

Australian/New Zealand Standard[®]

**Graphical symbols for
electrotechnical documentation**

**Part 107: Switchgear, controlgear
and protective devices**

[Based on and including the full text of IEC 617-7:1996, Graphical symbols for diagrams, Part 7: Switchgear, controlgear and protective devices]

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee TE/13, Symbols, Units and Quantities for Electrotechnology. It was approved on behalf of the Council of Standards Australia on 19 September 1997 and on behalf of the Council of Standards New Zealand on 19 September 1997. It was published on 5 December 1997.

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Australian/New Zealand Standard®

**Graphical symbols for
electrotechnical documentation**

**Part 107: Switchgear, controlgear
and protective devices**

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TE/13, Symbols, Units and Quantities for Electrotechnology. It is issued as a Joint Standard to supersede AS 1102.107—1989. It is based on but not equivalent to, and reproduced from, IEC 617-7, *Graphical symbols for diagrams*, Part 7: *Switchgear, controlgear and protective devices*.

The objective of this Standard is to provide users of electrotechnical documents with graphical symbols for switchgear, controlgear and protective devices for the purposes of uniformity and clarity in presenting electrotechnical diagrams.

The Part numbers in this series of Standards correspond to equivalent Parts in the IEC 617 series but with '100' added to the IEC 617 Part number. For example, for the Standard IEC 617-2 refer to AS/NZS 1102.102. The symbol numbers within this Standard are the same as the IEC 617 numbers. In AS 1102.101, *Graphical symbols for electrotechnical documentation*, Part 101: *General information and general index*, the first part of the symbol number refers to the Part number, e.g. in the index, for symbol 102-01-01, refer to Part 102, symbol 02-01-01.

In this Standard, Australian and New Zealand variations have been listed in Appendix ZA and accordingly, the source text should be amended, supplemented or replaced as required. The changes to the source text are indicated with a marginal bar against each clause, table, figure or part thereof affected. Appendix ZA provides symbols for use in Australia and New Zealand which are additional to or alternative to the IEC 617 symbols. The symbols are identified with an 'A' in the third part of the symbol number.

Appendix ZB contains information on the changes from the superseded Australian Standard to this Part of the Standard.

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.

As this Standard is reproduced from an international Standard, the following applies:

- (a) Its number appears on the cover and title page while the international Standard number appears only on the cover.
- (b) In the source text, 'this International Standard' should read 'this Australian/New Zealand Standard'.
- (c) A full point substitutes for a comma when referring to a decimal marker.

References to international Standards should be replaced by equivalent Australian or Australian/New Zealand Standards as follows:

<i>Reference to International Standard</i>		<i>Australian or Australian/New Zealand Standard</i>	
IEC		AS	
617	Graphical symbols for diagrams	1102	Graphical symbols for electrotechnical documentation
617-1	Part 1: General information, general index. Cross-reference tables	1102.101	Part 101: General information and general index

Please note that on the CD-ROM, only the English definitions are available. For the full version incorporating French terms, please refer to the hard copy.

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INTRODUCTION

Symbols have been designed in accordance with requirements given in the future ISO 11714-1. The module size $M = 2,5 \text{ mm}$ has been used. For better readability smaller symbols in this standard have been enlarged to double size and are marked "200 %" in the symbol column. To save space larger symbols have been reduced to half size and are marked "50 %" in the symbol column. In accordance with the future ISO 11714-1, clause 7, symbol dimensions (for instance height) may be modified in order to make space for a greater number of terminals or for other layout requirements. In all cases, whether the size is enlarged or reduced, or dimensions modified, the thickness of the original line should be maintained without scaling.

The symbols in this standard are laid out in such a way that the distance between connecting lines is a multiple of a certain module. The module 2M has been chosen to provide enough space for a required terminal designation. The symbols have been drawn to a size convenient for comprehension, using the same grid consistently in the representation of all symbols.

