

LANLEO22 - SQA Unit Code F9EH 04

Service and repair electrical systems on land-based equipment



Overview

This standard is designed to cover electrical principles, components and systems found in land-based equipment. It includes some aspects of mains electricity but due to current regulations an approved electrician should be involved or consulted if appropriate when working with mains electricity.

The standard is about both AC, (e.g. single, 3phase, 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.

Notes for this standard:

This standard is for those who work under the supervision of a more competent member of staff.

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Performance criteria

You must be able to:

- P1 identify, remove and replace electrical components
- P2 where appropriate dismantle, repair and reinstate electrical components and circuits to manufacturers' specifications
- P3 verify conformity of mains supply to electrical standards, manufacturer's/legislative, e.g. flash test, visual inspection
- P4 use test equipment to accurately measure and interpret, e.g. voltage, current flow, earth continuity, resistance to include
- P5 correctly wire a domestic mains lead to suitable plug
- P6 maintain optimal integrity of electrical systems, e.g. wiring harnesses, connections, earth, electrical consumers (batteries)
- P7 verify correct operation of safety devices, e.g. circuit protection, fuses, safety switches
- P8 identify and rectify faults in electrical systems and components

Knowledge and understanding

You need to know and understand:

- K1 how to interpret an electrical circuit diagram, e.g. electrical symbols colour coding, wire identification and sizing
- K2 the principles and how to identify of alternating and direct current and common voltages e.g. 10, 12, 24, 110, 240, 415
- K3 ohm's law and its application and principles
- K4 principles and effects of electromagnetism
- K5 the types of circuit protection and control, e.g. battery isolation fuses, thermal switches, over-under voltage switching, battery isolation, relays, RCCD, earth bonding, double insulation
- K6 the, principles, construction and function of electrical circuits and their component types, e.g.
 - K6.1 starter circuits
 - K6.2 ignition circuits
 - K6.3 charging circuits
 - K6.4 lighting circuits
 - K6.5 instrumentation
 - K6.6 spark ignition
 - K6.7 ancillary circuits
- K7 the different types of battery and their specifications, e.g. lead acid, gel, and maintenance free
- K8 how to maintain and correctly and safely charge different battery types
- K9 the risks posed to electrical systems and components by other activities/incidents, e.g. welding, short circuit, battery open circuit, overcharging, reverse polarity
- K10 how to test and repair and verify electrical systems land-based equipment using suitable techniques and tools in accordance with manufacturers' guidelines

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Glossary

System requirements

'System requirements' indicates satisfactory serviceable condition.

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