



Australian Government

Department of Education, Employment and Workplace Relations

TDMMR3207B OPERATE AND CARRY OUT BASIC ROUTINE SERVICING OF MARINE EXTRA LOW AND LOW VOLTAGE ELECTRICAL SYSTEMS

Release: 1

TDMMR3207B OPERATE AND CARRY OUT BASIC ROUTINE SERVICING OF MARINE EXTRA LOW AND LOW VOLTAGE ELECTRICAL SYSTEMS

Modification History

Not applicable.

Unit Descriptor

UNIT DESCRIPTOR:

This unit involves the skills and knowledge required to safely operate and carry out routine basic servicing of extra low voltage and low voltage electrical systems and be aware of the safety precautions for these systems on a small commercial vessel, including operation and service checks of systems, basic care and servicing of batteries and charging systems, and basic operation and servicing of starter motors, alternators and associated equipment.

Note: All installation, servicing and repair of AC (50 volts or above) or DC (above 115 volts) must be carried out only by a suitably qualified engineer or licensed tradesman. Relevant State/Territory electrical licensing requirements must be fulfilled by any persons carrying out installation, servicing and repair of electrical circuits and systems at such voltages on a vessel.

Application of the Unit

Application of the unit	The unit has applications in the qualification for a Coxswain and Marine Engine Driver Grade 3 (MED 3) as per relevant sections of Part D of the National Standard for Commercial Vessels (NSCV), i.e. Certificate II in Transport&Distribution (Coastal Maritime Operations - Coxswain) and Certificate II in Transport&Distribution (Marine Engine Driving Grade 3).
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Licensing/Regulatory Information

Licensing/legislative requirements	The unit is consistent with the relevant sections of State and Territory maritime regulations and NSCV/USL Code for a Coxswain or MED 3.
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Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Operate extra low voltage electrical systems	<ul style="list-style-type: none"> a Extra low voltage (ELV) electrical systems are safely operated in accordance with procedures and manufacturer's instructions and specifications b Appropriate precautions are taken when operating low voltage electrical systems in accordance with standard operating procedures c Basic servicing of extra low and low voltage systems is carried out in accordance with vessel's standard operating standard operating procedures) d Safely connect and disconnect 240 volt supply from shore as per standard operating procedures

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ELEMENT	PERFORMANCE CRITERIA
<p>2 Operate and carry out basic servicing of starter motors, alternators and associated equipment</p>	<ul style="list-style-type: none"> a The operation of starter motors, alternators and associated equipment is monitored in accordance with manufacturer's instructions b Faulty equipment and components are identified and are reported and action is initiated as required for isolation, tagging and repair or replacement in accordance with standard operating procedures
<p>3 Follow safety and hazard control procedures</p>	<ul style="list-style-type: none"> a All required safety precautions and regulations are followed when operating and servicing extra low voltage and low voltage electrical systems and associated equipment b Operational hazards are identified and action is taken to minimise or eliminate risk to personnel, vessel and the environment c Where relevant, and in consultation with relevant officers, procedures and precautions necessary for entry into confined spaces on a vessel are correctly followed d Appropriate action is taken in the event of a failure or emergency involving starter motors, alternators and extra low voltage electrical systems to isolate and secure the relevant equipment and the vessel and maintain the safety of the vessel and persons involved e Shipboard emergency and contingency plans are followed in the event of a failure or emergency involving starter motors, alternators and extra low voltage electrical systems

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Required Skills and Knowledge

REQUIRED KNOWLEDGE

This describes the knowledge required for this unit.

- 1 Relevant OH&S legislation and policies
- 2 Typical standard operating procedures for the operation and basic routine servicing of ELV and LV systems on a small vessel falling specifications.
Note: All installation, maintenance and repair of AC (50 volts or above) DC (above 115 volts) must be carried out only by a suitably qualified engineer or licensed tradesman. Relevant State/Territory electrical licensing requirements must be fulfilled by any persons carrying out installation, maintenance and repair of electrical circuits and systems at such voltages on a vessel.
- 3 Safety, environmental and hazard control precautions and procedures relevant to the operation and routine servicing of ELV and LV systems on a small vessel
- 4 Principal features and operating characteristics of typical ELV and LV systems used on small vessels, including:
 - a basic care and servicing of shipboard electrical systems generally
 - b DC systems
 - c batteries - types, care, servicing, hazards and safety precautions
 - d procedures and precautions when connecting batteries
 - e use of fuses and circuit breakers, including the selection of correct capacity
 - f types of starter motors and alternators typically used on small vessels

