



**Australian Government**

# **MARC010 Operate electrical systems**

**Release: 2**

# MARC010 Operate electrical systems

## Modification History

Release 2. Range of Conditions updated to include relevant information.

Release 1. New unit of competency.

## Application

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

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 2 Near Coastal on vessels up to 750 kW or as a Marine Engine Driver Grade 1 Near Coastal on vessels up to 1500 kW or as a Marine Engine Driver Steam.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

C - Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

|                                                                 |     |                                                                                                                           |
|-----------------------------------------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------|
| <b>1 Prepare electrical systems and equipment for operation</b> | 1.1 | Risks to self, others and the environment are identified according to organisational procedures                           |
|                                                                 | 1.2 | Pre-operational checks are carried out according to manufacturer specifications and organisational procedures             |
| <b>2 Operate electrical systems and equipment</b>               | 2.1 | Electrical systems and equipment are operated according to manufacturer specifications, regulations and vessel procedures |
|                                                                 | 2.2 | Performance of electrical equipment is monitored                                                                          |

- |                                                                 |     |                                                                                                                                                      |
|-----------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                 | 2.3 | AC electrical supply is monitored and demand is adjusted                                                                                             |
|                                                                 | 2.4 | Operational faults are recognised and recorded, and corrective action is taken according to manufacturer specifications and fault-finding procedures |
| <b>3 Connect and disconnect ship to shore electrical supply</b> | 3.1 | Vessel is positioned and secured for connecting to shore electrical supply                                                                           |
|                                                                 | 3.2 | Power cable is inspected and connected to shore supply                                                                                               |
|                                                                 | 3.3 | Procedures for changing from vessel supply to shore supply are implemented following vessel procedures                                               |
|                                                                 | 3.4 | Electrical supply is monitored for correct operation according to vessel procedures                                                                  |
|                                                                 | 3.5 | Operational faults are recognised and recorded, and corrective action is taken according to vessel procedures                                        |
|                                                                 | 3.6 | Procedures for changing from shore supply to vessel supply are implemented following vessel procedures                                               |
|                                                                 | 3.7 | Power cable is disconnected, inspected and stored                                                                                                    |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different 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.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Electrical systems and

- batteries

equipment include one or more of the following:

- charging systems
- fuses and circuit breakers
- generators/alternators
- motors
- shore power connection
- starter motors
- switchboards

Adjusted include one or more of the following:

- changing electrical supply to a larger alternator
- connecting further alternators in parallel
- requesting non-essential electrical systems be isolated

Operational faults include one or more of the following:

- 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 Mapping Information

This is a new unit. This unit is equivalent to MARC3007A Operate electrical systems.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC010 Operate electrical systems

## Modification History

Release 2. Performance Evidence and Knowledge Evidence amended to include correct information.

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- adjusting electrical supply to accommodate load demand
- connecting and disconnecting shore supply
- locating, interpreting and applying manufacturer specifications for electrical systems and equipment
- operating and monitoring alternating current (AC) electrical systems according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- operating and monitoring direct current (DC) systems according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- 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 ac 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.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

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

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>