

Australian Standard™

**Low-voltage switchgear and controlgear**

**Part 4.1: Contactors and motor-  
starters—Electromechanical contactors  
and motor-starters**

This Australian Standard was prepared by Committee EL-006, Industrial Switchgear and Controlgear. It was approved on behalf of the Council of Standards Australia on 22 July 2004.

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Australian Standard™

## Low-voltage switchgear and controlgear

### Part 4.1: Contactors and motor-starters—Electromechanical contactors and motor-starters

Originated in part as AS C165—1961.  
Previous edition AS/NZS 3947.4.1:2001.  
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## PREFACE

This Standard was prepared by the Standards Australia Committee EL-006, Industrial Switchgear and Controlgear to supersede AS/NZS 3947.4.1:2001.

The objective of this Standard, in addition to that stated in Clause 1, is to bring Australian requirements into line with consolidated Edition 2.1 (2002-2) of IEC 60947-4-1.

This Standard is Part 4.1 of a series which, when complete, will consist of the following:

AS 60947	Low-voltage switchgear and controlgear
AS 60947.1*	Part 1: General rules
AS 60947.2*	Part 2: Circuit-breakers
AS 60947.3	Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units
AS 60947.3 Suppl	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
AS 60947.4.1*	Part 4.1: Contactors and motor-starters—Electromechanical contactors and motor-starters (this Standard)
AS 60947.4.2*	Part 4.2: Contactors and motor-starters—A.C. semiconductor motor controllers and starters
AS 60947.4.3	Part 4.3: Contactors and motor-starters—A.C. semiconductor controllers and contactors for non-motor loads
AS 60947.5.1*	Part 5.1: Control circuit devices and switching elements—Electromechanical control circuit devices
AS 60947.5.2*	Part 5.2: Control circuit devices and switching elements—Proximity switches
AS 60947.5.3	Part 5.3: Control circuit devices and switching elements—Requirements for proximity devices with defined behaviour under fault conditions
AS 60947.5.4*	Part 5.4: Control circuit devices and switching elements—Methods of assessing the performance of low-energy contacts—Special tests
AS 60947.5.5	Part 5.5: Control circuit devices and switching elements—Electrical emergency stop devices with mechanical latching function
AS 60947.5.6	Part 5.6: Control circuit devices and switching elements—D.C. interface for proximity sensors and switching amplifiers (NAMUR)
AS 60947.5.7*	Part 5.7: Control circuit devices and switching elements—Requirements for proximity devices with analogue output
AS 60947.6.1	Part 6.1: Multiple function equipment—Automatic transfer switching equipment
AS 60947.6.2*	Part 6.2: Multiple function equipment—Control and protective switching devices (or equipment) (CPS)
AS 60947.7.1*	Part 7.1: Ancillary equipment—Terminal blocks for copper conductors
AS 60947.7.2*	Part 7.2: Ancillary equipment—Protective conductor terminal blocks for copper conductors

AS 60947.7.3*	Part 7.3:	Ancillary equipment—Safety requirements for terminal blocks for the reception of cartridge fuse-links
AS 60947.8*	Part 8:	Control units for built-in thermal protection for rotating machines

It is the intention of the Committee to align the numbering of this series of Standards with that of the corresponding IEC 60947 series of Standards.

Standards from the list above that are marked with an asterisk (\*) are, at the time of publication of this document, available as a part of the AS 60947 series of Standards.

Standards that are not so marked remain as AS/(NZS) 3947 series Standards. Following the next amendment or revision of the corresponding IEC Standard, each of these Standards remaining in the AS/(NZS) 3947 series will be revised and renumbered as a part of the AS 60947 series.

This Standard is identical in technical content with and has been reproduced from IEC 60947-4-1 Ed.2.1(2002), *Low-voltage switchgear and controlgear—Part 4.1: Contactors and motor-starters—Electromechanical contactors and motor-starters*, which includes IEC 60947-4-1: Edition 2.0 (2000), its Corrigendum (2001-07) and its Amendment 1 (2002).

