



Australian Government

AURRTR006 Diagnose and repair marine electrical systems

Release: 1

AURRTR006 Diagnose and repair marine electrical systems

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 low-voltage electrical systems of marine vessels, such as dash instrumentation, switch and fuse panels, bilge pumps and lighting, global positioning systems (GPS), depth sounders, fish finders, communications equipment and radars.

It applies to those working in the marine service and repair industry.

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

Competency Field

Marine

Unit Sector

Technical - Electrical and Electronic

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	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 marine electrical system	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

Elements	Performance Criteria
Elements describe the essential outcomes.	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.
	1.5 Diagnostic tools and equipment are selected and checked for serviceability
2. Diagnose electrical system	2.1 Diagnostic tests are carried out according to workplace procedures and <i>safety requirements</i> 2.2 Faults are identified from diagnostic test results and causes of faults are determined 2.3 Diagnosis findings, including recommendations for necessary repairs or adjustments, are reported according to workplace procedures
3. Repair electrical system	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 Repairs and component replacements and adjustments are carried out according to manufacturer specifications, workplace procedures and safety requirements, and without causing damage to components or systems 3.5 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 vessel is presented ready for use 4.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected 4.3 Tools and equipment are checked and stored 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
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Skills	Description
Learning skills to:	locate appropriate sources of information efficiently.
Reading skills to:	- interpret information from manufacturer and workshop literature when seeking marine electrical system specifications and procedures - interpret wiring diagrams.
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:	- use basic mathematical operations, including addition, subtraction, multiplication and division, to calculate current flow, resistance and voltage - interpret numbers on electrical measuring equipment and 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 electrical measuring equipment, such as multimeters.

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.

<i>Safety requirements</i> must include:	- work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for: - checking and dealing with flammable gas build-up in boats prior to starting electrical system work - working with potentially high-current electrical systems.
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Unit Mapping Information

No equivalent unit.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

Assessment Requirements for AURRTR006 Diagnose and repair marine electrical systems

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Performance Evidence

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

- diagnose and repair a fault in the following marine electrical systems and components:
 - dash instrumentation
 - switch and fuse panels
 - bilge pump system
 - lighting system
 - depth sounder or fish finder
 - global positioning system (GPS)
 - marine radio.

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 marine electrical systems and components, including procedures for:
 - checking and dealing with flammable gas build-up in boats, including LPG and hydrogen, prior to starting electrical system work
 - working with potentially high-current electrical systems
- operating principles of electrical system circuits and associated components, including:
 - Ohm's law
 - electromagnetic interference
- application, purpose and operation of marine electrical systems and components, including:

- marine vessel lighting systems, including marine regulations for vessel lighting
- dash instrumentation
- switch and fuse panels
- bilge pump systems
- depth sounders and fish finders
- GPS
- marine radios
- 12 volt marine accessories, including winches
- autopilot and radar
- marine battery charge management systems
- networked communication topographies
- diagnostic testing procedures for marine electrical systems and components, including:
 - testing for circuit resistance, voltage drop and current draw
 - testing for open and short circuits
 - testing for shorts to power circuits and grounds
 - inspecting for component moisture ingress and connector damage
 - testing marine battery charge management systems
 - testing networked communication topographies
- repair procedures for marine electrical systems and components, including procedures for:
 - selecting wiring gauge
 - soldering wiring
 - insulating wiring
 - crimping terminals
 - removing and replacing connectors
 - repairing networked communication topographies
- post-repair testing procedures for marine electrical systems and components.

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 marine electrical systems 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:

- marine repair workplace or simulated workplace

- workplace instructions
- manufacturer electrical system specifications
- marine vessel with faults in the electrical systems and components specified in the performance evidence
- diagnostic equipment for marine vessel electrical systems
- tools, equipment and materials appropriate for repairing marine vessel electrical systems.

Links

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