Australian Government

Assessment Requirements for AURETH009 Diagnose and repair DC to DC converters in battery electric vehicles

Release: 1

Assessment Requirements for AURETH009 Diagnose and repair DC to DC converters in battery electric vehicles

Modification History

Release	Comment
Release 1	New unit of competency.

Performance Evidence

Before competency can be determined, individuals must demonstrate they can perform the following according to the standard defined in the unit's elements and performance criteria, range of conditions and foundation skills:

- diagnose and repair the DC to DC converter and its system components on two different battery electric vehicles (BEVs) to correct performance deficiencies.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to diagnosing and repairing DC to DC converters in BEVs, including procedures for:
  - identifying hazards and controlling risks associated with:
    - working with high voltages in BEV electrical systems
    - wearing jewellery while working around high electrical currents
  - determining appropriate procedures for minimising risk associated with hazards, including applying electrical safety precautions:
    - using personal protective equipment (PPE), including electrical safety gloves with 1000 volt rating and high voltage (HV) insulating mat with Australian standards rating
    - identifying and using fire safety equipment as appropriate
    - using the 'one hand rule'
    - following live system warning tags and signs
    - depowering the vehicle
    - isolating the HV rechargeable energy storage system (RESS) electrical supply
    - stabilising the vehicle electrical system

- environmental requirements, including procedures for trapping, storing and disposing of waste produced during repair work
- key requirements of AS 5732 Electric vehicle operations: Maintenance and repair
- operating principles of DC to DC converters and associated components, including:
  - step-down converters
  - step-up converters
  - continuous current mode
  - discontinuous current mode
  - signal noise, including radio frequency (RF) noise, input noise and output noise
- application, purpose and operation of DC to DC converters and components, including:
  - linear converters
  - switched mode conversion
  - magnetic converters
  - capacitive converters
- diagnostic testing procedures for DC to DC converters, including:
  - accessing and interpreting scan tool system data, including:
    - diagnostic trouble codes (DTCs)
    - live data
    - freeze frame data
    - waveforms
  - using diagnostic flow charts
  - testing electrical systems, including procedures for:
    - accessing electrical terminals and using test probes without damaging connectors, fuse holders or wiring
    - checking voltage input and output of DC to DC converters
    - checking routing and damage to cabling
- repair procedures for traction motor speed control systems, including:
  - tightening connections
  - replacing faulty or damaged cable connections
  - removing and replacing faulty or damaged components
- post-repair testing procedures for BEVs, including:
  - DTC clearing procedures
  - checking for electrical connector mating.

Assessment Conditions

Assessors must satisfy NVR/AQTF assessor requirements.

Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.

Assessment must include direct observation of tasks.

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the BEV DC to DC converters that they have worked on, e.g. repair orders.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- automotive repair workplace or simulated workplace
- PPE and safety equipment, including electrical safety gloves with 1000 volt rating and HV insulating mat with Australian standards rating
- manufacturer specifications for BEV DC to DC converters
- AS 5732 Electric vehicle operations: Maintenance and repair
- two different BEVs with DC to DC converters accessible for diagnostic and repair or replacement activities
- electrical diagnostic equipment appropriate to the BEV being diagnosed and repaired, including:
  - digital multimeter with Cat III 1000 volt rating
  - insulation tester
  - scan tool
  - oscilloscope
  - residual voltage tester, if specified in original equipment manufacturer (OEM) test requirements
- tools, equipment and materials appropriate for repairing DC to DC converters in BEVs.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1

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