

<b>Title</b>	<b>Demonstrate knowledge of commercial systems and appliances</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>15</b>

<b>Purpose</b>	<p>This unit standard is intended for electrical technicians and servicepersons who are responsible for the installation, diagnosis and repair of commercial systems, appliances and associated equipment.</p> <p>People credited with this unit standard are able to demonstrate knowledge of:</p> <ul style="list-style-type: none"> <li>– operating principles and installation requirements of commercial systems and appliances;</li> <li>– associated equipment used with commercial systems; and</li> <li>– the impact of an emerging or converging technology for commercial systems or appliances;</li> <li>– describe professional development opportunities undertaken regarding new technologies.</li> </ul>
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<b>Classification</b>	Electrical Engineering > Electrical Appliance Servicing
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<b>Available grade</b>	Achieved
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### Guidance Information

- 1 This unit standard has been developed for learning and assessment off job.
- 2 Recommended unit standards for entry  
Unit 27912, *Demonstrate knowledge of electrical principles in an electrotechnology or telecommunications environment*;  
Unit 30641, *Demonstrate knowledge of electromechanical engineering principles for technicians*.
- 3 References  
Electricity Act 1992;  
Electricity (Safety) Regulations 2010;  
Health and Safety at Work Act 2015;  
and all subsequent amendments and replacements.
- 4 Definitions  
*a.c.* – alternating current.  
*Company practice* – those practices and procedures that have been circulated by the company for use by their employees.  
*CPU* – central processing unit.  
*d.c.* – direct current.  
*Industry conventions* – a set of agreed, specified, or generally accepted standards.

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

*IR* – infra-red.

*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)*.

## 5 Range

a Competence may be assessed on:

- i Commercial systems which may include but are not limited to – air conditioning, interconnected catering installation, ventilation, heating, extractor, climate control, central vacuum, prewash, interconnected retail installation, interconnected medical installation, interconnected office equipment installation, purpose built commercial solution;
- ii Commercial appliances which may consist of the following categories of commercial appliances or equipment – catering appliances and equipment, power tools, office equipment, medical or health equipment, retail equipment; and
- iii Associated equipment which may include but is not limited to – hard wired remote control, wireless remote control, internet remote control, hydraulic systems, pneumatic systems, mechanical systems, motors, power supplies, standby systems.

b Electrical, radiation, and workshop or laboratory safety practices must be observed at all times.

c All measurements are to be expressed in Système Internationale (SI) units and multipliers.

d Mathematical proof of the subject matter covered by this unit standard is not required.

e All activities and evidence presented for all outcomes and performance criteria in this unit standard must be in accordance with:

- i legislation;
- ii company 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 safe and sound practice;
- vi applicable site, company and industry practice, and industry conventions;
- vii where appropriate or applicable, environmental requirements, manufacturer instructions, specifications, data sheets and manufacturer, supplier and company health and safety procedures.

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## Outcomes and performance criteria

### Outcome 1

Demonstrate knowledge of operating principles and installation requirements of commercial systems and appliances.

**Performance criteria**

- 1.1 Describe system functions in accordance with given industry-specific diagrams.
- Range diagrams may include but is not limited to – block diagrams, functional flow block diagrams, signal flow graph, schematic; evidence of two different systems and three different appliances using at least two types of diagrams is required.
- 1.2 Explain the function and theory of operation of each identified segment or section in the diagrams used.
- 1.3 Describe the expected values and identify the test points for expected signals and voltages associated with each identified segment or section in the diagrams used.
- 1.4 Describe system interfaces, explain how they work and identify the nature of the interface signals.
- Range interface – may include but is not limited to – hardware, software, human, electronic, software, signal; evidence of two is required.
- 1.5 Identify typical faults for each segment or section in each diagram and describe typical symptoms for the fault conditions in terms of expected changes to signals and voltages attributable to the fault.
- 1.6 Describe typical configuration adjustments found in systems and appliances.
- 1.7 Describe control and/or configuration adjustment functions provided by electronic modules that control systems.
- Range may include but is not limited to – CPU, micro-processor, embedded, manual; evidence of three is required.
- 1.8 Describe the use of test equipment required to take measurements, and perform adjustments in terms of configuration, commissioning and restoration of operation of systems and appliances.
- 1.9 Describe the function of software embedded in electronic modules used to control systems and appliances.
- 1.10 Describe software adjustments that are available to modify electronic modules or system performance.
- 1.11 Identify hazards associated with installing or servicing systems and appliances and outline the safe management procedures in each case.

**Outcome 2**

Demonstrate knowledge of associated equipment used with commercial systems.

**Performance criteria**

2.1 Describe the operation of associated equipment used with the commercial systems in accordance with given industry-specific diagrams.

Range evidence of associated equipment relevant to two systems is required.

2.2 Explain the operation of common interfacing methods used with the associated equipment in terms of method and expected data transfer.

Range method of data transfer may include but is not limited to – serial communications, parallel communications, wireless communications, IR communications, d.c. voltage control, a.c. voltage control, variable frequency control; evidence of four types of interface is required.

2.3 Describe features and specifications of the identified interfaces between the associated equipment and the commercial systems.

2.4 Describe common human interface systems in terms of type, user friendliness, and reliability.

2.5 Describe the expected measurements at given points of the associated equipment described for the commercial systems.

2.6 Identify typical faults in associated equipment and describe typical fault symptoms in terms of expected changes to signals and voltages attributable to the fault.

**Outcome 3**

Demonstrate knowledge of the impact of an emerging or converging technology for commercial systems or appliances.

**Performance criteria**

3.1 Describe an emerging or converging technology that may impact on existing systems or appliances with reference to purpose, facilities or services offered.

Range selected technology should be one that is likely to be applied in the New Zealand environment.

3.2 Describe how the emerging or converging technology will impact upon or integrate with existing technologies.

Range may include but is not limited to – customer benefit, business efficiencies, competitive advantage.

**Outcome 4**

Describe professional development opportunities undertaken regarding new technologies.

**Performance criteria**

4.1 Describe professional development opportunities undertaken for technologies likely to be applied to New Zealand.

Range may include but is not limited to – conferences, trades shows, internal and external training courses, product courses, meetings, books, brochures, manuals, surveys, webinars; evidence of three is required.

<b>Planned review date</b>	31 December 2023
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**Status information and last date for assessment for superseded versions**

Process	Version	Date	Last Date for Assessment
Registration	1	28 March 2019	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	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 Skills Organisation [reviewcomments@skills.org.nz](mailto:reviewcomments@skills.org.nz) if you wish to suggest changes to the content of this unit standard.