AS/NZS 3002:2021

STANDARDS NEW ZEALAND
TE MANA TAUTĪKANGA O AOTEAROA

STANDARDS Australia

Australian/New Zealand Standard™

Electrical installations — Shows, carnivals and events



Documents
Document Sharing Hub

Full document details: AS NZS 3002-2021

AS/NZS 3002:2021

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee EL-001, Wiring Rules. It was approved on behalf of the Council of Standards Australia on 04 June 2021 and by the New Zealand Standards Approval Board on 04 May 2021.

This Standard was published on 25 June 2021.

The following are represented on Committee EL-001:

Australian Building Codes Board
Australian Energy Council
Australian Industry Group
Communications, Electrical and Plumbing Union — Electrical Division
Consumers Federation of Australia
Electrical Regulatory Authorities Council
Electrical Safety New Zealand
Electrical Workers Registration Board
ElectroComms & Energy Utilities Industries Skills Council
Energy Networks Australia
Engineers Australia
Institute of Electrical Inspectors
Master Electricians Australia
Master Electricians New Zealand
National Electrical and Communications Association
National Electrical Switchboard Manufacturers Association
New Zealand Manufacturers and Exporters Association
WorkSafe New Zealand

Additional Interests

B&R Enclosures Pty Ltd
Coates Hire
Focused Quality Systems
Triple Electrical Inspections

This Standard was issued in draft form for comment as DR AS/NZS 3002:2020.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

www.standards.org.au

www.standards.govt.nz

ISBN 978 1 76113 398 5

Documents
Document Sharing Hub

Full document details: AS NZS 3002-2021

Australian/New Zealand Standard™

Electrical installations — Shows, carnivals and events

Originated as AS 3002—1974.
Second edition 1985.
Jointly revised and redesignated as AS/NZS 3002:2002.
Previous edition 2008.
Third edition 2021.

© Standards Australia Limited/the Crown in right of New Zealand, administered by the New Zealand Standards Executive 2021

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth) or the Copyright Act 1994 (New Zealand).

Documents
Document Sharing Hub

Full document details: AS NZS 3002-2021

Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-001, Wiring Rules, to supersede AS/NZS 3002:2008, *Electrical installations — Shows and carnivals*.

This edition was prepared to update requirements for the use of electricity for lighting and power in concessions, stands, tents, booths and other shows carnivals and event structures and areas associated with shows, carnivals, events and the like in conjunction with the issue of AS/NZS 3000:2018. It is to be noted that some States have legislation that calls up additional requirements to those contained in this Standard.

This Standard differs from AS/NZS 3002:2008 in several areas including the following:

(a) The structure of this Standard is similar to AS/NZS 3000 with respect to the flow of information contained within.

(b) Shows, carnivals and events, public events and limited domestic events are encompassed.

(c) Section 2 provides requirements for electrical installation wiring.

(d) Section 3 provides requirements for event wiring, equipment and appliances that are present during the event only.

(e) The requirements around the use of three-pin plug adaptors (tapon, piggyback or similar fittings) have been added to ensure the safety of their use.

(f) There is an emphasis on electrical safety at shows, carnivals and events.

(g) A number of appendices from AS/NZS 3000:2018 are provided as reference material.

(h) Specific requirements are included for periodic assessment of events installations in Appendix C.

(i) Guidance is provided for initial and periodic verification of event wiring.

This Standard may be applied through legislative requirement, from a date to be set by the relevant regulatory authority. If work on an installation was commenced before publication of this edition, refer to the relevant authority regarding permission for the installation to be completed under AS/NZS 3002:2008 as applicable.

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

See Foreword for information on how to interpret and use this Standard.

Documents
Document Sharing Hub

© Standards Australia Limited/Standards New Zealand 2021

Full document details: AS NZS 3002-2021

Contents

Preface ..... **ii**

Foreword ..... **v**

Section 1 Scope and general **1**
1.1 Scope 1
1.1.1 General 1
1.1.2 Inclusions 1
1.1.3 Exclusions 2
1.2 Application 3
1.3 Normative references 3
1.4 Terms and definitions 5
1.5 Alterations and repairs 9
1.5.1 Alterations 9
1.5.2 Repairs 9

Section 2 Installation wiring for shows, carnivals and events **10**
2.1 General 10
2.2 Method of supply 10
2.2.1 General 10
2.2.2 Normal supply 10
2.2.3 Alternative supply 11
2.2.4 Standalone supply 11
2.2.5 Supplementary supply 11
2.3 Maximum demand 11
2.4 General arrangement, control and protection 11
2.4.1 Control and isolation 11
2.4.2 Overcurrent protection 11
2.5 Additional protection by residual current devices (RCDs) 12
2.5.1 Requirements for additional RCD protection 12
2.5.2 Location of RCD protection 13
2.6 Switchboards 13
2.6.1 General 13
2.6.2 Accessibility 13
2.6.3 Mounting height 13
2.6.4 Identification 13
2.6.5 Strain relief 13
2.6.6 Isolation devices 13
2.7 Wiring systems 14
2.7.1 General 14
2.7.2 Cable selection 14
2.7.3 Connection of cables 14
2.7.4 Underground wiring 15
2.7.5 Aerial wiring system 16
2.7.6 Electrical connections 19

Section 3 Event wiring **20**
3.1 General 20
3.2 Electrical supply 20
3.2.1 Supply from electrical installation 20
3.2.2 Supply by generating system 21
3.3 Maximum demand 26
3.4 Event switchboards 27
3.4.1 Enclosure 27
3.4.2 Accessibility 27
3.4.3 Mounting height 27
3.4.4 Socket-outlets 28

AVA Documents
Document Sharing Hub

Full document details: AS NZS 3002-2021

3.5 Event wiring systems 28
3.5.1 Cable selection 28
3.5.2 Connection of cables 28
3.5.3 Cables installed on ground, floor or platform 30
3.5.4 Underground wiring 30
3.5.5 Aerial Wiring 31
3.5.6 Cables supported by a catenary 31
3.6 Flexible cords and cord extension sets 32
3.6.1 General 32
3.6.2 Event wiring - detachable connections 34
3.7 Electrical accessories for events 35
3.7.1 General 35
3.7.2 ACS for event sites 36
3.7.3 Auxiliary socket-outlet panels 37
3.7.4 Outlet boxes 38
3.7.5 Electrical portable outlet devices 40
3.8 Electrical equipment for events 41
3.8.1 General 41
3.8.2 Electrical accessories 41
3.8.3 Event lighting 41
3.8.4 Prohibited zones around gas cylinders 44
3.9 Riding devices 44

Section 4 Verification 46
4.1 General 46
4.2 In Australia 46
4.2.1 Initial verification of installation wiring 46
4.2.2 Initial verification of event wiring 46
4.2.3 Periodic verification 46
4.3 In New Zealand 47
4.3.1 Initial verification 47
4.3.2 Verification following repairs 47
4.3.3 Periodic assessment 47

Appendix A (informative) **Electrical installation and event wiring guide 49**

Appendix B (informative) **Low voltage event wiring arrangements 52**

Appendix C (normative) **Periodic assessment of permanent installation at event venues New Zealand only 60**

Appendix D (normative) **Periodic assessment of event wiring New Zealand only 65**

Appendix E (informative) **Degrees of protection of enclosed equipment 70**

Appendix F (informative) **WS classification of wiring systems 75**

Appendix G (normative) **Marking of event switchboards to indicate the presence of live parts 82**

Appendix H (informative) **Recommended colours for tags on tested equipment 83**

Bibliography 84

Documents
Document Sharing Hub
Full document details: AS NZS 3002-2021

Foreword

Application of typefaces

Four different typefaces are used in this Standard. Each of these has a specific purpose as follows:

(a) **Bold print indicates opening statements defining the fundamental principles and requirements.**

(b) Normal print indicates requirements that form the main part of a clause. It also indicates deemed to comply methods that satisfy the requirements. Normal print is used in the Appendices to present informative material for guidance only.

