STANDARDISERINGEN I SVERIGE
SWEDISH INSTITUTE FOR STANDARDS

SVENSK STANDARD SS-EN 60204-32

Handläggande organ	Fastställd	Utgåva	Sida	Ingår i
Svenska Elektriska Kommissionen, SEK	1999-02-26	1	1 (1+113)	SEK Översikt 44
				Reg 436 04 15

Maskinsäkerhet – Maskiners elutrustning – Del 32: Särskilda fordringar på maskiner för lyftning

Safety of machinery – Electrical equipment of machines – Part 32: Requirements for hoisting machines

Som svensk standard gäller europastandarden EN 60204-32:1998. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60204-32:1998.

Nationellt förord

Europastandarden EN 60204-32:1998

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC

– **IEC 60204-32, First edition, 1998 - Safety of machinery - Electrical equipment of machines - Part 32: Requirements for hoisting machines**

utarbetad inom International Electrotechnical Commission, IEC.

Denna standard ersätter SS-EN 60204-1 vad gäller maskiner för lyftning.

ICS 29.020; 53.020.01

Standarder kan beställas hos SIS som även lämnar allmänna upplysningar om svensk och utländsk standard.
Postadress: SIS, Box 6455, 113 82 STOCKHOLM
Telefon: 08 - 610 30 00. *Telefax*: 08 - 30 77 57

Upplysningar om **sakinnehållet** i standarden lämnas av SEK.
Telefon: 08 - 444 14 00. *Telefax*: 08 - 444 14 30

Prisgrupp V

Tryckt i april 1999

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60204-32

October 1998

ICS 29.020; 53.020.01

Descriptors: Electrical equipment, hoisting machine, control and operation, tests, definitions, rules for electrical safety

English version

Safety of machinery - Electrical equipment of machines Part 32: Requirements for hoisting machines (IEC 60204-32:1998)

Sécurité des machines - Equipement électrique des machines
Partie 32: Prescriptions pour les appareils de levage
(CEI 60204-32:1998)

Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen
Teil 32: Anforderungen für Hebezeuge
(IEC 60204-32:1998)

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 60204-32:1998 E

Foreword

The text of document 44/228/FDIS, future edition 1 of IEC 60204-32, prepared by IEC TC 44, Safety of machinery - Electrotechnical aspects, in co-operation with IEC TC 64, Electrical installations of buildings, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60204-32 on 1998-10-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1999-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2001-07-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annexes A, B, C and D are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60204-32:1998 was approved by CENELEC as a European Standard without any modification.

In the official version, for annex D, Bibliography, the following note has to be added for the standard indicated:

IEC 60870-5-1	NOTE: Harmonized as EN 60870-5-1:1993 (not modified).

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60034-1 (mod)	1996	Rotating electrical machines Part 1: Rating and performance	EN 60034-1	1998
IEC 60034-5	1991[1)]	Part 5: Classification of degrees of protection provided by enclosures of rotating electrical machines (IP code)	-	-
IEC 60034-11	1978	Part 11: Built-in thermal protection	-	-
IEC 60050(191)	1990	International Electrotechnical Vocabulary (IEV) Chapter 191: Dependability and quality of service	-	-
IEC 60050(441)	1984	Chapter 441: Switchgear, controlgear and fuses	-	-
IEC 60050(826)	1982	Chapter 826: Electrical installations of buildings	HD 384.2 S1	1986
IEC 60072-1	1991	Dimensions and output series for rotating electrical machines Part 1: Frame numbers 56 to 400 and flange numbers 55 to 1080	-	-
IEC 60072-2	1990	Part 2: Frame numbers 355 to 1000 and flange numbers 1180 to 2360	-	-
IEC 60073	1996	Basic and safety principles for man-machine interface, marking and identification Coding principles for indication devices and actuators	EN 60073	1996
IEC 60076-5 (mod)	1976	Power transformers Part 5: Ability to withstand short-circuit	HD 398.5 S1	1983

1) IEC 60034-5:1981, mod. is harmonized as EN 60034-5:1986.