The provisions of the general rules dealt with in AS 60947.1 (hereinafter referred to as Part 1) are applicable to this Standard, where specifically called for. Clauses and subclauses, tables, figures and appendices of the general rules thus applicable are identified by reference to Part 1, for example, 1.2.3 of Part 1, table 4 of Part 1, or annex A of Part 1. Where reference is made to other parts of the AS 60947 (AS/NZS 3947) series, they too are referred to as their relevant parts after the initial reference. For instance, AS 60947.2 is referred to as Part 2 and AS/NZS 3947.3 is referred to as Part 3.

This Standard differs from AS/NZS 3947.4.1:2001 in the following areas:

- (a) Contactors or starters with an electronically controlled electromagnet are now covered.
- (b) Rated impulse withstand voltage now must be stated by the manufacturer.
- (c) Guidance for creepage and clearance distances is now derived from AS 60947.1 and Annex C has been deleted.
- (d) Additional safety requirements for equipment with isolating function have been augmented.
- (e) Limits of operation of contactors and power-operated starters have been revised.
- (f) Type tests for dielectric properties have been revised.
- (g) Requirements for the behaviour of the contactor or the starter during, and its condition after, the conventional operational performance tests have been tightened.
- (h) Informative tests have been tightened; and Annex E giving examples of circuit configurations and normative Annex F giving requirements for mirror contacts have been added.

A reference to an International Standard identified in the Normative References Clause by strikethrough (~~example~~) is replaced by a reference to the Australian or Australian/New Zealand Standard(s) listed immediately thereafter and identified by shading (**example**). Where the struck-through referenced document and the referenced Australian or Australian/New Zealand Standard are identical, this is indicated in parenthesis after the title of the latter.

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

- (i) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
- (ii) In the source text ‘this standard’ should read ‘this Australian Standard’.
- (iii) A full point should be substituted for a comma when referring to a decimal marker.

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

## CONTENTS

	<i>Page</i>
1 Scope and object .....	1
1.1 AC and d.c. contactors.....	1
1.2 AC motor-starters .....	1
1.2.1 Direct-on-line (full voltage) a.c. starters.....	2
1.2.2 Reduced voltage a.c. starters.....	2
1.2.3 Rheostatic rotor starters.....	2
1.3 Exclusions .....	3
1.4 Object.....	3
2 Normative references .....	3
3 Definitions.....	6
3.1 Definitions concerning contactors .....	6
3.2 Definitions concerning starters.....	7
3.3 Characteristic quantities .....	10
4 Classification .....	10
5 Characteristics of contactors and starters .....	10
5.1 Summary of characteristics.....	10
5.2 Type of equipment .....	11
5.2.1 Kind of equipment.....	11
5.2.2 Number of poles.....	11
5.2.3 Kind of current (a.c. or d.c.) .....	11
5.2.4 Interrupting medium (air, oil, gas, vacuum, etc.).....	11
5.2.5 Operating conditions of the equipment .....	11
5.3 Rated and limiting values for main circuits .....	11
5.3.1 Rated voltages.....	11
5.3.2 Currents or powers.....	13
5.3.3 Rated frequency.....	14
5.3.4 Rated duties.....	14
5.3.5 Normal load and overload characteristics.....	15
5.3.6 Rated conditional short-circuit current .....	17
5.4 Utilization category .....	17
5.4.1 Assignment of utilization categories based on the results of tests .....	18
5.5 Control circuits.....	19
5.6 Auxiliary circuits.....	20
5.7 Characteristics of relays and releases (overload relays).....	20
5.7.1 Summary of characteristics .....	20
5.7.2 Types of relay or release.....	20
5.7.3 Characteristic values.....	20
5.7.4 Designation and current settings of overload relays .....	21
5.7.5 Time-current characteristics of overload relays .....	21
5.7.6 Influence of ambient air temperature .....	22
5.8 Co-ordination with short-circuit protective devices.....	22
5.9 Switching overvoltages .....	22

