

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

Electromechanical contactors for household and similar purposes

Contacteurs électromécaniques pour usages domestiques et analogues

IEC 61095:2009

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# NORME INTERNATIONALE

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## CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references.....	9
3 Terms and definitions.....	11
3.1 General terms.....	11
3.2 Switching devices.....	13
3.3 Parts of switching devices.....	15
3.4 Operation of switching devices.....	18
3.5 Characteristic quantities.....	19
4 Classification.....	24
5 Characteristics of contactors.....	24
5.1 Summary of characteristics.....	24
5.2 Type of contactor.....	24
5.2.1 Number of poles.....	24
5.2.2 Method of control.....	24
5.3 Rated and limiting values for main circuits.....	24
5.3.1 General.....	24
5.3.2 Rated voltages.....	24
5.3.3 Currents or powers.....	25
5.3.4 Rated frequency.....	26
5.3.5 Rated duties.....	26
5.3.6 Normal load and overload characteristics.....	27
5.3.7 Rated conditional short-circuit current.....	28
5.4 Utilization category.....	28
5.4.1 General.....	28
5.4.2 Assignment of utilization categories based on the results of tests.....	28
5.5 Control circuits.....	29
5.6 Auxiliary circuits.....	29
5.7 Co-ordination with short-circuit protective devices.....	29
6 Product information.....	29
6.1 Nature of information.....	29
6.1.1 Identification.....	29
6.1.2 Characteristics, basic rated values and utilization.....	30
6.2 Marking.....	30
6.3 Instructions for installation, operation and maintenance.....	31
7 Normal service, mounting and transport conditions.....	31
7.1 Normal service conditions.....	31
7.1.1 Ambient air temperature.....	31
7.1.2 Altitude.....	32
7.1.3 Atmospheric conditions.....	32
7.1.4 Normal electromagnetic environmental conditions.....	33
7.2 Conditions during transport and storage.....	33
7.3 Mounting.....	33
8 Constructional and performance requirements.....	33
8.1 Constructional requirements.....	33

8.1.1	General .....	33
8.1.2	Materials .....	33
8.1.3	Strength of screws or nuts other than those on terminals which are intended to be operated during installation or maintenance .....	34
8.1.4	Vacant .....	35
8.1.5	Actuator .....	35
8.1.6	Indication of the OFF and ON positions .....	35
8.1.7	Terminals .....	36
8.1.8	Additional requirements for contactors provided with a neutral pole .....	37
8.1.9	Provisions for earthing .....	37
8.1.10	Enclosures .....	38
8.1.11	Degrees of protection of enclosed contactors .....	39
8.1.12	Resistance to impact .....	39
8.1.13	Durability of markings .....	39
8.2	Performance requirements .....	40
8.2.1	Operating conditions .....	40
8.2.2	Temperature-rise .....	40
8.2.3	Dielectric properties .....	43
8.2.4	Normal load and overload performance requirements .....	45
8.2.5	Co-ordination with short-circuit protective devices .....	47
8.3	Electromagnetic compatibility .....	47
8.3.1	Immunity .....	47
8.3.2	Emission .....	47
9	Tests .....	48
9.1	Types of test .....	48
9.1.1	General .....	48
9.1.2	Type tests .....	48
9.1.3	Routine tests .....	48
9.1.4	Sampling tests for clearance verification .....	49
9.2	Compliance with constructional requirements .....	49
9.2.1	General .....	49
9.2.2	Materials .....	49
9.2.3	Test on screws or nuts other than those on terminals which are intended to be operated during installation or maintenance .....	52
9.2.4	Verification of the degrees of protection of enclosed contactors .....	52
9.2.5	Mechanical properties of terminals .....	52
9.2.6	Test of resistance to impact .....	55
9.2.7	Test of durability of marking .....	57
9.3	Compliance with performance requirements .....	58
9.3.1	Test sequences .....	58
9.3.2	General test conditions .....	58
9.3.3	Performance under no load, normal load and overload conditions .....	60
9.3.4	Performance under short-circuit conditions .....	71
9.3.5	Overload current withstand capability .....	76
9.3.6	Routine tests .....	76
Annex A (normative)	Terminal marking and distinctive number .....	95
Annex B (normative)	Test sequences and number of samples .....	100
Annex C (normative)	Description of a method for adjusting the load circuit .....	102
Annex D (normative)	Determination of short-circuit power-factor .....	104

