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INTERNATIONAL STANDARD

colour inside

Electrical installations in ships –
Part 504: ~~Special features~~ –
Automation, control and instrumentation

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL INSTALLATIONS IN SHIPS –

Part 504: ~~Special features –~~ Automation, control and instrumentation

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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This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60092-504 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

This fourth edition cancels and replaces the third edition published in 2001. This edition constitutes a technical revision.

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

a) the part title has been changed, the term “Automation” was added;
b) the contents of the corrigendum of January 2011 have been included;
c) a new subclause 5.1 “General” with general requirements for type testing has been added;
d) Table 1 contents aligned with current version of document IACS Req. 1991/Rev. 5, 2006;
e) the revised IMO Resolution A.1021(26), Code on alerts and indicators:2009 has been taken into account;
f) IMO Resolution MSC.302(87) has been taken into account. As a consequence, the term “alert” has been used where the generic term applies. This concerns, in particular, the text in 8.4 and 9.3;
g) a new subclause 8.2.4: The revised IMO Resolution MSC.145(77), Performance standards for water level detectors on bulk carriers:2003 has been taken into account;
h) subclause 9.1 about fire detection and alarm systems has been completely revised, IMO Resolution MSC.98(73) (FSS Code) with amendment MSC.292(87): 2010 has been taken into account;
i) a new subclause 9.2 “Bilge systems” has been added;
j) the subclauses 9.4 “Automatic control installations for electrical power supply” and 9.5 “Automatic starting installations for electrical motor-driven auxiliaries” have been completely revised;
k) Clause 10 “Computer based systems” has been completely revised;
l) a new subclause 10.3.6 about wireless data communication has been added;
m) a new subclause 10.5 about remote access has been added.

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

FDIS	Report on voting
18/1539/FDIS	18/1545/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 60092 series, under the general title *Electrical installations in ships,* can be found 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 website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

IMPORTANT – The "colour inside" logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

INTRODUCTION

IEC 60092 forms a series of international standards ~~intended to ensure safety in the design, selection, installation, maintenance and use of electrical equipment for the generation, storage, distribution and utilization of electrical energy for all purposes~~ for electrical installations in sea-going ships, incorporating good practice and coordinating, as far as possible, existing rules.

~~This part of IEC 60092 also incorporates and co-ordinates, as far as possible, existing rules and forms a code of interpretation, where applicable, of the requirements of the International Maritime Organization, and serves as~~ These standards form a code of practical interpretation and amplification of the requirements of the International Convention for the Safety of Life at Sea, a guide for future regulations which may be prepared and a statement of practice for use by ship owners, shipbuilders and appropriate organizations~~, and by constructors and appropriate organizations~~.

~~This standard is based on equipment and practices which are in current use, but it is not intended in any way to impede development of new or improved techniques.~~

ELECTRICAL INSTALLATIONS IN SHIPS –

Part 504: ~~Special features –~~ Automation, control and instrumentation

1 Scope

This part of IEC 60092 ~~deals with~~ specifies electrical, electronic and programmable equipment intended for automation, control, monitoring, ~~alarm~~ alert, and safety and protection systems for use in ships.

2 Normative references

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

IEC 60050 (all parts), *International Electrotechnical Vocabulary (IEV)* (available at www.electropedia.org)

IEC 60068-2-1, *Environmental testing – Part 2: Tests – Test~~s~~ A: Cold*

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

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

IEC 60068-2-30, *Environmental testing – Part 2: Tests – Test~~s~~ Db ~~and guidance~~: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-52, *Environmental testing – Part 2: Tests – Test~~s~~ Kb: Salt mist, cyclic (sodium chloride solution)*

~~IEC 60092 (all parts), *Electrical installations in ships*~~

IEC 60092-101:1994, *Electrical installations in ships – Part 101: Definitions and general requirements*
IEC 60092-101:1994/AMD1:1995

IEC 60092-201:1994, *Electrical installations in ships – Part 201: System design – General*

IEC 60092-202, *Electrical installations in ships – Part 202: System design – Protection*

~~IEC 60092-204, *Electrical installations in ships – Part 204: System design – Electric and electrohydraulic steering gear*~~

IEC 60092-302, *Electrical installations in ships – Part 302: Low-voltage switchgear and controlgear assemblies*

~~IEC 60092-375, *Electrical installations in ships. Shipboard telecommunication cables and radio-frequency cables. General instrumentation, control and communication cables*~~

~~IEC 60092-376, *Electrical installations in ships – Part 376: Shipboard multicore cables for control circuits*~~

~~IEC 60092-401, *Electrical installations in ships – Part 401: Installation and test of completed installation*~~

