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IEC 61812-1

Edition 3.0 2023-06
REDLINE VERSION

INTERNATIONAL STANDARD



**Time relays and coupling relays for industrial and residential use –
Part 1: Requirements and tests**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.120.70

ISBN 978-2-8322-7136-0

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CONTENTS

FOREWORD.....	7
1 Scope.....	10
2 Normative references	10
3 Terms and definitions	12
3.1 Terms and definitions related to general terms.....	13
3.2 Terms and definitions of time relay types	17
4 Classification.....	25
4.1 Switching element.....	25
4.2 Mechanical construction.....	25
4.3 Device mounting	25
4.4 Connection	25
4.5 Environment	25
5 Influence quantities	25
6 Rated values	26
6.1 General.....	26
6.2 Input voltage and frequency	26
6.3 Release voltage	27
6.4 Power consumption.....	27
6.5 Output circuit	27
6.5.1 General	27
6.5.2 Electromechanical output circuit	27
6.5.3 Solid state output circuit	28
6.5.4 Endurance and operating frequency	28
6.5.5 Conditional short-circuit current	29
6.6 Ambient temperature.....	29
6.7 Transport and storage temperature	29
6.8 Humidity	29
6.9 Pollution degree.....	29
6.10 Altitude	29
6.11 Timing circuit function	30
6.11.1 General	30
6.11.2 Setting accuracy	30
6.11.3 Repeatability	30
6.11.4 Recovery time and minimum control impulse	30
7 Provisions for testing	30
7.1 General.....	30
7.2 Type test.....	31
7.3 Routine test	32
7.4 Sampling test.....	32
8 Documentation and marking	32
8.1 Data.....	32
8.2 Marking.....	35
9 Heating.....	35
9.1 General.....	35
9.2 Test conditions	36
9.3 Heating of terminals.....	37

9.3.1	General	37
9.3.2	Heating of screw terminals and screwless terminals	37
9.3.3	Heating of quick-connect terminations	37
9.3.4	Heating of sockets	38
9.3.5	Heating of alternative termination types	38
9.4	Heating of accessible parts	38
8.5	Heating of insulating materials	38
9.5	Ball pressure test	39
10	Basic operating function	39
10.1	General	39
10.2	Operate	40
10.3	Release	40
10.4	Time function	40
10.4.1	General	40
10.4.2	Functional test at reference values of input quantities	40
10.4.3	Influencing effects Effect of influence of voltage and temperature	41
11	Insulation Dielectric strength and impulse withstand	41
11.1	General	41
11.2	Preconditioning	41
11.3	Dielectric strength Insulation test	42
11.3.1	General	42
11.3.2	Impulse withstand test	42
11.3.3	Dielectric AC power frequency voltage test	43
10.4	Protection against direct contact	41
12	Electrical endurance	45
12.1	General	45
12.2	Resistive loads, inductive loads, and special loads	45
12.3	Low energy loads	45
13	Conditional short-circuit current of an output circuit	45
13.1	General	45
13.2	Test procedure	45
13.3	Test circuit electromechanical output circuit	46
13.4	Test circuit solid state output circuit	46
13.5	Condition of switching element after test	47
14	Insulation coordination and protection against electric shock	47
14.1	General	47
14.2	Clearances and creepage distances	47
14.2.1	General	47
14.2.2	Clearances	49
14.2.3	Creepage distances	50
13.4	Measurement of creepage distances and clearances	47
14.3	Solid insulation	51
14.4	Protection against direct contact	51
15	Mechanical strength	51
15.1	General	51
15.2	Mechanical strength of terminals and current-carrying parts	52
15.2.1	General	52
15.2.2	Mechanical strength of screw terminals and screwless terminals	52

15.2.3	Mechanical strength of flat quick-connect terminations	52
15.2.4	Mechanical strength of sockets	52
15.2.5	Mechanical strength of alternative termination types	52
16	Heat and fire resistance	53
16.1	General	53
16.2	Glow-wire test	53
17	Vibration and shock	53
17.1	Vibration	53
17.2	Shock	54
18	Electromagnetic compatibility (EMC)	54
18.1	General	54
18.2	EMC Immunity	55
18.3	EMC Radiated and conducted emission	58
19	Cybersecurity for industrial automation and control systems (IACS)	58
20	Environmental information	58
20.1	Environmentally conscious design process	58
20.2	Procedure to establish material declaration	58
Annex A (informative) Ball pressure test		
Annex A (informative) Setting accuracy, repeatability and effect of influence calculation		
		60
A.1	General	60
A.2	Example of calculation	60
Annex B (informative) Risk assessment		
		61
B.1	General	61
B.2	Risk assessment procedure	61
B.3	Achieving tolerable risk	62
B.4	Application of risk assessment procedures (proposal for the user)	66
Annex C (normative) Tests for EMC		
		67
C.1	General	67
C.2	EMC immunity	67
C.2.1	General	67
C.2.2	Performance criteria	67
C.3	EMC radiated and conducted emission	71
C.3.1	General	71
C.3.2	Conducted radio-frequency emission tests	71
C.3.3	Radiated radio-frequency emission tests	71
Bibliography		
		72
Figure 1	– Definition of ports	15
Figure 2	– Power ON-delay relay	17
Figure 3	– Power OFF-delay relay	18
Figure 4	– OFF-delay relay with control signal	18
Figure 5	– ON- and OFF-delay relay with control signal	19
Figure 6	– Flasher relay	19
Figure 7	– Star-delta relay	20
Figure 8	– Summation time relay	21
Figure 9	– Pulse delayed relay	21