Annex E (normative) Measurement of creepage distances and clearances .....	106
Annex F (normative) Correlation between the nominal voltage of the supply system and the rated impulse withstand voltage of a contactor .....	111
Annex G (normative) Hot wire ignition test .....	113
Annex H (normative) Degrees of protection of enclosed contactor .....	115
Annex I (normative) Requirements and tests for equipment with protective separation.....	122
Figure 1 – Thread-forming tapping screw .....	77
Figure 2 – Thread-cutting tapping screw .....	77
Figure 3 – Ball-pressure test apparatus (see 9.2.2.3.1) .....	77
Figure 4 – Test equipment for flexion test (see 9.2.5.3) .....	78
Figure 5 – Gauges of form A and form B (see 9.2.5.5) .....	78
Figure 6 – Pendulum for mechanical impact test apparatus (striking element) (see 9.2.6.2.1) .....	79
Figure 7 – Mounting support for sample, for mechanical impact test (see 9.2.6.2.1) .....	80
Figure 8 – Pendulum hammer test apparatus (see 9.2.6.2.1) .....	81
Figure 9 – Sphere test apparatus (see 9.2.6.2.2) .....	81
Figure 10 – Jointed test finger (according to IEC 60529) .....	82
Figure 11 – Diagram of the test circuit for the verification of making and breaking capacities of a single-pole contactor on single-phase a.c. ....	83
Figure 12 – Diagram of the test circuit for the verification of making and breaking capacities of a two-pole contactor on single-phase a.c. ....	84
Figure 13 – Diagram of the test circuit for the verification of making and breaking capacities of a three-pole contactor .....	85
Figure 14 – Diagram of the test circuit for the verification of making and breaking capacities of a four-pole contactor .....	86
Figure 15 – Schematic illustration of the recovery voltage across contacts of the first phase to clear (see 9.3.3.5.2, e)) under ideal conditions .....	87
Figure 16 – Diagram of a load circuit adjustment method .....	88
Figure 17 – Diagram of the test circuit for the verification of short-circuit making and breaking capacities of a single-pole contactor on single-phase a.c. ....	89
Figure 18 – Diagram of the test circuit for the verification of short-circuit making and breaking capacities of a two-pole contactor on single-phase a.c. ....	90
Figure 19 – Diagram of the test circuit for the verification of short-circuit making and breaking capacities of a three-pole contactor .....	91
Figure 20 – Diagram of the test circuit for the verification of short-circuit making and breaking capacities of a four-pole contactor .....	92
Figure 21 – Example of short-circuit making and breaking test record in the case of a single-pole contactor on single-phase a.c. ....	93
Figure 22 – Diagram of the test circuit for making and breaking verification for utilization category AC-7c .....	94
Figure C.1 – Determination of the actual value of the factor $\gamma$ .....	103
Figure E.1 – Measurement of ribs .....	106
Figure E.2 – Creepage distance example 1 .....	107
Figure E.3 – Creepage distance example 2 .....	107
Figure E.4 – Creepage distance example 3 .....	107
Figure E.5 – Creepage distance example 4 .....	108

Figure E.6 – Creepage distance example 5.....	108
Figure E.7 – Creepage distance example 6.....	108
Figure E.8 – Creepage distance example 7.....	109
Figure E.9 – Creepage distance example 8.....	109
Figure E.10 – Creepage distance example 9.....	109
Figure E.11 – Creepage distance example 10.....	110
Figure E.12 – Creepage distance example 11.....	110
Figure G.1 – Test fixture for hot wire ignition test.....	113
Figure H.1 – IP Codes .....	119
Figure I.1 – Example of application with component connected between separated circuits.....	126
Table 1 – Utilization categories.....	29
Table 2 – Standard cross-sections of round copper conductors.....	37
Table 3 – Temperature-rise limits for insulated coils in air.....	40
Table 4 – Temperature-rise limits of terminals .....	41
Table 5 – Temperature-rise limits of accessible parts.....	41
Table 6 – Intermittent duty test cycle data.....	42
Table 7 – Making and breaking capacities corresponding to the utilization categories.....	45
Table 8 – Relationship between current broken $I_C$ and off-time for the verification of rated making and breaking capacities .....	46
Table 9 – Conventional operational performance corresponding to the utilization categories.....	46
Table 10 – Overload current withstand requirements .....	47
Table 11 – Tightening torques for the verification of the mechanical strength of screw-type terminals .....	53
Table 12 – Test values for flexion and pull-out tests for round copper conductors.....	54
Table 13 – Maximum conductor cross-sections and corresponding gauges.....	55
Table 14 – Tolerances on test quantities.....	59
Table 15 – Test copper conductors .....	62
Table 16 – Impulse test voltages and corresponding altitudes.....	66
Table 17 – Minimum clearances in air.....	67
Table 18 – Minimum creepage distances .....	67
Table 19 – Dielectric test voltage corresponding to the rated insulation voltage .....	68
Table 20 – Values of power-factors corresponding to test currents and ratio $n$ between peak and r.m.s. values of current.....	73
Table 21 – Value of the prospective test current according to the rated operational current.....	75
Table B.1 – Test sequences.....	100
Table B.2 – Number of samples to be tested.....	101
Table F.1 – Correspondence between the nominal voltage of the supply system and the contactor rated impulse withstand voltage, in case of over-voltage protection by surge-arresters according to IEC 60099-1.....	112

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOR HOUSEHOLD AND SIMILAR PURPOSES**

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International Standard IEC 61095 has been prepared by subcommittee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear in conjunction with subcommittee 23E: Circuit-breakers and similar equipment for household use, of IEC technical committee 23: Electrical accessories.

