



Australian Government

AURRTR106 Diagnose and repair marine electrical systems

Release: 1

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Modification History

Release	Comments
Release 1	This version first released with AUR Automotive Retail, Service and Repair Training Package Version 6.0

Application

This unit describes the skills and knowledge 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. The unit involves preparing for the task, sourcing a diagnostic testing strategy, diagnosing the cause of the fault, carrying out the repair, performing post-repair testing, and completing workplace processes and documentation.

This unit 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.

Unit Sector

Technical - Electrical and Electronic

Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Prepare to diagnose and repair marine electrical system	1.1 Identify job requirements from workplace instructions 1.2 Identify required information for diagnosis activity 1.3 Analyse diagnostic options and source testing strategy to identify cause of fault using workplace and manufacturer procedures 1.4 Identify hazards and environmental issues associated with diagnose and repair activity, assess potential risks and implement control measures in line with workplace policies and procedures

ELEMENTS	PERFORMANCE CRITERIA
	1.5 Identify tools and equipment required for testing strategy and establish serviceability according to workplace procedures
2. Diagnose marine electrical system	2.1 Implement diagnostic tests set out in testing strategy according to manufacturer and workplace procedures, and workplace health and safety requirements 2.2 Identify cause of fault through analysis of diagnostic test results 2.3 Confirm and report cause of fault according to workplace procedures 2.4 Develop and report recommendations for necessary repairs according to workplace procedures
3. Repair marine electrical system	3.1 Identify required information for repair activity 3.2 Identify tools, equipment and materials required for repair activity and establish serviceability according to workplace procedures 3.3 Carry out repairs according to workplace and manufacturer procedures, manufacturer specifications, workplace health and safety and environmental requirements 3.4 Carry out post-repair testing according to workplace procedures, workplace health and safety and environmental requirements
4. Complete work processes	4.1 Conduct final inspection according to workplace procedures and confirm vehicle is ready for use 4.2 Clear work area and dispose of or recycle materials according to workplace procedures 4.3 Complete documentation according to workplace procedures

Foundation Skills

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

SKILL	DESCRIPTION
Learning	- Locates required sources of information efficiently - Develops a sequenced plan for a specific task.
Reading	- Interprets wiring diagrams - Organises and interprets technical information from workplace procedures, manufacturer procedures and

SKILL	DESCRIPTION
	manufacturer specifications.
Oral communication	• Clarifies instructions • Obtains information from customers and supervisors.
Numeracy	• Uses mathematical operations • Calculates current flow, resistance and voltage • Interprets numbers on electrical measuring equipment • Calculates deviations from manufacturer specifications.
Planning and organising	• Plans own work requirements • Prioritises actions to achieve required outcomes • Ensures tasks are completed within workplace timeframes.
Technology	• Uses electrical measuring equipment.

Unit Mapping Information

Supersedes and is equivalent to AURRTR006 Diagnose and repair marine electrical systems.

Links

Companion Volume Implementation Guide is found on VETNet -

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

Assessment Requirements for AURRTR106 Diagnose and repair marine electrical systems

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Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- 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

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- methods to locate and interpret information required to diagnose and repair marine electrical systems including:
 - information provided by customers and supervisors
 - manufacturer specifications and procedures or equivalent documentation
- workplace procedures required to diagnose and repair marine electrical systems including:
 - establishing serviceability of tools and equipment
 - documentation procedures
 - housekeeping procedures including:
 - examination of tools and equipment
 - storage of equipment
 - identification, tagging and isolation of faulty equipment
 - disposal of excess materials

- recycling procedures
- workplace health and safety (WHS) requirements relating to diagnosing and repairing marine electrical systems, 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
- environmental requirements relating to diagnosing and repairing marine electrical systems
- operating principles of electrical systems and associated components, including:
 - Ohm's law
 - electromagnetic interference
- purpose and operation of 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, 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, 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.

Assessment Conditions

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.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

Links

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