

Title	Demonstrate knowledge of electrical and electronic components used in commercial RAC systems		
Level	3	Credits	6

Purpose	This unit standard is for people working or intending to work in in the refrigeration and air conditioning (RAC) industry. People credited with this unit standard are able to explain the function and performance of electronic components and subsystems used in refrigeration and air conditioning systems.
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Classification	Mechanical Engineering > Refrigeration and Air Conditioning
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Available grade	Achieved
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Explanatory notes

- 1 References –
Althouse, Turnquist, Bracciano. *Modern Refrigeration and Air Conditioning*. 19th edition. Tinley Park, Illinois: The Goodhouse-Willcox Company Inc. ISBN 1-59070-280-8.
- 2 Definitions
Commercial refrigeration and air conditioning systems – refers to refrigeration systems found in: retail food outlets, truck and shipping-containers, horticultural cool rooms, controlled atmosphere food stores; and air conditioning equipment used in commercial buildings.
AC – alternating current
DC – direct current
RAC – refrigeration and air conditioning
RCD – residual current device

Outcomes and evidence requirements

Outcome 1

Explain the function and performance of electronic components and subsystems used in RAC systems.

Evidence requirements

- 1.1 Electrical components are explained in terms of their operating principles and use in RAC systems.

Range components – motors, relays, protection devices;

protection devices – fuses, circuit breakers, contactors, RCDs, overloads.

1.2 Electric motors are explained in terms operating principles, energy efficiency, and use in RAC systems.

Range AC and DC motors.

1.3 The speed control of AC and DC motors is explained in terms of electrical principles.

1.4 Electronic components are explained in terms of their operating principles, and use in electronic subsystems

Range components – resistors, capacitors, diodes, silicon controlled rectifiers, triacs, transistors, thermistors, optoelectronic devices, thermostats, hot-wire anemometers, humidity transducers, pressure transducers.

1.5 Electronic subsystems are explained in terms of their operating principles and use in RAC systems.

Range subsystems – DC power supplies and voltage regulators, PLCs, electronic speed controllers, temperature controls, humidity controls, pressure controls.

1.6 The effects of different operating environments on the performance of electronic subsystems are explained in terms of radio frequency (RF) interference, temperature, and hazardous atmospheres.

1.7 Common malfunctions of electrical and electronic components and subsystems are discussed in terms of displayed symptoms, causes, and rectification procedures.

Replacement information	This unit standard and unit 28964 replaced unit 22703.
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Planned review date	31 December 2020
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	18 June 2015	N/A

Consent and Moderation Requirements (CMR) reference	0013
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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.

Comments on this unit standard

Please contact Competenz at qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.