Publication	Year	Title	EN/HD	Year
IEC 60146	series	General requirements and line commutated convertors	EN 60146	series
IEC 60309-1 (mod) + corr. March	1988 1992	Plugs, socket-outlets and couplers for industrial purposes Part 1: General requirements	EN 60309-1[2]	1992
IEC 60332-1	1993	Tests on electric cables under fire conditions Part 1: Test on a single vertical insulated wire or cable	-	-
IEC 60364-3 (mod)	1993	Electrical installations of buildings Part 3: Assessment of general characteristics	HD 384.3 S2	1995
IEC 60364-4-41 (mod)	1992	Part 4: Protection for safety Chapter 41: Protection against electric shock	HD 384.4.41 S2	1996
IEC 60364-4-46 (mod)	1981	Part 4: Protection for safety Chapter 46: Isolation and switching	HD 384.4.46 S1	1987
IEC 60364-4-47 (mod)	1981	Part 4: Protection for safety Chapter 47: Application of protective measures for safety - Section 470: General Section 471: Measures of protection against electric shock	HD 384.4.47 S2[3]	1995
IEC 60364-4-473 (mod)	1977	Part 4: Protection for safety Chapter 47: Application of protective measures for safety Section 473: Measures of protection against overcurrent	HD 384.4.473 S1	1980
IEC 60364-4-481	1993	Part 4: Protection for safety Chapter 48: Choice of protective measures as a function of external influences Section 481: Selection of measures for protection against electric shock in relation to external influences	-	-
IEC 60364-5-54 (mod)	1980	Part 5: Selection and erection of electrical equipment -- Chapter 54: Earthing arrangements and protective conductors	HD 384.5.54 S1	1988
IEC 60364-5-523 (mod)	1983	Part 5: Selection and erection of electrical equipment -- Chapter 52: Wiring systems Section 523: Current-carrying capacities	HD 384.5.523 S1	1991

2) EN 60309-1 is superseded by EN 60309-1:1997, which is based on IEC 60309-1:1997.

3) HD 384.4.47 S2 includes A1:1993 to IEC 60364-4-47.

Publication	Year	Title	EN/HD	Year
IEC 60364-6-61 (mod)	1986	Part 6: Verification Chapter 61: Initial verification	HD 384.6.61 S1	1992
IEC 60417-2	1998	Graphical symbols for use on equipment Part 2: Symbol originals	-	-
IEC 60439-1 + corr. December	1992 1993	Low-voltage switchgear and controlgear assemblies Part 1: Type-tested and partially type-tested assemblies	EN 60439-1 + corr. August + corr. December + A11	1994 1997 1997 1996
IEC 60445	1988	Identification of equipment terminals and of terminations of certain designated conductors, including general rules for an alphanumeric system	EN 60445	1990
IEC 60446	1989[4]	Identification of conductors by colours or numerals	-	-
IEC 60447	1993	Man-machine interface (MMI) - Actuating principles	EN 60447	1993
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993
IEC 60536	1976	Classification of electrical and electronic equipment with regard to protection against electric shock	HD 366 S1	1977
IEC 60617	series	Graphical symbols for diagrams	EN 60617	series
IEC 60621-3	1979	Electrical installations for outdoor sites under heavy conditions (including open- cast mines and quarries) Part 3: General requirements for equipment and ancillaries	-	-
IEC 60664-1 (mod)	1992	Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests	HD 625.1 S1 + corr. November	1996 1996
IEC 60742 (mod)	1983	Isolating transformers and safety isolating transformers - Requirements	EN 60742[5]	1995
IEC 60757	1983	Code for designation of colours	HD 457 S1	1985
IEC 60947-2	1995	Low-voltage switchgear and controlgear Part 2: Circuit-breakers	EN 60947-2 + corr. June	1996 1997

4) IEC 60446:1973 is harmonized as HD 324 S1:1997.

