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Electrical installations — Extra-low voltage power supplies and service earthing within telecommunications networks

AS 3015:2022

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Electrical installations — Extra-low voltage power supplies and service earthing within telecommunications networks

Originated as AS 3015(Int)—1991.
Previous edition AS/NZS 3015:2004.
Revised and redesignated as AS 3015:2022.

Preface

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee EL-001, Wiring Rules, to supersede AS/NZS 3015:2004, *Electrical installations — Extra low-voltage d.c. power supplies and service earthing within public telecommunications networks*.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this document as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this document is to establish safety requirements, consistent with maintaining continuity of essential supply, for the installation of extra-low voltage (ELV) power supplies in restricted access locations (RAL) of telecommunications networks.

The major changes in this edition are as follows:

(a) AS/NZS 3015:2004 applied only to public telecommunications networks. This edition now applies to all telecommunications carriers.

(b) Other organizations and entities may opt to use this document.

(c) T[This is a preview. Click here to purchase the full publication.]ture have been defined.

(d) Requirements for outdoor cabinets and enclosures, and pole-mounted infrastructure have been included.

(e) Electrical energy source classifications have been defined.

(f) Requirements for the co-location of ELV and low voltage (LV) power have been included.

(g) Guidance on emergency powering of outdoor cabinets has been included.

(h) The batteries and battery hazards section includes new battery energy storage technologies and the addition of lithium-ion (Li-ion) batteries.

(i) Requirements for special earthing for buildings and shelters, outdoor cabinets, pole-mounted equipment and rooftops have been included.

(j) Updates to figures for overall site earthing, radio site earthing, outdoor cabinets, pole-mounted equipment and co-located site earthing.

(k) Requirements on indoor earthing have been included.

(l) Maximum values of earth resistance have been revised.

(m) Appendix C has been updated.

(n) Appendices D, E and F have been added.

(o) Hybrid fibre-coaxial (HFC) is deemed to be ES1 or ES2, and included in the scope of this document.

The terms “normative” and “informative” are used in Standards to define the application of the appendices to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is only for information and guidance.

Contents

Introduction

Most telecommunications network equipment is powered from extra-low voltage (ELV) supplies that are 12, 24 or 48 V d.c. but may also include a.c. telecommunications network equipment that is powered from ES1 or ES2 power supplies. This voltage is the nominal voltage between positive and negative regardless of which pole, if either, is earthed. Consequently, these supplies and their power distribution systems fall into the category of ELV as defined in this document.

The power supplies form an integral part of the telecommunications facility and their proper function is vital to the continuation of such a facility, especially to essential services such as railways, the police, fire brigade and ambulance services. The practices that are included in this document have been developed over many years of safe operation in telecommunications networks. This document applies to telecommunication carriers or other organizations and entities that opt to use this document. Use of this document is recommended for all other entities that install or operate telecommunications equipment.

Australian Standard®

Electrical installations — Extra-low voltage power supplies and service earthing within telecommunications networks

Section 1 Scope and general

1.1 Scope

This document sets out requirements for telecommunications ELV power systems and earthing in the provision of telecommunications networks where —

(a) the telecommunications carrier or entity owns the ELV power supply;

(b) the ELV power supply is located in a restricted access location; and

(c) the ELV power supply is located in premises and on land that are owned, leased or otherwise occupied in whole or in part by the telecommunications carrier or entity.

This document defines the demarcation points between Standards when used in telecommunications infra

This document also specifies the minimum requirements for personal safety, equipment safety and safety from fire while maintaining the viability of the telecommunications network.

This document is applicable to the following:

(i) Critical power systems including —

  (A) telecommunication facilities;

  (B) wireless/radio sites;

  (C) small cells;

  (D) outdoor cabinets and enclosures;

  (E) hybrid fibre-coaxial (HFC) power systems;

  (F) pole-mounted infrastructure; and

  (G) security and building management systems associated with information telecommunications infrastructure [Information Communication Technology (ICT)].

(ii) Single or dual plane power systems.

(iii) Float charged battery systems.

(iv) Partial state of charge battery systems.

(v) Telecommunications off-grid power systems e.g. solar, wind or fuel cell.

This document does not apply to power systems of the following types —

(A) portable equipment;

(B) electric vehicles;

(C) uninterruptible power systems (UPS) that are in accordance with AS 62040.1.1 and AS 62040.1.2 (with the exception of HFC UPS systems);

(D) non-telecommunications industrial premises; or

(E) domestic dwellings.

NOTE Solar PV systems used as standalone and as part of solar hybrid systems that operate at ELV are within the scope of this document.

This document applies to telecommunication carriers or other organizations and entities that opt to use this document.

