

Australian/New Zealand Standard™

Low-voltage switchgear and controlgear

Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units

Supplement 1: Fuse-switch-disconnectors and switch-disconnectors for use with low-voltage aerial bundled cables

(Supplement to AS/NZS 3947.3:2001)



Standards Australia



AS/NZS 3947.3 Supp1:2001

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PREFACE

This Standard was prepared by the Standards Australia/Standards New Zealand Committee EL-006 on Industrial Switchgear and Controlgear to supersede AS 3947.3 Supplement 1—1995.

The objective of this Standard is to specify the characteristics, conditions for operation and behaviour in normal and specified abnormal service, tests and methods to confirm that those conditions have been met for fuse-switch-disconnectors and switch-disconnectors for use with low-voltage aerial bundled cables (ABC).

This Standard follows the clause numbers of AS/NZS 3947.1, *Low-voltage switchgear and controlgear*, Part 1: *General rules*, and AS/NZS 3947.3, except where noted.

For the purpose of this Standard, AS/NZS 3947.1 and AS/NZS 3947.3 are referred to as Parts 1 and 3, respectively.

Some clauses of this Standard supplement, modify or replace clauses in AS/NZS 3947.1 and AS/NZS 3947.3, except that where this Standard has no corresponding clauses, those of the main documents apply without modification.

This Standard differs from AS 3947.3 Supplement 1—1995 in the following areas:

- (a) Overload requirements for equipment incorporating fuses.
- (b) Requirements for Electromagnetic Compatibility (EMC) have been added.
- (c) Type tests for performance—Test sequences V: Overload performance capability have been added.
- (d) Current carrying capacities of cables in Table C1 have been updated to reflect changes introduced into AS/NZS 3008.1 for both Australian and New Zealand conditions.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

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1 GENERAL

The provisions of the general rules dealt with in AS/NZS 3947.1 (Part 1) and AS/NZS 3947.3 (Part 3) are applicable to this Standard where specifically called for. Clauses and Subclauses, Tables, Figures and Annexes of the general rules are applicable and are identified by reference to Part 1 or Part 3 respectively.

1.1 Scope and object

This Standard applies to single-pole and three-pole fuse-switch-disconnectors and switch-disconnectors of the integral enclosure type for outdoor use with aerial bundled cable (ABC) having aluminium conductors in distribution circuits with a rated voltage of 400 V a.c. It is applicable to devices with characteristics as stated in Tables A, B, and C which will accept fuse-links/solid-links in accordance with Table D.

1.2 Normative references

The opening paragraph of Subclause 1.2 of Part 3 applies. In addition, the following Standards are referred to in this Standard:

AS

- | | |
|------|---|
| 1939 | Degrees of protection provided by enclosures for electrical equipment (IP Code) |
| 2467 | Maintenance of electrical switchgear |
| 3768 | Guide to the effects of temperature on electrical equipment |

AS/NZS

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|----------|--|
| 3008 | Electrical installations—Selection of cables |
| 3008.1.1 | Part 1.1: Cables for alternating voltages up to and including 0.6/1 kV—Typical Australian installation conditions |
| 3008.1.2 | Part 2.2: Cables for alternating voltages up to and including 0.6/1 kV—Typical New Zealand installation conditions |
| 3560 | Electric cables—Cross-linked polyethylene insulated—Aerial bundled—For working voltages up to and including 0.6/1 (1.2) kV |
| 3560.1 | Part 1: Aluminium conductors |
| 3947 | Low-voltage switchgear and controlgear |
| 3947.1 | Part 1: General rules |
| 3947.3 | Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units |

AS/NZS

60269 Low-voltage fuses

60269.2.1 Part 2.1: Supplementary requirements for fuses for use by authorized persons (Fuses mainly for industrial application)—Sections I to V: Examples of types of standardized fuses

1.3 Information to be given with enquiries and orders

NOTE: This information is given in Appendix A.

2 DEFINITIONS

For the majority of the definitions required in connection with this Standard, see Clause 2 of Part 3. For the purpose of this Standard, the additional definitions below apply.

2.1 Fuse-carrier

The removable part of a fuse designed to carry a fuse-link.

NOTE: The fuse-carrier in this Standard is that part of the device which carries the fuse-link.

2.2 Operating stick head

A device fixed to an operating stick for manually opening, closing, removing or replacing the fuse-carrier from ground level.

NOTE: See Figure B1 of Appendix B.

2.3 Solid-link

A removable link interchangeable with the fuse-link.

NOTE: The use of such solid-links allows the device to be used as a switch-disconnector.