REQUIRED KNOWLEDGE

- 5 Procedures for isolating equipment in ELV and LV electrical systems
- 6 Typical problems related to the during the operation and basic servicing of ELV and LV systems on small vessels and appropriate action and solutions
- 7 Maritime communication techniques needed during the operation and basic servicing of auxiliary systems on small vessels
- 8 Types of running logs and servicing records that must be maintained on a vessel to meet the requirements of the company and regulatory authorities

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REQUIRED SKILLS

This describes the basic skills required for this unit.

- 1 Use basic verbal communication skills required when operating and carrying out routine basic servicing on the low voltage and extra low voltage systems on a small vessel
- 2 Read, interpret and apply simple instructions and standard operating procedures for the operation and routine basic servicing of a low voltage and extra low voltage systems on a small vessel
- 3 Complete any required servicing records
- 4 Work safely and collaboratively with others during the operation and routine basic servicing of a low voltage and extra low voltage systems on a small vessel
- 5 Select and use relevant tools and equipment as per instructions
- 6 Recognise faulty equipment and take appropriate action as per operating instructions
- 7 Recognise routine problems during the operation and routine basic servicing of low voltage and extra low voltage systems on a small vessel and take appropriate action
- 8 Adapt to changes in equipment and procedures in the workplace
- 9 Follow required work schedule as per company requirements

REQUIRED SKILLS

- 10 Connect and disconnect 240 volts AC shore power to vessel and operate relevant switching devices on board vessel

Evidence Guide

Evidence Guide

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

<p>1 Critical aspects of evidence required to demonstrate competency in this unit</p>	<p>Assessment must confirm appropriate knowledge and skills to:</p> <ul style="list-style-type: none"> a Carry out basic operation of ELV and LV electrical systems on a small vessel b Carry out routine basic servicing and checks of ELV and LV electrical systems on a small vessel c Connect and disconnect 240 volt AC shore power d Identify typical problems related to the operation and basic servicing of ELV and LV systems and take appropriate action e Exercise all required safety, environmental and hazard control precautions and procedures during operational and servicing operations f Communicate effectively with others when carrying out operations and servicing procedures on board a vessel
<p>2 Evidence required for demonstration of consistent performance</p>	<ul style="list-style-type: none"> a Performance is demonstrated consistently over a period of time and in a suitable range of contexts b Consistently applies underpinning knowledge and skills when: <ul style="list-style-type: none"> 1 operating and carrying out basic routine servicing of ELV

- and LV systems
- 2 identifying and evaluating operational and servicing problems and determining appropriate courses of action
- 3 connecting and disconnecting 240 volt AC shore power
- 4 applying safety precautions relevant to the operation and servicing of ELV and LV systems
- 5 identifying and implementing improvements to procedures for the operation and routine servicing of ELV and LV systems
- c Shows evidence of application of relevant workplace procedures, including:
 - 1 relevant sections of the National Standard for Commercial Vessels
 - 2 OH&S regulations, pollution control and hazard prevention policies and procedures
 - 3 job procedures and work instructions
 - 4 relevant vessel manufacturer's guidelines relating to the operation and basic routine servicing of ELV and LV systems

Evidence Guide (continued)