All symbols are designed within a grid in a computer-aided draughting system. The grid which was used has been reproduced in the background of the symbols.

The older symbols which were included in appendix A of the first edition of IEC 617-7 for a transitional period, are no longer part of this second edition, as they will definitely be withdrawn from use.

The indexes in Annex B and C include an alphabetic list of symbol names and their corresponding number. The symbol names are based on the description of the symbols of this part. A general index including an alphabetic list of symbols of all parts is given in IEC 617-1.

AUSTRALIAN/NEW ZEALAND STANDARD

Graphical symbols for electrotechnical documentation

Part 107:

Switchgear, controlgear and protective devices

CHAPTER I: GENERAL RULES

- I.1 A small circle, open or filled in, representing the hinge point, may be added to most of the symbols. For example, see 07-02-02.
In some symbols the circle indicating the hinge point shall be shown. For example, see 07-02-05.
- I.2 For other methods of representing switches, especially complex, electronic switches, see IEC 617-12, section 17A and 29, and IEC 617-13, section 17.

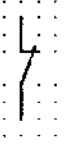
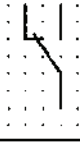
SECTION 1 — QUALIFYING SYMBOLS

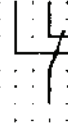
No.	Symbol	Description
07-01-01		Contactor function
07-01-02		Circuit breaker function
07-01-03		Disconnecter (isolator) function
07-01-04		Switch-disconnector (isolating-switch) function
07-01-05		Automatic tripping function initiated by a built-in measuring relay or release
07-01-06		Position switch function 1. This qualifying symbol may be applied to simple contact symbols to indicate position switches if there is no need to show the means of operating the contact. In complicated cases, where it is desirable to show the means of operation, one of the symbols 02-13-16 through 02-13-19 may be used instead. 2. To depict a contact which is mechanically operated in both directions, this symbol shall be placed on both sides of the contact symbol.

No.	Symbol	Description
07-01-07		Automatic return function, for example, spring return 1. This symbol may be used to indicate automatic return. For example, see 07-06-01. 2. This symbol shall not be used together with qualifying symbols 07-01-01, 07-01-02, 07-01-03 and 07-01-04. In many cases, symbol 02-12-07 may be used.
07-01-08		Non-automatic return (stay put) function 1. This symbol may be used to indicate non-automatic return function. When this convention is invoked, its use should be appropriately referenced. 2. This symbol should not be used together with qualifying symbols 07-01-01, 07-01-02, 07-01-03 and 07-01-04. In many cases, symbol 02-12-08 may be used.
07-01-09		Positive operation of a switch 1. This symbol shall be used to indicate that the positive operation of a mechanical device in the direction shown is ensured or is required. This means that the operation ensures that all contacts are in the position corresponding to the activating device. 2. If contacts are shown linked, the symbol shall apply to all the linked contacts unless otherwise indicated (see symbol 07-08-07).

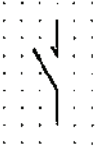
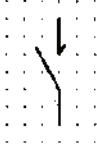
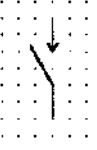
CHAPTER II: CONTACTS

SECTION 2 — CONTACTS WITH TWO OR THREE POSITIONS

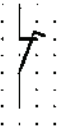
No.	Symbol		Description
07-02-01	Form 1		Make contact This symbol may also be used as the general symbol for a switch.
07-02-02	Form 2		
07-02-03			Break contact
07-02-04			Change-over break before make contact
07-02-05			Change-over contact with off-position in the centre

No.	Symbol		Description
07-02-06	Form 1		Change-over make before break contact
07-02-07	Form 2		
07-02-08			Contact with two makes
07-02-09			Contact with two breaks