(c) *Italic print indicates exceptions or variations to requirements. Exceptions generally give specific examples where the requirements do not apply or where they are varied for certain applications. They may contain requirements. Examples are also presented in italic text.*

(d) Reduced normal print indicates notes which give explanations and advice. They are preceded by "NOTE" in the manner used in previous editions.

It is important not to read text in any single typeface without consulting the preceding or following paragraphs, which may contain additional or modifying requirements.

National requirements

Certain provisions of the Standard have a different application in Australia and New Zealand. The following symbols appearing in the outer margin indicate that the identified Section or Clause is:

(i) Applicable in Australia only. **A**

(ii) Applicable in New Zealand only. **NZ**

Informative appendices

An informative appendix is for information or guidance only. Informative appendices provide additional information intended to assist in the understanding or use of the Standard.

Informative

For information and guidance only.

Normative

A term used to describe an element of a Standard to which it is necessary to conform in order to be able to claim compliance with the Standard.

Deemed to comply

The term "deemed to comply" means that a requirement can be met by following a specified Standard or method.

So, where an installation is carried out in accordance with the specified Standard or method, within the text of this Standard, the installation is "deemed to comply" with the requirements of this Standard.

Conformance to a deemed to comply Standard may exceed the minimum requirements of this Standard.

Notes

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard.

Documents Document Sharing Hub
© Standards Australia Limited/Standards New Zealand 2021
Full document details: AS NZS 3002-2021

Notes to clauses are informative and give explanations or advice. They do not form a mandatory part of this Standard.

Cross-references

Where reference to another clause has been made, such reference, unless otherwise stated, includes all appropriate subclauses and paragraphs of the clause or portion thereof referred to.

Frequently asked questions (FAQs)

Answers to FAQs can be found online at the following web address:

www.standards.org.au/faqs

Clarifications to requirements of the Wiring Rules that were covered by Rulings and Interpretations in earlier editions will be included in FAQs as the need arises. These FAQs are applicable throughout Australia and New Zealand and are developed by the Joint Standards Australia/Standards New Zealand Committee EL-001, Wiring Rules.

Provision for revision

This Standard is not intended to discourage invention or to exclude materials, equipment and methods that may be developed. Revisions will be made from time to time in view of such developments and Amendments to this edition will be made where essential.

© Standards Australia Limited/Standards New Zealand 2021

Documents
Document Sharing Hub

Full document details: AS NZS 3002-2021

Australian/New Zealand Standard

Electrical installations — Shows, carnivals and events

Section 1 Scope and general

1.1 Scope

1.1.1 General

This Standard sets out requirements for the supply of electricity to power consuming devices for —

(a) shows, carnivals and events;

(b) public events; and

(c) limited duration private domestic or private corporate events where attendance is expected to be in excess of 30 people or when staff are employed for the event.

Where an event is held at premises not normally used for events; this Standard applies to the event wiring of the event.

The particular requirements of this Standard are additional to, replace, or modify the general requirements of AS/NZS 3000 for the electrical wiring of shows, carnivals and events.

Where this Standard does not specify a requirement, the relevant requirements of AS/NZS 3000 apply.

NOTE See Appendices E and F for information on degrees of protection of enclosed equipment and WS classification of wiring systems from AS/NZS 3000:2018.

1.1.2 Inclusions

This Standard applies to the supply of electricity at low voltage to power consuming devices used for commercial, entertainment or display purposes at shows, carnivals and events within the event perimeter including but are not limited to the following:

(a) Concessions.

(b) Tents.

(c) Vending stalls.

(d) Catering services.

(e) Other structures associated with events either permanent or for the duration of an event.

(f) Limited duration events at showgrounds, amusement parks and circuses.

(g) Limited duration private domestic or private corporate events where attendance is expected to be in excess of 30 people or when staff are employed for the event.

For the purposes of this Standard, public events include exhibitions, shows, carnivals, farmers markets, craft markets and the like.

This Standard may also be used for scouting jamborees, military camps or civil defence shelters in conjunction with the AS/NZS 3001 series.

NOTE Recommendations are also made for the in-service testing of portable and fixed electrical equipment used on such sites.

Documents Document Sharing Hub
© Standards Australia Limited/Standards New Zealand 2021
Full document details: AS NZS 3002-2021

1.1.3 Exclusions

This Standard does not apply to the permanent installation wiring complying with AS/NZS 3000, not normally used for events; but which may host an event from time to time.

This Standard does not apply to permanent wiring connectable electrical installations (as defined in the AS/NZS 3001 series) used for shows, carnivals and other similar events, which comply with the requirements of AS/NZS 3001.2.

NOTE AS/NZS 3001.2 (Part 2 of the AS/NZS 3001 series) is in preparation.

This Standard does not apply to amusement rides and devices, which comply with the requirements of AS 3533.

Exclusions include relocatable units for —

(a) homes;

(b) huts;

(c) site offices;

(d) cloakrooms;

(e) meeting offices;

(f) dormitories;

(g) canteens;

(h) First Aid rooms;

(i) toilet facilities;

(j) washroom facilities; and

(k) other facilities, such as:

  (i) tents for accommodation; and

  (ii) rigid and non-rigid annexes.

Exclusions include connectable electrical installations with or without wheels that can readily be moved from one site to another either under their own motive power or by some other means including the following:

(A) Recreational Vehicles (RVs) including —

  (1) caravans;

  (2) camper vans;

  (3) motor homes,

  (4) camper trailers;

  (5) pop top caravans;

  (6) tent trailers;

  (7) fifth wheel caravans;

  (8) slide on campers;

© Standards Australia Limited/Standards New Zealand 2021

Documents
Document Sharing Hub

Full document details: AS NZS 3002-2021

(9) converted buses or trailers for the purpose of accommodation or recreational purposes; and

(10) any towable, self-propelled or hybrid vehicle intended for use as accommodation or for recreational purposes that does not specifically fit into any of the above categories.

(B) Non-recreational vehicles, such as —

(1) horse floats; and

(2) semi-trailers.

(3) livestock or car transporters;

(4) vehicles such as food and drink vending vans and trailers;

(5) educational display caravans and trailers, mobile classrooms;

(6) television outside broadcast vans;

(7) mobile stages;

(8) display units e.g. mobile electronic score boards and advertising signs, mobile traffic information signs; and

(9) hybrid, any towable or self- propelled recreational vehicle that does not fit specifically into any of the above categories.