	<i>Page</i>	
5.10	Types and characteristics of automatic change-over devices and automatic acceleration control devices.....	22
5.10.1	Types.....	22
5.10.2	Characteristics.....	22
5.11	Types and characteristics of auto-transformers for two-step auto-transformer starters.....	22
5.12	Types and characteristics of starting resistors for rheostatic rotor starters.....	23
6	Product information.....	23
6.1	Nature of information.....	23
6.1.1	Identification.....	23
6.1.2	Characteristics, basic rated values and utilization.....	23
6.2	Marking.....	25
6.3	Instructions for installation, operation and maintenance.....	25
7	Normal service, mounting and transport conditions.....	25
8	Constructional and performance requirements.....	25
8.1	Constructional requirements.....	25
8.1.1	Materials.....	25
8.1.2	Current-carrying parts and their connections.....	25
8.1.3	Clearances and creepage distances.....	25
8.1.4	Actuator.....	26
8.1.5	Indication of the contact position.....	26
8.1.6	Additional safety requirements for equipment with isolating function.....	26
8.1.7	Terminals.....	26
8.1.8	Additional requirements for contactors or starters provided with a neutral pole.....	26
8.1.9	Provisions for earthing.....	26
8.1.10	Enclosures for equipment.....	26
8.1.11	Degrees of protection of enclosed contactors and starters.....	27
8.2	Performance requirements.....	27
8.2.1	Operating conditions.....	27
8.2.2	Temperature rise.....	30
8.2.3	Dielectric properties.....	32
8.2.4	Normal load and overload performance requirements.....	32
8.2.5	Co-ordination with short-circuit protective devices.....	36
8.2.6	Switching overvoltages.....	37
8.2.7	Additional requirements for combination starters and protected starters suitable for isolation.....	37
8.3	Electromagnetic compatibility (EMC).....	37
8.3.1	General.....	37
8.3.2	Immunity.....	37
8.3.3	Emission.....	38
9	Tests.....	38
9.1	Kinds of test.....	38
9.1.1	General.....	38
9.1.2	Type tests.....	38
9.1.3	Routine tests.....	39
9.1.4	Sampling tests.....	39
9.1.5	Special tests.....	39

9.2	Compliance with constructional requirements.....	39
9.3	Compliance with performance requirements.....	40
9.3.1	Test sequences.....	40
9.3.2	General test conditions.....	40
9.3.3	Performance under no load, normal load and overload conditions.....	40
9.3.4	Performance under short-circuit conditions.....	48
9.3.5	Overload current withstand capability of contactors.....	52
9.3.6	Routine tests and sampling tests.....	52
9.4	EMC Tests.....	53
9.4.1	General.....	53
9.4.2	Immunity.....	53
9.4.3	Emission.....	55
Annex A	(normative) Marking and identification of terminals of contactors and associated overload relays.....	63
Annex B	(normative) Special tests.....	67
Annex C	Void.....	74
Annex D	(informative) Items subject to agreement between manufacturer and user.....	75
Annex E	(informative) Examples of control circuit configurations.....	76
Annex F	(normative) Requirements for auxiliary contact linked with power contact (mirror contact).....	79
Bibliography	.....	82
Figure 1	– Typical curves of currents and torques during a star-delta start (see 1.2.2.1).....	56
Figure 2	– Typical curves of currents and torques during an auto-transformer start (see 1.2.2.2).....	57
Figure 3	– Typical variants of combination starters (see 3.2.7) and protected starters (see 3.2.8).....	58
Figure 4	– Example of three-phase diagram of a rheostatic rotor starter with three starting steps (see 3.2.16) and one direction of rotation (in the case when all the mechanical switching devices are contactors).....	59
Figure 5	– Typical methods and diagrams of starting alternating-current induction motors by means of auto-transformers.....	60
Figure 6	– Examples of speed/time curves corresponding to cases a), b), c), d), e) and f) of 5.3.5.5 (the dotted parts of the curves correspond to the periods when no current flows through the motor).....	61
Figure 7	– Multiple of current setting limits for ambient air temperature compensated time-delay overload relays (see 8.2.1.5.1).....	62
Figure B.1	– Examples of time-current withstand characteristic.....	73
Table 1	– Utilization categories.....	19
Table 2	– Trip classes of thermal, time-delay magnetic or solid state overload relays.....	21
Table 3	– Limits of operation of time-delay overload relays when energized on all poles.....	29
Table 4	– Limits of operation of three-pole thermal overload relays when energized on two poles only.....	30
Table 5	– Temperature rise limits for insulated coils in air and in oil.....	31
Table 6	– Intermittent duty test cycle data.....	32

