

Title	Fault-find, repair, and test electric motors		
Level	4	Credits	8

Purpose	<p>This unit standard is for people intending to qualify in the electrical industry in motor rewinding and repair or as electricians or electrical service technicians.</p> <p>It covers fault-finding, repair, and testing of single-phase, three-phase, or direct current motors.</p> <p>People credited with this unit standard are able to in accordance with industry practice:</p> <ul style="list-style-type: none"> – fault-find electric motors; – service and repair electric motors; – reassemble electric motors; and – test electric motors.
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Classification	Electrical Engineering > Electrical Machines
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Available grade	Achieved
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Guidance information

- 1 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.
- 2 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 3760:2010, *In-service safety inspection and testing of electrical equipment*, and all subsequent amendments and replacements.
- 3 Definitions
Company practice – those practices and procedures that have been circulated by the company for use by their employees.
Current regulations and standards – refers to the requirements of the above references.

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

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

4 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 Motor types – single-phase, three-phase, direct current. Evidence is required for any two types of motors with faults.

Outcomes and performance criteria

Outcome 1

Fault-find electric motors in accordance with industry practice.

Performance criteria

1.1 Identify visible and audible defects.

Range defects may include but is not limited to – excessive sparking during operation; signs of tracking; overheating indicators such as discolouration, burning, melting, or burnt insulation smell; excessive vibration and noise; noisy, sloppy, or worn bearings; worn, loose, or damaged accessories; damage to easing, foot-plate, end plates, terminal box and cover, fan and fan cover, casings.

1.2 Analyse symptoms using a logical technique for fault-finding, identify likely causes, and make electrical measurements where necessary, to locate fault and/or faulty components.

1.3 Undertake fault-finding and associated dismantling and cleaning without causing damage to motor components.

1.4 Assess viability of repair, taking into account availability of parts, cost, time, and supervisor or customer instructions.

Outcome 2

Service and repair electric motors in accordance with industry practice.

Performance criteria

2.1 Service motor components in accordance with motor specifications and/or company practice.

Range servicing may include but is not limited to – machining of slip-rings, dressing and undercutting of commutators, testing of brush spring pressure and brush-arm insulation, fitting and bedding-in of new brushes, re-stacking of laminations, replacing bearings and seals, balancing rotors dynamically, replacing corroded or deteriorated parts, cleaning dirty parts, clearing ventilation ports; checking screens, covers, and guards for degree of protection; replacing capacitors, relays, and protection devices; resetting protection equipment.

2.2 Repair and restore the motor as close to original condition as possible given its age and, where appropriate, test repaired components.

2.3 Replace wiring in accordance with current industry practice in terms of length, type, current rating, insulation voltage, operating temperature, and requirement for rigidity or flexibility.

Outcome 3

Reassemble electric motors in accordance with industry practice.

Performance criteria

3.1 Assemble parts in a logical sequence using motor specifications where available.

3.2 Align parts and set to specified tolerances.

3.3 Verify tightness of each fastening in accordance with motor specifications.

3.4 Verify electrical connections and earthing of exposed metal parts in accordance with current regulations and standards.

Outcome 4

Test electric motors in accordance with industry practice.

Performance criteria

4.1 Confirm testing meets the requirements of current regulations and standards, and that the motor is safe to reconnect to the supply.

4.2 Test motor performance against specifications or records of previous performance.

Range dynamometer or in-situ connected-load tests, power factor, line current, speed, output.

4.3 Document test results in accordance with company practice.

Replacement information	This unit standard replaced unit standard 1199 and unit standard 1200.
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Planned review date	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 June 1999	31 December 2013
Review	2	26 May 2005	31 December 2013
Review	3	22 August 2008	31 December 2023
Rollover and Revision	4	15 March 2012	31 December 2023
Revision	5	15 January 2014	31 December 2023
Review	6	22 August 2019	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 The Skills Organisation reviewcomments@skills.org.nz if you wish to suggest changes to the content of this unit standard.