1.2 Application

This Standard may be applied through legislative requirements, made in each State and Territory of Australia and in New Zealand, concerned with the safety of electrical installations. The Standard may also be applied in conjunction with any additional requirements, exemptions or restrictions in such legislation.

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 for informative purposes are listed in the Bibliography.

AS 3533, *Amusement rides and devices*

AS 3996, *Access covers and grates*

AS 60529, *Degrees of protection provided by enclosures (IP Code)*

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

AS/NZS 3001, *Electrical installations — Transportable structures and vehicles including their site supplies*

AS/NZS 3008.1, *Electrical installations — Selection of cables (series)*

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

AS/NZS 3012, *Electrical installations — Construction and demolition sites*

AS/NZS 3019, *Electrical installations — Periodic verification*

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

Documents Document Sharing Hub
© Standards Australia Limited/Standards New Zealand 2021
Full document details: AS NZS 3002-2021

AS/NZS 3105, *Approval and test specification — Electrical portable outlet devices*

AS/NZS 3112, *Approval and test specification — Plugs and socket-outlets*

AS/NZS 3120, *Approval and test specification — Cord extension sockets*

AS/NZS 3123, *Approval and test specification — Plugs, socket-outlets and couplers for general industrial application*

AS/NZS 3128, *Approval and test specification — Portable lamp standards and brackets*

AS/NZS 3131, *Approval and test specification — Plugs and socket-outlets for stationary appliances*

AS/NZS 3190, *Approval and test specification — Residual current devices (current-operated earth-leakage devices)*

AS/NZS 3191, *Electric flexible cords*

AS/NZS 3199, *Approval and test specification — Cord extensions sets*

AS/NZS 3439.4, *Low-voltage switchgear and controlgear assemblies, Part 4: Particular requirements for assemblies for construction sites (ACS)*

AS/NZS 3760, *In-service safety inspection and testing of electrical equipment*

AS/NZS 4509, *Stand-alone power systems (series)*

AS/NZS 4763, *Safety of portable inverters*

AS/NZS 4777, *Grid connection of energy systems via inverters (series)*

AS/NZS 5000, *Electric cables — Polymeric insulated (series)*

AS/NZS 5033, *Installation and safety requirements for photovoltaic (PV) arrays*

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

AS/NZS 60598, *Luminaires (series)*

AS/NZS 60598.2.20, *Luminaires, Part 2.20: Particular requirements — Lighting chains (IEC 60598-2-20:1996, MOD)*

AS/NZS 60598.2.21, *Luminaires, Part 2.21: Particular requirements — Rope lights (IEC 60598-2-21, Ed 1.0 (2014) MOD)*

AS/NZS 61008.1, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) — General rules (IEC 61008-1, Ed. 3.2 (2013) MOD)*

AS/NZS 61009.1, *Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)*

AS/NZS 61439.4, *Low-voltage switchgear and controlgear assemblies — Part 4: Particular requirements for assemblies for construction sites*

AS/NZS 61558.1, *Safety of power transformers, power supply units and similar, Part 1: General requirements and tests*

IEC 60309-2, *Plugs, socket-outlets and couplers for industrial purposes — Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories*

IEC 62423, *Type F and type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses*

NZS 6115, *Electrical installations — Mobile medical facilities*

© Standards Australia Limited/Standards New Zealand 2021

Documents
Document Sharing Hub

Full document details: AS NZS 3002-2021

1.4 Terms and definitions

For the purposes of this document, the terms and definitions in AS/NZS 3000 and those below apply. Where an additional term is defined in a particular Section or Clause, the term takes the meaning defined in that Section or Clause.

1.4.1
assembly of low-voltage switchgear and controlgear for construction sites
ACS
combination of one or several transforming or LV switching devices, with associated control, measuring, signalling, protective and regulating equipment, complete with all their internal electrical and mechanical connections and structural parts, designed and built for use on all construction sites, indoors and outdoors

Note 1 to entry: ACS was known as a Cascadable Reticulation Unit (CRU).

1.4.2
carnival
gathering of stalls and/or amusements for public entertainment or sale of goods

1.4.3
competent person
person, who has acquired, through training, qualification or experience or a combination of these, the knowledge and skill enabling that person to perform the task required correctly

1.4.4
concession
any booth, display, riding device, stand or any other single entertainment unit

1.4.5
connection facility
any point within a permanent site installation supplying or intended to supply electrical power at low voltage to event wiring. A connection facility is typically a socket-outlet or set of terminals or links, being the point(s) at which the event wiring is connected to the permanent electrical installation

1.4.6
detachable connection
electrical connection of temporary low voltage electrical wiring and electrical equipment by means of a plug and socket-outlet, or socket and appliance inlet or a permanently attached lead and plug

1.4.7
direct connection
electrical connection of low voltage electrical wiring to other low voltage wiring, or to electrical equipment, by means requiring the handling of uninsulated conducting parts

Note 1 to entry: For example, the termination of bared conductor ends into screw-type terminals or using cable ends fitted with cable lug terminations on insulated connection studs.

1.4.8
electrical portable outlet device
EPOD
device, other than a cord extension set, having a single means of connection to a low voltage electrical power supply, and one or more socket-outlets. It may incorporate a reeling or coiling arrangement for the supply lead

[SOURCE: AS/NZS 3105]

1.4.9
event
occurrence that is an entertainment, such as a sporting, community, commercial or business occasion, public or private festival or pageant where systems are used for the duration of an event

Documents Document Sharing Hub
© Standards Australia Limited/Standards New Zealand 2021
Full document details: AS NZS 3002-2021

1.4.10
event duration
amount of time or a particular time interval that an event is operating for, including time taken to setup and pull down

1.4.11
event, public
event open to be attended by the general public, whether or not entry is restricted (for example to ticket holders only)

1.4.12
exhibition
event for purpose of displaying and/or selling products etc, which can take place in any suitable location, either a room, building, or non-permanent structure

1.4.13
keyed single pole connector (coupler)
KSPC
means of enabling the connection, of single-core flexible cables (see Figure 1.1). It consists of the following two parts:

(a) Connector: Male (Source) contact type integral with, or intended to be attached to, the single-core flexible cable connected to the supply; and

Note 1 to entry This term "Source" is used to describe the connector fitted with a male contact in a female housing; it is usually the connector attached to the source of the power, i.e. the live connector. The contact is fitted with an insulated end cap to prevent touching of live parts.

