

Title	Diagnose and rectify faults in starting and charging systems, and overhaul starter motors on outdoor powered equipment		
Level	4	Credits	4

Purpose	People credited with this unit standard are able to: diagnose and rectify faults in a charging system; diagnose and rectify faults in an electrical starting system; and overhaul a starter motor on outdoor powered equipment.
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Classification	Motor Industry > Automotive Electrical and Electronics
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Available grade	Achieved
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Guidance Information

- 1 Evidence presented for assessment against this unit standard must be consistent with safe work practices and be in accordance with applicable service information, and company requirements and legislative requirements. This includes the knowledge and use of suitable tools and equipment.
- 2 Legislation, regulations and/or industry standards relevant to this unit standard may include:
 - Health and Safety at Work Act 2015; and any subsequent amendments and replacements.
- 3 Definitions

Company requirements refer to instructions to staff on policy and procedures that are available in the workplace. These requirements may include – company policies and procedures, work instructions, product quality specifications and legislative requirements.

Service information refers to information such as technical information for a vehicle, machine, or product detailing operation; installation and servicing procedures; manufacturer instructions; technical terms and descriptions; and detailed illustrations.

Suitable tools and equipment refer to industry approved tools and equipment that are recognised within the industry as being the most suited to complete the task in a professional and competent manner with due regard to safe work practices.
- 4 For this unit standard, it is essential that the practical assessment evidence is obtained in the workplace under normal workplace conditions.
- 5 Assessment of this standard must be against electrical starting and charging systems.

Outcomes and performance criteria

Outcome 1

Diagnose and rectify faults in a charging system on outdoor powered equipment.

Performance criteria

- 1.1 The system is operated, and symptoms of the faults are identified.
- 1.2 A fully serviceable battery is used before continuing with other charging system tests.
- 1.3 The charging system is tested following a logical, systematic test procedure, and any faults identified and located.
- Range may include – flywheel alternator, permanent magnetic single phase alternator, three-phase alternator.
- 1.4 Faulty components are tested and the faults rectified to restore full serviceability.
- Range may include – charging coil, stator, rotor, rectifier (regulator), half-wave rectifier, switches, resistor.

Outcome 2

Diagnose and rectify faults in an electrical starting system on outdoor powered equipment.

Performance criteria

- 2.1 The system is operated, and symptoms of the faults are identified.
- 2.2 A fully serviceable battery is used before continuing with other starting system tests.
- 2.3 The starting system is tested following a logical, systematic test procedure, and any faults identified and located.
- 2.4 Component faults are rectified to restore full serviceability.
- Range may include – wiring, connections, switches.

Outcome 3

Overhaul a starter motor on outdoor powered equipment.

Performance criteria

- 3.1 The starter motor is removed from the machine.

- 3.2 The starter motor is disassembled and mechanical components inspected for damage and wear, and the need for repair or replacement is determined.
- Range case, shaft, gears, bushes, brushes and brush holders, pre-engagement mechanism.
- 3.3 The electrical components are tested for open, short, and ground faults, and the need for repair or replacement is determined.
- Range solenoids, relays, commutator, field and armature windings.
- 3.4 Repairable faulty parts are repaired.
- 3.5 Non-repairable faulty parts are replaced.
- 3.6 The starter motor is assembled, refitted to the engine, and tested.

Planned review date	31 December 2026
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	23 February 1999	31 December 2023
Revision	2	16 April 2003	31 December 2023
Review	3	25 January 2008	31 December 2023
Revision	4	18 June 2010	31 December 2023
Review	5	24 March 2022	N/A

Consent and Moderation Requirements (CMR) reference	0014
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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 Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council qualifications@hangaarorau.nz if you wish to suggest changes to the content of this unit standard.