
Overview

This standard is about removing and reinstating complete vehicle electromechanical and electronic systems and assemblies following accident damage. The removal process may be complicated as the units and assemblies involved could be damaged and within damaged areas of a vehicle. The reinstatement process may involve working within any restrictions caused by the repaired vehicle. Ensuring that renewed and refitted units, assemblies and components operate to manufacturers' and legal requirements is included.

Performance criteria*You must be able to*

- P1. use the appropriate personal protective equipment when removing, renewing and fitting **electromechanical** and **electronic** components systems and assemblies
- P2. protect the vehicle and its contents when removing, renewing and fitting **electromechanical** and **electronic** components systems and assemblies
- P3. support your removal and replacement activities by referring to:
 - P3.1. vehicle technical data
 - P3.2. removal and replacement procedures
 - P3.3. legal requirements
- P4. prepare, test and use all the **equipment** required following manufacturers' instructions and to meet any legal requirements
- P5. carry out all removal, renewal and refitting activities following:
 - P5.1. recognised research methods
 - P5.2. manufacturers' instructions
 - P5.3. your workplace procedures
 - P5.4. health and safety requirements
- P6. work in a way which minimises the risk of:
 - P6.1. damage to other vehicle systems, units and components
 - P6.2. damage to the environment
 - P6.3. leakage
 - P6.4. contact with hazardous substances
- P7. adapt your working practices and techniques safely to suit the needs of the job and vehicle
- P8. store all removed **electromechanical** and **electronic** units and components safely in the correct location
- P9. ensure all renewed **electromechanical** and **electronic** units and components conform to the vehicle operating specification and any legal requirements
- P10. use suitable **testing methods** to evaluate the performance of the reinstated system accurately
- P11. correct any component and system operational faults within the limits of your authority
- P12. ensure the reinstated **electromechanical** and **electronic** systems perform to the vehicle operating specification and meet any legal requirements prior to return to the customer

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- P13. promptly report any additional faults you find during the course of your work to the relevant person(s)
 - P14. ensure your records are accurate, complete and promptly passed to the relevant person(s) in the format required
 - P15. complete all removal and reinstatement activities within the agreed timescale
 - P16. promptly report any expected delays in completing your work the relevant person(s)

Knowledge and understanding

You need to know and understand:

Legislative and organisational requirements and procedures

- K1 the legal requirements relating to the vehicle (including road safety and refrigerant handling requirements)
- K2 how the vehicle is powered and the associated health and safety risks
- K3 the health, safety and environmental legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when removing and reinstating vehicle **electromechanical** and **electronic** systems and assemblies
- K4 requirements of manufacturer's warranty agreements
- K5 the vehicle work specification
- K6 your workplace procedures for
 - K6.1 the referral of problems
 - K6.2 reporting of delays to the completion of work
 - K6.3 completion of work records
- K7 the health and safety risks associated with vehicle safety systems and the implications for work practices
- K8 the legal requirements for the storage of vehicle safety systems
- K9 the importance of working to agreed timescales and keeping others informed of progress
- K10 the relationship between time, cost and profitability
- K11 the importance of reporting anticipated delays to the relevant person(s) promptly

Equipment

- K12 how to select, check and use all the tools and **equipment** required to remove and reinstate **electromechanical** and **electronic** systems and assemblies

Removal and reinstatement of electromechanical and electronic components systems and assemblies

- K13 how vehicle damage can affect the removal and replacement of units and components

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- K14 how to find, interpret and use sources of information applicable to **electromechanical** and **electronic** components unit and component removal, renewal and refitting
 - K15 the construction and operation of **electromechanical**, electrical and **electronic** vehicle systems and assemblies
 - K16 how **electromechanical** and **electronic** systems and components interact with other vehicle systems via multiplexing
 - K17 how to remove and rebuild **electromechanical** and **electronic** components systems and assemblies to meet the manufacturer's original specification
 - K18 the procedures necessary prior to carrying out removal and reinstatement of **electromechanical** and **electronic** systems
 - K19 types of contaminants associated with accident damaged vehicles and the dangers associated with them
 - K20 how to work in a logical sequence to remove damaged units and components within the **electromechanical** and **electronic** components systems
 - K21 the logical sequence of work for complete body changes
 - K22 the implications of an incorrect vehicle body structure on steering geometry
 - K23 how to refit **electromechanical** and **electronic** components systems to a repaired vehicle
 - K24 how to select, reinstate and check fluids
 - K25 how to work safely avoiding damage to other vehicle systems, components and units and contact with hazardous substances
 - K26 how and where to store removed items safely, including handling refrigerants, gases and vehicle safety system pyrotechnic devices
 - K27 how to test and evaluate the performance of renewed and refitted **electromechanical** and **electronic** systems and assemblies against vehicle operating specifications and any legal requirements
 - K28 the manufacturer's specification for the type and quality of units and components to be used within the vehicle's systems
 - K29 the relationship between test methods and the unit(s) renewed – the use of appropriate **testing methods**

Scope/range

All the items listed below form part of the National Occupational Standard.

- 1. Electromechanical systems are:**
 - 1.1. engine (air, fuel and exhaust)
 - 1.2. transmission
 - 1.3. chassis (covers steering, suspension and brakes)
 - 1.4. electrical/electronic (including high voltage integrated systems)
 - 1.5. Advanced Driver Assistance Systems (passive and active)
 - 1.6. electronically controlled exterior lighting

- 2. Equipment includes:**
 - 2.1. hand tools
 - 2.2. special purpose tools
 - 2.3. general workshop equipment
 - 2.4. electrical multimeter
 - 2.5. electronic testing equipment

- 3. Testing methods are:**
 - 3.1. sensory
 - 3.2. functional
 - 3.3. measurement

- 4. Electronic systems are:**
 - 4.1. exterior
 - 4.2. interior
 - 4.3. safety systems
 - 4.4. security
 - 4.5. body
 - 4.6. lighting

**Additional
Information****Glossary**

This section contains examples and explanations of some of the terms used but does not form part of the standard.

Alternative Fuel

This is defined as any type of fuel that may be used to power an internal combustion engine; examples would include LPG, bio ethanol etc.

Contaminants

Examples include: high voltage batteries and electrolyte, plastics, glass, gases, fuel and hydrocarbons

Vehicles

These can be light vehicles or commercial vehicles. In addition they may be SI, CI, Hybrid, Electric or Alternative fuel vehicles.

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