Use of this document is recommended for all other entities that install or operate telecommunications equipment.

1.2 Application

This document applies to the installation of ELV power supplies in RALs of telecommunications networks, e.g. telephone exchanges, telecommunications transmission sites, wireless sites, outdoor cabinets and pole-mounted infrastructure. Application of the requirements shall ensure that the installation is safe and that continuity of the ELV supply is maintained for telecommunications services or telecommunications carriers and other entities at all times.

Where this document applies as defined in the scope of this document and conflict exists between this document a flict with the se

The requirements of AS/NZS 3000, AS/NZS 3100 and related Standards shall apply to power supplies that are not installed in RALs within the telecommunications carrier's network.

1.3 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS 1170.4, *Structural design actions, Part 4: Earthquake actions in Australia*

AS 2676.2, *Guide to the installation, maintenance, testing and replacement of secondary batteries in buildings, Part 2: Sealed cells*

AS 3011.1, *Electrical installations — Secondary batteries installed in buildings, Part 1: Vented cells*

AS 3011.2, *Electrical installations — Secondary batteries installed in buildings, Part 2: Sealed cells*

AS/NZS 1768, *Lightning protection*

AS/NZS 3000, *Electrical installations (known as the Australian/New Zealand Wiring Rules)*

AS/NZS 3008.1.1, *Electrical installations—Selection of cables, Part 1.1: Cables for alternating voltages up to and including 0.6/1 kV—Typical Australian installation conditions*

AS/NZS 3008.1.2, *Electrical installations—Selection of cables, Part 1.2: Cables for alternating voltages up to and including 0.6/1 kV—Typical New Zealand conditions*

AS/NZS 3010, *Electrical installations—Generating sets*

AS/NZS 3100, *Approval and test specification—General requirements for electrical equipment*

AS/NZS 5000.1, *Electric cables—Polymeric insulated, Part 1: For working voltages up to and including 0.6/1 (1.2) kV*

AS/NZS 5000.2, *Electric cables—Polymeric insulated, Part 2: For working voltages up to and including 450/750 V*

AS/NZS 5139, *Electrical installations — Safety of battery systems for use with power conversion equipment*

AS/NZS 61000.6.2, *Electromagnetic compatibility (EMC), Part 6.2: General standards—Immunity for industrial environments*

AS/NZS 62368.1, *Audio/video, information and communication technology equipment — Part 1: Safety requirements (IEC 62368-1:2014 (ED. 2.0) MOD)*

AS/NZS CISPR 32, *Electromagnetic compatibility of multimedia equipment—Emission requirements*

AS/NZS IEC 61000-4.2, *Electromagnetic compatibility (EMC), Part 4.2: Testing and measurement techniques—Electrostatic discharge immunity test*

AS/NZS IEC 61000-4.3, *Electromagnetic compatibility (EMC), Part 4.3: Testing and measurement techniques — Radiated, radiofrequency, electromagnetic field immunity test*

AS/NZS IEC 61000-4.4, *Electromagnetic compatibility (EMC), Part 4.4: Testing and measurement techniques—Electrical fast transient/burst immunity test*

AS/NZS IEC 61000-4.5, *Electromagnetic compatibility (EMC), Part 4.5: Testing and measurement techniques—Surge immunity test*

AS/I*easurement techniques—Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 60896-21, *Stationary lead-acid batteries – Part 21: Valve regulated types – Methods of test*

IEC 60896-22, *Stationary lead-acid batteries – Part 22: Valve regulated types – Requirements*

ETSI EN 300-132-2, *Environmental Engineering (EE); Power supply interface at the input of Information and Communication Technology (ICT) equipment; Part 2: –48 V Direct Current (DC)*

EN 55032, *Electromagnetic compatibility of multimedia equipment - Emission requirements*

EN 55035, *Electromagnetic compatibility of multimedia equipment - Immunity requirements*

EN 61000-6-4, *Electromagnetic compatibility (EMC), Part 6-4: Generic standards – Emission standard for industrial environments (IEC 61000-6-4:2018)*

CISPR 35, *Electromagnetic compatibility of multimedia equipment - Immunity requirements*

ITU-T Recommendation K.27, *Bonding configurations and earthing inside a telecommunication building*

1.4 Terms and definitions

For the purposes of this document, the terms and definitions in AS/NZS 3000 and the following apply.

1.4.1
appliance
electrical device, conforming to AS/NZS 62368.1, that does not house the main a.c. switchboard, but may incorporate internal a.c. distribution within its housing

Note 1 to entry: Connection to the main a.c. switchboard is via a dedicated active, neutral and protective earth connection.

1.4.2
arc flash
electrical explosion or energy discharge, which occurs between electrified conductors during a fault or short-circuit condition