard is for people engaged in the manufacture of switchboards in the electrotechnology industry.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – explain the functions of switchboard components and circuits – use drafting software to draw a switchboard schematic diagram – explain the potential for electrical interference.
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Classification	Electrical Engineering > Electric Switchboards
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Available grade	Achieved
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Guidance Information

- 1 This unit standard may be used for learning and assessment off-job or on-job.
- 2 References
 - Accident Compensation Act 2001
 - AS/NZS 3000 (version as cited in the Electricity (Safety) Regulations), *Electrical installations (known as the Australian/New Zealand Wiring Rules)*
 - AS/NZS 61439.4:2016, *Low-voltage switchgear and controlgear assemblies – Part 4: Particular requirements for assemblies for construction sites (ACS)*, available at [Standards NZ](https://standards.nz)
 - Electricity Act 1992
 - Electricity (Safety) Regulations 2010
 - Health and Safety at Work Act 2015
 - The New Zealand Electrical Codes of Practice, available at WorkSafe New Zealand, [worksafe.govt.nz](https://www.worksafe.govt.nz)

and all subsequent amendments and replacements.
- 3 Definitions

AC – alternating current.

DC – direct current.

Industry practice – those practices that competent practitioners within the industry recognise as current industry best practice.

PLC – Programmable Logic Controller.

Safe and sound practice – this relates to the installation of electrical equipment and is defined in AS/NZS 3000.

4 Range

- a Candidates may refer to current legislation and Standards during assessment.
- b Demonstration of safe working practices and installation in accordance with *safe and sound practice* are essential components of assessment of this unit standard.
- c All evidence presented for assessment against this unit standard must be in accordance with:
 - i legislation
 - ii policies and procedures
 - iii ethical codes
 - iv Standards – may include but are not limited to those listed in Schedule 2 of the Electricity (Safety) Regulations 2010
 - v applicable site, enterprise, and industry practice
 - vi where appropriate manufacturers' instructions, specifications, and data sheets.

Outcomes and performance criteria

Outcome 1

Explain the functions of switchboard components and circuits.

Range explanation must include use of a three-phase switchboard diagram of at least 500 amps capacity.

Performance criteria

- 1.1 Identify and describe the functions of at least ten switchgear components.
- 1.2 Explain the functions of the main power distribution system, associated protective devices, and metering.
- 1.3 Demonstrate and explain how control circuits operate.

Range direct-on-line, electrical motor starters, electronic motor starters, PLC control of motor operation, timer control, lighting control; evidence of five different types of control circuits is required.

Outcome 2

Use drafting software to draw a switchboard schematic diagram.

Performance criteria

- 2.1 Draw switchboard schematic diagrams to specification.

Range specification includes – three-phase motor starter with protection and two control devices; control devices may include but are not limited to – push button, timer, PLC.

- 2.2 Draw the diagram with symbols regularly and uncommonly used in the industry.
- 2.3 Ensure the diagram has sufficient detail to enable unique identification of all items necessary for installation of the circuit in an enclosure.

Outcome 3

Explain the potential for electrical interference.

Performance criteria

- 3.1 Explain the mechanisms of electrical interference on AC and DC voltage signals in terms of their effect on circuit performance.
- 3.2 Explain how to prevent common sources of electrical interference on low voltage signals with reference to the minimum installation requirements to eliminate interference.

Range sources – cable alignment, power cables, cable proximity, radio signals, switching devices.

Planned review date	31 December 2026
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	31 August 1998	31 December 2013
Revision	2	12 March 2002	31 December 2013
Review	3	20 March 2008	31 December 2020
Rollover and Revision	4	15 March 2012	31 December 2020
Revision	5	15 January 2014	31 December 2020
Review	6	17 November 2016	N/A
Rollover and Revision	7	25 July 2024	N/A

Consent and Moderation Requirements (CMR) reference	0003
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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 the Waihangara Ara Rau Construction and Infrastructure Workforce Development Council qualifications@WaihangaraAraRau.nz if you wish to suggest changes to the content of this unit standard.