



Australian Government

MEM27007 Diagnose and rectify low voltage starting systems

Release: 1

MEM27007 Diagnose and rectify low voltage starting systems

Modification History

Release 1. Supersedes and is equivalent to MEM18031B Diagnose and rectify low voltage starting systems

Application

This unit of competency defines the skills and knowledge required to assess the operation, test and repair starting systems requiring the use of amps, voltage and resistance (AVR) test equipment.

Where soldering of wires/connections is required unit MEM05001 Perform manual soldering/desoldering - electrical/electronic components should also be selected.

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

Band: A

Unit Weight: 2

Pre-requisite Unit

MEM09002	Interpret technical drawing
MEM11011	Undertake manual handling
MEM12023	Perform engineering measurements
MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information
MEM18001	Use hand tools
MEM18002	Use power tools/hand held operations
MEM18055	Dismantle, replace and assemble engineering components
MEM27006	Diagnose and rectify batteries, low voltage sensors and circuits

Competency Field

Fixed and mobile plant

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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|---|---|-----|---|
| 1 | Determine job requirements | 1.1 | Follow standard operating procedures (SOPs) |
| | | 1.2 | Comply with work health and safety (WHS) requirements at all times |
| | | 1.3 | Use appropriate personal protective equipment (PPE) in accordance with SOPs |
| | | 1.4 | Identify job requirements from specifications, drawings, job sheets or work instructions |
| | | | |
| 2 | Assess starting motor operation | 2.1 | Apply principles of magnetism, induced voltage and electromagnetism and electric motor principles to assess starter motor operation |
| | | 2.2 | Interpret starting motor component functions and multi-pole/winding/shunt wiring arrangements |
| | | 2.3 | Test the performance of the cranking motor drive mechanism |
| | | 2.4 | Determine starter locked armature current, voltage and torque |
| | | | |
| 3 | Test and rectify starting motors | 3.1 | Dismantle and assemble starting motors according to manufacturer recommendations |
| | | 3.2 | Perform testing to determine shorts to ground, turn shorts and winding continuity |
| | | 3.3 | Test solenoid, relays and over-temperature devices |
| | | 3.4 | Test starter engagement mechanism and adjust where possible, i.e. pinion clearance |
| | | 3.5 | Ensure starting system is free of excessive voltage drops |
| | | 3.6 | Connect starting and charging cables to circuit connections tighten and insulate |
| | | 3.7 | Determine starter locked armature current, voltage and |

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

torque

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different 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.

Axial and coaxial type starters with drive arrangements include one (1) or more of the following:

- Dyer
- Positork
- Sprag clutch
- overrunning clutch
- inertia drive

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM18031B Diagnose and rectify low voltage starting systems

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM27007 Diagnose and rectify low voltage starting systems

Modification History

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting specifications, charts, lists, drawings, diagrams and service documents to diagnose and rectify low voltage starting systems
- identifying the construction of electric starter motors
- testing the cranking motor drive mechanism
- dismantling and assembling given starter motors in accordance with manufacturer recommendations/procedures and specifications using appropriate tools, equipment and techniques
- checking operation of given starter motors for electrical faults, including testing solenoids, relays and over-temperature devices, operation and conformance of the engagement mechanism, excessive voltage drops and all circuit connections for compliance with specifications
- testing the repaired/overhauled starter motor to ensure that the locked armature current, voltage and torque for compliance to specifications.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- concepts of magnetism, electromagnetism and induced voltage
- principles of operation of electric motors
- components and functions of common starting motors
- effect of multi-pole/winding/shunt wiring arrangements on starting motor performance
- tests and test procedures that can be used to check the performance of the cranking motor drive mechanism
- concept of 'locked armature' in terms of current, voltage and torque and specifications
- tools and equipment used to test components and systems
- procedures for:

- determining locked armature current, voltage and torque
- testing solenoids, relays and over-temperature devices for correct operation and operational specifications
- testing and adjusting starter engagement mechanisms and specifications
- checking starting systems for excessive voltage drops
- manufacturers' recommended dismantling/assembling procedures, tools and equipment for given starting motors
- range of electrical tests that can be applied to starting motors and the purpose of these tests
- equipment and procedures required to carry out the tests
- function of solenoids, relays and over-temperature devices
- effect and causes of voltage drops on starting system operation/performance
- effect of loose, poorly joined and/or inappropriate insulation on starting motor performance/operation and specifications of all circuit connections.

Assessment Conditions

- Assessors must:
 - have vocational competency in diagnosing and rectifying low voltage starting systems at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

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