



Australian Government

MARB038 Maintain and repair marine electrical and electronic equipment

Release: 1

MARB038 Maintain and repair marine electrical and electronic equipment

Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

Application

This unit involves the skills and knowledge required to maintain and repair marine electrical and electronic equipment on a vessel. This includes carrying out routine maintenance of marine generators, switchboards, electric motors, motor starters, direct current (DC) electrical systems and electrical distribution systems; and identifying faults in automated control systems.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Pre-requisite Unit

Not applicable.

Competency Field

B – Equipment Checking and Maintenance

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

PERFORMANCE CRITERIA

Elements describe the essential outcomes.

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

1 Maintain marine generators

- 1.1** Safety requirements associated with working on marine electrical generation systems are complied with
- 1.2** Marine generators are inspected using appropriate manuals and drawings according to regulatory, organisational and manufacturer requirements
- 1.3** Routine maintenance and testing of marine generators is performed according to regulatory, organisational and manufacturer requirements
- 1.4** Alternators are synchronised according to organisational and manufacturer requirements
- 1.5** Testing and maintenance records are maintained according to regulatory, organisational and manufacturer requirements

2 Maintain marine switchboards

- 2.1** Safety requirements associated with handling circuit breakers are complied with
- 2.2** Routine maintenance is performed on main circuit breaker according to with regulatory, organisational and manufacturer requirements
- 2.3** Faults in circuit breakers are detected and corrected according to regulatory, organisational and manufacturer requirements
- 2.4** Testing and maintenance records are maintained according to regulatory, organisational and manufacturer requirements

3 Maintain marine electrical motors

- 3.1** Safety requirements associated with working on marine electrical motors are complied with
- 3.2** Equipment required for maintenance of electrical motors

- is selected and checked for serviceability
- 3.3** Routine maintenance procedures are applied on marine electrical motors according to regulatory, organisational and manufacturer requirements
- 4 Test marine electrical motor starters**
- 4.1** Safety requirements associated with working on marine electrical motor starters are complied with
- 4.2** Faults in electrical motor starters are detected and rectified according to regulatory, organisational and manufacturer requirements
- 4.3** Starting and running current load testing is performed on electrical motors according to regulatory, organisational and manufacturer requirements
- 4.4** Procedures for finding start and finish of electrical motor windings are applied according to regulatory, organisational and manufacturer requirements
- 4.5** Testing, repairs and maintenance records are maintained according to regulatory, organisational and manufacturer requirements
- 5 Maintain marine electrical distribution systems**
- 5.1** Safety requirements associated with working on marine electrical distribution systems are complied with
- 5.2** Causes and potential dangers associated with earth faults in multiple earthed neutral (MEN) and floating neutral systems are identified
- 5.3** Earth faults are detected and repaired using correct equipment according to regulatory, organisational and manufacturer requirements
- 5.4** Hazards associated with working on fluorescent lamp circuits are identified
- 5.5** Fluorescent lamp circuit is constructed using appropriate manuals and drawings according to regulatory, organisational and manufacturer requirements
- 5.6** Components, function and operation of watertight and flame proof fittings are identified
- 5.7** Reasons for earthing high voltage (HV) systems via a resistor are outlined

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| | 5.8 | Routine maintenance, inspection and testing of marine electrical distribution systems is performed according to regulatory, organisational and manufacturer requirements |
| | 5.9 | Temporary repairs to insulation are performed according to regulatory, organisational and manufacturer requirements |
| | 5.10 | Limitation of temporary repairs to insulation in terms of survey requirements are identified |
| 6 | Maintain DC electrical systems | |
| | 6.1 | Safety requirements associated with working on marine DC electrical systems are complied with |
| | 6.2 | Operation of a rectifier is identified |
| | 6.3 | Single-phase full wave rectifier fitted with filters is built and operated |
| | 6.4 | Routine battery maintenance is carried out according to organisational and manufacturer requirements |
| | 6.5 | Correct procedures for checking specific gravity of electrolyte in lead acid and alkaline batteries are applied according to manufacturer requirements |
| | 6.6 | Methods for supplying back-up power for remote/automatic control equipment are identified |
| | 6.7 | Procedure for testing back-up power is identified and applied |
| 7 | Identify faults in automated control systems | |
| | 7.1 | Pneumatic, hydraulic, electronic/electrical control systems are compared and contrasted |
| | 7.2 | Function and operation of main components of automated control systems are outlined |
| | 7.3 | Faults in automated control systems are detected and rectified using standard fault-finding procedures |
| | 7.4 | Testing procedures for identifying function and performance of automatic control systems in vessel operating systems are identified and applied |
| 8 | Operate electrical testing and measuring | |
| | 8.1 | Insulation tester is operated safely according to manufacturer procedures |

equipment

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| | 8.2 | Continuity testing on electrical circuits is performed according to organisational and manufacturer procedures |
| | 8.3 | Clamp meter is operated safely according to manufacturer procedures |
| | 8.4 | Multimeter is operated safely according to manufacturer procedures |
| 9 | Test automatic control devices | |
| | 9.1 | Operational functions are performed on a monitor |
| | 9.2 | Different types and operation of control valves are identified |
| | 9.3 | Control system control functions are applied using different control devices |

Foundation Skills

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

Range of Conditions

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

Unit Mapping Information

This unit replaces and is equivalent to MARB013 Maintain and repair marine electrical and electronic equipment.

Links

Companion Volume implementation guide can be found in VetNet -
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>