5) EN 60742 includes A1:1992 to IEC 60742.

Publication	Year	Title	EN/HD	Year
IEC 60947-3 (mod) + corr. December	1990 1991	Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	EN 60947-3 + corr. June	1992 1997
IEC 60947-4-1	1990	Part 4: Contactors and motor-starters Section 1: Electromechanical contactors and motor-starters	EN 60947-4-1 + corr. June	1992 1997
IEC 60947-5-1	1997	Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices	EN 60947-5-1 + A11	1997 1997
IEC 60947-7-1	1989	Part 7: Ancillary equipment Section 1: Terminal blocks for copper conductors	EN 60947-7-1 + corr. June + A11	1991 1997 1997
IEC 61082-1	1991	Preparation of documents used in electrotechnology Part 1: General requirements	EN 61082-1	1993
IEC 61082-2	1993	Part 2: Function-oriented diagrams	EN 61082-2	1994
IEC 61082-3	1993	Part 3: Connection diagrams, tables and lists	EN 61082-3	1994
IEC 61082-4	1996	Part 4: Location and installation documents	EN 61082-4	1996
IEC 61131-1	1992	Programmable controllers Part 1: General information	EN 61131-1	1994
IEC 61131-2	1992	Part 2: Equipment requirements and tests	EN 61131-2 + A11 + corr. December	1994 1996 1997
IEC 61346-1	1996	Industrial systems, installations and equipment and industrial products Structuring principles and reference designations Part 1: Basic rules	EN 61346-1	1996
ISO 3864	1984	Safety colours and safety signs	-	-
ISO 7000	1989	Graphical symbols for use on equipment - Index and synopsis	-	-
ISO/TR 12100-1	1992	Safety of machinery - Basic concepts, general principles for design Part 1: Basic terminology, methodology	-	-
ISO 13852	1996	Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs	-	-

CONTENTS

Clause Page

Page

Tables

Figures

Annexes

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY OF MACHINERY – ELECTRICAL EQUIPMENT OF MACHINES –

Part 32: Requirements for hoisting machines

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 co-operation 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 express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
3) The documents produced have the form of recommendations for international use and are 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.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60204-32 has been prepared by IEC technical committee 44: Safety of machinery – Electrotechnical aspects, in co-operation with IEC technical committee 64: Electrical installations of buildings.

This edition incorporates material from the fourth edition of IEC 60204-1.

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

FDIS	Report on voting
44/228/FDIS	44/235/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.

Annexes A, B, C and D are informative.

The following differences exist in some countries:

- 4.3.1: The voltage characteristics of electricity supplied by public distribution systems are given in EN 50160:1994, *Voltage characteristics of electricity supplied by public distribution systems* (Europe);
- 7.2.3: Disconnection of the neutral conductor is mandatory in a TN-S system (France);
- 10.7.2: The use of non-latching emergency stop devices in conjunction with separate reset devices is considered acceptable practice (USA);
- 13.6, table 6: Cross-sectional area is specified according to American Wire Gauge (AWG) (USA);
- 14.2.2: For the protective conductor, the colour identification GREEN (with or without YELLOW stripes) is used as equivalent to the bicolour combination GREEN-AND-YELLOW (USA and Canada);
- 14.2.3: The colour identification WHITE or NATURAL GREY is used for earthed neutral conductors instead of the colour identification LIGHT BLUE (USA and Canada);
- 14.2.4: The colour YELLOW is used instead of ORANGE for that purpose (USA).

INTRODUCTION

This part of IEC 60204 provides requirements and recommendations relating to the electrical equipment of hoisting machines so as to promote:

- safety of persons and property;
- consistency of control response;
- ease of maintenance.

High performance is not to be obtained at the expense of the essential factors mentioned above.

