

# IMIAEME102a

## Install complex motor vehicle electrical system enhancements



### Overview

This standard is about fitting complex electrical features and components to enhance the original vehicle features and specification to meet customer and business requirements.

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### Performance

#### criteria

- You must be able to:
- P1 select and use appropriate personal and vehicle protective equipment at all times
  - P2 support your enhancement activities by reviewing:
    - P2.1 fitting procedures
    - P2.2 technical data
    - P2.3 legal requirements
  - P3 prepare and test all the tools and equipment required, following manufacturers' instructions, prior to use
  - P4 fit components that are compatible with the vehicle specification and customer requirements
  - P5 carry out all enhancement activities following:
    - P5.1 manufacturers' procedures
    - P5.2 your workplace procedures
    - P5.3 health, safety and environmental requirements
  - P6 work in a way which minimises the risk of:
    - P6.1 damage to other vehicle systems, units and components
    - P6.2 contact with leakage, hazardous substances and high voltage systems
    - P6.3 damage to your working environment
    - P6.4 injury to yourself and others
  - P7 adjust the enhancements fitted and vehicle systems to ensure that they comply with all relevant specification for effective operation
  - P8 ensure all enhancements function to specification prior to handover to the customer
  - P9 complete all enhancement activities within the agreed timescale
  - P10 promptly report any anticipated delays in completion to the relevant person(s)

**Knowledge and  
understanding**

You need to know  
and understand:

**Legislative and organisational requirements and procedures**

- K1 the current health and safety legislation and workplace procedures relevant to workshop practices, including working at height, and personal and vehicle protection when fitting vehicle electrical enhancements
- K2 the legal implications of the mechanical and electrical enhancement of vehicles
- K3 your workplace procedures for:
  - K3.1 recording enhancement activities
  - K3.2 recording functionality of enhancements
  - K3.3 the referral of problems
  - K3.4 reporting delays to the completion of work
- K4 the importance of working to agreed timescales and keeping others informed of progress
- K5 the relationship between time and costs
- K6 the importance of promptly reporting anticipated delays to the relevant person(s)

You need to know  
and understand:

**Tools and Equipment**

- K7 how to prepare, check and use general workshop, special tools and appropriate testing equipment

You need to know  
and understand:

**Electrical and electronic principles**

- K8 vehicle earthing principles and methods
- K9 basic electrical and electronic principles, including Ohms Law, voltage, power, current (AC/DC) resistance, magnetism, electromagnetism, electromagnetic induction and EMF
- K10 circuit protection devices
- K11 electrical safety procedures
- K12 electric symbols, units and terms
- K13 how vehicle networking systems operate

You need to know  
and understand:

**Fitting electrical enhancements**

- K14 the hazards associated with working on or near high voltage components

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- K15 the function and purpose of any enhancements and how they operate
- K16 how to interpret and follow technical instructions and customer requirements
- K17 how enhancement opportunities may be limited by the existing vehicle systems and fitments
- K18 the advantages and disadvantages of electrical customisation including possible impact on warranty and customers' vehicle insurance
- K19 manufacturers' requirements relating to the components to be fitted
- K20 how to fit enhancements
- K21 how to check that the components to be fitted are compatible with the vehicle specification and customer requirements
- K22 how to check that newly fitted enhancements are functioning correctly and the importance of doing so before handover to the customer
- K23 how to make adjustments to components and any surrounding systems to ensure correct operation
- K24 how to work safely avoiding injury to yourself, others and damage to vehicles

**Scope/range**

- 1. Enhancements include::**
  - 1.1. audio systems
  - 1.2. visual systems
  - 1.3. communication systems
  - 1.4. safety systems, including audible alerts
  - 1.5. lamps, including beacons
  - 1.6. tow bar electrical systems
  - 1.7. navigation systems
  - 1.8. security systems
  - 1.9. auxiliary power supplies
  - 1.10. telematics / vehicle location systems
  - 1.11. software modification
  - 1.12. inverter chargers
  - 1.13. high current devices
  - 1.14. battery management systems
  
- 2. Tools and equipment include:**
  - 2.1. hand tools
  - 2.2. specialist fitting tools
  - 2.3. general workshop equipment
  - 2.4. electrical and electronic testing and measuring equipment
  - 2.5. ladders

**Additional  
information**

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

**Glossary**

**Agreed timescales**

Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

**Vehicles**

These can be any of the following – light vehicles, heavy goods and passenger service vehicles, fork lift trucks, motorhomes, emergency services vehicles, motorcycles, mopeds and scooters

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