
Overview

This standard identifies the competencies you need to investigate, locate and diagnose the cause of faults on electrical systems and equipment, in accordance with approved procedures. You will be expected to locate and diagnose faults in electrical rotating, wound or power control/management equipment. In addition, you will be required to select and use test instruments, review fault symptoms, interpret technical data, apply systematic fault finding procedures and record your findings.

Your responsibilities will require you to comply with organisational policy and procedures for the fault diagnostic activities undertaken and to report any problems with the activities or with the tools and equipment used, that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work with a minimum of supervision taking full responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work and will provide an informed approach to applying fault diagnostic techniques and procedures. You will understand the diagnostic techniques and associated equipment and their application and will know about the electrical/electronic products/components, in adequate depth and breadth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety precautions required when carrying out the fault diagnostic activities. You will be required to demonstrate safe working practices throughout and will understand the responsibility you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

- P1 work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
- P2 review all relevant information on the symptoms and problems associated with the products or assets
- P3 investigate and establish the most likely causes of the faults
- P4 locate faults, using appropriate diagnostic techniques, tools and aids
- P5 complete the fault diagnosis within the agreed time and inform the appropriate people when this cannot be achieved
- P6 determine the implications of the fault for other work and for safety considerations
- P7 draw valid conclusions about the nature and probable cause of the fault using evidence from the fault diagnosis
- P8 deal with problems within your control and report those that cannot be solved
- P9 complete and store all relevant documentation in accordance with organisational requirements
- P10 leave the work area in a safe condition on completion of the activities, as per organisational requirements

Knowledge and understanding

You need to know and understand:

- K1 how to work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
- K2 the importance of wearing the appropriate personal protective equipment (PPE), and of keeping the work area clean and tidy
- K3 voltage ranges, what constitutes a hazardous voltage and how to reduce the risks of a phase to earth shock
- K4 how to recognise and deal effectively in the workplace with victims of electric shock
- K5 how to obtain the authority to conduct fault location and diagnosis in the relevant work areas and any specific permit-to-work procedures that are required
- K6 how to obtain and use data that relates to the fault diagnostic activities
- K7 how to check the calibration status of authorised test facilities and test equipment to be used
- K8 the various fault diagnosis and location techniques that are used
- K9 how to set up, care for and use the range of test equipment needed for the fault location
- K10 how to read and interpret circuit diagrams and related symbols
- K11 how to recognise, read values and, where appropriate, the polarity of electrical/electronic components
- K12 the basic operating principles of the electrical components, systems and equipment being diagnosed
- K13 the recognition of defects/issues
- K14 how to analyse and evaluate the results of the fault diagnosis checks carried out

K15 the faults that can occur and typical actions needed to deal with them

K16 the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve

K17 how to access, use and maintain information to comply with organisational requirements and legislation

Scope/range related to performance criteria

1. Carry out all of the following requirements during fault location/diagnosis activities on electronic/electrical equipment:
 - 1.1 use the correct issue of drawings, job instructions and specifications
 - 1.2 adhere to health and safety regulations, systems and procedures to realise a safe system of work
 - 1.3 use grounded wrist straps, mats and other electrostatic discharge (ESD) precautions, as appropriate
 - 1.4 carry out the fault location/diagnosis activities, in line with organisational procedures
 - 1.5 create and store records, in accordance with appropriate procedures
2. Conduct fault diagnosis on one of the following categories of electrical equipment:
 - 2.1 rotating equipment (such as single/three-phase motors, alternators)
 - 2.2 wound equipment (such as large transformers/inductors)
 - 2.3 control equipment (such as switchgear, distribution, power management)
3. Collect fault diagnosis evidence from two of the following sources:
 - 3.1 test instrument measurements
 - 3.2 recording devices (such as shock, vibration, humidity, temperature)
 - 3.3 circuit meters
 - 3.4 sensory input (such as sight, sound, smell, touch)
 - 3.5 circuit self-diagnosis
4. Use two of the following sources of technical information to assist with fault finding activities:
 - 4.1 technical manual/specifications
 - 4.2 wiring/circuit diagrams
 - 4.3 engineering drawings
 - 4.4 logic diagrams
 - 4.5 flow charts/fault algorithms
 - 4.6 fault finding/trouble shooting guides
5. Use two of the following fault diagnostic techniques:
 - 5.1 half-split technique
 - 5.2 unit substitution
 - 5.3 emergent sequence
 - 5.4 input/output technique
 - 5.5 injection and sampling
 - 5.6 function testing
 - 5.7 six point technique
6. Use all the following fault diagnosis procedures:
 - 6.1 inspection (such as breakages, signs of overheating, missing parts, loose fitting, dry joints)
 - 6.2 operation (such as manual switching off and on, automatic switching/timing/sequencing, outputs)
 - 6.3 measurement (such as voltage, current, continuity, logic states, noise,

frequency, signal shape and level)

7. Identify and locate two of the following categories of fault:
 - 7.1 intermittent component/circuit failure
 - 7.2 complete component/circuit failure
 - 7.3 partial failure/reduced performance

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Locating and diagnosing faults in electrical systems and equipment



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