3 CLASSIFICATION

3.1 According to the intended applications (see Subclause 4.4).

3.2 Dependent manual operation (see Subclause 2.11 of Part 3).

3.3 Suitable for isolation (see Subclause 7.1.6 of Part 1 and Subclause 7.1.6.1 of Part 3).

3.4 The degree of protection (see Subclause 7.1.11).

4 CHARACTERISTICS

4.1 Subclause 4.1 of Part 3 applies, where appropriate.

4.2 Subclause 4.2 of Part 3 applies.

4.3 Subclause 4.3 of Part 3 applies.

4.4 The intended applications of the devices are given in Table A and device characteristics are given in Tables B and C.

4.5 Not applicable.

4.6 Not applicable.

4.7 Not applicable.

TABLE A
SUMMARY OF INTENDED APPLICATIONS

Device	Applications
160/160	160 A as a fuse-switch-disconnector and 160 A as a switch-disconnector.
250/250	250 A as a fuse-switch-disconnector and 250 A as a switch-disconnector.
315/400	315 A as a fuse-switch-disconnector and 400 A as a switch-disconnector.
630	630 A as a switch-disconnector.

TABLE B
FUSE-SWITCH-DISCONNECTORS (See Note 1)

Characteristic	Device		
	160/160	250/250	315/400
Rated operational voltage (V)	400	400	400
Rated insulation voltage (V)	1000	1000	1000
Rated impulse withstand voltage (kV)	12	12	12
Rated conventional free air thermal current (A)	160	250	315
Rated operational current (A)	160	250	315
Rated conditional short-circuit current (See Note 2) (kA)	6.3	10	10
Rated making capacity (A)	240	375	600
Rated breaking capacity (See Note 3) (A)	240	375	600
Minimum value of power acceptance (maximum value of fuse-link watts loss) (See Note 4) (W/pole)	16	23	34
Mechanical endurance (Operations)	1000	1000	1000
Electrical endurance (Operations)	50	50	50
Pollution degree	3	3	3

NOTES:

- 1 The typical application of the devices is the switching of low voltage distribution loads. This involves relatively infrequent switching of mixed resistive and inductive loads including moderate overloads, in accordance with the conditions specified in Table H. This requirement is not satisfied by devices tested to AC21 but is satisfied by devices tested to AC22 in accordance with AS/NZS 3947.3.
- 2 The rated conditional short-circuit currents have been based on the short-circuit capacity of a 200 kVA distribution transformer for the 160/160 device and a 315 kVA distribution transformer for the 250/250 and 315/400 devices.
- 3 The device should be capable of breaking any value of the load current up to the rated breaking capacity. The rated breaking capacity is expressed by the r.m.s. value of the a.c. component.
- 4 Appendix C provides a guide to minimizing terminal temperatures under in-service conditions

TABLE C
SWITCH-DISCONNECTORS (See Note 1)

Characteristic	Device			
	160/160	250/250	315/400	630
Rated operational voltage (V)	400	400	400	400
Rated insulation voltage (V)	1000	1000	1000	1000
Rated impulse withstand voltage (kV)	12	12	12	12
Conventional free air thermal current (A)	160	250	400	630
Rated operational current (A)	160	250	400	630
Short-time withstand current (See Note 2) (kA)	6.3	10	10	10
Duration of rated short-time withstand current (s)	.2	.5	.5	.5
Short-circuit making capacity (kA)	10.7	17	17	17
Making capacity (A)	240	375	600	945
Breaking capacity (See Note 3) (A)	240	375	600	945
Mechanical endurance (Operations)	1000	1000	1000	1000
Electrical endurance (Operations)	50	50	50	50
Pollution degree	3	3	3	3

NOTES:

- 1 The typical application of the device is the switching of low voltage distribution loads. This involves relatively infrequent switching of mixed resistive and inductive loads including moderate overloads, in accordance with the conditions specified in Table H. This requirement is not satisfied by devices tested to AC21 but is satisfied by devices tested to AC22 in accordance with AS 3947.3.
- 2 The rated short-time withstand and short-circuit making currents have been based on the short-circuit capacity of a 200 kVA distribution transformer for the 160/160 device and a 315 kVA distribution transformer for the 250/250, 315/400 and 630 devices.
- 3 The device shall be capable of breaking any value of the load current up to the rated breaking capacity. The rated breaking capacity is expressed by the r.m.s. value of the a.c. component.

5 PRODUCT INFORMATION

5.1 General

Subclause 5.1 of Part 1 applies as appropriate for the specified device.

5.2 Marking

Each device shall be marked in a durable and legible manner with the following data:

- (a) AS/NZS 3947.3 Supplement 1, if the manufacturer claims compliance with this Standard.
- (b) Manufacturer's name or trademark.
- (c) Device designation.
- (d) Rated conventional free air thermal current (see Subclause 4.3).
- (e) Rated operational voltage (see Subclause 4.3).
- (f) Batch reference number. (Alternatively, month and year of manufacture.)