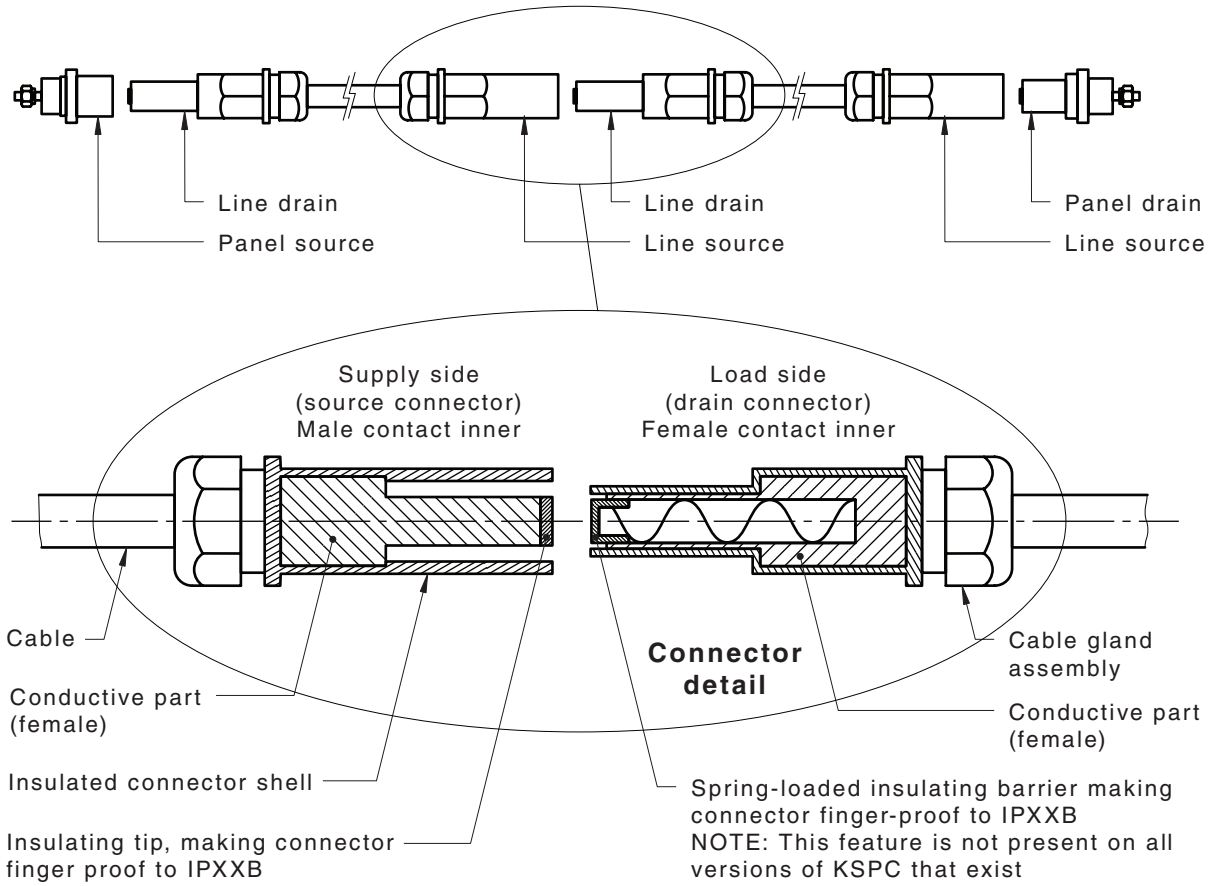
(b) Plug: Female (Drain) contact type integral with, or intended to be attached to, the single-core flexible cable connected to the equipment.

Note 2 to entry This term "Drain" is used to describe the connector fitted with a female contact in a male housing. This is not normally the live conductor; however it does include the spring-loaded insulated cap to prevent touching of live parts. The Drain connector is fitted with a secondary locking pin that locks into the mating half when the two connectors are fully engaged. A release key is required to disconnect the connectors. See Figure 1.1.

© Standards Australia Limited/Standards New Zealand 2021

Documents
Document Sharing Hub

Full document details: AS NZS 3002-2021



[SOURCE: Figure adapted from Figure F.1 from BS 7909:2011. Permission to reproduce extracts from British Standards is granted by BSI Standards Limited (BSI). No other use of this material is permitted.]

Figure 1.1 — Typical arrangement for KSPC and cross section of KSPC source and drain connector

1.4.14
outlet box
portable power distribution unit supplied via an attached or detachable flexible lead and fitted with one or more socket-outlets and one or more overload protective devices

Note 1 to entry: It may also incorporate a residual current device (RCD) and reeling or coiling arrangements.

1.4.15
residual current device
RCD
device intended to isolate supply to protected circuits, socket-outlets or equipment in the event of a current flow to earth which exceeds a predetermined value

1.4.16
shall
indicates a statement is mandatory

1.4.17
should
indicates a recommendation

Documents
Document Sharing Hub
© Standards Australia Limited/Standards New Zealand 2021
Full document details: AS NZS 3002-2021

1.4.18
show
display or performance in any suitable location, either a room, building or structure for the duration of an event

1.4.19
site
any area encompassing all the concessions of a show, carnival and event

1.4.20
stand
area or structure used for the duration of an event for display, marketing, sales, entertainment, etc

1.4.21
standalone supply
standalone power systems
systems that are not connected to the power distribution systems of an electricity entity/distributor. Standalone systems are supplied with power from one or more of a number of sources

Note 1 to entry: For example, power may be supplied from a photovoltaic (PV) array, a wind turbine generator, a micro-hydro generator and a motor-generator set.

1.4.22
supply, alternative
supply system intended to maintain the functioning of an electrical installation or a part or parts thereof, in case of interruption of the normal supply

1.4.23
supply, normal
source of supply that the electrical installation is supplied from under normal conditions of operation

Note 1 to entry: The normal supply is usually from a distribution network but may instead be from a generation system.

1.4.24
supply, supplementary
supply system intended to operate in conjunction with the normal supply

1.4.25
switchboard
assembly of circuit protective devices, with or without switchgear, instruments or connecting devices, suitably arranged and mounted for distribution to, and protection of, one or more submains or final subcircuits, or a combination of both

1.4.26
wiring, installation
system of wiring in which cables are fixed or supported in position in accordance with the appropriate requirements of AS/NZS 3000 and this Standard

1.4.27
wiring, event
system of wiring, equipment and accessories assembled for the duration of an event and removed at the end of the event

Note 1 to entry: This includes but is not limited to; KSPCs, ACSs, outlet boxes, EPODs, cord extension sets, generator systems and appliances used for the event.

© Standards Australia Limited/Standards New Zealand 2021

Documents
Document Sharing Hub

Full document details: AS NZS 3002-2021

1.5 Alterations and repairs

1.5.1 Alterations

Alterations to electrical installations in shows, carnivals and events shall comply with all relevant provisions of this Standard.

Alterations to electrical installations shall not cause any portion of the original electrical installation, or electrical equipment connected thereto, to —

(a) carry currents or sustain voltages in excess of those permitted by AS/NZS 3000; or

(b) be used in any manner that is not in accordance with AS/NZS 3000 and this Standard.

1.5.2 Repairs

Repairs to existing electrical installations in shows carnivals and events or parts thereof may be effected using methods, fixtures and fittings that were acceptable when that part of the electrical installation was originally installed or with methods, fixtures and fittings currently available as direct replacement, provided that the methods satisfy the fundamental safety principles of Part 1 of AS/NZS 3000.

© Standards Australia Limited/Standards New Zealand 2021

Documents Document Sharing Hub

Full document details: AS NZS 3002-2021

Section 2 Installation wiring for shows, carnivals and events

2.1 General

The requirements of this Section apply to all low voltage electrical installation wiring (fixed wiring) and electrical equipment that is installed to supply electricity for shows, carnivals and events.

These requirements include—

(a) method of supply;

(b) maximum demand;

(c) control and protection;

(d) overcurrent protection;

(e) supplementary protection by RCDs;

(f) switchboards;

(g) isolating devices;

(h) wiring systems; and

(i) electrical connections.

