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| Domain | AUTOMOTIVE ELECTRICAL AND ELECTRONICS | Unit ID: 488 |
| Title: | Overhaul starter motor | |
| Level: 3 | | Credits: 7 |

Purpose

This unit standard specifies the competencies required to overhaul a starter motor. It includes procedures for bench-testing, dismantling, inspecting and testing a starter motor. This unit standard is intended for those who work as automotive electricians.

Special Notes

1. Entry information:
 - Prerequisite
 - Unit 65 - *Apply safety rules and regulations in an automotive mechanics workshop* or demonstrated equivalent knowledge and skills.
2. Assessment evidence may be collected from a real workplace or a simulated real workplace or an appropriate simulated realistic environment in which automotive electrical and electronic operations are carried out.
3. Glossary of terms:
 - *'bench-test'* refers to off-vehicle component testing on an electrical machine, simulating service operations, to identify electrical and mechanical faults
 - *'starter motor'* may include inertia, pre-engaged, axial and coaxial type, fixed and remote solenoid, direct drive, gear reduction and protection lockout.
4. Performance of all elements in this unit standard must comply with manufacturers' specifications, workplace specific requirements and reasonable flat rate time.
5. Regulations and legislation relevant to this unit standard include the following:
 - Labour Act, No. 6, 1992
 - Occupational Health and Safety Regulations No. 18, 1997
 - Road Traffic and Transport Regulations No. 266, 2000
 and all subsequent amendments.
7. This unit standard applies to passenger and commercial vehicles, heavy plant and earthmoving equipment.

Quality Assurance Requirements

This unit standard and others within this subfield may be awarded by institutions which meet the accreditation requirements set by the Namibia Qualifications Authority and the Namibia Training Authority and which comply with the national assessment and moderation requirements. Details of specific accreditation requirements and the national assessment arrangements are available from the Namibia Qualifications Authority and the Namibia Training Authority. All approved unit standards, qualifications and national assessment arrangements are available on the Namibia Training Authority website www.nta.com.na.

Elements and Performance Criteria

Element 1: Plan and prepare for work

Range

Planning and preparation may include but is not limited to workplace inspection, equipment defect identification, assessment of conditions and hazards and determination of work requirements.

Tools and equipment may include but are not limited to standard tool set, test bench, soft soldering equipment, growler, insulation tester, multimeter, lathe and measuring equipment including micrometer, vernier calliper and dial gauge.

Materials may include but are not limited to spare parts, solder flux and cleaning material.

Performance Criteria

- 1.1 Installation and work instructions, including repair order forms, specifications and operational details are obtained, confirmed and applied.
- 1.2 Safety requirements are followed in accordance with safety plans and policies.
- 1.3 Tools and equipment selected to carry out tasks are consistent with the requirements of the job, checked for serviceability and any faults rectified or reported prior to commencement.
- 1.4 Material requirements are identified and obtained in accordance with repair order form and/or specifications.
- 1.5 Materials are safely handled and located ready for use in line with workplace procedures.
- 1.6 Technical and/or calibration requirements for tools and equipment are sourced and implemented in line with workplace procedures.
- 1.7 Environmental protection requirements are identified and applied in line with environmental plans and regulatory obligations.

Element 2: Bench-test starter motor

Performance Criteria

- 2.1 Procedures and information required for bench-testing the starter motor are identified and sourced in line with workplace procedures.
- 2.2 Starter motor is bench-tested according to workplace procedures and manufacturers' specifications.
- 2.3 Results are documented with evidence and supporting information and recommendation made in line with workplace procedures.
- 2.4 Report is forwarded to appropriate personnel according to workplace procedures.

Element 3: Dismantle starter motor

Performance Criteria

- 3.1 Procedures and information required for dismantling the starter motor are identified and sourced in line with workplace procedures.
- 3.2 Starter motor is dismantled according to workplace procedures and manufacturers' specifications.
- 3.3 Component parts are cleaned, ready for inspection, by using appropriate solvents.

Element 4: Inspect and test starter motor components

Range

Inspection procedures may include but are not limited to visual, aural and functional assessment (including damage, corrosion, electrical leakage and wear) in line with manufacturers' specifications.

Testing methods may include but are not limited to reading and interpreting wiring diagrams, interpretation of readings related to faults where the cause may be direct, indirect or intermittent, diagnosing, functional testing, measurements, visual, aural and functional assessment (including damage, corrosion, electrical short or broken circuit, wear) in line with manufacturers' specifications.

Performance Criteria

- 4.1 Procedures and information required for inspecting and testing starter motor components are identified and sourced in line with workplace procedures.
- 4.2 Inspecting and testing procedures are implemented according to workplace procedures and manufacturers' specifications.

- 4.3 Worn, damaged, deteriorated or faulty components and/or parts are identified and listed.
- 4.4 Conditional report and recommendation made are forwarded to appropriate personnel in line with workplace procedures.

Element 5: Overhaul and refit starter motor

Range

Overhaul procedures may include but are not limited to the complete dismantling of component parts, measuring and evaluation of wear, the replacement, repair, rebuilding or reconditioning of parts comparable to original parts, the assembly of parts, and performance of functional testing in line with manufacturers' specifications.

Performance Criteria

- 5.1 Procedures and information required for inspecting and testing starter motor components are identified and sourced in line with workplace procedures.
- 5.2 Starter motor replacement components and/or parts are selected and fitted to meet customer requirements.
- 5.3 Overhaul procedures are implemented according to manufacturers' specifications.
- 5.4 Starter motor is retested prior to installation according to manufacturers'
- 5.5 Starter motor is refitted in line with workplace procedures and manufacturers' specifications.
- 5.6 Final performance test is carried out and compared with manufacturers' specifications.

Element 6: Complete work and clean up

Range

Work completion details may include but are not limited to repair order form, sign-out form for equipment, service record book and service plan form.

Performance Criteria

- 6.1 Work is completed and appropriate personnel notified in accordance with workplace procedures.
- 6.2 Work area is cleared of waste, cleaned, restored and secured in accordance with workplace procedures.
- 6.3 Reusable material is collected and stored in accordance with workplace procedures.

- 6.4 Equipment used is cleaned, checked, maintained and stored in accordance with workplace procedures.
- 6.5 Work completion details are finalised in accordance with workplace procedures.

Registration Data

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