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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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.
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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.

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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.

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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)*

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

IEC 62314:~~2006~~2022, *Solid-state relays – Safety requirements*

CISPR 11:~~2009~~2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
~~Amendment 1 (2010)~~
CISPR 11:2015/AMD1:2016
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~~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*

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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

IEC 61812-1:2023-06(en-fr)

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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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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.
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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.

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

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 mm^2 à 35 mm^2 (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*