Figures 1 and 2 have been provided as an aid to the understanding of the interrelationship of the various elements of a hoisting machine and its associated equipment. Figure 1 is an overall block diagram of a typical material handling system (a group of cranes working together in a co-ordinated manner) and figure 2 is a block diagram of a typical crane and associated equipment showing the various elements of the electrical equipment addressed in this standard.

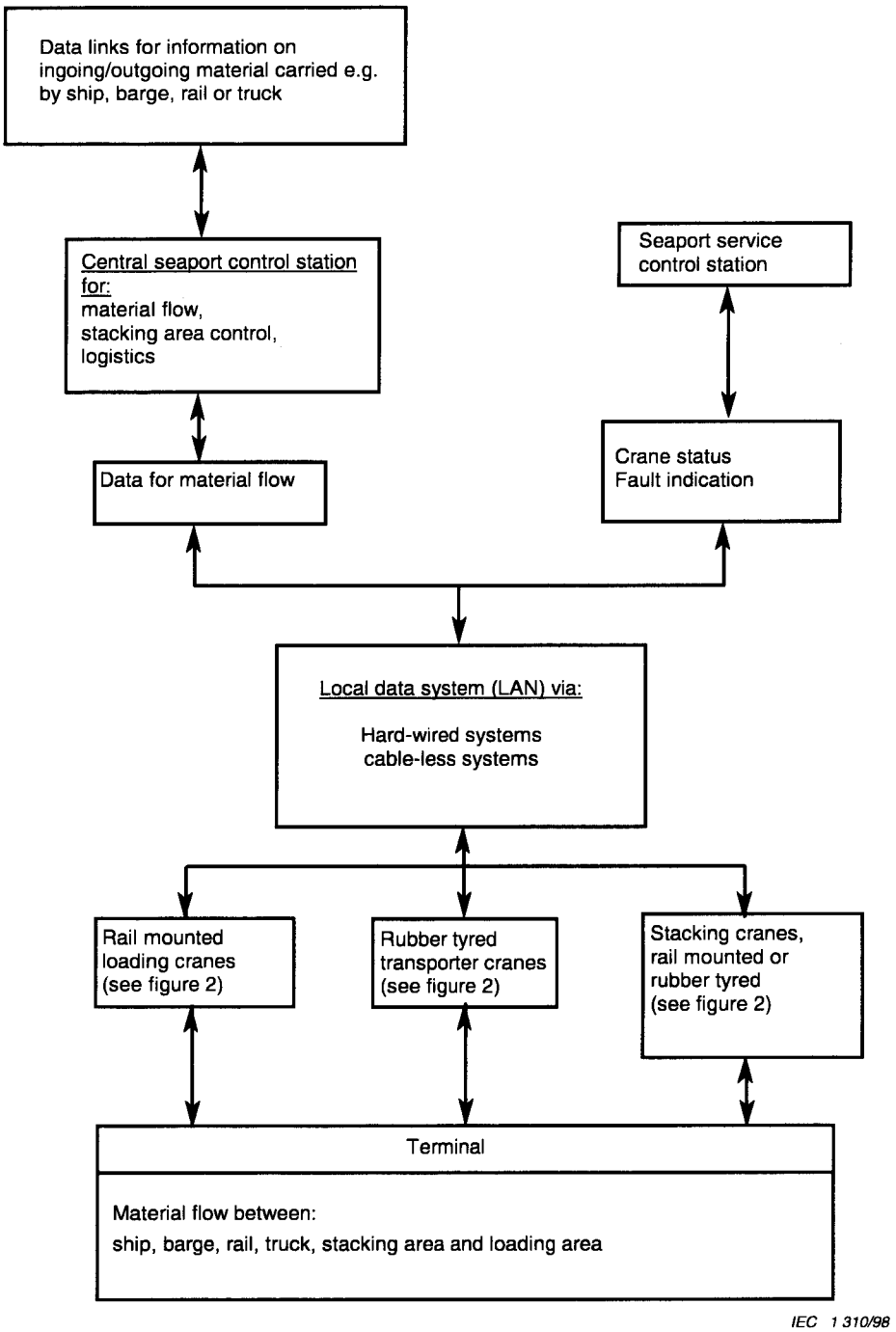

Figure 1 – Block diagram of combined working cranes in a typical material handling system in a seaport

