

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

ITC STANDARD PREVIEW
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Relais à temps spécifié pour applications industrielles et résidentielles –
Partie 1: Exigences et essais

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TIME 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 second edition cancels and replaces the first edition published in 1996. 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 terms and definitions more commonly used by industry;
- addition of timing charts to help explain terms and definitions involving a sequence of events;
- renumbering of clauses to bring them into a more logical order;
- addition of provisions for residential use.

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

FDIS	Report on voting
94/324/FDIS	94/333/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.

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

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

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

- reconfirmed,
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TIME 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.

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.

- iTeh STANDARD PREVIEW**
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- [IEC 61812-1:2011](#)
- IEC 60050-444:2002, *International Electrotechnical Vocabulary – Part 444: Elementary relays*
- IEC 60050-445:2010, *International Electrotechnical Vocabulary – 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)*
- 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, *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 60664 (all parts), *Insulation coordination for equipment within low-voltage systems*
- IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*
- IEC 60664-3:2003, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

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

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

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

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

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

IEC 61000-4-6:2008, *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 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

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

IEC 61810-1:2008, *Electromechanical elementary relays – Part 1: General requirements*

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

IEC 62314:2006, *Solid-state relays*

CISPR 11:2009, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
Amendment 1 (2010)

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

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

specified time

specified characteristic of a 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]

3.1.3

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]

3.1.4

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]

3.1.5

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]

3.1.6

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]

3.1.7

repeatability

difference between the upper and lower limits of the specified confidence range determined from several time measurements of a 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]

3.1.8

power supply energizing quantity

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

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

3.1.9

input voltage input current

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

3.1.10

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]

3.1.11

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] <https://standards.iteh.ai/catalog/standards/sist/1b961190-cce7-45bc-b133-678a18c0eaf7/iec-61812-1-2011>

3.1.12

on-state voltage drop of a solid-state output circuit

voltage drop of a solid-state output circuit (deprecated)

voltage measured across the effectively conducting solid-state output of a time relay, when carrying the given load current

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

3.1.13

leakage current of a solid-state output

off-state current of a solid-state output (deprecated)

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

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

3.1.14

power port

point at which the supply voltage (either a.c. or d.c.) is connected to the time relay

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

3.1.15

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]

3.1.16 output port

port at which a load is connected to the time relay

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

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

3.1.17 enclosure port

physical boundary of the time relay through which electromagnetic fields can radiate or impinge

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

NOTE See Figure 1.

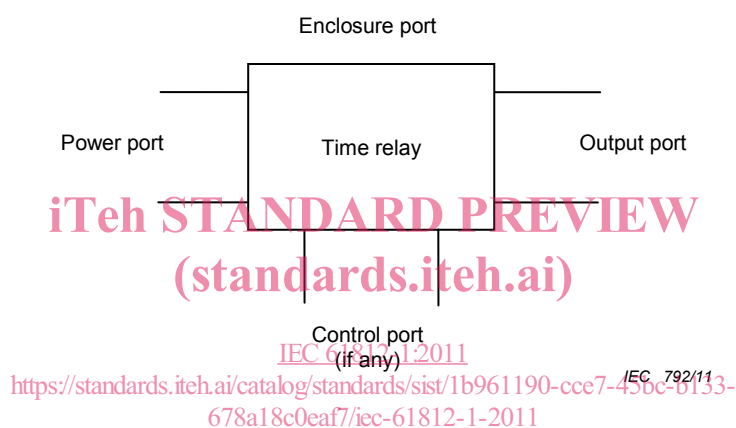


Figure 1 – Definition of ports

3.2 Terms and definitions of relay types

Key

Ⓢ Power supply

Ⓡ Control signal

T Setting time

Ⓜ Make contact IEC 793/11

Figure 2 – Definition of symbols

3.2.1 power on-delay relay on-delay relay

time relay in which the time delay starts when applying the power supply and the output switches to the operate condition after the setting time has elapsed (see Figure 2 and Figure 3)

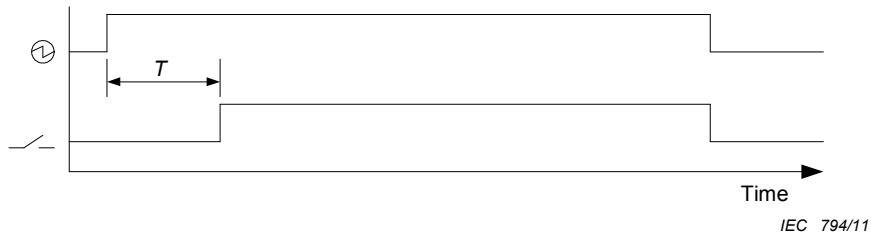


Figure 3 – Power on-delay relay

[IEC 60050-445:2010, 445-01-02]

3.2.2

power off-delay relay
true off-delay relay

time relay in which the output immediately switches to the operate condition when applying the power supply; the time delay starts when the power supply is removed; the output switches to the release condition after the setting time has elapsed (see Figure 2 and Figure 4)

