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**Overview**

This standard is about the removal, renewal and refitting of electromechanical and electronic components within advance vehicle systems following accident damage.

It is advisable to check the current regulatory requirements concerning air conditioning systems and F Gas prior to handling and storing refrigerants.

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**Performance criteria***You must be able to*

- P1. use the appropriate personal protective equipment when removing and refitting **electromechanical** and electronic components
- P2. protect the vehicle and its contents when removing and refitting **electromechanical** and electronic components
- 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. ensure that the **tools and equipment** you require are calibrated and in a safe working condition to meet manufacturer's and legal requirements
- P5. select and use the correct **tools and equipment** for the components you are going to remove or refit
- P6. remove and refit **electromechanical** and electronic components following:
  - P6.1. recognised research methods
  - P6.2. removal and fitting procedures
  - P6.3. manufacturers' instructions
  - P6.4. your workplace procedures
  - P6.5. health, safety and legal requirements
- P7. renew fittings and fasteners that are unsuitable for re-use
- P8. dispose of waste materials to conform with legal, environmental and workplace requirements
- P9. work in a way which reduces the risk of damaging other components and units on the vehicle
- P10. adapt your working practices safely to suit the needs of the job and vehicle
- P11. store all removed components, refrigerants, gases and vehicle safety system pyrotechnic devices safely in the correct location
- P12. prepare, connect and test all available electronic system testing equipment following manufacturer's instructions prior to use
- P13. check that the components you have refitted operate correctly following the manufacturer's specification prior to release to the customer
- P14. correct any component and system operational faults within the limits of your authority

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- P15. report any additional vehicle unit and component faults you find during the course of your work to the relevant person(s) promptly
  - P16. make suitable and justifiable recommendations for further cost-effective repairs, if required
  - P17. report any delays in completing your work to the relevant person(s) promptly
  - P18. remove and refit **electromechanical** and electronic components within the agreed timescale
  - P19. complete work records accurately, in the format required and pass them to the relevant person(s) promptly

## Knowledge and understanding

You need to know and understand:

### Legislative and organisational requirements and procedures

- K1 the health, safety, environmental and legal requirements relating to the removal and refitting of **electromechanical** and electronic components
- K2 how the vehicle is powered and the associated health and safety risks
- K3 your workplace procedures for:
  - K3.1 referral of problems
  - K3.2 reporting of delays to the completion of work
  - K3.3 completion of work records and the format required
- K4 the work that needs to be done and the standard required
- K5 the requirements for protecting the vehicle and contents from damage before, during and after removing and refitting activities
- K6 the importance of selecting, using and maintaining the appropriate personal protective equipment when removing and refitting **electromechanical** and electronic components
- K7 the limitations of your role and responsibility

### Equipment

- K8 how to select, check and use all the **tools and equipment** required to remove and refit **electromechanical** and electronic components

### Removal, renewal and refitting of electromechanical and electronic components

- K9 the types of components found in advanced **electromechanical** and electronic systems
- K10 the construction and operation of advanced **electromechanical** and electronic components and systems
- K11 how **electromechanical** and electronic components and systems interact with other vehicle systems via multiplexing
- K12 where to find and how to interpret and use sources of information applicable to the removal and fitting of **electromechanical** and electronic components
- K13 the procedures necessary prior to carrying out removal and refitting of **electromechanical** and electronic components

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- K14 types of contaminants associated with accident damaged vehicles and the dangers associated with them
  - K15 the procedures for the systematic removal and refitting **electromechanical** and electronic components
  - K16 the methods of storing removed parts and the importance of storing them correctly
  - K17 how to handle and store refrigerants, gases, vehicle safety systems and pyrotechnic devices
  - K18 the different types of fastenings and the reasons for their use
  - K19 single use mechanical fasteners, why they are used and the dangers of not renewing them
  - K20 the need for correct alignment of components and the methods used to achieve this
  - K21 the types of quality checks that can be used to ensure correct alignment and operation of components to manufacturer's specification and their purpose
  - K22 how to test and evaluate the performance of renewed and refitted **electromechanical** and electronic components against vehicle operating specifications and any legal requirements

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**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. Tools and equipment required for:**
  - 2.1. removal and refitting of engine electromechanical systems
  - 2.2. removal and refitting of transmission electromechanical systems
  - 2.3. removal and refitting of chassis electromechanical systems
  - 2.4. specialist electrical/electronic repair
  - 2.5. general workshop activities

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**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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