Title	**Demonstrate basic knowledge of diagnostics and fault finding for service and installation technicians**		
Level	**3**	**Credits**	**5**

Purpose	This unit standard is for service and installation technicians and workers who service and repair end-user appliances, goods and/or equipment and systems, and covers basic underpinning knowledge for this occupation. People credited with this unit standard are able to demonstrate: – knowledge of fault codes and interface systems for diagnosing faults; – knowledge of basic techniques to identify the location and cause of faults in electrical appliances or electronic products; – knowledge of the use of basic diagnostic equipment used for fault finding for service and installation technicians; and – basic knowledge of maintenance and calibration requirements for fault finding, test, and diagnostic tools and equipment used in electrotechnology or telecommunications practice.

Classification	Electrical Engineering > Electrotechnology

Available grade	Achieved

Guidance Information

1 This unit standard has been designed for learning and assessment off-job.

2 Definitions
Basic knowledge – employing some operational and theoretical knowledge of the subject matter to interpret available information.
ESD – Electrostatic Discharge.
Fault Codes also known as Diagnostic Trouble Code (DTC) – a set of codes relating to documented possible symptoms, causes and solutions.
Half split – a fault location technique in which the system is continuously split in half, and the faulty section isolated for further investigation.
Systematic testing – a fault diagnostic process in which each part of the system is tested from one end to the other.

3 Range
- a Competence may be assessed on any one or more of the following categories of electrical appliances, electronic products or installed systems incorporating such products – domestic appliances, portable appliances, portable tools, commercial appliances, electronic consumer goods, electronic equipment, office equipment, electronic security systems, or re-locatable or domestic system installations.
- b Service manuals, where referenced, should be available to candidates during assessment.
- c Candidates must refer to current legislation and Standards during assessment.
- d All activities and evidence presented for all outcomes and performance criteria in this unit standard must be in accordance with:
  - i legislation;
  - ii policies and procedures;
  - iii ethical codes;
  - iv Standards – may include but are not limited to those listed in Schedule 2 of the Electricity (Safety) Regulations 2010;
  - v applicable site, enterprise, and industry practice; and,
  - vi where appropriate, manufacturer instructions, specifications, and data sheets.

4 Assessor information
- a Persons assessing against this unit standard are required to hold a current practising licence at or above the level being sought by the trainee.
- b Details about classes of registration for electrical workers are available at EWRB Electrical Licensing Classes.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of fault codes and interface systems for diagnosing faults.

Performance criteria

1.1 Describe the use of diagnostic fault codes.

Range may include but is not limited to – previous fault data including frequency of occurrence, manufacturer documentation and diagnostic data, alarm priority.

1.2 Describe common interfaces used to access fault codes and perform diagnostics.

Range may include but is not limited to – built-in diagnostics, computer, hand held device, smart devices, manufacturer applications.

1.3 Identify how fault code data, information, and solutions may be obtained legally.

Range may include but is not limited to − manufacturer accreditations, product courses, online documentation.

1.4 Explain the requirement to prevent diagnostic interfaces being damaged or affecting the operation of other associated equipment or circuits.

Range other associated equipment includes – power supplies, interference, damage to cables and control modules, use of incorrect devices for the product or brand, use of third party devices or software.

Outcome 2

Demonstrate knowledge of basic techniques to identify the location and cause of faults in electrical appliances or electronic products.

Range electrical appliances, electronic products, electronic security, domestic systems installations.

Performance criteria

2.1 Explain techniques used to diagnose faults in terms when and how they are used.

Range techniques include but are not limited to – observation, simulation, measurement, identification of function loss, comparison, and previous fault data including frequency of occurrence, manufacturers' documentation and diagnostic data, built-in diagnostics, alarm priority.

2.2 Explain common techniques to isolate a faulty component in electrical appliances, electronic products or systems components in terms when and how they are used.

Range systematic testing, half split, loop back, transposition.

2.3 Identify possible external causes of a given fault.

Range may include but is not limited to − mechanical versus electrical, control circuit versus power circuit, environmental influences, module versus wiring and terminations, where appropriate alternatives listed in service diagnostics book or service manual.

Outcome 3

Demonstrate knowledge of the use of basic diagnostic equipment used for fault finding for service and installation technicians.

Performance criteria

3.1 Identify built in test equipment available in a given item of equipment.

Range may include but is not limited to − local terminal, built in test equipment, built in diagnostic tools, logs.

3.2 Explain four basic testing tools in terms of features offered for a simple installation.

Range may include but is not limited to – insulation resistance tester, multi-meter, clamp meter, inverter tester, oscilloscope, frequency counter, test probes, phase rotation meter.

3.3 Explain the requirement to prevent diagnostics affecting the operation of other associated equipment or circuits.

Range other equipment includes – power supplies, interference, impedance of test equipment, use of monitoring points, dependent components and modules.

3.4 Explain storage, transport and handling of basic diagnostic equipment.

Range ESD damage, physical damage, moisture damage, packaging, labelling, securing in vehicle, temperature control, shock damage.

Outcome 4

Demonstrate basic knowledge of maintenance and calibration requirements for fault finding, test, and diagnostic tools and equipment used in electrotechnology or telecommunications practice.

Performance criteria

4.1 Explain the importance of calibration and maintenance schedules for test and diagnostic tools and equipment is important.

Range evidence of a minimum of five reasons is required.

4.2 Explain self-validation methods used for test and diagnostic tools and instrumentation for installations.

Range evidence of a minimum of six methods is required.

Planned review date	31 December 2027

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	14 December 2017	31 December 2024
Review	2	2 March 2023	N/A

Consent and Moderation Requirements (CMR) reference	0003

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council at qualifications@waihangaararau.nz if you wish to suggest changes to the content of this unit standard.