This second edition cancels and replaces the first edition published in 1992 and its Amendment 1 (2000), and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- deletion of switching overvoltages requirements,
- addition of a new utilization category AC-7c: switching of compensated electric discharge lamp control,
- measuring of  $U_{imp}$  required, but the marking is not required if  $U_{imp}$  equal to 4 kV,
- improvement regarding marking concerning direction of movement,
- improvement of dielectric properties,
- test of resistance to humidity referred to IEC 60068-2-78 instead of IEC 60068-2-3,

- amendment to Table B.1 regarding test sequences,
- deletion of Table F.2 regarding the correspondence between the nominal voltage of the supply system and the contactor rated impulse withstand voltage,
- addition of a new Annex H (normative): degrees of protection of enclosed contactor,
- addition of a new Annex I (normative): requirements and tests for equipment with protective separation.

The text of this standard is based on the following documents:

FDIS	Report on voting
17B/1640/FDIS	17B/1652/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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## INTRODUCTION

This International Standard gives requirements for contactors household and similar purposes, including contactors for distribution control in buildings.

Contactors for such purposes have particular requirements which include test sequences and sampling plans to facilitate testing.

Contactors according to this standard are limited in the range of operational currents and operational voltages to values appropriate to the applications. Such contactors are for use in circuits of limited prospective short-circuit fault current for which they need to be co-ordinated with an appropriate short-circuit protective device to provide suitable co-ordination.

This standard defines in a single document the specific utilization category for a described application and states the relevant requirements. As far as possible, it is in line with the requirements contained in IEC 60947-4-1 "Electromechanical contactors and motor-starters".

This standard also applies to contactors which are components of an appliance, unless otherwise stated in the standard covering the relevant appliance.

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# ELECTROMECHANICAL CONTACTORS FOR HOUSEHOLD AND SIMILAR PURPOSES

## 1 Scope

This International Standard applies to electromechanical air break contactors for household and similar purposes provided with main contacts intended to be connected to circuits the rated voltage of which does not exceed 440 V a.c. (between phases) with rated operational currents less than or equal to 63 A for utilization category AC-7a and 32 A for utilization categories AC-7b and AC-7c, and rated conditional short-circuit current less than or equal to 6 kA.

The 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.

This standard does not apply to

- contactors complying with IEC 60947-4-1;
- semiconductor contactors;
- contactors designed for special applications;
- auxiliary contacts of contactors. These are dealt with in IEC 60947-5-1.

This standard states

- 1) the characteristics of contactors;
- 2) the conditions with which contactors shall comply with reference to:
  - a) their operation and behaviour;
  - b) their dielectric properties;
  - c) the degrees of protection provided by their enclosures, where applicable;
  - d) their construction;
  - e) their electromagnetic compatibility characteristics.
- 3) the tests intended for confirming that these conditions have been met, and the methods to be adopted for these tests.
- 4) the test sequences and the number of samples.
- 5) the information to be given with contactors or in the manufacturer's literature.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60028:1925, *International standard of resistance for copper*

IEC 60050-151:2001, *International Electrotechnical Vocabulary (IEV) – Part 151: Electrical and magnetic devices*

IEC 60050-441:1984, *International Electrotechnical Vocabulary (IEV) – Chapter 441: Switchgear, controlgear and fuses*  
Amendment 1 (2000)

IEC 60050-604:1987, *International Electrotechnical Vocabulary (IEV) – Chapter 604: Generation, transmission and distribution of electricity – Operation*  
Amendment 1 (1998)

IEC 60050-826:2004, *International Electrotechnical Vocabulary (IEV) – Part 826: Electrical installations*

IEC 60068-2-78:2001, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60073:2002, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indicators and actuators*

IEC 60085:2007, *Electrical insulation – Thermal evaluation and designation*

IEC 60099-1:1991, *Surge arresters – Part 1: Non-linear resistor type gapped surge arresters for a.c. systems*  
Amendment 1 (1999)

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60216 (all parts), *Electrical insulating materials – Properties of thermal endurance*

IEC 60364-4-44:2007, *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

(standards.iteh.ai)

IEC 60417-DB: 2007<sup>1</sup>, *Graphical symbols for use on equipment*

[IEC 61095:2009](#)

IEC 60445:2006, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals and conductor terminations*

IEC 60447:2004, *Basic and safety principles for man-machine interface, marking and identification – Actuating principles*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*  
Amendment 1 (1999)

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60695-2-10:2000, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2000, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*

IEC 60695-11-10:1999, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*  
Amendment 1 (2003)

IEC 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules*

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<sup>1</sup> “DB” refers to the IEC on-line database.