Table 7 – Making and breaking capacities – Making and breaking conditions according to utilization category .....	33
Table 7a – Relationship between current broken $I_c$ and off-time for the verification of rated making and breaking capacities .....	34
Table 7b – Operational current determination for utilization categories AC-6a and AC-6b when derived from AC-3 ratings .....	34
Table 8 – Conventional operational performance – Making and breaking conditions according to utilization category .....	35
Table 9 – Overload current withstand requirements .....	36
Table 10 – Specific acceptance criteria for immunity tests .....	38
Table 12 – Value of the prospective test current according to the rated operational current .....	50
Table 13 – EMC immunity tests .....	54
Table 14 – Conducted radio-frequency emission test limits .....	55
Table 15 – Radiated emission test limits .....	56
Table B.1 – Verification of the number of on-load operating cycles – Conditions for making and breaking corresponding to the several utilization categories .....	70
Table B.2 – Test conditions .....	72
Table F.1 – Test voltage according to altitude .....	80

## STANDARDS AUSTRALIA

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**Australian Standard****Low-voltage switchgear and controlgear**  
**Part 4.1: Contactors and motor-starters—Electromechanical contactors**  
**and motor-starters**

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**1 Scope and object**

This part of ~~IEC 60947~~ **AS 60947** applies to the types of equipment listed in 1.1 and 1.2 whose main contacts are intended to be connected to circuits the rated voltage of which does not exceed 1 000 V a.c. or 1 500 V d.c.

Starters and/or contactors dealt with in this standard are not normally designed to interrupt short-circuit currents. Therefore, suitable short-circuit protection (see 9.3.4) shall form part of the installation but not necessarily of the contactor or the starter.

In this context, this standard gives requirements for:

- contactors associated with overload and/or short-circuit protective devices;
- starters associated with separate short-circuit protective devices and/or with separate short-circuit and integrated overload protective devices;
- contactors or starters combined, under specified conditions, with their own short-circuit protective devices. Such combinations, e.g. combination starters (see 3.2.7) or protected starters (see 3.2.8) are rated as units.

Circuit-breakers and fuse-combination units used as short-circuit protective devices in combination starters and in protected starters shall comply with the requirements of ~~IEC 60947-2~~ **AS 60947.2 (Part 2)** and ~~IEC 60947-3~~ **AS/NZS 3947.3 (Part 3)**, as the case may be.

Equipment covered by this standard is as follows.

**1.1 AC and d.c. contactors**

AC and d.c. contactors intended for closing and opening electric circuits and, if combined with suitable relays (see 1.2), for protecting these circuits against operating overloads which may occur therein.

**NOTE** Contactors combined with suitable relays and which are intended to provide short-circuit protection shall additionally satisfy the relevant conditions specified for circuit-breakers (Part 2).

This standard applies also to the actuators of contactor relays and to the contacts dedicated exclusively to the coil circuit of a contactor.

Contactors or starters with an electronically controlled electromagnet are also covered by this standard.

**1.2 AC motor-starters**

AC motor-starters intended to start and accelerate motors to normal speed, to ensure continuous operation of motors, to switch off the supply from the motor and to provide means for the protection of motors and associated circuits against operating overloads.

Starters the operation of which depends on thermal electrical relays for motor protection complying with IEC 60255-8, or motor-incorporated thermal protective devices dealt with in IEC 60034-11 do not necessarily meet all the relevant requirements of this standard.

Overload relays for starters, including those based on solid state technology, shall meet the requirements of this standard.