SECTION 3 — PASSING CONTACTS WITH TWO POSITIONS

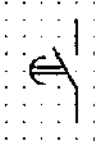
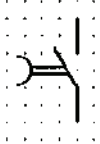
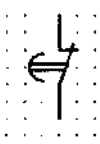
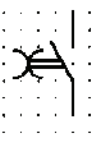
No.	Symbol	Description
07-03-01		Passing make contact closing momentarily when its operating device is actuated
07-03-02		Passing make contact closing momentarily when its operating device is released
07-03-03		Passing make contact closing momentarily when its operating device is actuated or released

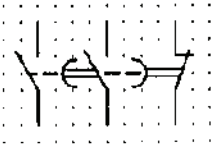
SECTION 4 — EARLY AND LATE OPERATING CONTACTS

No.	Symbol	Description
07-04-01		Make contact (of a multiple contact assembly) which is early to close relative to the other make contacts of the assembly
07-04-02		Make contact (of a multiple contact assembly) which is late to close relative to the other make contacts of the assembly
07-04-03		Break contact (of a multiple contact assembly) which is late to open relative to the other break contacts of the assembly
07-04-04		Break contact (of a multiple contact assembly) which is early to open relative to the other break contacts of the assembly

SECTION 5 — CONTACTS WITH DELAYED OPERATION

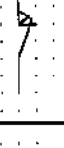
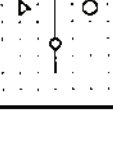
- 5.1 See symbols 02-12-05 and 02-12-06. Closing and opening of the contact is delayed with respect to the activation or deactivation operation. The movement is delayed in the direction towards the centre of the arc ("parachute effect"). The symbol for delayed action may be drawn on that side of the contact symbol which is most suitable for the application and for the placing of item designations.

No.	Symbol	Description
07-05-01		Make contact, delayed when the device containing the contact is being activated
07-05-02		Make contact, delayed when the device containing the contact is being de-activated
07-05-03		Break contact, delayed when the device containing the contact is being activated
07-05-04		Break contact, delayed when the device containing the contact is being de-activated
07-05-05		Make contact, delayed both when the device containing the contact is being activated and when it is being de-activated

No.	Symbol	Description
07-05-06		EXAMPLE: Contact assembly with one make contact not delayed, one make contact delayed when the device containing the contact is being activated and one break contact delayed when the device containing the contact is being de-activated

SECTION 6 — AUTOMATIC RETURN AND NON-AUTOMATIC RETURN CONTACTS

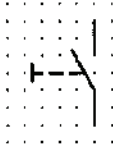
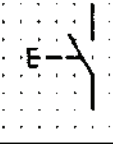
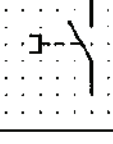
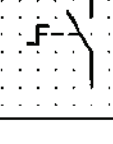
6.1 The rules with symbols 07-01-07 and 07-01-08 apply.

No.	Symbol	Description
07-06-01		Make contact with automatic return
07-06-02		Make contact without automatic return Stay put make contact
07-06-03		Break contact with automatic return
07-06-04		Two-way contact with off-position in the centre and automatic return from one position (shown to the left), and without automatic return in the opposite position

CHAPTER III: SWITCHES, SWITCHGEAR AND STARTERS

- III.1 Devices with "push" or "pull" operation most often have automatic return. It is therefore not necessary to show the automatic return symbol (02-12-07). On the other hand, a detent symbol (02-12-08) shall be shown in those cases where non-return exists.
- III.2 Devices operated by turning do not usually have automatic return. It is therefore not necessary for the detent symbol (02-12-08) to be shown. On the other hand, the automatic return symbol (02-12-07) should be shown in those cases where an automatic return exists.