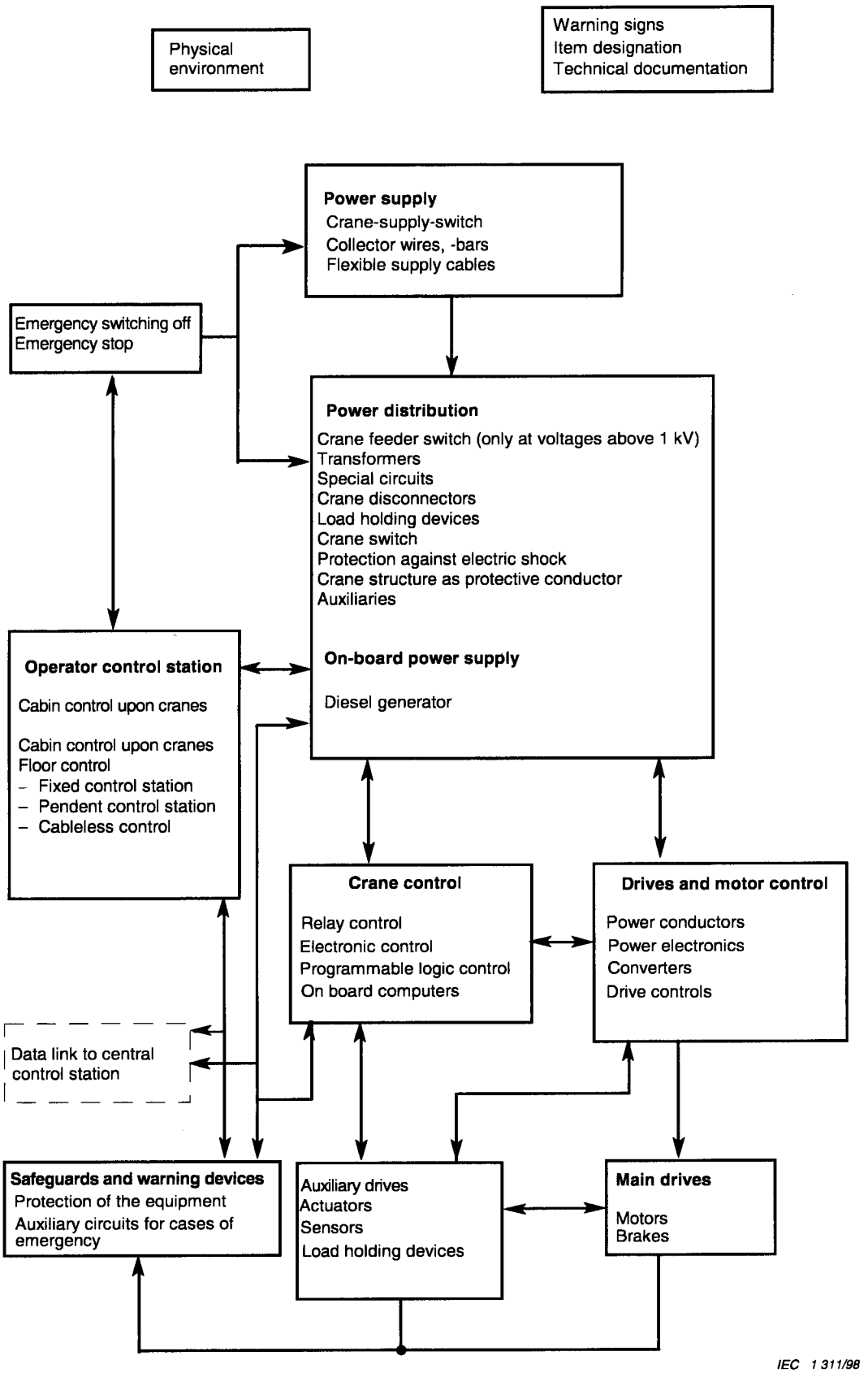

Figure 2 – Block diagram of a typical crane and its associated electrical equipment

