



Australian Government

MARB013 Maintain and repair marine electrical and electronic equipment

Release: 1

MARB013 Maintain and repair marine electrical and electronic equipment

Modification History

Release 1. New unit of competency.

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 the work of a Marine Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

Pre-requisite Unit

Not applicable.

Competency Field

B – Equipment Checking and Maintenance

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.

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

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| | 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 and maintenance records are maintained according to regulatory, organisational and manufacturer requirements |
| 5 Maintain marine | 5.1 | Safety requirements associated with working on marine |

electrical distribution systems		electrical distribution systems are complied with
	5.2	Causes and potential dangers associated with earth faults in multi earth neutral 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 systems via a resistor are outlined
	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 is 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 equipment	8.1	Insulation tester is operated safely according to manufacturer procedures
	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

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.

Testing of marine generators include one or more of the following:

- functional test of automatic voltage regulator (AVR)
- insulation
- reading of alternator:
 - excitation circuit
 - stator

Faults in circuit breakers include one or more of the following:

- alignment of contactors
- condition of:
 - closing and opening mechanisms
 - insulation barriers
- wear and tear on linkages

Faults in electrical motor starters include one or more of the following:

- earthing
- open circuit

Main components of automated control systems include one or more of the following:

- actuator
- control valve
- controller
- positioner
- regulator
- relay
- sensor
- servomotor
- transducer

Faults in automated control systems include one or more of the following:

- failure of components
- intermittent functional faults

Vessel operating systems include one or more of the following:

- auxiliary machinery
- boilers
- main engine
- power generation and distribution

Operation of control valves include one or more of the following:

- electrical
- hydraulic
- manual
- pneumatic

Unit Mapping Information

This is a new unit. This unit is equivalent to MARB5001A Maintain and repair marine electrical and electronic equipment.

Links

Companion Volume implementation guides are found in VETNet -

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