SECTION 7 — SINGLE-POLE SWITCHES

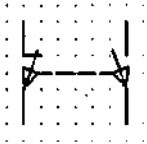
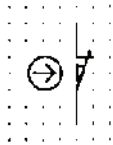
No.	Symbol	Description
07-07-01		Manually operated switch, general symbol
07-07-02		Push-button switch make contact and automatic return
07-07-03		Pull-switch with make contact and automatic return
07-07-04		Turn-switch with make contact without automatic return

No.	Symbol	Description
07-07-05		Push-button switch with positive operation of the make contact (for example: alarm)
07-07-06		Emergency stop switch ("mushroom-head" activated) with positive opening operation of the break contact and maintain position

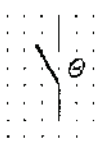
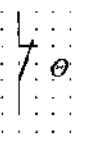
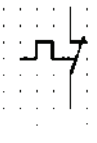
SECTION 8 — POSITION SWITCHES

Where in a set of contacts one or some of them are constructed to have positive opening operation this positivity may concern:

- either the opening of break contact(s) (for example 07-08-04: Position switch and 07-07-06: Emergency stop switch) or the closing of a make contact (for example 07-07-05: Alarm) and
- either all the contacts or only particular contacts (see for example 07-13-14) but
- not both the opening *and* the closing of the same contact.

No.	Symbol	Description
07-08-01		Position switch, make contact
07-08-02		Position switch, break contact
07-08-03		Position switch, mechanically operated in both directions with two separate circuits
07-08-04		Position switch with positive opening operation of the break contact

SECTION 9 — TEMPERATURE SENSITIVE SWITCHES

No.	Symbol	Description
07-09-01		Temperature sensitive switch, make contact Θ may be replaced by the operating temperature conditions
07-09-02		Temperature sensitive switch, break contact The note with symbol 07-09-01 applies
07-09-03		Self-operating thermal switch (for example, bimetal) break contact It is important to distinguish between a contact as shown and a contact of a thermal relay, which in detached representation may be shown as follows: 
07-09-04		Gas discharge tube with thermal element Starter for fluorescent lamp

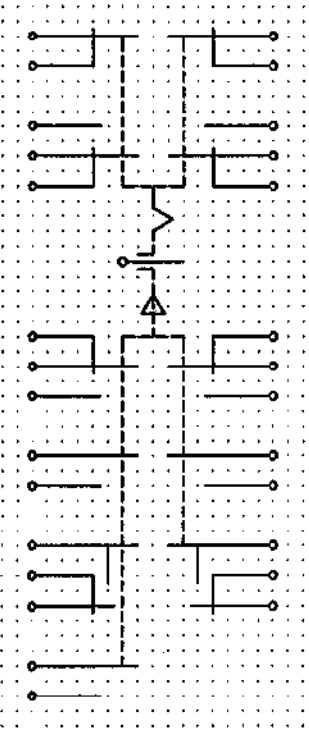
SECTION 10 — SPEED CHANGE SENSITIVE CONTACTS, MERCURY AND LEVELLING SWITCHES

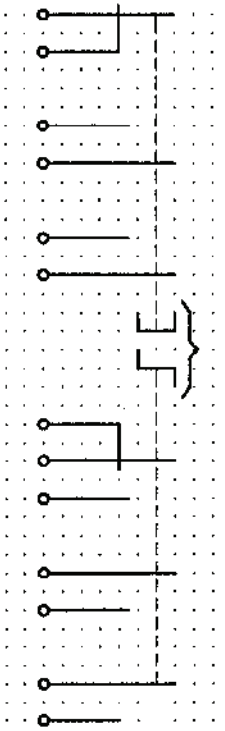
Transferred to annex A1

SECTION 11 — EXAMPLES OF MULTI-POSITION SWITCHES, INCLUDING CONTROL SWITCHES

11.1 See III.1 in section 7.

11.2 See III.2 in section 7.

No.	Symbol	Description
07-11-01		Lever-operated switch, three positions, locking in the upper position and with automatic return from the lower position to the middle one, shown with terminals

No.	Symbol	Description
07-11-02		Button-operated switch One set of contacts is operated by pushing the button (automatic return) and another set by turning it (non-automatic return), shown with terminals. The bracket indicates that there is only one actuator.