NR/L2/ELP/27238/APP-N

Maintenance of Uninterruptible Power Supply equipment

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Appendix N
Maintenance of Uninterruptible Power Supply equipment

N.1 Purpose

This module of NR/L2/ELP/27238 specifies the periodic maintenance requirements for a typical in-service UPS installation, operating within its designed parameters.

N.2 Scope

This module is applicable to all UPS equipment with a rating of 10 kVA or above that is owned or operated by Network Rail.

N.3 Reference documentation

BS EN 60896-11, *Stationary lead-acid batteries – General requirements and methods of test – Vented types – General requirements and methods of tests.*

BS 6290-2, *Lead-acid stationary cells and batteries – Specification for lead-acid high performance Planté positive type*

NR/L2/ELP/27238, *Maintenance specification for fixed plant equipment.*

N.4 Definitions and abbreviations

The term and definitions specified in NR/L2/ELP/27238 and the following apply.

Uninterruptible Power Supply (UPS)	A power supply system that is used to maintain an adequate AC supply to the operational infrastructure in the event of failure or loss of the main incoming and/or alternative supply. It is a single or multiple module power supply system. Equipment contained between input and output terminals, including manual and/or automatic bypass switching facilities and energy sources, such as a battery are considered to part of the UPS
Simulated Mains Failure Test (On-Load Test)	A test undertaken to assess the equipment's ability to support the intended load under simulated mains failure conditions for a set duration. The battery is not significantly discharged during this test.
Discharge Capacity Test	A test undertaken to assess the operational capacity of the battery system. A load is applied to the UPS inverter via the batteries. A minimum of 25% and a maximum of 50% of the battery's full capacity is discharged during this test.

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N.5 Maintenance requirements

N.5.1 General

The Maintenance function shall develop a maintenance plan for each installation.

NOTE The maintenance strategy for UPSs is dependant on whether or not it is possible to carry out an impedance test on individual cells without resorting to disconnecting any circuits.

The periodicity of load testing regimes to be adopted shall be as specified in Table N.1.

Type	Six-monthly	12-monthly
Accessible batteries	Impedance test and functional test	Discharge capacity test
Inaccessible batteries	Discharge capacity test	Discharge capacity test

Table N.1 – Load testing maintenance strategy

At the end of a maintenance visit, the maintainer shall check that the installation is operating in accordance with specification. Where this has not been achieved, the maintainer shall identify and implement the remedial tasks required to return the installation to service.

N.5.2 Periodicity

The relevant frequency of test, inspection, and other maintenance activities shall be determined for each installation. Maintenance periodicities for UPS installations shall not be less than those specified in this module.

Test, inspection or maintenance frequencies shall be increased to compensate for abnormal operation or environmental conditions, i.e. degraded performance due to ageing.

N.5.3 Record keeping

The condition of the UPS shall be monitored by keeping a record of maintenance tasks, tests, and inspections.

A logbook shall be kept on site for each installation. Records of maintenance visits, faults, major items of work, controller settings, battery installation dates and electrical inspection and testing shall be kept for each installation.

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