IEC 60092-501, *Electrical installations in ships – Part 501: Special features – Electric propulsion plant*

IEC 60092-502, *Electrical installations in ships – Part 502: Tankers – Special features*

IEC 60447, *Basic and safety principles for man-machine interface ~~(MMI)~~, marking and identification – Actuating principles*

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

IEC 60533, *Electrical and electronic installations in ships – Electromagnetic compatibility (EMC) – Ships with a metallic hull*

IEC 60945, *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and ~~measurement~~ measuring techniques – Electrostatic discharge immunity test. ~~Basic EMC Publication~~*

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

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

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

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

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

IEC 61355-1, *Classification and designation of documents for plants, systems and equipment – Part 1: Rules and classification tables*

IEC 62443 (all parts), *Industrial communication networks – Network and system security*

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CISPR 16-1-1, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*

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EN 54 (all parts), *Fire detection and fire alarm systems*

~~IMO Assembly Resolution A.830 (19)1995, *Code on Alarms and Indicators* [1]~~

IMO Resolution A.1021(26):2009, *Code on alerts and Indicators*

~~NOTE Other informative IMO documents are referenced within the text of this standard.~~

IMO Resolution MSC.302(87):2010, *Adoption of performance standards for bridge alert management (BAM)*

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SOLAS, *International Convention for the Safety of Life at Sea (SOLAS):1974, consolidated edition, 2009*

~~[1] See IMO 867E:1996, *Code on Alarms and Indicators*, 1995~~

IEC 60092-504

Edition 4.0 2016-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electrical installations in ships – Part 504: Automation, control and instrumentation

Installations électriques à bord des navires – Partie 504: Automatisation, commande et instrumentation

IEC 60092-504:2016-09(en-fr)

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Part 504: Automation, control and instrumentation

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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INSTALLATIONS ÉLECTRIQUES À BORD DES NAVIRES –

Partie 504: Automatisation, commande et instrumentation

AVANT-PROPOS

1) La Commission Electrotechnique 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. A 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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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.
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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.
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 et de ne pas avoir signalé leur existence.

La Norme internationale IEC 60092-504 a été établie par le comité d'études 18 de l'IEC: Installations électriques des navires et des unités mobiles et fixes en mer.

Cette quatrième édition annule et remplace la troisième édition parue en 2001. Cette édition constitue une révision technique.

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

a) le titre de la partie a été modifié avec addition du terme "Automatisation";
b) le contenu du corrigendum de janvier 2011 a été intégré;
c) un nouveau paragraphe 5.1 "Généralités" contenant les exigences générales applicables aux essais de type a été ajouté;

d) le Tableau 1 a été aligné sur la dernière version du document IACS Req. 1991/Rev. 5, 2006;

e) la version révisée de la Résolution OMI A.1021(26), Recueil de règles relatives aux alertes et aux indicateurs:2009, a été prise en compte;

f) la Résolution OMI MSC.302(87) a été prise en compte. Par conséquent, le terme "alerte" a été utilisé lorsqu'il est question du terme générique. Cela concerne notamment le texte de 8.4 et 9.3;

g) un nouveau paragraphe 8.2.4: la version révisée de la Résolution OMI MSC.145(77) Normes de fonctionnement des détecteurs de niveau d'eau à bord des vraquiers: 2003 a été pris en compte;

h) le paragraphe 9.1 relatif aux systèmes de détection et d'alarme d'incendie a été entièrement révisé; la Résolution OMI MSC.98(73) (Recueil FSS) et son amendement MSC.292(87): 2010 ont été pris en compte;

i) un nouveau paragraphe 9.2 "Systèmes de cales" a été ajouté;

j) le paragraphe 9.4 "Installations de commande automatique pour alimentation électrique" et le paragraphe 9.5 "Installations de démarrage automatique pour systèmes auxiliaires à motorisation électrique" ont été intégralement révisés;

k) l'Article 10 "Systèmes informatiques" a été intégralement révisé;

l) un nouveau paragraphe 10.3.6 "Communication de données sans fil" a été ajouté;

m) un nouveau paragraphe 10.5 "Accès à distance" a été ajouté.

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
18/1539/FDIS	18/1545/RVD

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

Cette publication a été rédigée selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 60092, publiées sous le titre général *Installations électriques à bord des navires,* peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de cette publication ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives à la publication recherchée. A cette date, la publication sera

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- amendée.

INTRODUCTION

L'IEC 60092 constitue une série de Normes internationales applicables aux installations électriques des navires maritimes, qui rassemblent les bonnes pratiques et coordonnent, dans la mesure du possible, les règles en place.