NOTE Electrical installations as defined in Clause 1.1.3 need not comply with the requirements of this Standard.

2.2 Method of supply

2.2.1 General

The low voltage electrical supply for any show, carnival or event shall be in accordance with—

(a) AS/NZS 3000;

(b) the additional or modified requirements of this Standard; and

(c) other applicable Standards including but not limited to—

(i) AS/NZS 4509;

(ii) AS/NZS 3010;

(iii) AS/NZS 5033;

(iv) AS/NZS 4777;

(v) AS/NZS 4763; and

(vi) AS/NZS 5139.

2.2.2 Normal supply

A normal supply to a show, carnival or event shall be in accordance with AS/NZS 3000 and other applicable standards, e.g. AS/NZS 3010, AS/NZS 5033, AS/NZS 4777 and AS/NZS 5139.

© Standards Australia Limited/Standards New Zealand 2021

Documents
Document Sharing Hub

Full document details: AS NZS 3002-2021

2.2.3 Alternative supply

An alternative supply to a show, carnival or event shall be in accordance with AS/NZS 3000 and other applicable standards, e.g. AS/NZS 3010, AS/NZS 5033, AS/NZS 4777 and AS/NZS 5139.

2.2.4 Standalone supply

A standalone supply to a show, carnival or event shall be in accordance with AS/NZS 3000 and other applicable standards, e.g. AS/NZS 3010, the AS/NZS 4509 series, AS/NZS 5139 and AS/NZS 4763.

2.2.5 Supplementary supply

A supplementary supply to a show, carnival or event shall be in accordance with AS/NZS 3000 and other applicable standards, e.g. AS/NZS 5033, AS/NZS 4777 and AS/NZS 5139.

2.3 Maximum demand

The maximum demand in a permanent installation shall be determined by one of the methods outlined in AS/NZS 3000.

The maximum demand for events wiring shall be determined in accordance with Clause 3.3.

2.4 General arrangement, control and protection

2.4.1 Control and isolation

Every connection facility shall be controlled by its own individual isolating switch mounted on or immediately adjacent to the associated connection facility.

The overcurrent circuit-breaker required by Clause 2.4.2 will satisfy this requirement if it is mounted on, or is immediately adjacent to, the associated connection facility.

2.4.2 Overcurrent protection

2.4.2.1 Connection facility overcurrent protection

Each connection facility shall be —

(a) supplied by a dedicated circuit; and

(b) protected by a separate overcurrent protection device in accordance with the following:

(i) For connection facilities rated up to 50 A, the device shall be a circuit breaker.

(ii) For connection facilities rated 50 A or more, the device shall be a circuit breaker or High Rupturing Capacity (HRC) fuse(s).

(iii) Where the connection facility is a socket-outlet, the rating of the overcurrent protective device shall not exceed the rating of that socket-outlet.

HRC fuse bases shall provide a minimum degree of protection of IP2X with the fuse carrier removed.

2.4.2.2 In Australia

In Australia, the overcurrent circuit-breaker required by Clause 2.4.2.1 shall operate in all live (active and neutral) conductors. **A**

Documents Document Sharing Hub
© Standards Australia Limited/Standards New Zealand 2021
Full document details: AS NZS 3002-2021

2.4.2.3 Final subcircuit overcurrent protection

If there is only one final subcircuit, overcurrent protection may be provided by the current limiting circuit-breaker required by Clause 2.4.2.1.

2.4.2.4 Overcurrent protection marking requirements

Overcurrent protective devices shall be permanently and legibly identified on or adjacent to the circuit-breaker indicating the electrical section of the installation or equipment it controls and protects.

NOTE The provision of a switchboard legend will satisfy this requirement.

2.5 Additional protection by residual current devices (RCDs)

2.5.1 Requirements for additional RCD protection

In Australia, additional protection by RCDs with a maximum rated residual current of 30 mA in accordance with AS/NZS 61008.1 or AS/NZS 61009.1 or IEC 62423 that operate in all live (active and neutral) conductors shall be provided for final subcircuits with a rating not exceeding 32 A supplying — A

(a) socket-outlets;

(b) lighting; and

(c) direct connected electrical equipment that represents an increased risk of electric shock. Factors that may represent an increased risk of electric shock include external influences.

RCDs shall be of the type for which tripping is ensured —

(i) for residual sinusoidal alternating current; or

(ii) for residual sinusoidal alternating current and residual pulsating direct current.

For 24 months from the date of publication of AS/NZS 3000:2018 Amendment No. 2, either Item (i) or (ii) may apply. Following that time, Type AC RCDs as described in Item (i) shall not be installed.

In New Zealand, additional protection by RCDs with a maximum rated residual current of 30 mA that complies with the requirements of a Type A RCD in accordance with AS/NZS 61008.1 or AS/NZS 61009.1 or IEC 62423 that operate in all live (active and neutral) conductors shall be provided for final subcircuits with a rating not exceeding 32 A supplying — NZ

(A) socket-outlets;

(B) lighting; and

(C) direct connected electrical equipment that represents an increased risk of electric shock. Factors that may represent an increased risk of electric shock include external influences.

Exceptions: These requirements need not apply to the following:

1 Repairs in accordance with Clause 1.5.2.

2 Situations where the disconnection of a circuit by an RCD could cause a danger greater than earth leakage current.

3 Final subcircuits installed for the connection of specific items of equipment, provided that the connected equipment is designed, constructed and installed in such a manner that is not likely to present a significant risk of electric shock and —

(a) *is required by the owner or operator to perform a function that is essential to the performance of the installation and that function would be adversely affected by a loss of supply caused by the RCD operation; or*

© Standards Australia Limited/Standards New Zealand 2021

AVA Documents Document Sharing Hub

Full document details: AS NZS 3002-2021

(b) *may cause spurious nuisance tripping through high leakage current being generated in the normal operation of the equipment (e.g. amusement rides).*

In addition, where the specific item of equipment is connected by a plug and socket-outlet, that socket-outlet is—

(i) *located in a position that is not likely to be accessed for general use; and*

(ii) *clearly marked to indicate the restricted use of that socket-outlet and that RCD protection is not provided for that socket-outlet (e.g. outlet boxes and ACSs).*

4 Where other methods of protection are applied, e.g. a separated supply.

2.5.2 Location of RCD protection

Where protection of final subcircuits is required, RCDs shall be installed at the switchboard from which the final subcircuit originates.

2.6 Switchboards

2.6.1 General

A switchboard or switchboards shall be provided in an electrical installation for the mounting or the enclosure of switchgear and protective devices to the requirements of AS/NZS 3000.

2.6.2 Accessibility

All switchboards shall be readily accessible and shall be protected from damage.

2.6.3 Mounting height

All electrical equipment within a switchboard shall be located not more than 2.0 m above the relevant ground, floor or platform level.

2.6.4 Identification

Where there is more than one switchboard on site, each switchboard shall be legibly and indelibly marked with a set of numbers or letters, or both, which uniquely distinguishes the switchboard from others on the site, see Clause C.6.3.

2.6.5 Strain relief

Where the switchboard is provided with socket-outlets and insulated terminals provided for the connection of event wiring, means to prevent strain on connections or terminations, such as an insulated or covered tie bar, shall be provided for the anchorage of external cables and flexible cords.

