Australian Government

AURETH007 Diagnose and repair system instrumentation and safety interlocks in battery electric vehicles

Release: 1

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Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to diagnose and repair faults in the system instrumentation and safety interlocks of battery electric vehicles (BEVs). It involves preparing for the task, selecting the correct diagnostic procedure, carrying out the diagnosis and the repair, performing post-repair testing, and completing workplace processes and documentation. Importance is placed in the unit on applying electrical safety procedures when working on high voltage (HV) rechargeable energy storage systems (RESS).

It applies to those working in the automotive service and repair industry. System instrumentation and safety interlocks include circuits in BEVs.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

AURETH001 Depower and reinitialise battery electric vehicles

Competency Field

Electrical

Unit Sector

Technical - Hybrid Vehicle and Battery Electric Vehicle

Elements and Performance Criteria

Elements Elements describe the essential outcomes.	**Performance Criteria** Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section**.**
1. Prepare to diagnose and repair BEV system instrumentation and safety interlocks	1.1 Job requirements are determined from workplace instructions 1.2 Diagnostic information is sourced and interpreted 1.3 Diagnostic options are analysed and those most appropriate to the circumstances are selected 1.4 Hazards associated with the work are identified and risks are managed according to ***safety requirements*** and AS 5732 Electric vehicle operations: Maintenance and repair 1.5 Diagnostic ***tools and equipment*** are selected and checked for serviceability
2. Diagnose system instrumentation and safety interlocks	2.1 Diagnostic tests are carried out according to manufacturer specifications, workplace procedures and safety requirements 2.2 Faults are identified from diagnostic test results and causes of faults are determined 2.3 Diagnosis findings and recommendations for necessary repairs or adjustments are reported according to workplace procedures
3. Repair system instrumentation and safety interlocks	3.1 Repair information is sourced and interpreted 3.2 Repair options are analysed and those most appropriate to the circumstances are selected 3.3 Repair tools, equipment and materials are selected and checked 3.4 RESS service plug or manual service disconnect is located and isolated to depower vehicle HV RESS according to manufacturer specifications 3.5 System instrumentation and safety interlocks are replaced, repaired or adjusted as required according to manufacturer specifications, workplace procedures, safety and ***environmental requirements***, and without causing damage to components or systems 3.6 RESS service plug or manual service disconnect is reconnected and vehicle is reactivated 3.7 Post-repair testing is carried out according to workplace procedures to confirm fault rectification, and any further problems detected as having been introduced during the repair process are rectified
4. Complete work processes	4.1 Final inspection is made to ensure work is to workplace expectations and vehicle is presented ready for use 4.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected

Elements Elements describe the essential outcomes.	Performance Criteria Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section**.**
	4.3 Tools and equipment are checked and stored and faulty electrical equipment is identified, tagged and isolated according to workplace procedures 4.4 Workplace documentation is processed according to workplace procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance and are not explicit in the performance criteria.

Skills	Description
Learning skills to:	• identify and locate various sources of information efficiently.
Reading skills to:	• interpret text, symbols and wiring diagrams in diagnostic and repair information in manufacturer specifications and workplace instructions and procedures.
Writing skills to:	• legibly and accurately fill out workplace documentation when reporting diagnostic findings, making repair recommendations, and recording parts and material used.
Oral communication skills to:	• clarify instructions • report diagnostic findings and make repair recommendations.
Numeracy skills to:	• match electrical components and part identification numbers to workplace instructions, vehicle and component part lists, and manufacturer specifications • interpret vehicle electrical measurements and readings • measure voltage, current and resistance and use basic mathematical operations, including addition and subtraction, to calculate deviations from manufacturer specifications.
Planning and organising skills to:	• plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.
Technology skills to:	• use specialised equipment, including multimeters and scan tools.

Range of Conditions

This section specifies work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

Safety requirements must include:	• work health and safety (WHS) and occupational health and safety (OHS) requirements, 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), such as electrical safety gloves with 1000 volt rating and 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 RESS electrical supply • stabilising the vehicle electrical system.
Tools and equipment must include:	• those specified in the specific vehicle service maintenance procedures, including: • digital multimeter with Cat III 1000 volt rating • insulation tester • scan tool • oscilloscope • residual voltage tester, if specified in OEM requirements.
Environmental requirements must include:	• procedures for trapping, storing and disposing of waste released during repair work.

Unit Mapping Information

Equivalent to AURETH4007 Diagnose and repair system instrumentation and safety interlocks in battery electric vehicles

Links

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