Figure 10 – Pulse delayed relay with control signal	22
Figure 11 – Interval relay	22
Figure 12 – Interval relay with control signal	23
Figure 13 – Retriggerable interval relay with control signal ON	23
Figure 14 – Retriggerable interval relay with control signal OFF	24
Figure 15 – Maintained time relay	24
Figure 16 – Test circuit electromechanical output, conditional short-circuit current	46
Figure 17 – Test circuit solid state output, conditional short-circuit current	47
Figure B.1 – Iterative process of risk assessment and risk reduction	62
Figure B.2 – Risk reduction	64
Figure B.3 – Example of the time relay circuit block diagram	65
Table 1 – Influence quantities and reference values	25
Table 2 – Preferred values of endurance	28
Table 3 – Preferred values of maximum permissible operating frequency	28
Table 4 – Recommended final values of the setting range	30
Table 5 – Type testing	31
Table 6 – Routine testing	32
Table 7 – Required time relay or coupling relay information	33
Table 8 – Thermal classification	36
Table 9 – Cross-sectional areas and lengths of conductors dependent on the current carried by the terminal	37
Table 10 – Maximum steady state current dependent on the connector size	38
Table 11 – Temperature rise limits of accessible parts	39
Table 12 – Changing of influencing quantities	41
Table 13 – Impulse test for basic insulation	43
Table 14 – Dielectric test voltage for basic insulation for devices suitable devices suitable for use in single-phase three- or two-wire AC and DC systems	44
Table 15 – Dielectric test voltage for basic insulation for devices suitable for use in three-phase four or three-wire AC systems	44
Table 16 – Environmental conditions influencing EMC	49
Table 16 – Minimum clearances for basic insulation	49
Table 17 – Immunity tests for industrial environments	50
Table 17 – Minimum clearances in controlled overvoltage conditions for internal circuits	50
Table 18 – Immunity tests for residential, commercial and light industrial environments	50
Table 18 – Minimum creepage distances for basic insulation	50
Table A.1 – Calculation formulae	60
Table B.1 – Examples of the relation between failure mode, consequences and hazard	65
Table B.2 – Severity of harm	66
Table B.3 – Probability of harm	66
Table B.4 – Risk category	66
Table C.1 – Environmental conditions influencing EMC	67
Table C.2 – Immunity tests for industrial environments	69

Table C.3 – Immunity tests for residential, commercial and light-industrial environments	70
Table C.4 – Terminal disturbance voltage limits for conducted radio-frequency emission (for power port)	71
Table C.5 – Radiated emission test limits.....	71

INTERNATIONAL ELECTROTECHNICAL COMMISSION

TIME RELAYS AND COUPLING RELAYS FOR INDUSTRIAL AND RESIDENTIAL USE –

Part 1: Requirements and tests

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 61812-1:2011. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 61812-1 has been prepared by IEC technical committee 94: Electrical relays. It is an International Standard.

This third edition cancels and replaces the second edition published in 2011. This edition constitutes a technical revision.

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

- a) update of references;
- b) addition of requirements for risk assessment;
- c) addition of requirements for routine test;
- d) renumbering of clauses to bring them into a more logical order;
- e) clarification of the requirement for shock;
- f) addition of cybersecurity requirements for industrial automation and control systems;
- g) addition of environmentally conscious design requirement;
- h) addition of common data dictionary reference;
- i) addition of terms and definitions of relay types;
- j) addition of coupling relays in title;
- k) addition of coupling relays in scope.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
94/843/FDIS	94/889/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts of the IEC 61812 series can be found, under the general title *Time relays and coupling relays for industrial and residential use*, on the IEC website.

Future documents in this series will carry the new general title as cited above. Titles of existing documents in this series will be updated at the time of the next edition.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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TIME RELAYS AND COUPLING RELAYS FOR INDUSTRIAL AND RESIDENTIAL USE –

Part 1: Requirements and tests

1 Scope

~~This part of the IEC 61812 applies to time relays for industrial applications (e.g. control, automation, signal and industrial equipment).~~

~~It also applies to time relays for automatic electrical controls for use in, on, or in association with equipment for residential and similar use.~~

~~The term “relay” as used in this standard comprises all types of relays with specified time functions, other than measuring relays.~~

~~NOTE – Depending on the field of application of these relays (for example automatic electrical controls for household and similar use, switches for household and similar fixed electrical installations), further standards may be applicable, for example IEC 60730-2-7 or IEC 60669-2-3.~~

This part of IEC 61812 applies to time relays and coupling relays for industrial applications (for example control, automation, signal and industrial equipment) and for automatic electrical controls for use in, on, or in association with equipment for residential and similar use.

The term “relay” as used in this document comprises all types of time relays and coupling relays, other than measuring relays.

NOTE 1 Time relays and coupling relays can be used for industrial application (for example control, automation, signal and industrial equipment) and for automatic electrical controls for use in, on, or in association with equipment for residential and similar use.”

NOTE 2 Measuring relays are handled by the IEC TC95.