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| <p>2 Evidence required for demonstration of consistent performance (continued)</p> | <ul style="list-style-type: none"> d Action is taken promptly to report and/or rectify issues and problems identified with the operation and routine servicing of ELV and LV systems in accordance with manufacturer's instructions, statutory requirements and company procedures e Work is completed systematically with required attention to detail f Recognises and adapts appropriately to cultural differences in the workplace, including modes of behaviour and interactions among crew and others |
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<p>3 Context of assessment</p>	<ul style="list-style-type: none"> a Assessment of competency must comply with the assessment requirements of the relevant maritime regulations b Assessment of this unit must be undertaken within relevant marine authority approved and audited arrangements by a registered training organisation: <ul style="list-style-type: none"> 1 As a minimum, assessment of knowledge must be conducted through appropriate written/oral examinations, and 2 Appropriate practical assessment must occur: <ul style="list-style-type: none"> i at the registered training organisation; and/or ii on an appropriate working or training vessel
<p>4 Specific resources required for assessment</p>	<p>Access is required to opportunities to:</p> <ul style="list-style-type: none"> a participate in a range of exercises, case studies and other simulated practical and knowledge assessments that demonstrate the skills and knowledge to operate and carry out routine servicing of ELV and LV systems on a small vessel; and/or b operate and carry out routine servicing of ELV and LV systems on an operational small commercial or training vessel

Range Statement

Range Statement

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The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

VARIABLE	SCOPE
1. GENERAL CONTEXT	
a. Work must be carried out:	1 in compliance with the relevant sections of State and Territory marine regulations and the National Standard for Commercial Vessels
b. Work is performed:	1 within established procedures, with responsibility for own outputs in relation to specified quality and safety standards

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

- d. Work requires:**
- 1 limited responsibility for others in achieving outcomes, including the application of solutions to a variety of predictable servicing problems falling within the limits of responsibility of a Marine Engine Driver Grade 3 or a Coxswain
- Note: All installation, maintenance and repair of AC (50 volts or above) DC (above 115 volts) must be carried out only by a suitably qualified engineer or licensed tradesman. Relevant State/Territory electrical licensing requirements must be fulfilled by any persons carrying out installation, maintenance and repair of electrical circuits and systems at such voltages on a vessel

2. WORKSITE ENVIRONMENT

a ELV systems may include:	<ol style="list-style-type: none"> 1 those normally found on a small commercial vessel up to 500 kW propulsion power
b Operation and basic servicing of on-board ELV and LV systems may be carried out:	<ol style="list-style-type: none"> 1 by day or night in both normal and emergency situations 2 under any permissible conditions of weather 3 while underway 4 while anchored or moored 5 during servicing operations or when vessel is slipped
c Extra low voltage and low voltage systems may include:	<ol style="list-style-type: none"> 1 lead acid batteries 2 circuit breakers 3 wiring, switches and lights 4 starter motors and alternators

Range Statement (continued)

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VARIABLE	SCOPE
<p>d Basic servicing may include:</p>	<ol style="list-style-type: none"> 1 routine checks of systems and equipment 2 identification and reporting of faults and arranging for repair or replacement
<p>e Typical operation and basic servicing tasks in extra low voltage systems may include:</p>	<ol style="list-style-type: none"> 1 operating main switches 2 identifying switches 3 changing a fuse 4 checking and replacing a blown lamp 5 testing and checking a battery 6 reading basic ammeters 7 checking navigation lights 8 identifying and fixing bad connections 9 ensuring batteries are properly vented and there is no gas build up 10 identifying and fixing battery leaks 11 checking that wiring is correctly connected and repairing loose wires 12 checking belt tension on an alternator 13 checking that shore power is properly connected and is operational

VARIABLE	SCOPE
f Servicing tools and equipment may include:	<ol style="list-style-type: none"> 1 hand tools, including screwdrivers, pliers, cutters, soldering iron, etc. 2 meters and instrumentation 3 protective clothing and equipment such as: <ol style="list-style-type: none"> i eye and ear protection ii head gear and safety boots
g Documentation and records may include:	<ol style="list-style-type: none"> 1 relevant sections of maritime and electrical regulations 2 vessel and company servicing procedures for ELV systems 3 equipment manufacturer's instructions, specifications and procedures
h Applicable legislation, regulations and codes may include:	<ol style="list-style-type: none"> 1 National Standard for Commercial Vessels and USL Code 2 relevant State/Territory electrical licensing requirements and wiring rules 3 relevant OH&S regulations

Unit Sector(s)

Not applicable.

Field

Field R Carry Out Operations on Equipment and Systems

Relationship to other units

Relationship to other units	The unit may be assessed in conjunction with other units that relate to the functions of the occupation(s) concerned.
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