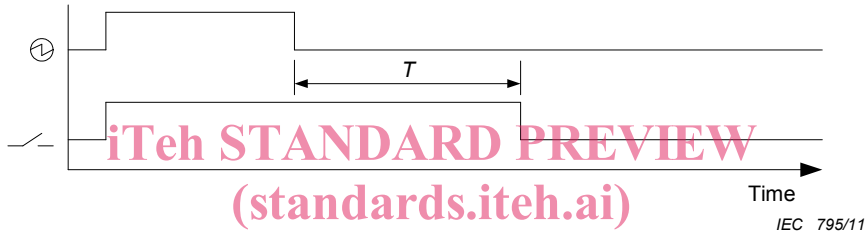


Figure 4 – Power off-delay relay

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

3.2.3

off-delay relay with control signal
off-delay relay

time relay in which the output immediately switches to the operate condition when applying the power supply and the control signal; the time delay starts when removing the control signal, and the output switches to the release condition after the setting time has elapsed (see Figure 2 and Figure 5)

NOTE Effects of subsequent operating or resetting of the control signal should be declared by the manufacturer.

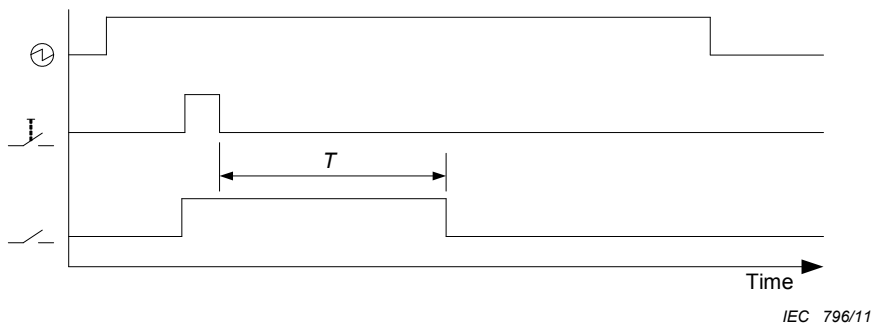


Figure 5 – Off-delay relay with control signal

[IEC 60050-445:2010, 445-01-04]

3.2.4**on- and off-delay relay with control signal**

time relay in which the output switches to the operate condition when applying the power supply and the control signal and after the setting time has elapsed; the output switches to the release condition when the control signal is removed and after the setting time has elapsed (see Figure 2 and Figure 6)

NOTE Effects of subsequent operating or retriggering of the control signal should be declared by the manufacturer.

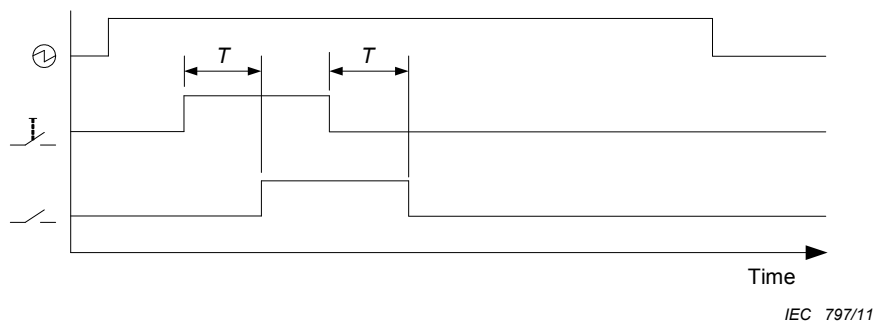


Figure 6 – On- and off-delay relay with control signal

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

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3.2.5**flasher relay
repeat cycle relay**

time relay in which the output periodically switches on and off as long as the power supply or control signal is applied (see Figure 2 and Figure 7)

NOTE 1 Depending on the relay type, the output starts with "pulse on" or "pulse off".

NOTE 2 Flasher relay may also be initiated with a control signal.

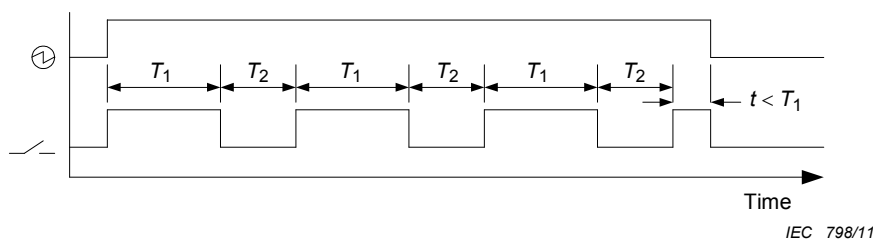


Figure 7 – Flasher relay

[IEC 60050-445:2010, 445-01-06]

3.2.6**symmetrical flasher relay
symmetrical repeat cycle relay**

flasher relay in which the output periodically switches on and off with substantially identical durations of pulse on time and pulse off time

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

3.2.7**asymmetrical flasher relay
asymmetrical repeat cycle relay**

flasher relay in which the pulse on time and pulse off time are selectable separately