SAFETY OF MACHINERY – ELECTRICAL EQUIPMENT OF MACHINES –

Part 32: Requirements for hoisting machines

1 Scope

This part of IEC 60204 applies to the application of electrical and electronic equipment and systems to hoisting machines and related equipment.

NOTE 1 – In this standard, the term *electrical* includes both electrical and electronic matters (i.e. *electrical equipment* means both the electrical and the electronic equipment).

NOTE 2 – In the context of this part, the term *person* refers to any individual and includes those persons who are assigned and instructed by the user or his agent(s) in the use and care of the hoisting machine in question.

The equipment covered by this standard commences at the point of connection of the supply to the electrical equipment of the hoisting machine (crane-supply-switch) including systems for power supply and control feeders situated outside of the hoisting machine, e.g. flexible cables or collector wires or collector bars (see figure 3).

NOTE 3 – For the requirements for the electrical supply installation in buildings, see IEC 60364.

This standard is applicable to equipment or parts of equipment not exceeding 1 000 V a.c. or 1 500 V d.c. between lines, and with nominal frequencies not exceeding 200 Hz.

NOTE 4 – Requirements for high voltage equipment are under consideration by IEC/TC 44 and IEC/TC 99.

Additional and special requirements can apply to the electrical equipment of hoisting machines that are used in potentially explosive and/or flammable atmospheres.

For the purposes of this standard, hoisting machines include cranes of all types, winches of all types, and storage and retrieval machines. The following product groups are included:

- overhead travelling cranes;
- mobile cranes;
- tower cranes;
- slewing luffing cranes;
- gantry cranes;
- offshore cranes;
- floating cranes;
- winches of all types;
- hoists and accessories;
- loader cranes;
- cable cranes;
- load holding devices;
- storage and retrieval machines;
- monorail hoists;
- straddle carriers;
- rubber tyred gantry cranes (RTGs).

The present part of IEC 60204 does not cover individual items of electrical equipment other than their selection for use and their erection.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60204. 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 60204 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 normative documents.

IEC 60034-1:1996, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-5:1991, *Rotating electrical machines – Part 5: Classification of degrees of protection provided by enclosures of rotating electrical machines (IP code)*

IEC 60034-11:1978, *Rotating electrical machines – Part 11: Built-in thermal protection*

IEC 60050(191):1990, *International Electrotechnical Vocabulary – Chapter 191: Dependability and quality of service*

IEC 60050(441):1984, *International Electrotechnical Vocabulary – Chapter 441: Switchgear, controlgear and fuses*

IEC 60050(826):1982, *International Electrotechnical Vocabulary – Chapter 826: Electrical installations of buildings*

IEC 60072-1:1991, *Dimensions and output series for rotating electrical machines – Part 1: Frame numbers 56 to 400 and flange numbers 55 to 1080*

IEC 60072-2:1990, *Dimensions and output series for rotating electrical machines – Part 2: Frame numbers 355 to 1000 and flange numbers 1180 to 2360*

IEC 60073:1996, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indication devices and actuators*

IEC 60076-5:1976, *Power transformers – Part 5: Ability to withstand short-circuit*

IEC 60146, *General requirements and line commutated convertors*

IEC 60309-1:1988, *Plugs, socket-outlets and couplers for industrial purposes – Part 1: General requirements*

IEC 60332-1:1993, *Tests on electric cables under fire conditions – Part 1: Test on a single vertical insulated wire or cable*

IEC 60364-3:1993, *Electrical installations of buildings – Part 3: Assessment of general characteristics*

