LANLEO22

Service and repair electrical systems on land-based equipment

Overview

This standard covers the service and repair of electrical systems on land-based equipment. It includes the electrical principles, components and systems found in land-based equipment. It also includes some aspects of mains electricity but due to current regulations an approved electrician should be involved when working with mains electricity.

The standard includes both AC, (e.g. single, 3 phase, voltage and colour coding - 415, 240, 110) and DC (e.g. starting circuits, ignition systems, charging/batteries, lighting/instrumentation and ancillary systems) systems and components.

This standard is for those who work in land-based engineering and is appropriate for persons working under supervision.

Performance criteria

You must be able to:

1. identify, remove and replace components on electrical systems on land-based equipment
2. dismantle, service/repair and reinstate electrical components and circuits to manufacturers' specifications where appropriate
3. **verify conformity** of mains supply to electrical standards, including manufacturers' and legislative
4. use **test equipment** to accurately measure and interpret
5. maintain optimal **integrity** of electrical systems
6. verify correct operation of **safety devices**
7. confirm and rectify faults in electrical systems and components

Knowledge and understanding

You need to know and understand:

1. how to interpret an electrical circuit diagram including electrical symbols, colour coding, wire identification and sizing
2. the principles of and how to identify alternating (AC) and direct current (DC) and **common voltages**
3. Ohm's law and its application
4. principles and effects of electromagnetism
5. the types of **circuit protection and control**
6. the, principles, construction and function of **electrical circuits and their component types**
7. the different **types of battery** and their specifications
8. how to safely and correctly charge and maintain different battery types
9. how to correctly wire a domestic plug
10. the **risks posed** to electrical systems and components by other activities/incidents
11. how to route and secure cables and electrical harnesses
12. how to test, repair and verify electrical systems on land-based equipment using suitable techniques and tools in accordance with manufacturers' guidelines

Glossary

circuit protection and control - e.g. battery isolation fuses, thermal switches, over-under voltage switching, battery isolation, relays, RCCD (Residual Current Circuit Device), earth bonding, double insulation

common voltages - e.g. 6, 10, 12, 18, 24, 110, 240, 415

electrical circuits and their component types - e.g.
- starter circuits
- ignition circuits
- charging circuits
- lighting circuits
- instrumentation
- spark ignition
- ancillary circuits

integrity of electrical systems - e.g. wiring harnesses, connections, earth, electrical consumers (batteries)

risks posed to electrical systems and components by other activities/incidents - e.g. welding, short circuit, battery open circuit, overcharging, reverse polarity

safety devices - e.g. circuit protection, fuses, safety switches

test equipment to measure and interpret - e.g. voltage, current flow, earth continuity, resistance

types of battery - e.g. lead acid, gel, and maintenance free

verify conformity - e.g. flash test, visual inspection

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