2.6.6 Isolation devices

2.6.6.1 Control

Each switchboard shall be provided with one isolating switch, complying with the requirements for isolating switches in AS/NZS 3000.

This switch shall interrupt supply to all final subcircuits and submains originating from the switchboard, including circuits supplying socket-outlets mounted on the switchboard.

Documents Document Sharing Hub
© Standards Australia Limited/Standards New Zealand 2021
Full document details: AS NZS 3002-2021

Exceptions:

1 One additional switch may be provided, marked in accordance with this Clause 2.6.6.2 for the control of all final subcircuits intended to operate outside of normal working hours.

2 Additional switches controlling safety services, where required by AS/NZS 3000, shall be provided and clearly identified, all in accordance with AS/NZS 3000.

3 Where multiple electricity supplies are connected to a single switchboard, each supply shall be controlled by an isolating switch and the final subcircuits segregated by barriers from other supplies within that switchboard.

2.6.6.2 Marking of isolating switches

All isolating switches controlling the portions of the installation included in Clause 2.6.6.1 shall be marked as required by AS/NZS 3000 and as follows:

"MAIN SWITCH" — on main switchboards.

"DISTRIBUTION BOARD ISOLATING SWITCH" — on distribution boards.

"ISOLATING SWITCH AFTER HOURS SUPPLY — DO NOT SWITCH OFF" — for circuits supplying electrical equipment operating outside of normal working hours.

Main switches for safety services shall be identified in accordance with AS/NZS 3000.

2.7 Wiring systems

2.7.1 General

Wiring systems shall be able to operate safely and shall function properly in the conditions to which they are likely to be exposed at the point of installation.

Protections against such adverse influences may be provided by—

(a) suitable design and construction of the wiring system; or

(b) additional means, provided as part of the electrical installation, that do not adversely affect operation of the wiring system.

2.7.2 Cable selection

Installation wiring for a show, carnival or event shall have adequate cross-sectional area and current carrying capacity in accordance with the requirements of AS/NZS 3008.1 series.

2.7.3 Connection of cables

2.7.3.1 Direct connections facilities

Any provisions made for direct connection of a low voltage electrical wiring installation for an event shall be installed in accordance with AS/NZS 3000.

2.7.3.2 Keyed single pole connectors

Where Keyed Single Pole Connectors (KSPCs) are used to supply event wiring from a low voltage electrical installation, sequential panel connectors shall be installed at the connection facility.

Keyed Single Pole Connectors (KSPCs) shall —

(a) be keyed for their circuit function; and

© Standards Australia Limited/Standards New Zealand 2021

Documents
Document Sharing Hub

Full document details: AS NZS 3002-2021

(b) be coloured in accordance with conductor colours for installation wiring in AS/NZS 3000; and

(c) carry the relevant alphanumeric markings; and

(d) provide touch protection from live contacts when disconnected with the degree of protection of IP23, in accordance with AS 60529; and

(e) be provided with a locking facility to prevent disconnection of the KSPC without the use of a tool to disable the locking device and the disconnection of the KSPC assemblies.

See Clause 3.5.2.2 for KSPCs used for event wiring.

2.7.3.3 Socket-outlets for connection facilities

Taking into account local conditions including any regulatory authority requirements and the types of plugs used by typical or anticipated users of socket-outlets, each socket-outlet supplying a show, carnival or event shall comply with one of the following Standards —

(a) AS/NZS 3112 (three-pin, flat pin) with a minimum rating of 15 A; or

(b) AS/NZS 3123 (round pin) with a minimum rating of 20 A; or

(c) IEC 60309-2 (round pin) with a minimum rating of 16 A; or

(d) AS/NZS 3131, with a maximum rating of 32 A.

Exception: Where local conditions and/or regulatory requirements mean that plugs matching other types of socket-outlet are likely to be in common use, these requirements need not apply.

2.7.4 Underground wiring

Underground wiring within a show, carnival or event site shall be installed where pegs or anchor stakes are not likely to be driven. (e.g. outside of the area of all concessions).

Where pegs or anchor stakes exceeding 400 mm are reasonably expected to be used, the following requirements shall apply in addition to those of AS/NZS 3000 —

(a) the cable shall be located at a depth of not less than 1.0 m; or

(b) where the depth of burial is less than 1.0 m, mechanical protection greater than that required by AS/NZS 3000 shall be provided by —

  (i) a continuous pour of concrete, which shall —

    (A) be placed not more than 75 mm above the wiring system; and

    (B) have a thickness of not less than 100 mm; and

    (C) be not less than 150 mm wide and overlap the wiring system by at least 40 mm on each side; or

  (ii) an alternative that provides an equivalent level of mechanical protection detailed in (i) above; or

(c) where rock is encountered closer to the surface than 1.0 m, the cable may be enclosed in heavy gauge galvanized steel tube or heavy-duty insulating conduit installed in a Category C underground wiring system as specified in AS/NZS 3000; or

(d) for cable location marking, the following shall be provided:

  (i) An underground cable location marking of the cable entry point to buildings and the like.

Documents Document Sharing Hub
© Standards Australia Limited/Standards New Zealand 2021
Full document details: AS NZS 3002-2021

(ii) An underground cable location plan in the switchboard supplying the underground cable to the requirements of AS/NZS 3000.

NOTE Pegs or anchor stakes longer than 400 mm may be used for larger marquees such as circus tents, and/or at sites that are exposed to extreme weather conditions.

2.7.5 Aerial wiring system

2.7.5.1 General

Aerial wiring systems shall consist of either —

(a) insulated aerial conductors; or

(b) cable supported by a catenary.

NOTE The use of aerial wiring systems may be prohibited by the relevant regulatory authority in some areas, particularly those areas at risk of bushfire.

2.7.5.2 Types of conductor

Conductors used as aerial conductors shall be —

(a) polymeric insulated cables; or

(b) parallel-webbed, twisted or bundled insulated cables.

2.7.5.3 Minimum size

The minimum size of aerial conductors shall be not less than seven (7) strands and not smaller than 6 mm^2 copper or 16 mm^2 for aluminium.

2.7.5.4 Clearances

2.7.5.4.1 General

Aerial wiring shall be positioned to avoid crossing roadways or access ways where cranes, high loads or heavy machinery may travel.

Minimum height of aerial wiring shall be 6 m from the finished ground level, see Figure 2.1.

Where it is not possible to avoid access ways, an effective means shall be provided to minimize the risk of vehicular contact with the overhead wiring system. This condition may be satisfied by the placement of flagged catenary wires or cables of suitable material across the access way —

(a) 6 m on either side of the overhead wiring (see Figure 2.2); and

(b) 0.6 m below the lowest point of the overhead electrical cables or lower (see Figure 2.3).

NOTE Regulatory authorities may have additional requirements regarding aerial conductor clearances.