IEC 60364-4-41:1992, *Electrical installations of buildings – Part 4: Protection for safety – Chapter 41: Protection against electric shock*

IEC 60364-4-46:1981, *Electrical installations of buildings – Part 4: Protection for safety – Chapter 46: Isolation and switching*

IEC 60364-4-47:1981, *Electrical installations of buildings – Part 4: Protection for safety – Chapter 47: Application of protective measures for safety – Section 470: General – Section 471: Measures of protection against electric shock*

IEC 60364-4-473:1977, *Electrical installations of buildings – Part 4: Protection for safety – Chapter 47: Application of protective measures for safety – Section 473: Measures of protection against overcurrent*

IEC 60364-4-481:1993, *Electrical installations of buildings – Part 4: Protection for safety – Chapter 48: Choice of protective measures as a function of external influences – Section 481: Selection of measures for protection against electric shock in relation to external influences*

IEC 60364-5-54:1980, *Electrical installations of buildings – Part 5: Selection and erection of electrical equipment – Chapter 54: Earthing arrangements and protective conductors*

IEC 60364-5-523:1983, *Electrical installations of buildings – Part 5: Selection and erection of electrical equipment – Chapter 52: Wiring systems – Section 523: Current-carrying capacities*

IEC 60364-6-61:1986, *Electrical installations of buildings – Part 6: Verification – Chapter 61: Initial verification*

IEC 60417-2:1998, *Graphical symbols for use on equipment – Part 2: Symbol originals*

IEC 60439-1:1992, *Low-voltage switchgear and controlgear assemblies – Part 1: Type-tested and partially type-tested assemblies*

IEC 60445:1988, *Identification of equipment terminals and of terminations of certain designated conductors including general rules of an alphanumeric system*

IEC 60446:1989, *Identification of conductors by colours or numerals*

IEC 60447:1993, *Man-machine interface (MMI) – Actuating principles*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60536:1976, *Classification of electrical and electronic equipment with regard to protection against electric shock*

IEC 60617, *Graphical symbols for diagrams*

IEC 60621-3:1979, *Electrical installations for outdoor sites under heavy conditions (including open-cast mines and quarries) – Part 3: General requirements for equipment and ancillaries*

IEC 60664-1:1992, *Insulation co-ordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60742:1983, *Isolating transformers and safety isolating transformers – Requirements*

IEC 60757:1983, *Code for designation of colours*

IEC 60947-2:1995, *Low-voltage switchgear and controlgear – Part 2: Circuit breakers*

IEC 60947-3:1990, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors, and fuse combination units*

IEC 60947-4-1:1990, *Low-voltage switchgear and controlgear – Part 4: Contactors and motor – starters – Section One: Electrotechnical contactors and motor-starters*

IEC 60947-5-1:1997, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical circuit devices*

IEC 60947-7-1:1989, *Low-voltage switchgear and controlgear – Part 7: Ancillary equipment – Section One – Terminal blocks for copper conductors*

IEC 61082-1:1991, *Preparation of documents used in electrotechnology – Part 1: General requirements*

IEC 61082-2:1993, *Preparation of documents used in electrotechnology – Part 2: Function – oriented diagrams*

IEC 61082-3:1993, *Preparation of documents used in electrotechnology – Part 3: Connection diagrams, tables and lists*

IEC 61082-4:1996, *Preparation of documents used in electrotechnology – Part 4: Location and installation documents*

IEC 61131-1:1992, *Programmable controllers – Part 1: General information*

IEC 61131-2:1992, *Programmable controllers – Part 2: Equipment requirements and tests*

IEC 61346-1:1996, *Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 1: Basic rules*

ISO 3864:1984, *Safety colours and safety signs*

ISO 7000:1989, *Graphical symbols for use on equipment – Index and synopsis*

ISO/TR 12100-1:1992, *Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology*

ISO 13852:1996, *Safety of machinery – Safety distances to prevent danger zones being reached by the upper limbs*