

Title	Demonstrate knowledge of electric switchboards		
Level	4	Credits	3

Purpose	<p>This unit standard is intended for the training and assessment of people engaged in the electrical industry and covers knowledge of electric switchboards and circuits.</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; – demonstrate knowledge of switchboard construction and installation requirements; – draw a switchboard schematic diagram; – describe the potential for electrical interference; and – explain consumer metering.
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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 has been developed for learning and assessment off-job.
- 2 This unit standard and unit standards 5931, 5932, 15848, 15855, 29419, 29430, 29471, and 29480 together meet the assessment requirements of ERAC CEPC 24. This unit standard and unit standards 5931, 5932, 15848, 15855, 29419, and 29474 together meet the requirements of ERAC's CEPC 37. This unit standard and unit standards 2016, 5931, and 29419 together meet the requirements of ERAC's CEPC 38.
- 3 **Definitions**
 - a.c.* – alternating current.
 - CEPC* – Critical Essential Performance Capabilities.
 - ERAC* – Electrical Regulatory Authorities Council.
 - EWRB* – Electrical Workers Registration Board.
 - Industry practice* – those practices that competent practitioners within the industry recognise as current industry best practice.
 - PLC* – programmable logic controller.
 - RCD* – residual current device.
 - Safe and sound practice* – as it relates to the installation of electrical equipment is defined in AS/NZS 3000:2007, *Electrical Installations (known as the Australian/New Zealand Wiring Rules)*.

Switchboard – low-voltage switchgear and control gear assemblies, the rated voltage of which does not exceed 1000 V a.c. at frequencies not exceeding 1000 Hz, or 1500 V d.c.

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 activities and evidence presented for all outcomes and performance criteria in 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; and,
 - vi where appropriate, manufacturers' instructions, specifications, and data sheets.

Outcomes and performance criteria

Outcome 1

Explain the functions of switchboard components and circuits.

Range assessment will be by means of a three-phase switchboard diagram of at least 500 amps capacity.

Performance criteria

- 1.1 Identify and explain the functions of at least ten switchgear components on the given drawing.
- 1.2 Explain the main power distribution system, associated protective devices, and metering on the given drawing.
- 1.3 Explain the operation of five different control circuits identified on the given drawing.

Outcome 2

Demonstrate knowledge of switchboard construction and installation requirements.

Performance criteria

- 2.1 Describe requirements regarding the construction of switchboard.

Range general construction, busbars and links, control and metering equipment, equipment identification, wiring, access to live parts, fire protective measures, prevention of internal arc faults.

2.2 Explain switchboard location and accessibility requirements.

Range environment, access requirements, restricted locations, general positioning, switchboard identification, main switchboard identification, ventilation.

2.3 Describe requirements for installation of RCDs.

Outcome 3

Draw a switchboard schematic diagram.

Performance criteria

3.1 Draw a simple switchboard schematic diagram to a given specification using standard symbols and with sufficient detail to enable unique identification of all items necessary for installation of the circuit in an enclosure.

Range given specification must include – three phase motor-starter with protection and at least two control devices, for example push button, timer, PLC source; cable size calculations.

Outcome 4

Describe the potential for electrical interference.

Performance criteria

4.1 Describe mechanisms of electrical interference on a.c. and d.c. voltage signals in terms of their effect on circuit performance.

4.2 Describe means of preventing 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.

Outcome 5

Explain consumer metering.

Performance criteria

5.1 Explain the purpose of consumer metering and the types of consumer metering available.

5.2 Explain the installation of consumer metering equipment.

5.3 Explain low voltage consumer metering.

5.4 Explain high voltage consumer metering.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	21 July 2016	31 December 2027
Review	2	24 March 2022	31 December 2027
Rollover and Revision	3	25 May 2023	31 December 2027

Consent and Moderation Requirements (CMR) reference

0003

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