Title	**Draw and interpret electrical diagrams**		
Level	**3**	**Credits**	**3**

Purpose	This unit standard is for electricians and related trades, who need to draw and to understand electrical installation and control diagrams. People credited with this unit standard are able to: – demonstrate knowledge of electrical symbols and terminology; – design, draw, and explain control circuits; – design, draw, and explain lighting circuits; and – prepare drawings for an electrical installation.

Classification	Electrical Engineering > Core Electrical

Available grade	Achieved

Explanatory notes

1 This unit standard has been developed for learning and assessment off-job.

2 References
Electricity (Safety) Regulations 2010;
AS/NZS 1102:1997, *Graphical symbols for electrotechnical documentation;* various parts, but see Explanatory Note 4;
AS/NZS 3000:2007, *Electrical installations (known as the Australian/New Zealand Wiring Rules),* including Amendment 1;
and all subsequent amendments and replacements.

3 The term *current regulations and standards* is used in this unit standard to refer to the requirements of the above references.

4 Useful information, particularly with respect to symbols, is contained in the publication *SAA/SNZ HB 3:1996 – Electrical and electronic drawing practice for students,* available from Standards New Zealand, Private Bag 2439, Wellington 6020.

5 This unit standard is intended for people training to become electricians. The assessment should therefore concentrate not so much on draughtsmanship, as on the understanding of circuitry and the ability to use and sketch electrically and logically correct drawings.

Outcomes and evidence requirements

Outcome 1

Demonstrate knowledge of electrical symbols and terminology.

Evidence requirements

1.1 Electrical drawing symbols are identified from diagrams.

Range connecting devices; make, break, change-over, and delayed contacts; normally-open and normally-closed push-buttons; circuit-breakers and contactors, thermal relays; indicating, recording, and integrating meters; mechanically, temperature, and time actuated switches.

1.2 Control circuit terminology is defined according to industry practice.

Range normal position, energised position, holding contacts, overload contacts, make contacts, break contacts, manual, automatic, semi-automatic.

Outcome 2

Design, draw, and explain control circuits.

Range control circuits – three-heat switch, energy regulator (simmerstat), thermostat, direct on-line motor starter, lighting control with light sensor and timer.

Evidence requirements

2.1 Diagrams are drawn to represent the circuit using standard symbols.

2.2 Circuit operation is explained logically, with reference to the purpose of each component and the time sequence of events.

Outcome 3

Design, draw, and explain lighting circuits.

Evidence requirements

3.1 Circuit diagrams are drawn using standard symbols.

Range circuit diagrams – one-way, two-way two strap, two-way three strap, intermediate switching.

3.2 Wiring diagrams are drawn for a one-way light circuit using loop-in and triple plate methods.

3.3 Circuit operation is explained logically, with reference to the purpose of each component.

Outcome 4

Prepare drawings for an electrical installation.

Range evidence is required of a related set of drawings for one installation. Candidates shall be supplied with a specification for a simple domestic installation.

Evidence requirements

4.1 Diagrams are electrically functional and in accordance with current regulations and standards and industry practice.

4.2 Site plan is drawn according to current regulations and standards.

Range diagram includes at least – meter board, switch board, distribution board if specified, mains entry point, main earth location, mains cable route.

4.3 Location diagram is drawn according to industry practice.

Range diagram includes at least – main switchboard, lights, light switches, power outlets, fixed wired appliances, water heating, security alarm components, smoke detectors.

4.4 Power distribution line diagram is drawn according to industry practice.

Range diagram includes at least – mains cable, submains if specified, subcircuits, protection, switches, revenue meters, off-peak power control. All cables must be labelled for size and type.

4.5 A legend of symbols is provided in accordance with industry practice.

4.6 Specification requirements are satisfied according to industry practice.

Replacement information	This unit standard replaced unit standard 1208. This unit standard and unit standard 15845 have been replaced by unit standard 29479 and unit standard 29480.

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	10 February 1999	31 December 2013
Revision	2	3 April 2001	31 December 2013

Process	Version	Date	Last Date for Assessment
Review	3	26 May 2005	31 December 2021
Rollover and Revision	4	15 March 2012	31 December 2021
Revision	5	15 January 2014	31 December 2021
Review	6	21 July 2016	31 December 2021

Consent and Moderation Requirements (CMR) reference	0003

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

Please note
Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.