This document defines type test and routine test to confirm the service condition. Subclause 3.2 provides definitions for different types of time relays in use in the IEC 61812 series.

2 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. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-444:2002, *International Electrotechnical Vocabulary (IEV) – Part 444: Elementary relays*

IEC 60050-445:2010, *International Electrotechnical Vocabulary (IEV) – Part 445: Time relays*

~~IEC 60068 (all parts), *Environmental testing*~~

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-6:2007, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

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IEC 60068-2-27:2008, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

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

IEC 60112:~~2003~~2020, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

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

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

~~IEC 60664 (all parts), Insulation coordination for equipment within low-voltage systems~~

IEC 60664-1:~~2007~~2020, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60664-3:~~2003~~2016, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60664-4:2005, *Insulation coordination for equipment within low-voltage systems – Part 4: Consideration of high-frequency voltage stress*

~~IEC 60664-5:2007, Insulation coordination for equipment within low-voltage systems – Part 5: Comprehensive method for determining clearances and creepage distances equal to or less than 2 mm~~

IEC 60695-2-11:~~2000~~2021, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end products (GWEPT)*

IEC 60695-10-2:~~2003~~2014, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*

IEC 60947-5-1:2016, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

IEC 60947-5-4:2002, *Low-voltage switchgear and controlgear – Part 5-4: Control circuit devices and switching elements – Method of assessing the performance of low-energy contacts – Special tests*

IEC 60947-5-4:2002/AMD1:2019

IEC 60999-1:1999, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)*

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:~~2006~~2020, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:~~2004~~2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:~~2005~~2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-5:2014/AMD1:2017

IEC 61000-4-6:20082013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8:2009, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11:20042020, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

IEC 61000-4-34:2005, *Electromagnetic compatibility (EMC) – Part 4-34: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with mains current more than 16 A per phase*
IEC 61000-4-34:2005/AMD1:2009

IEC 61210:2010, *Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements*

IEC 61810-1:20082015, *Electromechanical elementary relays – Part 1: General and safety requirements*
IEC 61810-1:2015/AMD1:2019

IEC 61984:2008, *Connectors – Safety requirements and tests*

IEC 62314:20062022, *Solid-state relays – Safety requirements*

CISPR 11:20092015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
~~Amendment 1 (2010)~~

CISPR 11:2015/AMD1:2016

CISPR 11:2015/AMD2:2019

~~CISPR 22:2008, Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement~~

ISO 9223:2012, *Corrosion of metals and alloys – Corrosivity of atmospheres – Classification, determination and estimation*

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Time relays and coupling relays for industrial and residential use –
Part 1: Requirements and tests**

**Relais temporisés et relais de couplage pour applications industrielles et
résidentielles –
Partie 1: Exigences et essais**

CONTENTS

FOREWORD.....	6
1 Scope.....	8
2 Normative references	8
3 Terms and definitions	10
3.1 Terms and definitions related to general terms.....	10
3.2 Terms and definitions of time relay types	15
4 Classification.....	22
4.1 Switching element.....	22
4.2 Mechanical construction.....	22
4.3 Device mounting	22
4.4 Connection	22
4.5 Environment	22
5 Influence quantities	22
6 Rated values	23
6.1 General.....	23
6.2 Input voltage and frequency	23
6.3 Release voltage	24
6.4 Power consumption.....	24
6.5 Output circuit	24
6.5.1 General	24
6.5.2 Electromechanical output circuit	24
6.5.3 Solid state output circuit	25
6.5.4 Endurance and operating frequency	25
6.5.5 Conditional short-circuit current	26
6.6 Ambient temperature.....	26
6.7 Transport and storage temperature	26
6.8 Humidity	26
6.9 Pollution degree.....	26
6.10 Altitude	26
6.11 Timing circuit function	26
6.11.1 General	26
6.11.2 Setting accuracy	27
6.11.3 Repeatability	27
6.11.4 Recovery time and minimum control impulse	27
7 Provisions for testing	27
7.1 General.....	27
7.2 Type test.....	27
7.3 Routine test	28
7.4 Sampling test.....	29
8 Documentation and marking	29
8.1 Data.....	29
8.2 Marking.....	32
9 Heating.....	32
9.1 General.....	32
9.2 Test conditions	33
9.3 Heating of terminals.....	33

9.3.1	General	33
9.3.2	Heating of screw terminals and screwless terminals	33
9.3.3	Heating of quick-connect terminations	34
9.3.4	Heating of sockets	34
9.3.5	Heating of alternative termination types	35
9.4	Heating of accessible parts	35
9.5	Ball pressure test	35
10	Basic operating function	36
10.1	General	36
10.2	Operate	36
10.3	Release	36
10.4	Time function	36
10.4.1	General	36
10.4.2	Functional test at reference values of input quantities	36
10.4.3	Effect of influence of voltage and temperature	37
11	Dielectric strength and impulse withstand	37
11.1	General	37
11.2	Preconditioning	37
11.3	Insulation test	38
11.3.1	General	38
11.3.2	Impulse withstand test	38
11.3.3	Dielectric AC power frequency voltage test	39
12	Electrical endurance	40
12.1	General	40
12.2	Resistive loads, inductive loads, and special loads	40
12.3	Low energy loads	40
13	Conditional short-circuit current of an output circuit	41
13.1	General	41
13.2	Test procedure	41
13.3	Test circuit electromechanical output circuit	41
13.4	Test circuit solid state output circuit	42
13.5	Condition of switching element after test	42
14	Insulation coordination and protection against electric shock	43
14.1	General	43
14.2	Clearances and creepage distances	43
14.2.1	General	43
14.2.2	Clearances	44
14.2.3	Creepage distances	44
14.3	Solid insulation	45
14.4	Protection against direct contact	46
15	Mechanical strength	46
15.1	General	46
15.2	Mechanical strength of terminals and current-carrying parts	46
15.2.1	General	46
15.2.2	Mechanical strength of screw terminals and screwless terminals	46
15.2.3	Mechanical strength of flat quick-connect terminations	46
15.2.4	Mechanical strength of sockets	47
15.2.5	Mechanical strength of alternative termination types	47

16	Heat and fire resistance.....	47
16.1	General.....	47
16.2	Glow-wire test.....	47
17	Vibration and shock.....	48
17.1	Vibration.....	48
17.2	Shock.....	48
18	Electromagnetic compatibility (EMC).....	49
18.1	General.....	49
18.2	Immunity.....	49
18.3	Radiated and conducted emission.....	49
19	Cybersecurity for industrial automation and control systems (IACS).....	50
20	Environmental information.....	50
20.1	Environmentally conscious design process.....	50
20.2	Procedure to establish material declaration.....	50
Annex A (informative) Setting accuracy, repeatability and effect of influence calculation.....		51
A.1	General.....	51
A.2	Example of calculation.....	51
Annex B (informative) Risk assessment.....		52
B.1	General.....	52
B.2	Risk assessment procedure.....	52
B.3	Achieving tolerable risk.....	53
B.4	Application of risk assessment procedures (proposal for the user).....	57
Annex C (normative) Tests for EMC.....		58
C.1	General.....	58
C.2	EMC immunity.....	58
C.2.1	General.....	58
C.2.2	Performance criteria.....	58
C.3	EMC radiated and conducted emission.....	62
C.3.1	General.....	62
C.3.2	Conducted radio-frequency emission tests.....	62
C.3.3	Radiated radio-frequency emission tests.....	62
Bibliography.....		63
Figure 1 – Definition of ports.....		13
Figure 2 – Power ON-delay relay.....		15
Figure 3 – Power OFF-delay relay.....		15
Figure 4 – OFF-delay relay with control signal.....		16
Figure 5 – ON- and OFF-delay relay with control signal.....		16
Figure 6 – Flasher relay.....		17
Figure 7 – Star-delta relay.....		18
Figure 8 – Summation time relay.....		18
Figure 9 – Pulse delayed relay.....		19
Figure 10 – Pulse delayed relay with control signal.....		19
Figure 11 – Interval relay.....		20
Figure 12 – Interval relay with control signal.....		20

Figure 13 – Retriggerable interval relay with control signal ON	21
Figure 14 – Retriggerable interval relay with control signal OFF	21
Figure 15 – Maintained time relay	22
Figure 16 – Test circuit electromechanical output, conditional short-circuit current	42
Figure 17 – Test circuit solid state output, conditional short-circuit current.....	42
Figure B.1 – Iterative process of risk assessment and risk reduction.....	53
Figure B.2 – Risk reduction.....	55
Figure B.3 – Example of the time relay circuit block diagram.....	56
Table 1 – Influence quantities and reference values.....	23
Table 2 – Preferred values of endurance	25
Table 3 – Preferred values of maximum permissible operating frequency.....	25
Table 4 – Recommended final values of the setting range.....	27
Table 5 – Type testing	28
Table 6 – Routine testing	29
Table 7 – Required time relay or coupling relay information	29
Table 8 – Thermal classification.....	32
Table 9 – Cross-sectional areas and lengths of conductors dependent on the current carried by the terminal	34
Table 10 – Maximum steady state current dependent on the connector size	34
Table 11 – Temperature rise limits of accessible parts	35
Table 12 – Changing of influencing quantities	37
Table 13 – Impulse test for basic insulation	39
Table 14 – Dielectric test voltage for basic insulation for devices suitable for use in single-phase three- or two-wire AC and DC systems.....	39
Table 15 – Dielectric test voltage for basic insulation for devices suitable for use in three-phase four or three-wire AC systems	40
Table 16 – Minimum clearances for basic insulation.....	44
Table 17 – Minimum clearances in controlled overvoltage conditions	44
Table 18 – Minimum creepage distances for basic insulation	45
Table A.1 – Calculation formulae	51
Table B.1 – Examples of the relation between failure mode, consequences and hazard.....	56
Table B.2 – Severity of harm.....	57
Table B.3 – Probability of harm.....	57
Table B.4 – Risk category	57
Table C.1 – Environmental conditions influencing EMC.....	58
Table C.2 – Immunity tests for industrial environments	60
Table C.3 – Immunity tests for residential, commercial and light-industrial environments	61
Table C.4 – Terminal disturbance voltage limits for conducted radio-frequency emission (for power port)	62
Table C.5 – Radiated emission test limits.....	62

INTERNATIONAL ELECTROTECHNICAL COMMISSION

TIME RELAYS AND COUPLING RELAYS FOR INDUSTRIAL AND RESIDENTIAL USE –

Part 1: Requirements and tests

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
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- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61812-1 has been prepared by IEC technical committee 94: Electrical relays. It is an International Standard.

This third edition cancels and replaces the second edition published in 2011. This edition constitutes a technical revision.

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

- a) update of references;
- b) addition of requirements for risk assessment;
- c) addition of requirements for routine test;
- d) renumbering of clauses to bring them into a more logical order;
- e) clarification of the requirement for shock;
- f) addition of cybersecurity requirements for industrial automation and control systems;

- g) addition of environmentally conscious design requirement;
- h) addition of common data dictionary reference;
- i) addition of terms and definitions of relay types;
- j) addition of coupling relays in title;
- k) addition of coupling relays in scope.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
94/843/FDIS	94/889/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts of the IEC 61812 series can be found, under the general title *Time relays and coupling relays for industrial and residential use*, on the IEC website.

Future documents in this series will carry the new general title as cited above. Titles of existing documents in this series will be updated at the time of the next edition.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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TIME RELAYS AND COUPLING RELAYS FOR INDUSTRIAL AND RESIDENTIAL USE –

Part 1: Requirements and tests

1 Scope

This part of IEC 61812 applies to time relays and coupling relays for industrial applications (for example control, automation, signal and industrial equipment) and for automatic electrical controls for use in, on, or in association with equipment for residential and similar use.

The term “relay” as used in this document comprises all types of time relays and coupling relays, other than measuring relays.

NOTE 1 Time relays and coupling relays can be used for industrial application (for example control, automation, signal and industrial equipment) and for automatic electrical controls for use in, on, or in association with equipment for residential and similar use.”

NOTE 2 Measuring relays are handled by the IEC TC95.

This document defines type test and routine test to confirm the service condition. Subclause 3.2 provides definitions for different types of time relays in use in the IEC 61812 series.

2 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. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-444:2002, *International Electrotechnical Vocabulary (IEV) – Part 444: Elementary relays*

IEC 60050-445:2010, *International Electrotechnical Vocabulary (IEV) – Part 445: Time relays*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-6:2007, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27:2008, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

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

IEC 60112:2020, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60664-3:2016, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60664-4:2005, *Insulation coordination for equipment within low-voltage systems – Part 4: Consideration of high-frequency voltage stress*

IEC 60695-2-11:2021, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end products (GWEPT)*

IEC 60695-10-2:2014, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*

IEC 60947-5-1:2016, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

IEC 60947-5-4:2002, *Low-voltage switchgear and controlgear – Part 5-4: Control circuit devices and switching elements – Method of assessing the performance of low-energy contacts – Special tests*

IEC 60947-5-4:2002/AMD1:2019

IEC 60999-1:1999, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)*

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2020, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-5:2014/AMD1:2017

IEC 61000-4-6:2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8:2009, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11:2020, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

IEC 61000-4-34:2005, *Electromagnetic compatibility (EMC) – Part 4-34: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with mains current more than 16 A per phase*

IEC 61000-4-34:2005/AMD1:2009

IEC 61210:2010, *Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements*

IEC 61810-1:2015, *Electromechanical elementary relays – Part 1: General and safety requirements*

IEC 61810-1:2015/AMD1:2019

IEC 61984:2008, *Connectors – Safety requirements and tests*

IEC 62314:2022, *Solid-state relays – Safety requirements*

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*

CISPR 11:2015/AMD1:2016

CISPR 11:2015/AMD2:2019

ISO 9223:2012, *Corrosion of metals and alloys – Corrosivity of atmospheres – Classification, determination and estimation*

SOMMAIRE

AVANT-PROPOS	69
1 Domaine d'application	71
2 Références normatives	71
3 Termes et définitions	73
3.1 Termes et définitions relatifs aux termes généraux	73
3.2 Termes et définitions relatifs aux types de relais temporisés	78
4 Classification	86
4.1 Élément de commutation	86
4.2 Construction mécanique	86
4.3 Montage du dispositif	86
4.4 Connexion	86
4.5 Environnement	86
5 Grandeurs d'influence	86
6 Valeurs assignées	87
6.1 Généralités	87
6.2 Tension d'entrée et fréquence	87
6.3 Tension de relâchement	88
6.4 Puissance absorbée	88
6.5 Circuit de sortie	88
6.5.1 Généralités	88
6.5.2 Circuit de sortie électromécanique	89
6.5.3 Circuit de sortie statique	89
6.5.4 Endurance et fréquence de fonctionnement	89
6.5.5 Courant de court-circuit conditionnel	90
6.6 Température ambiante	90
6.7 Température de transport et de stockage	90
6.8 Humidité	91
6.9 Degré de pollution	91
6.10 Altitude	91
6.11 Fonction de circuit de temporisation	91
6.11.1 Généralités	91
6.11.2 Exactitude de réglage	91
6.11.3 Répétabilité	92
6.11.4 Temps de récupération et impulsion minimale de commande	92
7 Dispositions relatives aux essais	92
7.1 Généralités	92
7.2 Essai de type	92
7.3 Essai individuel de série	93
7.4 Essai sur prélèvement	94
8 Documentation et marquage	94
8.1 Données	94
8.2 Marquage	96
9 Échauffement	97
9.1 Généralités	97
9.2 Conditions d'essai	97
9.3 Échauffement des bornes	98

9.3.1	Généralités	98
9.3.2	Échauffement des bornes à vis et sans vis	98
9.3.3	Échauffement des bornes à connexion rapide	100
9.3.4	Échauffement des socles	100
9.3.5	Échauffement des types alternatifs de bornes	100
9.4	Échauffement des parties accessibles	101
9.5	Essai à la bille	101
10	Fonctionnement de base	101
10.1	Généralités	101
10.2	Fonctionnement	102
10.3	Relâchement.....	102
10.4	Fonction temporelle	102
10.4.1	Généralités	102
10.4.2	Essai fonctionnel aux valeurs de référence des grandeurs d'entrée	102
10.4.3	Effet d'influence de la tension et de la température.....	103
11	Rigidité diélectrique et résistance aux ondes de choc	103
11.1	Généralités	103
11.2	Préconditionnement	103
11.3	Essai d'isolation	104
11.3.1	Généralités	104
11.3.2	Essai de résistance aux ondes de choc	104
11.3.3	Essai de tension diélectrique en courant alternatif à la fréquence du réseau	105
12	Endurance électrique.....	106
12.1	Généralités	106
12.2	Charges résistives, charges inductives et charges spéciales.....	106
12.3	Charges à basse énergie	107
13	Courant de court-circuit conditionnel d'un circuit de sortie	107
13.1	Généralités	107
13.2	Procédure d'essai	107
13.3	Circuit de sortie électromécanique d'un circuit d'essai.....	107
13.4	Circuit de sortie statique du circuit d'essai	108
13.5	État de l'élément de commutation après essai	109
14	Coordination de l'isolement et protection contre les chocs électriques	109
14.1	Généralités	109
14.2	Distances d'isolement et lignes de fuite	109
14.2.1	Généralités	109
14.2.2	Distances d'isolement.....	110
14.2.3	Lignes de fuite.....	111
14.3	Isolation solide.....	112
14.4	Protection contre les contacts directs.....	113
15	Résistance mécanique.....	113
15.1	Généralités	113
15.2	Résistance mécanique des bornes et parties qui transportent le courant.....	113
15.2.1	Généralités	113
15.2.2	Résistance mécanique des bornes à vis et sans vis.....	114
15.2.3	Résistance mécanique des bornes plates à connexion rapide.....	114
15.2.4	Résistance mécanique des socles	114

15.2.5	Résistance mécanique des types alternatifs de bornes	114
16	Résistance à la chaleur et au feu	114
16.1	Généralités	114
16.2	Essai au fil incandescent	115
17	Vibrations et chocs	115
17.1	Vibrations	115
17.2	Chocs	116
18	Compatibilité électromagnétique (CEM)	116
18.1	Généralités	116
18.2	Immunité	116
18.3	Émissions rayonnées et conduites	117
19	Cybersécurité pour les systèmes d'automatisation et de commande industrielles (IACS, <i>Industrial Automation and Control System</i>)	117
20	Informations relatives à l'environnement	117
20.1	Processus d'écoconception	117
20.2	Procédure d'établissement d'une déclaration de matières	117
Annexe A (informative) Calcul de l'exactitude de réglage, de la répétabilité et de l'effet d'influence		118
A.1	Généralités	118
A.2	Exemple de calcul	118
Annexe B (informative) Appréciation du risque		120
B.1	Généralités	120
B.2	Procédure d'appréciation du risque	120
B.3	Obtention d'un risque tolérable	122
B.4	Application des procédures d'appréciation du risque (proposition pour l'utilisateur)	125
Annexe C (normative) Essais de CEM		127
C.1	Généralités	127
C.2	Immunité CEM	127
C.2.1	Généralités	127
C.2.2	Critères de performance	128
C.3	Émissions CEM rayonnées et conduites	131
C.3.1	Généralités	131
C.3.2	Essais d'émissions conduites aux fréquences radioélectriques	131
C.3.3	Essais d'émissions rayonnées aux fréquences radioélectriques	132
Bibliographie		133
Figure 1 – Définition des ports		76
Figure 2 – Relais temporisé à la mise sous tension		78
Figure 3 – Relais temporisé à la coupure		79
Figure 4 – Relais temporisé à la coupure avec signal de commande		79
Figure 5 – Relais temporisé à la mise sous tension et à la coupure avec signal de commande		80
Figure 6 – Relais clignotant		80
Figure 7 – Relais temporisé à couplage étoile-triangle		81
Figure 8 – Relais temporisé à addition de temps		82
Figure 9 – Relais à impulsion retardée		82

Figure 10 – Relais à impulsion retardée avec signal de commande.....	83
Figure 11 – Relais d'intervalle.....	83
Figure 12 – Relais d'intervalle avec signal de commande.....	84
Figure 13 – Relais de surveillance	84
Figure 14 – Relais de surveillance à retrait du signal de commande	85
Figure 15 – Relais temporisé maintenu	85
Figure 16 – Sortie électromécanique du circuit d'essai, courant de court-circuit conditionnel	108
Figure 17 – Sortie statique du circuit d'essai, courant de court-circuit conditionnel	109
Figure B.1 – Processus itératif d'appréciation du risque et de réduction du risque	121
Figure B.2 – Réduction du risque.....	123
Figure B.3 – Exemple de schéma fonctionnel de circuit de relais temporisé	124
Tableau 1 – Grandeurs d'influence et valeurs de référence.....	87
Tableau 2 – Valeurs préférentielles relatives à l'endurance.....	90
Tableau 3 – Valeurs préférentielles relatives à la fréquence de fonctionnement maximale admissible.....	90
Tableau 4 – Valeurs finales recommandées de la plage de réglage	91
Tableau 5 – Essais de type.....	93
Tableau 6 – Essais individuels de série	93
Tableau 7 – Informations exigées relatives aux relais temporisés ou aux relais de couplage.....	94
Tableau 8 – Classification thermique	97
Tableau 9 – Sections et longueurs des conducteurs en fonction du courant transporté par la borne	99
Tableau 10 – Courant maximal en régime établi en fonction de la dimension du connecteur.....	100
Tableau 11 – Limites d'échauffement des parties accessibles.....	101
Tableau 12 – Modification des grandeurs d'influence	103
Tableau 13 – Essai de résistance aux ondes de choc pour isolation principale	105
Tableau 14 – Tension d'essai diélectrique pour l'isolation principale des dispositifs destinés à être utilisés dans des systèmes monophasés en courant alternatif et courant continu à trois ou deux conducteurs	105
Tableau 15 – Tension d'essai diélectrique pour l'isolation principale des dispositifs destinés à être utilisés dans des systèmes triphasés en courant alternatif à quatre ou trois conducteurs	106
Tableau 16 – Distances d'isolement minimales pour l'isolation principale.....	111
Tableau 17 – Distances d'isolement minimales dans des conditions de surtension contrôlées.....	111
Tableau 18 – Lignes de fuite minimales pour l'isolation principale.....	112
Tableau A.1 – Formules de calcul	118
Tableau B.1 – Exemples de relations entre le mode de défaillance, les conséquences et les dangers.....	125
Tableau B.2 – Sévérité des dommages	125
Tableau B.3 – Probabilité des dommages	126
Tableau B.4 – Catégorie de risque.....	126

Tableau C.1 – Conditions d'environnement qui ont une influence sur la CEM.....	127
Tableau C.2 – Essais d'immunité pour les environnements industriels	129
Tableau C.3 – Essais d'immunité pour les environnements résidentiels, commerciaux et de l'industrie légère	130
Tableau C.4 – Limites de tension perturbatrice aux bornes pour les émissions conduites aux fréquences radioélectriques (port d'alimentation).....	131
Tableau C.5 – Limites d'essai d'émissions rayonnées	132

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

RELAIS TEMPORISÉS ET RELAIS DE COUPLAGE POUR APPLICATIONS INDUSTRIELLES ET RÉSIDENTIELLES –

Partie 1: Exigences et essais

AVANT-PROPOS

- 1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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- 4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
- 5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
- 6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
- 7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 61812-1 a été établie par le comité d'études 94 de l'IEC: Relais électriques de tout-ou-rien. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2011. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) mise à jour des références;
- b) ajout d'exigences relatives à l'appréciation du risque;
- c) ajout d'exigences relatives à l'essai individuel de série;
- d) renumérotation des paragraphes selon un ordre plus logique;

- e) clarification de l'exigence relative aux chocs;
- f) ajout d'exigences de cybersécurité pour les systèmes d'automatisation et de commande industrielles;
- g) ajout d'une exigence d'écoconception;
- h) ajout d'une référence au dictionnaire de données commun;
- i) ajout de termes et définitions relatifs aux types de relais;
- j) ajout des relais de couplage dans le titre;
- k) ajout des relais de couplage dans le domaine d'application.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
94/843/FDIS	94/889/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Le présent document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

Une liste de toutes les parties de la série IEC 61812, publiées sous le titre général *Relais temporisés et relais de couplage pour applications industrielles et résidentielles*, se trouve sur le site web de l'IEC.

Les futurs documents de cette série porteront le nouveau titre général cité ci-dessus. Le titre des documents qui existent déjà dans cette série sera mis à jour lors de leur prochaine édition.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera

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RELAIS TEMPORISÉS ET RELAIS DE COUPLAGE POUR APPLICATIONS INDUSTRIELLES ET RÉSIDENIELLES –

Partie 1: Exigences et essais

1 Domaine d'application

La présente partie de l'IEC 61812 s'applique aux relais temporisés et aux relais de couplage pour applications industrielles (par exemple, systèmes industriels de commande, d'automatisation et de signalisation) ainsi qu'aux dispositifs de commande électrique automatiques destinés à être utilisés dans, sur ou avec des équipements pour applications résidentielles et analogues.

Le terme "relais", utilisé dans le présent document, comprend tous les types de relais temporisés et de relais de couplage, hormis les relais de mesure.

NOTE 1 Les relais temporisés et les relais de couplage peuvent être utilisés pour une application industrielle (par exemple, systèmes industriels de commande, d'automatisation et de signalisation) ainsi qu'aux dispositifs de commande électrique automatiques destinés à être utilisés dans, sur ou avec des équipements pour applications résidentielles et analogues.

NOTE 2 Les relais de mesure sont traités par le CE 95 de l'IEC.

Le présent document définit l'essai de type et l'essai individuel de série qui visent à confirmer la condition de service. Les définitions des différents types de relais temporisés utilisés dans la série IEC 61812 sont données en 3.2.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60050-444:2002, *Vocabulaire Électrotechnique International (IEV) – Partie 444: Relais élémentaires*

IEC 60050-445:2010, *Vocabulaire Électrotechnique International (IEV) – Partie 445: Relais temporisés*

IEC 60068-2-2:2007, *Essais d'environnement – Partie 2-2: Essais – Essai B: Chaleur sèche*

IEC 60068-2-6:2007, *Essais d'environnement – Partie 2-6: Essais – Essai Fc: Vibrations (sinusoïdales)*

IEC 60068-2-27:2008, *Essais d'environnement – Partie 2-27: Essais – Essai Ea et guide: Chocs*

IEC 60085:2007, *Isolation électrique – Évaluation et désignation thermiques*

IEC 60112:2020, *Méthode de détermination des indices de résistance et de tenue au cheminement des matériaux isolants solides*

IEC 60529:1989, *Degrés de protection procurés par les enveloppes (Code IP)*
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

IEC 60664-1:2020, *Coordination de l'isolement des matériels dans les réseaux d'énergie électrique à basse tension – Partie 1: Principes, exigences et essais*

IEC 60664-3:2016, *Coordination de l'isolement des matériels dans les réseaux d'énergie électrique à basse tension – Partie 3: Utilisation de revêtement, d'empotage ou de moulage pour la protection contre la pollution*

IEC 60664-4:2005, *Coordination de l'isolement des matériels dans les réseaux d'énergie électrique à basse tension – Partie 4: Considérations sur les contraintes de tension à haute fréquence*

IEC 60695-2-11:2021, *Essais relatifs aux risques du feu – Partie 2-11: Essais au fil incandescent/chauffant – Méthode d'essai d'inflammabilité pour produits finis (GWEPT)*

IEC 60695-10-2:2014, *Essais relatifs aux risques du feu – Partie 10-2: Chaleurs anormales – Essai à la bille*

IEC 60947-5-1:2016, *Appareillage à basse tension – Partie 5-1: Appareils et éléments de commutation pour circuits de commande – Appareils électromécaniques pour circuits de commande*

IEC 60947-5-4:2002, *Appareillage à basse tension – Partie 5-4: Appareil et éléments de commutation pour circuits de commande – Méthode d'évaluation des performances des contacts à basse énergie – Essais spéciaux*
IEC 60947-5-4:2002/AMD1:2019

IEC 60999-1:1999, *Dispositifs de connexion – Conducteurs électriques en cuivre – Prescriptions de sécurité pour organes de serrage à vis et sans vis – Partie 1: Prescriptions générales et particulières pour les organes de serrage pour les conducteurs de 0,2 mm² à 35 mm² (inclus)*

IEC 61000-4-2:2008, *Compatibilité électromagnétique (CEM) – Partie 4-2: Techniques d'essai et de mesure – Essai d'immunité aux décharges électrostatiques*

IEC 61000-4-3:2020, *Compatibilité électromagnétique (CEM) – Partie 4-3: Techniques d'essai et de mesure – Essai d'immunité aux champs électromagnétiques rayonnés aux fréquences radioélectriques*

IEC 61000-4-4:2012, *Compatibilité électromagnétique (CEM) – Partie 4-4: Techniques d'essai et de mesure – Essais d'immunité aux transitoires électriques rapides en salves*

IEC 61000-4-5:2014, *Compatibilité électromagnétique (CEM) – Partie 4-5: Techniques d'essai et de mesure – Essai d'immunité aux ondes de choc*
IEC 61000-4-5:2014/AMD1:2017

IEC 61000-4-6:2013, *Compatibilité électromagnétique (CEM) – Partie 4-6: Techniques d'essai et de mesure – Immunité aux perturbations conduites, induites par les champs radioélectriques*

IEC 61000-4-8:2009, *Compatibilité électromagnétique (CEM) – Partie 4-8: Techniques d'essai et de mesure – Essai d'immunité au champ magnétique à la fréquence du réseau*

IEC 61000-4-11:2020, *Compatibilité électromagnétique (CEM) – Partie 4-11: Techniques d'essai et de mesure – Essais d'immunité aux creux de tension, coupures brèves et variations de tension pour les appareils à courant d'entrée inférieur ou égal à 16 A par phase*

IEC 61000-4-34:2005, *Compatibilité électromagnétique (CEM) – Partie 4-34: Techniques d'essai et de mesure – Essais d'immunité aux creux de tension, coupures brèves et variations de tension pour matériel ayant un courant appelé de plus de 16 A par phase*
IEC 61000-4-34:2005/AMD1:2009

IEC 61210:2010, *Dispositifs de connexion – Bornes plates à connexion rapide pour conducteurs électriques en cuivre – Exigences de sécurité*

IEC 61810-1:2015, *Relais électromécaniques élémentaires – Partie 1: Exigences générales et de sécurité*
IEC 61810-1:2015/AMD1:2019

IEC 61984:2008, *Connecteurs – Exigences de sécurité et essais*

IEC 62314:2022, *Relais statiques – Exigences de sécurité*

CISPR 11:2015, *Appareils industriels, scientifiques et médicaux – Caractéristiques de perturbations radioélectriques – Limites et méthodes de mesure*
CISPR 11:2015/AMD1:2016
CISPR 11:2015/AMD2:2019

ISO 9223:2012, *Corrosion des métaux et alliages – Corrosivité des atmosphères – Classification, détermination et estimation*