Lesdites normes forment un code d'interprétation pratique et de précision des exigences de la Convention internationale pour la sauvegarde de la vie humaine en mer, un guide destiné aux règlements qui pourront être préparés ultérieurement et un énoncé des pratiques à l'usage des propriétaires, des constructeurs de navires et des organismes appropriés.

INSTALLATIONS ÉLECTRIQUES À BORD DES NAVIRES –

Partie 504: Automatisation, commande et instrumentation

1 Domaine d'application

La présente partie de l'IEC 60092 définit les équipements électriques, électroniques et programmables destinés aux systèmes d'automatisation, de commande, de surveillance, d'alerte, et de sécurité et de protection utilisés à bord des navires.

2 Références normatives

Les documents suivants sont cités en référence de manière normative, en intégralité ou en partie, dans le présent document et sont indispensables pour son application. 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 (toutes les parties), *Vocabulaire électrotechnique international (VEI)* (disponible sous www.electropedia.org)

IEC 60068-2-1, *Essais d'environnement – Partie 2-1: Essais – Essai A: Froid*

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

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

IEC 60068-2-30, *Essais d'environnement – Partie 2-30: Essais – Essai Db: Essai cyclique de chaleur humide (cycle de 12 h + 12 h)*

IEC 60068-2-52, *Essais d'environnement – Partie 2-52: Essais – Essai Kb: Brouillard salin, essai cyclique (solution de chlorure de sodium)*

IEC 60092-101:1994, *Installations électriques à bord des navires – Partie 101: Définitions et prescriptions générales*
IEC 60092-101:1994/AMD1:1995

IEC 60092-201:1994, *Installations électriques à bord des navires – Partie 201: Conception des systèmes – Généralités*

IEC 60092-202, *Installations électriques à bord des navires – Partie 202: Conception des systèmes – Protection*

IEC 60092-302, *Installations électriques à bord des navires – Partie 302: Ensembles d'appareillage à basse tension*

IEC 60092-501, *Electrical installations in ships – Part 501: Special features – Electric propulsion plant* (disponible en anglais seulement)

IEC 60092-502, *Electrical installations in ships – Part 502: Tankers – Special features* (disponible en anglais seulement)

IEC 60447, *Principes fondamentaux et de sécurité pour l'interface homme-machine, le marquage et l'identification – Principes de manœuvre*

IEC 60529, *Degrés de protection procurés par les enveloppes (Code IP)*

IEC 60533, *Electrical and electronic installations in ships – Electromagnetic compatibility (EMC) – Ships with a metallic hull* (disponible en anglais seulement)

IEC 60945, *Matériels et systèmes de navigation et de radiocommunication maritimes – Spécifications générales – Méthodes d'essai et résultats exigibles*

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

IEC 61000-4-3, *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, *Compatibilité électromagnétique (CEM) – Partie 4-4: Techniques d'essai et de mesure – Essai 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 61000-4-6, *Compatibilité électromagnétique (CEM) – Partie 4-6: Techniques d'essai et de mesure – Immunité aux perturbations conduites, induites par les champs radioélectriques*

IEC 61000-4-11, *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*

IEC 61355-1, *Classification et désignation des documents pour installations industrielles, systèmes et matériels – Partie 1: Règles et tableaux de classification*

IEC 62443 (toutes les parties), *Réseaux industriels de communication – Sécurité dans les réseaux et les systèmes*

Publication ABS, *Guidance notes on the application of ergonomics to marine systems (02-2014)* (disponible en anglais seulement)

CISPR 16-1-1, *Spécification des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Partie 1-1: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Appareils de mesure*

CISPR 16-2-1, *Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Partie 2-1: Méthodes de mesure des perturbations et de l'immunité – Mesures des perturbations conduites*

EN 54 (toutes les parties), *Systèmes de détection et d'alarme incendie*

Résolution OMI A.1021(26):2009, *Recueil de règles relatives aux alertes et aux indicateurs*

Résolution OMI MSC.302(87):2010, *Adoption de la recommandation sur les normes de performance pour la gestion des alertes à la passerelle (BAM)*

Résolution OMI A.813(19):1995, *Prescriptions générales relatives à la compatibilité électromagnétique de tous les équipements électriques et électroniques des navires*

Résolution OMI MSC.98(73):2000, *Adoption du recueil international des règles applicables aux systèmes de protection contre l'incendie (recueil FSS)*

SOLAS, *Convention internationale pour la sauvegarde de la vie humaine en mer (SOLAS, Safety Of Life At Sea):1974, édition consolidée, 2009*