

Title	Overhaul a.c. rotating machines and control equipment		
Level	4	Credits	5

Purpose	<p>This unit standard covers the overhaul of alternating current (a.c.) electric motors and generators, and associated control equipment such as starters and speed controllers, and is for people wishing to qualify in the electrical industry as motor rewinders or electricians.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – prepare to overhaul a.c. rotating machines; – dismantle a.c. rotating machines; – inspect a.c. rotating machines; – repair and replace defective components of a.c. rotating machines; – re-assemble a.c. rotating machines; – overhaul control equipment for a.c. rotating machines; and – re-install and re-commission a.c. rotating machines.
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Classification	Electrical Engineering > Electrical Machines
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Available grade	Achieved
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Guidance Information

- 1 This unit standard has been developed for learning and assessment on-job.
- 2 Achievement of this unit standard does not by itself imply that trainees may legally perform prescribed electrical work in their own right. Until they are registered and licensed under the Electricity Act 1992, trainees are assisting, and must work under the supervision of a Supervisor of Electrical Work when carrying out prescribed electrical work. If the prescribed electrical work in question is carried out for reward the Supervisor of Electrical Work must hold a valid practising licence.
- 3 References
 Electricity Act 1992;
 Electricity (Safety) Regulations 2010;
 Health and Safety at Work Act 2015;
 AS/NZS 3000:2018, *Electrical installations (known as the Australian/New Zealand Wiring Rules)*;
 AS/NZS 3760:2022, *In-service safety inspection and testing of electrical equipment RCDs*;
 and all subsequent amendments and replacements.

4 Definitions

Current regulations and standards – refers to the requirements of the above references.

Machine specifications – refers to the manufacturer's specifications for the machine, but may also include data generated at previous overhauls. In situations where neither of these are available, general guidelines contained in industry handbooks may be used instead.

Repair – includes activities such as reconditioning slip rings and bedding-in brushes.

Safe and sound practice – relating to the installation of electrical equipment is defined in AS/NZS 3000:2018.

5 Assessment

- a Demonstration of *safe working practices* and installation in accordance with *safe and sound practice* are essential components of assessment against this unit standard.
- b The number and type of machines chosen are left to the discretion of the assessor, but must be sufficient to assess competence in all outcomes of the unit.

Outcomes and performance criteria

Outcome 1

Prepare to overhaul a.c. rotating machines.

Performance criteria

- 1.1 Establish the reason for the overhaul.

Range	reasons may include but are not limited to – planned maintenance, failure, fault report, service tag, customer instruction, re-deployment of machines.
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- 1.2 Isolate, tag, and disconnect machine from the supply and control circuits, in accordance with current regulations and standards.

- 1.3 Establish a clean and dry workplace in which to do the overhaul.

- 1.4 Move machines to the workplace without damage to the machines, other equipment, or surroundings.

Outcome 2

Dismantle a.c. rotating machines.

Performance criteria

- 2.1 Mark positions of components to ensure the drive and non-drive end bells are replaced on the correct stator ends on re-assembly, and to ensure grease channels are aligned.

- 2.2 Record component clearances and compare with specifications.

2.3 Dismantle in the order recommended by machine specifications.

Outcome 3

Inspect a.c. rotating machines.

Performance criteria

- 3.1 Inspect (visually) for damage.
- 3.2 Clean components.
- 3.3 Identify worn, deteriorated, or damaged components, in accordance with machine specifications.

Outcome 4

Repair and replace defective components of a.c. rotating machines.

Performance criteria

- 4.1 Assess each defective component to determine whether it should be repaired or replaced.

Range the assessment takes into account – availability of replacements, cost, time, manufacturers' recommendations, customer's or supervisor's instructions.
- 4.2 Restore the machines to as close to original condition as possible, given the age and condition of the machines.
- 4.3 Test repaired and replaced components to verify operation against machine specifications.

Outcome 5

Re-assemble a.c. rotating machines.

Performance criteria

- 5.1 Re-assemble in the order recommended by machine specifications.
- 5.2 Align and secure fastening of components without distortion.
- 5.3 Set clearances and make adjustments in accordance with machine specifications.
- 5.4 Lubricate bearings in accordance with machine specifications.

Outcome 6

Overhaul control equipment for a.c. rotating machines.

Range may include but is not limited to – motor starters – direct-on-line, forward and reverse, star-delta motor starters; speed controllers – primary resistance, secondary resistance, pole changing, variable frequency, variable amplitude; the nature of the control equipment will be determined by the a.c. machines presented for evidence.

Performance criteria

- 6.1 Inspect and test control equipment, associated components, and wiring in accordance with control equipment specifications and job instructions.
- 6.2 Locate faulty components and/or wiring using a logical technique for analysing symptoms and making electrical measurements where necessary.
- 6.3 Repair and/or replace faulty components and wiring in accordance with control equipment specifications.
- 6.4 Test to confirm that all requirements of current regulations and standards have been met and that the equipment is safe to reconnect.
- 6.5 Test and adjust to restore the equipment to operational condition in accordance with specifications.
- 6.6 Complete documentation in accordance with company requirements.

Outcome 7

Re-install and re-commission a.c. rotating machines.

Performance criteria

- 7.1 Re-install without damage to the machines and its environment, and follow machine specifications.
- 7.2 Test to confirm that all requirements of current regulations and standards have been met and that the machines are safe to reconnect.
- 7.3 Test, adjust, and confirm operation of control equipment in accordance with machine specifications.
- 7.4 Verify off-load and on-load operation of the machines against machine specifications and records of previous tests.

Range direction of rotation, vibration, temperature rise, current draw.
- 7.5 Document test results in accordance with current regulations and standards and company requirements.

Planned review date	31 December 2025
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	22 April 1994	31 December 2013
Review	2	23 April 1996	31 December 2013
Review	3	28 June 1999	31 December 2013
Review	4	26 May 2005	31 December 2013
Review	5	22 August 2008	31 December 2023
Rollover and Revision	6	15 March 2012	31 December 2023
Revision	7	15 January 2014	31 December 2023
Review	8	22 August 2019	N/A
Review	9	30 January 2025	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 Waihanga Ara Rau Construction and Infrastructure Workforce Development Council qualifications@waihangaararau.nz if you wish to suggest changes to the content of this unit standard.