

© Copyright SEK. Reproduction in any form without permission is prohibited.

Elinstallationer i fartyg – Del 201: Systemuppbyggnad – Allmänt

*Electrical installations in ships –
Part 201: System design –
General*

Denna svenska standard innehåller den engelska texten i nedan angiven IEC-publikation, utarbetad inom International Electrotechnical Commission, IEC:

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

Nationellt förord

Tidigare fastställd svensk standard SS-IEC 92, utgåva 4, 1995, gäller ej fr o m 2017-11-23.

ICS 47.020.60

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinhålllet** i standarden.
Postadress: Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00.
E-post: sek@elstandard.se. Internet: www.elstandard.se

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

CONTENTS

	Page
FOREWORD.....	7
INTRODUCTION	13
 Clause	
1 Scope	15
SECTION 1: DEFINITIONS	
2 Definitions.....	17
SECTION 2: SAFETY ASPECTS	
3 General	21
SECTION 3: DISTRIBUTION SYSTEMS	
4 D.C. distribution systems.....	21
5 A.C. distribution systems.....	23
SECTION 4: SOURCES OF ELECTRICAL POWER	
6 Sources of electrical power for auxiliary services.....	27
SECTION 5: DISTRIBUTION SYSTEM REQUIREMENTS	
7 General	37
8 Methods of distribution	37
9 Balance of loads	39
10 Single-wire systems with hull return	39
11 Final sub-circuits	41
12 Socket-outlets	45
13 Lighting circuits in machinery spaces, accommodation spaces, cargo spaces, etc.	45
14 Shore connections	45
15 Navigation lights	47
16 Radio installations.....	47
17 Submersible, permanently installed bilge-pumps	47
18 Motor circuits	49
19 Luminaires	51
20 Internal communication circuits	51

SECTION 6: DIVERSITY (DEMAND) FACTORS

Clause	Page
21 Final sub-circuits	53
22 Circuits other than final sub-circuits	53
23 Application of diversity (demand) factors	53
24 Motive-power circuits - General	53
25 Cargo handling winch and crane circuits	55

SECTION 7: DEGREES OF PROTECTION

26 General	57
------------------	----

SECTION 8: CABLES

27 Choice of cables	57
28 Choice of insulation	57
29 Choice of protective coverings	61
30 Cables for fire alarm, fire detection and emergency fire extinguishing services.....	63
31 Determination of the cross-sectional areas of conductors	63
32 Current ratings for continuous service	65
33 Correction factors for different ambient air temperatures	65
34 Correction factors for cable grouping	67
35 Correction factors for non-continuous services	71
36 Voltage drop	71
37 Parallel connection of cables	73
38 Separation of circuits	73
39 Short-circuit capacity	73
40 Cables in refrigeration spaces	73
 Figures	 76

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL INSTALLATIONS IN SHIPS -**Part 201: System design - General****FOREWORD**

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. 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. The 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 the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

This part of International Standard IEC 92 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

It forms the fourth edition of IEC 92-201, cancels and replaces the third edition, published in 1980, and its amendment No. 5 (1990); it is in line with the International Convention for the safety of life at sea.

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

DIS	Report on voting
18A(C0)74	18A(C0)83

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

IEC 92 consists of the following parts, under the general title: *Electrical installations in ships*:

IEC 92-101: 1980, *Part 101: Definitions and general requirements*

IEC 92-201: 199X, *Part 201: System design - General*

IEC 92-202: 1980, *Part 202: System design - Protection*

IEC 92-203: 1985, *Part 203: System design - Acoustic and optical signals*

IEC 92-204: 1987, *Part 204: System design - Electric and electrohydraulic steering gear*

IEC 92-301: 1980, *Part 301: Equipment - Generators and motors*

IEC 92-302: 1980, *Part 302: Equipment - Switchgear and controlgear assemblies*

IEC 92-303: 1980, *Part 303: Equipment - Transformers for power and lighting*

IEC 92-304: 1980, *Part 304: Equipment - Semiconductor convertors*

IEC 92-305: 1980, *Part 305: Equipment - Accumulator (storage) batteries*

IEC 92-306: 1980, *Part 306: Equipment - Luminaires and accessories*

IEC 92-307: 1980, *Part 307: Equipment - Heating and cooking appliances*

IEC 92-350: 1988, *Part 350: Low-voltage shipboard power cables - General construction and test requirements*

IEC 92-351: 1983, *Part 351: Insulating materials for shipboard power cables*

IEC 92-352: 1979, *Part 352: Choice and installation of cables for low-voltage power systems*

IEC 92-353: 1988, *Part 353: Single and multicore cables with extruded solid insulation for rated voltages 0,6/1 kV*

IEC 92-359: 1987, *Part 359: Sheathing materials for shipboard power and telecommunication cables*

IEC 92-373: 1977, *Part 373: Shipboard telecommunication cables and radio-frequency cables - Shipboard flexible coaxial cables*

IEC 92-374: 1977, *Part 374: Shipboard telecommunication cables and radio-frequency cables - Telephone cables for non-essential communication services*

IEC 92-375: 1977, *Part 375: Shipboard telecommunication cables and radio-frequency cables - General instrumentation, control and communication cables*

IEC 92-376: 1983, *Part 376: Shipboard multicore cables for control circuits*

IEC 92-401: 1980, *Part 401: Installation and test of completed installation*

IEC 92-501: 1984, *Part 501: Special features - Electric propulsion plant*

IEC 92-502: 1980, *Part 502: Special features - Tankers*

IEC 92-503: 1975, *Part 503: Special features - A.C. supply systems with voltages in the range above 1 kV up to and including 11 kV*

IEC 92-504: 1974, *Part 504: Special features - Control and instrumentation*

IEC 92-504A: 1977, *First supplement: Specific control and instrumentation installations*

IEC 92-505: 1984, *Part 505: Special features - Mobile offshore drilling units*

INTRODUCTION

IEC 92: *Electrical installations in ships*, forms a series of international standards for electrical installations in sea-going ships, incorporating good practice and co-ordinating as far as possible existing rules.

These standards form a code of practical interpretation and amplification of the requirements of the International Convention on Safety of Life at Sea, a guide for future regulations which may be prepared and a statement of practice for use by shipowners, shipbuilders and appropriate organizations.

ELECTRICAL INSTALLATIONS IN SHIPS -**Part 201: System design - General****1 Scope**

This standard is applicable to the main features of system design of electrical installations for use in ships.

1.1 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 92. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 92 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 79-0: 1983, *Electrical apparatus for explosive gas atmospheres - Part 0: General requirements*

Amendment No. 2 (1991)

IEC 92-101: 1980, *Electrical installations in ships - Part 101: Definitions and general requirements*

Amendment No. 2 (1987)

IEC 92-401: 1980, *Electrical installations in ships - Part 401: Installation and test of completed installation*

Amendment No. 1 (1987)

IEC 92-502: 1980, *Electrical installations in ships - Part 502: Special features - Tankers*

IEC 92-503: 1975, *Electrical installations in ships - Part 503: Special features - A.C. supply systems with voltages in the range above 1 kV up to and including 11 kV*

IEC 331: 1970, *Fire-resisting characteristics of electric cables*

IEC 332: XXX, *Tests on electric cables under fire conditions*

IEC 529: 1989, *Degrees of protection provided by enclosures (IP codes)*