IEC 60947-4-1:2000, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*  
Amendment 1 (2002)  
Amendment 2 (2005)

IEC 60947-5-1:2003, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

IEC 61140:2001, *Protection against electric shock – Common aspects for installation and equipment*  
Amendment 1 (2004)

IEC 61180 (all parts), *High-voltage test techniques for low-voltage equipment*

ISO 7000:2004, *Graphical symbols for use on equipment – Index and synopsis*

ISO 2039-2:1987, *Plastics – Determination of hardness – Part 2: Rockwell hardness*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1 General terms iTeh STANDARD PREVIEW (standards.iteh.ai)

##### 3.1.1 over-current

current exceeding the rated current

[IEC 61095:2009](#)

[IEV 441-11-06] <https://standards.iteh.ai/catalog/standards/sist/48daa91c-352f-4b39-b57b-3e5b45174cf6/iec-61095-2009>

##### 3.1.2 short-circuit

accidental or intentional conductive path between two or more conductive parts forcing the electric potential differences between these conductive parts to be equal to or close to zero

[IEV 151-12-04]

##### 3.1.3 short-circuit current

over-current resulting from a short circuit due to a fault or an incorrect connection in an electric circuit

[IEV 441-11-07]

##### 3.1.4 overload

operating conditions in an electrically undamaged circuit which cause an over-current

[IEV 441-11-08]

##### 3.1.5 overload current

over-current occurring in an electrically undamaged circuit

### 3.1.6

#### **ambient air temperature**

temperature, determined under prescribed conditions, of the air surrounding the complete switching device or fuse

NOTE For switching devices or fuses installed inside an enclosure, it is the temperature of the air outside the enclosure.

[IEV 441-11-13]

### 3.1.7

#### **conductive part**

part which is capable of conducting current although it may not necessarily be used for carrying service current

[IEV 441-11-09]

### 3.1.8

#### **exposed conductive part**

conductive part which can readily be touched and which is not normally alive, but which may become alive under fault conditions

NOTE Typical exposed conductive parts are walls of enclosures, operating handles, etc.

[IEV 441-11-10]

### 3.1.9

#### **electric shock**

physiological effect resulting from an electric current through a human or animal body

[IEV 826-12-01]

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### 3.1.10

#### **live part**

conductor or conductive part intended to be energized in normal operation, including a neutral conductor, but by convention not a PEN conductor or PEM conductor or PEL conductor

NOTE This concept does not necessarily imply a risk of electric shock.

[IEV 826-12-08]

### 3.1.11

#### **protective conductor** (identification: PE)

conductor provided for purposes of safety, for example protection against electric shock

NOTE In an electrical installation, the conductor identified PE is normally also considered as protective earthing conductor.

[IEV 826-13-22]

### 3.1.12

#### **neutral conductor**

conductor electrically connected to the neutral point and capable of contributing to the distribution of electric energy

[IEV 826-14-07]

### 3.1.13

#### **PEN conductor**

conductor combining the functions of both a protective earthing conductor and a neutral conductor

[IEV 826-13-25]

### 3.1.14

#### **PEM conductor**

conductor combining the functions of both a protective earthing conductor and a mid-point conductor

[IEV 826-13-26]

### 3.1.15

#### **PEL conductor**

conductor combining the functions of both a protective earthing conductor and a line conductor

[IEV 826-13-27]

### 3.1.16

#### **enclosure**

part providing a specified degree of protection of equipment against certain external influences and a specified degree of protection against approach to or contact with live parts and moving parts

[IEV 441-13-01, modified]

NOTE This definition is similar to IEC 441-13-01, which applies to assemblies.

### 3.1.17

#### **integral enclosure**

enclosure which forms an integral part of the equipment

### 3.1.18

#### **utilization category (for a switching device or a fuse)**

combination of specified requirements related to the condition in which the switching device or the fuse fulfils its purpose, selected to represent a characteristic group of practical applications

NOTE The specified requirements may concern e.g. the values of making capacities (if applicable), breaking capacities and other characteristics, the associated circuits and the relevant conditions of use and behaviour.

[IEV 441-17-19]

## 3.2 Switching devices

### 3.2.1

#### **switching device**

device designed to make or break the current in one or more electric circuits

[IEV 441-14-01]

NOTE A switching device may perform one or both of these operations.

### 3.2.2

#### **mechanical switching device**

switching device designed to close and open one or more electric circuits by means of separable contacts

NOTE Any mechanical switching device may be designated according to the medium in which its contacts open and close, e.g. air, SF<sub>6</sub>, oil.

[IEV 441-14-02]