



Australian Government

MARC3007A Operate electrical systems

Release 1

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Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMR2907B Operate and maintain marine low and medium voltage electrical systems.

Unit Descriptor

This unit involves the skills and knowledge required to operate 220 to 440 voltage alternating current (AC) electrical systems.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 2 on vessels up to 750 kW or as a Marine Engine Driver Steam.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|--|
| 1 Prepare electrical systems and equipment for operation | <p>1.1 Risks to self, others and the environment are identified according to organisational procedures</p> <p>1.2 Pre-operational checks are carried out according to manufacturer specifications and organisational procedures</p> |
| 2 Operate electrical systems and equipment | <p>2.1 Electrical systems and equipment are operated according to manufacturer specifications, regulations and vessel procedures</p> <p>2.2 Performance of electrical equipment is monitored</p> <p>2.3 AC electrical supply is monitored and demand is adjusted</p> <p>2.4 Operational faults are recognised and recorded, and corrective action is taken according to manufacturer specifications and fault-finding procedures</p> |
| 3 Connect and disconnect ship to shore electrical supply | <p>3.1 Vessel is positioned and secured for connecting to shore electrical supply</p> <p>3.2 Power cable is inspected and connected to shore supply</p> <p>3.3 Procedures for changing from vessel supply to shore supply are implemented following vessel procedures</p> <p>3.4 Electrical supply is monitored for correct operation according to vessel procedures</p> <p>3.5 Operational faults are recognised and recorded, and corrective action is taken according to vessel procedures</p> <p>3.6 Procedures for changing from shore supply to vessel supply are implemented following vessel procedures</p> <p>3.7 Power cable is disconnected, inspected and stored</p> |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Adjust electrical supply to accommodate load demand
- Connect and disconnect shore supply
- Locate, interpret and apply manufacturer specifications for electrical systems and equipment
- Operate and monitor alternating current (AC) electrical systems according manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- Operate and monitor direct current (DC) systems according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- Recognise electrical system faults and where necessary, take steps to make them immediately safe

Required Knowledge:

- Basic care of electrical systems and equipment in general - fault recognition
- Batteries:
 - care
 - hazards
 - types
- Charging systems:
 - alarms/indicators
 - regulators
- Connecting batteries in series and parallel
- DC systems not exceeding 32V DC
- Earth indicating devices
- Electric systems (above 32 V DC and up to 415 V AC)
- Emergency supply and regulatory requirements
- Fault identification, location, and safety implications
- Operation of starter motors, alternators and associated equipment
- Personal safety
- Protective devices on switchboards
- Shore power connection
- Single and three-phase SC power
- Uses of fuses and circuit breakers
 - selection of correct capacity
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and

work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- working safely at all times
- attention to appropriate level of detail in recordkeeping.
- Performance is demonstrated consistently over time and in a suitable range of contexts.

Context of and specific resources for assessment

Resources for assessment include access to:

- industry-approved marine operations site where operating electrical systems can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating electrical systems
- direct observation of the candidate applying relevant

WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Electrical systems and equipment may include:

- Batteries
- Charging systems
- Fuses and circuit breakers
- Generators/alternators
- Motors
- Shore power connection
- Starter motors
- Switchboards

Adjusted may include:

- Changing electrical supply to a larger alternator
- Connecting further alternators in parallel
- Requesting non-essential electrical systems be isolated

Operational faults may include:

- Battery faults
- Earth faults
- Failure of:
 - starter motors
 - alternators to produce voltage
- Faults with shore power connections including phase rotations
- Operation of fuses and circuit breakers
- Operation of protection devices on the switchboard

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations