SLOVENSKI STANDARD
oSIST prEN IEC 61812-1:2022

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

Zeitrelais (Relais mit festgelegtem Zeitverhalten) für industrielle Anwendungen und für den Hausgebrauch - Teil 1: Anforderungen und Prüfungen

Relais à temps spécifié pour applications industrielles et résidentielles - Partie 1: Exigences et essais

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94/596/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
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2022-01-14	**2022-04-08**
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94/519/CD, 94/568/CC	

IEC TC 94 : ALL-OR-NOTHING ELECTRICAL RELAYS	
SECRETARIAT: Austria	SECRETARY: Mr Bernhard Spalt
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 121A	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT	☐ QUALITY ASSURANCE ☐ SAFETY
☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
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TITLE:

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

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NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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TIME RELAYS AND COUPLING RELAYS FOR INDUSTRIAL AND RESIDENTIAL USE –

Part 1: Requirements and tests

FOREWORD

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International Standard IEC 61812-1 has been prepared by IEC technical committee 94: All-or-nothing electrical relays.

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:

– update of references;
– addition of requirements for risk assessment;
– addition of requirements for routine test;
– renumbering of clauses to bring them into a more logical order;
– clarification of the requirement for shock;
– addition of cybersecurity requirement for industrial automation and control systems;
– addition of environmentally conscious design requirement;

229 – addition of common data dictionary reference;
230 – addition of terms and definitions of relay types;
231 – addition of coupling relays in title temporarily;
232 – addition of coupling relays in scope temporarily;
233 The text of this document is based on the following documents:

4CD	Report on voting
94/519/CD	94/568/CC

234
235 Full information on the voting for the approval of this International Standard can be found in the
236 report on voting indicated in the above table.

237 This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

238 A list of all parts of the IEC 61812 series can be found, under the general title *TIME RELAYS*
239 *AND COUPLING RELAYS FOR INDUSTRIAL AND RESIDENTIAL USE*, on the IEC website.

240 The committee has decided that the contents of this document will remain unchanged until the
241 stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to
242 the specific document. At this date, the document will be

243 • reconfirmed,
244 • withdrawn,
245 • replaced by a revised edition, or
246 • 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 series applies to time relays and coupling relays for industrial applications (e.g. 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 relays with specified time functions and coupling relays, other than measuring relays.

This document defines type test and routine test to confirm the service condition.

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 60050-444:2002, *International Electrotechnical Vocabulary – Part 444: Elementary relays*

IEC 60050-445:2010, *International Electrotechnical Vocabulary – 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 +AMD1:1999+AMD2:2013, *Degrees of protection provided by enclosures (IP Code)*

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 60695-2-11:2014, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*

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

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 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 + AMD1:2017, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

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

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

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

IEC 62314:2021, *Solid-state relays*

IEC 62430:2019, *Environmentally conscious design (ECD) - Principles, requirements and guidance*

IEC 62474:2018 + AMD1:2020; *Material declaration for products of and for the electrotechnical industry*

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

CISPR 11:2015 + AMD1:2016 + AMD2:2019, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
Amendment 1 (2010)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-444 and IEC 60050-445, as well as the following apply.

NOTE Terms having the same or nearly the same meaning are printed in boldface on separate lines and can be used as an alternative.

3.1 Terms and definitions related to general terms

3.1.1
time relay
specified-time relay
all-or-nothing relay (IEC 60050-444:2002, 444-01-02) with one or more time functions

[IEC 60050-445:2010, 445-01-01 modified]

3.1.2
coupling relay
All-or-nothing electrical relay incorporated into a housing or mounted on a socket (e.g. EN 60715 mounting rail) with no specified time or logic function for industrial or residential use intended for incorporation into cabinets.

NOTE Typically this is a relay according to IEC 61810 series or IEC 62314 incorporated into a housing or mounted on a socket (e.g. EN 60715 mounting rail) for installation in industrial or residential cabinets.

3.1.3
specified time
specified characteristic of the time relay at given type of function, e.g. operate time, release time, pulse on time, interval time

[IEC 60050-445:2010, 445-05-01 modified]

3.1.4
setting accuracy
difference between the measured value of the specified time and the reference value set on the scale

NOTE For analogue setting this value relates to the maximum setting value.

[IEC 60050-445:2010, 445-06-07]

3.1.5
effect of influence (on specified time)
degree with which the influence quantity within its nominal range has an effect on the specified time

[IEC 60050-445:2010, 445-06-02]

3.1.6
recovery time
minimum time interval for which the power supply is removed or control signal is applied or removed before the specified function can be performed again

[IEC 60050-445:2010, 445-05-04]

3.1.7
minimum control impulse time
shortest duration of the power supply or control signal to fulfil the specified function

[IEC 60050-445:2010, 445-05-02]

3.1.8
repeatability
difference between the upper and lower limits of the specified confidence range determined from several time measurements of the time relay under identical conditions

NOTE Preferably the repeatability is indicated as a percentage of the mean value of all measured values.