© Standards Australia Limited/Standards New Zealand 2021

Documents
Document Sharing Hub

Full document details: AS NZS 3002-2021

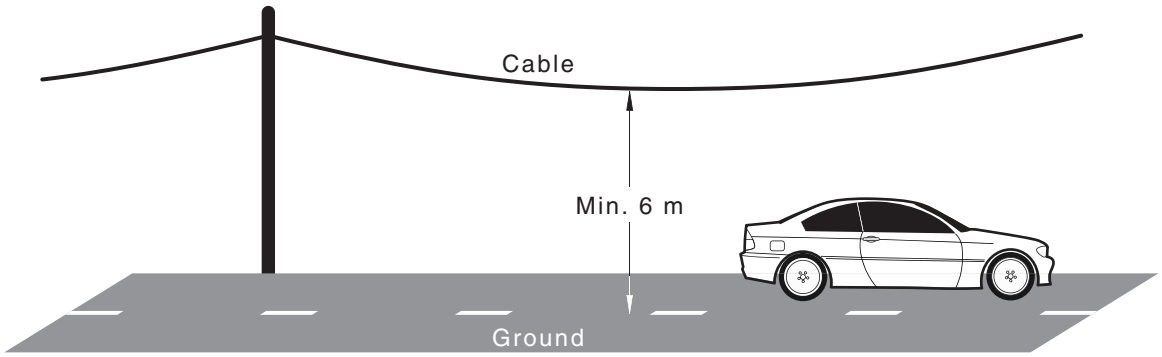


Figure 2.1 — Aerial wiring minimum height above ground

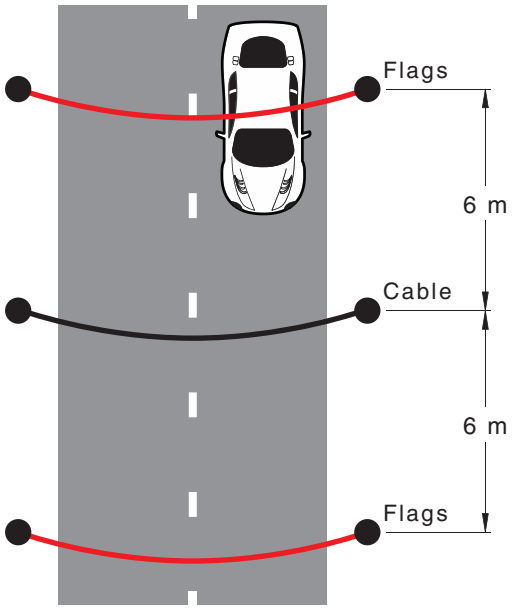


Figure 2.2 — Aerial wiring minimum horizontal distance between cable supports and flag supports

© Standards Australia Limited/Standards New Zealand 2021

Full document details: AS NZS 3002-2021

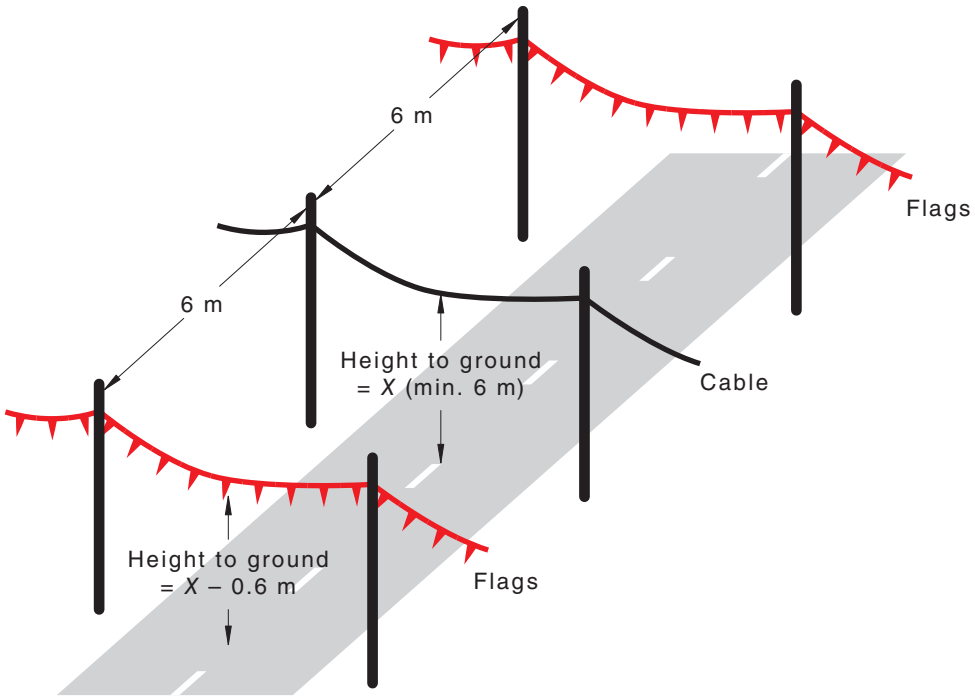


Figure 2.3 — Aerial wiring vertical height to ground minimum distance — ground to catenary and cable

If overhead wiring crosses a roadway or access-way, two additional flagged cables (or other suitable warning cables) need to be installed 6 m either side of the overhead wiring, and at least 0.6 m below the lowest point of the overhead wiring.

When installed overhead, all cables shall either be able to support their own weight at the appropriate height, as an insulated aerial conductor, or be supported by a secondary (catenary) wire, e.g. a steel wire or rope.

2.7.5.4.2 Safety warnings

Suitable devices or notices, warning of the presence of aerial conductors, shall be erected in locations where such conductors are erected, including —

(a) above areas used by sailing craft;

(b) where long lengths of conductive piping and material, such as irrigation pipes and lengths of steel, may be reasonably be expected to be raised or otherwise handled;

(c) where loading or unloading of high vehicles is likely to occur; or

(d) in other locations where the risk of inadvertent contact with aerial conductors may reasonably be anticipated.

NOTES:

1. The responsible water authority may have additional signage requirements where aerial conductors cross a waterway.

2. The relevant authority may require aerial conductors in the vicinity of an aerodrome, airport or landing strip to carry aircraft warning devices.

© Standards Australia Limited/Standards New Zealand 2021

Documents
Document Sharing Hub
Full document details: AS NZS 3002-2021

2.7.5.4.3 Distance between supports (spans)

The length of span of aerial conductors shall not exceed the values specified in Table 3.1 for the appropriate type and size of conductor.

Table 3.1 — Aerial conductor maximum spans

Type of conductor	Size mm^2	Maximum span m
Insulated annealed copper including neutral-screened	≥ 6	20
Insulated hard-drawn copper including two-, three- and four-core twisted but excluding neutral-screened	6	40
	10	50
	≥ 16	60
Neutral-screened cables with hard-drawn copper conductors —		
two conductors	6 or 10	40
three conductors	6 or 10	60
four conductors	6 or 10	50
two, three, or four conductors	16	60
Insulated aluminium excluding neutral screened	16	50
	≥ 25	60
Aerial bundled cables (aluminium conductor)	≥ 25	60

Exception: Spans greater than the values specified in Table 3.1 may be used, provided that the design is in accordance with sound engineering practice e.g. AS/NZS 7000.

2.7.6 Electrical connections

2.7.6.1 General

Connections between conductors, and between conductors and other electrical equipment, shall provide electrical continuity, an appropriate level of insulation and adequate mechanical strength.

The method of joining or connecting cables shall be suitable for the application and ensure that the conductivity of the joint or connection is not less than that of the conductor.

All cables and conductors shall be installed so that there is no undue mechanical stress on any connection.

