



Australian Government

AURETR018 Overhaul starting system motors

Release: 1

AURETR018 Overhaul starting system motors

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to return starting system motors to original manufacturer tolerances and clearances. It involves preparing for the task, dismantling and evaluating the transmission, carrying out the overhaul process, reassembling and testing the transmission, and completing workplace processes and documentation.

It applies to those working in an automotive service and repair industry. The starting system motors include those fitted to agricultural machinery, heavy commercial vehicles, light vehicles, marine vessels, mobile plant machinery, motorcycles or outdoor power equipment.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Competency Field

Electrical

Unit Sector

Technical - Electrical and Electronic

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
1. Prepare to dismantle starter motor	1.1 Job requirements are determined from workplace instructions 1.2 Dismantling information is sourced and interpreted 1.3 Dismantling options are analysed and those most appropriate to

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
	the circumstances are selected 1.4 Hazards associated with the work are identified and risks are managed 1.5 Dismantling tools and equipment are selected and checked for serviceability
2. Dismantle and evaluate starter motor and components	2.1 Starter motor is dismantled in a logical sequence according to manufacturer and workplace procedures, and <i>safety and environmental requirements</i>, and without causing unnecessary damage to components or systems 2.2 Components are cleaned for evaluation according to workplace procedures and safety and environmental requirements 2.3 Components are measured and compared with manufacturer specifications and serviceability is determined 2.4 Component repair method is determined 2.5 Unserviceable parts are identified and replacement parts sourced
3. Carry out overhaul	3.1 Overhaul information is sourced and interpreted 3.2 Overhaul options are analysed and those most appropriate to the circumstances are selected 3.3 Overhaul tools and equipment are selected and checked for serviceability 3.4 Components are machined, repaired and replaced as required, and adjustments are carried out according to manufacturer specifications, workplace procedures, and safety and environmental requirements, and without causing damage to components or systems
4. Assemble starter motor and components	4.1 Starter motor is assembled according to manufacturer specifications, workplace procedures, and safety and environmental requirements 4.2 Tolerances and clearances are measured against manufacturer specifications and necessary adjustments are made 4.3 Assembly of starter motor is completed within workplace timeframes and without causing damage to other components or systems 4.4 Post-assembly testing is carried out according to workplace procedures and safety and environmental requirements, and any problems detected as having been introduced during the assembly process are rectified

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
5. Complete work processes	5.1 Final inspection is made to ensure work is to workplace expectations and starter motor is presented ready for use or storage 5.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected 5.3 Tools and equipment are checked and stored, and any faulty electrical equipment is identified, tagged and isolated according to workplace procedures 5.4 Workplace documentation is processed according to workplace procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance and are not explicit in the performance criteria.

Skills	Description
Learning skills to:	locate sources of information relevant to starting system motor efficiently.
Reading skills to:	interpret and assess information from manufacturer and workshop literature when seeking starting system motor specifications and procedures.
Writing skills to:	legibly and accurately fill out workplace documentation when reporting diagnostic findings, making repair recommendations, and recording parts and material used.
Oral communication skills to:	clarify instructions, report evaluation findings and make overhaul recommendations.
Numeracy skills to:	measure starting system motor components and use basic mathematical operations, including addition and subtraction, to calculate tolerances and deviations from manufacturer specifications.
Planning and organising skills to:	plan own work requirements and prioritise and sequence actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.
Technology skills to:	use precision measuring equipment, such as vernier calipers and

Skills	Description
	- micrometers - use specialised starting system motor overhaul equipment.

Range of Conditions

This section specifies work environments and conditions that may affect performance.

Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

<i>Safety and environmental requirements</i> must include:	- work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for: - using specialised tools and equipment - using appropriate personal protective equipment (PPE) - identifying hazards and controlling risks associated with wearing jewellery while working around high current wiring systems - environmental requirements, including procedures: - found in safety data sheets (SDS) relating to toxic and corrosive substances - for disposing of replaced components.
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Unit Mapping Information

Equivalent to AURETR3018 Overhaul starting motors

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

Assessment Requirements for AURETR018 Overhaul starting system motors

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Performance Evidence

Before competency can be determined, individuals must demonstrate they can perform the following according to the standards defined in this unit's elements, performance criteria, range of conditions and foundation skills:

- overhaul the starting system motors of three different vehicles, vessels or machinery, which must include:
 - one direct drive starter motor
 - one of the following solenoid pre-engaged types of starter motors:
 - direct drive
 - reduction drive
 - one stop-start starter motor.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to overhauling starting system motor, including procedures for:
 - using specialised tools and equipment
 - using appropriate personal protective equipment (PPE)
 - identifying hazards and controlling risks associated with wearing jewellery while working around high current wiring systems
- environmental requirements, including procedures:
 - found in safety data sheets (SDS) relating to toxic and corrosive substances
 - for disposing of replaced components
- types, characteristics and operating principles of vehicle, vessel or machinery starting system motors, including starter motors that are direct drive and solenoid pre-engaged types

- starting system overhaul procedures, including:
 - methods for cleaning and preparing starting system motors for overhaul
 - starting system motor dismantling procedures
 - starting system motor inspection, measuring and evaluation procedures, including methods for measuring and calculating tolerances and clearances
 - starting system motor repair and adjustment procedures, including:
 - brushes to commutator alignment
 - motor drive shaft to planetary gear assembly
 - solenoid shift lever to clutch drive assembly
 - procedures for tolerance measuring and calculating and adjusting components
- post-overhaul bench testing procedures, including:
 - use of load simulator load tester for complete system analysis
 - analysis of system operation while using gauges, current clamps, electrical test equipment, scan tools, oscilloscopes and other industry-relevant test equipment
- post-overhaul testing procedures of starting system motors in vehicles, vessels or machinery, including:
 - accessing and interpreting diagnostic trouble codes (DTCs)
 - DTC clearing procedures
 - checking for electrical connector mating
 - checking for voltage drop and starting system motor correct current draw.

Assessment Conditions

Assessors must satisfy NVR/AQTF assessor requirements.

Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.

Assessment must include direct observation of tasks.

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the starting system motors that they have worked on, e.g. repair orders.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- automotive repair workplace or simulated workplace
- workplace instructions
- manufacturer starting system motor specifications
- three different vehicles, vessels or machinery with the starting system components specified in the performance evidence and requiring overhaul
- tools, equipment and materials appropriate for overhauling and adjusting a range of starting system motors.

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