[IEC 60050-445:2010, 445-06-08]

3.1.9
power supply
electrical quantity (e.g. electric current, voltage) which has to be applied or removed from the input circuit of the time relay or coupling relay in order to enable it to fulfil its purpose

[IEC 60050-445:2010, 445-03-01 modified]

3.1.10
input voltage
electrical quantity that can be applied (or removed) to the power supply and/or to the control signal

3.1.11
control signal
trigger signal (deprecated)
input signal which has to be applied or removed in addition to the power supply in order to ensure a function of the time relay

NOTE The control signal is provided by a separate device designed to close or open an electrical circuit.

[IEC 60050-445:2010, 445-02-05]

3.1.12
conditional short-circuit current of an output circuit
prospective electric current that a contact circuit, protected by a specified short-circuit protective device, can satisfactorily withstand for the total breaking time of that protective device under specified conditions of use and behaviour

[IEC 60050-445:2010, 445-04-03]

3.1.13
on-state voltage drop of a solid-state output circuit
voltage drop of a solid-state output circuit
voltage measured across the effectively conducting solid-state output of the time relay or coupling relay, when carrying the given load current

[IEC 60050-445:2010, 445-04-04 modified]

3.1.14
leakage current of a solid-state output
off-state current of a solid-state output
electric current which flows through the effectively non-conducting solid-state output of the time relay or coupling relay at a specified voltage

[IEC 60050-445:2010, 445-04-05 modified]

3.1.15
power port
port at which the supply voltage (either AC. or DC) is connected to the time relay or coupling relay

[IEC 60050-445:2010, 445-07-01 modified]

3.1.16
control port
additional port for the starting of functions whilst supply voltage is applied, or for the connection of a remote potentiometer, control signal, etc.

NOTE There are control ports for floating (potential-free) and non-floating control.

[IEC 60050-445:2010, 445-07-02]

3.1.17
output port
port at which a load is connected to the time relay or coupling relay

NOTE The output port could consist of electromechanical contacts or be a solid-state output.

[IEC 60050-445:2010, 445-07-03]

3.1.18
enclosure port
physical boundary of the time relay or coupling relay through which electromagnetic fields can radiate or impinge

[IEC 60050-445:2010, 445-07-04]

NOTE See Figure 1.

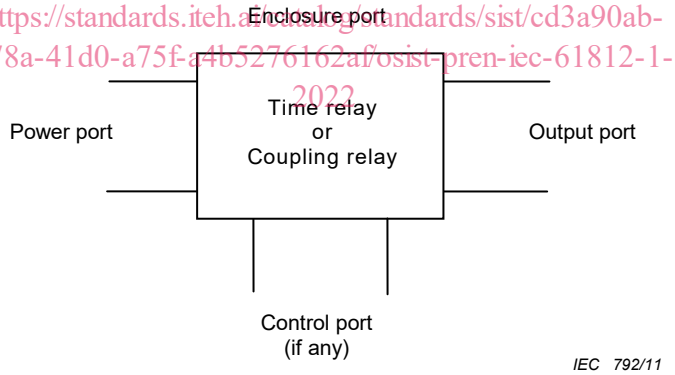

Figure 1 – Definition of ports

3.1.19
type test
test of one or more devices made to a certain design to show that the design meets certain specifications

[IEC 61810-1:2015, 3.1.7]

3.1.20
routine test
test to which each individual device is subjected during and/or after manufacture to ascertain whether it complies with certain criteria

[IEC 61810-1:2015, 3.1.8]

3.1.21
sampling test
test on a number of devices taken at random from a batch

[IEC 61810-1:2015, 3.1.9]

3.1.22
operative range
range of values of power supply for which the time relay or coupling relay is able to perform its specified function

[IEC 61810-1:2015, 3.4.5 modified]

3.1.23

rated input voltage range
range of input voltages used for specification purposes, established for a specified set of operating conditions

3.2 Terms and definitions of time relay types

See Annex A.

4 Classification

4.1 Switching element

Time relays and coupling relays may be classified according to the switching element, e.g. electromechanical output circuit or solid-state output circuit.

4.2 Mechanical construction

Time relays and coupling relays may be classified according to the mechanical construction, e.g. monobloc (non modular) relay or plug-in (modular) relay.

4.3 Device mounting

Time relays and coupling relays may be classified according to the mounting capabilities, e.g. DIN rail or panel mounting.

4.4 Connection

Time relays and coupling relays may be classified according to the connection facilities, e.g. screw type or spring type.

4.5 Environment

Time relays and coupling relays may be classified according to the application environment, e.g. industrial or residential, commercial and light-industrial.

5 Influence quantities

The specified performance of the time relay or coupling relay shall be given with respect to the reference conditions, i.e. the set of reference values of all influence quantities.

The values and tolerance ranges listed in Table 1 apply unless otherwise specified.