2.7.6.2 Enclosure

All connection facilities shall be provided with an enclosure that complies with AS 60529 to a minimum degree of protection of IP23 with its maximum number of cables connected, or be installed under an appropriate cover providing an equivalent degree of protection.

© Standards Australia Limited/Standards New Zealand 2021

Documents Document Sharing Hub

Full document details: AS NZS 3002-2021

Section 3 Event wiring

3.1 General

The requirements of this Section apply to all low voltage electrical wiring and electrical equipment that is installed on the site for the duration of a show, carnival or event, including set up and pack up.

NOTE See Appendix A for typical installation and event wiring configurations.

3.2 Electrical supply

Supply to event wiring for a show, carnival or event shall be from one or more of the following:

(a) Supply from an electrical installation connection facility; in accordance with Clause 3.2.1.

(b) Supply from a generating system; in accordance with Clause 3.2.2.

3.2.1 Supply from electrical installation

3.2.1.1 Confirmation of overcurrent and RCD protection

Where the low voltage electricity supply for event wiring is provided from a socket-outlet of an electrical installation, prior to connecting to a socket-outlet, a competent person shall—

(a) verify that the socket-outlet is protected by an RCD; and

(b) record the location of the overcurrent and RCD protection device at the socket-outlet. This is to enable rapid restoration of supply.

3.2.1.2 Additional protection of event wiring

In Australia, all event wiring shall be protected by one or more RCDs with maximum rated residual current of 30 mA in accordance with AS/NZS 61008.1 or AS/NZS 61009.1 or IEC 62423 that operate in all live (active and neutral) conductors. See Figure 3.1 (a). **A**

RCDs shall be of the type for which tripping is ensured —

(a) for residual sinusoidal alternating current; or

(b) for residual sinusoidal alternating current and residual pulsating direct current.

For 24 months from the date of publication of AS/NZS 3000:2018 Amendment No. 2, either Item (a) or (b) may apply. Following that time, Type AC RCDs as described in Item (a) shall not be installed.

If a socket-outlet supplying event wiring does not have RCD protection; a portable RCD connected as the first item of event wiring supplied from that socket-outlet is deemed to comply with this requirement. See Figure 3.1 (b).

Exception: This requirement need not apply to any of the following:

1 Where the first item of equipment connected to the socket-outlet is an ACS unit.

2 Specific items of equipment that are either directly connected or supplied by a KSPC wiring system.

In New Zealand, all event wiring shall be protected by one or more RCDs with maximum rated residual current of 30 mA that complies with the minimum requirements of a Type A RCD in accordance with AS/NZS 61008.1 or AS/NZS 61009.1 or IEC 62423 that operate in all live (active and neutral) conductors. See Figure 3.1 (a). **NZ**

© Standards Australia Limited/Standards New Zealand 2021

Documents
Document Sharing Hub
Full document details: AS NZS 3002-2021

If a socket-outlet supplying event wiring does not have RCD protection; a portable RCD connected as the first item of event wiring supplied from that socket-outlet is deemed to comply with this requirement. See Figure 3.1 (b).

Exception: This requirement need not apply to any of the following:

1 Where the first item of equipment connected to the socket-outlet is an ACS unit.

2 Specific items of equipment that are either directly connected or supplied by a KSPC wiring system.

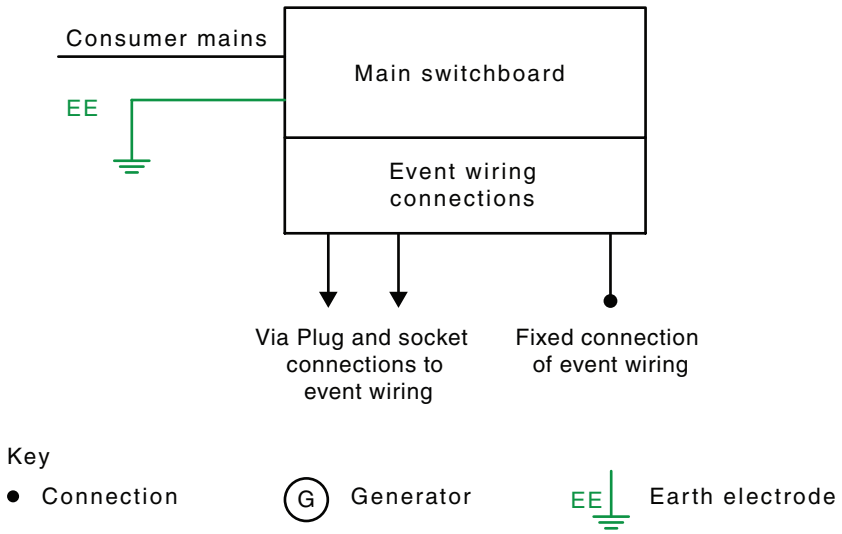


Figure 3.1(a) — Typical arrangement of normal supply from a single switchboard for a show, carnival or event

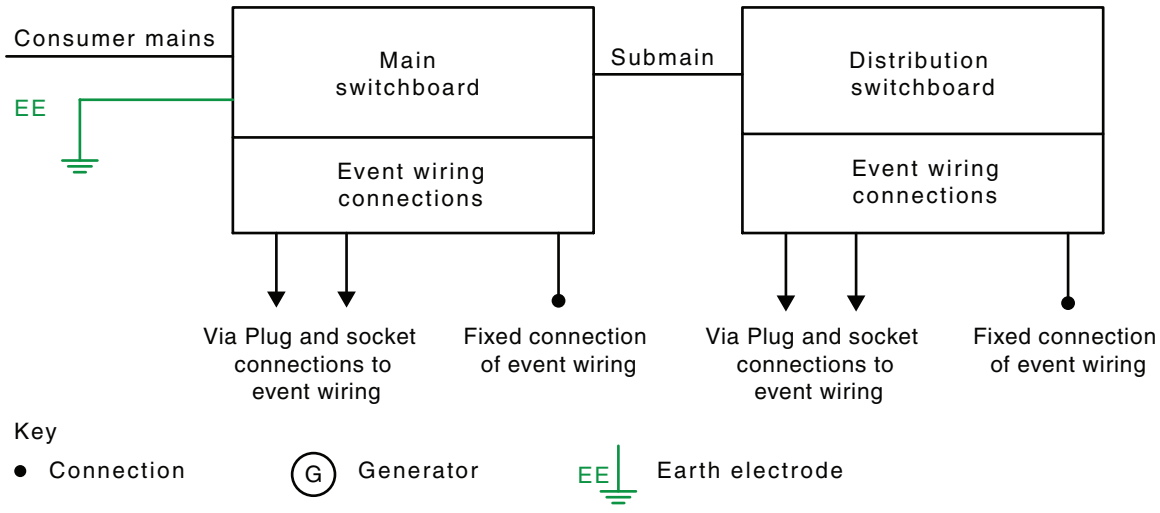


Figure 3.1(b) — Typical arrangement of normal supply from multiple switchboards for a show, carnival or event

3.2.2 Supply by generating system

3.2.2.1 General

The supply to the whole or any part of a show, carnival or event may be derived from electricity generating sets or inverters powered by photovoltaic (PV) systems and/or batteries. See Figure 3.1(c).

© Standards Australia Limited/Standards New Zealand 2021

Full document details: AS NZS 3002-2021